No. 792,174. PATENTED JUNE 13, 1905.

C. W. SQUIRES.

ELECTRIC RAILWAY SWITCH OPERATING DEVICE.

APPLICATION FILED MAY 16, 1904.

4 SHEETS—SHEET 1.

Fig. 1.

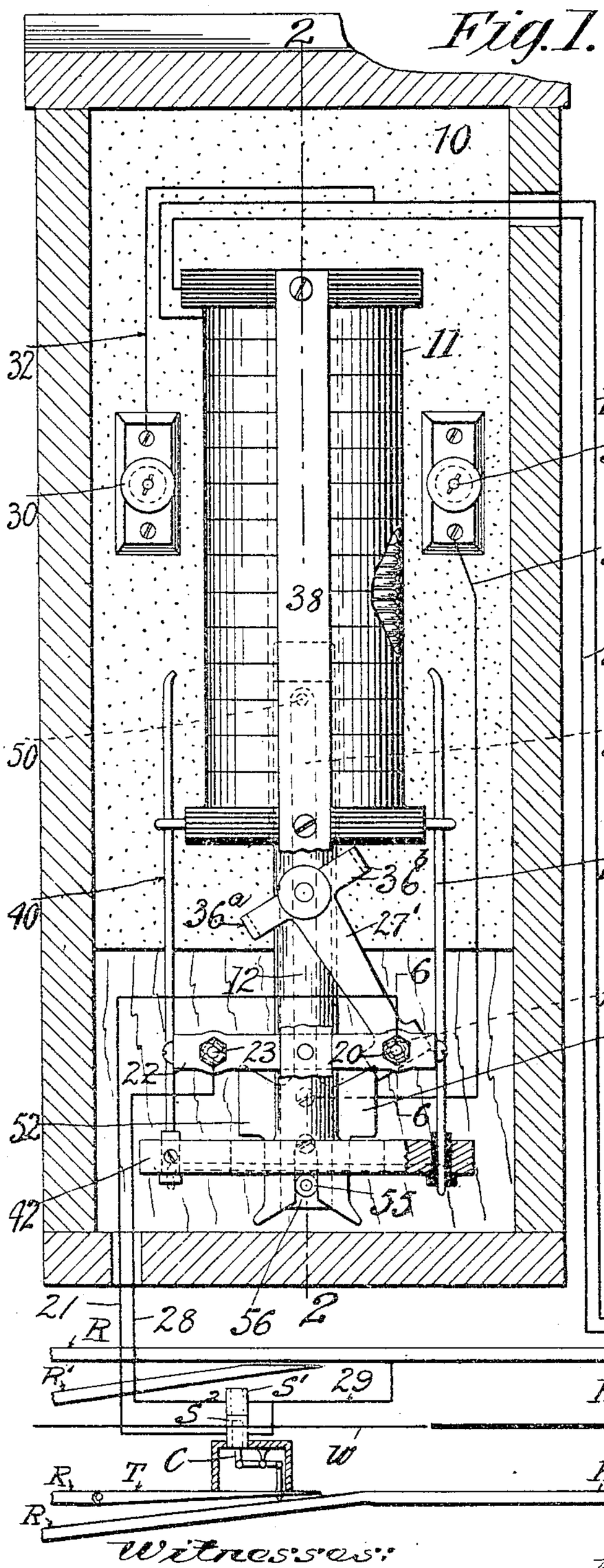
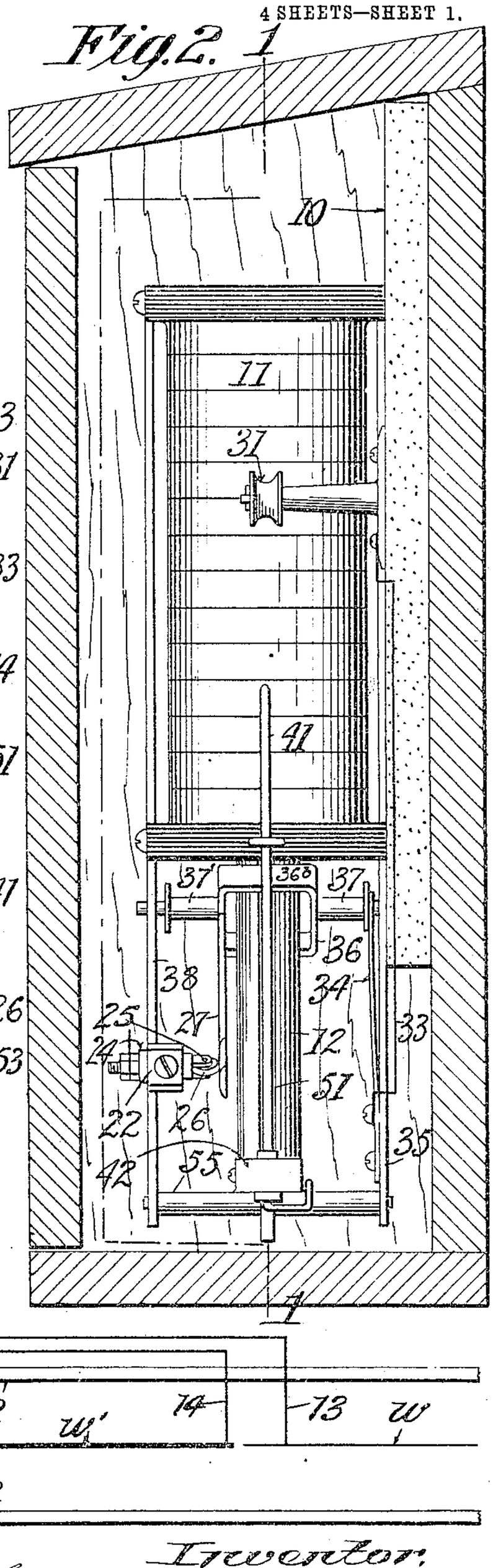


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

Fig. 4.

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4 SHEETS—SHEET 3.

Fig. 5.

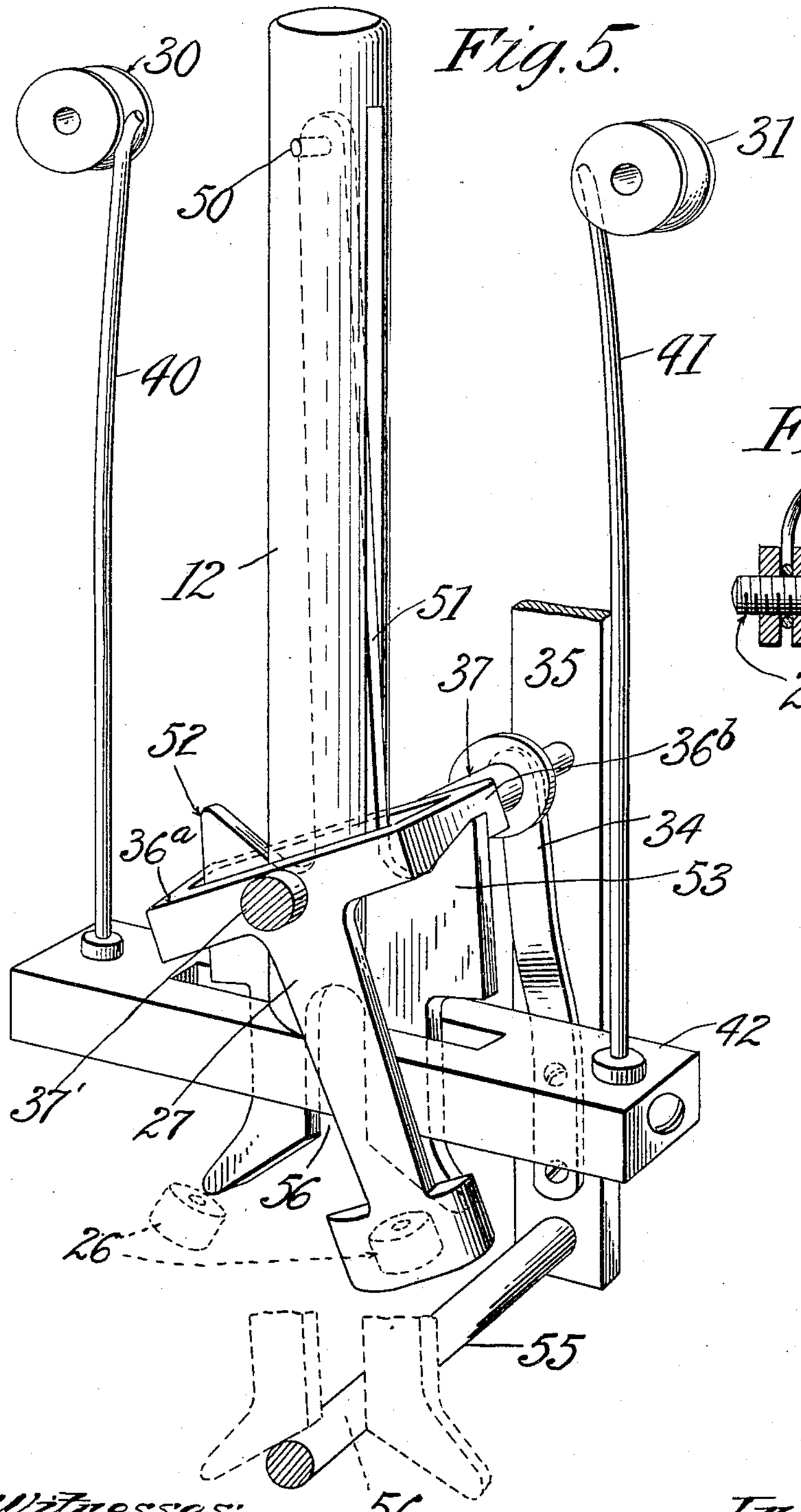
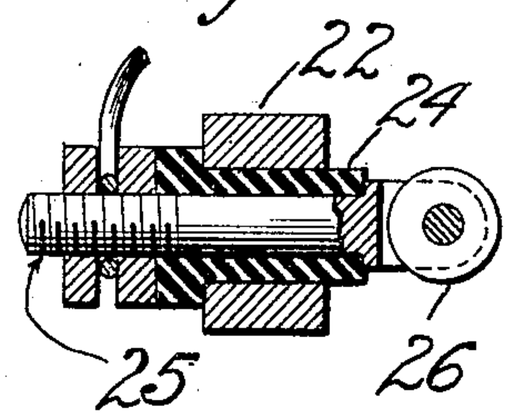


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

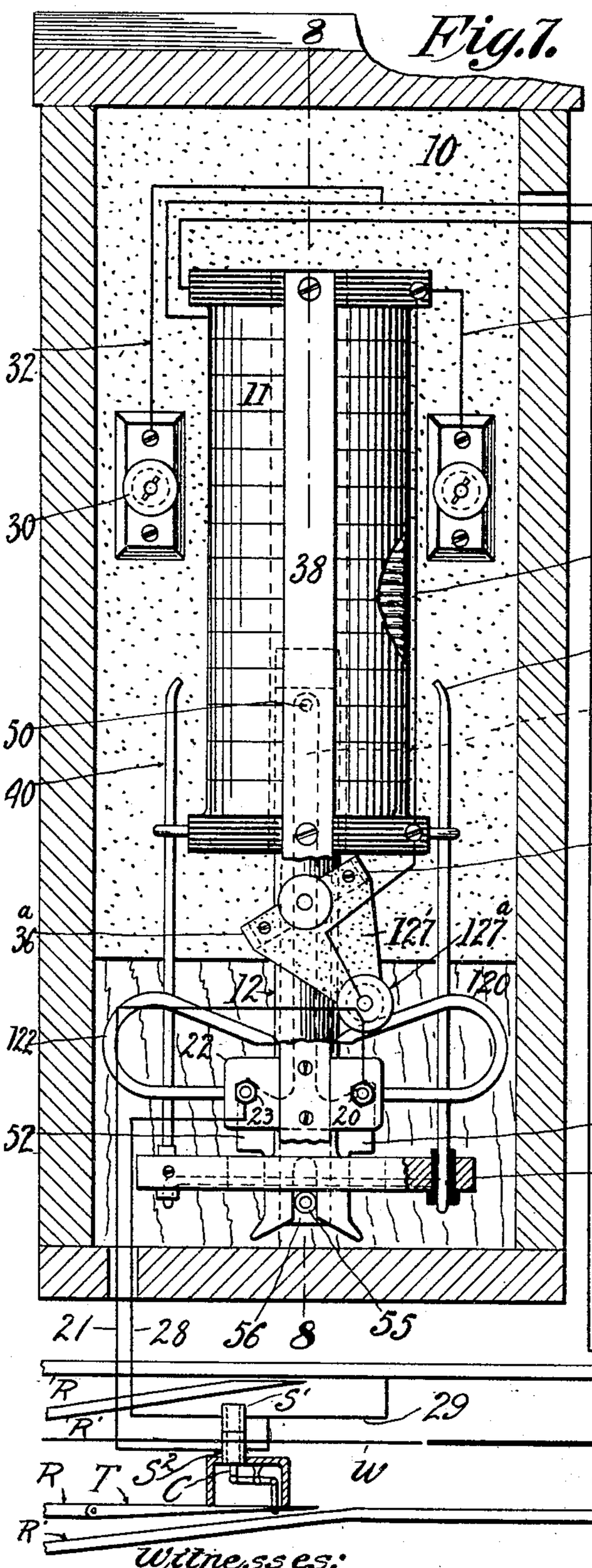
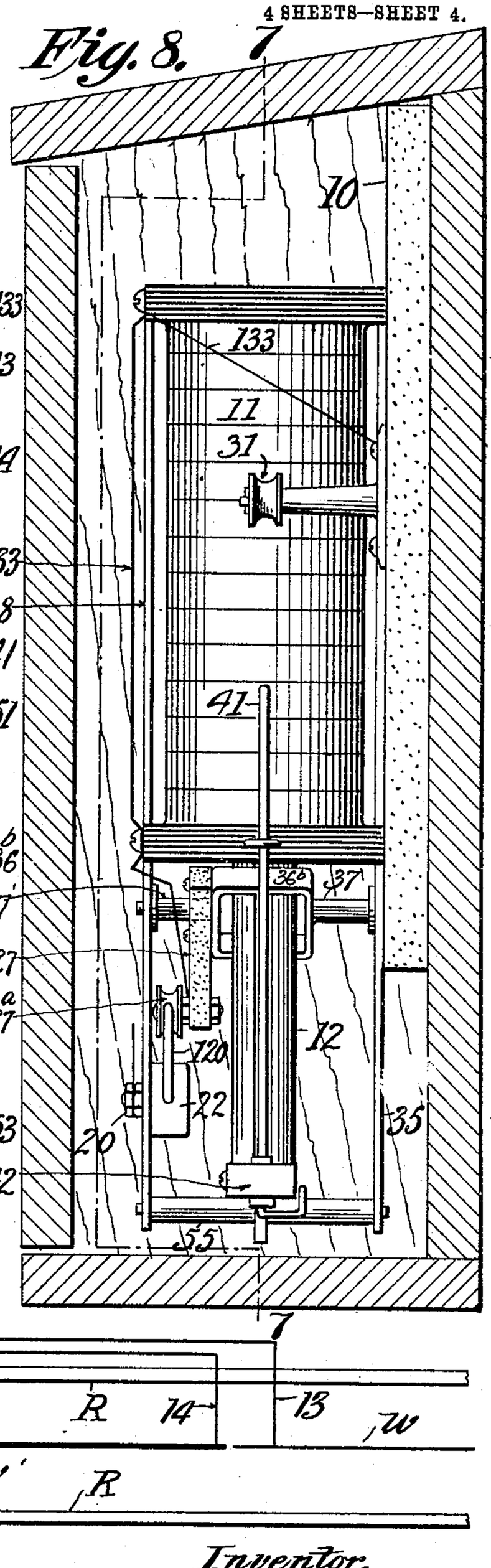


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES W. SQUIRES, OF SPRINGFIELD, MASSACHUSETTS.

ELECTRIC RAILWAY-SWITCH-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 792,174, dated June 13, 1905.

Application filed May 16, 1904. Serial No. 208,165.

To all whom it may concern:

Be it known that I, CHARLES W. SQUIRES, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Electric Railway-Switch-Operating Devices, of which the following is a full, clear, and exact description.

This invention relates to railway-switch-operating mechanism, and more especially to that class thereof in which the switch-tongue is moved by a pair of oppositely effective magnets or solenoids the movable core of which may be directly connected with the tongue; and it has for one of its objects the provision of a device whereby electric energy is systematically supplied to the solenoids alternately.

More particularly stated, my invention has for its object an improved device for distributing electric energy in such a manner that the first application of power to a car within the limits of the switch-operating distance or field will result in throwing the switch-tongue and the next application reverses its position. In other words, each application of motive power by the controller on the car results in changing the position of the switch-tongue from that which it occupies at the time.

My invention has, furthermore, for its object the improved organization and construction of what may be termed a "primary" device or switch for controlling the circuits of the track-solenoids, as will be hereinafter described, and illustrated in the accompanying drawings, in which similar characters denote similar parts, and in which—

Figure 1 shows a front view of my improved distributing mechanism, which is usually attached to a pole near the side of the road-bed and incased in a box, shown in section on line 1 1 of Fig. 2. Fig. 2 is a side view of the mechanism, the box being sectioned on line 2 2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, but showing the parts in a position which they will occupy when an application of energy is given to a car-motor. Fig. 4 represents a section on line 4 4 of Fig. 3. Fig. 5 shows a perspective view of the core of the primary device and the electric switching member operated thereby corresponding to Fig. 1. Fig. 6 is a section of the movable contact substantially on line 6 6 of Fig. 1, and Figs. 7 and 8 illustrate another form or modification of the device as shown in Figs. 1 and 2 and show what I consider the preferred and most practical manner of construction.

Briefly stated, my present invention refers directly to the distributing mechanism and has no bearing whatever upon the track-solenoid or switch-tongue mechanism, which may be of usual construction and as is indicated in Fig. 1 diagramatically, in which R denotes the main track and R′ a side track controlled by a switch-tongue T, which may connect with a core C, actuated in opposite directions by a pair of oppositely-effective solenoids S' S^2, the former of which will close the switch for leaving the main track open, while the other, S^2, will open the side track. The trolley-wire is designated by W, and a section or portion W′ thereof is insulated therefrom, the length of the insulated section being about fifty feet, so that the motorman of an approaching car may be enabled to ascertain the position of the tongue T and change its position, if necessary, by application of power to the car-motor. It should be stated at this time that the tongue is under immediate control of the motorman only as long as the car-trolley is in contact with the insulated section W′, as will hereinafter appear.

One form of my improved distributing mechanism is illustrated in Figs. 1 and 2, where 10 denotes an insulating-plate having secured thereto an electromagnet 11, preferably made in the form of a solenoid and having a gravitative core 12, which constitutes a reciprocatory member and is raised whenever the solenoid is sufficiently energized and which drops again as soon as the current is shut off entirely or falls below a certain amperage, and so that the current for lighting the car is not sufficient to raise the core 12; but the controller on the car must be used to produce this result. The solenoid 11 is in electrical communication with the trolley-wire W through a conductor 13, and the negative or return wire 14 thereof leads to the insulated

section W'. Hence it follows that when a car is on the track and its trolley-wheel is in contact with the section W' the controller may establish a powerful current through the solenoid to the rail R, which constitutes the return-line, as usual. Furthermore, it will be understood that whenever such current is shut off the core 12 will gravitate or descend to its normal position. Consequently it is evident that each application of power by means of the car-controller will result in raising the core 12, and it is this sequential rising movement of the core which I utilize for sending the power-current first to one track-solenoid and the next time to the other, so that the tongue T may be played back and forth as fast as the motorman can let on and shut off the power-current while the trolley is in contact with the wire section W'.

By referring to Fig. 1 it will be seen that the solenoid S^2 is electrically connected, through a conductor 21, with a terminal 20, supported in a cross-bar 22, which is stationary and constitutes a part of the frame-support for other devices to be hereinafter described. Near its other extremity the bar 22 carries another terminal 23, similar to that designated by 20, both being insulated from the bar 22, substantially as shown in Fig. 6, by a bushing 24, surrounding the stem 25, which is bifurcated at its inner end to receive a roller 26, which serves as a contact-wheel for a movable contacting member 27. While, as before stated, the terminal 20 is connected with the solenoid S^2, the terminal 23 is connected by a conductor 28 with the solenoid S', both solenoids being also connected with the rail R through a return-wire 29 and forming portions of a pair of independent power-circuits for throwing the tongue T in opposite directions, respectively. Disposed at opposite sides of the solenoid 11 are a pair of contact-points 30 31, preferably made in the form of rollers, the roller 30 being connected through conductor 32 with the conductor 13, and hence with the trolley-wire W. The contact-roller 31 is connected, through a conductor 33, with a metallic brush 34, secured upon a plate 35, which constitutes a part of the supporting-frame. The brush 34 consists substantially of a spring-blade. The upper end contacts frictionally with the member 27, above mentioned, and comprises an eye-frame 36, provided with trunnions 37 37', journaled in the back plate 35 and a front plate 38, respectively. The member 27 is thus mounted for oscillation alternately to contact with the rollers of the terminals 20 and 22, and hence to bring either of the track-solenoids S^2 and S', respectively, into electrical connection with the terminal or contact roller 31. Normally the contact 31 is "dead," so that the circuits for the track-solenoids S' S^2 are open and the core C thereof is free to be moved—for instance, if it should be desired to turn the tongue T by hand.

Means are provided for electrically connecting the member 27 with the trolley-wire W, and this is easily done by connecting the terminal 30 and 31 when required. The means for accomplishing this result consist of a contact-maker comprising a pair of resilient contacts 40 41, rigidly held at their lower ends in a cross-bar 42, but insulated therefrom, while, on the other hand, the contacts 40 and 41 are electrically connected—as, for instance, by a bonding-wire, as indicated in dotted lines in Fig. 7. The bar 42 is attached to the lower end of the solenoid-core 12, and it will be readily understood that when this core rises the contacts 40 41 will also rise and finally form an electrical connection between the contact-rollers 30 31, thus bringing the switch member 27 into connection with the trolley-wire W. It is therefore evident that if the switch-arm 27' is in contact with the roller of the terminal 22 and the core 12 is raised, as seen in Fig. 3, the solenoid S' will be energized to open the main track and also that if the arm 27' should be in contact with the terminal 20 the circuit for the solenoid S^2 will be closed to throw the switch-tongue T to open the side track.

The switch member 27 is moved to contact with the terminals 20 22 alternately by successive rising movements of the core 12, as follows: Pivoted for oscillation, as at 50, is an actuator 51, having lateral extensions or wings 52 53, adapted to engage the portions 36^a and 36^b and subject to being engaged by the upper edge of the wing 52 when the core 12 rises. As soon as the wing 52 engages the bar 36^a the actuator will on account of the inclined upper face of the wing 52 be swung toward left and finally lift the bar 36^a, thereby swinging the arm 27' of the switch member 27 into contact with the terminal 22, a condition illustrated in Fig. 3, which also shows the actuator swung to the left sufficiently to have its wing 53 clear the bar 36^b, which of course descends as the bar 36^a rises. If now the circuit for the primary magnet 11 is broken, the core 12 will immediately drop to its normal position, leaving the arm 27' in contact with the terminal 22 and permitting the actuator 51 to resume its normal perpendicular position, and in order to insure this return movement of the actuator I deem it expedient to provide a centering-rod 55, supported by the frame-plates 35 38 and adapted to enter the flared slot 56 of the actuator 51.

While in the foregoing description my invention has been clearly set forth, I prefer in practice to employ the construction shown in Figs. 7 and 8, in which the switch-arm 127' is made of insulating material and carries a roller 127^a, adapted to contact with the resilient wire terminals 120 122 and in electrical con-

nection with the terminal 31 through a conductor 133, the operation of the several parts being identical with that above given.

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

1. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby, of normally open power-circuits for said solenoids, a primary solenoid, a switch member for closing the circuits for the track-solenoids, alternately, during successive active movements of the primary core, and an actuator for said switch member, pivotally supported on the primary core.

2. The combination, with a track-solenoid, and a switch-tongue operable thereby, of a normally open power-circuit for said solenoid, a pair of normally disconnected terminals in the power-circuit, a primary solenoid having a gravitative core, and a pair of electrically-connected resilient members carried by said core, and for engaging and electrically connecting said terminals.

3. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby, of normally open power-circuits for said solenoids, a primary solenoid, a switch member for closing the circuits of the track-solenoids, alternately, during successive active movements of the primary core, an actuator for such switch member and movable with the primary core, and having lateral extensions for shifting said switch member in opposite directions.

4. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby, of a normally open power-circuit for the track-solenoid, a primary solenoid having a gravitative core, means for completing the power-circuit during the upward movement of the primary core, and a switch member for closing a break in the circuits for the track-solenoids, alternately, during successive upward movements of the primary core.

5. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby, of a normally open power-circuit for the track-solenoid, a primary solenoid having a gravitative core, means for completing the power-circuit during the upward movement of the primary core, and a switch member for closing a break in the circuits for the track-solenoids, alternately, during successive upward movements of the primary core, and controlled by the upward movement of the primary core.

6. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby, of a normally open power-circuit for said track-solenoid, a primary solenoid having a gravitative core, a switch member for closing the break in the circuits of the track-solenoids, alternately, an actuator for said switch member, and pivotally supported on the primary core and having extensions for shifting said switch member in opposite directions during successive active movements of the primary core.

7. The combination, with a pair of independent power-circuits, and a switch member for closing said circuits alternately, of a reciprocative actuator having extensions for shifting said switch members in opposite directions during successive movements of said actuator in one direction.

8. The combination, with a pair of normally open independent power-circuits, and a switch member for closing said circuits, alternately, of a reciprocatory primary member, an actuator for said switch member, and movable with said primary member and having extensions for shifting said switch member in opposite directions during successive movements of said primary member in one direction.

9. The combination, with a pair of normally open independent power-circuits, of a switch member for closing said circuits, alternately, a reciprocatory primary member an actuator therefor and pivotally supported on the primary member and having lateral extensions for shifting said switch member in opposite directions during successive movements of said primary member in one direction, and means for returning the actuator to its normal position during the return movement of the primary member.

10. The combination, with a pair of normally open independent power-circuits, and a switch member for closing said members, alternately, of a reciprocatory primary member, an actuator for said member and pivotally supported on the primary member and having lateral extensions for shifting said switch member in opposite directions during successive movements of the primary member in one direction, and having a slotted end and a stationary rod for engaging such slotted end and for returning the actuator to its normal position during the return movement of the primary member.

11. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby; of a normally open power-circuit comprising a main line; a pair of normally disconnected terminals in the main line, branch lines having separate terminals and connecting with the track-switch solenoids, respectively; a primary solenoid, a pair of electrically-connected resilient members carried by said primary core, and for engaging and electrically connecting said main-line terminals, and a switch device operable by the primary core, and operative to connect one or the other of the branch terminals with the main line of the power-circuit.

12. The combination, with oppositely-effective track-solenoids, and a switch-tongue operable thereby; of a normally open power-circuit comprising a main line, a pair of nor-

mally disconnected terminals in the main line consisting of rollers, branch lines having separate terminals and connecting with the track-switch solenoids, respectively, a primary solenoid, a pair of electrically-connected members carried by said primary core, and for engaging and electrically connecting said main-line roller-terminals, and a switch device operable by the primary core, and operative to connect one or the other of the branch terminals with the main line of the power-circuit.

13. The combination with a pair of independent power-circuits comprising a main line and a pair of branch lines, of a switch member for connecting the main line with either one of the branch-line terminals, said switch member having a roller-contact with the branch-line terminals for completing the circuit of either one of the branch lines.

14. The combination with a pair of independent power-circuits comprising a main line and a pair of branch lines, of a switch member for connecting the main line with either one of the branch-line terminals, said switch member having a resilient roller-contact with the branch-line terminals for completing the circuit of either one of the branch lines.

15. The combination with a pair of independent power-circuits comprising a main line and a pair of branch lines, each having a resilient terminal, of a switch member permanently connected with the main line and having a roller for engaging either of said branch-line terminals to complete either of the branch-line circuits respectively.

16. The combination with a pair of independent power-circuits comprising a main line and a pair of branch lines each having a resilient-wire terminal, of a switch member permanently connected with the main line and carrying a roller, and a primary device for oscillating said switch member to bring said roller into engagement with either of the branch-line terminals to complete either of the branch-line circuits respectively.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

CHARLES W. SQUIRES.

Witnesses:
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A. V. LEAHY.