G. H. MAIRE.

ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED NOV. 29, 1907.

943,196.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

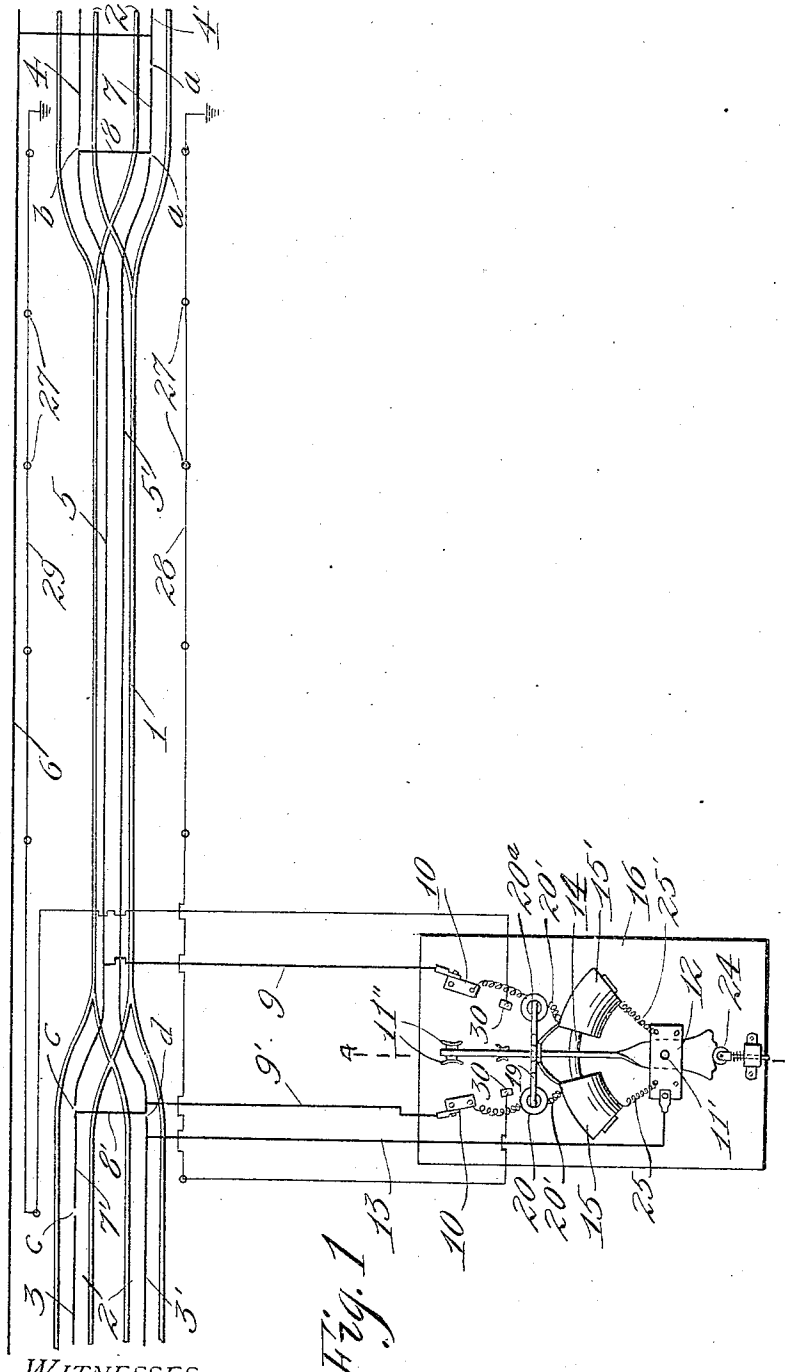

Fig. 1

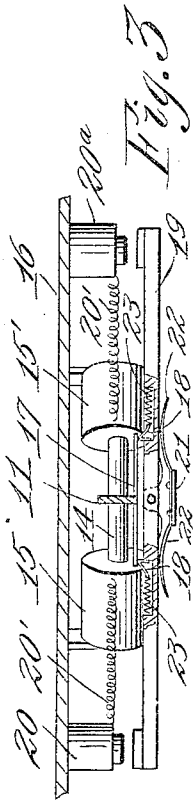

Fig. 3

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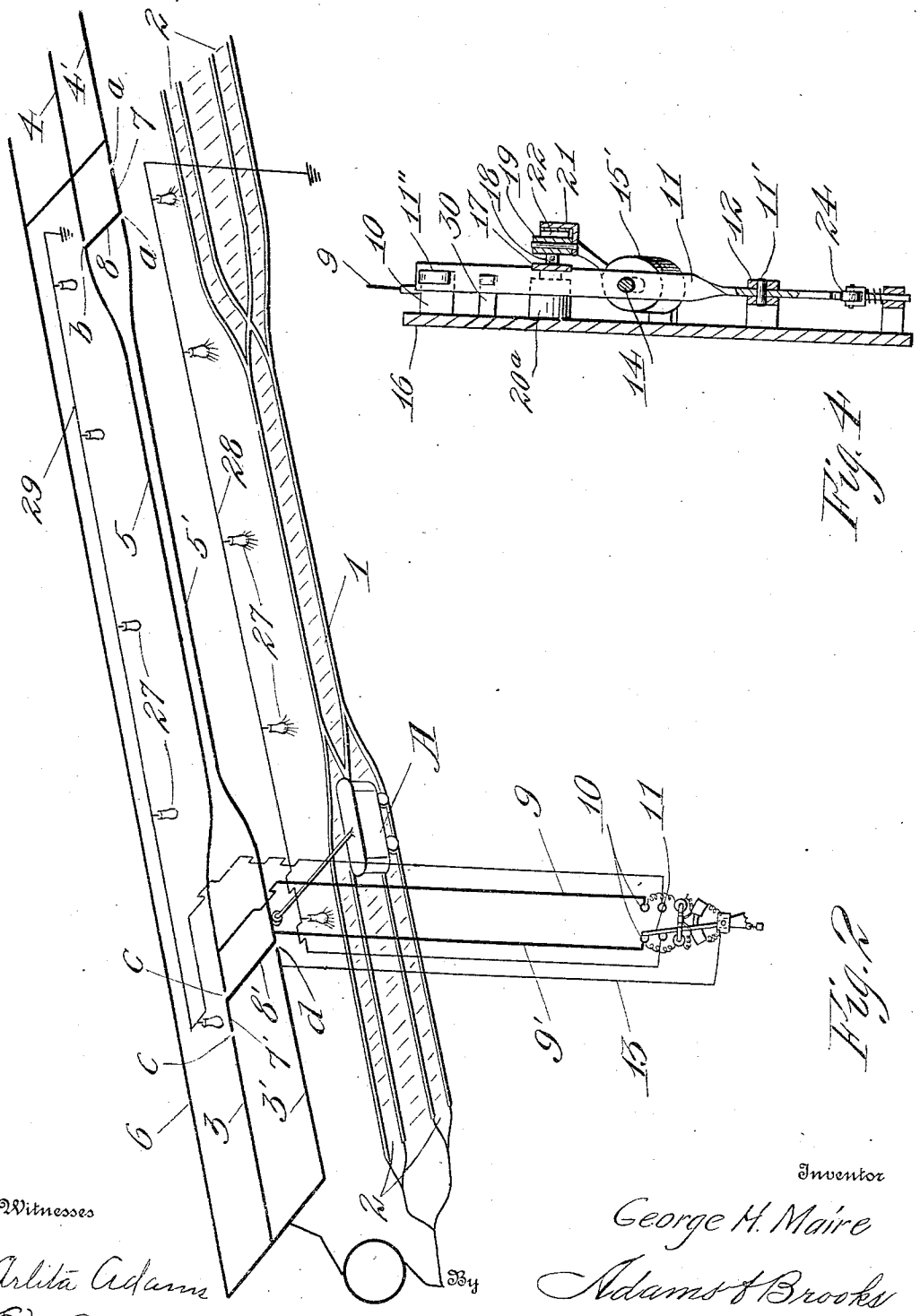

Fig. 4

Fig. 2

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE H. MAIRE, OF SEATTLE, WASHINGTON.

ELECTRIC-RAILWAY SYSTEM.

943,196. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed November 29, 1907. Serial No. 404,310.

To all whom it may concern:

Be it known that I, GEORGE H. MAIRE, a citizen of the United States of America, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Electric-Railway Systems, of which the following is a specification.

The primary object of my invention is to provide efficient means whereby the flow of the electrical current will be so controlled that it will be impossible for two cars entering a block from opposite directions to both receive electrical current for propelling the same.

A further object resides in the provision of novel mechanism operated by a car entering a block to connect a normally open feed section in the line circuit.

Other objects will be set forth as the description progresses.

Referring now to the accompanying drawing, in which like characters of reference indicate like parts throughout: Figure 1 is a view showing a portion of the track in plan and illustrating diagrammatically my invention related thereto. Fig. 2 is a view in perspective of a portion of the track and illustrating diagrammatically my invention in operation, a car being about to enter the section of single track. Fig. 3 is a fragmentary section taken horizontally through my improved electrical controller at points above the electro-magnets, and Fig. 4 is a section of said controller on line 4—4 of Fig. 1.

Referring now to the drawing by characters of reference, 1 indicates a section of block composed of a single track, connected at its ends by suitable turnouts, of any desired construction, with the sections of double track 2.

Reference numerals 3, 3′ and 4, 4′ indicate the trolley or feed wires of the line circuit, the same being arranged over the sections of double track and connected to a suitable feeder 6, and 5, 5′ indicate sections of trolley wire arranged over track 1 and constituting a normally open feed section.

7 indicates a section of trolley wire disposed between the adjacent ends of wires 5′ and 4′, and being spaced or insulated therefrom as diagrammatically shown at *a*, and 8 indicates a cross wire connected to wire 7 and wire 5. Wire 5 at that end adjacent to wire 7 is spaced or insulated from wire 4, as at *b*. At the other end of wire 5 is a section of trolley wire 7′ corresponding to wire 7 and being spaced or insulated from wires 3 and 5, as at *c*. A cross wire 8′ connects wire 7′ with wire 5′, whose adjacent end is spaced or insulated, as at *d*, from wire 3′.

Reference numerals 9, 9′ indicate wires leading from wires 5, 5′ to contacts 10 of my improved controller mechanism, which I will now proceed to describe. This controller mechanism which may be mounted or arranged in any desired manner is supported on a base 16 of insulating material, and comprises a suitable switch 11, pivoted at 11′ to a plate 12, which is secured to base 16 and connected by a wire 13 to receive current from wire 3′. Switch 11 is secured to the core 14 of solenoids 15, 15′ of suitable high resistance so as to swing therewith upon said solenoids being energized, as will be more fully explained in the following, and said switch as now considered, is provided with contacts 11′ for engagement with contacts 10, when it is properly swung. Fixed to switch 11 is a plate 17, the side edge portions of which form abutments for engagement with stops 18, carried by an armature 19, of electro-magnets 20, 20ª of suitable high resistance, which are connected by wires 20′ to solenoids 15, 15′. Armature 19 is pivoted to a suitable fixed bracket 21, and is normally held by springs 22 out of engagement with the poles of either of the electro-magnets, as illustrated in Fig. 3. Stops 18 which normally bear on the outer face of plate 17 are slidably mounted in suitable recesses formed in armature 19 and are yieldingly pressed toward one another by coil springs 23, see Fig. 3. The lower end portion of switch 11 is preferably enlarged and formed in its lower edge with notches in which a spring pressed roller 24 is adapted to engage to serve to maintain said switch against accidental displacement from its normal position or from either of the contacts 10. Wires 25, 25′ connect solenoids 15 with plate 12 and suitable wires 26 connect electro-magnets 20, 20ª with contacts 10.

In operation, assuming that a car, as A, is traveling to the right and has passed the gap or insulated portion *d*, as indicated in Fig. 2, the circuit including wires 3′, 13, 9′ and 5′ will be closed and solenoid 15 being energized will cause switch 11 to be swung toward the left into engagement with the contact 10, as shown in Fig. 2. The current

will now flow through switch 11 and will continue to do so until the trolley of the car passes from wire 5′ onto wire 7, and as will be observed, should another car enter track 1 from the opposite end to that entered by car A and have its trolley engaged with wire 5, it will be impossible for it to receive sufficient current for propelling purposes for switch 11 is held by solenoid 15 and therefore will not be drawn over by solenoid 15′ to the contact 10 to which wire 9 is secured. When the trolley of car A moves onto wire 7 the circuit is closed through wires 5, 9 and 13, thereby energizing solenoid 15′ and causing switch 11 to be moved to the right. Electro-magnet 20ª being also energized, attracts the adjacent end of armature 19, causing said armature to swing so that one of the stops 18 will be moved into the path of plate 17 to limit the movement of the switch and hold the same in substantially the position shown in Fig. 1. During this movement of switch 11, stop 18 yields a little, due to the compression of its spring 23 and when armature 19 is returned to its normal position by springs 22 upon magnet 20ª being deënergized, stop 18 is returned to its normal position by said spring 23 so as to lie at the outer face of plate 17 and out of the path thereof (see Fig. 3). When the car passes onto one of tracks 2 and receives the current from wire 4′ the circuit through wire 5 is broken, and the parts will stand substantially as shown in Figs. 1 and 3.

The operation with respect to cars entering the block or single track section 1 from the opposite direction is identical with that just described with the exception that the trolley of the car engaging the wire 5 and switch 11 will therefore obviously be first moved into engagement with the contact 10 on the right.

In conjunction with my invention suitable signals in the form of lights 27 may be employed to indicate when a car is traveling through block 1, said lights being included in the independent light circuits 28, 29 which are closed by switch 11 engaging contacts 30.

My invention is adapted for both overhead and underground systems, and the term "trolley wire" as herein used covers wire as generally defined, also rails or other means of an equivalent nature for conveying the current to be fed to the car as the propelling agent.

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

1. In an electric railway system, a line circuit including a normally open section, a switch connected to have the current pass therethrough from the line circuit to said normally open feed section when a car passes onto said normally open section, means operated by a car entering and passing from said normally open section to open and close said switch, and electrically controlled means to limit the movement of said switch when it is opened.

2. In an electric railway system, a line circuit including a normally open feed section, a switch for connecting said normally open feed section with said line circuit, means operated by a car entering and passing from said normally open section to open and close said switch, and electrically controlled means for limiting the movement of said switch when it is opened.

3. In an electric railway system, line circuits including parallel normally open feed sections, a switch for connecting one or the other of said normally open feed sections in a line circuit, means operated by cars passing onto and off of said normally open feed sections to close and open said switch, and electrically controlled means for limiting the movement of said switch when it is opened.

4. In an electric railway system, line circuits including parallel normally open feed sections, a switch arranged to connect one or the other of said normally open feed sections in circuit, contacts to be engaged by said switch, wires leading from said contacts each to a respective normally open feed section, means controlled by cars entering on and passing from said normally open feed sections to move said switch alternately into and out of engagement with one or the other of said contacts, and stop means controlled by cars passing from said normally open feed sections for limiting the movement of said switch to a neutral position between said contacts.

5. In an electric railway system, in combination with a single track, line circuits including two normally open feed sections arranged longitudinally of said track for engagement by the trolleys of cars traversing the same, said normally open feed sections being spaced laterally of the track whereby one can be engaged by the trolleys of cars traveling on said track in one direction and the other engaged by the trolleys of cars traveling on said track in the opposite direction, and electric controlling means operated by cars passing onto said normally open feed sections to connect one or the other in circuit.

6. In an electric railway system, in combination with a single track, line circuits including two normally open feed sections extending longitudinally of said single track and spaced laterally thereof, whereby each will be engaged by the trolleys of cars traveling on said single track in a respective direction, and electric controlling means operated by cars passing onto said normally open

feed sections to connect one or the other in circuit, said controlling means when operated preventing the other of said normally open feed sections being included in its circuit.

7. In an electric railway system, in combination with a section of single track and sections of double track at each end thereof connected thereto by turn-outs, line circuits including feed wires arranged over said sections of double track and normally open feed sections arranged over said section of single track, said normally open feed sections each extending from the feed wires of one of said sections of double track to those of the other and arranged to each receive the trolleys of cars traveling in a respective direction, and electric controlling means operated by cars passing onto said normally open feed sections to connect one or the other in circuit.

8. In an electric railway system, in combination with a section of single track and sections of double track at each end thereof connected thereto by turn-outs, line circuits including feed wires arranged longitudinally of said sections of double track for engagement by the trolleys of cars traversing the same and a pair of normally open feed sections arranged longitudinally of said section of single track, each of said normally open feed sections being provided at one end with a feed section arranged between and insulated from the adjacent end of the opposite normally open feed section and the adjacent feed wire of those provided for the adjacent section of double track, and means electrically connected with said normally open feed sections and with the feed wires provided for the sections of double track for operation by cars passing onto the former to connect one or the other in circuit.

Signed at Seattle, Washington this 22 day of November 1907.

GEORGE H. MAIRE.

Witnesses:
ANDREW KENNEDY,
LOREN GRINSTEAD.