No. 755,899. PATENTED MAR. 29, 1904.

T. MAHONEY.

ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED APR. 20, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

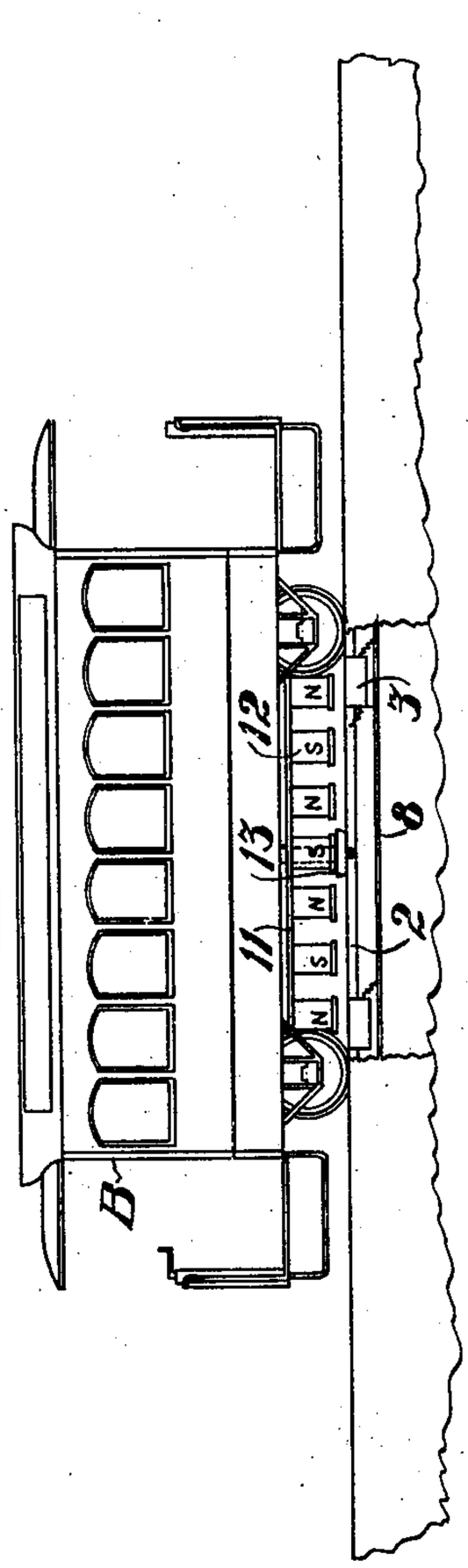
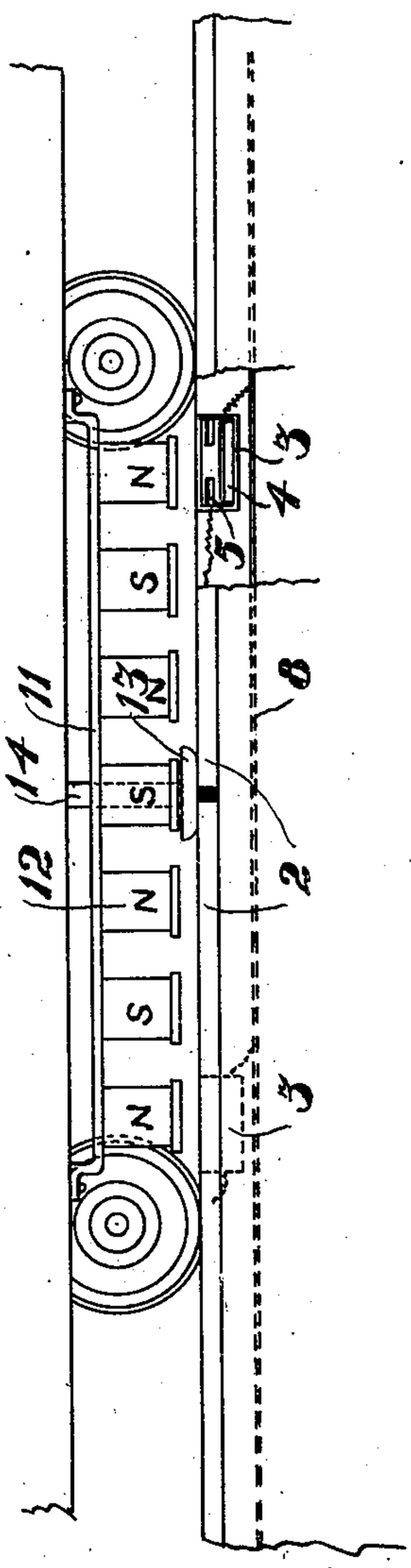


Fig. 2.



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ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED APR. 20, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

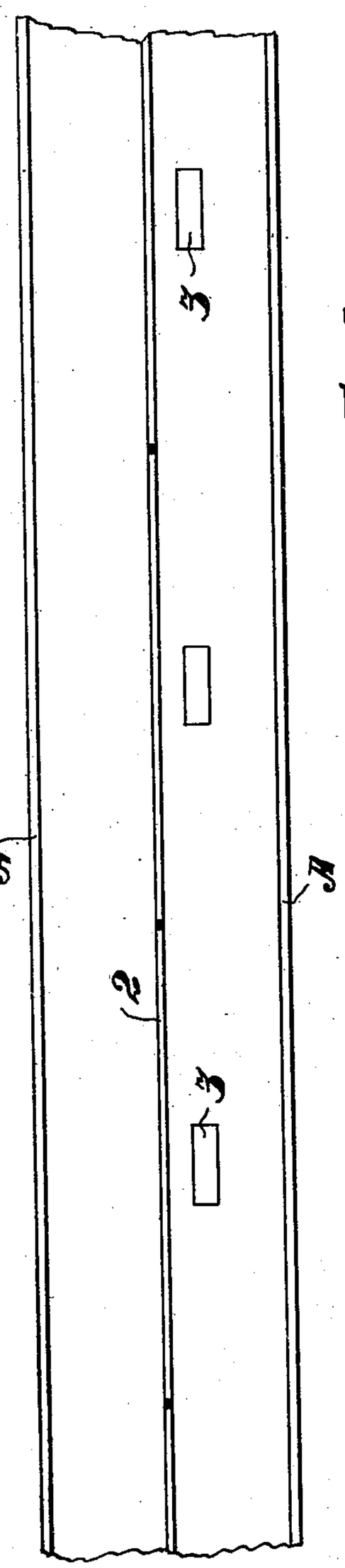


Fig. 5.

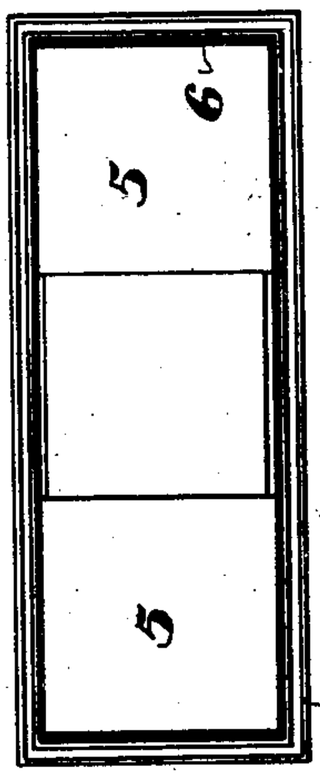


Fig. 6.

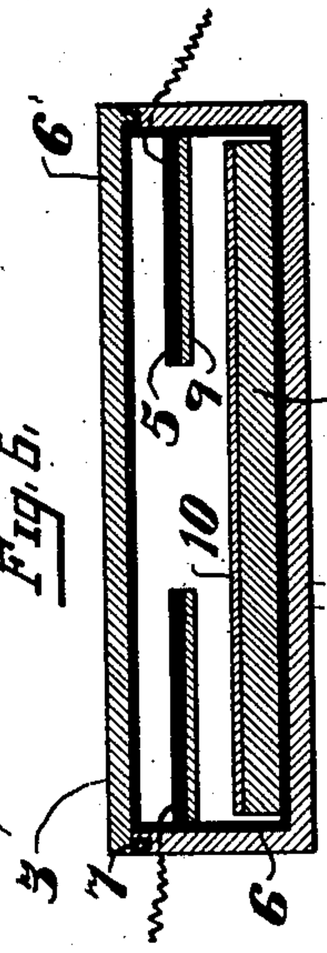
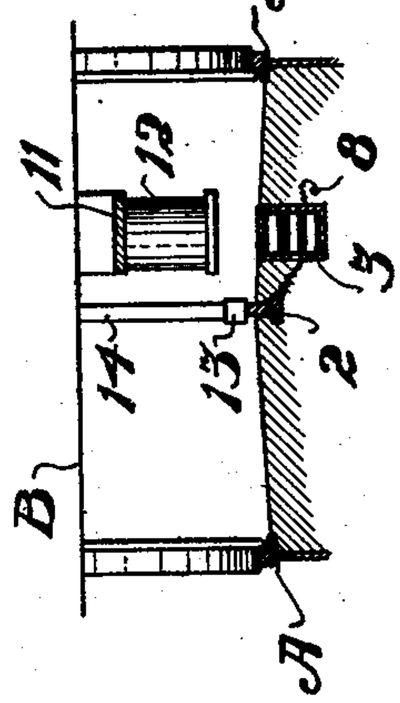


Fig. 4.



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No. 755,899. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

TIMOTHY MAHONEY, OF SAN FRANCISCO, CALIFORNIA.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 755,899, dated March 29, 1904.

Application filed April 20, 1903. Serial No. 153,394. (No model.)

To all whom it may concern:

Be it known that I, TIMOTHY MAHONEY, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Electric-Railway Systems; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in means for operating electric railways of the type employing a sectional trolley-rail having its sections normally out of circuit with the main and adapted to be energized momentarily and successively by the passing car. Its object is to simplify construction, reduce cost, afford perfect insulation, and particularly to overcome the difficulty heretofore experienced in many of the magnetically-operated switch systems in cutting in the current when the car is traveling at a high rate of speed.

The invention consists of the parts and the construction and combination of parts hereinafter more fully described, having reference to the accompanying drawings, in which—

Figure 1 is an elevation of car with track in partial section. Fig. 2 is a longitudinal section of car truck and track. Fig. 3 is a plan view of track, showing position of switches. Fig. 4 is a transverse section of track. Fig. 5 is a top view of switch-box with cover removed. Fig. 6 is a longitudinal vertical section of same.

A A represent the rails of an ordinary street-railway, between which and on the surface of the ground is disposed the sectional trolley-rail 2. The sections of rail 2 are suitably insulated one from the other and are of a length preferably less than that of a car. In fact, it is desirable that they should be not longer than half a car length to enable a car to stand over two sections at one time, whereby the current may be cut out of one section and into the other before the end of a live section is uncovered by the car. This gives no opportunity for accidents to arise from one stepping onto a rail A and a section of 2 immediately a car has passed.

A switch-box 3 is disposed between a rail A and each section and about centrally of the latter and has its top flush with the surface, so as to be brought into as close range as possible with the magnetic switch-operating means carried on the car B.

Box 3, which may be of any suitable material, is quite shallow, since its only contents are a soft-iron bar 4, normally lying loose on the bottom, and the superposed contacts 5. Ordinarily bar 4 would be, say, twelve inches long, 4 inches wide, and a quarter inch thick. The interior of the box is lined with suitable insulating material, as at 6, and the space intervening between the inner sides of the box and the bar is just sufficient to allow the bar to have a free up-and-down movement between the bottom of the box and the contacts. The latter consists of plates secured in the walls of the box and insulated therefrom and from each other except when bar 4 is lifted to bridge the space between them. The box is closed by a cover. In order to render the box water-tight, which is essential, the upper edge of the box is grooved, and the cover has a corresponding flange 7. To seal the box, the groove, which is larger than the flange, is first filled with asphaltum or any suitable cement and the cover placed in position and screwed or bolted down, causing the flange to be embedded in the cement and preventing any possible ingress of moisture. One of the contacts is in constant connection with the feed wire or main 8 and the other with a section of the trolley-rail. The under surfaces of the contacts are faced with copper, as shown at 9, and the bar 4 has a similar facing 10, so that the conductivity of the connecting means between the feed-wire and the rail-sections will be as perfect as possible. A great advantage of this switch aside from its simplicity and cheapness is the fact that the plates 5 and bar 4 offer a large contact area, thereby reducing resistance to a minimum.

The switch is operated by a magnet or series of magnets on the car.

The switch is one important feature of my invention. The means for operating it is the other important feature. This means com-

prises a multiple magnet carried by and between the car-trucks, so located as to pass immediately over the switches and presenting a magnetic surface in length substantially equal to the distance between the trucks, whereby the period is prolonged in which the magnets may act to lift the armature 4 and cut in the current.

The core-bar 11 is secured to the car by standards hung from the truck-frames. Fixed to or integral with bar 11 are the several soft-iron projections 12, extending downward and terminating close to the ground and in a path immediately above the switch-boxes 3. The core projections 12 are wound to form each an electromagnet, successive magnets being oppositely wound and of opposite polarity, as shown at N S. A brush or trolley-shoe 13 is connected with a standard 14, suitably supported between the trucks and adapted to run or slide upon the trolley-rail 2. The shoe is connected through the controller with a car-axle and a rail or rails A, which act as return-conduits for the current. A shunt-wire connects the trolley and the magnets, which are always excited, even when the car is at a standstill, since the length of the line of magnets is equal to the distance between any two adjacent switch-boxes, and when the magnets are not taking current from one box they are from another. The circuit through the magnets is completed by suitable ground connections through one of the car-axles and rails A. The shoe 13 depends from a point midway of the magnets and is adapted to bridge the insulation between two adjoining rail-sections in its passage thereover to give a constant and steady flow of current through the car when under way and prevent sparking, as might otherwise occur.

By hanging the magnets and trolley from the truck-frames they are maintained always at a uniform distance from the ground and in turning curves are not carried materially out of line with the section-switches and trolley-rail, as they would be were they attached, as is usual, to the end of the car-body.

From a contemplation of the present invention it will be readily seen that during the entire period of transit of the line of magnets over any one switch-box the armature-bar in the latter will be held up against its contacts. This will always give sufficient time for the switch to operate in and cut the current into the section and maintain the speed of the car. Before the magnets drop one switch they will lift another, and as soon as that is done the one previously held up will drop back by gravity to break the circuit and cut out the current from the corresponding section.

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

1. The combination with a motor-car or like movable body, of a sectional surface trolley-rail, a plurality of connected magnets carried by the car and presenting their poles in a line substantially coextensive with the distance between the car-trucks, successive magnets being of opposite polarity, and a switch disposed relative to each section and in the vertical plane of the magnets, the distance between the switches being substantially equal to the length of the line of magnets on the car and each switch consisting of a box disposed between a main rail and a section of the trolley-rail and a metallic bar within said box, lying loose on the bottom thereof and insulated therefrom and having such length and width that it substantially fills the box horizontally, plates secured in the walls of the box and lying horizontally in the same plane and insulated therefrom and from each other, said bar adapted to be lifted by the magnets to bridge the space between said plates, and connections between one of the plates and the feed-wire and between the other plate and a section of the trolley-rail.

2. The combination with a motor-car, of a section surface trolley-rail, a series of coöperating magnets on the car, successive magnets in the series being of opposite polarity, said magnets extending a substantial part of the car length, a switch disposed relative to each section of the trolley-rail and in the vertical plane of and out of physical contact with the magnets, the distance between the successive switches being substantially equal to the length of the line of magnets on the car and each switch consisting of a box disposed between a main rail and a section of the trolley-rail and a metallic bar within said box, lying loose on the bottom thereof and insulated therefrom and having such length and width that it substantially fills the box horizontally, plates secured in the walls of the box and lying horizontally in the same plane and insulated therefrom and from each other, said bar adapted to be lifted by the magnets to bridge the space between said plates, and connections between one of the plates and the feed-wire and between the other plate and a section of the trolley-rail.

In witness whereof I have hereunto set my hand.

TIMOTHY MAHONEY.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.