No. 736,752. PATENTED AUG. 18, 1903.

T. MAHONEY.

ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED FEB. 7, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

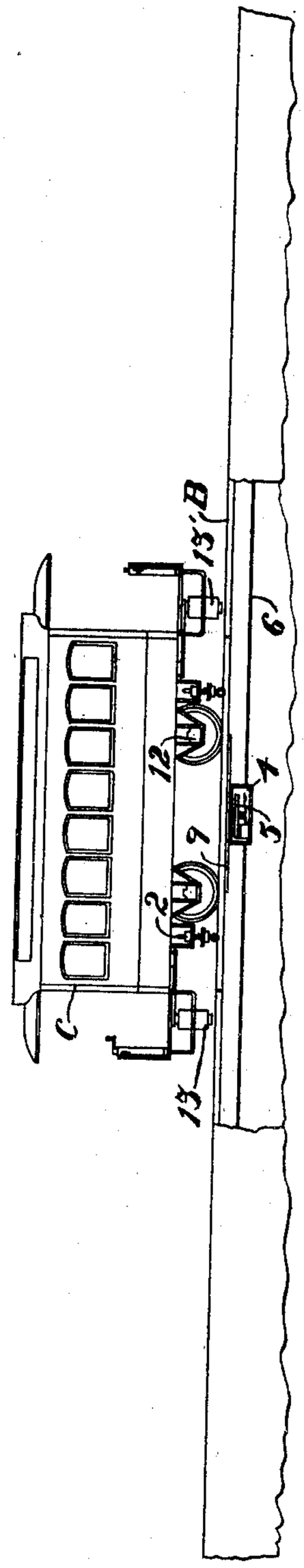
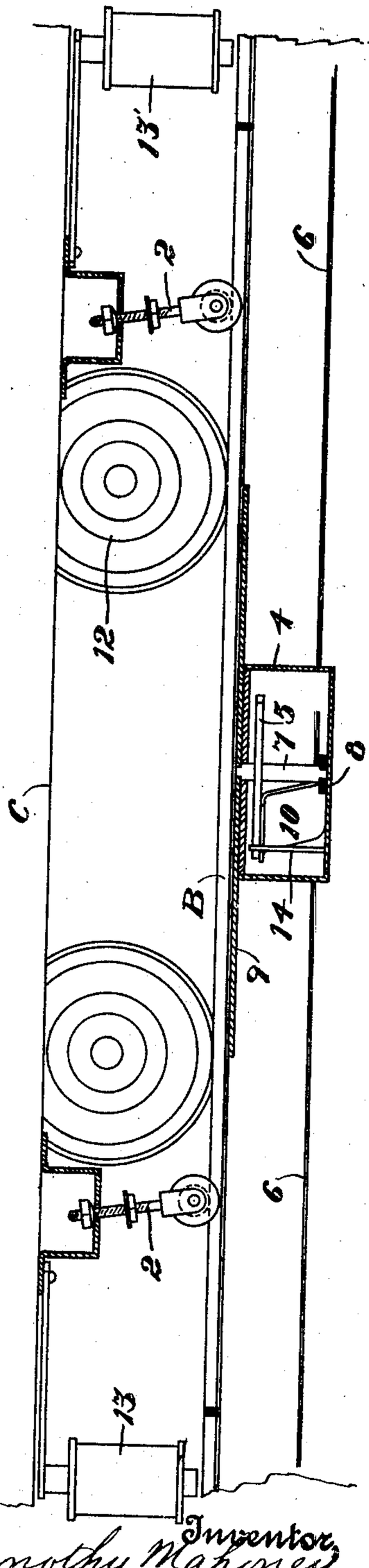


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

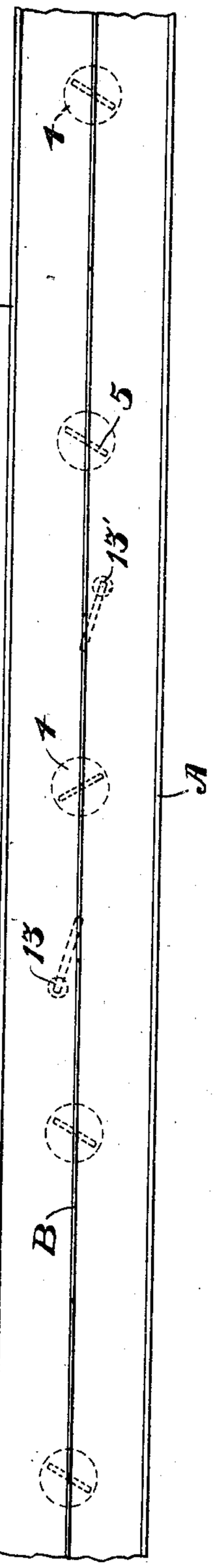


Fig. 5.

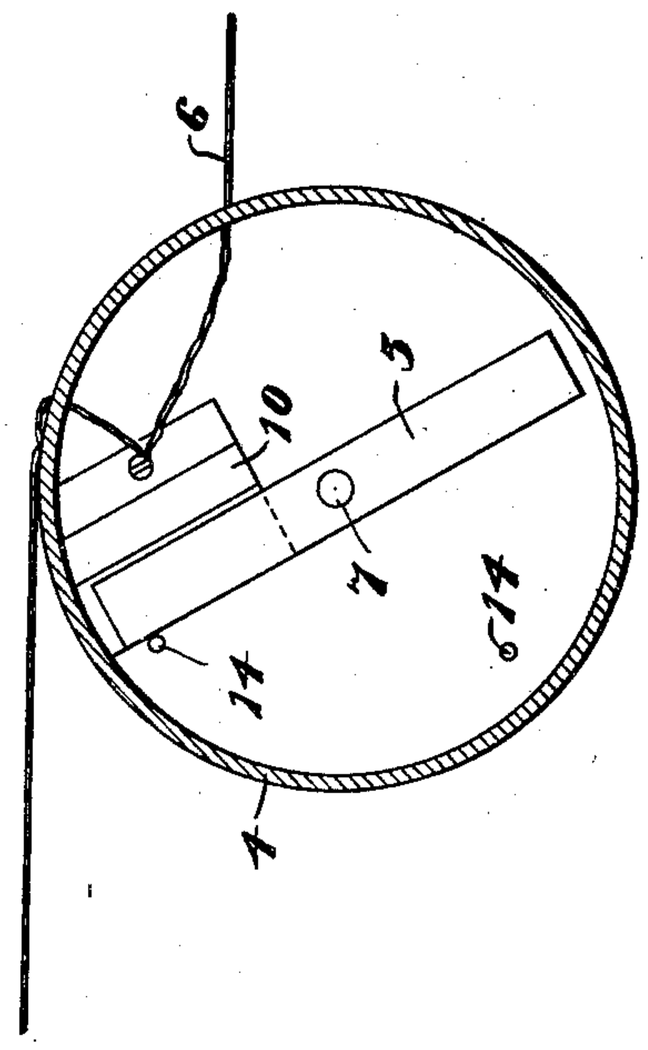
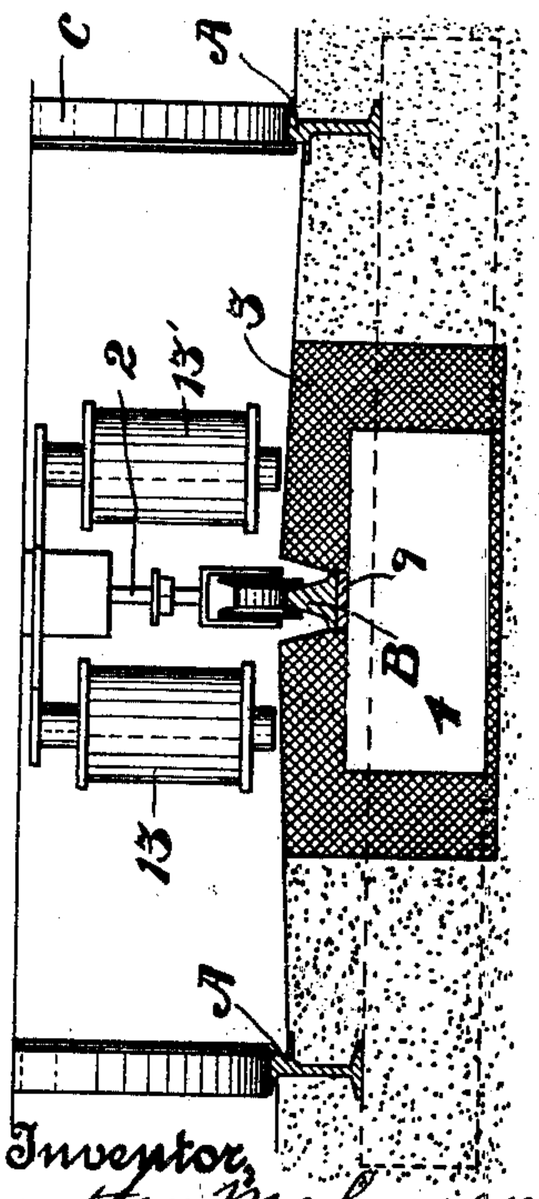


Fig. 4.



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No. 736,752. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

TIMOTHY MAHONEY, OF SAN FRANCISCO, CALIFORNIA.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 736,752, dated August 18, 1903.

Application filed February 7, 1903. Serial No. 142,266. (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, and pertains particularly to that type of railway in which the main conveying the current to propel the car is connected at intervals with sectional feeders normally out of circuit with the main and adapted to be energized momentarily and successively by the passing car.

The object of my invention is to improve upon the so-called "underground-conduit" systems by simplifying construction, affording perfect insulation, and operating the switch mechanism whereby the trolley-sections are energized and deënergized magnetically instead of mechanically.

It is usual in conduit systems to employ a conducting-shoe dependent from the car and running in a slot between the rails to make physical contact directly with a series of contact-points disposed in a conduit and connected with a source of electrical supply. The constant striking of the shoe against the contacts causes them to be damaged or broken sooner or later, and as the contacts are exposed more or less to the elements leakage of current and short-circuiting necessarily result.

In the present system I employ an insulated sectional trolley-rail disposed directly upon the surface between the tracks and a hermetically-sealed switch-box in which the connections with the main-line wire and the car-motor are made and broken by electromagnetic means upon the passing car.

The invention consists of the parts and the construction and combination of parts, as 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 central section of car-truck and track. Fig. 3 is a plan view of track, showing position of magnets. Fig. 4 is a transverse section of track. Fig. 5 is a section of switch-box.

A A represent the rails of an ordinary street-railway.

B is a sectional trolley-rail, here shown as disposed between and parallel with the tracks and in substantially the same plane therewith.

C represents a car movable along the tracks A and having a trolley-standard 2 at each end engaging rail B.

The sections comprising the trolley-rail are of any suitable length, but preferably are about that of a car. They are insulated one from another and are embedded in asphaltum or like insulating material 3, whereby they are normally out of electrical connection with the tracks A.

A switch-box 4 is suitably located in relation to each section of trolley-track B. These boxes are here represented as situated centrally beneath the sections and each contains a centrally-pivoted soft-iron needle 5, which is disposed transversely of the line of the trolley-rail and is adapted to be oscillated by electromagnetic means carried by a passing car to successively make and break the circuit between the corresponding section of B and the main supply-wire 6. The box may be of any suitable shape, size, or material and when installed in position and the proper connections made with the rail and with the source of electrical supply is adapted to be hermetically sealed to obviate all possibility of current leakage or short-circuiting through the presence of water, snow, or ice. The pivot-shaft 7 of the needle or switch-point 5 has one end stepped in an insulating-block 8 in the bottom of the box, and the other end is stepped in a conducting-plate 9, of copper, secured to the under side of and in electrical contact with the section of B above. The box contains a spring-contact 10, disposed to one side of the line of the trolley-rail in the path of an end of the switch-point. This contact is in the circuit of the main conductor 6, and the switch-point is adapted on alternate oscillations to engage the spring to connect the superposed trolley-section with the conductor.

A car, (represented at C,) provided with the usual motor mechanism, (indicated at 12,)

carries the electromagnets 13 13′, disposed one at each end of the car and on either side of the trolley-rail and having their lower ends in close proximity to the surface of the street.

In operation as the car moves forward over a section of B the energized magnet 13 as it is carried over the switch-box causes the end of the switch-point 5 beneath that side of the car to be drawn forward into engagement with contact 10, throwing the current into that section, whence it passes through a trolley-standard 2, the magnets and motor to propel the car, and thence to the ground. Magnet 13′ similarly attracts the opposite end of the switch-point, breaking the circuit and cutting out the section. Meanwhile, however, the car has moved forward and is receiving power through the next section, and so successively each section is alternately energized and deënergized in the fashion indicated. Stops 14 limit the movements of the switch-point, so that it will always have its ends projecting into the path of energy of the two magnets. A trolley-rail section is of sufficient length to accommodate both trolleys of a car at the same time. As the front trolley passes from an energized to a still unenergized section all the current is conveyed through the rear trolley and continues so to be conveyed until the front magnet 13 has thrown the current into the car from the front section. Momentarily then two trolley-rail sections are energized, but almost instantly rear magnet 13′ acts to cut out the rear section. The purpose of thus connecting the section in advance before cutting out the one in rear is to prevent sparking at the contacts, which would be liable to burn out the switches.

The course of the current through the car would be as follows, assuming the switch-point to be in engagement with contact 10: from main 6 through contact 10, switch-point 5, shaft 7, plate 9 on section of B, through section, a trolley-standard 2, through both magnets, the motor, and thence to the ground. As soon as a switch is opened its trolley-track section is deënergized. No short-circuiting ordinarily can take place between the trolley-rail and the tracks, since the asphaltum in which the trolley-rail is embedded acts as a perfect insulation, and, moreover, since only one or at most two sections of trolley-track are energized at any one time (in relation to a single car) the limits within which short-circuiting could take place would be in a space practically beneath a car and during only such time as the car is traversing that space. Even should the tracks be flooded with water, since no current passes into any section of the trolley-rail except when a car moves over that section, the circuit between the trolley-section and the ground will be through the copper conduits of the car owing to their lower resistance.

The present system effects an economy of power. It is safe. The full current energy for any one car is concentrated always in a space limited substantially to one car length. Since the switch-box is hermetically sealed and is operated through the influence of the electromagnets, perfect insulation is rendered possible by the exclusion of moisture, which otherwise might bridge the space between the contacts when they were separated.

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

1. In an electric-railway system, the combination with a car or the like, of a sectional trolley-rail, a feed-conductor, and a switch relative to said rail, said switch including a lever fulcrumed intermediate of its ends and movable in a horizontal plane and in continuous electrical connection with said trolley-rail, and a contact-piece disposed in the path of one end of said lever and in constant electrical communication with the feed-conductor, and actuating means on the car for inciting the lever to throw the latter into immediate electrical connection with said contact-piece and to move it out of contact therewith.

2. In an electric-railway system, the combination with a surface, sectional third rail and a movable car, of a feed-conductor, a switch disposed beneath said rail, said switch comprising a post having its upper end in electrical connection with the rail, the lower end of said post insulated, a lever fulcrumed intermediate of its ends to said post and in electrical communication therewith, said lever movable in a horizontal plane, actuating mechanism on the car for operating said lever, and a contact in electrical communication with the feed-conductor disposed in the path of one end of said lever.

In witness whereof I have hereunto set my hand.

TIMOTHY MAHONEY.

Witnesses:
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