

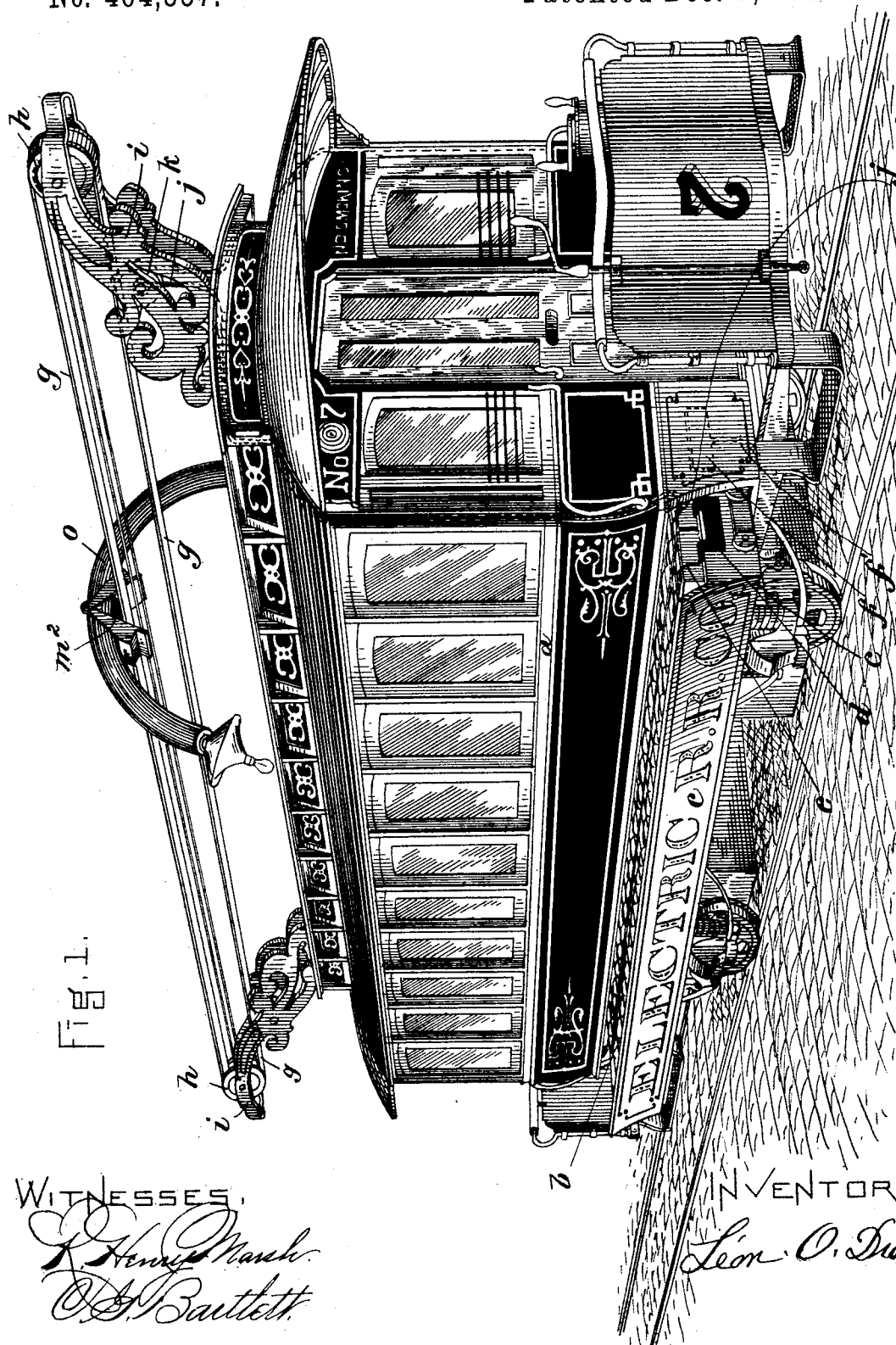
(No Model.)

3 Sheets—Sheet 1.

L. O. DION.
ELECTRIC RAILWAY SYSTEM.

No. 464,557.

Patented Dec. 8, 1891.



WITNESSES.

J. Henry Marsh.
D. S. Battlett.

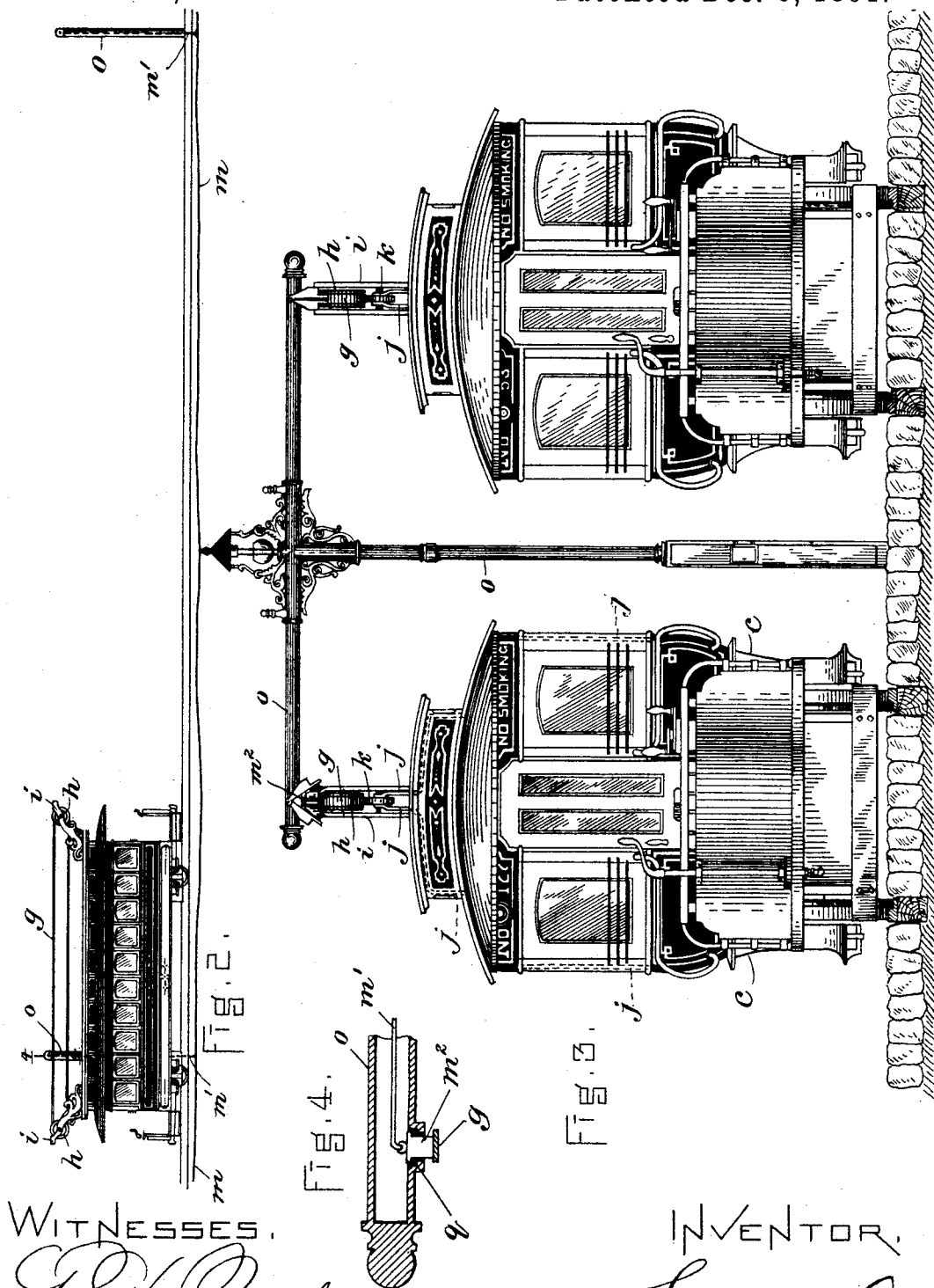
INVENTOR.

Leon O. Dion

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WITNESSES:

C. G. Bartlett.
A. D. Harrison.

INVENTOR:

Leon O. Dixon
Night Room Foreman
Atty.

UNITED STATES PATENT OFFICE.

LÉON O. DION, OF NATICK, MASSACHUSETTS.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 464,557, dated December 8, 1891.

Application filed December 5, 1890. Serial No. 373,664. (No model.)

To all whom it may concern:

Be it known that I, LÉON O. DION, of Natick, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric-Railway Systems, of which the following is a specification.

This invention relates to electric-railway systems in which the cars are driven by electrical energy supplied by storage-batteries carried by the cars, each car having its own storage-battery, which is connected with the motor of the car.

My invention has for its object to provide simple and highly efficient means whereby the necessity of stopping the cars while charging their storage-batteries is obviated; and it consists in the improvements which I will now proceed to describe.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a perspective view of a car embodying my invention and other parts of my improved system. Fig. 2 represents a side view of the car and two of the supports for the branches of the electric conductor. Fig. 3 represents a cross-section of the road-bed, showing a double track and two cars thereon. Fig. 4 represents a section on line 4 4, Fig. 2. Fig. 5 is a diagram representing the connections.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a car, which is provided with a storage-battery *b* of sufficient power to impel the motor of the car. The construction of the battery, its location on the car, and the connection of the battery to the motor, as well as the construction of the motor, form no part of my invention, and I refer to any of the present well-known forms of storage-batteries and to means for propelling cars thereby for a full understanding of my invention, which relates to the charging or maintaining of the storage-battery.

The battery is shown in Fig. 1 as placed in a casing *c*, arranged under the seats and made movable, so that it can be pulled out, as shown, to obtain access to the battery. At one end of the casing is an electrode *d*, connected with the battery by wire *e*, and to the body of the car is affixed a contact-plate *f*, which, when the battery-casing is in place,

makes contact with the electrode *d*, said plate *f* being connected by conductor *f'* with the motor of the car.

g represents an elongated conductor or contact located on the exterior of the car and electrically connected with the battery by means presently described. Said elongated contact is here shown as a belt of conducting material mounted on pulleys *h h*, which are journaled in brackets *i i*, affixed to the roof of the car, the belt extending lengthwise of the car, so that its upper portion, when the car is in motion, makes contact with the series of terminals hereinafter referred to at the ends of branches of a fixed conductor of electricity located over the track, the elongation of the contact or belt *g* causing a somewhat protracted contact with each terminal while the car is passing under the same. The belt or contact *g* may be electrically connected in any suitable way with the battery. I have here shown as the electrical connection a wire *j*, connected with the battery and extending upwardly through the car to a pulley *k*, which is in rolling contact with the lower portion of the belt, the pulley being a conductor of electricity. In case two storage-batteries are employed, one at each side of the car, two wires *j* will extend from each pulley *k*, as shown in Fig. 3, one to one battery and the other to the other battery.

The cars having the described apparatus are used in connection with a system of electrical distribution comprising a fixed main conductor *m*, Fig. 2, which is connected with a source of electrical supply and is located in an underground conduit or elsewhere, and a series of branches *m'* from said conductor, which are supported by fixed posts or supports *o*, having overhanging portions in such relation to the track that the contact *g* on a car moving on the track will make contact successively with the terminals *m²* at the outer ends of said branches *m'*. (See Fig. 4.) Said terminals *m²* are preferably adapted to rise and fall in openings formed for them in the laterally-extending or overhanging portions of the supports *o*, the lower ends of the terminals projecting below said laterally-extending portions, as shown in Fig. 4, in position to bear on the elongated contact or belt *g* of each car that passes the points where they

are located. The terminals m^2 should be suitably separated from the supports o by insulation q , Fig. 4. The vertical movability of said terminals compensates for any curvature that may exist in the elongated contact or belt g by reason of the sagging of the same between its supports. By reason of the contact-belt being passed beneath and made to bear against an overhanging terminal the establishment of the electric connection is always insured.

Fig. 5 is a diagrammatic drawing showing the car and the electric circuits arranged according to my invention.

r represents a rail of the track upon which the car a travels.

D is a dynamo located at any suitable place where power is obtained. The positive wire or conductor m extends from the dynamo, and the minus or negative side of the dynamo is grounded by wire A' . Two of the open terminals or branches m' are shown extending from the conductor m at suitable intervals, their upper ends being arranged to bear on the elongated contact g on the car a . The storage-battery b is shown connected in series, both terminals 5 and 6 being connected through the wire f' and motor z . In practice a loop of the battery-circuit extends to each end of the car, where a switch under the control of the motorman is arranged to open and close the circuit and otherwise manipulate the car in a manner well understood. The elongated contact g is connected through one of its supports i by wire j to the point 8 in the battery-circuit, this being at the positive terminal of the battery. As is well known a storage-battery is charged at the terminal or electrode from which the positive current issues, and when the elongated contact touches the end of a branch or terminal m' , as represented, a positive current passes down the wire j to the point 8, and from thence into and through the battery, charging the same to the point 9 on the negative wire 5, where a wire s extends to the ground by means of rails r at the same time that a current is passing in the battery-circuit through the motor. The current from the dynamo will divide at the point 8, and a portion will go by wire f' to the motor, which will have the same effect upon the battery as the portion which charges it, as the portion that helps to operate the motor is saved to the battery.

It will be seen from the foregoing that each contact of the belt g on a car with a terminal m^2 will put the storage-battery in connection with the source of electrical supply while said contact is maintained, so that the battery is partially charged at each contact. It will be seen, therefore, that by providing a sufficient number of branches m' the storage-

battery of a car running on the track will be kept at a practically-uniform strength, the power expended during the passage from one branch m' to the next being restored by the last contact. Hence the car can run continuously so long as the battery elements are in good condition, no periodical stoppage of the car for the purpose of charging the battery being required. The improved system therefore has all the advantages of the overhead trolley system, so far as the capability of continuous running of the car is concerned, without the disadvantages and objections which attend the employment of overhead wires. The posts or supports o may be located so far apart that their presence in a street will be practically unobjectionable.

My invention is not limited to the belt form of the elongated contact g , nor to any of the details of construction above specified, and the essential parts or elements of the system may be variously modified in construction and arrangement without departing from the spirit of my invention.

I claim—

1. The combination of a car or other vehicle, a storage-battery thereon, an elongated conductor or contact on the exterior of the car, extending lengthwise thereof, and consisting of an endless belt and loosely-mounted pulleys around which said belt is passed, and electrical connections between one of said pulleys and the battery, whereby when the contact-belt touches a distributor of electricity the battery will receive a partial charge, as set forth.

2. The improved electric-railway system herein described, consisting of a fixed conductor, a series of branches extending therefrom along fixed supports arranged in suitable proximity to the car-tracks, each having an overhanging portion provided with a terminal free to move vertically, a car adapted to move on the track and provided with a motor, a storage-battery suitably connected with the motor, an endless contact-belt, and loosely-mounted pulleys around which said belt is passed, one of said pulleys being connected with said storage-battery, said contact-belt being arranged lengthwise of the car in position to be brought by the movement of the car into contact successively with the lower ends of said terminals of the fixed conductors, each contact partially charging the battery, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 29th day of November, A. D. 1890.

LÉON O. DION.

Witnesses:

A. D. HARRISON,
C. G. BARTLETT.