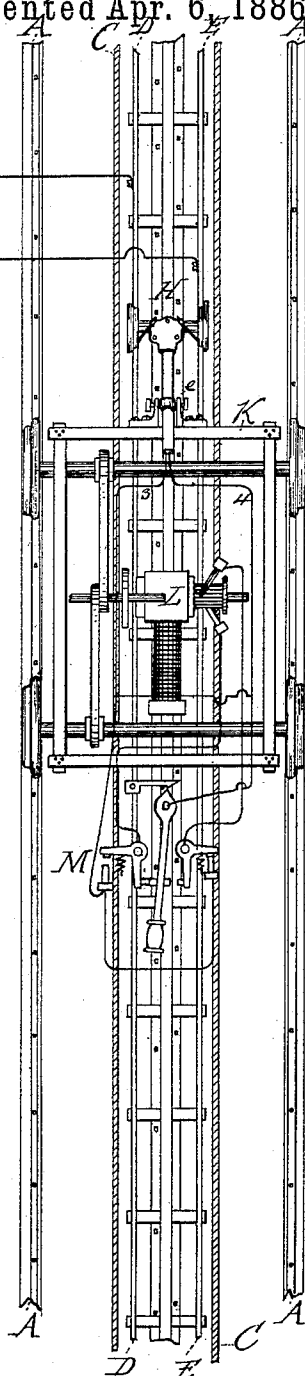
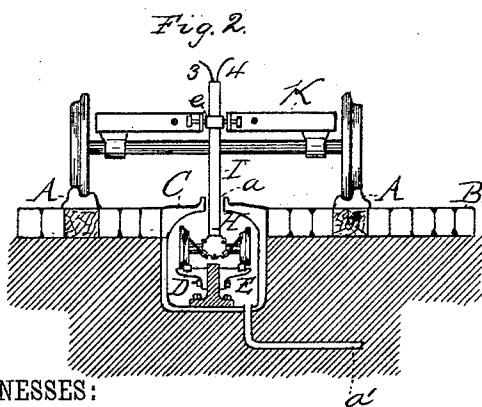
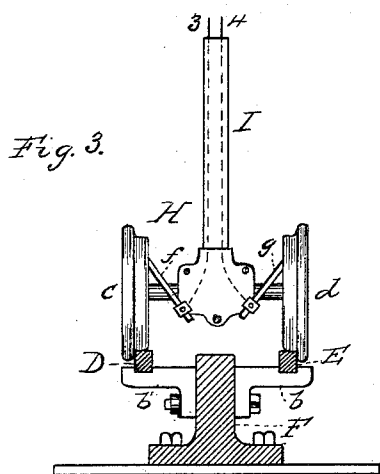
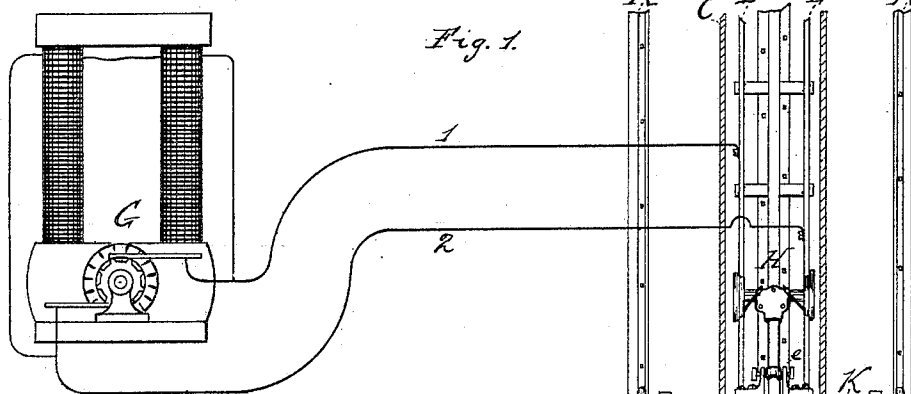


(No Model.)

T. A. EDISON.
ELECTRIC RAILWAY.

No. 339,278.

Patented Apr. 6, 1886.



WITNESSES:

E. C. Rowland
W. W. Healy

INVENTOR:

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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, ASSIGNOR TO THE
EDISON ELECTRIC LIGHT COMPANY, OF NEW YORK, N. Y.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 339,278, dated April 6, 1886.

Application filed August 14, 1882. Serial No. 69,366. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Electric Railways, (Case No. 468;) and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of the present invention is to produce simple and efficient means for operating street-railroads by electricity, wherein it is essential that there should be no obstruction projecting above the surface of the pavement, and that there should be two continuous metallic conductors for carrying the current to and from the motors of the various cars, having good electrical joints, and forming practically a continuous and integral metallic circuit, and wherein, further, it is desirable that such conductors should be concealed from sight and wholly protected from accidental external contact, and should, further, be independent of the rails, so that such rails can be taken up and replaced or the track otherwise repaired without breaking the circuit or becoming liable to form a short circuit.

The object is accomplished by providing each track of a street-railroad with a suitable tube or way, constructed preferably of metal, and located centrally between the rails. This tube rises only to the surface of the pavement, or slightly above the same, and has a continuous longitudinal slot in its top at the center thereof. Within the sunken tube are two continuous parallel conductors insulated from each other and forming rails, upon which travels a truck or small wheeled carriage having an arm projecting upwardly through the slot of the tube and attached to the car. Each car is provided with such a contact-truck. The two continuous conductors are connected with the dynamo or magneto electric machine or machines which supply the electrical energy for operating the motors mounted upon the cars. The wheels of each contact-truck have their rims insulated from their hubs, or they are otherwise insulated from each other. They conduct current from and to the conducting-rails upon which they travel, and have contact

brushes or springs bearing upon them and supported by the body of the truck, which brushes are connected with two conductors leading up through the arm attached to the car. From this arm the conductors run to the field and armature circuits of the electro-dynamic motor, such circuits being preferably independent multiple-arc circuits, and provided with suitable circuit-controllers for making and breaking the circuits at will. In the armature-circuit is located a current-reversing device, as described in my application No. 61,955, by the manipulation of which the direction of the current through the coils of the armature can be reversed and the car made to travel forward or backward at will without disturbing the commutator-brushes of the motor. An adjustable resistance may also be located in the field-circuit, or any other device be provided in the field or armature circuit or in the circuit common to both the field and armature coils, for changing the rate of speed as desired without disturbing the commutator-brushes of the motor, as described in my application No. 68,645. The revolving armature of the motor is connected with one or more axles of the car by speed-reducing connections, so that the motor can run at high speed, and an endless belt, rope, chain, or other flexible connection (one or more) is used as part of the connections in order to permit the car to move on its springs without affecting the running of the motor, as described in my application No. 68,649. A friction-clutch is also preferably used to throw the armature into and out of connection with the axle or axles, so that the car can be stopped without stopping the motor, as described in my application No. 68,649.

The foregoing will be better understood by reference to the drawings, in which Figure 1 is a view, partly diagrammatic, of a street-railroad, and connections for working the same by means of electrical energy, the parts of the car illustrated being shown, for clearness, somewhat separated, and the slotted tube being in horizontal section; Fig. 2, a vertical section through the road-bed, with the car in end elevation, and Fig. 3, a vertical section, on a somewhat larger scale, of the continuous concealed conductors and support.

A A are the rails of one track of a street-

railroad, and B represents the pavement of the street. In the center of the track is the continuous sunken tube C, constructed preferably of metal, and having the continuous narrow slot *a*, extending along the center of its top. This tube rises to the surface only of the pavement, or slightly above, the lips of the slot projecting preferably above the body of the tube. The tube C may have pipes *a'*, at intervals connected with the sewer, for carrying off the water.

D E are two continuous metallic conductors, which are supported within the tube C, parallel with each other, by brackets *b* of insulating material, secured to a longitudinal support, F, rising from the bottom of the tube C. This support may be a line of T-beams, as shown.

The conductors D E are connected with the conductors 1 2, leading from the dynamo or magneto electric machine or machines G, which supply the current.

H is a truck having wheels *c d*, which travel upon the conductors D E, and carry the current from and to such conductors. These wheels *c d* have their rims insulated from their hubs; or the wheel or wheels on one side of the truck are insulated in any other way from those on the other side, as described in my application No. 61,955. The truck is provided with an arm, I, projecting upwardly through the slot *a* of the tube C, and attached to the frame K of the car by a pivoted joint, *e*, or other loose joint, permitting of independent vertical movement of the car-frame and contact-truck.

Contact brushes or springs *f g* are carried by the truck H, and bear upon the wheels *c d*. These brushes *f g* are connected with insulated conductors 3 4, running through the arm I, and protected thereby from contact with the tube C at the sides of the slot *a*.

L is the electro-dynamic motor, mounted

upon the car and connected with an axle or axles of the car through a flexible connection and a friction-clutch, as described in my applications before referred to. The armature and field coils of the motor are preferably in multiple-arc circuits from 3 4, a suitable current-reverser, such as shown at M, being located in the armature-circuit, and a device for varying the speed being also used, if desired, as described in my applications before referred to.

What I claim is—

1. In an electrical railroad, the combination, with the parallel conductors inclosed within and concealed by a sunken slotted tube, of a car, a contact-truck attached to the car and having wheels traveling upon such parallel conductors, and connections from the wheels of the contact-truck to the motor on the car, substantially as set forth.

2. In an electrical railroad, the combination, with the parallel conductors inclosed within and concealed by a sunken slotted tube, of a contact-truck, an arm extending from such contact-truck to the car, and insulated conductors inclosed within such arm and protected thereby from contact with the sides of the slot, substantially as set forth.

3. In an electrical railroad, the combination, with the parallel conductors inclosed within and concealed by a sunken slotted tube, of a contact-truck riding upon such conductors, and an arm from such truck attached to the car by a pivoted or loose joint and permitting of an independent movement of the car and contact-truck, substantially as set forth.

This specification signed and witnessed this 7th day of July, 1882.

THOMAS A. EDISON.

Witnesses:

RICHD. N. DYER,
EDWARD H. PYATT.