

J. W. GRANTLAND.
CONDUIT RAILWAY CONDUCTOR.

No. 507,806.

Patented Oct. 31, 1893.

FIG. 1.

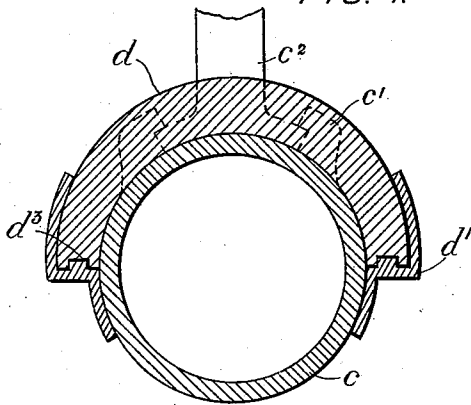


FIG. 2.

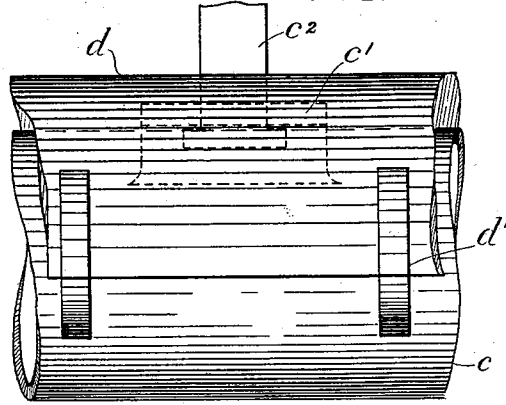


FIG. 3.

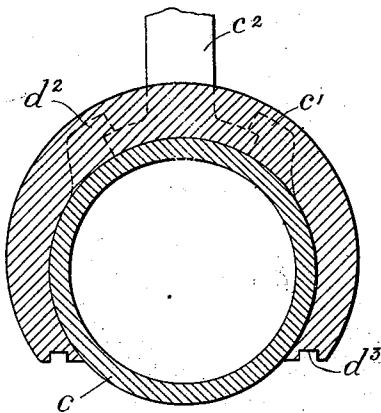


FIG. 4.

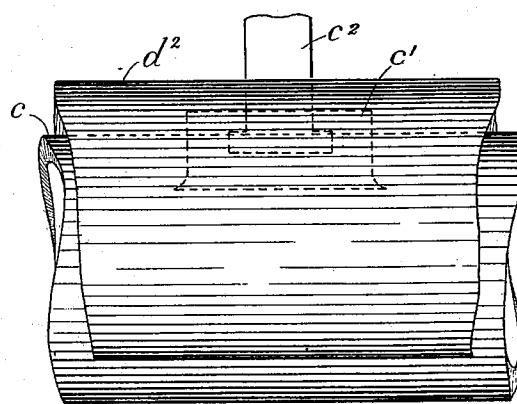


FIG. 5.

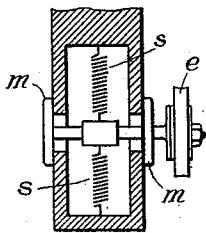


FIG. 6.

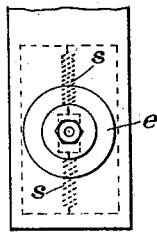


FIG. 7.

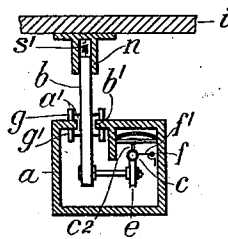
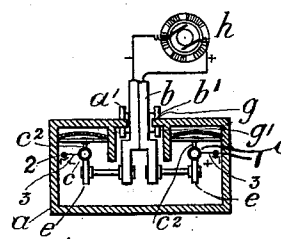


FIG. 8.



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Thomas M. Smith.
Richard C. Maxwell.

INVENTOR,
John H. Grantland,
BY J. Walter Douglas.
ATT'Y.

(No Model.)

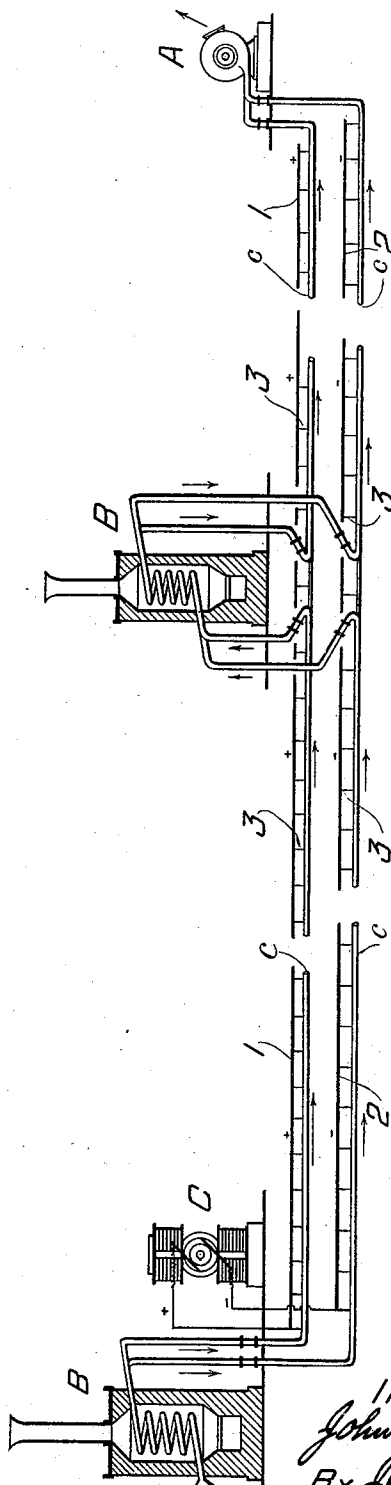
2 Sheets—Sheet 2.

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Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN W. GRANTLAND, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
GILBERT L. PARKER, OF SAME PLACE.

CONDUIT RAILWAY-CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 507,806, dated October 31, 1893.

Application filed May 17, 1892. Serial No. 433,313. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GRANTLAND, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

The principal objects of my present invention are first, to insure the presence of a continuous and uniform current throughout the entire length of a conduit for operating the motor of an electric railway car; second, to maintain one or more conductors for conveying the current through a conduit or sub-way substantially dry and free from moisture, whereby leakage of the current is obviated; third, to insure good electrical contact between the conductor and its complemental trolley, sled or brush; and fourth, to prevent the oscillations of the car being imparted to the trolley-arm.

My invention consists of the improvements hereinafter described and claimed.

The nature and general characteristic features of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, and in which—

Figure 1, is a transverse section of an electric conductor embodying features of my invention and adapted for use in electric railways. Fig. 2, is a side elevation of the same. Figs. 3 and 4, are respectively views in section and in side elevation of a modification of the conductor illustrated in Figs. 1 and 2. Fig. 5, is a transverse section of a trolley-arm embodying features of my invention, showing means for affording the trolley or sled a range of play. Fig. 6, is a side elevation of the trolley-arm illustrated in Fig. 5. Fig. 7 is a transverse section of a subway or conduit embodying features of my invention and showing means for preventing undue motion of the trolley-arm. Fig. 8, is a transverse section of a modified form of conduit showing a metallic return conductor and a trolley-arm provided with two sleds, brushes or trolley-wheels; and Fig. 9, is a diagrammatic view representing means for forcing a heating medium through

a hollow conductor and a hollow return conductor, and also showing feeders and connections for said conductors.

In the drawings *a*, is a conduit or subway adapted for use in connection with an electric railway and provided with a slot *a'*, for the reception of a trolley-arm *b*, and with one or more projecting lips *b'*, for a purpose to be presently fully explained.

c, is a tubular electric conductor provided with cleats *c'*, adapted to engage insulated hangers *c²*, by means of which the conductor is supported in the conduit *a*, to one side of the slot *a'*.

d, Figs. 1 and 2, is a covering of asbestos or other preferred material applied to the upper portion of the conductor *c*, and retained to place by means of spring clips *d'*. However, the spring clips *d'*, may be omitted and the covering *d²*, secured to place by extending it more than half way around the conductor *c*, as shown in Figs. 3 and 4. In either case the covering *d*, protects the upper surface of the conductor against moisture and affords an exposed surface at the bottom of the conductor along which the trolley wheel, sled or brush *e*, may travel.

d³, are drip grooves cut or otherwise formed in the edges of the covering *d*, in order to deflect moisture from the exposed surface of the conductor. One of these conductors *c* may be suspended from the top of the conduit by means of the hangers *c²*, as shown in Fig. 7. Under such circumstances the conductor *c*, is connected with the line wire *f*, of a ground return circuit by means of feeders *f'*, and a heated medium as hot air, is drawn or otherwise forced through the conductor *c*, so that the exposed lower surface of the conductor accommodates a brush, sled or trolley that carries off the current required for the propulsion of a car or other vehicle and is also kept perfectly dry, whereby leakage is avoided. Referring now to Figs. 8 and 9, one of these conductors *c*, is suspended by means of its complemental hangers upon each side of the slot *a'*. A stream or blast of a heating medium is caused to traverse both of these conductors by means of a blowing engine *A*, insulated from the conductors and this me-

dium is heated by means of furnaces B, located at suitable distances apart along the line of the railway. One of these conductors is connected through the intervention of suitable feeders 3, with the line wire 1, and the other conductor is connected in a similar manner with the return wire 2, so that these two conductors lead off from the respective poles of a dynamo or other generator and when connected, as through the motor of a car or other vehicle, constitute a metallic circuit. Of course the wires 1 and 2 and their complementary feeders 3, may be dispensed with and in such case the conductors are connected at one of their respective extremities directly with the terminals of the dynamo C, or other source of electric energy and at the other of their respective extremities are properly insulated from each other. When one conductor *c*, is employed the current is taken off therefrom and delivered to the terminal of the motor of the car or other vehicle by means of a single trolley-wheel, sled or brush *e*, (Fig. 7,) it being understood that the other terminal of the motor is connected to earth through a wheel of the car or in any preferred, convenient or suitable manner. When two conductors are employed as illustrated in Fig. 8, the current is taken off from one of them and delivered to one of the terminals of the motor *h* of the car or other vehicle by means of a trolley-wheel, sled or brush, and the current after having traversed the motor is delivered to the other conductor by means of another trolley-wheel, sled or brush, and both of these trolley-wheels, sleds or brushes may be carried by a single trolley-arm. *g* and *g'*, are rollers journaled to each side of the shank of the trolley-arm and adapted respectively to ride upon opposite faces of the lips *b'*, of the conduit. These rollers *g* and *g'*, serve to prevent undue end-play of the trolley-arm and thus insure the successful operation thereof.

In practice it frequently happens that the conductors *c*, are not perfectly straight, so that it is necessary to provide means for affording the trolley-wheel, sled or brush a slight range of play, so that it may remain at all times in contact with the conductor *c*. This result is accomplished according to my invention by providing a slotted connection *m*, between the axis of the trolley-wheel, sled or brush and the trolley-arm, and employing springs *s*, for maintaining the trolley-wheel, sled or brush normally in contact with the conductor; it being understood that the springs *s*, by yielding permit the trolley-arm, wheel or sled to run over irregular or curved portions of the conductor without breaking contact therewith. The upper extremity of trolley-arm is connected with the frame-work *i* of the car or other vehicle by means of a sleeve *n*, and spring *s'*, so that the car or other vehicle is afforded a range of movement independently of the trolley-arm.

It will be obvious to those skilled in the art to which my invention appertains that various modifications as to construction and arrangement of parts of the present system may be readily made without departing from the spirit of my invention, and hence I do not limit myself to any particular construction or to any particular arrangement of the parts in such system as has been hereinbefore explained; but

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric railway, a hollow conductor provided with a partial covering of insulating material and means for supplying a heating medium to the conductor, substantially as and for the purposes set forth.

2. In an electric railway, a hollow conductor provided with a covering extending partially around the same, means for securing the covering thereto and means for supplying a heating medium to the conductor, substantially as and for the purposes set forth.

3. In an electric railway, a hollow conductor provided with a covering partially surrounding the same and means for passing a heating medium through said conductor, substantially as and for the purposes set forth.

4. In an electric railway, a hollow conductor provided with an insulating covering clipped thereto and means for passing a heating medium through the conductor to maintain the same in a dry state or condition, substantially as and for the purposes set forth.

5. In an electric railway, a hollow conductor with an exterior covering partially surrounding the same, means, substantially as described, for supplying a heating medium to the interior of the conductor, appliances for maintaining said conductor throughout the length thereof in a heated condition a line wire and its complementary connections, and feeders connected with said wire and conductor, substantially as and for the purposes set forth.

6. In an electric railway, a hollow conductor, means for passing a heating medium through the conductor, and a covering applied to a portion of the surface of the conductor and provided with drip grooves or notches, substantially as and for the purposes set forth.

7. In an electric railway, a hollow conductor, means for supplying a heating medium to the interior of the conductor, and a covering applied to a portion of the surface of the conductor and provided with means to prevent moisture or fluids coming in contact with the exposed and heated surface of the conductor, substantially as and for the purposes set forth.

8. In an electric railway, a sub-way or slotted conduit, a hollow conductor supported therein and having a covering applied to a portion thereof, means for passing a heating medium through the conductor to dissipate moisture on or about the same, appliances

for maintaining said medium in a normal condition throughout the conductor, electrical feeders connected with said conductor and a car or vehicle provided with means, substantially as described, adapted to be maintained in contact with said conductor, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN W. GRANTLAND.

Witnesses:

THOMAS M. SMITH,
RICHARD C. MAXWELL.