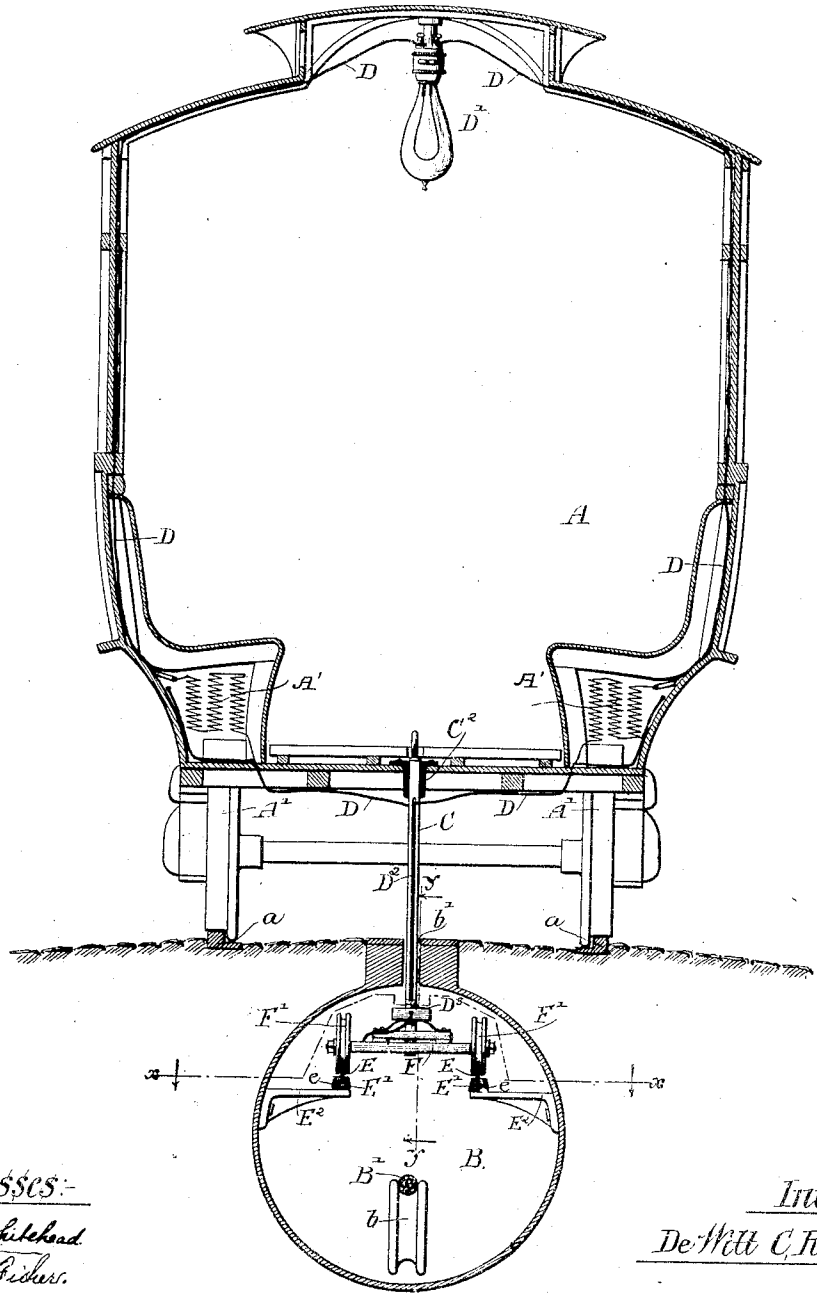
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DE WITT C. ROBERTS.

DEVICE FOR LIGHTING AND HEATING CARS BY ELECTRICITY.

No. 385,774. Patented July 10, 1888.

Fig. 1.



Witnesses:
Louis M. Whitehead
Charles E. Fisher.

Inventor:
De Witt C. Roberts.

by: Dayton & Poole
Attorneys.

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DE WITT C. ROBERTS.

DEVICE FOR LIGHTING AND HEATING CARS BY ELECTRICITY.

No. 385,774. Patented July 10, 1888.

Fig. 2.

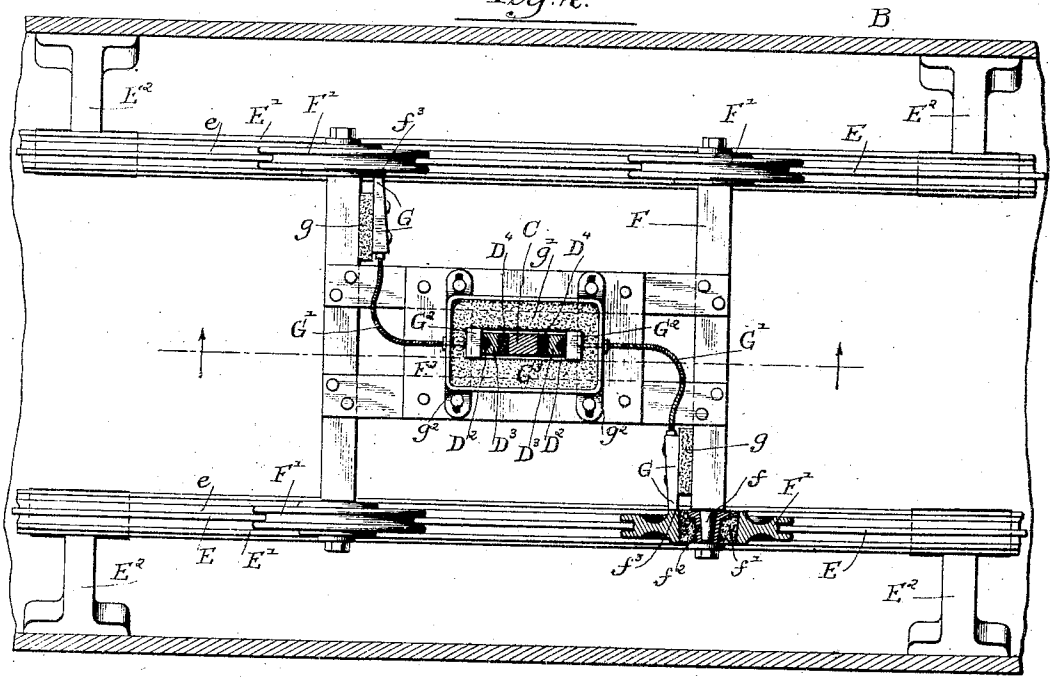
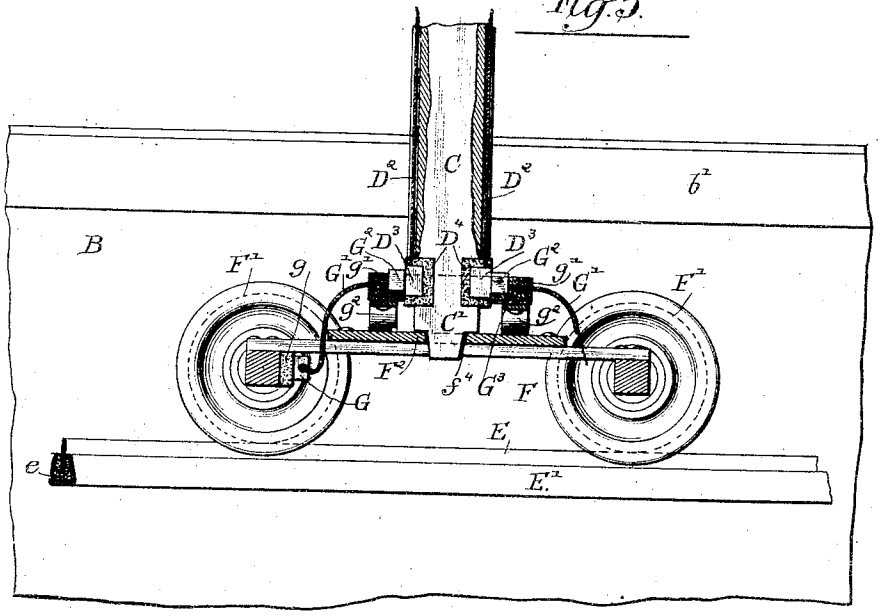


Fig. 3.



Witnesses:
Louis M. Whitehead.
Charles E. Fisher.

Inventor:
De Witt C. Roberts.
by- Dayton + Poole
Attorneys

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Fig. 4.

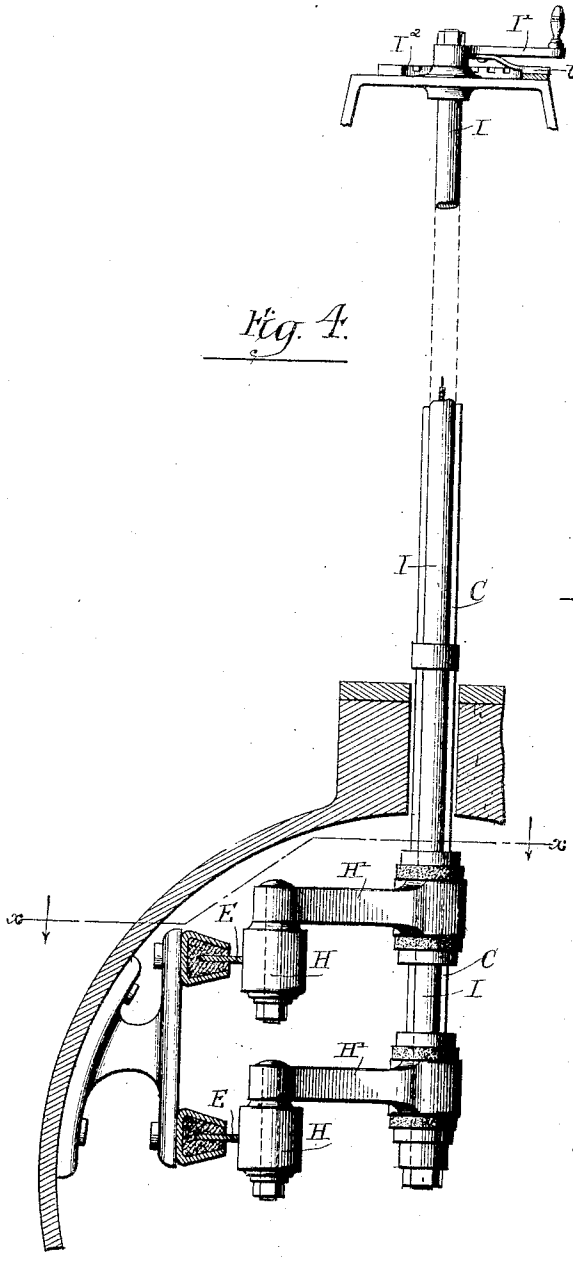


Fig. 6.

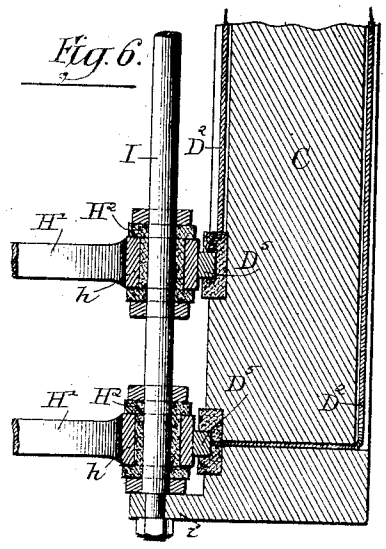
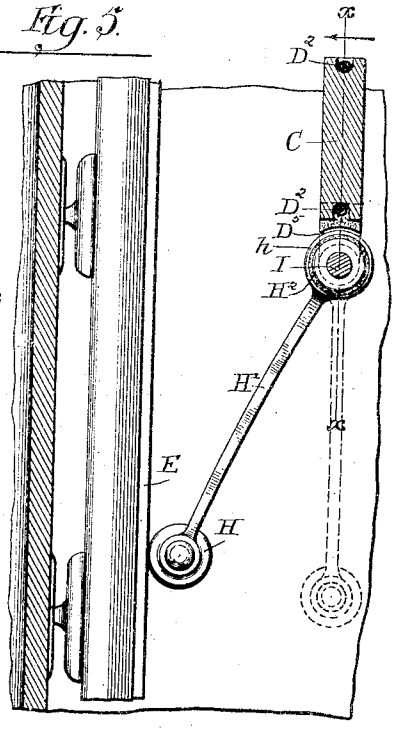


Fig. 5.



Witnesses:-
Louis W. Whitehead.
Charles E. Fisher

Inventor.
De Witt C. Roberts.

by- Dayton + Poole
Attorneys.-

UNITED STATES PATENT OFFICE.

DE WITT C. ROBERTS, OF CHICAGO, ILLINOIS, ASSIGNOR OF FIVE-NINTHS TO CHARLES T. YERKES, OF SAME PLACE.

DEVICE FOR LIGHTING AND HEATING CARS BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 385,774, dated July 10, 1888.

Application filed August 24, 1886. Serial No. 211,715. (No model.)

To all whom it may concern:

Be it known that I, DE WITT C. ROBERTS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Devices for Heating and Lighting Cars by Electricity, and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to devices for lighting or heating by electricity cars which are propelled by means of a traveling cable located in a conduit beneath the ground, and more especially to means for establishing connection between wires or conductors located in the cars and conducting strips or wires through which the electric current is conveyed to the cars from a generating plant or plants located at one or more places on the line of a railway.

A principal feature of my invention is embraced in a construction comprising two conducting wires or strips connected with opposite poles of a dynamo or electrical generator laid longitudinally in the cable-conduit of a railway and two rollers, wheels, brushes, or other contact-surfaces sustained within the conduit in contact with the said wires or strips and having connection with the car by a rigid arm or bar extending through the slot of the conduit through which the arm supporting the grip device extends, said rollers, wheels, or brushes being moved with the car and having electrical connection by means of conductors upon the said bar or arm with the conductors of the car.

I have herein shown two different forms of devices for the purpose above described, in both of which rollers are employed for making contact between the conductors upon the car and those within the conduit. These devices contain certain novel features of construction which are herein claimed as new; but the main feature of novelty above referred to is herein broadly claimed without restriction to the particular devices herein illustrated as desirable embodiments thereof.

In the accompanying drawings, Figure 1 is a transverse sectional view through a cable or grip car, its supporting-track, and a cable-conduit, illustrating one form of my invention. Fig. 2 is an enlarged sectional view taken upon line *x x* of Fig. 1. Fig. 3 is an enlarged sectional plan view taken upon line *y y* of Fig. 1. Fig. 4 is a partial or fragmentary view through a conduit, illustrating another form of device embodying the main features of my invention. Fig. 5 is a sectional plan view taken upon line *x x* of Fig. 4. Fig. 6 is a detail sectional view taken upon line *x x* of Fig. 5.

As illustrated in the said drawings, A is the car-body, A′ the wheels thereof, and *a* the supporting tracks or rails.

B is a cable-conduit, which may be of any usual or preferred construction, and within which is the cable B′ and supporting-pulleys thereof, one of which is indicated at *b* in Fig. 1.

C is a rigid arm or bar attached to the lower part of the frame of the car and extending downwardly through the slot *b′* of the conduit B.

D D, Fig. 1, are conducting-wires which extend from the arm or bar C to an incandescent lamp, D′, at the top of the car. These conductors may, however, lead to or be connected with a heating device, A′, located beneath the seats or in any other desirable position on the car, or a lamp of other form, or with both a lamp and heating device, as may be desired or preferred.

D^2, Figs. 2 and 3, are insulated wires or conductors forming a continuation of the conductors D of the car and extending downwardly along the bar C to the lower end of the latter, where they are connected with insulated metal blocks or contact-points D^3. In the particular construction illustrated in said figures the conductors D^2 are surrounded by insulating material and are laid in vertical grooves formed in the edges of the said bar C, and the contact-points D^3 are fixed in blocks D^4 of insulating material, which are secured at opposite edges of the bar C at its lower end.

E E in the several figures of the drawings represent longitudinal strips or conductors leading through the conduit B. As shown in Figs. 1, 2, and 3, said conductors are made in the form of flat strips placed edgewise upon opposite sides of the conduit, so as to form supporting-tracks for a wheeled car, F, through the medium of which the electrical currents

are conducted from the said conductors E to the conductors upon the car A. The conductors E E when arranged to support a car, F, as described, may be sustained in any suitable manner from the walls of the conduit, suitable insulating material being of course inserted in the supporting parts to suitably insulate the said conducting-strips. A simple and desirable way of sustaining said conductors, whereby the latter may be made with a relatively small cross-sectional area, as is desirable for economical considerations in the use of copper conductors, is shown in the drawings. In this case the strips E are supported by continuous metal stringers E′ of inverted-U or trough shape, a packing, *e*, of insulating material, being placed around the lower part of the conductor-strip within the hollow interior of the bar E′, so as to firmly hold the said strip E in place. In this construction the upper edge of the said strip is of course extended sufficiently far above the top edge of the trough-shaped stringer E′ to enable the wheels of the car F to run thereon without contact with the metal of the stringer. The said stringer may be conveniently supported from the walls of the conduit by means of metal brackets E^2 or otherwise, as desired.

When the conducting-strip is supported in the manner above described and shown, I preferably make the lower part of the said strip with a narrow flange and I converge the walls of the trough-shaped stringer E′ inwardly and upwardly, as clearly shown in Fig. 1, so that when the insulating material *e* is packed around the strip liability of movement of the latter either upwardly or in any other direction will be obviated.

The car F, as illustrated in Figs. 1, 2, 3, is made with four wheels, F′, the outer parts or rims of which are insulated from their journals *f* by means of rings *f′*, of insulating material, placed between the said rims or outer parts of the wheels and the thimbles f^2, which are directly in contact with the said journals. Upon the car frame at opposite sides thereof are located contact surfaces or brushes G, which are insulated from the car-frame by interposed blocks of insulating material, as *g*, and are adapted to remain continuously in contact with annular bearing surfaces f^3 upon the outer parts or rims of the wheels F′, which parts are in contact with the conductor strips E, upon which the car rests. The brushes G are connected by means of conducting strips or wires G′ with the insulated contact points G^2, sustained at the middle of the car opposite each other in such position that the lower end of the bar C may be placed between them with the contact-points D^3 D^3 upon said bar in contact with the said contact-points G^2 G^3 upon the car. As a preferred construction, the contact-points G^2G^2 are held by means of interposed blocks *g′*, of insulated material, in a frame, G^3, which is sustained by means of springs g^2 upon the frame of the car, the bar C being provided with a rigid downwardly-projecting part, C′, extending below the contact-points D^3, and engaging an aperture, f^4, in a plate, F^2, attached to the frame of the car F. By this construction the said car F is obviously actuated by engagement of the arm C therewith independently of the engagement of the contact-points D^3 G^2, and the said contact points G^2 being movably sustained upon the car by the springs g^2, said contact points will yield or move during any irregular or jolting movement of the grip-car, so that said contact-points G^2 will remain in close contact with the contact-points D^3 D^3 under all circumstances. In the operation of the device above described the electrical current for heating or lighting the grip-car passes from one of the conducting-strips E, through one of the wheels F′ and brushes G, to one of the contact-points G^2, through which it passes to the conductors of the car by means of one of the contact-points D^3, and from the opposite contact-point G^3 it passes through the corresponding parts at the opposite side of the car to the other conducting-strip E.

In the form of the device for the purpose above set forth shown in Figs. 4, 5, and 6 the conducting-strips E E are arranged at the same side of the cable-conduit, one above another, and rollers H H, mounted upon horizontal swinging arms H′ H′, (which arms are sustained upon the bar C, which extends downwardly from the car into the conduit,) are employed for making contact with the said conducting-strips E E. The conducting-strips are in this instance constructed and supported in the same manner as before described in connection with the form of device shown in Figs. 1, 2, and 3. The arms H′, supporting the rollers H, are desirably supported upon a vertical shaft, I, which is mounted in suitable bearings *i* at one edge of the vertical bar C, said shaft I extending upwardly into the car and being provided with a hand-lever, I′, whereby it may be turned to carry the wheels against the conducting-strips or to move them away from said strips when the current is not in use. Means will be provided for holding the shaft I in position with the rollers H either in contact with or away from the conductor-strips, means being herein shown for this purpose, consisting of a notched segment, I^2, connected with a spring-arm, *i′*, upon the said lever I′.

To give a yielding pressure of the rollers H H against the conducting strips E E, so as to enable said rollers to move horizontally, as may be necessary to prevent injury to the parts by reason of the jarring or shaking of the car, the arms H′ H′ are preferably made of thin spring metal—such as steel—arranged with their flat faces vertical, as clearly shown in Fig. 5 of the drawings. The said arms H′ are rigidly fixed to the shaft I, and are insulated from the said shaft and from each other by means of sleeves H^2, of insulating material, placed within the hubs *h* of the said arms and around the said shaft. Electrical connection is made between the said arms and the con-

ductors D^2 D^2 (which are held upon the bar C in the same manner as before described) by means of insulated metal blocks D^5, connected with the said conductors D^2 and sustained upon the bar C in contact with the cylindric surfaces of the hubs *h* of the arms H', this construction obviously affording a means for maintaining the said arms constantly in electrical communication with the said conductors D^2 D^2 in whatever position the said arms are placed.

In the use of a device comprising a wheeled frame or car, F, such as is shown in Figs. 1, 2, and 3, the car will preferably be detached from the bar C, and will be retained at a station upon or at the end of the route at times when the employment of a current in the car for heating or lighting is not required, thereby saving the power required to move the said wheeled frame or car and the wear and tear upon the parts which would be occasioned by the continuous passage of the said car over the conducting-strips. As a simple construction in the parts to enable the bar C to be readily disengaged from the car F, said bar is shown in the drawings as held at its upper end in a socket, C^2, in the frame of the car, the bar being extended through and adapted to slide vertically in the socket, so that it may be lifted to release its lower end from the car F when desired. The construction illustrated is, however, one only of a great number of different devices which may be employed in practice for removably securing the said bar C to the grip-car and for detachably connecting the said bar with the car F.

The main feature of my invention is embodied in a construction in which electrical conductors upon a car are maintained in electrical communication with two electrical conductors located within a slotted conduit, and in carrying out this broad feature of the invention devices other than those above described and shown may obviously be used for maintaining continuous contact between the conductors upon the rigid bar which extends into the conduit and the longitudinal conducting-strips within the latter. My invention is not, therefore, limited to the particular features of construction shown, excepting as such features are specifically set forth in the appended claims.

I claim as my invention—

1. The combination, with a car and slotted conduit, of two conducting-strips located within the said conduit, an arm or bar attached to the said car and extending into the conduit, insulated metallic wheels rolling upon the said conducting-strips within the conduit, a frame or axle detachably connected with the said bar and affording bearings for said wheels, insulated contact-surfaces upon the frame having electrical connection with the said wheels, contact-surfaces upon the said arm or bar and conductors leading from said contact-surfaces along the said arm or bar to the car, translating devices upon the car, and connections between the said translating devices and the conductors upon the arm or bar, substantially as described.

2. The combination, with a car provided with a consumption-circuit including heating, lighting, or other translating devices, and a slotted conduit, of two conducting-strips located within the said conduit, an arm or bar attached to the said car and extending into the conduit, insulated wheels rolling upon the said conducting-strips within the conduit, a frame or axle having a vertically-yielding connection with the said bar and affording bearings for said wheels, insulated contact-surfaces upon the frame in electrical connection with the said wheels, contact-surfaces upon the said arm or bar, and conductors extending along the said arm or bar to the consumption circuit on the car, substantially as described.

3. The combination, with a car provided with a consumption-circuit including heating, lighting, or similar translating devices, and a slotted conduit, of two metallic conducting-strips located within the conduit and arranged to form a continuous track, a frame or axle carrying insulated metallic contact-wheels traveling upon the track, spring-supported contact-surfaces upon the frame or axle, and an arm or bar adjustably secured to and extending downward from the car and provided with contact-surfaces adapted to engage the contact-surfaces upon the traveling contact and to be thereby detachably connected thereto, substantially as described.

4. The combination, with a car provided with a consumption-circuit including heating, lighting, or similar translating devices, and a slotted conduit, of two conducting-strips located within the conduit and arranged to form a continuous track, traveling contact devices comprising a supporting-frame and insulated grooved contact-wheels traveling upon the track, connections extending from the contact-wheels to contact-surfaces carried upon the frame, and an arm extending downward from the cars and provided with conductors extending upward into the car and with exposed contact-surfaces at its lower portion, the contact-surfaces of the arm being arranged to engage the contact-surfaces of the traveling contact device within the conduit and to propel the same while maintaining electrical connection between the cars and the conductors within the conduit, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

DE WITT C. ROBERTS.

Witnesses:

C. CLARENCE POOLE,

CHARLES E. FISHER.