(No Model.)

C. G. BURKE.

CLOSED CONDUIT ELECTRIC RAILWAY.

No. 529,704. Patented Nov. 27, 1894.

Fig. 1

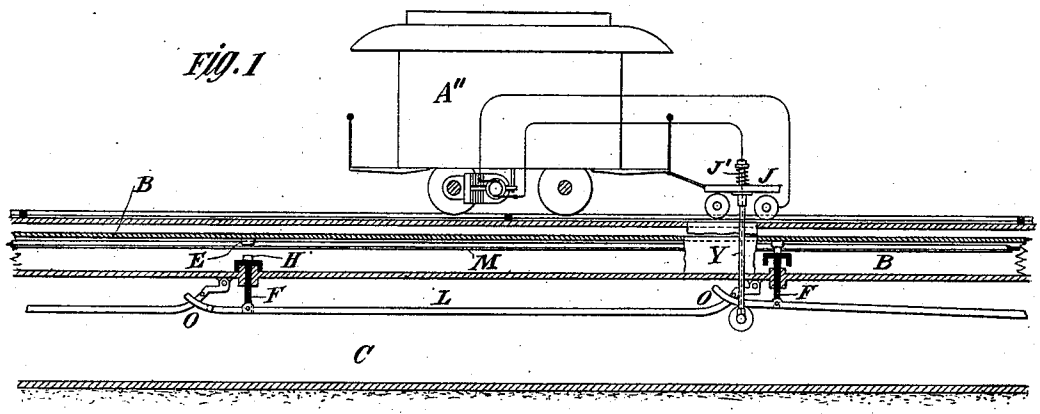


Fig. 2

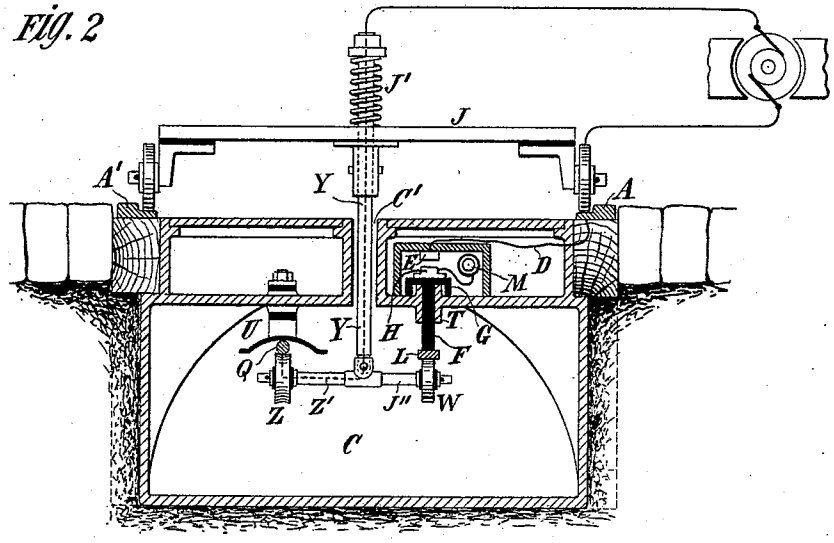
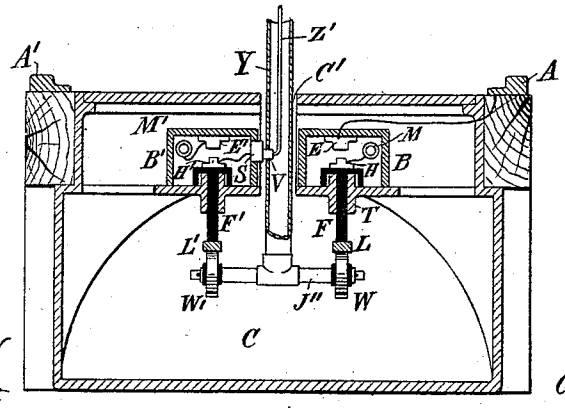


Fig. 3



Witnesses:
Raphael Netter
James N. Catlow

Inventor
Charles. G. Burke
by Duncan & Page
Att'ys.

UNITED STATES PATENT OFFICE.

CHARLES G. BURKE, OF BROOKLYN, NEW YORK.

CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 529,704, dated November 27, 1894.

Application filed February 10, 1894. Serial No. 499,697. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. BURKE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The invention which forms the subject of this application is an improvement in electric railways, the improvements relating to that class or system of roads in which one or both of the conductors which convey the current from a station to a motor or motors running along the track are insulated from the earth and in which electrical contact between the motor or motors and the supply conductors is secured by means of a trolley or contact wheel running in a subway or conduit.

The invention comprises a novel arrangement of the supply conductors and a new and improved combination of devices for establishing electrical connection between said conductors and the motor, the general nature of said improvements being as follows: One of the main or supply conductors is run the entire length of the line of rail and is carefully insulated from the ground, being preferably placed underground. At short intervals insulated branches are run from said main conductor into a closed and insulated box or series of boxes constructed along the line of travel and underground below the track. Electrical connections by means of insulated conductors are also established at the same intervals between one line of rails of the track and contact points or terminals in said box or boxes. Each branch from the main or supply conductor leads to a movable contact while the rail connections are with stationary contacts, and the two sets of contacts are arranged to be brought into contact by the movement of one toward the other. This movement is effected through the instrumentality of a series of levers which are placed end to end and pivoted in a continuous line in a conduit or chamber under the box or boxes containing the contact points. These levers correspond in number with the number of the branches from the main conductor and carry suitable pins or rods that move the terminals of the main line branches when said levers, by the engagement therewith of a traveling wheel, trolley or other like device carried by a car are raised. On each car or on an independent truck propelled by the car is an arm or bar of suitable construction that carries two trolley wheels, one of said wheels operating to raise the levers successively so as to establish electrical connection between the main conductor and the rails, while the other trolley runs in contact with a naked conductor carried by insulated supports in the conduit and constituting the return conductor of the circuit. The trolley in contact with the return conductor is of conducting material and is connected by an insulating conductor running up through the trolley arm to one terminal of the motor, the other terminal of the motor being electrically connected with the rail or that section of the rail which for the time being is connected with the supply conductor. In a modification of this plan I insulate both the line conductors and run branches from the return conductor at intervals to insulated contact points in a second box or series of boxes or chambers similar to that described. I also employ in conjunction with such contact points movable contacts connected with an exposed conductor in contact with which runs a brush or trolley electrically connected with the negative terminal of the motor. With this system I use two insulating trolleys and a double line of levers which operate, when raised, to establish connection between the two series of fixed and movable contact points respectively.

In the accompanying drawings I have illustrated the construction and the preferred arrangement of the several parts of the system above described.

Figure 1 is a view in elevation and part section of a track and conduit equipped with my improved system. Fig. 2 is a cross section of the track and conduit and Fig. 3 is a similar view of a modification of the invention.

A, A′ designate any conducting rails which may be and in this case are the rails upon which the cars are to run, and as shown are laid on timbers along the road bed so that they will be to some extent insulated from the ground. Beneath the track is a conduit

or longitudinal chamber C of any suitable construction provided with the usual slot C'. Above this conduit and preferably in a chamber especially provided for the same is a box B running the entire length of the track or a series of boxes which are composed of insulating material or which are carefully insulated. Along the line of the rails and either in the box B or elsewhere near it is the continuous insulated supply conducter M running from the station where the current is produced and connected with one pole of the generator. This conductor is thoroughly insulated, but insulated branch wires are connected with the same at short intervals and are led to metallic terminals H within the box or boxes B. In front of said terminals and at a short distance therefrom are other terminals E which by means of insulated wires D are connected with one of the lines of rails, which latter are either in electrical connection with each other or divided into insulated sections as shown in Fig. 1, as may be preferred. One or the other of the terminals or contact points E H is movable and the other stationary and in the drawings I have shown those contacts which are connected with the line wire as movable. For this purpose they are mounted on rods F of insulating material which are provided with flanged caps G and which extend through tubes T entering the box or boxes B. Each of the insulating pins or rods F is connected with or carried by a lever L. These levers are pivoted at or near one end beneath the openings into the box B through the tubes T. The end of each lever is forked and embraces the adjacent lever near its pivoted end which latter is bent and rounded as shown at O in Fig. 1. The forked ends of the levers are turned upward as indicated so that a wheel or trolley running along under the levers in either direction will pass readily from one lever to the next raising all the levers in succession as it is carried along.

On the car A'', or on a truck J which is propelled by the car, is a tube or bar Y that extends downward through the slot into the conduit. This bar is surrounded or acted upon by a spring J' which tends to lift it up out of the slot. Within the conduit and to the lower end of the bar Y is attached by a swivel or universal joint an axle or shaft J'' carrying two wheels or trolleys W, Z. The trolley W is of insulating material or is insulated from its shaft and runs under and in contact with the series of levers L. The trolley Z is of metal or provided with a metallic periphery which is in permanent electrical connection with one terminal of the motor on the car through an insulated wire Z' that runs through the trolley rod or arm Y and the axle J''. Said trolley runs in contact with the bare wire Q which is supported by insulating brackets U in the conduit. This wire runs the entire length of the line and forms the return conductor of the system. The action of the spring J' is to maintain the trolley wheels W Z in engagement with the conductor Q and the series of levers L. When current is supplied from the station, at any given moment the trolley W resting in contact with one of the levers L will raise the same and with it the rod or pin F so as to bring the contact terminal H carried thereby into engagement with the corresponding stationary terminal E. By this means a branch connection is established between the supply conductor B and the rails A or one of the insulated sections of said line of rails. From this point the current is conveyed by the wheels of the car or truck to the motor on the car A'' and from the motor the current is carried through the insulated wire Z' to the return conductor Q. As the car progresses the trolley W passes from one lever L to the next, raising the lever in advance before leaving that in the rear by reason of the overlapping of said levers. The current in this way is transferred from one section of rails to the next, all parts of the circuit being insulated except that portion of the rail on which the truck or car is at the time running. Instead of employing a continuous exposed return conductor I may provide a continuous insulated return conductor from which branches lead to insulated stationary terminals E', in a box or series of boxes B' similar to those heretofore described. At any convenient point within the conduit or slot is secured a conductor S which may be either continuous or in sections. This conductor is connected by insulated branches to movable contacts H' supported by insulating rods F' which extend up into the box D' and which are carried by a series of levers L'. In this case the rod Y carries two insulated trolleys W W' which run under and in engagement with the two series of levers L L' respectively so that both the leading and return conductors are at all times insulated from the motor and the earth except at the point where two of the levers L L' are raised by the trolleys to establish branch connections with the rails A and the conductor S respectively. The trolley rod Y carries a brush or a wheel V which runs in permanent contact with the conductor S and which forms one terminal of the motor being connected therewith through the insulating wire Z.

What I claim is—

1. The combination with a line of rails, a conduit having upper and lower longitudinal chambers or compartments and an insulated supply conductor, of a series of circuit-controlling levers in the lower compartment of the conduit adapted to establish connections between the rails and supply conductors, an exposed return conductor, an arm extending from the car into the lower compartment and an insulated trolley carried thereby and running in engagement with the circuit-controlling levers and a conducting trolley connected with the car motor and running in contact with the return conductor.

2. The combination with a line of rails from which the car motors are arranged to receive current, and contact terminals in a conduit beneath the track connected at intervals with said rails, of an insulated supply conductor in said conduit, insulated movable terminals connected therewith at intervals, and extending through openings into a lower chamber in said conduit, an arm extending from a car into said lower compartment, a series of levers in the lower compartment with which the said arm engages and adapted to raise the terminals successively upward into contact with those connected with the rails, and a spring acting on said arm and tending to raise it from the conduit, as set forth.

3. The combination with a line of rails, a conduit and an insulated supply conductor of a series of circuit controlling levers in said conduit adapted to establish electrical connections between the supply conductor and line of rails, a bared or exposed return conductor also in the conduit, an arm extending from a car into the conduit and having two trolleys, one adapted to engage with and operate the circuit controlling levers, the other connected with the motor and adapted to run in contact with the return conductor, as set forth.

4. The combination with a line of rails, a conduit beneath the same provided with a longitudinal slot, and an insulated box or series of boxes above the conduit and provided with passages opening into the same, of a series of stationary and a corresponding series of movable terminals located in the box and connected at intervals with the rails and an insulated supply conductor respectively, insulating rods supporting the movable terminals and extending through the passages into the conduit, a series of levers each carrying one of said rods, an arm carried by a car and extending into the conduit and adapted to raise said lever successively, as set forth.

5. The combination with a line of rails and a conduit beneath the same, of an arm or rod carried by a car and extending through a slot into said conduit, two trolleys carried by said arm, a supply conductor, a series of nominally open branch connections between the rails and said conductor, means for closing said branches successively, adapted to be operated by one of said trolleys, a return conductor with which the other trolley is constantly in engagement, and circuit connections between the car motor and said trolley as set forth.

CHARLES G. BURKE.

Witnesses:
R. F. GAYLORD,
JAMES N. CATLOW.