

(No Model.)

F. W. SABOLD.  
CIRCUIT FOR ELECTRIC RAILWAYS.

No. 442,140.

Patented Dec. 9, 1890.

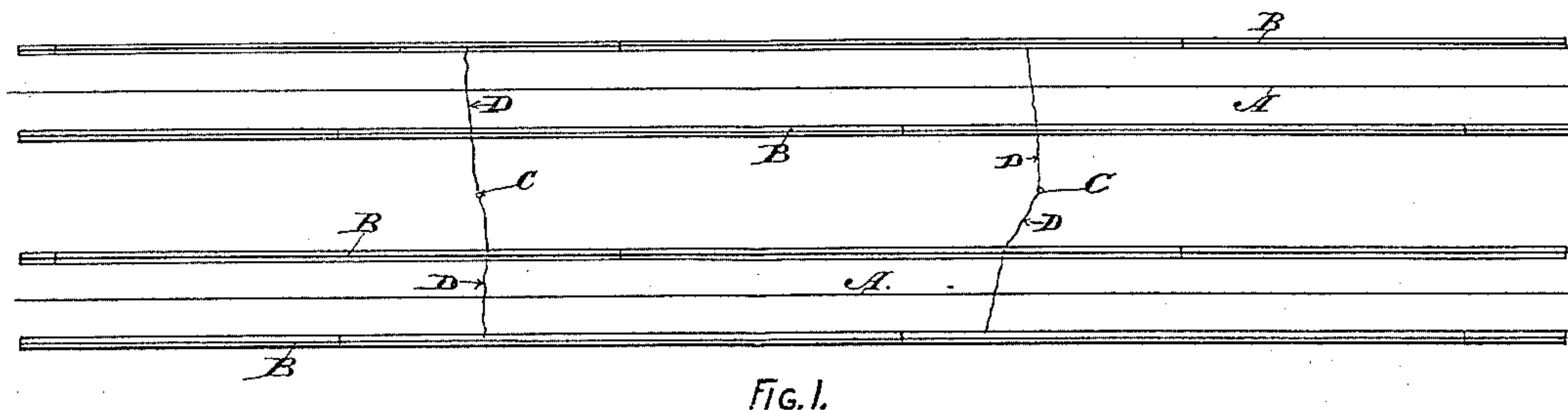


FIG. 1.

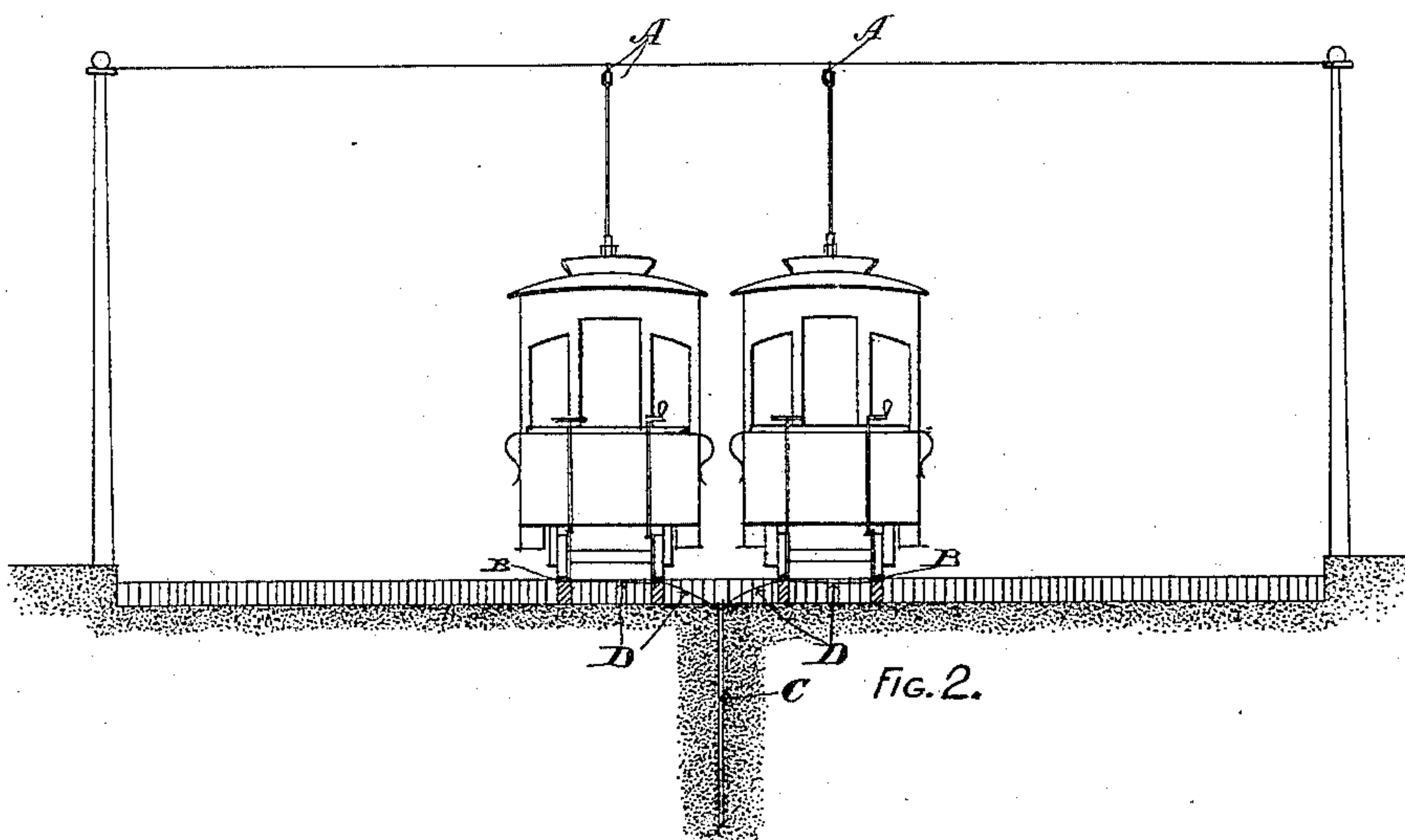


FIG. 2.

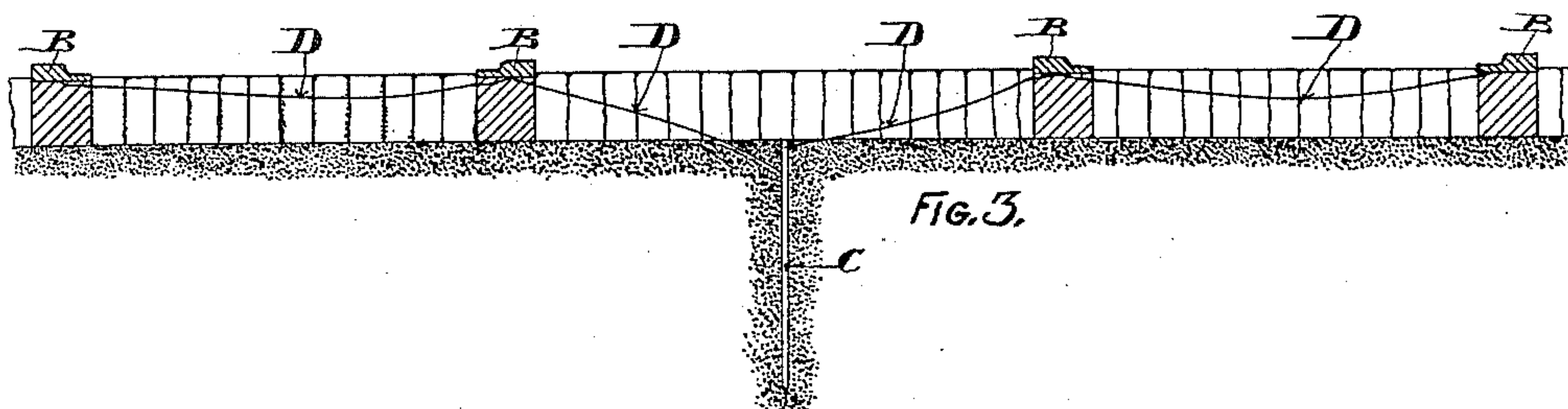


FIG. 3.

WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## CIRCUIT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 442,140, dated December 9, 1890.

Application filed September 22, 1890. Serial No. 365,770. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK W. SABOLD, of the city and county of Albany, in the State of New York, have invented new and useful Improvements in Circuits for Electric Railways, of which the following is a specification.

It is a well-known fact that the earth a very few feet beneath its surface offers no perceptible resistance to the flow of the electric current, and for that reason it forms the best and cheapest known conductor that can be used for the purpose of conducting electric currents.

My invention consists in combining with an overhead electric conductor the rails of a railway, which are electrically connected with a series of metallic bars inserted into the ground adjacent to and in line with the railway-tracks at distances apart that will not exceed the length of an ordinary track-rail, so that a car equipped with the usual motor and conducting-wires will in its transit over said track effect a constant variation in the length of the electric circuit, making the latter longer or shorter, according to the direction in which the car is moving in respect to the generator, the course pursued by the current from the dynamo or generator being through the overhead or trolley wire, downward through the conducting-wires of the car to the track-rails, thence to the metallic bars through the wires connecting said bars to the track-rails, then from said bars through the earth back to the generator, the earth alone being used to complete the circuit from the metallic bar nearest the point on the track where the car is at the time located to the dynamo or generator, regardless of the fact whether at that time the car is in motion or stationary. In electric railways as ordinarily constructed a conducting-wire is usually placed in electrical connection by the side of or underneath the track-rails, so as to form a complete metallic circuit through the entire system; but this is open to the objection that it is both expensive to build and unreliable in use.

In the accompanying drawings, which are herein referred to and form part of this specification, Figure 1 is a plan view of a railway which embodies my invention. Fig. 2 is an

end view of the same; and Fig. 3 is an enlarged transverse section of the railway-tracks, showing the mode of forming electrical connections between said tracks and the earth.

As illustrated by the drawings, A indicates the overhead or trolley wires of an electric railway of a common and well-known construction, and B the track-rails of the same. Said wires and rails when considered by themselves form no part of my invention.

C is a series of bars or other forms of metal or other material which possesses suitable electric conductivity, driven or otherwise inserted into the ground in proximity to and substantially in line with the tracks B. Said bars are connected by means of wires or other electrical conductors D to the track-rails B, and said connections should be in electric contact to insure a proper operation of the circuits. The electric current from the dynamo or generator is conducted to the motor in the car by means of the overhead wire in the usual manner, and from the motor the current passes through the car-wheels into the track-rails at the point whereon said car-wheels at that time have their bearing. From the track-rails the current is conducted through the nearest conductor D and bar C into the earth, which conducts the current back to the generator, and thereby the circuit is completed; and it is obvious that the point of contact of the car-wheels with the track-rails being constantly shifting by reason of the movement of the car on the tracks the length of the circuit will be constantly correspondingly increased or diminished, according to the direction in which the car is being moved, the increase in length occurring when the car is being moved away from the generator and the decrease when it is being moved in the opposite direction, and it will be observed that the variations in the length of the circuit are produced automatically by the travel of the car.

I am aware that telegraph-lines have heretofore been constructed with electric conductors inserted in the earth at points where the terminals of the circuit were located; but in such cases the length of the circuit has not been variable automatically and required the manipulation of switches to vary the

length of the circuit; but in such constructions the currents could not be extended beyond said terminals without shifting the switch to effect that purpose. I do not claim  
5 said earlier construction; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

In an electric railway comprising an overhead conductor or trolley-wire, a motor-car  
10 provided with electrical conductors by which the electric current is carried to the motor

and thence into the track-rails, a series of electric conductors fixed in the ground in proximity to the track-rails and connected to the latter by means of electric conductors, whereby a constantly-varying length of the electric circuit is automatically effected, substantially as specified.

FRANK W. SABOLD.

Witnesses:

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