

(No Model.)

2 Sheets—Sheet 1.

W. M. BROWN.
ELECTRIC RAILWAY SYSTEM.

No. 558,151.

Patented Apr. 14, 1896.

Fig. 2.

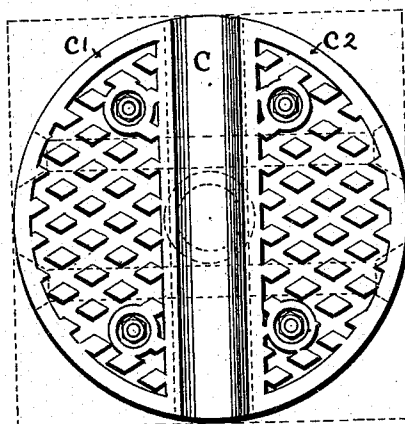


Fig. 3.

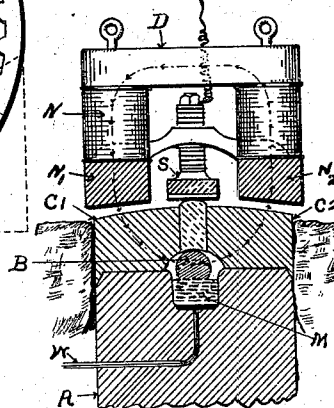
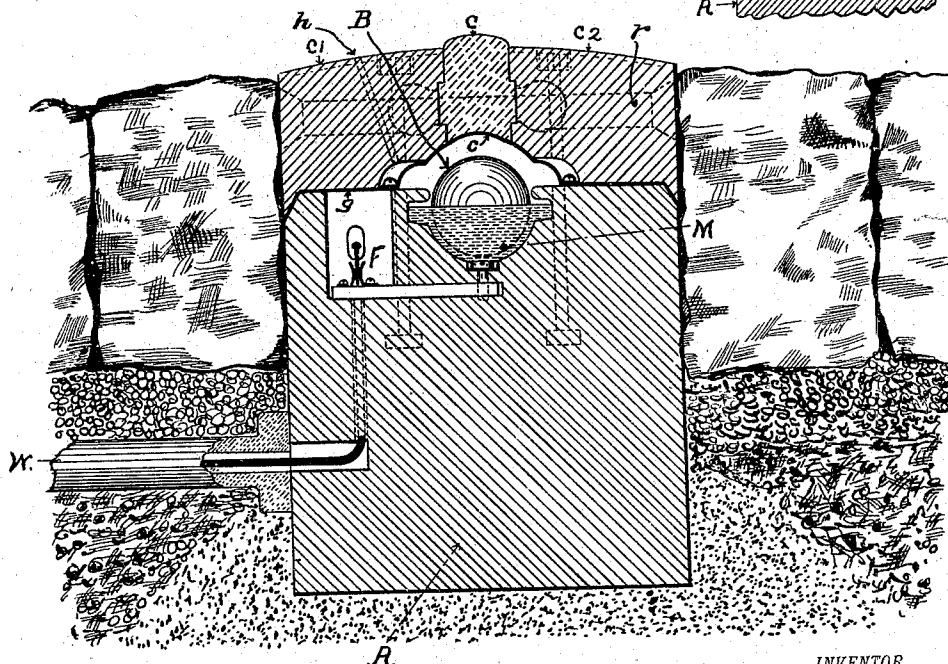


Fig. 1.



WITNESSES:

N. G. Kantner
Charles Bennett

INVENTOR

W. M. Brown

BY

Wm. R. Ragsdale
ATTORNEY.

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Fig. 6.

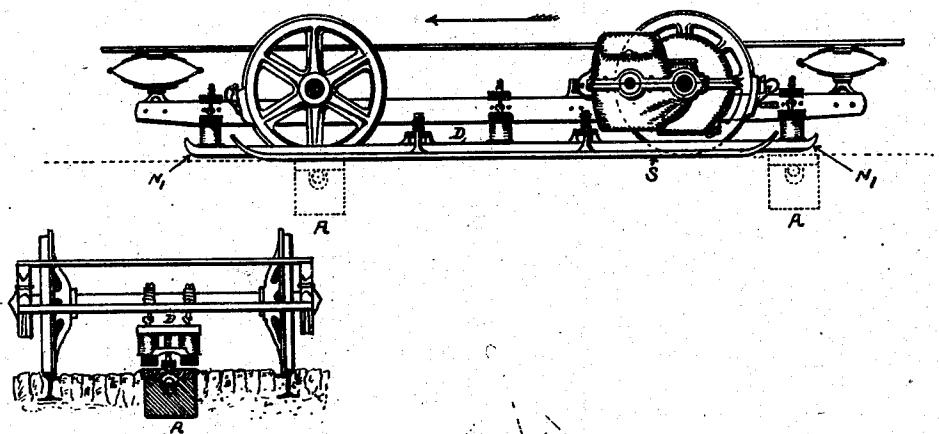


Fig. 5.

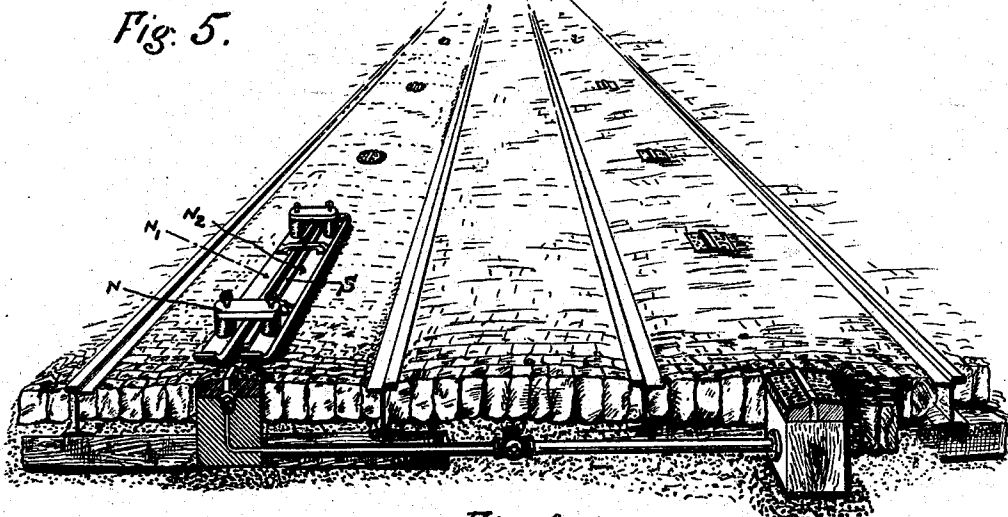


Fig. 4.

WITNESSES:

R. G. Kantner
Charles Bennett

INVENTOR

W. M. Brown

BY

Ward Raymond
ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM MILTON BROWN, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO
THE JOHNSON COMPANY, OF LORAIN, OHIO.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 558,151, dated April 14, 1896.

Application filed November 29, 1895. Serial No. 570,347. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILTON BROWN, of Johnstown, county of Cambria, State of Pennsylvania, have invented a new and useful Improvement in Electric-Railway Systems, of which the following specification is a true and exact description, due reference being had to the accompanying drawings.

My invention relates to certain improvements in electric-railway systems, and has for its object to provide a system in which the car-motors draw their current from isolated contact-pieces in the street, and also to obtain certain other advantages hereinafter pointed out and described.

In general an electric-railway system constructed in accordance with and embodying my invention comprises a series of contact-boxes, hereinafter explained, located in the track, an electromagnet carried by the car and adapted to pass over the contact-box, and a contact-shoe also carried by the car and adapted to make contact with the contact-box.

Referring to the drawings, Figure 1 represents a vertical section through a contact-box. Fig. 2 is a top view of such a box. Fig. 3 shows in section a box and the magnet over it. Fig. 4 is a general view of a section of track constructed in accordance with my invention and showing a magnet approaching one of the boxes which is in section. Fig. 5 is a transverse and Fig. 6 a longitudinal section through a car-truck, showing the method of attaching the magnet and shoe to the car.

I will now describe the contact-box in detail. Referring to Fig. 1, A is a base-block of suitable material, as wood. In the top of this block is a cavity containing mercury, M, in which floats an iron or steel ball B. On the top of base A is a cover composed of three pieces, a center one C of non-magnetic material, as manganese steel or brass, and a cast-iron one on each side, as C' C². These are securely fastened together, as by bolts or rivets, or they may be cast together, the center one C being provided with suitable lugs L, around which the fluid cast-iron will flow and thus form one solid piece. This cover is secured to the base A, as by the bolts shown. The cavity shown in the under surface of the cover is directly over the ball as it floats in the mer-

cury, as is shown in Fig. 1, the top of the cavity being preferably of a form to fit the ball when it is lifted up, as will be hereinafter explained. Between base A and the cover may be placed a suitable gasket g to insure a tight joint between the two, and above the mercury and ball I may place the sheet-metal cover c, securing it all around to the base A, thus still further insuring a perfect sealing of the mercury-chamber. This inside cover is of use in another way. Being of sheet metal it can be cheaply stamped of a form and finish that will insure a good fit between it and the ball, and the cover proper can be cast with a slight clearance, thus avoiding the cost of finishing it, which if the contact portion C be of manganese steel would be expensive. When the whole is together, melted lead or other suitable material may be run in through hole h, filling the clearance-space and insuring a good contact between the two.

The line-wire W enters the block, as shown, and at F, I may place a fuse-switch, which in case of accidental grounding of the contact will blow and kill the box, thus rendering it harmless. From the fuse a conductor runs to the bottom of the mercury-cavity, as shown. The ball is therefore always a live terminal.

Carried on the car is a magnet, the form of which is very clearly shown in Fig. 4. This magnet comprises two parallel poles N' N², energized by suitable coils N. Also carried by the car and between the poles of the magnet is the contact-shoe S, the whole being arranged as is shown in Fig. 3, so that the poles N' and N² pass over but do not touch cover-pieces C' and C², and the shoe S makes a sliding contact with contact C. Now it will be seen from Fig. 3 that if the magnet be energized the path of the magnetism will be from one pole, as N', through C', thence partly across the gap caused by the insertion of the non-conductor C, and partly down through ball B to the other cover-piece C² and to the other pole N². This will exert an upward pull upon the ball B, and as it floats in the mercury not only is it free to rise, but as its apparent weight is nothing a very slight force will tend to start it upward. As it rises and emerges from the mercury its apparent weight

increases; but this is more than overcome by the greater pull due to the lessening of the air-gap between it and the cover-pieces C' and C², so that it is finally drawn up tightly against the contact C, and is securely held there without rebound. As it is still in the mercury, the current is free to travel up through it and energize contact C, from whence it passes to shoe S and to the motors.

The operation of the system is as follows: The magnet and shoe are made of any suitable length and suspended beneath the car, and the contact-boxes placed in the street at such distance apart that the shoe will not leave one until it has passed onto the next one. The magnet may be excited entirely by a storage battery carried on the car, or it may be operated in the working circuit in series with the motors.

The exposed portion of the contact-boxes is normally dead, but as the magnet passes over it the ball is lifted up against the contact C, energizing it so that when the shoe engages it the current passes up into the motors. It will be noticed in Fig. 6 that the magnet is longer on each end than the shoe. This is in order that the magnet shall pull the ball up against contact C before the shoe engages it, and also hold it up until after the shoe has passed off, thus insuring any arcing that may take place due to breaking the circuit through that box occurring between the contact and shoe and not within the box. As the magnet passes off the box the ball will fall and its inertia will carry it below its normal level in the mercury, thus causing a temporary air-gap larger than normal, which tends to prevent any arcing between the ball and contact C.

It will be seen that in Fig. 1 I have shown the mercury-cavity as semispherical in the bottom and widening out on the top. This is in order to secure the least fall of level in the mercury as the ball rises out of it. If preferred, the cavity may be plain straight sided, as is shown in Fig. 3; nor is the sheet-metal cover c a necessity, though desirable, and I have therefore omitted it in Fig. 3. The box may be either circular in shape, as shown, or where used in paved streets it may be rectangular, as shown in dotted lines in Fig. 2.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. A contact-box for electric-railway sys-

tems, comprising a body having a cavity containing mercury and a conductor leading into said cavity, a body floating in said mercury and adapted to be magnetically influenced, a cover over said mercury composed of a center of non-magnetic material and two sides each of material adapted to conduct magnetism.

2. A contact-box for electric railways, comprising a base having a cavity containing mercury and a conductor leading into said mercury, a body floating in said mercury and adapted to be magnetically influenced, a contact member above the floating body and adapted to convey the current from said body to the collecting device on the car, a non-magnetic piece extending across the top of the base and a conductor of magnetism on each side thereof.

3. In a contact-box for electric railways, a base having a cavity therein, a body of mercury in said cavity, an iron or steel ball floating in said mercury, a main cover composed of a central portion of non-magnetic material, and two side portions of a material adapted to convey magnetism, and an inner cover adapted to seal the mercury-chamber.

4. In a contact-box for electric railways, a plurality of magnetic conductors substantially insulated magnetically from each other and having a recess or cavity between them into which the contact member is adapted to enter.

5. In a contact-box of the character described, a cover containing two magnetic conductors magnetically separated from each other and having a recess or cavity in its lower face into which cavity the member to be magnetically influenced is adapted to enter.

6. In a contact-box of the character described, a cavity containing a switch member in continual electrical connection with the supply and adapted to be magnetically influenced, a pair of magnetic conductors above said switch member, which conductors have a common cavity or recess between them, said switch member standing normally partly entered in said recess and adapted to be drawn therein by means of the magnetic influence in the said conductors.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM MILTON BROWN.

Witnesses:

S. G. BONN,

H. W. SMITH.