

(No Model.)

E. H. BROWN.
CLOSED CONDUIT ELECTRIC RAILWAY.

No. 516,626.

Patented Mar. 13, 1894.

Fig. 1.

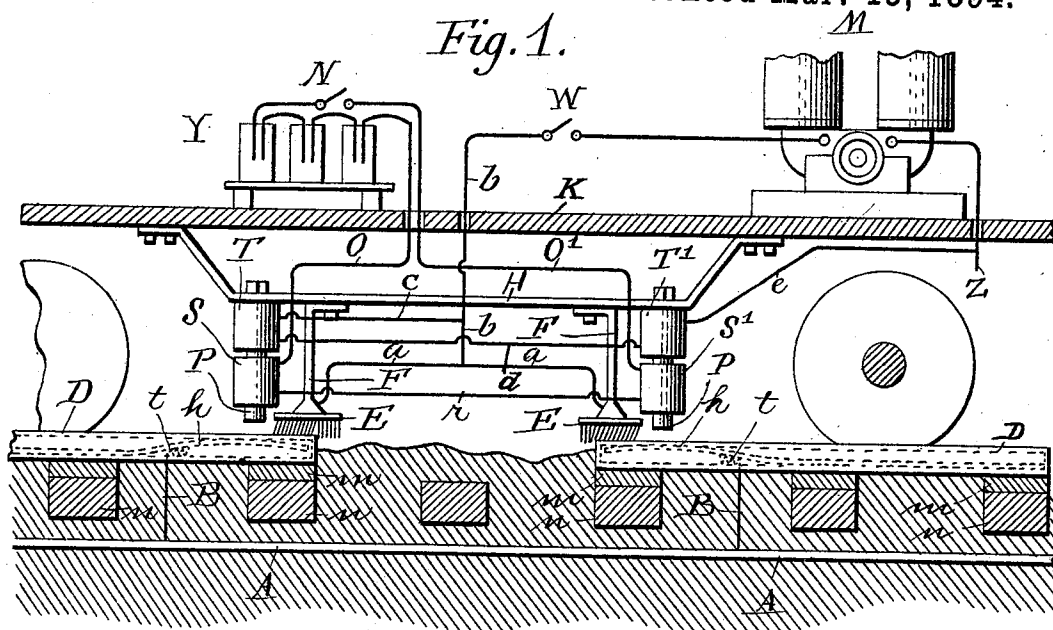


Fig. 2.

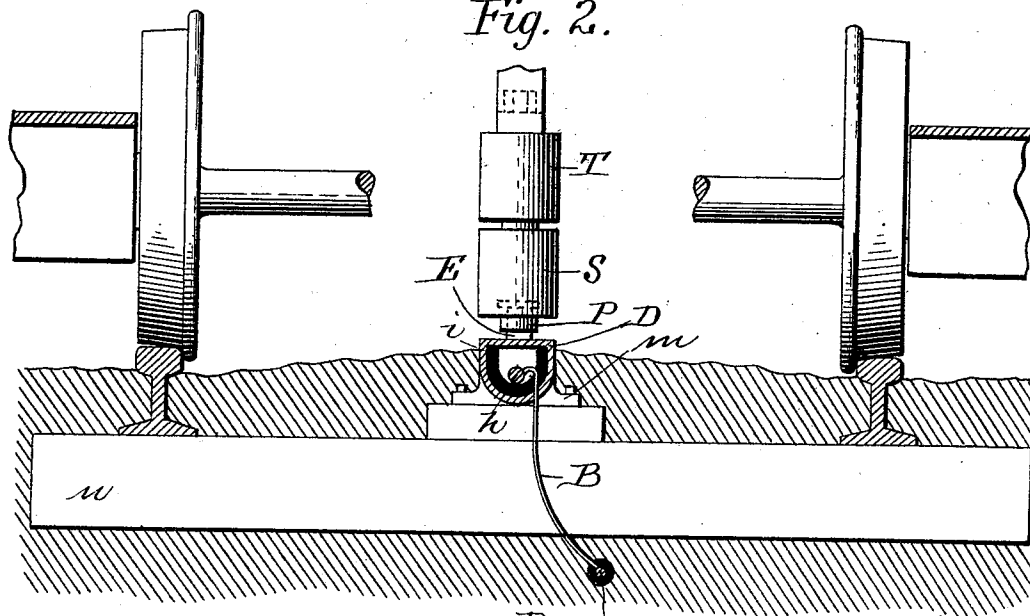
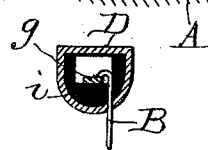


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

EDWARD H. BROWN, OF SALEM, ASSIGNOR TO THE MAGNETIC ELECTRIC COMPANY OF WEST VIRGINIA, OF BOSTON, MASSACHUSETTS.

CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 516,626, dated March 13, 1894.

Application filed April 22, 1893. Serial No. 471,495. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. BROWN, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Closed-Conduit Electric Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that system of closed conduit electric railways in which magnetic induction from the car is employed to lift the service conductor, and to switch surface supplies into and out of circuit with the main supply. Known characteristic features in such a system are a magnetic attachment to the car or vehicle, fixed surface magnetic pieces electrically and magnetically insulated from each other, a continuous flexible magnetic conductor forming a component part of the main electric conductor conveying the working current, which conductor has an upward motion for producing the electric contact, and which after the magnetic influence is over it returns to its normal position, by the force of gravity.

My invention consists of improvements, as hereinafter described and claimed, and having the following objects in view:—to arrange the main supply wire entirely distinct and apart from the inclosure containing the switch contacts; to constitute such inclosure for the switch contacts of independent closed sections which form a center rail from which the current is collected; to make these sections, or surface conductors, of considerable length, with a considerable insulating space between them, and to employ them in connection with brushes and magnets, so that with two brushes and two magnets, for instance, each brush will be arranged near a magnet, and each set be placed at such distance apart that the head magnet and brush will make contact on a coming section before contact is lost on a following section; to give to the separate switch boxes a continuous contact throughout their length, the contact point not being confined to the point directly below the magnet pole; to make the connection between each of said

magnetic contacts and the main feed flexible, and to have the series of magnetic contacts connected independently to the main electric feed which is made continuous. The instrumentalities with which I accomplish these objects are illustrated in the accompanying drawings, in which—

Figure 1, is a side elevation of the entire arrangement; Fig. 2, a transverse view, partly in section, illustrating the construction in cross section of the inclosure forming a surface conducting switch box, and its connection with the magnet, the connection of branch magnetic rod therein with main electric feed, and the relative position of these devices with the side tracks and car wheels; and Fig. 3, a cross section of a modified form of branch magnetic conductor.

Referring to the drawings, A represents an electric main insulated conductor or buried supply wire, leading from any suitable source of electricity.

B, B, are branch wires leading into inclosures D, and there connecting by spiral spring connections *t*, with switch contacts, which may be either wire rods *h*, as shown in Fig. 2, or flexible metal strips *g*, as in Fig. 3, or said wires B, B may be connected directly to said rods *h*, as shown in Fig. 2.

The inclosures D, are metal boxes, preferably tubular in form with flat top surfaces preferably non-magnetic. They are arranged in sections in the middle of the track, and are separated by quite a long space. The switch contacts are each the length of a box, and lie loosely upon a bed of insulating material *i*, which material also extends along the sides of the contacts and fills up the box, except the space directly between the contacts and top of the box. The boxes rest in brackets *m*, which are bolted to the ties *n*.

On the car frame K are carried a motor M, and a battery Y. N is a battery switch, and W a motor switch. Beneath the car frame and suspended from a supplementary frame H, are brushes E, and magnets P. The brushes are hung on the ends of rods F, and so as to collect the current from the top metallic surfaces of the boxes or the tubes D, which form the center track.

The brushes and magnets are set together

in pairs, in one set the brush being in advance of the magnet, and in the next set the brush being behind the magnet. The magnets are each provided with coils, S, S', with supply wires leading respectively as indicated by O, O', from battery Y. This battery circuit serves to energize the magnets, and when thus energized the contact is kept closed through the track switches even if the battery switch N, be then opened.

The battery coils S, S', are connected by wire r. The brush circuit around the motor is from surface of contacts D, through wire, a, connecting the brushes, thence through wire b, to and through the motor switch W, to motor.

The magnets are energized from main line circuit through the short coils T, T', by wire c, to coil T, thence through wire d, to coil T', and from coil T', through wire e, back to ground wire Z.

The character of the battery motor, magnets, coils, and brushes, the shape of the contact sections, whether round, partly circular, or square, and the contact switch contacts whether a rod or a strip are not essential, and may be varied. The connections B, however, between the contacts and the insulated main line should be flexible, in order that the said contacts which are placed loosely within their inclosures may be free to touch throughout their length the under part of the top surface of such inclosures.

The advantages of constructing the switch boxes, which form the center rail, independently, are to give independent access to each section when the box or its inclosed contacts are in need of repair or replacement, without disturbing the adjacent boxes, or without interrupting the running of the cars; and to prevent the line from being short circuited by the filling of the contact inclosures by water as in those systems having a continuous and connected tube or conduit.

From the above statement and description it is believed that the construction and operation of my invention will be readily understood without further description.

What I claim is—

1. In a closed conduit electric railway system, in combination with a car provided with magnets, a main electric supply wire, magnet contacts, and separate and independent inclosures for the same, said inclosures forming sections of a continual central rail, said main wire independent of said inclosures and di-

rectly connected with said contacts, substantially as described.

2. A main electric supply in combination with separate and independently operating magnet contacts, separate insulating inclosures for said contacts forming conducting surfaces, said contacts lying longitudinally and loosely within said inclosures, and a separate flexible and direct connection between each of said contacts and the main electric supply, substantially as described.

3. Closed independent and separate sections, each forming a surface conductor, a section of a continual central rail, and an insulating inclosure, in combination with independent longitudinal switch contacts each lying loosely within such inclosure, substantially as described.

4. The closed switch boxes in section forming the center rail of considerable length and separated by a considerable insulating space, in combination with the separate and independently movable magnetic contacts contained in said boxes, said magnetic contacts adapted to have continuous connection throughout the entire length of each contact with the conducting surface of said boxes, a car, magnets, and current collectors on the car, substantially as described.

5. In combination with magnets on a car, a series of boxes containing magnetic rods or strips lying in insulated, water tight spaces in said boxes, and having upper coverings of good conductivity, preferably non-magnetic, said rods or strips being connected with the main line wire by a flexible, insulated wire, allowing said rods free play up and down in said spaces, said series of boxes placed in the ground between the rails, substantially as described.

6. The combination of a continuous insulated main line wire with one or more magnetic rods or strips, the said main wire connected to said rods or strips by a flexible wire, a water tight receptacle having a cover of conducting material, said rods or strips lying loosely and longitudinally in said receptacle and a car provided with magnets and contact brushes on its under surface, substantially as described.

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

EDWARD H. BROWN.

Witnesses:

HARRY A. TAYLOR,
P. F. TEIRNEY.