

No. 627,477.

Patented June 27, 1899.

W. M. BROWN.
ELECTRIC RAILWAY.

(Application filed Mar. 4, 1899.)

(No Model.)

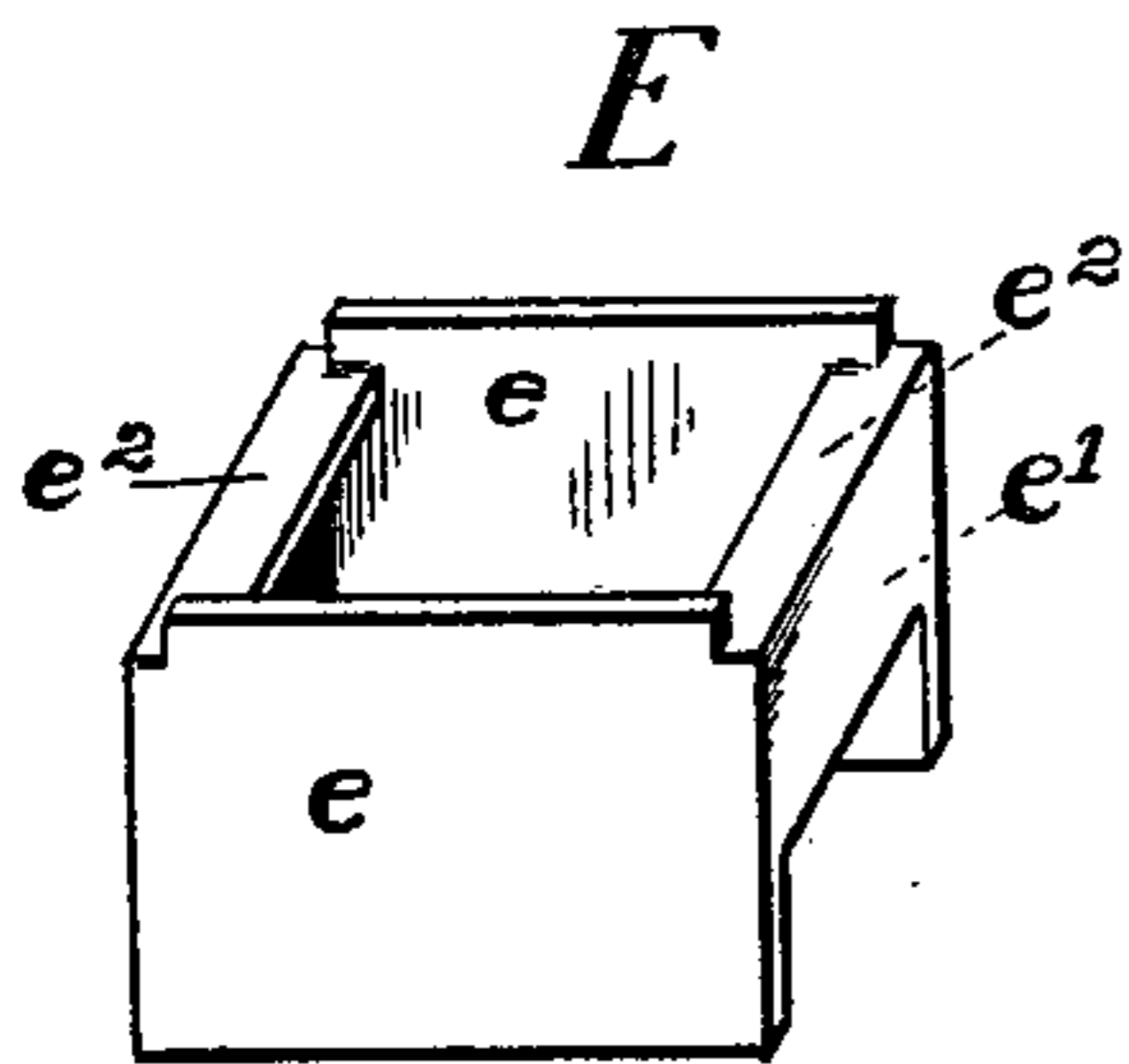


Fig. 5.

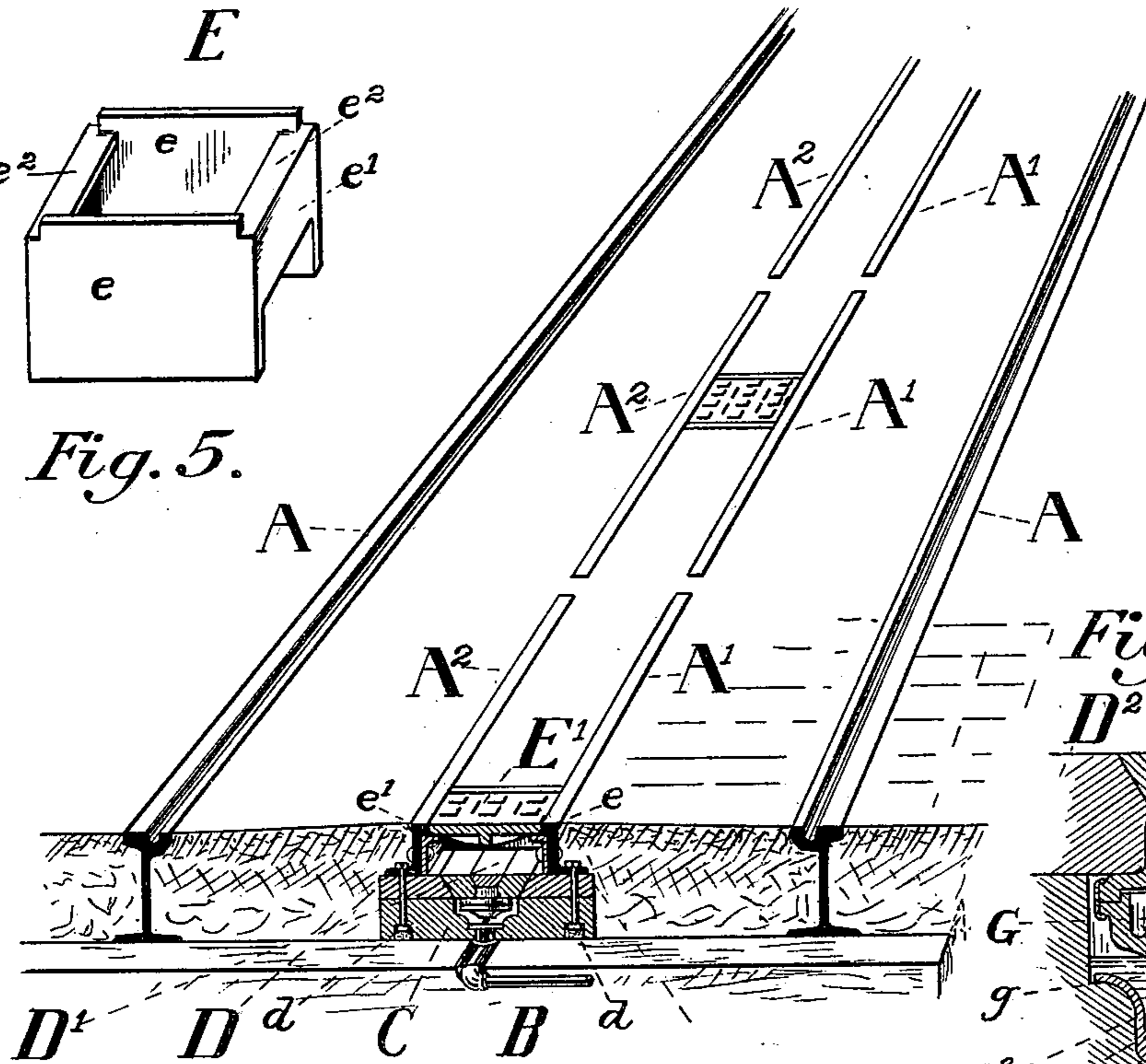


Fig. 1.

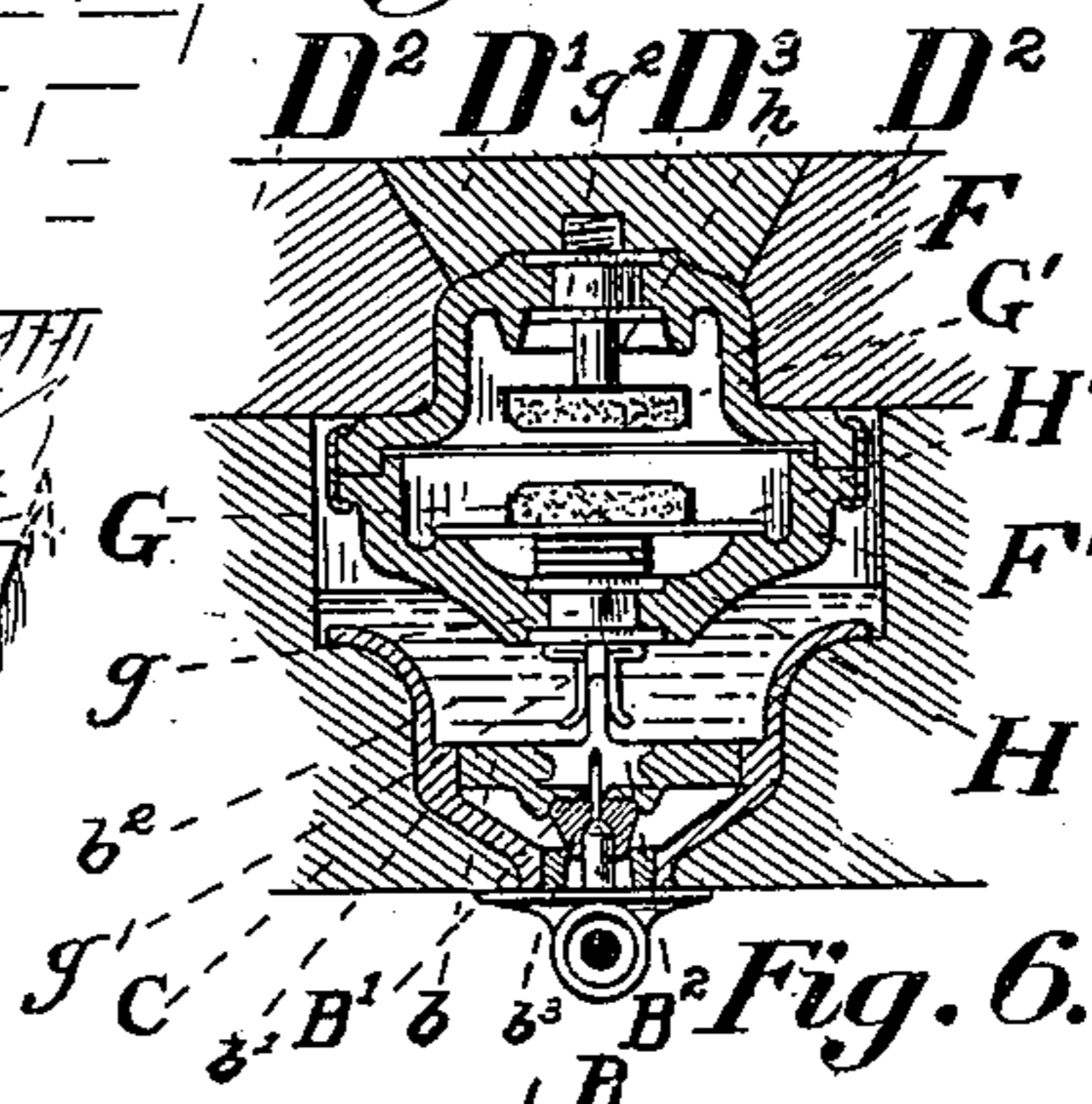


Fig. 6.

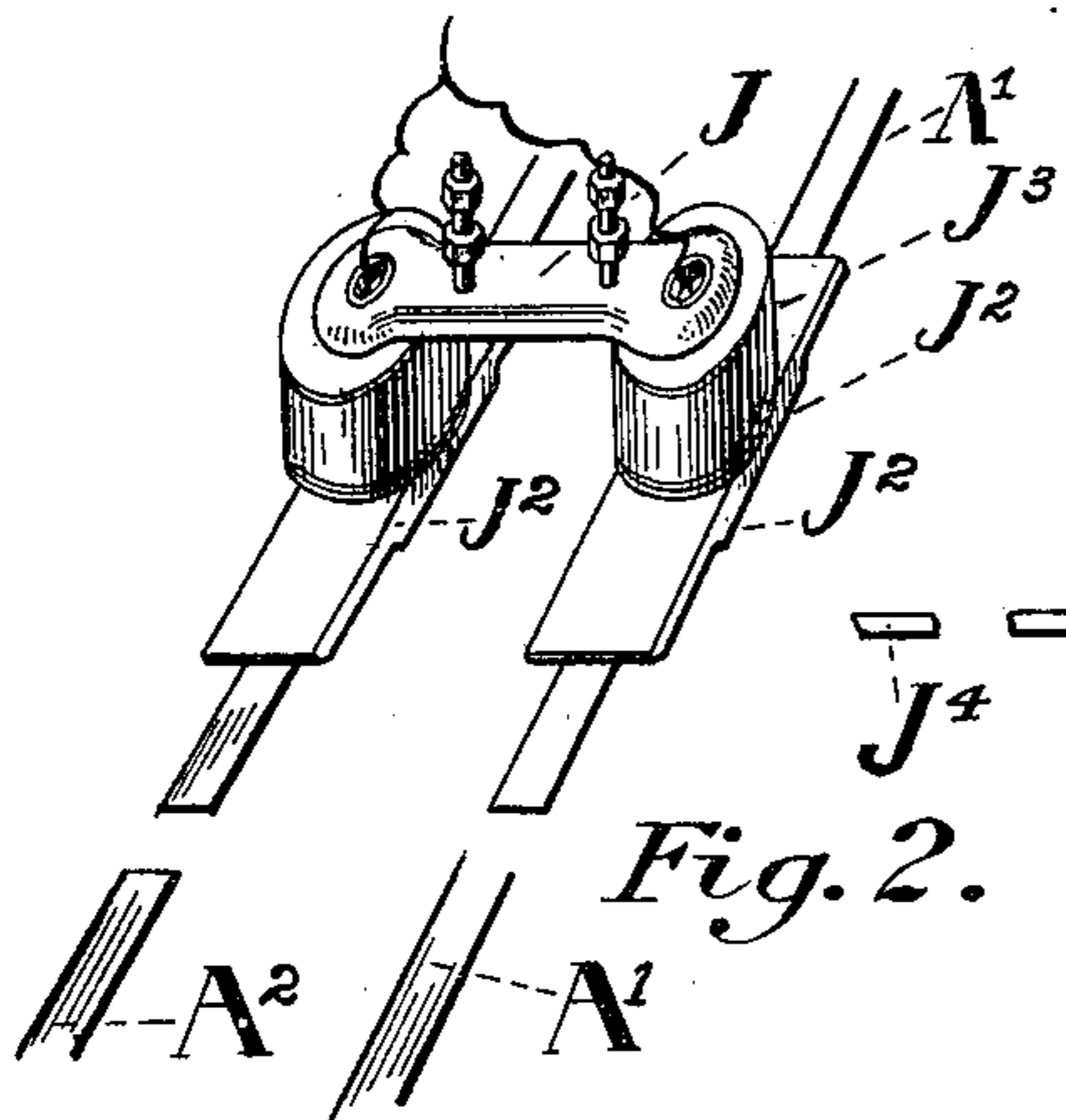


Fig. 2.

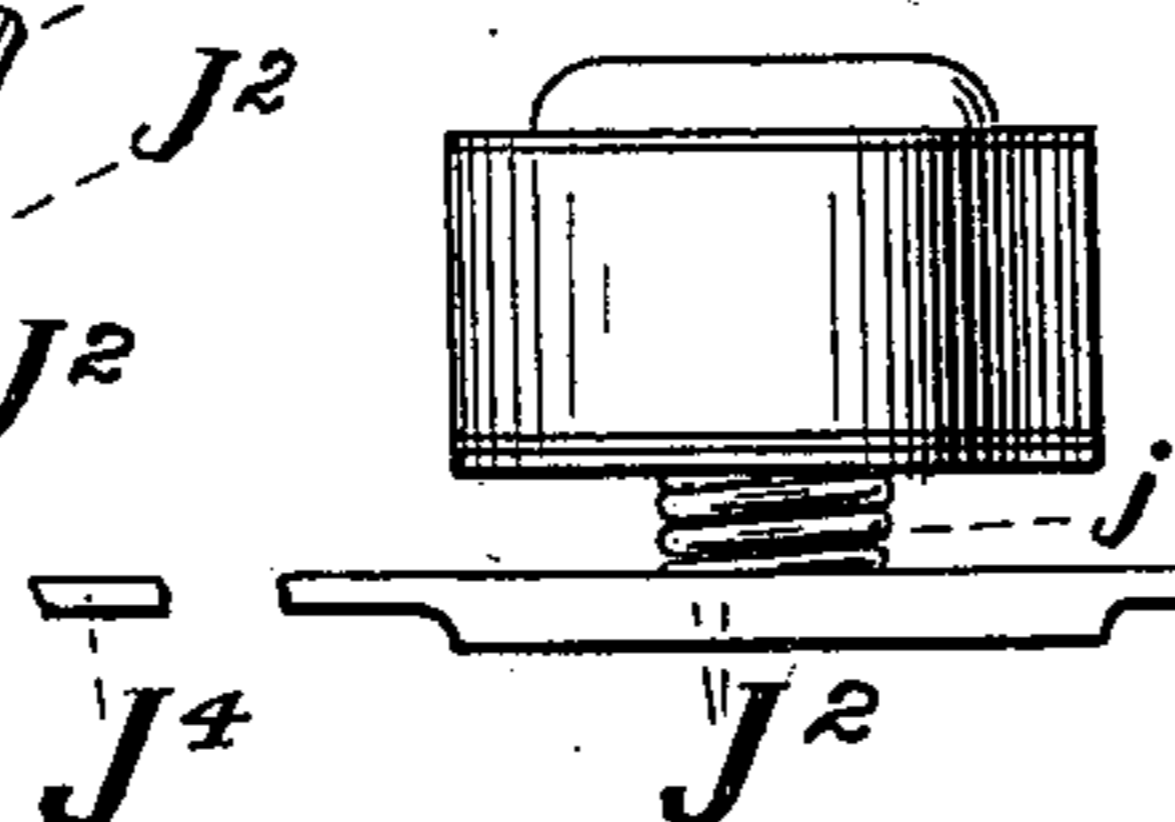


Fig. 3.

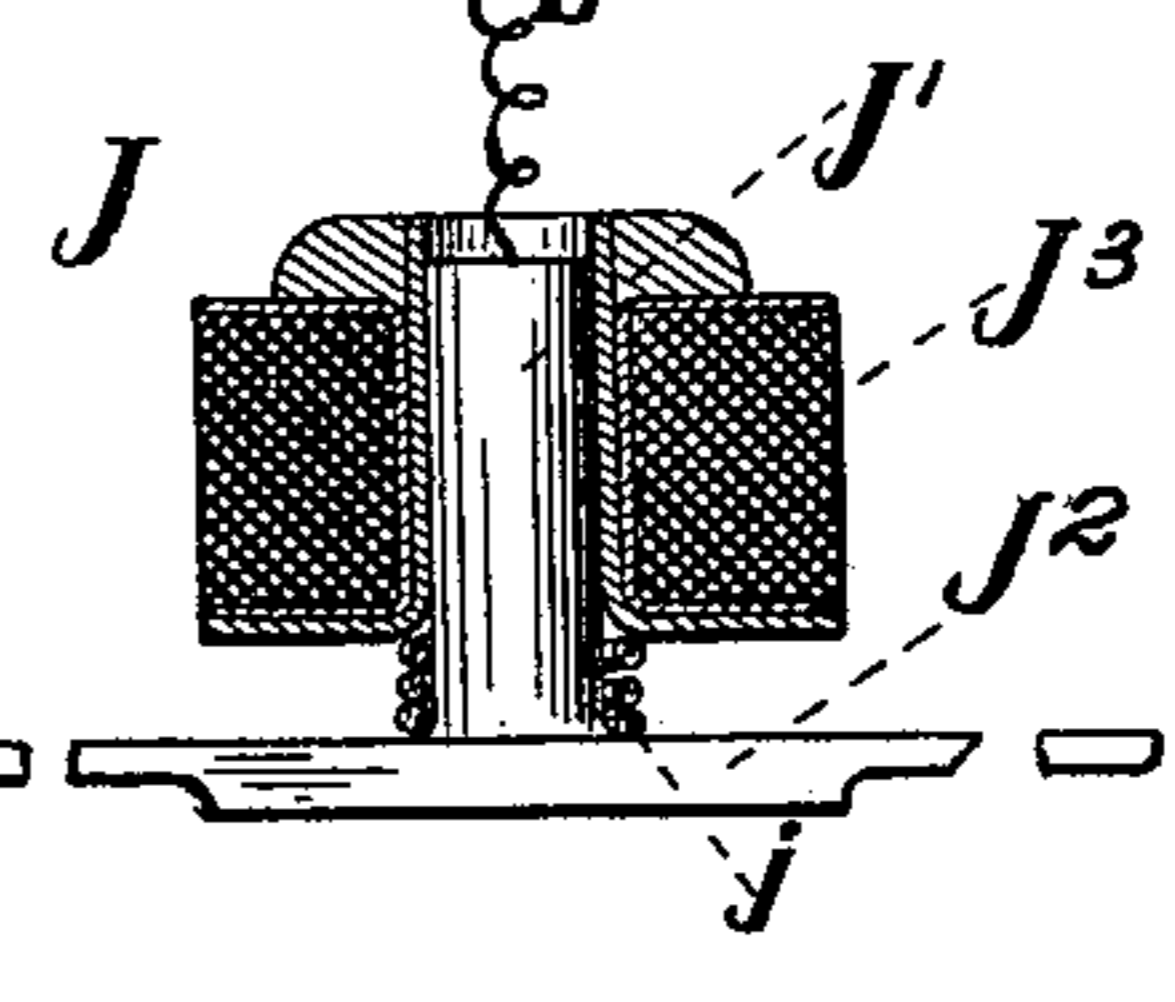


Fig. 4.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 627,477, dated June 27, 1899.

Application filed March 4, 1899. Serial No. 707,737. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILT. BROWN, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to electric railways of the general class in which there are disconnected contacts from the terminals for one side of a circuit, although normally there is an open circuit between the disconnected contacts and the source of electric supply.

The present invention specifically relates to that type of railway in which the circuit between the disconnected contacts and the source of supply is closed temporarily by means of a traveling magnet carried by the railway-vehicle.

In a general way the object of my invention may be said to consist in the provision of an improved form of system by which the weight of the magnet is reduced, while at the same time the efficiency of operation of the system will be augmented. Nearly all previous systems of this general type have belonged to one of two species. One of these species employs disconnected contacts, which are separated from each other a considerable distance—say eight or ten feet—while a sufficiently long magnet and collecting-shoe are provided to span these isolated contacts and render the operation continuous. The other species employ disconnected contacts, which are separated from each other only enough to permit of the necessary insulation between them, the circuit-closing device below the disconnected contacts being continuous or substantially continuous. Broadly speaking, my invention consists in combining these two species in such a way that I obtain the main advantages of each while eliminating many of the troubles of both.

My invention further consists in certain more specific features, which can be set forth to more advantage and with more clearness after describing the specific structure shown in the drawings in detail.

Referring to the drawings, Figure 1 is a perspective view, partly in section, of an electric railway embodying my invention. Fig. 2 is another perspective view showing a combined electromagnet and collecting-shoe in its operative position on the disconnected contacts. Fig. 3 is a side view of the said electromagnet and collecting-shoe, and Fig. 4 is a sectional view of the same. Fig. 5 is a perspective view of the box-frame which I employ above each of the circuit-closers. Fig. 6 is an enlarged sectional view of a portion of Fig. 1, showing more fully a preferred construction for the circuit-closer.

A represents the track-rails, which in the specific construction shown are intended to be used also for the return side of the electric circuit.

A' and A² are the disconnected contacts, which are in the form of rails laid in pairs alongside of each other in short lengths—say about eight feet. The length of the disconnected contacts or supplementary rails depends principally upon the length of the car or train which is intended to pass over them.

B represents a pipe inclosing a feeder B' in permanent connection with one side of the electric circuit. This feeder is led into a closed receptacle or box, which, as shown, is composed of four main parts—viz., an insulating-base C, made of fire-brick or similar material, the blocks D, and the center removable cover D', which is itself composed of a central strip D³ of non-magnetizable metal, and two sides D² of magnetizable material. Within this box are a number of parts composing the circuit-closer and the connections therefor to the feeder B'. I may state at this point that the specific construction of these parts is not material or novel to the present invention; but as this system is to some extent a carrying forward of the principles of a system which has already been patented to me in previous patents—as, for example, No. 558,151, dated April 14, 1896—I have shown the circuit-closer and surrounding parts of the exact form which is shown in the McFeaters patent, No. 618,179, dated January 24, 1899, the circuit-closer of which patent has been used in connection with the system of my previous

patents to a large extent. Briefly, the parts inclosed within the box are as follows: The tube B, surrounding the feeder B', is screwed into an open metallic vessel b'. A solid insulator b, in which is embedded a metallic pedestal B², is carried by this vessel and rests on a rubber bushing b³, which bears against the end of the tube B². The end of the feeder B' is secured to the pedestal B². Secured into the cover-plate is the end of a bolt g², which is formed in one with the top portion F of a sealed vessel comprising the parts F and F'. This vessel should of course be of insulating material, such as porcelain or vulcabeston. A bolt h is secured in the lower end of the bolt g² and carries an electrode G', preferably of carbon. This electrode is thus in permanent connection with the metallic cover of the box. In the lower wall of the vessel is a nut g, to which are secured at the outside of the vessel springs g', which engage the pedestal B². Within the vessel is a flexible copper ribbon H, secured to the nut g and at its other end to an armature H', which carries a second carbon electrode G. In my earlier systems, in which this circuit-closer was employed, the traveling magnet had two long longitudinal parallel poles which were carried over the parts which correspond to the sides D² of the central cover-plate D'. The magnetic path would be therefore through one of these sides, through the transversely-disposed armature H', and thence through the other of the sides D² to the magnet. This is a very efficient disposition of the magnetic path, and, as will be shown, this same principle is employed in the present invention, although the magnetic poles are not carried directly above the sides D².

Above the blocks D are secured the disconnected contact-rails A' and A²—as, for example, by bolts d, which connect the base C, blocks D, and rails A' and A².

E is an open box-frame having deep ends e, adapted to slip over the ends of the closed box, while the sides e' are somewhat shallower, so as to rest on the top of the blocks D, a flange e² being provided to engage the heads of rails A' and A². E' is a cover-plate, which also rests on the flanges E² and between the end walls e and the heads of the rails A' and A². This box-frame E and cover E' should be of non-magnetizable material.

In Figs. 2 to 4 I have illustrated a form of magnet adapted for use with my improved system. J is the neutral portion of the yoke, while J', Fig. 4, shows one of the vertical cores, which terminates in a pole-piece J², the two pole-pieces riding one on rail A' and the other on rail A². As shown, these pole-pieces are also used for collecting-shoes, and I deem this a preferable arrangement. J³ represents the energizing-coils. j is a spring which permits the shoes J² to ride smoothly and evenly on the contact-rails. I prefer to design the shoes J², as shown, so that at each end there is a projecting portion J⁴, which does not

bear upon the contact-rails. This arrangement is for the purpose of allowing the magnetic field to act upon any given pair of contact-rails both before the current collection from such rails commences and after it has ceased, thereby making it certain that the circuit-closer will not be opened when in circuit with the car-motors, which would cause a destructive arc to form between the electrodes G and G'.

I believe that the operation of my invention will now be clear. The circuit between G and G' is normally open. When, however, the ends J⁴ project over the ends of a pair of the contact-rails, a magnetic path is at once formed, which path flows from one of the projections J⁴ to rail A', block D, one side of D² of cover D', armature H', opposite side D² of cover D', second block D, and rail A² to the opposite magnet-pole. This will raise armature H' and close the circuit from B' to the contact-rails. An instant later the main portions of shoes J² will bear upon the said contact-rails, and current is collected by them and delivered to the apparatus on the car by any of the well-known methods for arranging the control-circuits.

It will be seen that by my invention I have dispensed with the long and extremely bulky magnet and collecting-shoe which had ordinarily been provided where isolated circuit-closers like those shown are at rest. At the same time I am enabled to make an even more efficient magnet, for the poles may ride directly on the contact-rails, and the air-space is thus cut down to a minimum. As a matter of fact these rails practically form temporary magnet-poles. At the same time I have dispensed with the employment of continuous-current conveyers, such as magnetizable ribbons, &c., which are not only extremely expensive, as they must be placed in continuous closed conduits, but my experience has shown me that for many reasons they are also very impracticable for commercial use. By my construction the boxes can be very readily opened and examined at any time without interfering with the regular operation of the road. The space above the cover D' inclosed by the box-frame E would preferably be wholly or partially filled with some heavy liquid insulator—such, for instance, as a mixture of asphalt and paraffin-oil in such proportions as to make a liquid heavier than water, which has been used to good effect for such conditions. This I have not shown, because immaterial to my invention, and it would only tend to complicate the drawings.

It will be perfectly obvious that the invention herein shown and described may be employed without using the specific details which I have pointed out, as my invention is much broader than the specific mechanism which I have employed to illustrate it. I do not, therefore, desire to be limited to the specific embodiment of my invention herein shown.

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

1. The combination, in an electric-railway system, of the armature of a circuit-closer, a pair of magnetically-separated magnetic conductors above said armature, and a pair of contact-rails, each forming a longitudinal magnetic continuation of one of the said magnetic conductors.

2. The combination, in an electric-railway system, of a circuit-closer in connection with one side of the circuit and adapted to be magnetically operated to temporarily close the circuit, magnetic conductors placed in proximity to the armature of said circuit-closer, contact-rails forming longitudinal magnetic continuations of said magnetic conductors, and a magnet adapted to travel over and in close proximity to said contact-rails.

3. The combination, in an electric-railway system, of circuit-closers, each of which is normally open but has an armature adapted when raised by magnetic attraction, to temporarily close the circuit, said circuit-closers being isolated from each other and connected to one side of the circuit, contact-rails disconnected from each other but each of sufficient length to almost bridge the distance between adjacent circuit-closers, and a magnet adapted to travel over and in close proximity to said contact-rails to transmit magnetism there-through successively to the armature of the respective circuit-closers.

4. The combination, in an electric railway, of magnetically-actuated circuit-closers separated along the line of way, a magnetic conductor closely adjacent to the armature of each circuit-closer, and a contact-rail of sufficient length to almost bridge the distance between neighboring circuit-closers connected to each of said magnetic conductors and forming a longitudinal continuation thereof.

5. The combination, in an electric railway of magnetically-actuated circuit-closers separated along the line of way, a magnetic conductor closely adjacent to the armature of each closer, a contact-rail of sufficient length to almost bridge the distance between neighboring circuit-closers connected to each of said magnetic conductors and forming a longitudinal continuation thereof, and a magnet and collecting-shoe traveling over said contact-rails, substantially as described.

6. The combination, in an electric-railway system, of a box containing a circuit-closer in connection with one side of the electric circuit, magnetic conductors forming part of said box and located above said circuit-closer, said magnetic conductors forming substantially a pair of magnetic conductors at opposite sides of the box, the individual members of the pair being substantially insulated magnetically from each other, and a contact-rail engaging each of said pairs and forming longitudinal continuations thereof.

7. The combination in an electric railway of a pair of parallel rails arranged longitudinally with the track, a box below said pair of rails, a top for said box having two sides of magnetic material separated by a non-magnetic center, but each magnetically connected to one of the said rails, and the armature of a circuit-closer within the box and beneath the said sides of the box-top.

8. The combination of rails A and A' laid alongside each other, magnetizable blocks D secured beneath said rails, box-cover D' composed of magnetizable sides D² and non-magnetic center D³, insulating-base H, and the magnetically-actuated circuit-closer within said base.

9. A pair of longitudinal, parallel magnetic conductors arranged in the road-bed and a traveling magnet having its poles adjacent to said conductors, in combination with a box having separated magnetizable blocks connected one to each of said parallel conductors, and the armature of a magnetically-actuated circuit-closer below said blocks.

10. The combination, in an electric railway, of a pair of parallel magnetic conductors in the road-bed, a box beneath the same having magnetic continuations of said conductors, a magnetically-actuated circuit-closer within said box, and a non-magnetizable box-frame and cover inclosing the space between said rails and above said box.

11. The combination, in an electric railway, of a pair of parallel magnetic conductors in the road-bed, a box beneath the same having blocks forming magnetic continuations of said conductors, a removable cover for said box fitting between said blocks and composed of a non-magnetizable center separating magnetizable sides, the non-magnetizable box-frame and cover inclosing the space between said rails and above said box, and the magnetically-actuated circuit-closer within said box.

12. The combination, in an electric railway, of a box containing a magnetically-actuated circuit-closer, a pair of rails of magnetizable material forming magnetic continuations of said box, a box-frame of non-magnetizable material having ends extending downwardly to the bottom of said box and sides secured to the webs of said rails, and a cover of similar material between the ends of said box-frame and the heads of said rails.

13. In an electric railway, the combination of a magnetically-actuated circuit-closer, a pair of parallel rails electrically and magnetically in circuit with the said circuit-closer, and a combined magnet and collecting device adapted to travel over said rails, the poles of said magnet being spring-pressed against the said rails to act as a current-collecting device and having extended portions out of contact with the said rails, but closely adjacent thereto.

14. The combination of the rails A and A',

the non-magnetizable box-frame E and cover
E', the magnetic conductors D and D² be-
tween the said rails and the circuit-closing
devices, the circuit-closer having terminal G'
5 electrically in circuit with the said rails, the
movable terminal G electrically in circuit
with the source of electric supply, and the
traveling magnet and collecting-shoe adapted

to actuate the said terminal G and collect cur-
rent from the said rails.

In testimony whereof I have affixed my sig-
nature in presence of two witnesses.

W. MILT. BROWN.

Witnesses:

RICHARD EYRE,

H. W. SMITH.