

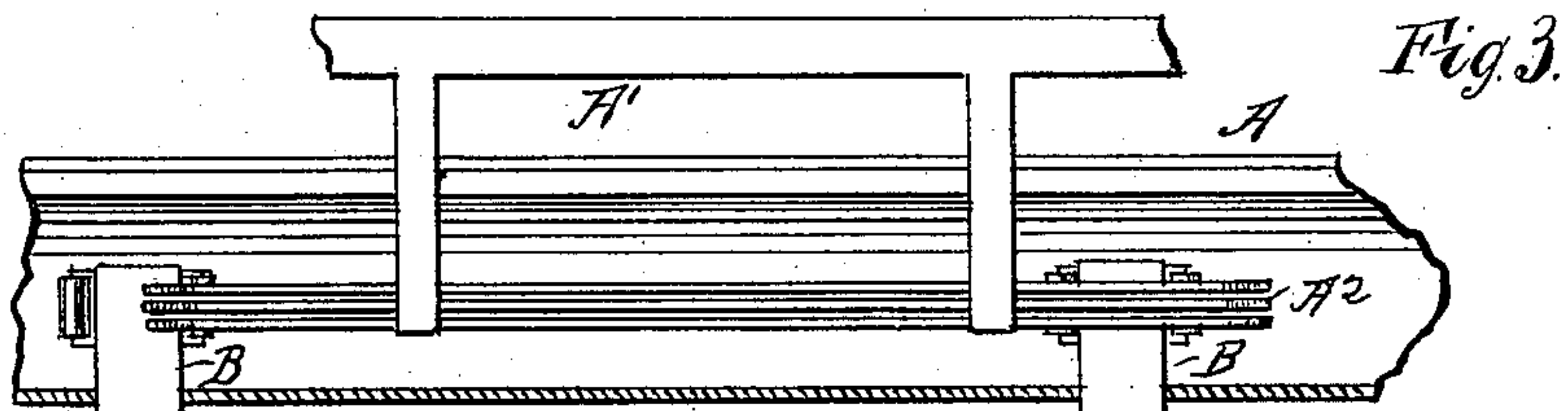
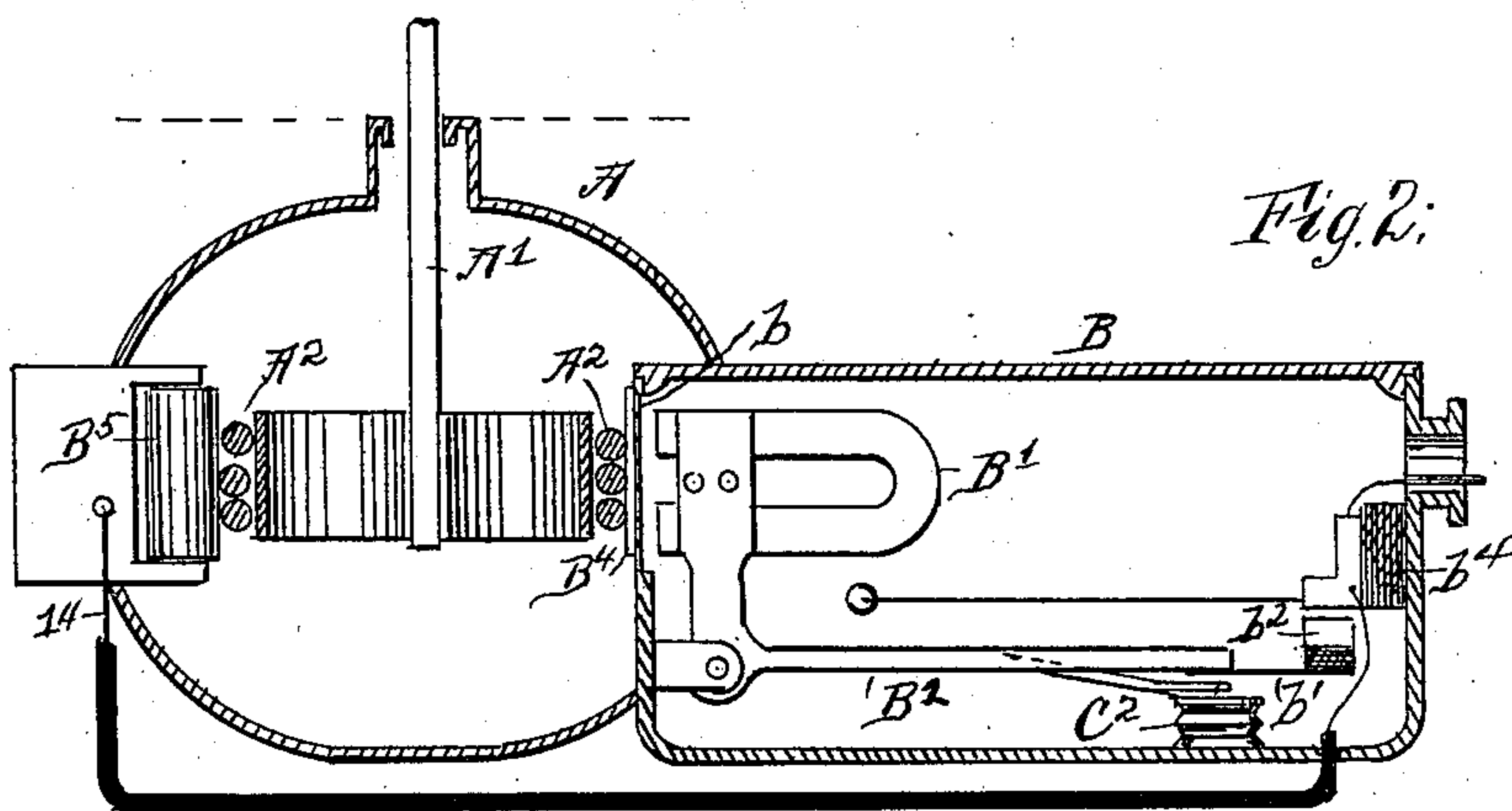
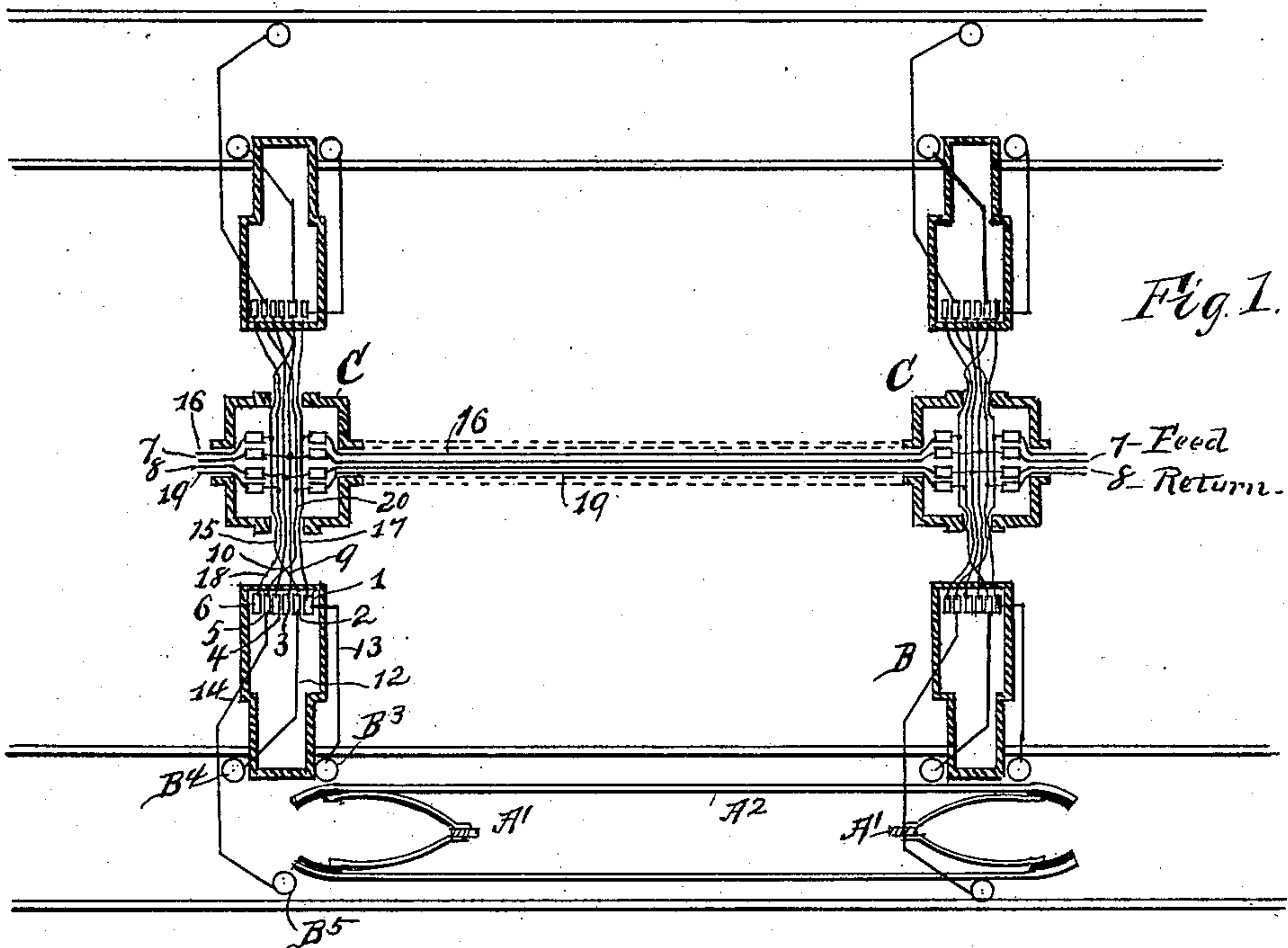
(No Model.)

3 Sheets—Sheet 1.

C. F. DE REDON.
ELECTRIC RAILWAY SYSTEM.

No. 577,450.

Patented Feb. 23, 1897.



Witnesses:

A R Ferguson
Le Roy Minter

Inventor:

C. F. de Redon
By his attorney
C. R. Ferguson

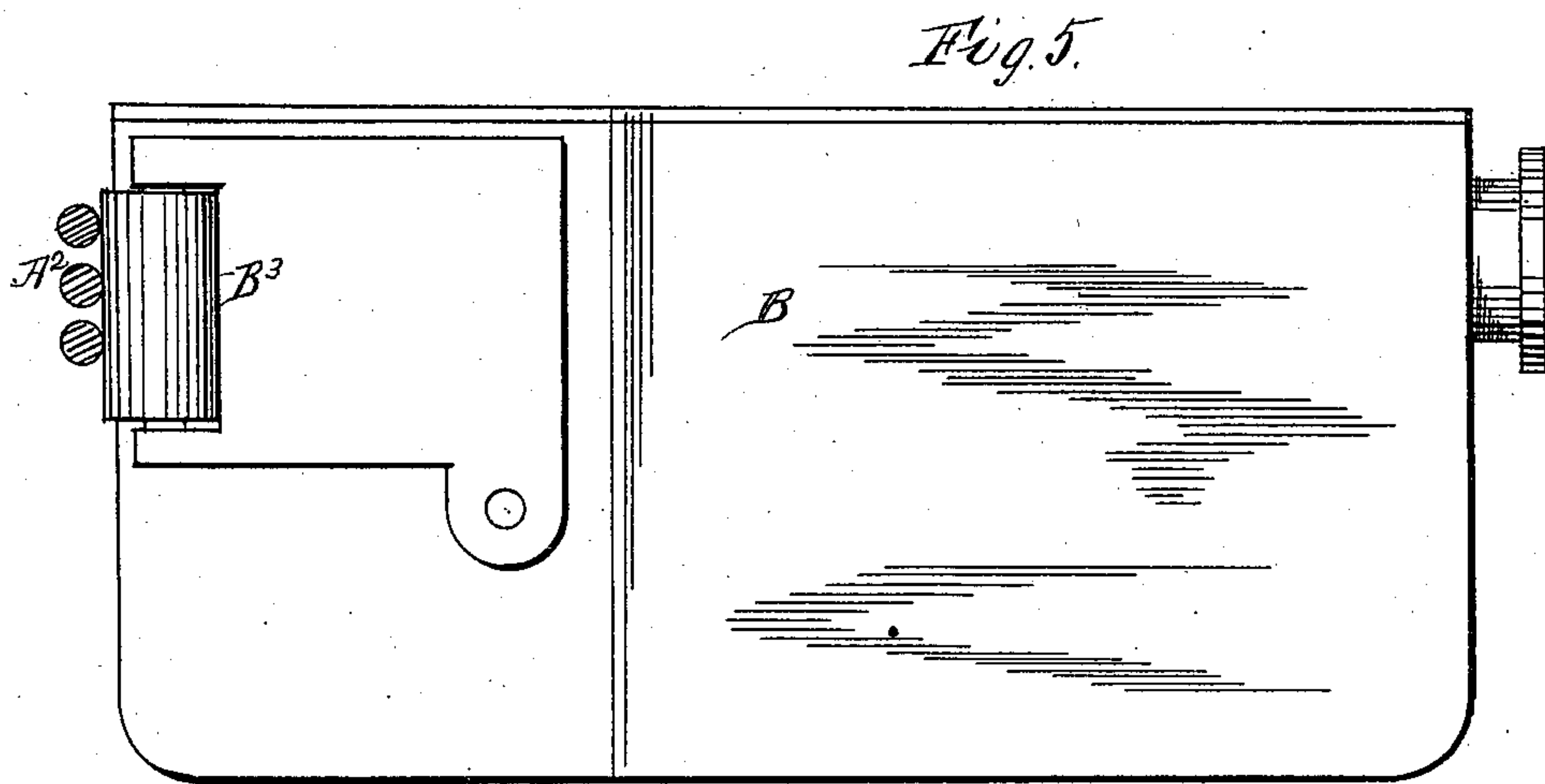
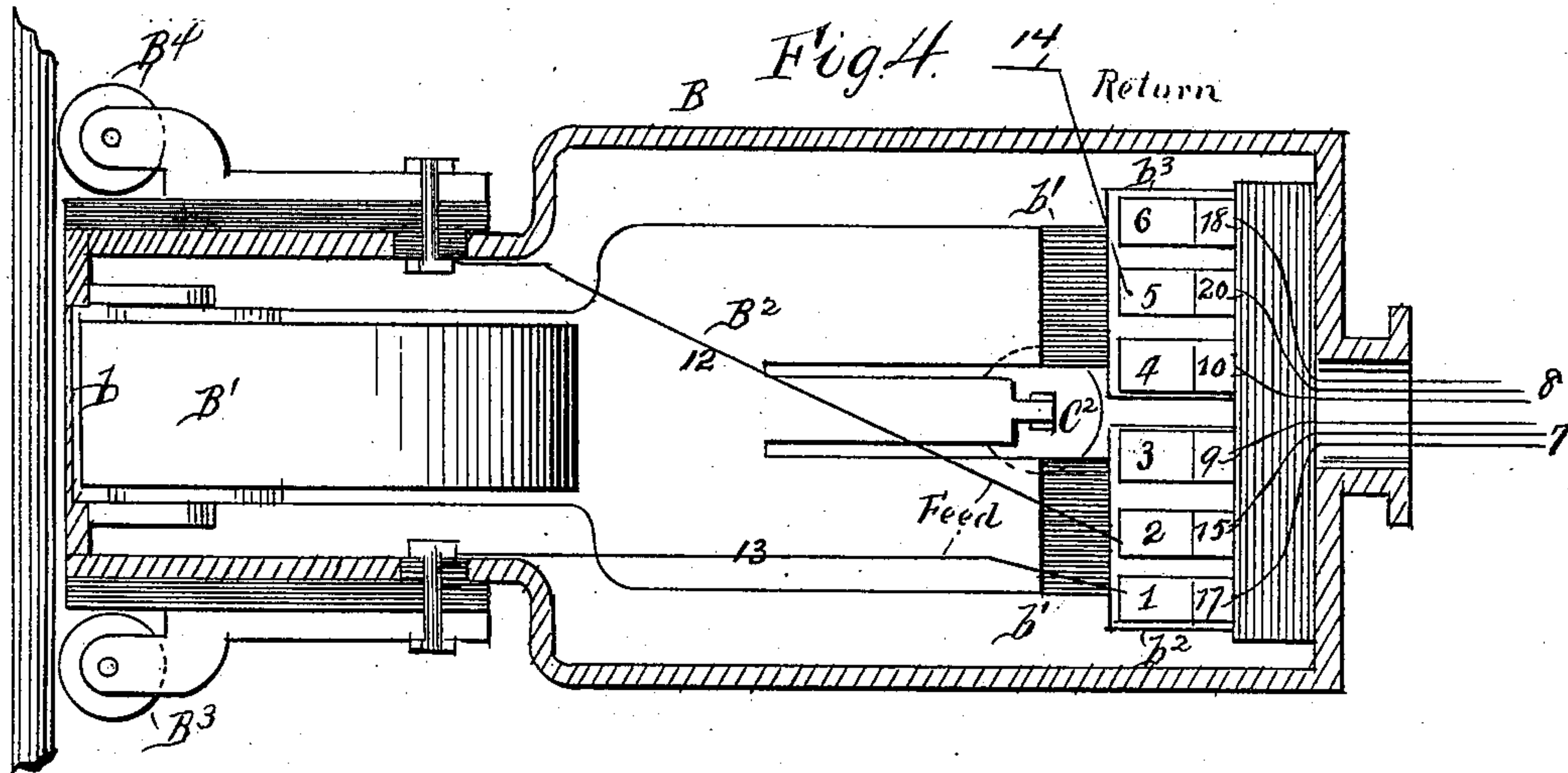
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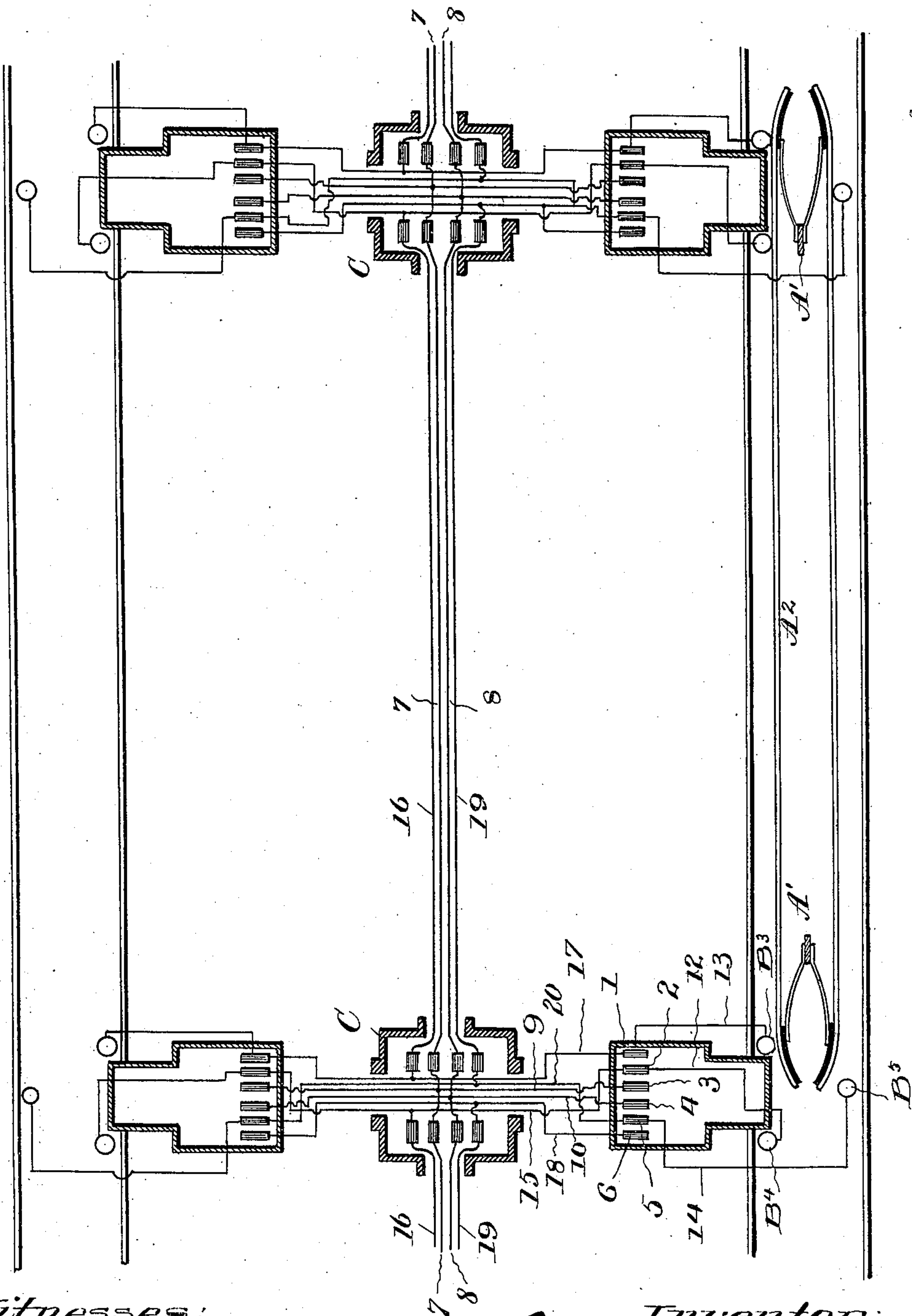
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Fig. 6.



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Inventor:
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Asso. Atty.

UNITED STATES PATENT OFFICE.

CONSTANT F. DE REDON, OF NEW YORK, N. Y.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 577,450, dated February 23, 1897.

Application filed September 5, 1895. Serial No. 561,478. (No model.)

To all whom it may concern:

Be it known that I, CONSTANT F. DE REDON, a citizen of France, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric-Railway Systems, of which the following is a specification.

This invention relates to that class of electric-railway systems in which the power-transmitting mechanism is located under ground; and the object of my present invention is to reduce to a minimum the electrical leakage and consequent loss of power.

The invention comprises a circuit-closer operated by means of a permanent magnet designed to be attracted by a metal piece carried by a car.

The invention further consists in the construction and novel arrangement of parts, as will hereinafter appear and be more fully pointed out in the appended claims.

In the drawings, Figure 1 is a diagrammatic view of an electric-railway system embodying my invention. Fig. 2 is a transverse section of a track-conduit and the circuit-closer box and showing the closer in elevation. Fig. 3 is a longitudinal section of the track-conduit. Fig. 4 is a partial section and partial plan view of the circuit-closer. Fig. 5 is a side elevation of the circuit-closer box or casing; and Fig. 6 is a similar view to Fig. 1, on an enlarged scale.

Referring by reference-characters to the drawings, A designates a conduit designed to be placed in the ground between the two rails of a track. This conduit may be made of any desired insulating material, and it has a longitudinal slot-opening in its top, through which the shoe-hanger A' extends. The hanger depends from a car and has within the conduit, at each side, a contact-shoe A², which, as here shown, consists of parallel rods or cables curved inward at the ends and which may be connected with a motor in any desired manner.

I will now describe the circuit-closer and its connections.

B indicates a tightly-closed box or casing consisting, preferably, of a non-magnetic metal, such, for instance, as brass, and at the point adjacent the poles of the permanent

magnet B' and within the conduit A it is made quite thin, as indicated at b. The magnet B' is here shown in the form of a horseshoe magnet, but I do not wish to be limited thereto. It is mounted on the vertical arm of an angle-lever B², having pivotal bearings at its angle in lugs extended from the inner end wall of the box or casing B. On the outer side of the box or casing B and within the conduit A are contact-rollers B³ B⁴, suitably insulated from the box or casing and projected slightly forward of the inner end of the box or casing to be engaged by the shoe A², carried by a car. I extend the rollers slightly forward of the inner end of the box, so that the shoe will not engage with the box, which would create too much friction or act as a brake under the influence of the magnet B'.

The free end of the lever B² is provided with extension-pieces b', and on these extension-pieces contact-plates b² b³ are mounted, with a suitable insulating material between the plates and the extension-pieces.

The contact-plate b² is designed to close a circuit or engage with contact-blocks 1 2 3, and the plate b³ is designed to close a circuit or engage with contact-blocks 4 5 6. These several blocks are mounted on a bar b⁴, of insulating material, within the box or casing B, and certain of the blocks are in engagement with the working current, and the other blocks are in engagement with a shunt or auxiliary current, as will be more fully explained hereinafter.

C indicates boxes or casings arranged at the side of a track, or, as here shown, between two tracks, in line with the casings B. These boxes or casings are connected together by means of a suitable tubing, as indicated by the dotted lines in Fig. 1. The several feeding-wires are intended to extend through the pipe, but it is obvious that the several wires may be formed in a cable suitably insulated.

7 indicates the main line-wire, and 8 is the return-wire. A wire 9 leads from the main wire 7 to the contact-block 3, and a wire 10 leads from the return-wire 8 to the contact-block 4. From the contact-block 2 a wire 12 extends to the contact-roller B⁴, and from the contact-block 1 a wire 13 extends to the contact-roller B³, and from the contact-block 5

a wire 14 extends to a return contact-roller B⁵, adapted to engage with the shoe portion opposite that engaged by the rollers B³ B⁴.

It may be here stated that the contact-roller B⁴ is in the nature of an auxiliary contact placed in an auxiliary circuit, so as to be energized at one box B by the action of the circuit-closer in the preceding box B, the object being to provide a driving-current for the short space of time when the shoe carried by a car is not in proper position to attract the permanent magnet in this particular box and after the shoe shall have left its engagement with the contact-rollers of the preceding box. With this end in view (and in this description assuming that the car is moving to the left) the contact-block 2 at the right-hand box B is connected by a wire 15 with the auxiliary line-wire 16, which, by the wire 17, is connected with the block 1 of the left-hand box B, and the block 6 at the right-hand box B is connected by the wire 18 with the auxiliary line-wire 19, which is connected by the wire 20 with the block 5 of the box B at the left, which block 5 is, as shown, connected with the roller B⁵ by the wire 14.

If it is now assumed that the car moving toward the left is opposite to the right-hand box B and that the contact-plates b² and b³ of said box have been moved against the contact-blocks 1 2 3 and 4 5 6, respectively, it will be found that the main circuit or current from the wire 7 is through the wire 9, block 3, plate b², block 1, and wire 13 to the roller B³ and that the main circuit or current on its return is from the roller B⁵ through the wire 14, block 5, plate b³, block 4, and wire 10 to the main return-wire 8. Thus the course of the main circuit is clearly established, and at the same time that the car is opposite to the right-hand box B and moving toward the left-hand box B an auxiliary current or circuit is sent ahead of the car to said left-hand box, and this auxiliary circuit is (starting with the right-hand box B and moving toward the left-hand box B) from the main wire 7 through the wire 9, block 3, plate b², block 2, wire 15, wire 16, and wire 17 to the block 1 of the left-hand box B, thence through wire 13 to the auxiliary roller B³, thus completing one-half of the auxiliary circuit. The return half of the auxiliary circuit or current is (starting from the left-hand box B and moving toward the right-hand box B) from the roller B⁵ through the wire 14, block 5, wire 20, auxiliary line-wire 19, wire 18, block 6, (in right-hand box B,) plate b³, block 4, and wire 10 to the main line-wire 8. Thus the auxiliary current sent ahead from one box B to the box B ahead of it in advance of the moving car has been clearly defined. The boxes B are at definite points, depending on the length of the car, all along the track, and whenever the car is opposite to one box and the plates b² and b³ therein are closed against the blocks 1 2 3 and 4 5 6, respectively, the main circuit at said box becomes established and the aux-

iliary current is simultaneously sent to the next box ahead in advance of the rapidly-moving car.

The conductors 18, 19, and 20 are simply made use of in providing an auxiliary circuit from one box or, say, the first box B to the box B next ahead of it along the line of the track, in order that there may be a current ready for the advancing car and to act simply during the time the magnet in the latter box is performing its movement to close the circuit in said latter box. The breaking of the circuit at each box B is retarded a few seconds after the car passes onward to the box B ahead, and it is during these few seconds that the auxiliary circuit is formed from one box to the box ahead in advance of the moving car. The invention is not, however, limited to the special wiring shown.

To hold the contact-plates in connection with the blocks for a short space of time after the shoe carried by a car shall have left its active position with a permanent magnet B', I employ a retarding device, here shown in the form of a wind-bellows C², engaged by the arm B² of the circuit-closer. In action when the arm B² is drawn upward it will expand the bellows, which will draw in air, and this air will exhaust slowly through a suitable valve, which may be regulated as desired.

Having described my invention, what I claim is—

1. In an electric-railway system, a circuit-closer comprising a permanent magnet adapted to be attracted by a part carried by a car, a lever on which the magnet is placed, a contact-plate carried by said lever and contact-blocks to be engaged by said plate and having connection with the current-carrying wires, substantially as specified.

2. In an electric-railway system, a circuit-closer comprising a permanent magnet, a lever on which the magnet is mounted, a closed casing in which the lever is pivoted, a contact-plate on the lever, contact-blocks for engagement with the plate, and a retarding device for the closer, substantially as specified.

3. In an electric-railway system, a circuit-closer comprising a permanent magnet, a pivoted lever on which the magnet is mounted, a casing in which said parts are placed, the said casing having a thin wall adjacent the poles of the magnet, contact-plates carried by the lever and the contact-blocks adapted to be engaged by the contact-plate, substantially as specified.

4. In an electric-railway system, the main circuit, and the series of circuit-closers along the line of the track each comprising the swinging magnet adapted to be attracted by a part carried by the car, the contact-plates which are moved by the movement of said magnet, and the series of contact-blocks to be engaged respectively by said plates, combined with the conductors passing from two of said contact-blocks to the main line-wires, conductors passing from two other of said con-

tact-blocks to contacts to be engaged by the car, and auxiliary-circuit conductors passing from two others of said contact-blocks to contact-blocks of the circuit-closer ahead which are connected with the contacts to engage the car moving toward them, substantially as and for the purposes described.

5. In an electric-railway system, the main circuit and the series of circuit-closers along the line of the track each comprising the swinging magnet adapted to be attracted by a part carried by the car, the contact-plates which are moved by the movement of said magnet, and the series of contact-blocks to be engaged respectively by said plates, combined with the conductors, passing from two of said contact-blocks to the main line-wires, conductors passing from two other of said contact-blocks to contacts to be engaged by the car, auxiliary-circuit conductors passing from two others of said contact-blocks to contact-blocks of the circuit-closer ahead which are connected with the contact to engage the car moving toward them, and a retarding device to prevent the sudden breaking of the circuit

when the magnet is no longer attracted by the said part carried by the car, substantially as and for the purposes described.

6. In an electric-railway system, a circuit-closer comprising a magnet adapted to be attracted by and thereby moved toward a part carried by the car, a contact-plate mounted to be moved by said magnet during the motion of the latter toward said part carried by the car, contacts connected with the current-carrying wires and arranged to be engaged by said plate to close the circuit when the plate is moved due to the movement of said magnet, and a retarding device to prevent the sudden breaking of the circuit when the magnet is no longer attracted by the said part carried by the car; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 26th day of August, A. D. 1895.

CONSTANT F. DE REDON.

Witnesses:

CLARENCE R. FERGUSON,
LEROY M. FERGUSON.