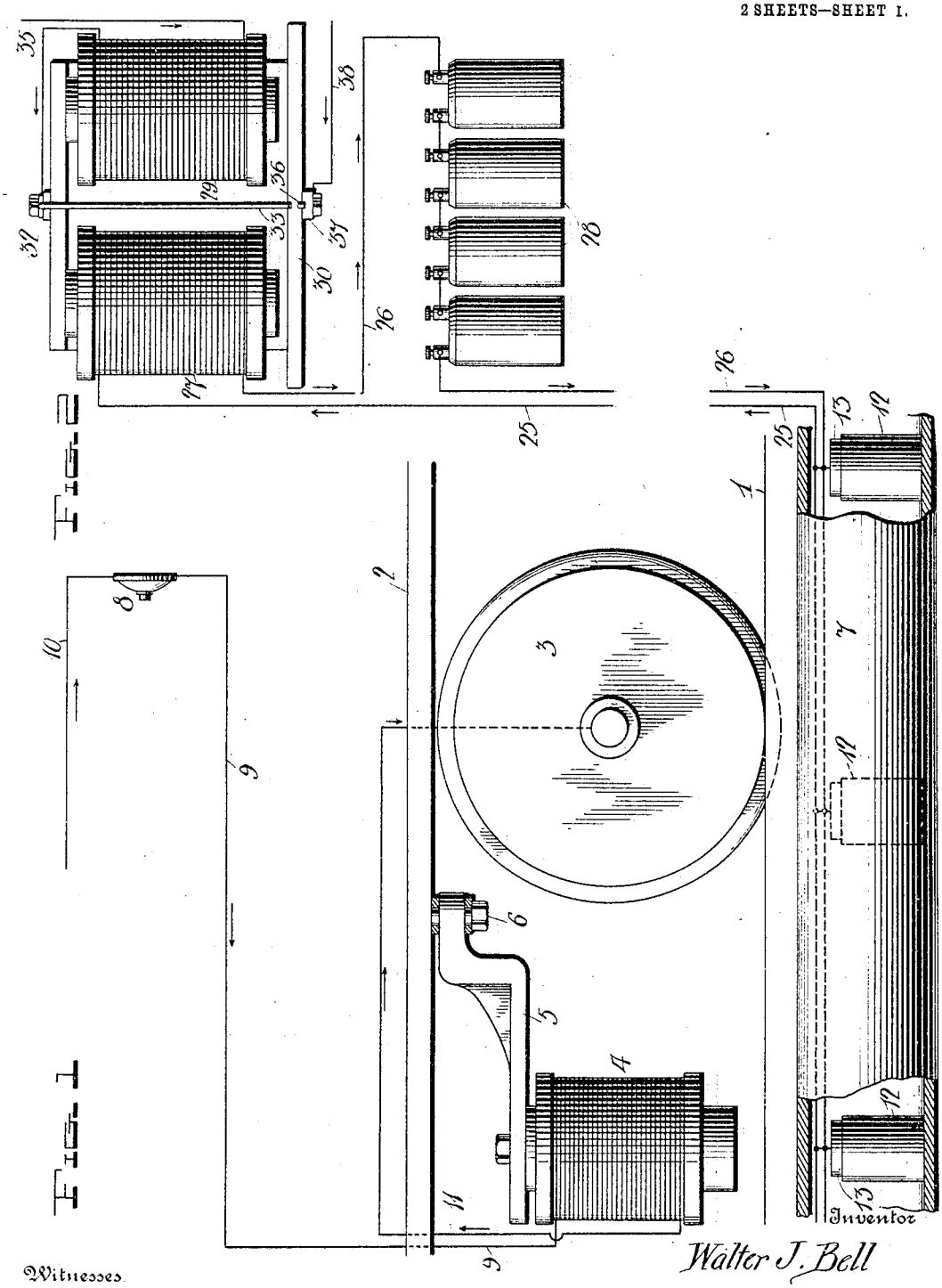
No. 781,993. PATENTED FEB. 7, 1905.

W. J. BELL.

CIRCUIT CLOSER.

APPLICATION FILED OCT. 9, 1903.

2 SHEETS—SHEET 1.



Witnesses.

By W. W. Dudley & Co. his Attorneys

No. 781,993. PATENTED FEB. 7, 1905.

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APPLICATION FILED OCT. 9, 1903.

2 SHEETS—SHEET 2.

FIG. 5

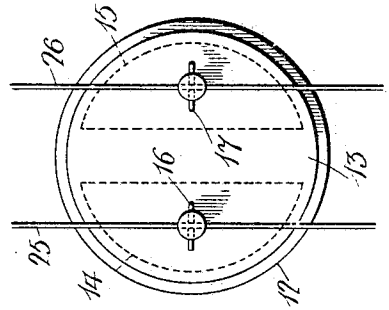


FIG. 6

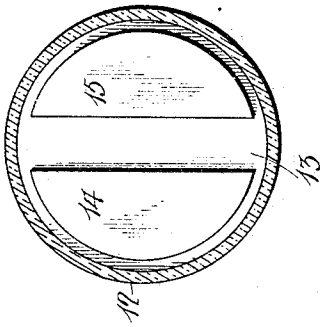


FIG. 4

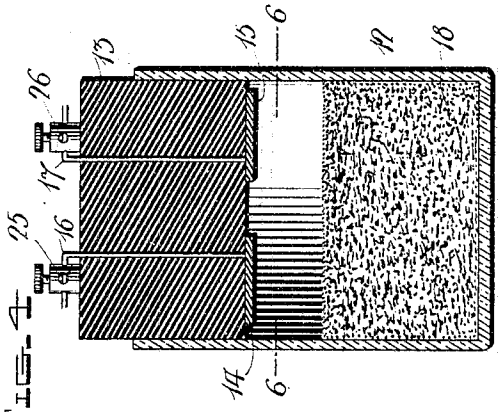


FIG. 8

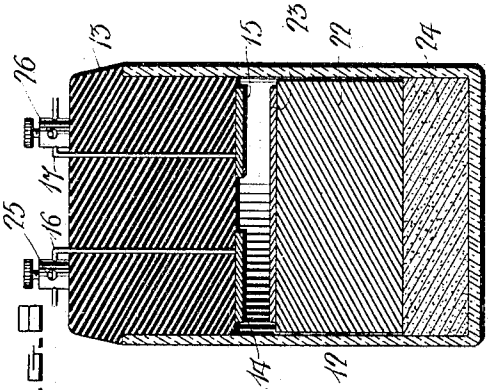


FIG. 3

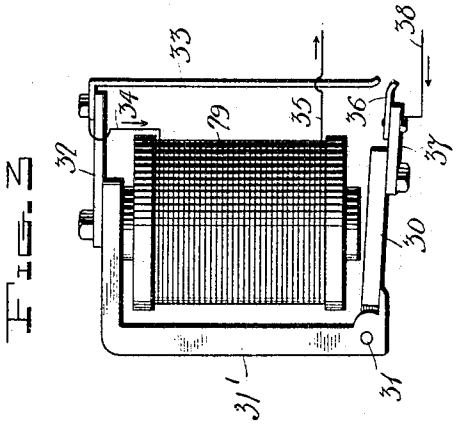
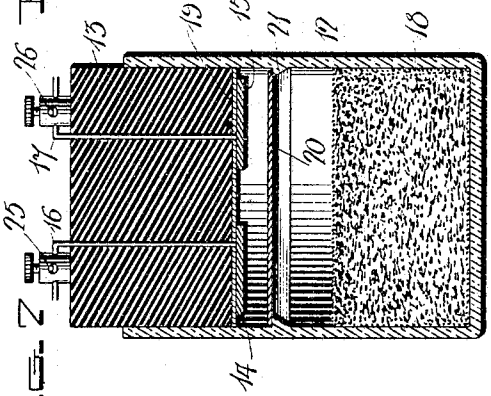


FIG. 7



Witnesses

Inventor

Walter J. Bell,

By

O. B. Dudley & Co

his Attorneys

No. 781,993. Patented February 7, 1905.

UNITED STATES PATENT OFFICE.

WALTER J. BELL, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO LEON F. MOSS, OF LOS ANGELES, CALIFORNIA.

CIRCUIT-CLOSER.

SPECIFICATION forming part of Letters Patent No. 781,993, dated February 7, 1905.

Application filed October 9, 1903. Serial No. 176,405.

To all whom it may concern:

Be it known that I, WALTER J. BELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Circuit-Closers; 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.

This invention relates to electric circuit-closers, and contemplates the production of an appliance of this character which is adapted for employment in connection with railway cars or trains for operating switches, semaphores, and other signaling devices, gates, &c., and which is constructed on simple and durable lines to be thoroughly reliable in operation.

The nature of the invention will be readily comprehended, reference being had to the following detailed description and to the accompanying drawings, in which—

Figure 1 is a side elevation of a railway car and track equipped with a circuit-closer embodying my invention. Fig. 2 is a front elevation of the circuit-closing magnets. Fig. 3 is a side elevation of the same. Fig. 4 is an enlarged sectional view of the primary circuit-closer. Fig. 5 is a top view of the same. Fig. 6 is a sectional view on line 6 6 of Fig. 4. Fig. 7 is a view similar to Fig. 4, showing a modification. Fig. 8 is a view similar to Fig. 4, showing a further modification.

Referring to the drawings by numerals, 1 designates one of a pair of railroad-rails.

2 is a car, and 3 is one of the wheels thereof. Beneath the car is an electromagnet 4, depending from the free end of a bracket-arm 5, pivoted by a bolt 6 or the like to the bottom of the car. Buried beneath the surface of the road-bed and parallel with the rails is a tube 7, in which are a number of primary circuit-closers. In a single-track system two of these tubes are employed, and by reason of the pivotal mounting of the magnet 4 it may be shifted to a position over one of the tubes or the other, dependent upon the direction of travel, or, if desired, two magnets may be employed, one for each tube, the magnets being located to travel directly over the tubes and sufficiently close thereto to exert the requisite magnetic influence upon the circuit-closers. The tube or tubes, as the case may be, are preferably constructed from non-magnetic material and may have any length, and said tubes are located in advance of the location of the switch, gate, or signal the operation of which the circuit-closer is designed to control.

Any suitable means may be employed to effect the energization of the magnet 4—as, for example, the push-button 8 shown, which is connected by a wire 9 with said magnet and to which is led a wire 10. A return or ground wire 11 leads from said magnet to the wheel 3. In connection with a single magnet 4 means may be provided by which said magnet is cut out when brought to a position centrally between the tubes and cut in when moved to a position over either of said tubes.

The circuit-closers located within the tube each consists of a casing 12, preferably of glass and having a closed lower end and an open upper end, in which is inserted a closely-fitting plug 13, of insulating material. On the lower end of the plug are two separated contacts 14 15, preferably of the form shown in Fig. 6, and leading from said contacts through and beyond the plug are wires 16 17. In the casing are iron filings 18, which are normally in the bottom of the casing below the plug, but which are moved upwardly to bridge the contacts and close a circuit between them when attracted by the magnetic influence of the energized magnet 4 as the latter travels over the portion of the tube in which the closer is located. The circuit closed by the filings is maintained for a comparatively very short time, and when the magnetic influence ceases the filings drop from the contacts and break the circuit. A number of such closers are provided to insure the action of one of them regardless of the point at which the energiz-

ing-circuit is closed. A mica insulating-disk 19 may be interposed between the contacts and the plugs, as shown in Fig. 7, and in said figure is shown by way of modification a non-magnetic disk 20, which normally rests on shoulders 21 in the casing, but which is elevated by the attracted filings against the contacts to close the circuit between them. In lieu of the filings or filings and plate I may employ an iron disk 22, which is attracted by the magnet 4 and which has at its top a brass or other non-magnetic circuit-closing plate 23. In this modification a felt or other cushion 24 is placed in the bottom of the casing to receive the impact of the descending disk.

25 is a wire extending into the tube and to which are connected the wires 16 of the several circuit-closers. A wire 26 similarly connects the several wires 17. The wires 25 and 26 lead to the coils of a magnet 27, and in the wire 26 are batteries 28 28. At the side of the magnet 27 is a magnet 29, and 30 is an armature pivoted at 31 to the magnet-supporting frame 31′ and adapted in its elevated position to contact with the poles of both magnets. Secured to the magnet-supporting frame, through the medium of an interposed insulating-block 32, is a depending contact 33, connected by a wire 34 with the coils of magnet 29, and leading from said magnet 29 is a wire 35, which carries the current to the gate, switch, or signal operating means. The armature 30 carries a contact 36, insulated therefrom by a block 37, which contact is normally out of engagement with the contact 33. A constantly-charged wire 38 leads to the contact 36.

In operation the magnet 4 is energized by the car or train operator within the limits of the circuit-closers, and the attractive influence of said magnet causes a circuit to be closed at the contacts or terminals 14 15. The closing of the circuit effects the energization of the magnet 27, and the armature 30 is elevated to bring the contacts 36 33 into engagement, whereupon current flows from the constantly-charged wire 38 through contacts 36 33, through wire 34 to the coils of magnet 29, and from thence through the wire 35 to the device for operating or controlling the operation of the switch, gate, signal, or other appliances. What may be termed the "primary" or "starting" circuit through wires 25 and 26 and the magnet 27 is, as above stated, of short duration, magnet 27 becoming deënergized when the magnet 4 has passed the circuit-closer. The energization of the magnet 29 by the secondary circuit, however, maintains the elevated position of the armature. Consequently the secondary or operating circuit is maintained closed until interrupted by a circuit-breaker located beyond the switch, gate, signal, or other appliance. The secondary or operating circuit, which includes the constantly-charged wire, is of high voltage; but I preferably employ a low-voltage current for energizing the magnet 27.

It will be observed that the operation of the switch or gate or signal, as the case may be, is under the complete control of the car or train operator; but it is within the scope of my invention to provide for the automatic closing of a circuit through the magnet 4 or even to provide a constantly-energized magnet. In the preferred form of manually-controlled circuit-closer there is no danger of the switch, gate, or signal being accidentally operated, as the magnet 4, unless energized by the act of the operator, traverses the series of circuit-closers without result. Obviously in lieu of the push-button other means may be employed for effecting the energization of the magnet 4—as, for example, by a shunting device or by using the controller to open the motor-circuit and pass it through the magnet—and in other details the construction may be variously departed from without exceeding the scope of the concluding claims.

I claim as my invention—

1. The combination of a magnet mounted on a car or the like, and a circuit-closer in close proximity to the path of movement of the magnet consisting of a casing, a plug inserted in the casing, terminals carried by the plug, and a body movable by the magnetic attraction of said magnet to close a circuit at said terminals.

2. The combination of a magnet mounted on a car or the like, a circuit-closer in close proximity to the path of movement of the magnet and operated by the magnetic influence of the latter, a magnet electrically connected with said closer, a second magnet connected in an operating-circuit, and an armature movable by the first-named magnet to close said operating-circuit.

3. The combination of an electromagnet mounted on a car or the like, a primary circuit, a circuit-closer in said primary circuit arranged to be operated by said magnet, an operating-circuit, and a circuit-closer in said operating-circuit operated by the closing of the primary circuit.

4. The combination of a magnet mounted on a car or the like, a circuit-closer in close proximity to the path of movement of the magnet and operated by the magnetic influence of the latter, a magnet electrically connected with said closer, a magnet connected in an operating-circuit, an armature, and a pair of contacts in said operating-circuit one of which is carried by the armature, said armature being moved by the first-named magnet to close the operating-circuit at said contacts and being held in its moved position by the energized second-named magnet.

5. A circuit-closer consisting of a casing having a closed lower end and an open upper end, a plug fitting said upper end, electric wires extending through the plug and terminating in separated contacts, iron filings in the casing, and a magnet adapted to attract said filings to said contacts to close a circuit between them.

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

WALTER J. BELL.

Witnesses:
LEON F. MOSS,
MAUDE COOPER.