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W. M. BROWN.
SURFACE CONTACT ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED DEC. 18, 1902.

NO MODEL.

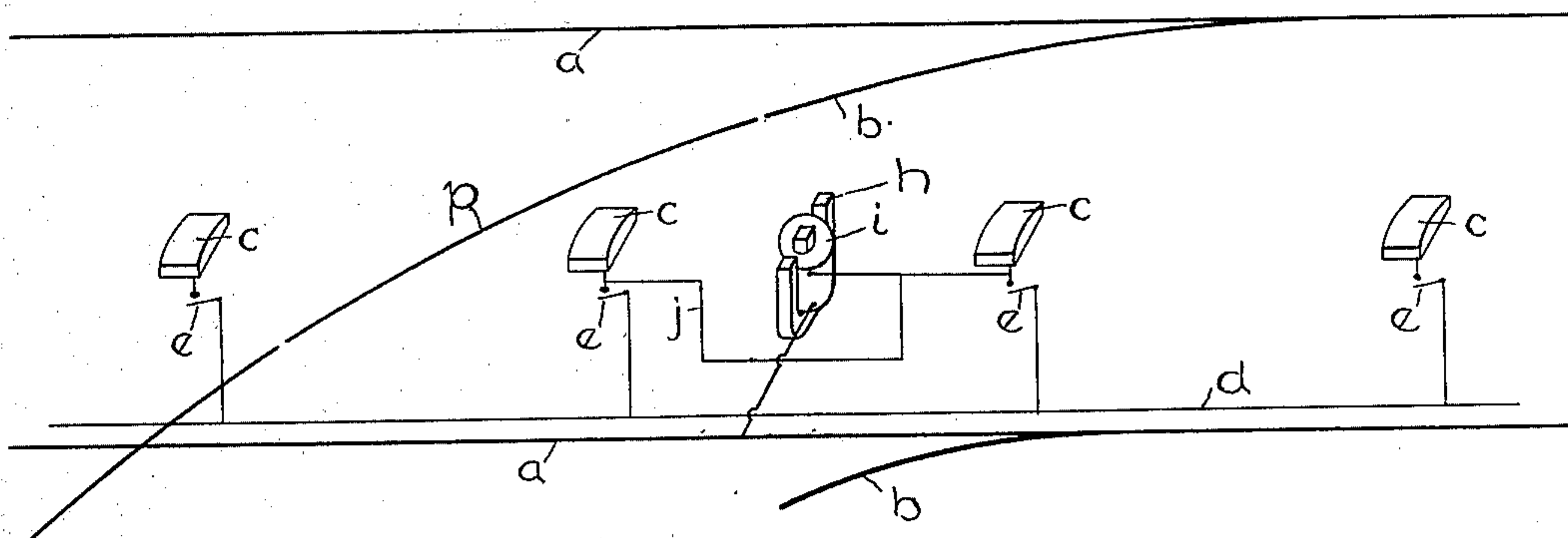


Fig. 1

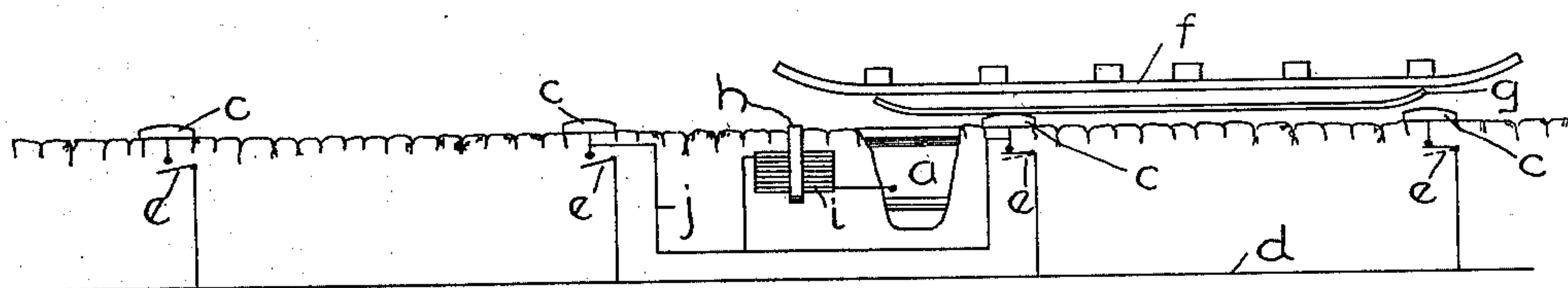


Fig. 2

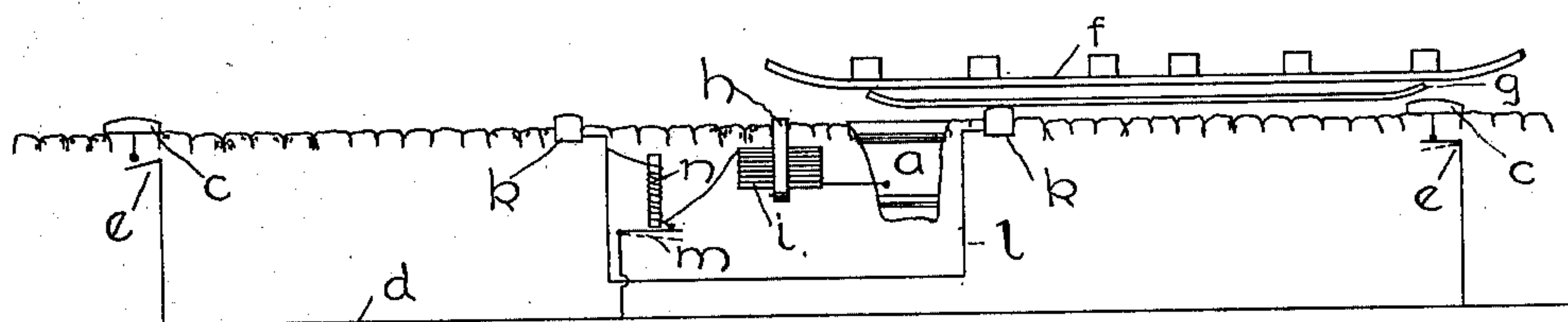


Fig. 3

WITNESSES:

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UNITED STATES PATENT OFFICE.

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SURFACE-CONTACT ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 735,340, dated August 4, 1903.

Application filed December 18, 1902. Serial No. 135,823. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILTON BROWN, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Surface-Contact Electric-Railway Systems, 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.

This invention relates to means for the prevention of short circuits in the operation of surface-contact electric-railway systems of that type in which the circuit-closing magnet or magnets is carried upon the car. In the operation of railway systems of this type it sometimes happens that the car-magnet will attract to itself small pieces of iron and steel—such as nails, pieces of wire, scrap-iron, &c.—which lie in the street, which will be carried along by the magnets and will dispose themselves in such a manner in passing over the rail or rails of an intersecting or branching track as to come in contact with such rail and also with the current-collecting shoe on the car, and thereby form a direct short circuit for a portion of the supply system. This is prevented by the present invention by providing at intervals along the track between the rails and directly underneath the path of the car-magnet what may be termed “cleaning-magnets.” These are magnets which are of sufficient strength to cause their poles to overcome the action of the car-magnet and attract to themselves such pieces of iron or steel as are being carried by the car-magnet. These magnets derive their current from the supply system of the railway to which they are so connected that they are energized only when a car is in the immediate vicinity thereof. They are preferably placed adjacent to intersecting or branching tracks.

The precise nature of the invention is shown by the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating one of the cleaning-magnets and its relation to the system; and Fig. 2 is a sectional view of a portion of the track-bed, showing the application of the invention. The magnet and collecting-shoe of a car are also indicated in this figure. The circuit-closing devices and

electrical connections are shown conventionally. Fig. 3 is a view similar to Fig. 2, but showing a slightly-modified arrangement.

The letters *a a* indicate the main-track rails of an electric railway, and *b b* the rails of a branching track.

c designates the surface-contacts, supplied with current from a feeder-cable *d*, to which they are connected by normally open circuit-closing switches *e*. These switches may be of any well-known type adapted to be closed by the action of a magnet *f*, carried by the car. *g* is a current-collecting shoe also carried by the car and engaging the surface-contacts *c*. As railway systems of this type are now well known, it is unnecessary to show and describe these parts in detail.

h designates one of the cleaning-magnets. This is preferably, but not necessarily, a three-pole magnet energized by a single coil *i*, wound upon its central limb. The two surface-contacts *c* adjacent to this magnet, which is embedded in the road-bed between the track-rails with its poles flush with or a little above the road-bed surface, are connected by a conductor *j*, and the magnet-coil *i* is connected in circuit between this conductor and the return side of the supply-circuit, which in the present instance is one of the rails *a*. As the car approaches this magnet the circuit-closing switch *e* of the adjacent contact *c* is closed by the action of the car-magnet *f*. This causes current to flow through the conductor *j* and coil *i* and energizes the magnet *h*, which attracts to its poles any pieces of magnetic material which may be adhering to the car-magnet. Before the collecting-shoe leaves the contact *c* at one side of the magnet *h* it is also engaging the adjacent contact at the opposite side, which will in turn supply current to the conductor *j* and coil *i*, and thus maintain said magnet energized during the whole time that the magnet *f* is passing over it.

The arrangement shown in Fig. 3 differs from that just described in that instead of requiring a contact *c* and circuit-closing device *e* to be placed so near the magnet *h* at each side thereof a small metallic conducting plate or stud *k* is set in the road-bed adjacent to the magnet *h*, upon each side thereof and within the length of the shoe *g* from the nearest con-

tact *c*. These two plates or studs are connected by a conductor *l* and the magnet-coil *i* is connected between this conductor and the return side of the circuit. The conductor *l* is also connected to the feeder *d* through a normally open electromagnetic switch *m*. In this arrangement as soon as the collecting-shoe spans one of the plates or studs *k* and the nearest contact *c* the magnet-coil *g* is energized. The energizing-coil *n* of the switch *m* is connected in series with the coil *i*, is also energized, and acts to close the said switch, so that after the shoe *g* leaves the contact *c* the coil *i* will continue to be energized.

Various other means, all within the spirit and scope of this invention, may be used to provide for the energization of the magnet *h*.

The coil *i* should be so wound as to give the magnet *h* sufficient strength to overcome the action of the car-magnets and should of course have sufficient resistance to guard against short-circuiting therethrough.

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

1. In a surface-contact electric-railway system in which the circuit-closing magnets are carried by the cars, means for removing adhering pieces of iron and steel from the car-magnets, such means consisting of cleaning-magnets arranged in the road-bed adjacent to the path of the car-magnets and means for energizing said cleaning-magnets.

2. In a surface-contact electric-railway system in which the circuit-closing magnets are carried by the cars, means for removing ad-

hering pieces of iron and steel from the car-magnets, such means consisting of cleaning-magnets arranged in the road-bed adjacent to the path of the car-magnets, normally open circuit connections between the coils of said magnets and the supply-circuit of the system, and means whereby such connections are closed by the action of the car-magnets.

3. In an electric-railway system of the character described, a cleaning-magnet placed in the road-bed of the system, with a pole or poles thereof exposed at the surface of said bed, an energizing-coil for said magnet normally disconnected from the supply-circuit of the system, and means whereby the coil is temporarily connected to said circuit by a passing car.

4. In an electric railway of the class described, a cleaning-magnet placed in the road-bed of the system and having one or more exposed poles, surface-contacts adjacent to said magnets, and normally disconnected from the supply-circuit of the system, means whereby the said contacts are connected to such circuit by the action of a passing car, and an electrical connection between said contacts, the coil of the said cleaning-magnet being connected between such connection and the return side of the supply-circuit.

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

W. MILT. BROWN.

Witnesses:

LORETTO O'CORMELL,
H. W. SMITH.