

UNITED STATES PATENT OFFICE.

ALFREDO DIATTO, OF TURIN, ITALY.

MAGNETIC CONTACT-BOX FOR ELECTRIC TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 748,268, dated December 29, 1903.

Application filed April 8, 1902. Serial No. 101,933. (No model.)

To all whom it may concern:

Be it known that I, ALFREDO DIATTO, a subject of the King of Italy, residing at Turin, in the Kingdom of Italy, have invented a new and useful Magnetic Contact-Box for Electric Tramways, (for which I have made applications for patents in France, dated the 5th of October, 1901, and in Great Britain, dated the 15th of March, 1902,) of which the following is a full, clear, and exact description.

The invention relates to contact-boxes for electric tramways taking the current from the level of the ground by means of a straight magnet.

It has for its object arrangements suitable for protecting the sides of the box and the apparatus which it contains against deteriorations caused by sparks or voltaic arcs which may accidentally take place between the various parts of the apparatus.

It has also for its object to moderate the speed of the movable contact, and thereby avoid its rebounding and the sparks consequent thereon.

The invention is illustrated in the accompanying drawing, which represents a vertical axial section of the improved box.

The contact-pieces consist, as is well known, of two pieces of carbon, one of which, *c*, is fixed to the upper part of the box in communication with the exterior contact-piece, while the other, *f*, is fixed to the movable contact *a*, floating in a bath of mercury. These pieces are ordinarily inclosed in a hermetic box formed by a bell *b*, closed below by a flange of the ebonite cup *h*. This cup contains the mercury in which the movable contact *a* floats and is closed by a copper plug *d*, which conducts the current to the mercury. It may, however, happen that either by the imperfect adjustment of this plug or by cracks in the ebonite the mercury escapes from the cup in sufficient quantity to prevent the contact forming and even to give sparks between the contact-piece *a* and the mercury, which cause a great discharge of heat, and consequently burning of the interior surfaces.

According to this invention this inconvenience is remedied by placing in the interior of the cup *h* a lining *e*, of non-magnetic metal not acted upon by mercury, such as steel with nickel—that is, containing nickel. This

body is not magnetic, though both steel and nickel be so separately, for example. This lining is brazed to the plug *d*, so as to form a hermetic cup, preventing any escape of mercury. The metallic lining *e* further produces an advantageous effect by moderating the shock of the movable contact upon the fixed contact.

As shown in the drawing, the mercury-reservoir is carried by a cast-iron ring *k*. When the movable contact *a*, which is of iron, is magnetized by the passage of the straight magnet, a magnetic field is created between it and the cast-iron ring *k*. The magnetic flux flows from the movable pin *a* horizontally and passes through the case *e*. At the same time the pin is attracted toward the fixed contact *c*, and the horizontal flux that is displaced with this pin creates in case *e*, whose surface is continuous, Foucault currents tending to oppose the movement of the flux. The velocity of the pin is thus delayed. The result, unimportant at the outset of the travel when the velocity is small, increases in proportion as the velocity tends to augment and becomes the highest at the end of the travel, where it attenuates the shock of coals *f* and *c* notably. It also prevents the rebounding of the pin, which may produce sparks. Finally, the movable contact may be heated by the passage of a strong current and burn the insulating parts on which it rests in falling. This inconvenience is also avoided by the metallic lining *e*, the upper part of which serves as a rest to the movable contact. It may also happen that between the carbon head *f* of the movable contact and the carbon ring *c* of the fixed contact an electric arc is established at the moment of separation of these parts. There is situated within the magnetic field produced by the flux flowing from the straight magnet of the wagons, which flux passes from the fixed contact *c* to the pin *a*. The arc generally is inclined on the lines of force making up this field. It is therefore projected on one side or the other against the interior walls of the protecting-box. It may deteriorate it or even form, with the insulating material of this box, lampblack, which renders the surface conductive and destroys the insulation between the contact-pieces.

This inconvenience is remedied by surrounding the contacts with an envelop *g*, of porcelain or other insulating and refractory material upon which the projected arc has no effect. This envelop *b* is placed in the interior of the hermetic box *b* upon supports *i* of caoutchouc.

What I claim as my invention, and desire to secure by Letters Patent, is—

10 1. In a magnetic contact-box for electric tramways, the combination with a mercury-cup, a movable contact therein, means for creating a magnetic field when the contact is moved and means for creating Foucault currents opposing the movement of the field and the elevation of the movable contact, substantially as described.

2. In a magnetic contact-box for electric tramways the combination with a mercury-

cup, a movable contact therein, means for creating a magnetic field and a non-magnetic lining for the mercury-cup for creating Foucault currents opposing the elevation of the contact, substantially as described.

3. In a magnetic contact-box for electric tramways the combination with a mercury-cup, a movable contact therein, a cast-iron ring between which and the contact a magnetic field is created and a non-magnetic lining for the mercury-cup to create Foucault currents opposing the elevation of the movable contact, substantially as described.

In witness whereof I hereunto set my hand in presence of two witnesses.

ALFREDO DIATTO. [L. S.]

Witnesses:

MARIO TRIBANDINO, [L. S.]

HUGO PIZZOTTI. [L. S.]