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Patented Jan. 16, 1900.

E. BONNET, J. PAUFIQUE & G. LINIÈRE.
CONTACT BOX FOR ELECTRIC TRAMWAYS.

(No Model.)

(Application filed June 16, 1899.)

2 Sheets—Sheet 1.

FIG-2-

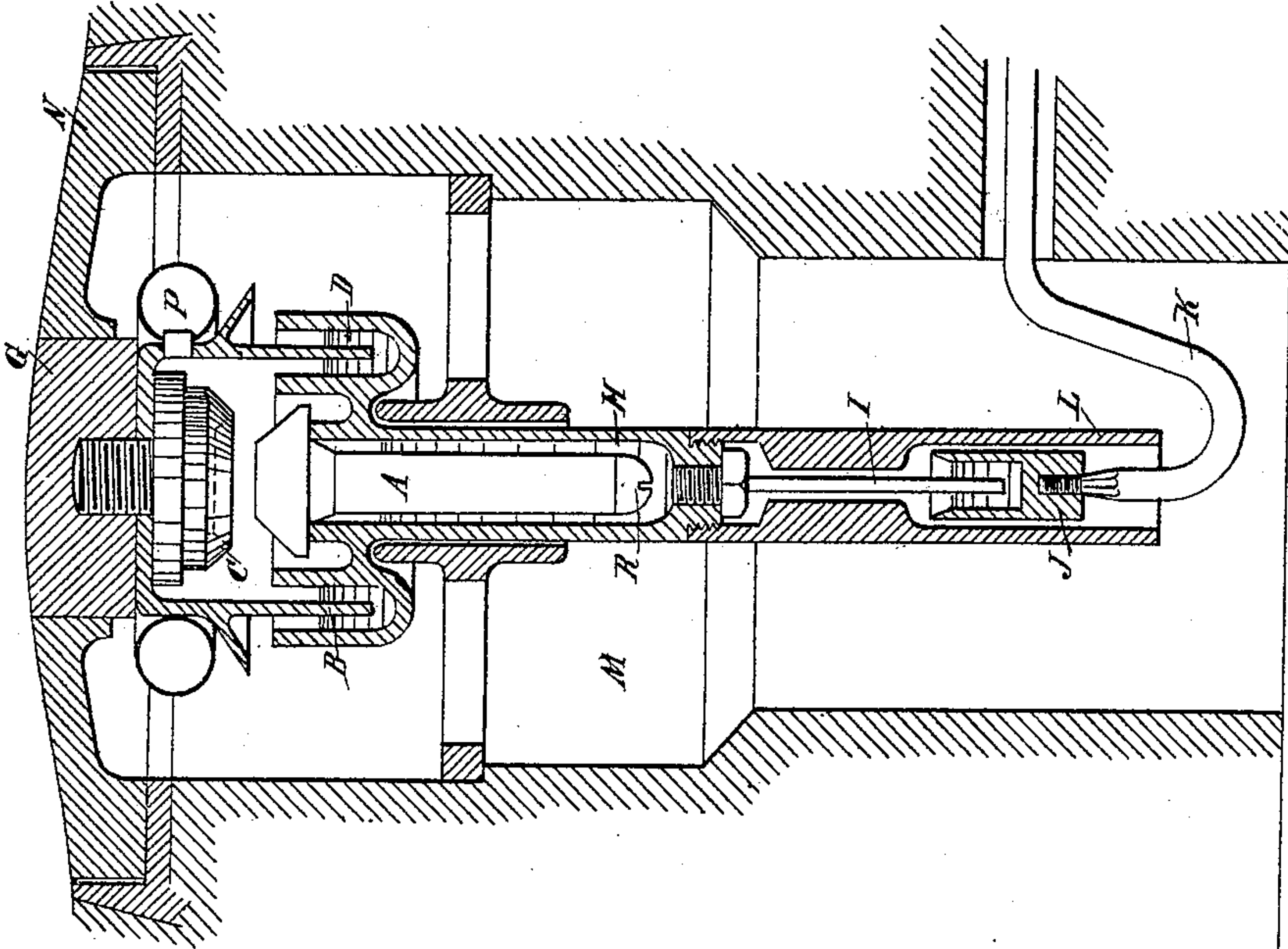
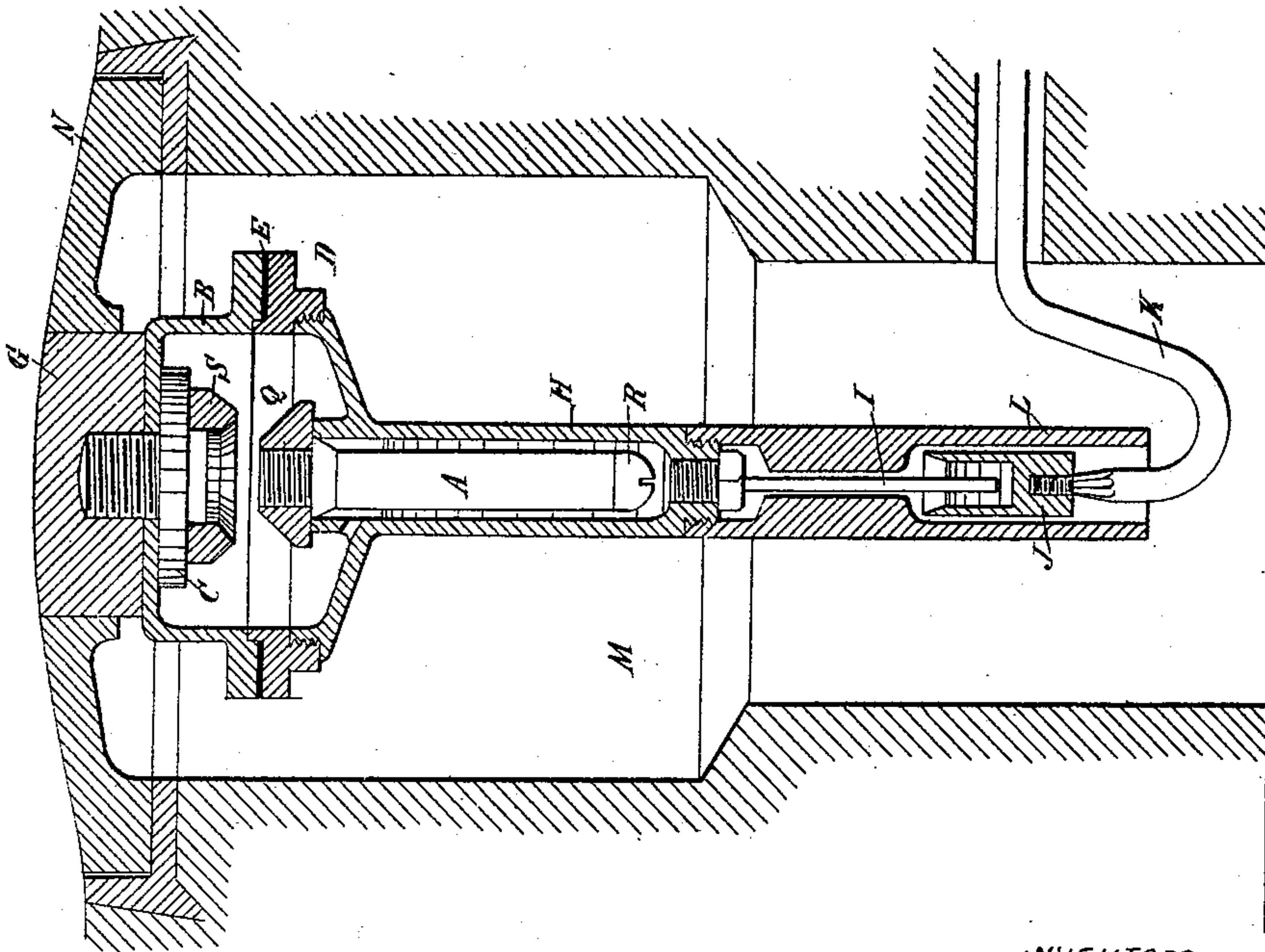


FIG-1-



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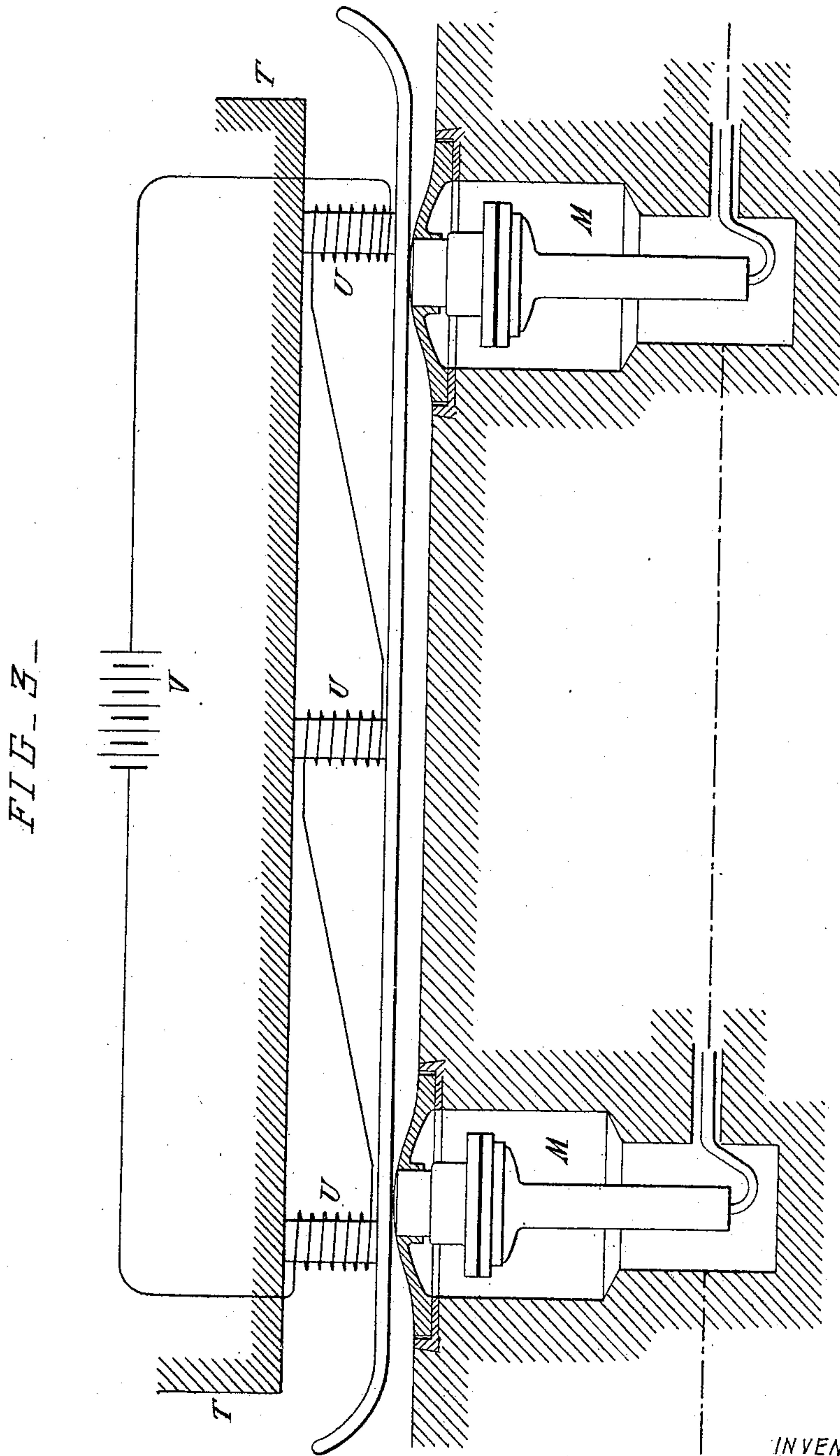
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UNITED STATES PATENT OFFICE.

EDOUARD BONNET, JULES PAUFIQUE, AND GEORGES LINIÈRE, OF LYONS, FRANCE.

CONTACT-BOX FOR ELECTRIC TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 641,264, dated January 16, 1900.

Application filed June 16, 1899. Serial No. 720,860. (No model.)

To all whom it may concern:

Be it known that we, EDOUARD BONNET, JULES PAUFIQUE, and GEORGES LINIÈRE, citizens of France, residing at Lyons, France, have invented certain new and useful Improvements in Contact-Boxes for Electric Tramways and the Like, of which the following is a full, clear, and exact description.

Our invention relates to the permanent ways of electric tramways and railways in which the vehicles obtain the current by means of contact-plugs arranged at a short distance apart at the surface of the roadway and placed successively in communication by the passage of the vehicle with an underground conductor. It is particularly applicable in those cases where the communication of the conductor with the exterior plugs takes place by means of an iron contact-piece attracted by an energized or magnetized bar placed under the vehicle. In the applications which have been made of this system it has been noticed that the operation of the interrupted parts was often troubled by the humidity of the atmosphere or of the ground, the condensation of which may produce derived currents between the contact-piece and the plug, and even form between these two parts a film of water or ice, establishing a permanent communication dangerous for the passengers. It is further very difficult to place in position and to regulate the various parts of the apparatus.

Our invention has for its object to shelter these organs from humidity and to assemble and regulate them before placing them in position, and to render them easily transportable and capable of being placed in position without special precautions.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in section one arrangement of apparatus, and Fig. 2 shows a slight modification thereof. Fig. 3 is a view showing two contact-boxes and the contact-bar carried by the car, conventionally indicated as T.

M is one of the cavities which are arranged a short distance apart upon the permanent way to receive the contacts. It is closed by a cover N level with the ground at its edges

and carrying at its center the iron plug G, under which is screwed the interior contact C. The movable contact is an iron rod A, situated in a mercury cup or container H in constant communication with the line-current. When the magnetized or energized bar fixed under the vehicle comes into contact with the plug G, this latter attracts the movable contact A, and the current passes to the vehicle through the magnetized or energized bar.

The parts which should be particularly preserved from damp are the movable contact-piece A, attracted by the magnetized or energized bar of the vehicle and the fixed contact C, fixed to the cover of the box. In the arrangement shown in Fig. 1 we inclose these two parts in an air-tight box formed of two parts B and D, connected by an india-rubber or other joint E by means of bolts or in other convenient manner. The upper part B is held between the plug G and the fixed contact C, or these two pieces B and C are soldered together. The lower part D is screwed upon the mercury cup or container H, into which plunges the movable contact A. The cup or container H, being made of ebonite or other non-conducting material, insulates this contact from the box B D, which may be made of metal. It is also very important to place that part of the conducting-cable from which the current is taken sheltered from the water which may accumulate in the excavation M in which the box is placed. The current is taken off by a rod I, screwed to the bottom of the mercury cup or container H and dipping in a mercury-cup J, carried by the end of the conducting-cable K. This part is prevented from coming into contact with water which might get into the box M by an ebonite bell L, which descends a little lower than the metal cup J. By this construction the entire apparatus is suspended from the cover N of the box and may be lifted with it for inspection and repairs. The electric contact between the movable contact A and the rod I may be made by other means—for example, by a flexible cable or a spiral wire. We prefer to employ mercury; but in this case it is difficult to prevent a certain amount of oxidation of the mercury, from which it

results that the movable piece A becomes covered upon the surface which dips in the mercury with a powder which interferes with the passage of the current. We overcome this
 5 inconvenience by screwing to the lower part of the contact-piece an end piece made of copper, which becomes amalgamated and assures an excellent contact. It is neither indispensable to employ mercury for taking off
 10 the current. It can be accomplished by any form of contact which disengages itself.

In order to prevent any welding between the surfaces of the two contacts by the passage of the current, these latter are provided
 15 with carbon fittings Q and S.

Fig. 2 shows a slight modification from the apparatus hereinbefore described, in which the fixed joint E is replaced by a hydraulic joint. The box B is in the form of a bell
 20 dipping into the liquid contained in a circular channel D around the mercury cup or container H. This arrangement enables the cover N to be dismounted without displacing the other parts of the apparatus; but it necessitates a special precaution to prevent the
 25 differences of pressure between the interior and exterior of the box B D allowing damp air to penetrate into this latter. The arrangement invented by us for this purpose consists
 30 in causing the box to communicate with a closed chamber P, formed of a flexible membrane, which can receive and return a portion of the air of this box, according to the variations of temperature, which tend to augment or diminish the pressure in the interior
 35 of the said capacity without the level of the liquid making the joint varying sensibly. The chamber P may have any desirable form, notably that shown in Fig. 2—namely, a circular india-rubber tube. As in the arrangement
 40 previously described, the taking off of the current at the lower part is protected by a bell L, made of insulating material.

In Fig. 3 the car-body is conventionally indicated at T. The magnetized bar is shown
 45 attached thereto by the cores *u*, around which the coils are placed and connected with the source of electricity V. The switch-boxes are indicated generally at M.

50 Having thus fully described our invention,

what we claim, and desire to secure by Letters Patent, is—

1. In a contact-box for electric tramways and the like in which the current is taken from plugs level with the surface of the road
 55 by means of a magnetized bar, the combination with the fixed contact C and movable contact A, of a metallic rod I in electric contact with the movable contact A and connected to the end of the conducting-cable, so
 60 as to transmit the current from the cable to the contact A without a rigid connection, substantially as herein shown and described.

2. In a contact-box for electric tramways and the like in which the current is taken from plugs level with the surface of the road
 65 by means of a magnetized bar, the combination of an air-tight box inclosing and protecting the contact-pieces C and A, with a bell arranged at the lower part of said air-tight
 70 box for protecting that part of the cable from which the current is taken, substantially as herein shown and described.

3. In a contact-box for electric tramways and the like in which the current is taken from plugs level with the surface of the road
 75 by means of a magnetized bar, the combination of an air-tight box with an air-tight elastic chamber P communicating with the box and maintaining an equilibrium between the
 80 interior and the exterior pressure, substantially as herein set forth.

4. In a contact-box for electric tramways and the like, the combination of a fixed plug and contact-piece, a movable contact-piece
 85 arranged in an air-tight box and dipping into a mercury-cup, a rod in communication with said mercury-cup and dipping into a mercury-cup carried by the conducting-cable, and a protecting-bell carried by the air-tight box,
 90 substantially as herein set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

EDOUARD BONNET.
 JULES PAUFIQUE.
 GEORGES LINIÈRE.

Witnesses:

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