

No. 652,419.

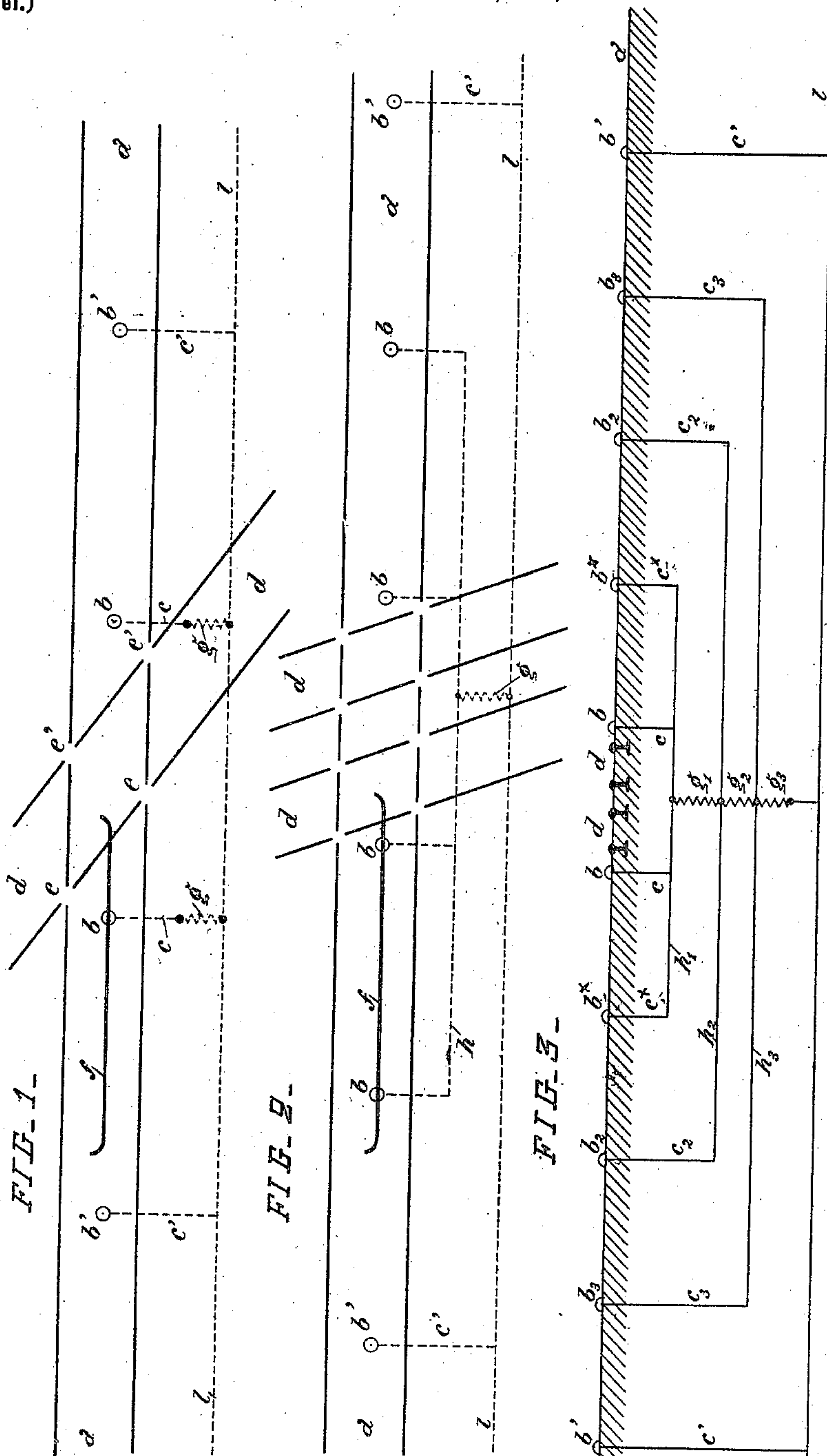
Patented June 26, 1900.

E. BONNET, J. PAUFIQUE & G. LINIÈRE.

ELECTRIC TRAMWAY.

(Application filed Mar. 27, 1900.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

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

ELECTRIC TRAMWAY.

SPECIFICATION forming part of Letters Patent No. 652,419, dated June 26, 1900.

Application filed March 27, 1900. Serial No. 10,321. (No model.)

To all whom it may concern:

Be it known that we, EDOUARD BONNET, residing at 21 Place Bellecour, Lyons, JULES PAUFIQUE, residing at 15 Rue Saint Dominique, Lyons, and GEORGES LINIÈRE, residing at Ecully, Rhône, France, have invented certain new and useful Improvements in Electric Tramways, of which the following is a full, clear, and exact description and for which we have made application for patent in Great Britain dated March 3, 1900, and in France dated January 12, 1900.

The invention applies to that class of electric tramways in which the carriages receive the current by means of a magnetized bar or by other suitable conductor coming into contact successively with contacts placed on a level with the ground. It relates to special arrangements to obviate the short circuits which might be produced at crossings or changes of road.

The object and principle of the invention are illustrated in the accompanying drawings, in which—

Figure 1 represents the invention applied to a line having a single crossing. Fig. 2 represents it applied to a line having a double crossing, and Fig. 3 is a sectional view of the latter.

$a a$ represent the main road, along the length of which are arranged contact-boxes $b b'$, receiving the current from the main line by means of conductors $c c'$. $d d$ represent any given road, belonging or not to the same system and crossing the road $a a$. The parts $e e' e'$ of the road $d d$ comprised between the rails of the road $a a$ are encountered by the current-collector f , placed under the carriage, while this collector is in contact with one of the boxes $b b$. While care is taken to raise the collector as much as possible above the level of the rails, there may nevertheless be established an accidental contact between these two parts, either by the interposition of a foreign body which is more or less conductive or in electromagnetic tramways by the filings or particles which remain suspended from the bar f . This contact establishes a short circuit between the main line $l l$ and the rails which serve for the return of the current. It has been endeavored to

remedy the consequences of this short circuit by insulating the dangerous parts from the other parts of the road by spaces made at $e e' e'$; but, while these spaces are not always authorized on roads belonging to other proprietors, their efficacy is almost destroyed by rainy weather. This inconvenience not being capable of complete suppression, the invention has succeeded in reducing it to a minimum, which can in no case cause an accident. For this purpose on the conductors $c c$, which convey the current to the boxes $b b$, near to the crossing, are intercalated resistances $g g$ of such character that the intensity of the current passing directly from these boxes to the rails cannot exceed a certain maximum amount from which no accident is to be feared. It should be understood that all the boxes which might be in contact with the bar f at the same time as the rails of the crossing road should be provided with these resistances. In the case of Fig. 2, in which the crossing is double, there would be four boxes $b b$ thus provided. It is more simple in this case to unite the four boxes by a conductor h and to unite this conductor by a single resistance g to the main cable l . The passage from the ordinary boxes to those provided with resistances causes in the current-transmitter to the carriage abrupt changes of intensity which it might be advisable to graduate. This result will be obtained by the arrangement represented at Fig. 3.

$a a$ represent a longitudinal section of the road; $d d$, the crossing road; $b b^x b^2 b^3 b'$, the contact-boxes immediately in front or to the rear of the point of crossing, and $l l$ represent the conducting-cable. The boxes b^3 communicate directly with the cable by the conductors c' . The boxes b^3 communicate with each other by a conductor h^3 and with the cable by a resistance g^3 . The boxes b^2 communicate with each other by a conductor h^2 and with the conductor h^3 by a resistance g^2 , and finally the four boxes $b^x b b b^x$ communicate with each other by a conductor h' and with the conductor h^2 by a resistance g' . The sum of the resistances $g' + g^2 + g^3$ is constantly opposed within the desired limits to the passage of the current by the road $d d$; but the current taken by the carriage diminishes gradu-

ally, first by the resistance g^3 on arriving at the box b^3 , then by g^3+g^2 on arriving at the box b^2 , and lastly by the sum of the resistances g^3+g^2+g' on arriving at the box b^x .

5 The increase of the current is effected with the same graduation in going from b^x to b' . This graduation might be extended to any given number of boxes in front or to the rear of the crossing-point.

10 Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination with an electric tramway having surface contacts and having a
15 crossing road of resistances interposed between the supply and the contacts located near the crossing road, whereby only a limited current may pass.

2. The combination with an electric tramway having surface contacts and crossed by
20 a road of resistances placed between the sup-

ply and the contacts in proximity to the crossing road, the resistance to the contacts nearest the crossing road being greater than the resistance to the more remote contacts. 25

3. The combination with an electric tramway having surface contacts and having a crossing road of resistance interposed between the supply and the contacts in proximity to said crossing road, the resistances in the lines leading to the contacts on each side of said crossing road gradually increasing toward said road, substantially as described. 30

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

EDOUARD BONNET.
JULES PAUFIQUE.
GEORGES LINIÈRE.

Witnesses:

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