

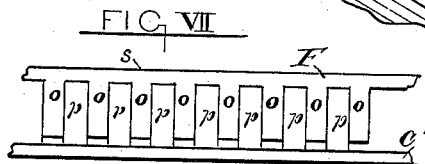
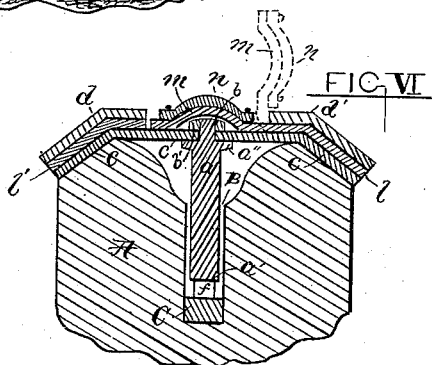
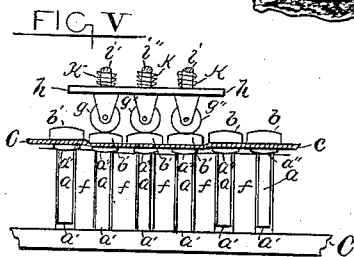
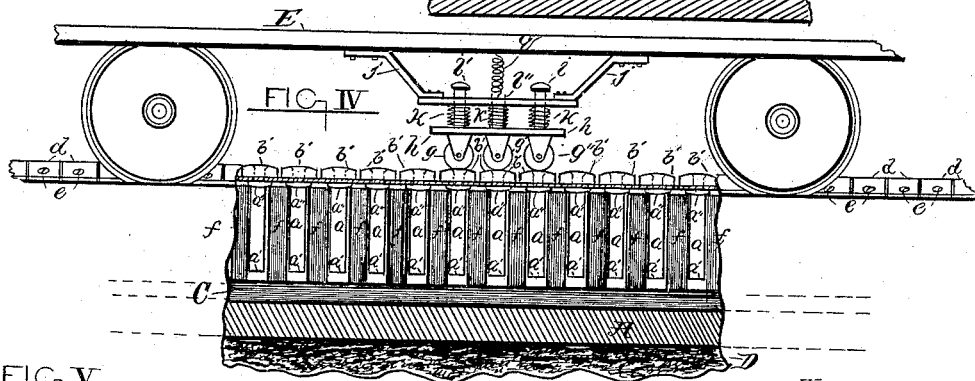
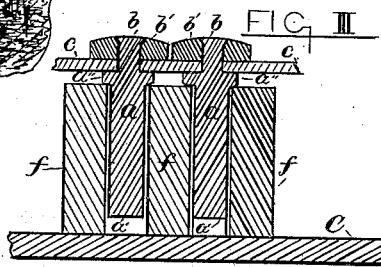
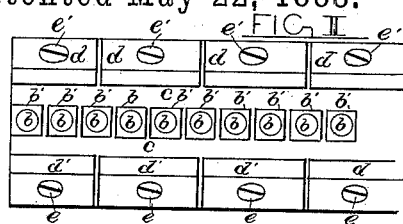
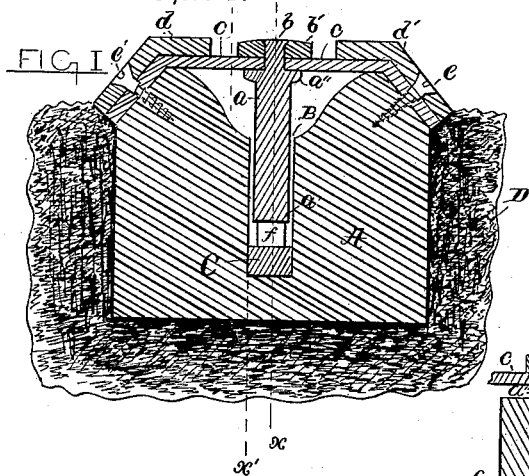
(No Model.)

2 Sheets—Sheet 1.

H. T. BLAKE & C. STERLING.  
ELECTRICAL TRAMWAY.

No. 383,274.

Patented May 22, 1888.



Witnesses.

Sylvester V. Nichols.  
James F. Burnett.

Inventors.

Henry T. Blakee.  
Clarence Sterling.

By Geo. D Phillips

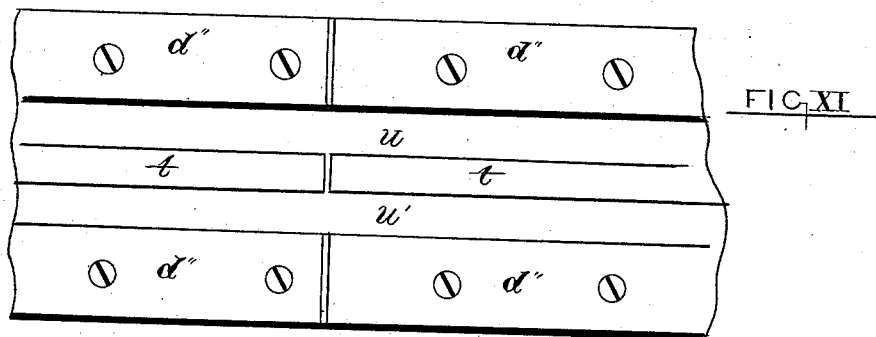
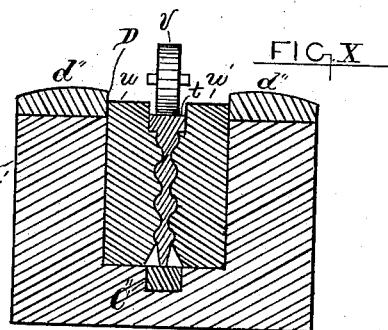
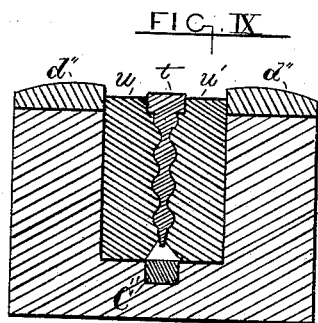
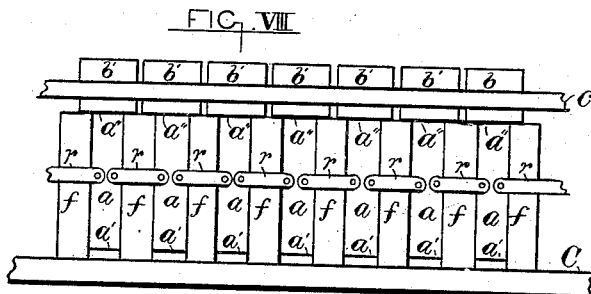
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2 Sheets—Sheet 2.

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By Geo. A. Phillips

# UNITED STATES PATENT OFFICE.

HENRY T. BLAKE, OF NEW HAVEN, AND CLARENCE STERLING, OF BRIDGE-  
PORT, CONNECTICUT.

## ELECTRICAL TRAMWAY.

SPECIFICATION forming part of Letters Patent No. 383,274, dated May 22, 1888.

Application filed June 2<sup>d</sup>, 1887. Serial No. 242,194. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY T. BLAKE, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, and CLARENCE STERLING, of Bridgeport, Connecticut, have invented certain new and useful Improvements in Electrical Tramways; and we do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to that class of electric conduits for tramways in which the primary or main conductor is placed in the interior of the conduit and electric communication is had therewith by means of an exterior secondary conductor placed parallel to said main conductor.

Said invention consists in improved methods of constructing, arranging, and supporting the several parts of the device, so as to promote the cheapness and efficiency of the apparatus and to protect all its members from moisture, dirt, and ice, and from injury by street travel and other external causes.

In the accompanying drawings our invention is shown in different forms.

Figure I represents in cross-section an end elevation of the device. Fig. II represents a plan view of Fig. I; Fig. III, a detail view and section through *x* of Fig. I. Fig. IV represents the lower section of a car and longitudinal section through *x* and *x'* of Fig. I. Figs. V, VI, and VII represent detail views. Fig. VIII represents the transmitter linked together. Fig. IX represents an end elevation and cross-section of the sleeper and corrugated transmitter-bar having flexible side supports, said bar shown out of electrical contact. Fig. X represents said bar in electrical contact. Fig. XI represents a plan view of Figs. IX and X.

D represents the road-bed; E, lower section of a car; *a*, the intermediate secondary conductors or transmitters; *b*, its upper point; *b'*, plate to which said point is secured; *c*, flexible diaphragm spanning and covering the conductor channel or groove; *d d'*, plates to protect said diaphragm; *e e'*, screws to secure

plates and diaphragm to the sleeper; *f*, flexible supports for the transmitters; *g*, trolley-wheels to force said transmitters into electrical contact with the primary conductor; *h*, frame to support said trolleys; *i*, steady-pins; *j*, frame attached to bottom of car-supporting frame below; *k*, springs; *l*, flap or cover; *n*, metal plate resting upon same.

The sleeper A, (see Fig. I,) which is supposed to be of wood or other good non-conducting material, is placed longitudinally in the road-bed, preferably between the rails. The groove or channel B is formed therein to admit the conductor C, which rests at the bottom of the same. The intermediate conductors or transmitters, *a*, are vertically suspended over the primary conductor C, and a short distance from it. Said transmitters are represented as a series of pins having shoulders *a''*, which rest upon the elastic rubber supports *f*, which serve to keep said transmitter out of electrical contact with the conductor C. Said elastic supports (which are made of rubber or other similar non-conducting elastic material) rest upon said conductor, (see Fig. II,) which is a longitudinal side elevation through dotted line *x* of Fig. I. The diaphragm *c*, which is flexible, and also non-conducting, spans the channel B (see Figs. I and II) its entire length, and is secured to the sleeper A at opposite sides of said channel. Over this diaphragm at the sides of said sleeper are placed the plates *d d'*. Said diaphragm and plates are secured to the sleeper by the screws *e e'*. These plates are represented in short lengths, and are insulated from each other to prevent a leakage of the electric current, their object being to protect the diaphragm from the contact of passing vehicles and other rough usage to which they would be exposed.

The diaphragm is perforated to admit the small end *b* of the transmitters *a*, and to this small end are riveted the caps or plates *b'*, thus placing the diaphragm *c* between the shoulder *a''* of the transmitter and the cap *b'*. These caps (see Fig. II) are also insulated from each other by a short distance. The object of the diaphragm is to serve the purpose of excluding dirt, water, and other foreign matter from the channel, which would interfere with the proper working of the primary and secondary conductors.

Between the secondary conductors or trans-

mitters *a* are the flexible supports *f*. One end of these supports rests upon the primary conductor, and the other end will support the transmitters *a* at their shoulders *a''*, bringing the lower end, *a'*, of said transmitters within a short distance of the primary *C* and just out of electrical contact therewith. The space between ends *a'* and primary *C* will depend on the flexibility and elasticity of the supports *f* and the unevenness of said primary. In Fig. IV is shown the lower section of a car and the mechanism employed in connection with the device before mentioned.

Beneath the car *E* are the trolley-wheels *g g'*, which engage with the heads or plates *b*, and with the necessary pressure brought to bear thereon will depress the transmitters *a* (see Fig. V) until the points *a'* of the same are brought into electrical contact with the primary *C*, and the circuit completed through the wire *g* to the motor, (not shown,) and thence through one or both rails in the usual way.

The number of wheels used for depressing the transmitters may, if desired, be increased or diminished. It is evident that by the use of two or more wheels at least one of said transmitters will be in electrical contact all the time, so that there will be no cessation of electrical condition, and consequently no "sparking." After the trolleys have passed by, the elasticity of the supports will lift the transmitters, pins, or points off of electrical contact and back to their normal position. To protect the diaphragm *c* from abrasion, to which it would be exposed, the metal plates *d d'* (see Fig. I) are provided. Said plates and diaphragm are secured by screws *e e'* to the sleeper *A*. To protect the upper portion, *b'*, of the secondary conductors or transmitters, the flexible cover *l* may be used. Said cover is secured beneath the plate *d'*, (see Fig. VI,) having the arch *m*, spanning plate *b'*, and reinforced by the metal cap *n*. These arched stiffening-plates are preferably made wide enough to extend across the width of the channel, their outside edges resting upon the solid sides, thus forming a bridge over the secondary conductor and preventing its accidental depression by street traffic or otherwise. The cover *l* is adapted to be lifted by suitable means (not shown) to the dotted perpendicular position shown. This will permit the passage of the trolleys to accomplish the object hereinbefore described.

The exact form or construction of the intermediate or secondary conductors is immaterial so long as the best possible results are obtained. In Figs. I, II, III, IV, V, and VI they are represented as narrow independent pins, each insulated from its neighbor. In Fig. VIII, as shown, they may, if necessary, be linked together by the connection *r*. In Fig. VII is shown the bar *F*, of any desired length, having a series of downward-projecting fingers, *o*, to effect the electrical contact with primary *C'*.

The flexible supports *p* perform the same office as with the individual pins, as before mentioned, the trolley *v* engaging with the top surface of bar *F*.

In Fig. IX is shown a secondary conductor, *t*, having corrugated sides. Said conductor may be constructed of any required length consistent with the best results, and is supported at the sides by the elastic rubber strips or packing *u u'*. This packing, together with the secondary conductor *t*, is supposed to fill the groove or channel *D*, and to give sufficient support to the secondary *t*, so as to suspend the same above the primary *C''* and out of electrical contact therewith.

In Fig. X is shown the trolley *v* depressing the secondary *t*, bringing it into electrical contact with its primary *C''*. The metal plates *d''* serve the purpose, as shown in the other figures, to protect the upper exposed surface of the sleeper.

Having thus described our invention, what we claim as new, and desire to protect and secure by Letters Patent, is—

1. An electric conduit for tramways and other uses, consisting of a sleeper, of wood or other suitable non-conducting material, having a channel cut in its upper surface and a primary or main conductor laid in the bottom of said channel, in combination with a diaphragm of flexible non-conducting material secured along the upper surface of such conduit across such channel, a secondary conductor attached along the outer surface of said diaphragm over said channel and having a series of projections extending through said diaphragm into said channel, which projections approach nearly to said main conductor, but not to the point of electrical connection therewith, and blocks or strips of elastic rubber or other similar non-conducting elastic material supporting said secondary conductor in its normal position, all as described.

2. The combination of the channeled conduit, constructed substantially as described, having the main conductor at the bottom of the channel, the flexible diaphragm covering said channel, the secondary conductor placed upon said diaphragm, and the flexible flap over said secondary conductor having stiffening-plates which extend across said channel and form a bridge over the secondary conductor, in the manner and for the purpose described.

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

HENRY T. BLAKE.

Witnesses:

HENRY C. WHITE,  
FRANK L. OWEN.

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

CLARENCE STERLING.

Witnesses:

LOUIS N. MIDDLEBROOK,  
CHARLES H. FOGG.