

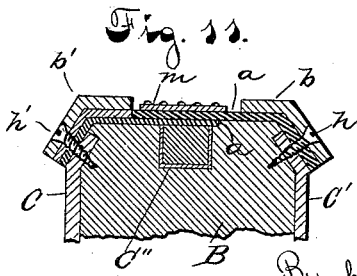
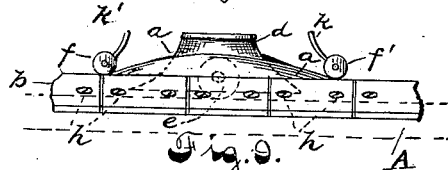
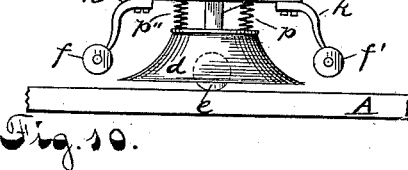
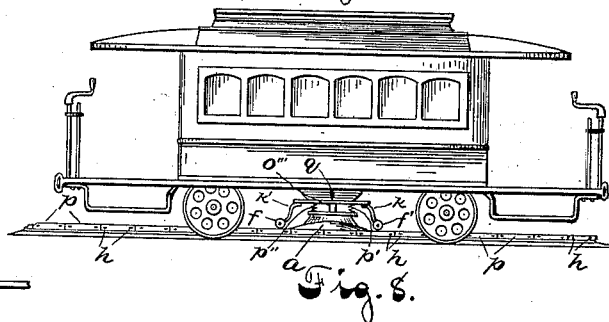
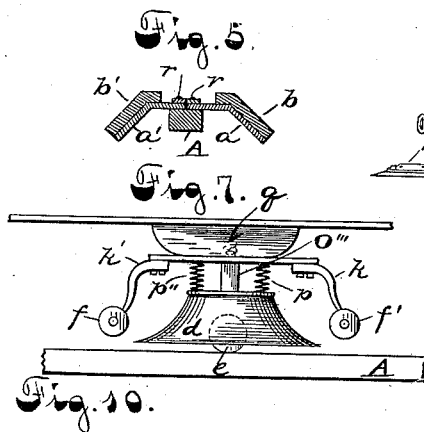
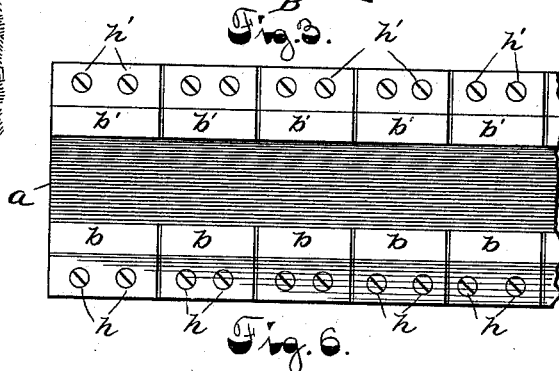
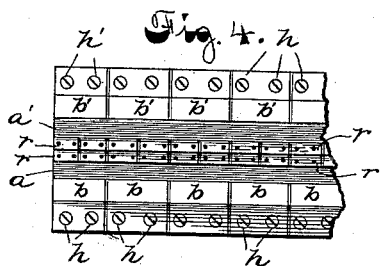
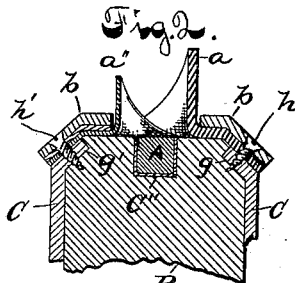
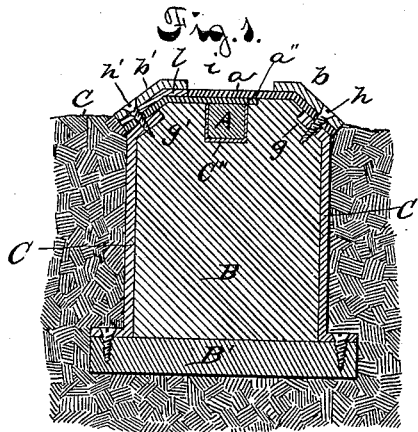
(No Model.)

2 Sheets—Sheet 1.

H. T. BLAKE.
ELECTRICAL TRAMWAY.

No. 383,273.

Patented May 22, 1888.



Witnesses.
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By his Atty.
GEO. D. PHILLIPS.

(No Model.)

2 Sheets—Sheet 2.

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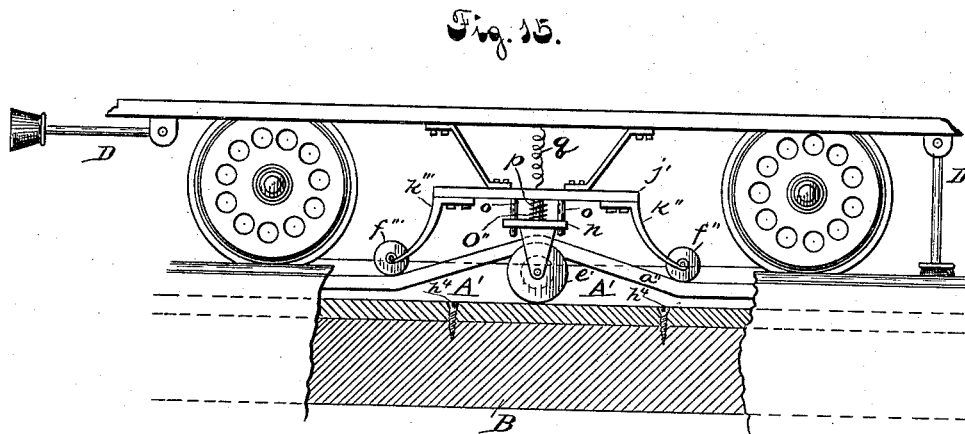
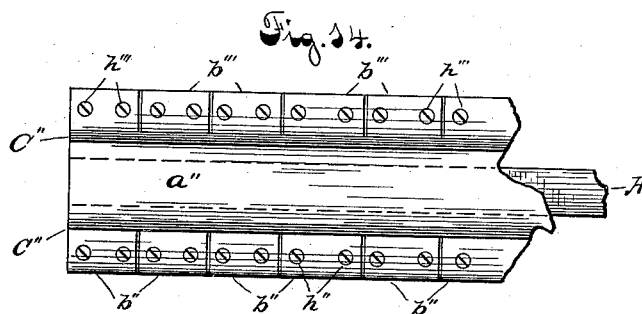
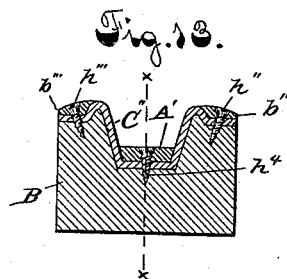
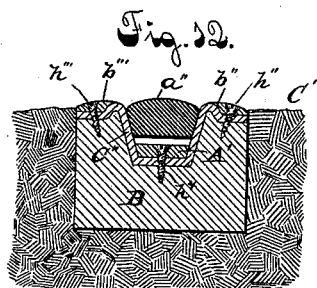
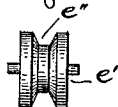


Fig. 16.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY T. BLAKE, OF NEW HAVEN, CONNECTICUT.

ELECTRICAL TRAMWAY.

SPECIFICATION forming part of Letters Patent No. 383,273, dated May 22, 1888.

Application filed June 2, 1887. Serial No. 240,109. (No model.)

To all whom it may concern:

Be it known that I, HENRY T. BLAKE, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electrical Tramways; and I 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.

My invention relates to a conductor-conduit for electrical tramways.

A leading feature or purpose in my invention has been to avoid the use of slotted, tubular, or chambered conduits, as these, especially when placed beneath the surface of the ground, are liable to become choked with water, dirt, and ice. I therefore make use of a sleeper or base of wood or other suitable non-conducting material for the conduit proper, in or upon the upper surface of which the metallic conductor is firmly fixed. In this form simply the device would resemble a third rail-conductor, and would not be new or patentable.

My invention consists, first, in combining with the conduit and conductor an overlying strip or flap of flexible non conducting material closely covering the conductor, so as to exclude moisture and dirt therefrom, and leaving no space in which they can collect, and also measurably insulating the exposed surface of such conductor and protecting it from injury by travel or otherwise, said flexible covering being also so constructed and arranged as to be capable of being lifted at the passage of a traveling trolley or other device for making electrical contact with said conductor and replaced in position after such passage; and, second, in certain special features connected with the construction and arrangement of said conduit-covering flaps and trolley, as herein-after set forth.

To properly understand my invention reference is had to the drawings, and to the figures and letters marked thereon, forming a part of this specification.

Figure 1 represents an end elevation in cross-section of the conductor and its conduit, a metal frame or box to support the same, flexible covers or flaps, and a series of plates or blocks to stiffen and protect said covers. Fig. 2 represents a section of Fig. 1, showing the flaps lifted. Fig. 3 represents a plan view of Fig. 1; Figs. 4 and 5, modifications of my device. Fig. 6 represents a side elevation of a car, showing the device in operation. Fig. 7 represents a side elevation of the conductor and trolley-wheel in contact with said conductor, a plow to lift the flexible covering, and means for replacing said covers in position. Fig. 8 represents a side elevation of the plow, showing also its contact with and manner of lifting the flexible covers. Figs. 9 and 10 represent detail views. Fig. 11 shows a modification of my device. Fig. 12 represents an end elevation in cross-section of a slightly-modified form of my invention, showing a solid flexible strip or cable closely fitting the conduit. Fig. 13 is a representation of Fig. 12, showing the flexible strip removed. Fig. 14 represents a plan view of Fig. 12. Fig. 15 represents the lower section of a car, showing the operation of the flexible strip and trolley-wheel. Fig. 16 represents a front elevation of the trolley-wheel.

Its construction and mode of operation are as follows:

A represents the conductor.

B is the wooden sleeper in which said conductor rests; *a a'*, the flexible covers or flaps; *b b'*, metal plates to protect said covers; *c c'*, metal frame inclosing wooden pillow or sleeper; *d*, plow to lift the covers; *e*, trolley-wheel to engage with the conductor; *f f'*, wheels to assist in replacing the flaps or covers after they have been lifted.

The sleeper B is placed in the road-bed between the rails, and is made continuous the entire length of the tramway and a channel formed along the whole length of its upper surface. In the bottom of this channel is laid the conductor A, which consists of a strip of copper or other suitable conducting metal. The strip of vulcanized rubber, *C'*, or other non-conducting material, may be placed in the channel before laying in the conductor A for the purpose of further insulation. This rub-

ber forms a lining for the channel. Its outer edges may be turned over the top of the sleeper, as seen at Fig. 12. To protect the sleeper B, it may be inclosed in the metal casing *c c'*, which is preferably flanged at the upper ends, *g g'*, (see Fig. 1,) which gives greater support and protection to the flexible covers *a a'*, which are placed thereon. To protect said covers from contact with vehicle-wheels, the plates *b b'* are placed over the outer ends of the same, and the whole secured in place by the screws *h h'*. The plank B' supports the sleeper B, and also the casing *c c'*. The top plates, *b b'*, should be in short lengths and separated or insulated from each other, as seen in Fig. 3. This will enable them to be readily taken up and the flaps repaired when necessary. Separating or insulating the plates *b b'* from each other at their ends will effectually prevent a leakage of the electrical current in a long circuit. The space *i*, between the ends of the plates *b b'*, (see Fig. 1,) is made as narrow as possible to prevent the entrance of heavy wheels. The upper flexible cover, *a*, extends entirely across the space *i*. The lower flexible cover is, for convenience in lifting, made shorter and preferably thinner, as this difference in thickness of the covers *a a'* would not bring the top plates, *b b'*, at the same distance above the surface of the ground, and to compensate for this the strip *l* is placed on the top of flap *a'*. The conductor A may be secured in the channel of the sleeper in any suitable manner, or it may be laid on the surface of the sleeper; but it is necessary that it should be so jointed and secured as to preserve its flat position through all changes of temperature.

In Fig. 7 is shown the trolley-wheel *e* in electrical contact with the conductor A. As the covers *a a'* lie close to the upper surface of said conductor, it is evident that the said covers must be temporarily lifted to open a free passage for the wheel *e*. Therefore the plow *d* is provided, to which said wheel is secured. (See also Fig. 10, representing the under surface of the plow.) Said plow is adapted to operate in either direction, presenting a thin edge to the flaps or covers, and so formed as to readily lift said covers with the least possible friction or resistance while the car is in motion.

The plow is attached to the frame *j* and suspended from the center of the car; but it may be placed at either end of the car, or in any position desired which will secure the best possible results. After the covers *a a'* have been lifted by the plow, and to assist in replacing them in position, the wheels *f f'* are provided. Said wheels are placed in direct line and a short distance from said plow, so that in whatever direction the car is moving one of said wheels will precede and the other follow the plow. Said wheels may be brought in direct contact with the upper surface of the flap *a* or a short distance therefrom. The office of

the rear wheel is to close the covers after the plow has lifted them. The forward wheel prevents the flaps rising too quickly. There might be sufficient elasticity to the flexible covers to cause them to resume their former position without the aid of the wheel *f f'*; but it is evident that the said wheels will materially assist in bringing about that result. Said wheels are attached to the flexible fingers or springs *k*, and these are secured, as shown, to the frame *j*. To protect the upper flap, *a*, the thin metal plate *m* may be placed thereon, as shown in Fig. 11. In place of the upper and under flaps, *a a'*, lapping over each other, as shown in Figs. 1 and 2, their ends can abut at the center, as shown in Figs. 4 and 5. On the extreme ends or edges of said flaps the short strips or plates of metal or other suitable material insulated from each other could be placed to give protection from abrasion. The brushes D D operate to keep the flaps free from dirt and obstacles, and are attached to each end of the car, both brushes being hinged, so that they can be turned up when not in use.

In Figs. 12 and 13 the channel in the sleeper B is preferably made tapering or V-shaped. The flexible cable *a''*, also V-shaped, fits in said channel; but in this device the plow is dispensed with, as seen in Fig. 15, which represents a longitudinal section of Fig 13 through dotted line *x*. The cable *a''* passes over the trolley-wheel *e'*. The groove *e''* is formed therein (see Fig. 16) to receive the same.

The wheels *f'' f'''*, Fig. 15, perform the same office in reference to the cable as they do to the flaps, as hereinbefore described. The trolley-wheel *e'* is attached to the frame *n*, which in turn is flexibly connected to the frame *j*, the steady-pins O O' and the central pin, O'', around which the spring *p* is wound, serving to steady the wheel *e'*. The frame *n* is allowed sufficient vertical movement to compensate for any unevenness of the conductor A' or motion of the car. The spring *p* will always insure contact between wheel *e'* and conductor A'.

In Fig. 7 the springs *p' p''* serve the same purpose for the plow. The large centered steady-pin O''' firmly supports the plow against the pressure brought to bear against it when in contact with the flaps and while the car is in motion. In both of the devices shown the wire *q*, or other metallic connection between the trolley-wheels, transmits the electric current to the motor. The return-current from the motor to the dynamo may be transmitted in the usual way through one of the rails or by a separate conductor.

I do not wish to be confined strictly to the exact mechanical construction of my device as shown. Some parts could be dispensed with—such, for instance, as the iron casing of the sleeper, the extra rubber packing *l* between plate *b'* and flange *g'*. The under flap, *a'*, could be made thick enough at that end, so as to dispense with the extra piece. Such under flap may also be dispensed with altogether,

and other mechanical changes could be made without departing from the spirit of my invention.

I am aware that patents have been granted which show slots or other openings into chambered or tubular conduits as closed by double flaps meeting at the edges, so as to form a roof over such openings; but in all such cases, so far as I know, there is open space left between such flaps and the conductor, where water, dirt, and ice may accumulate. Moreover, in these devices, the flaps being placed over open spaces, as aforesaid, are of necessity either constructed of short metal strips or plates hinged at one side and sufficiently heavy to support travel by their own stiffness, or they are set so far beneath the exterior slot of the conduit as to be protected from exposure to such travel. In neither case do they come into close contact with the conductor or partially enwrap it, or serve to insulate it in any degree. None of the devices shown in said patents, or heretofore known or used within my knowledge, combine in a flap-covered conduit all the requisites of complete covering and insulation of the conductor where the trolley is not passing, its thorough protection against dirt, moisture, abrasion, and adequate flexibility,

strength, and support for the flap under the wear and tear of street-travel over the surface which my invention secures.

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

An electrical conduit for tramways and other uses, consisting of a base of wood or other suitable non-conducting material, having a metallic conductor strip attached along its upper surface, in combination with a flexible flap or covering of non-conducting material overlying such conductor-strip, resting upon the same and its supporting-base, so as to be substantially in contact with said strip, in the manner and for the purpose hereinbefore set forth, said flap being arranged in the manner described, so as to be lifted and replaced in position to permit the passage of the trolley or other contact-making device, in the manner and for the purpose set forth.

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

HENRY T. BLAKE.

Witnesses:

LEVI W. BROWN,
HENRY C. WHITE.