

(No Model.)

2 Sheets—Sheet 1.

W. H. KNIGHT.

CONDUIT AND CONDUCTOR FOR ELECTRIC RAILWAYS.

No. 461,549.

Patented Oct. 20, 1891.

FIG. I

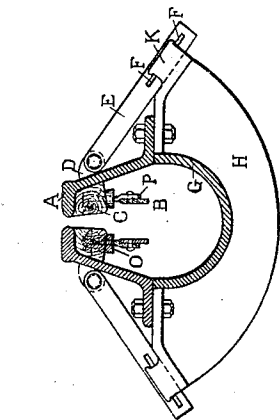


FIG. II

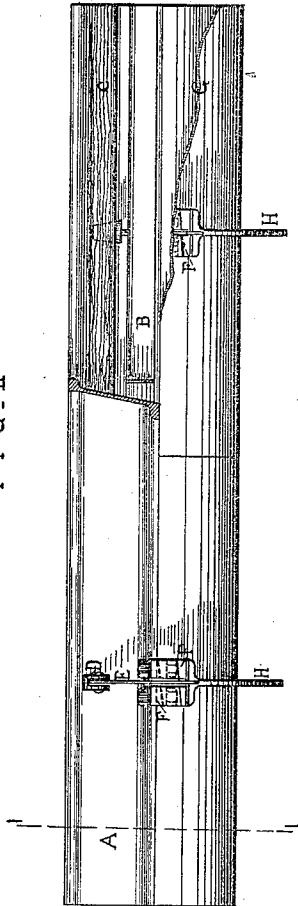


FIG. III

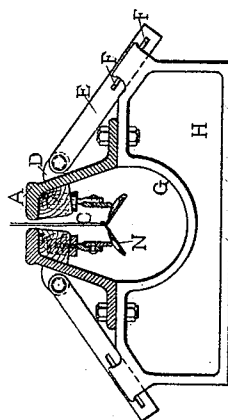
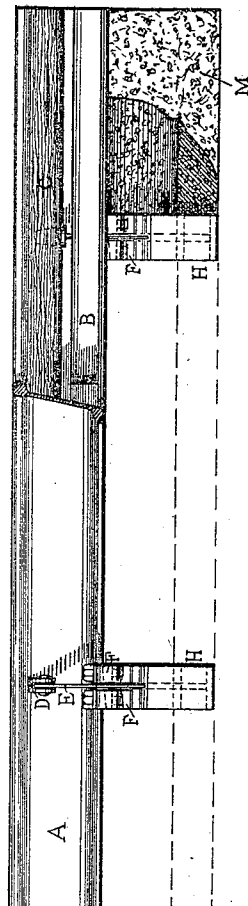


FIG. III



WITNESSES

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Att'y

(No Model.)

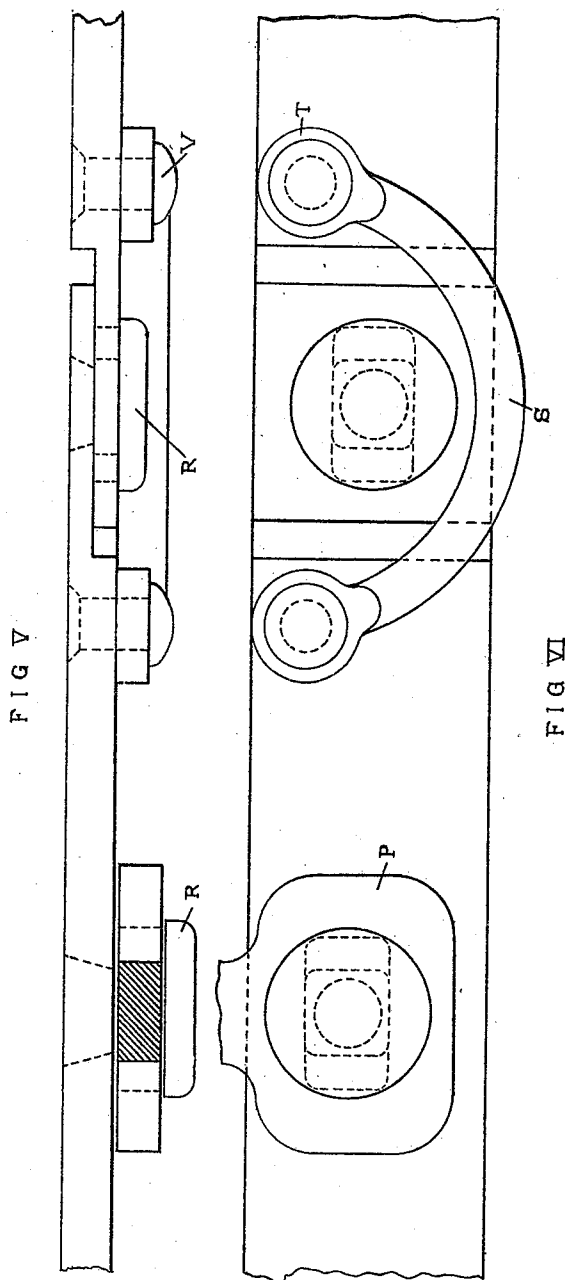
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UNITED STATES PATENT OFFICE.

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CONDUIT AND CONDUCTOR FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 461,549, dated October 20, 1891.

Application filed April 29, 1887. Serial No. 236,549. (No model.)

To all whom it may concern:

Be it known that I, WALTER H. KNIGHT, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Conduits for Electric Railways, of which the following is a specification.

My invention relates to conduits for inclosing the supply conductor or conductors of an electric railway; and it consists in various features of construction by which one or more conductors may be supported at such a height that a small size of conduit may be employed, while at the same time they will be perfectly insulated, firmly held in place, and easy of access for the contact device, which extends through the slot.

In the accompanying drawings, Figure I is a cross-section of a conduit with cast-iron bottom, taken on line 1 1 of Fig. II. Fig. II is a side elevation of the same conduit, partly in section. Figs. III and IV are corresponding views of a conduit with concrete bottom. Figs. V and VI are respectively a plan and elevation of a conductor with its support and section-joint.

In Fig. I, A is a slot-piece of Z-shaped metal, the upright web being inclined inward, so that two of them placed on an underlying foundation form the upper part of a slotted conduit. The lower part of the conduit is in the form shown at Figs. I and II, made of cast-iron semi-cylindrical sections G, having flanges H every few feet. The slot-pieces are bolted to the cast-iron bottom, and from flanges H braces E extend up and are bolted to ears D, fastened to the outside of the slot-pieces. These braces E are adjustable by means of tapered keys F, driven through slotted holes upon opposite sides of the corner lug K. Ears D are made with a neck, which is inserted in a hole in the slot-iron and then headed up from the inside. In Figs. III and IV the bottom of the conduit is formed by concrete M, in which are set at intervals yokes H, to which the slot-pieces are bolted. The braces E are the same in both cases. In the conduit thus formed one or more electric conductors are placed in the following manner: Under the upper horizontal lip of the slot-piece A is fastened a longitudinal strip or block of wood C,

preferably extending the whole length of the conduit. From this wood is suspended the conductor B in the following manner: At intervals of about four feet along C are inserted insulating-bushings O, preferably of wood, which are sealed in with shellac or white lead. Into these bushings are screwed hangers P, which are secured to the back of the conductor in the manner shown in Figs. V and VI. The lower ends of bushings O are turned out slightly concave, so as to form a water-shed for any drippings that may enter the slot of the conduit. In these figures, P is the lower end of the hanger, which has a slotted hole in it. Through this hole is passed a flat-headed rivet R, which is then passed through a countersunk hole in conductor B and smoothly headed up on the anterior face of the conductor, so as not to interfere with the passage of the contact device. The rivet or connecting-piece R is thus firmly fastened to conductor B; but it is movable on the hanger or support P to allow for any expansion and contraction of B due to changes of temperature.

The sections of B are joined by having the adjacent ends chamfered off, as shown in Fig. VI, in a plane through their greatest diameter and overlapped, with separation enough to allow of necessary expansion. A rivet R, like that used with hanger P, is then passed through a slotted hole in one section and firmly attached to the other section.

To render more secure the electrical continuity of the conductor, a flexible cable S, with eyes T at each end, is riveted to the conductors, so as to bridge the joint.

The contact device used with this arrangement of conductors is like that shown in my patent, No. 338,175, dated March 16, 1886, and rides upon the under edge of the conductor, as shown in Fig. III.

The type of slot-rail herein shown, which I have termed "upright," has a web, giving vertical stiffness and forming a stop for the pavement; while at the same time it forms the upper part of the conduit-inclosure, this inclosure being enlarged by the flange at the top of the web and by the inclination given to it. For the purpose of some of the claims herein-after made the web may be perfectly vertical; but certain specific advantages are gained by inclining the web inward, the inclination be-

ing limited at the point where the external pressure will force the pavement to slide forward onto the rail.

The main advantages of the inclined rail are that the expanse of metal on the surface of the street is reduced to a minimum, while it allows the conductors to be supported in the upper part of the conduit and permits connection with them to be readily maintained by the contact devices shown. This last advantage is of special importance, for if the conductors are forced down to a lower position the conduit-inclosure is below the slot-rails and must consequently be carried below the ordinary cross-tie found in street-railway construction, by which the expense is greatly increased.

I claim—

1. The combination, in an electric railway, of a conduit formed of the upright slot-pieces united to a common base, an electric supply-conductor in the conduit supported from one of the slot-pieces, and a contact device bearing on the under side of the said conductor.

2. The combination, in an electric railway, of the supply-conductor, an inclosing conduit, a support for the conductor attached to the conduit, and a joining-piece between the conductor and its support connected to the conductor and movable upon the support.

3. The combination, with an electric conductor in a slotted conduit, of an insulating-block attached to the slot-piece, a hanger attached to the conductor and connected to the said block, with an intermediate insulating-bushing.

4. In a conduit for electric railways, the combination, with the slot-rail having an upright web inwardly inclined and provided with an exterior brace, of an insulated conductor supported in the conduit on said slot-rail.

5. In a conduit for electric railways, the combination, with the slot-rail having an upright web inwardly inclined and provided with an exterior brace, of an insulated conductor supported on said slot-rail in the upper part of the conduit inclosed by the rail.

6. In a conduit for electric railways, the combination, with the slot-rail having an upright web inwardly inclined and provided with an exterior brace, of a corresponding parallel slot-rail, a common substructure to which both rails are attached, and an insulated conductor supported on the slot-rail in the upper part of the conduit inclosed by the rail.

7. The combination, in an electric railway, of a conduit formed of slot-rails having an upright web and united by a common substructure provided with yokes or flanges, an insulated supply-conductor in the conduit supported on one of the slot-rails, and a contact device supported from without the conduit and having an upward pressure against the conductor.

8. The combination, in an electric railway,

of a conduit formed of slot-rails having an upright web united by a common substructure, an insulated supply-conductor supported on one of the slot-rails in the upper part of the conduit inclosed by said rails, and a contact device supported from without the conduit and having an upward pressure against the conductor.

9. In a conduit for electric railways, the combination of a slot-rail having an upright web, an ear attached to the outside of the slot-rail, a brace engaging with said ear, a substructure supporting the rail, and a supply-conductor in the conduit supported from the rail.

10. In a conduit for electric railways, the combination, with a metallic slot-rail, of an inclosed rigid sectional conductor supported thereon through intervening insulators, the conductor-sections being connected with an expansible joint, and the supporting-insulators having a sliding connection permitting longitudinal movement of the conductor relatively to the slot-rail, whereby independent expansion of slot-rail and conductor is provided for.

11. In a conduit for electric railways, the combination, with the slot-rail having an upright web inwardly inclined, of an exterior brace therefor, and a rigid sectional conductor supported thereon through intervening insulation, the sections of conductor having an expansible joint and being provided with a sliding support, whereby independent expansion and contraction of conductor and slot-rail are permitted.

12. In a conduit for electric railways, the combination, with the slot-rails, of flanged yokes placed at intervals to which the slot-rails are attached, an electric supply-conductor supported on one of the slot-rails, and a filling between the yokes forming part of the conduit-inclosure.

13. In a conduit for electric railways, the combination, with the slot-rails, of transverse yokes placed at intervals, a filling between the yokes, and an insulated sectional supply-conductor supported loosely on one of the slot-rails and provided with expansion-joints permitting independent expansion and contraction of the conductor and slot-rail.

14. In a conduit for electric railways, the combination, with the slot-rails, of transverse yokes placed at intervals, an intermediate filling of non-conducting material between the yokes, and an insulated supply-conductor supported on one of the slot-rails.

15. In an electric-railway conduit, the combination, with a metallic slot-rail, of a substructure therefor having yokes or flanges at intervals, an insulating-lining for a metallic part of the conduit, a series of projections from said lining, and an insulated supply-conductor supported on said projections.

16. A conduit for an electric railway, composed of the inwardly-inclined slot pieces attached to an underlying foundation to form

the upper part of the conduit and having an insulated electric supply-conductor supported in the conduit in the said upper part.

17. A conduit for an electric railway, having a slot-piece with an inwardly-inclined web and a horizontal inwardly-projecting flange above the web, combined with an insulated electric supply-conductor in the conduit above the lower edge of the slot-piece.

18. In a conduit for an electric railway, the combination of the slot-pieces having an upright web and a flange thereon, transverse yokes, sides of insulating material, and an insulated electric conductor supported in the upper part of the conduit formed by the slot-pieces.

19. In a conduit for electric railways, the combination of an upright slot-rail, a substructure therefor beneath the pavement,

forming the lower part of the conduit and having transverse yokes, a transverse brace for the slot-rail extending from the substructure up into the pavement, and an insulated conductor in the conduit supported from the slot-rail.

20. The combination, in an electric-railway conduit, of a slot-rail forming the upper part of the conduit, a series of yokes at intervals upon which said slot-rail is supported, an intermediate filling between the yokes, and an insulated electric conductor supported from the said slot-rail.

Signed this 26th day of April, 1887.

WALTER H. KNIGHT.

Witnesses:

E. M. BENTLEY,
ROBT. W. BLACKWELL.