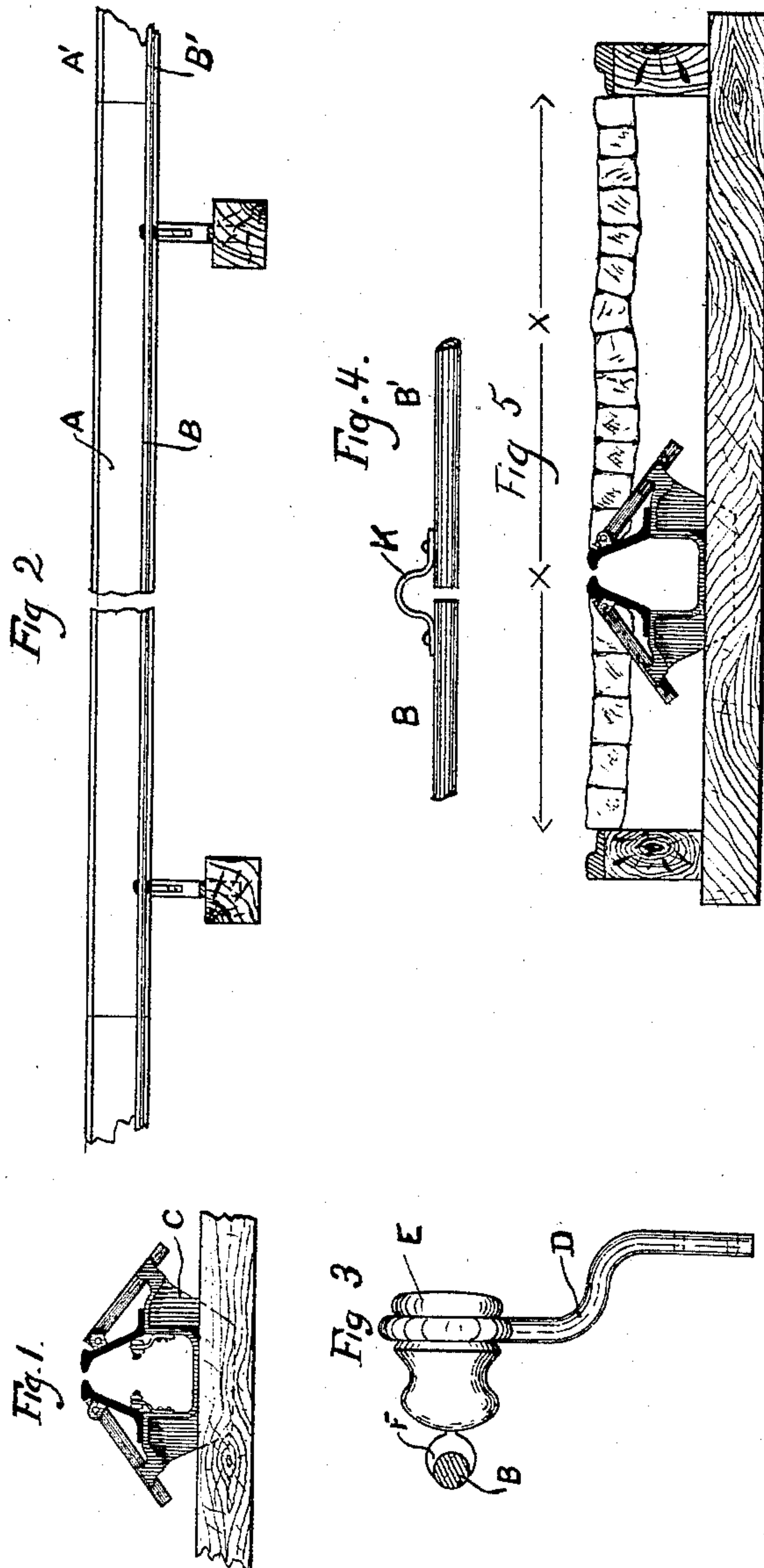


(No Model.)

2 Sheets—Sheet 1.

W. H. KNIGHT.
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No. 458,747.
Patented Sept. 1, 1891.



WITNESSES

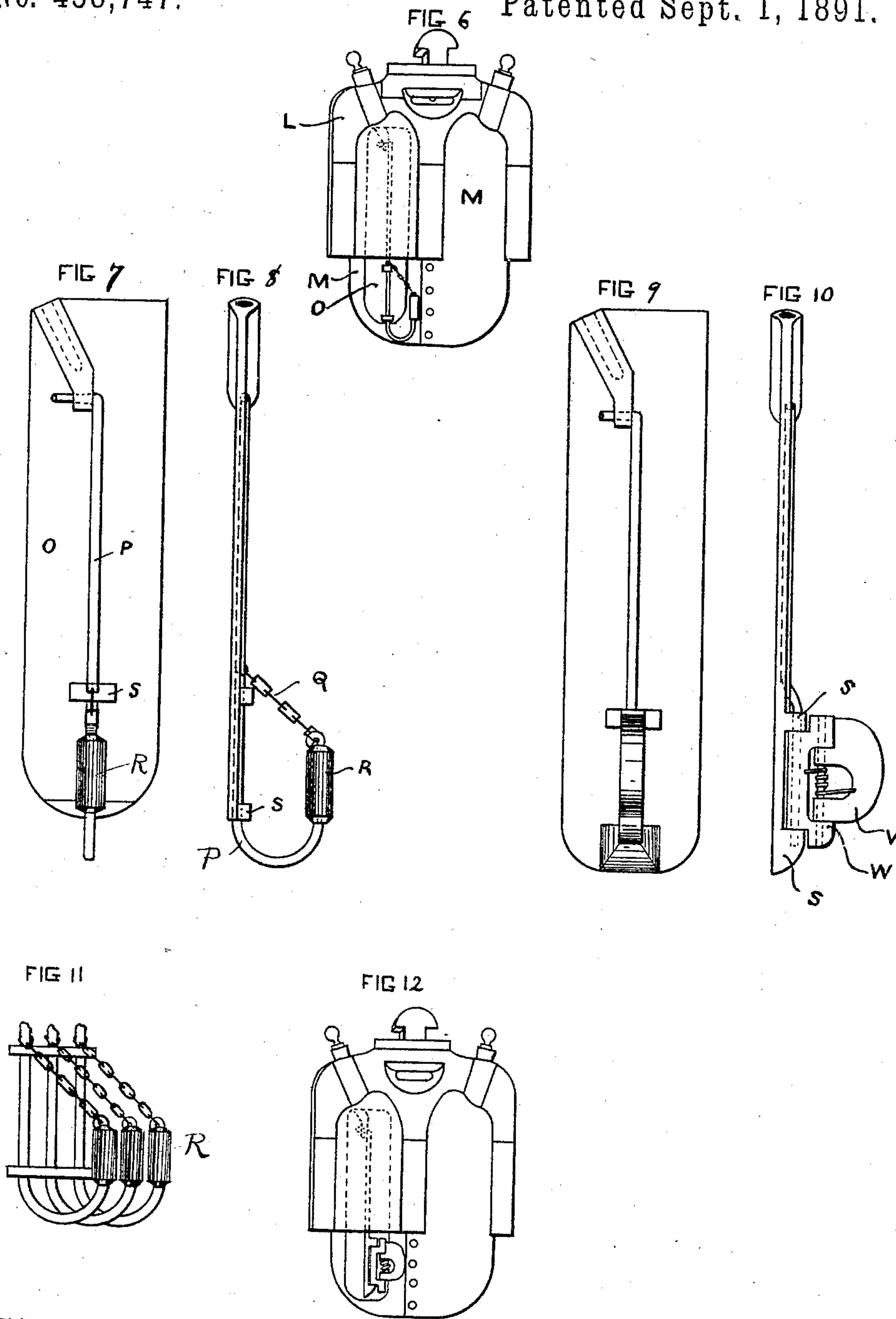
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UNITED STATES PATENT OFFICE.

WALTER H. KNIGHT, OF NEW YORK, N. Y.

ELECTRIC-RAILWAY CONDUIT AND CONTACT DEVICE.

SPECIFICATION forming part of Letters Patent No. 458,747, dated September 1, 1891.

Application filed May 10, 1888. Serial No. 273,522. (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 Electric-Railway Conduits and Contact Devices, of which the following is a specification.

My invention relates to electric railways; and it consists in certain features of construction of an underground conduit for inclosing a supply-conductor, and also in a contact device for maintaining electrical connection between the conductor in the conduit and an electrically-propelled vehicle on the line. It is illustrated in the accompanying drawings, in which—

Figure 1 is a transverse section of a conduit embodying my invention. Fig. 2 is a longitudinal section thereof. Fig. 3 is a detail of an insulator. Fig. 4 is a detail of a connection between different sections of conductor, and Fig. 5 is a transverse section of a road-bed including the conduit. Fig. 6 is a side elevation of my contact device. Figs. 7 and 8 are detached views of the conductor-plate. Figs. 9, 10, 11, and 12 show modifications.

In Figs. 1 and 2, A A' represent sections of slot-rails which are secured upon and braced to transverse yokes C in any desired way, and B B' are conductor-sections, which are respectively of equal length with the slot-rail sections. The conductors in this case are supported from transverse yokes C upon metallic projections D, there being an intermediate insulator E. This insulator E is preferably made of glass, porcelain, or similar fire and water proof material and carries at its outer end a jaw F, embracing the conductor B, to which it is firmly fastened.

In Fig. 4 an ordinary flexible connection between two adjacent sections of conductor B and B' is illustrated, it consisting of a flexible band or wire K, having its ends riveted to the conductors B B', respectively.

In Fig. 5 I have shown a conduit placed between the two rails of a track at about one-third the distance from one of the rails. It has proved an objectionable feature in the employment of a conduit to have it placed in the usual position, midway between the rails,

as it then comes directly in the horse-path for single vehicles. By placing it at one side of the central horse-path, and yet out of the line of the two side horse-paths used by the double teams, I render its use entirely unobjectionable on a street, as both double and single teams can proceed on the roadway without having the horses traveling on the conduit.

The contact device shown in Figs. 6 to 12, inclusive, is especially adapted for the form of conduit shown in Figs. 1 and 5, where the wooden lining for the slot-iron heretofore employed to prevent accidental contact with the slot-rail is removed, as the contact-piece is moved in the conduit about a vertical axis and will in all cases leave the conductor before it strikes the slot-iron, and will not, as in previous forms, where the contact moves about a horizontal axis, fly up under the influence of the contact-spring and establish an arc between the conductor and the slot-rail.

In Fig. 6 L is a metallic frame, carrying insulating-panels M, in which are embedded the conductor-plates O in a manner heretofore well known. My invention relates to the device employed on the lower ends of these plates to establish a traveling connection between them and the supply-conductor in the conduit. It has heretofore been customary to attach to the plate a contact device movable about a horizontal axis under the influence of a spring, by which it was normally held up against the conductor from below. In this case I connect to the plate O a contact-piece movable relatively thereto about a vertical axis. This contact-piece is adapted to bear against the vertical face of the conductor and is also adapted for progress in either direction. It is, moreover, made of a dimension thinner than a width of the slot and is rounded both at top and bottom, so that it will be automatically forced to one side or the other into a position substantially in the same plane with the frame L and the panels M, so as to be withdrawn from the slot of the conduit at any point.

In Figs. 7 and 8 O represents the main supporting-plate. P is a spring-wire partly embedded in plate O and at its lower end bent up upon itself and provided with a roller or similar contact device R. The wire P is held

in position by loops S, and a flexible rod or a small chain Q leads from the lower free end of the wire to a point on plate O, so as to limit the range of motion of the free end of the wire and serve as a guide when the device is pulled up through the slot. Normally the wire P and the roller R stand out at right angles to plate O, and as the upper end of the wire O is firmly connected with the plate, while its free end is not, the roller R can be depressed to one side or the other in a position more or less approximating the plane of plate O, and when released will spring back into its normal position by the torsional resiliency of the wire. When these plates O, having the contact device just described, are inserted in the frame L, rollers R will normally stand out at right angles to the frame, as described. The "plow," as the whole device is called, may then be dropped into the slot of the conduit at any point. The lower rounded ends of wires P will strike the edges of the slot-rail and be folded down flat against panels M and readily passed through the narrow opening. When, however, they are once inside, they will fly out again until they come in contact with the conductors B upon opposite sides of the conduit. The chains Q will perform the same function as the rounded ends of wires P when the plow is entering the slot. They form a guide which will strike the under edges of the slot when the plow is pulled out and gradually fold down the rollers R against panels M. As these rollers can be folded down in either direction, the plow can move as readily one way as the other, and should any obstruction, like an offset in the conductor, be encountered the rollers R will spring in until they pass the center and will then be free to be pulled over the obstruction.

In Fig. 11 I have shown a modification wherein there are a number of these contacts R fastened to one plate O. By this multiplicity a reliable contact will be insured.

In Figs. 9, 10, and 12 I have shown a modification wherein the roller and wire are replaced by a rounded plate V, having a spring-hinge connection with a second piece W, which in turn has a spring-hinge connection with plate O. This second spring-hinge may be formed by extending the wire P through loops S and an offset on W and securing it firmly to the latter. In this way a torsional spring action for W will be secured. Both W and V are rounded, so as to be readily folded down against O when entering or leaving the conduit through the slot, and when an obstruction is encountered they will be readily doubled together, so as to pass over the obstruction without injury. In both cases it will be seen that the insulated panels extending down into the conduit behind the main

conductor O provides against the contact device being accidentally forced into contact with the opposite conductor.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an electric-railway conduit, of a slot-rail, a series of transverse supporting-yokes, and an insulated conductor within the conduit supported by upward metallic projections from the said yokes.

2. In an electric-railway conduit, the combination, with a slot-rail A, of a transverse metallic yoke C, a conductor B, an independent projecting metallic support D, bolted or otherwise attached to yoke C, and an intervening insulator E.

3. In an electric railway, the combination, with a railway-track, of a conduit inclosing an electric conductor placed between the rails of the track at a point between the single and double horse-paths.

4. In a contact device for an electric railway, the combination, with an insulated protected conductor, of a contact device connected at the lower end of said conductor by a joint having a vertical axis consisting of an upright spring-wire connected at its ends, respectively, with the conductor and contact device, so as to give the latter a torsional spring action relatively to the former.

5. The combination, in a contact device for electric railways, of an insulated protected conductor extending through the slot of a conduit, and a contact device attached to the lower end of said conductor by a spring-joint having a vertical axis and having a rounded lower edge by which it may be automatically folded down, so as to be inserted through the slot.

6. In a contact device for an electric railway, the combination, with an insulated protected conductor extending through the slot of a conduit, of a contact device at its lower end movable relatively thereto about a vertical axis and having a curved or inclined contour on its upper edge, whereby it may be withdrawn through the slot of the conduit.

7. In a contact device for an electric railway, the combination, with an insulated protected conductor extending through the slot of a conduit, of a contact device at its lower end connected therewith by a spring-joint having a vertical axis and allowing the contact device to swing in either direction from an intermediate normal position, whereby it is adapted for progress in opposite directions of movement, as set forth.

Signed this 8th day of May, 1888.

WALTER H. KNIGHT.

Witnesses:

JOHN P. S. CHURCHILL,
GEO. BLACKWELL.