

(No Model.)

2 Sheets—Sheet 1.

L. K. DEVLIN.
ELECTRIC RAILWAY SYSTEM.

No. 586,422.

Patented July 13, 1897.

Fig. 1.

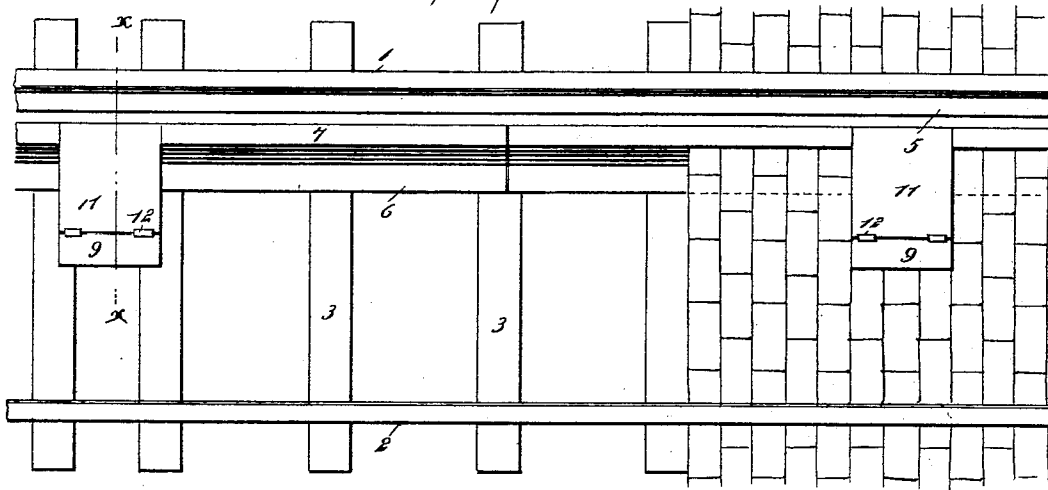


Fig. 2.

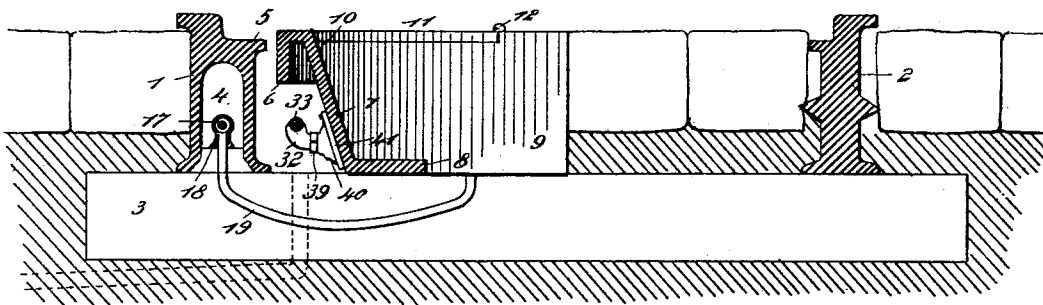
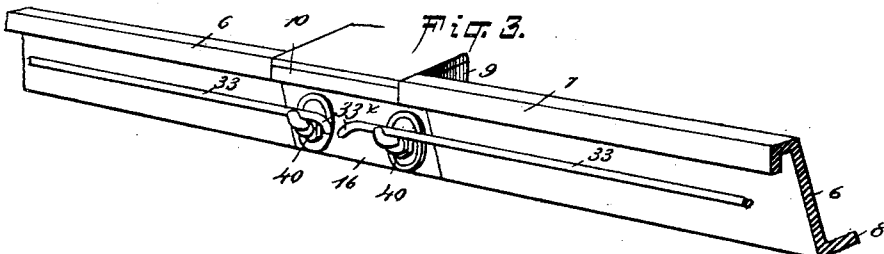


Fig. 3.



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(No Model.)

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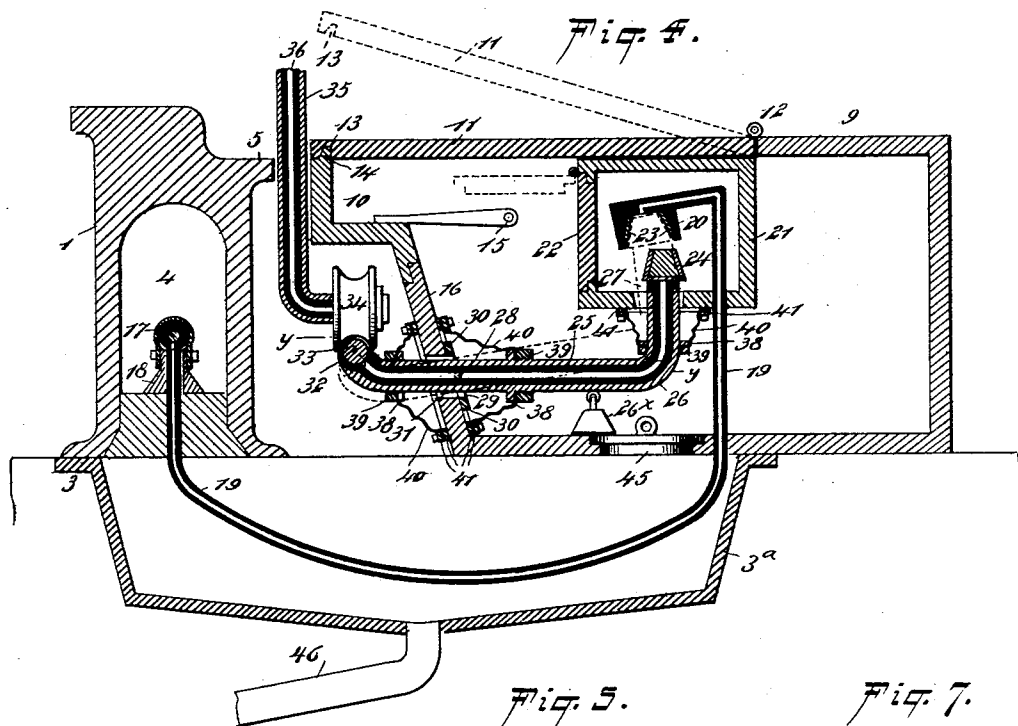
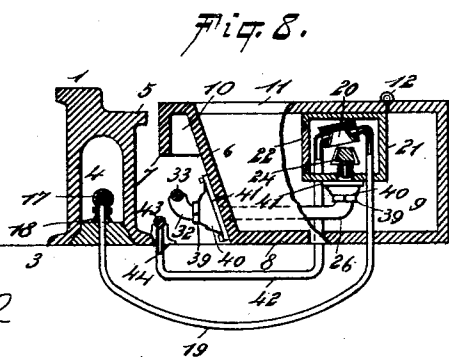
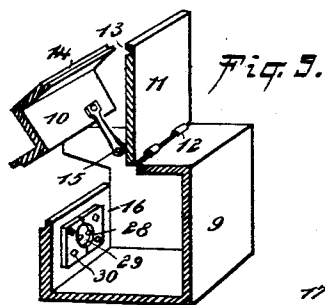
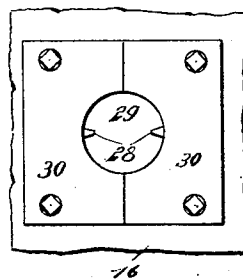
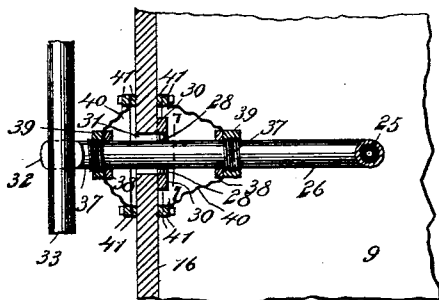
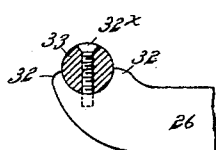


Fig. 5.



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LAWRENCE K. DEVLIN, OF HAVRE, MONTANA.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 586,422, dated July 13, 1897.

Application filed May 24, 1895. Serial No. 550,508. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE K. DEVLIN, of Havre, in the county of Choteau and State of Montana, have invented a new and Improved Electric-Railway System, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in that class of electric-railway systems wherein the car is provided with a trolley adapted to run on a sectional contact-rail located in a slotted conduit and normally out of electrical communication with the feed-wire, the sections of said contact-rail being put in communication with the feed-wire by contact devices actuated by the movement of the car; and the object of the invention is to provide an electrical-railway system of this general character of a novel and improved construction.

The invention contemplates certain novel features of construction and combinations of parts whereby certain advantages are attained over other similar devices heretofore in use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a portion of an electric railway, showing the construction of the conduit. Fig. 2 is a transverse section taken through the track, showing the conduit in cross-section. Fig. 3 is a perspective view showing the arrangement of the slot-rail opposite the track-rail and forming one side of the conduit and the contact-rail therein. Fig. 4 is an enlarged transverse section taken vertically through the conduit in the plane of the line *xx* in Fig. 1. Fig. 5 is a fragmentary horizontal section in the plane indicated by the line *yy* in Fig. 4. Fig. 6 is a fragmentary detail view showing the means employed for securing the contact-rail sections to the ends of their supporting-levers. Fig. 7 is a fragmentary detail view showing the pivot-bearing for the contact-rail-supporting lever. Fig. 8 is a view similar to Fig. 4, but drawn to a smaller scale and showing a modified arrangement of the circuit connections in the

conduit to be referred to hereinafter; and Fig. 9 is a perspective view drawn to a small scale and showing the form of one of the track-boxes, one end thereof being removed for purposes of illustration.

In the views, 1 and 2 represent the track-rails of the electric railway, which are laid upon ties 3, the road-bed being of any preferred construction. The rail 1 is of greater width than the rail 2, and is provided in its under side with a longitudinal channel for the reception of the main-line conductor, as clearly seen in Figs. 2 and 4, the said recess being closed at its bottom in order to protect the insulation of said feed-wire.

The tread of the rail 1 is provided at the inner side of said rail or that side adjacent to the rail 2 with a projecting overhanging portion 5, extending longitudinally and forming one side of the conduit-slot, the other side of said slot being formed by an overhanging portion 7, formed on the adjacent side of a slot-rail 6, having its body portion inclined to the rail 1, as clearly seen in Figs. 2 and 4, and provided at its base with a horizontal wing or flange 8, projecting from its rear side and adapted for attachment to the ties 3.

Thus it will be seen that the rail 1 forms one side of the conduit wherein the trolley of the motor-car travels, and the inclined slot-rail 6 forms the other side of said conduit, said conduit being slotted at its top and open at its bottom. Below the open bottom of the conduit is arranged a trough-like drain 3^a, serving to convey away water falling therein. The slot-rails 6 will be constructed in sections of proper length, and at suitable intervals track-boxes 9 are inserted between the ends of said slot-rail sections, as clearly seen in Figs. 1 and 3, the said track-boxes being closed and resting at their bottoms on the ties 3 and having their upper parts at or adjacent to the level of the road-bed.

As clearly seen in Figs. 4 and 9, the track-boxes 9 have overhanging front portions corresponding to the overhanging portion 7 of the slot-rail 6 and are provided with covers 11, hinged at 12 to the upper sides of the boxes and adapted to be raised and opened when access is to be had to the track-boxes 9 for purposes of repair, &c., as indicated in dotted lines in Fig. 4.

At its forward edge the cover 11 of the track-box 9 is provided with a transverse slot 13 in its under side, adapted to receive the upper edge 14 of the overhanging portion 10 of the box 9, said overhanging portion being formed separately from the body of the box 9 and being provided at opposite sides with arms pivoted at 15 to the inner sides of the box 9, whereby when desired the said overhanging portion 10 may be raised, as indicated in Fig. 9, to afford access to the conduit itself when the same is to be cleaned or the devices therein repaired. The said overhanging portion 10 is provided along its lower edge with a recessed portion adapted to be engaged by a corresponding tongue on the lower front plate 16 of the box 9, whereby when the part 10 is in its closed or lowered position a close joint will be formed at its lower edge.

As stated above, the feed-wire 17 is arranged in the recess 4 at the base of the rail 1, being mounted on insulated supports 18 of any preferred kind, and at intervals usually corresponding to the space between the track-boxes 9 feeders 19 connect at one end with said feed-wire 17, the opposite ends of each of said feeders 19 being carried up through the bottom of one of the said track-boxes 9 into a casing or box 21, located therein and provided with a hinged door 22 at its front, as clearly shown in Fig. 4, the said feeder 19 being connected at its extremity with a contact-block 20 of any suitable material having a recess in its under side, the opposite sides of which are faced with copper plates 23 or the like arranged at angles to each other and adapted to receive and fit a contact-piece 24, secured on the upper end of a bent lever 26, formed, as shown in Figs. 4 and 5, of a metal tube, said lever having its bent end projecting upward into the box or casing 21 through an opening 27, formed in the bottom thereof and in position to engage and enter the recess in the said contact-block 20.

The contact-block 20 will usually be of trough-like form and of a length equal substantially to that of the casing or box 21, and the said box 21 will have two perforations 27 in its bottom, one adjacent to each end, to receive two levers 26, one at each end of the track-box, and said levers have their opposite ends arranged to extend through openings 31, suitably formed in the front plate 16 of the track-box 9, into the conduit, each lever being pivoted between studs 28, formed at the opposite sides of an opening 29, formed in a bearing composed of two sections 30, secured to the front plate 16 of the track-box 9, as clearly seen in Figs. 5, 7, and 9. As stated above, each of the levers 26 is tubular, as shown in Figs. 4 and 5, and in the hollow thereof is arranged an insulated conductor 25, connected at the bent inner end of the lever with the contact-piece 24, which is similarly insulated, and each lever is provided at its opposite end in the conduit with a socket 32, adapted

to receive and support, by means of a screw 32^x, one end of a contact-rail section 33, circular in cross-section, as seen in Figs 2, 3, 4, 70 and 6, and in electrical communication with the conductor 25 in the hollow of the tubular lever 26.

Each section 33 of the contact-rail in the conduit is of a length sufficient to extend between two of the track-boxes 9, and at each end each section 33 is curved or bent downward, as indicated at 33^x in Fig. 3, so that the trolley 34, held on the trolley-arm 35 of the motor-car, on passing off one section 33 of the contact-rail may ride freely upon the next section 33.

The openings 31 in the front plate 16 of the track-box 9 and the opening 27 in the bottom of the casing 21 will of necessity be sufficiently large to permit free movement of the lever 26 in making the contact between the contact-block 20 and the contact-piece 24, and in order to prevent the leakage of water, &c., through said openings, whereby the operation of the devices and the insulation would be impaired, I provide diaphragms of canvas or similar flexible material having sufficient strength and resisting power and provided with an exterior coating of waterproofing material, such as waterproof paint or the like, said diaphragms being each connected at their outer parts to the lever 26 by a waterproof joint and at the inner end to the front plate 16 and bottom of casing 21, respectively, by a similar joint.

As clearly seen in Figs. 4 and 5, the lever 26 is provided at suitable points with flanges 38 and screw-threaded portions 37 adjacent thereto, and on the said screw-threaded portions 37 of the lever are screwed collars or nuts 39, between which and the flanges 38 are clamped the central edges of the diaphragms 40, the outer edges of said diaphragms being similarly clamped between rings 41, bolted to the front plate 16 of the track-box and to the bottom of the casing 21, respectively, and surrounding the respective openings 31 and 27 therein.

In operation the trolley 34, being arranged in the conduit and brought to bear on one of the contact-rail sections 33, depresses the same, causing the supporting-levers 26 at opposite ends of that section of the contact-rail to tilt on their pivots 28 to the position indicated in dotted lines in Fig. 4, whereby the contact-pieces 24 are inserted in the recesses in the contact-blocks 20 to place the wire 25 and said contact-rail section 33 in circuit with the feeder 19 of the feed-wire 17, so that the current flows from the contact-rail to the trolley, and by way of an insulated conductor 36, carried in the trolley-arm 35, flows to the motor and thence to the ground or to another return-conductor arranged in any preferred or suitable way.

When the trolley passes the end of one of the sections 33 of the contact-rail, that section will be returned to its raised position by

the weight of the inner ends of levers 26, which are provided with weights 26^x or their equivalents, as seen in Fig. 4, and the adjacent end of the next contact-section 33 being bent down, as seen at 33^x, permits the trolley to ride freely on said next section 33, so as to depress said section and place it in circuit with the feed-wire 17, the former section 33 being placed out of circuit by the breaking of contact between the contact-piece 24 and contact-block 20. By this construction of the contact-rail in sections the liability of damage resulting from defective insulation is in a great measure prevented, since the rail-sections 33 will be of a length adapted to be covered by the car, so that even should there be a slight leak no damage could be done to persons or vehicles passing over the track.

By the arrangement of the track-boxes with hinged covers and hinged or pivoted extensions at their front portions it is evident the construction is made of extreme simplicity and strength and is at the same time adapted to afford ready and convenient access to the interior of the track-box and of the conduit when it is desired to repair the connections. The arrangement of the flexible diaphragms at the openings in the track-box and casing 21 also affords a simple, inexpensive, and durable substitute for packing-boxes, &c., and the construction of the conduit, formed in part by the track-rail, having a longitudinal channel to receive the feed-wire, and the slot-rail, said rails being secured at their base to the ties, is of extreme simplicity and at the same time fulfils all requirements.

The drain 3^a will usually be provided with waste-pipes 46 at intervals, communicating with sewers or drains, and the track-boxes 9 will usually be provided in their bottoms with manholes closed by covers 45, as seen in Fig. 4, so that they may be conveniently cleaned.

It will be evident that some modification may be made in the system as herein shown, and for this reason I do not wish to be understood as limiting myself to the precise arrangement of the various devices as herein set forth. For example, instead of inclosing the conductor 25 in the lever 26 I may employ the arrangement shown in Fig. 8, wherein the contact-block 20 is provided at opposite sides with insulated contact-strips, one of which is connected to the feeder 19 and the other of which is connected by a wire 42 to a second contact-rail 43, composed of sections mounted on insulated supports 44 at the bottom of the conduit. In this form of the device the contact-rail sections 33 are never in circuit with the feed-wire, but when said sections 33 are depressed their levers 26 serve to close the circuit between the contact-strips at opposite sides of the contact-block 20, so that the current flows to the sectional contact-rail 43, whence it is conveyed by a trolley suitably located on the car to the motor.

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

1. In a conduit for electric and other railways, the combination of a slot-rail constructed in sections having overhanging upper portions forming one side of the slotted top of the conduit, and track-boxes located between the ends of the slot-rail sections and provided with overhanging extensions corresponding to the overhanging upper portions of the slot-rail, said track-boxes being also provided with hinged covers, and said extensions being movable, substantially as set forth.

2. In a conduit for electric or other railways, the combination with a slot-rail constructed in sections and having overhanging upper portions, of track-boxes located between the ends of the slot-rail sections and provided with overhanging extensions corresponding with the overhanging upper portions of the slot-rail, said extensions being hinged and provided with hinged covers adapted to rest upon the upper edges of the said extensions, substantially as described.

3. A track-box for electric or other railways, consisting of a box having an overhanging extension, said extension being separate from the body of the box and hinged thereto, and provided with a hinged top, the free edge of which is adapted to rest upon the upper edge of the extension, substantially as described.

4. In an electric-railway system, the combination of a conduit, track-boxes located along said conduit flush with the inner surface thereof, circuit-closing devices in the track-boxes, movable contact-rail sections in the conduit, said sections being in alinement and extending between the track-boxes, and two levers pivoted in each track-box, said levers having one end projecting through the track-boxes and connected to the adjacent ends of the respective contact-rail sections and adapted to be operated by the same, the inner ends of the said levers being connected to and adapted to operate the circuit-closing devices, substantially as described.

5. In an electric-railway system, the combination of a conduit, track-boxes located along said conduit, circuit-closing devices in the track-boxes, movable contact-rail sections in the conduit, and extending between the track-boxes, said sections being in alinement and having their ends curved downwardly, and two levers pivoted in each track-box, said levers having one end projecting through the track-boxes and provided with sockets to receive and support the adjacent ends of the respective contact-rail sections, the inner ends of the levers within the track-boxes being connected to and adapted to operate the circuit-closing devices, substantially as described.

6. In an electric-railway system, the combination with a conduit, track-boxes located along said conduit, circuit-closing devices in

the track-boxes, and movable contact-rail sections in the conduit and in alinement with each other, of two hollow levers in each track-box, said levers having their outer ends projecting through the track-boxes an equal distance and connected to the contact-rail sections and adapted to be operated by the same, the inner ends of the said levers being connected to and adapted to operate the circuit-closing devices, and conductors in said levers, substantially as described.

7. In an electric-railway system, the combination with a conduit, track-boxes along the conduit, casings within the track-boxes, circuit-closing devices in the casings, and movable contact-rail sections in the conduit, of levers pivoted in openings in the track-boxes, the outer ends of the levers carrying the contact-rail sections and the inner ends of the

levers projecting into the said casings through openings in the bottom thereof, flexible diaphragms secured to the inner and outer faces of the openings of the track-boxes and to the levers, and flexible diaphragms secured to the casings and to the levers, substantially as described.

8. The combination of a box having a perforation in its wall, bearing-plates secured to the wall of said box on opposite sides of said perforation and provided with alined studs, and a lever pivoted between said studs and playing through the opening in the wall of the box, substantially as set forth.

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