(No Model.) 3 Sheets—Sheet 1.

C. J. VAN DEPOELE.

TURN-OUT AND CROSSING FOR UNDERGROUND CONDUITS.

No. 393,277. Patented Nov. 20, 1888.

Fig. 2.

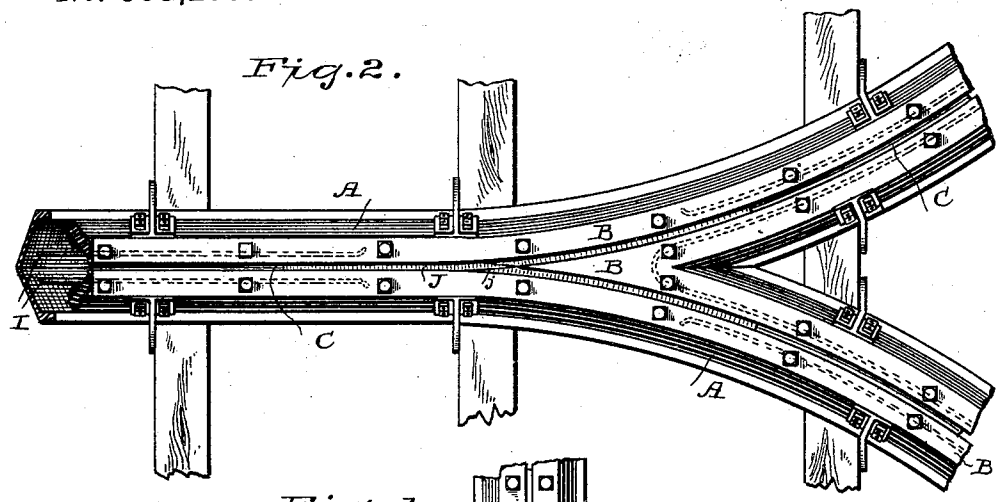
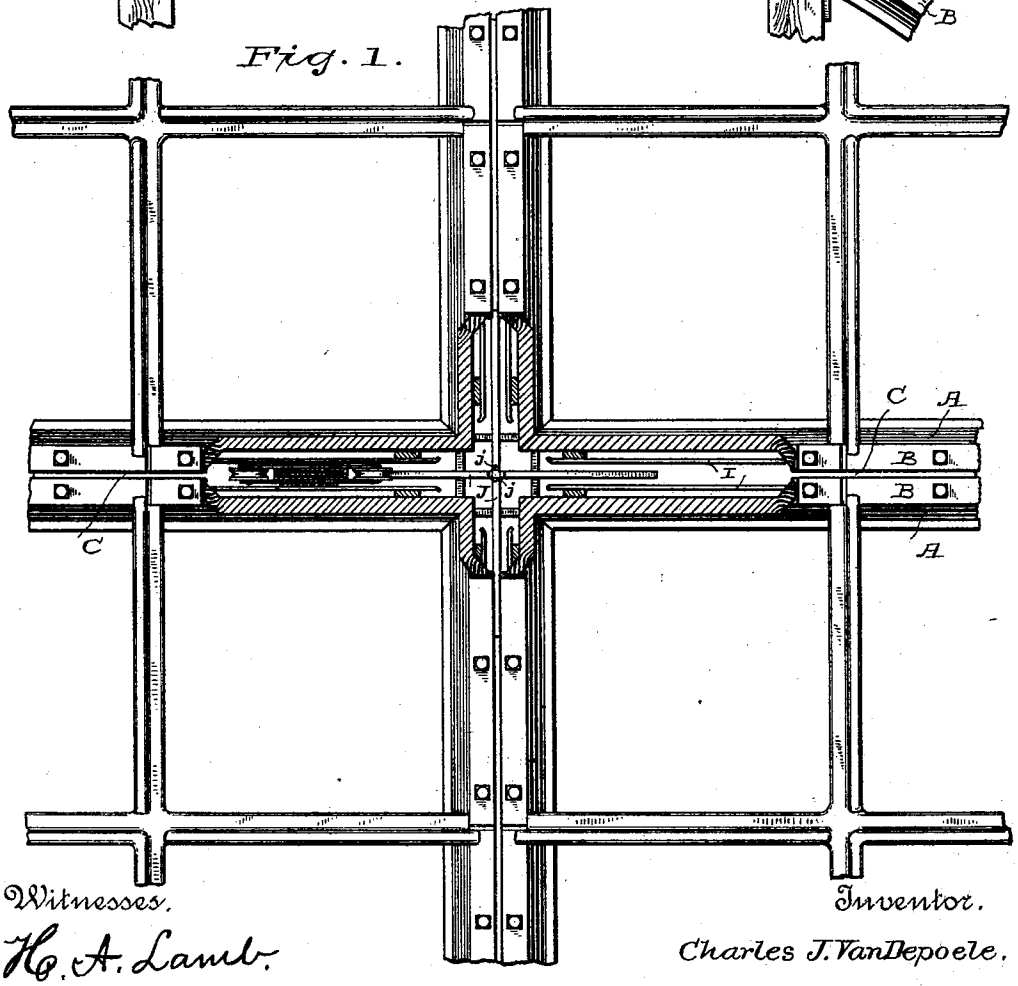


Fig. 1.



Witnesses.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

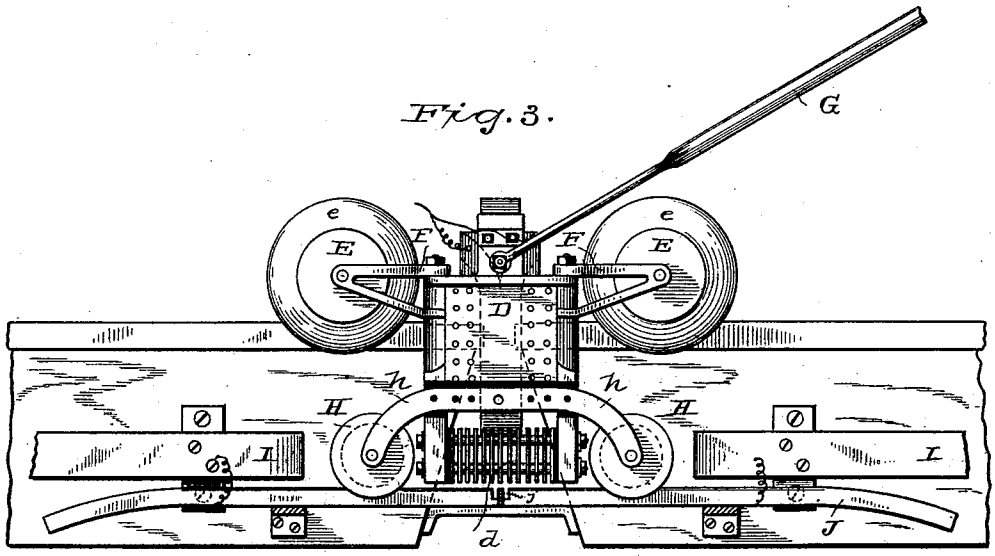
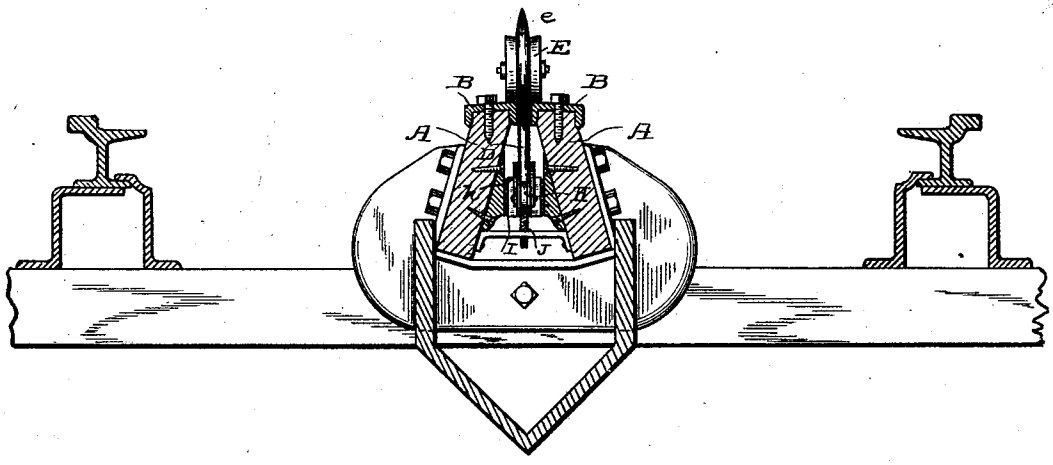


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 6.

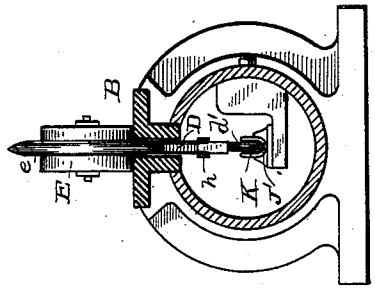


Fig. 8.

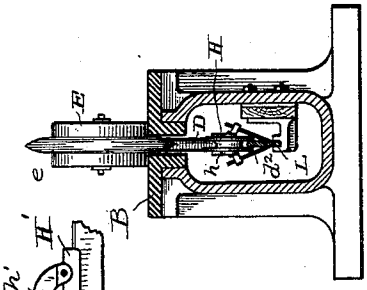


Fig. 7a.

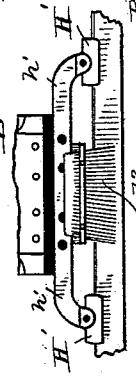


Fig. 5.

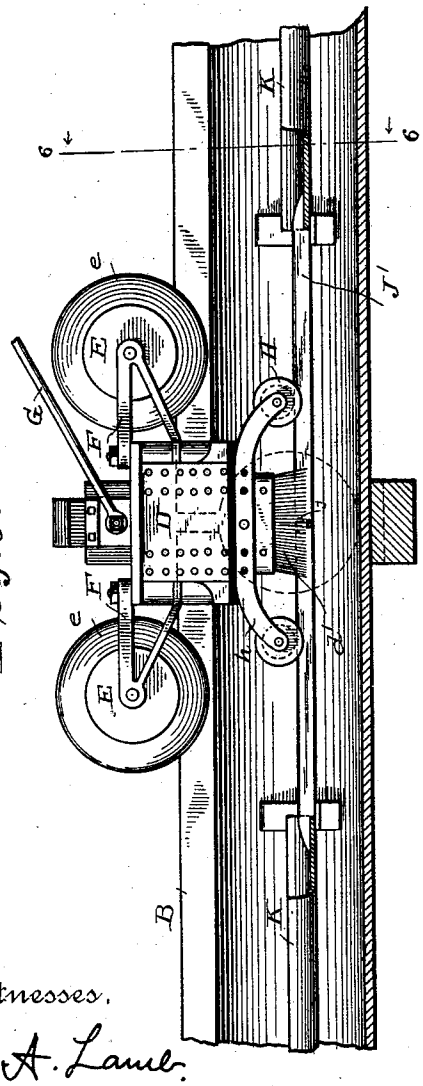


Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS.

TURN-OUT AND CROSSING FOR UNDERGROUND CONDUITS.

SPECIFICATION forming part of Letters Patent No. 393,277, dated November 20, 1888.

Application filed June 9, 1888. Serial No. 276,645. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Turn-Outs and Crossings for Underground Conduits, of which the following is a description.

My invention relates to improvements in systems of conductors for electric railways of the class in which the main conductor or conductors are contained within a tube or conduit located between the rails of the roadway. The invention refers more particularly to a system of switches, whereby the contact devices moving within the conduit may pass from one line of conductors to another or over sets crossing in direct or oblique directions without delay, danger, or injury to the contact devices, and without interfering with the movement of the vehicle to which it is attached or the necessity of stoppage or of manual interference.

Broadly stated, the invention consists in providing special conductors at intersecting points, said conductors engaging some portion of the contact device to support and guide it in the desired direction and at the proper height, while the exterior carrying devices pass over or through the open spaces in the exposed portion of the conduit formed by intersecting slots.

The supporting-conductor at switching-points may assume any number of forms consistent with the principle involved, some of which are shown in the accompanying drawings. The invention also comprises various details of construction and arrangement, hereinafter fully described and referred to in the appended claims.

In the accompanying drawings, Figure 1 is a top plan view showing electrical conduits crossing each other at right angles, parts thereof being broken away to show the interior arrangement. Fig. 2 is a plan view of an electric conduit branching in two directions. Fig. 3 is an elevation of the contact-carriage, showing also one side of the conduit structure and the conductors. Fig. 4 is a transverse sectional elevation showing the roadway, conduit, conductors, traveling contact, and the switching-conductor. Fig. 5 is an elevation showing a contact-carriage, one side of a conduit structure, and the conductor of a different form of conduit also embodying my invention. Fig. 6 is an end view on the line 6 6 of Fig. 5. Fig. 7 is a view similar to Fig. 5, showing another form of conduit also embodying my invention. Fig. 7ª is a fragmentary view showing a modification. Fig. 8 is an end view on the line 8 8 of Fig. 7.

Similar letters denote like parts throughout.

In the drawings illustrating my invention, A A indicate the side walls of an underground conduit for electrical conductors, said side walls being arranged in downwardly-divergent positions, and provided at the surface of the roadway with metallic surface or capping plates B B. The plates B B are separated to form a slot, C, along which moves the interiorly-extending portion of the traveling contact.

The details of construction or particular form of the conduit structure, forming no essential part of the present invention, will not be herein specifically set forth, except so far as may be necessary to a fair understanding thereof. The several forms of conduit shown are, however, all included and fully described in separate contemporaneous applications for Letters Patent filed June 6, 1888, Serial Nos. 276,256, 276,258, and 276,259.

As shown in the drawings, the conduits are all provided with metallic surface or capping plates B B, between which is formed the slot C, as stated. The plates B B are preferably electrically connected to constitute the return-circuit. A traveling contact device, D, adapted to extend into the conduit, also to move along in the slot C, is supported upon two or more metallic wheels, E, traveling upon the capping-plates B, and desirably provided with projecting ribs *e*, moving in the slot, to keep the wheels E in place. The carrying-wheels E may be pivotally connected with the central portion, D, by brackets F, and when suitably connected thereto serve to support and carry said central portion in its passage along the conduit.

The contact device, hereinafter referred to as the "contact-truck," may be connected with the vehicle carrying the motor by an arm or link, G, or other suitable device. The main conductors I I, as shown in Figs. 1, 2, and 3, are continuous metallic strips supported upon

each side of the interior of the conduit in any suitable manner and in parallel positions.

The lower central portion of the part D is, as shown in Figs. 1, 3, and 4, provided with a number of contact plates or springs, *d*, for direct and continuous electrical contact with the parallel main conductors I I, between which the contact plates or springs are inserted and travel, being supported in operative position by the carrying-wheels E or their equivalent.

A pair of auxiliary carrying-wheels, H H, are mounted between arms *h*, extending from and in electrical connection with the central portion, D. The wheels H may, however, be secured in any other convenient manner to the said central portion of the contact-truck, provided they are arranged in fixed relation with the main supporting-wheels E and insulated therefrom.

In Fig. 1 is shown a plan view of two conduit systems crossing at right angles, and in Fig. 2 conduits are shown diverging—as, for instance, for a turn-out or side track.

Viewing the interior of the intersecting conduits, as shown in Fig. 1, it will be seen that the conductors I I terminate a short distance before reaching the point of intersection, and that the point of intersection is bridged by supplemental conductors crossing the space between the ends of the said main conductors. These supplemental conductors will be referred to as the "switching-conductors" in any or either of the many forms they may assume, and their office is to maintain the electrical continuity of the circuit and to support the contact-truck while its exterior supports are passing over the gaps formed by the intersecting slots.

The switching-conductors J are metallic bars of any convenient size or cross-section and of good conducting metal. The outer ends of the switching-conductors J are bent downwardly or sloped off in order not to catch and injure any part of the contact-truck. The switching-conductors are so arranged that when the contact-truck is in the position shown in Fig. 1—that is, almost free from the main conductors I I—the auxiliary supporting-wheels H H will engage and ride upon the switching-conductor, which extends in the desired direction and in the same line as the surface slot, and will support and carry the contact-truck across the opening formed at the surface by the intersecting slots C and guide it into position between the continuing portions of the conductors I I. The auxiliary supporting-wheels H may be grooved to fit over the upper edge of the auxiliary conductor J when said conductor is in the form of a flat bar placed edgewise, which form I prefer. It will be entirely obvious, however, that the switching-conductors may be laid flatwise, in which event the auxiliary supporting-wheels need not be formed with grooves in their periphery.

When the switching-conductors are placed edgewise, small grooves *j* will be necessary at the points of intersection to enable the flanges of the grooved wheels to pass the intersecting conductors.

The construction described with reference to Fig. 1 is shown in Fig. 2, with this difference, that in said latter figure conductors diverging at an angle or converging into one are shown instead of crossing at right angles. In Figs. 5 and 6 a single U-shaped conductor, K, is shown, and the contact device D is provided with a metallic brush, *d'*, extending thereinto. The switching-conductor is in this instance an inverted-V-shaped metallic bar extending from the terminal of the U-shaped or concave conductor K at one side of the switch or crossing to the beginning of the continuation of said conductor. Carrying-wheels H are provided, as previously described, which said wheels are ordinarily a short distance from the contact-surface of the conductor K; but at switches or crossings said carrying-wheels engage the switching-conductor J', serving to support and carry the contact-truck K whenever necessary or desirable. When upon the switching-conductor J', the brush *d'* divides on either side thereof without injury.

The switching-conductor J' is electrically connected with the main conductor K, and the wheels H are in electrical connection with the contact-brush *d'*, but, together with said brush, thoroughly insulated and protected from the supporting-frame and carrying-wheels E E.

As shown in Fig. 7, the main conductor L consists of a single flat bar of conducting material mounted edgewise on suitable supports within the conduit structure, the current being collected from said conductor by the contact-truck by means of metallic brushes *d²* pressing against the sides thereof. Auxiliary supporting-wheels H, supported upon arms *h*, are carried by the contact devices and normally a short distance from—that is, just out of contact with—the upper edge of the conductor L.

At points where conduits intersect or form gaps between the capping-plates wide enough for the main supporting-wheels E to drop into or for them to become jammed within, the auxiliary wheels H will support and carry the contact-truck, since whenever either or both of the supporting-wheels should begin to drop the wheels H will fully engage and rest upon the upper edge of the conductor L, preventing further descent of the contact-truck and carrying it safely across the opening or depression. An intersecting conduit system is shown in Fig. 3, and intersecting structures are indicated in dotted lines in Figs. 6 and 7.

It will be entirely obvious that my invention can be readily applied to conduit systems of greatly-varied construction; also, that the forms shown and described may be duplicated by the addition of a second set of conductors. Where, however, a pair of conductors are shown, as in Figs. 1, 2, 3, and 4, a double contact-truck or two separate trucks—such, for instance, as shown in Figs. 7 and 8—may be employed to collect current, or to respectively collect and return current from the separate

conductors, crossings and switches for which will consist of a continuation of the conductors I I, Fig. 1.

The auxiliary supporting devices may take the form of shoes or rubbers H' (indicated in Fig. 7[a]) instead of wheels H without departure from my invention.

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

1. The combination, with an inclosing-conduit and main conductors inclosed therein, of suitable turn-out or crossing devices therefor, comprising a traveling contact, auxiliary supporting devices therefor, and a conducting surface or surfaces in substantially the same horizontal plane as the main conductors and located in the path of the auxiliary supporting devices in the immediate vicinity of intersecting or crossing conductors, substantially as described.

2. The combination, with an inclosing-conduit and main conductors inclosed therein, of turn-out or crossing devices therefor, comprising a traveling contact, devices normally supporting the traveling contact, auxiliary supports therefor, and a conducting-surface in substantially the same plane as the main conductors, and located in the path of and adapted to engage the auxiliary supports and to sustain the contact device at points intersecting or crossing other conductors, substantially as described.

3. The combination, with a slotted conduit for electric conductors, of a traveling contact supported from the exterior of the conduit, auxiliary supports in electrical connection with the traveling contact, and conducting-surfaces arranged to cross or intersect other conductors and located in the path of the auxiliary supports at crossings or switches, substantially as described.

4. A switch for inclosed conductors, comprising a traveling contact and means for supporting the same in appropriate relation with the main conductors, auxiliary supporting devices therefor, and conducting-surfaces intersecting or crossing other conductors and located in the path of the auxiliary supporting devices, whereby the contact-truck is supported and carried in the desired direction at crossings or switches, substantially as described.

5. A turn-out or crossing for conduit systems, comprising a conduit and a traveling contact device therefor supported upon the exterior of the conduit, auxiliary supporting devices upon the interior portion thereof, main electrical conductors within the conduit and in electrical connection with the traveling contact, and conductors crossing or intersecting other systems of conductors and located in the path of and adapted to engage the auxiliary supports of the traveling contact at such points, substantially as described.

6. The combination of crossing or intersecting conduits, main conductors within the conduits, and a traveling contact device provided with auxiliary supporting wheels or devices arranged to engage the conductors at points intersecting or crossing other conduits or conductors, substantially as described.

7. The combination of crossing or intersecting conduits, main conductors within said conduits and terminating in the immediate vicinity of the points of intersection or crossing, conducting-surfaces extending between and bridging the terminals of the main conductors, and a traveling contact provided with auxiliary contact and supporting surfaces arranged to move upon and in electrical contact with the bridging-conductors at crossings or switches, substantially as described.

8. The combination of crossing or intersecting conduits, main conductors in said conduits, a traveling contact device moving with the vehicle and extending into the conduit and provided with auxiliary supporting-wheels adapted for electrical contact with the main contact devices, and arranged to engage the main conductors and support the traveling contact at points intersecting or crossing other conduits, and to also maintain electric connection with the conductors when the main contact devices are inoperative, substantially as described.

9. The combination of crossing or intersecting conduits, a pair of main conductors in each conduit, a traveling contact moving between the conductors and provided with auxiliary supporting-wheels in electrical connection with the contact devices, switching-conductors bridging the terminals of the main conductors and located in the path of the auxiliary contact and supporting wheels, substantially as described.

10. The combination of crossing or intersecting conduits, main conductors in each conduit, conductors extending between and bridging the terminals of the main conductors, and a traveling contact provided with auxiliary supporting-surfaces arranged to engage the bridging-conductors at crossings and switches, whereby the contact device is supported and prevented from dropping into or becoming jammed in the intersecting surface slots, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:
WILLIAM A. STILES,
JOHN EASON.