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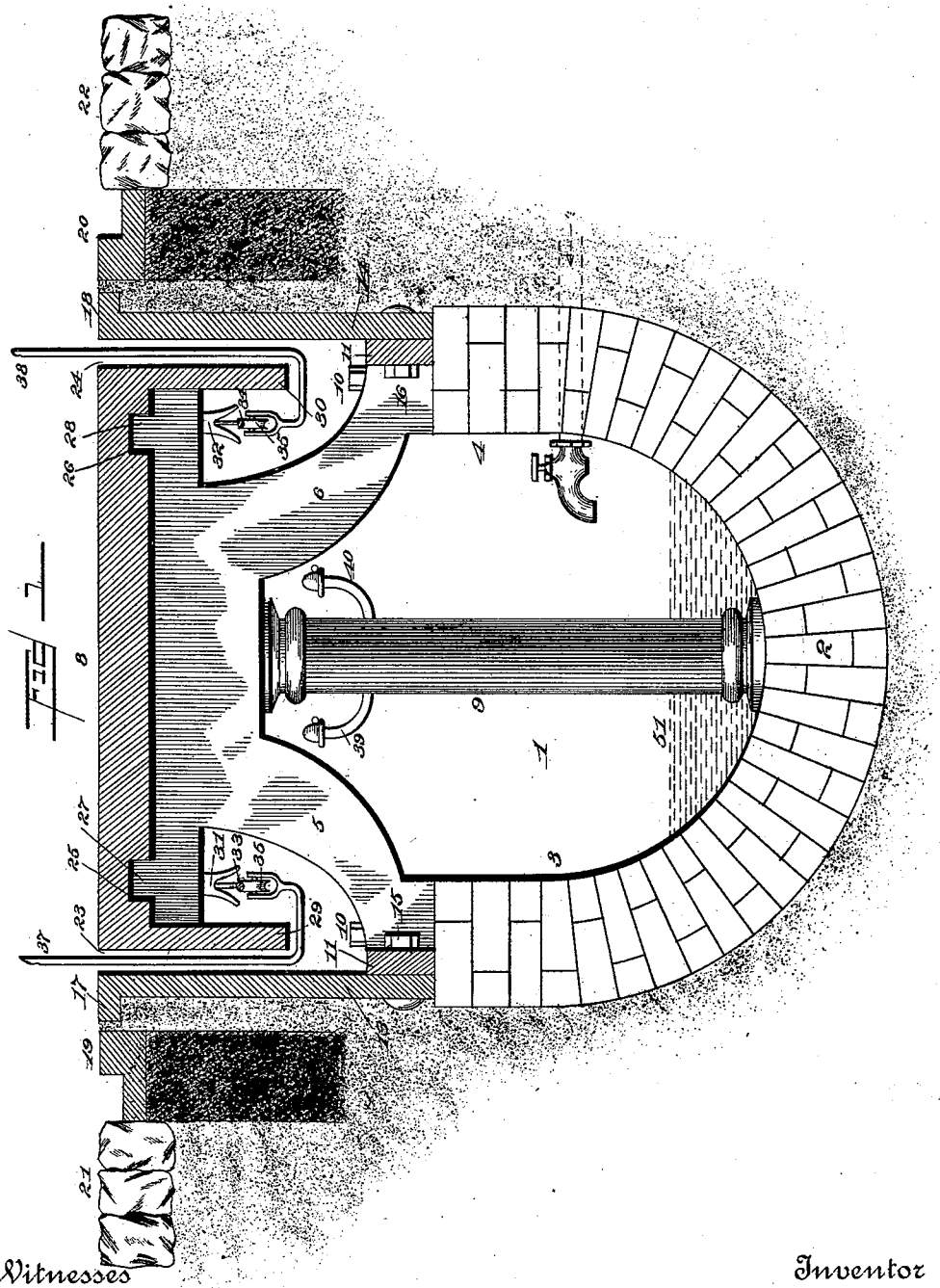
A. H. HIEATZMAN.

ELECTRIC RAILWAY CONDUIT.

No. 498,169. Patented May 23, 1893.



Witnesses
Chas. F. Miller
S. Grashear Jr.

Inventor
A. H. Hieatzman
By his Attorney
S. Grashear

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A. H. HIEATZMAN.

ELECTRIC RAILWAY CONDUIT.

No. 498,169. Patented May 23, 1893.

Fig 2

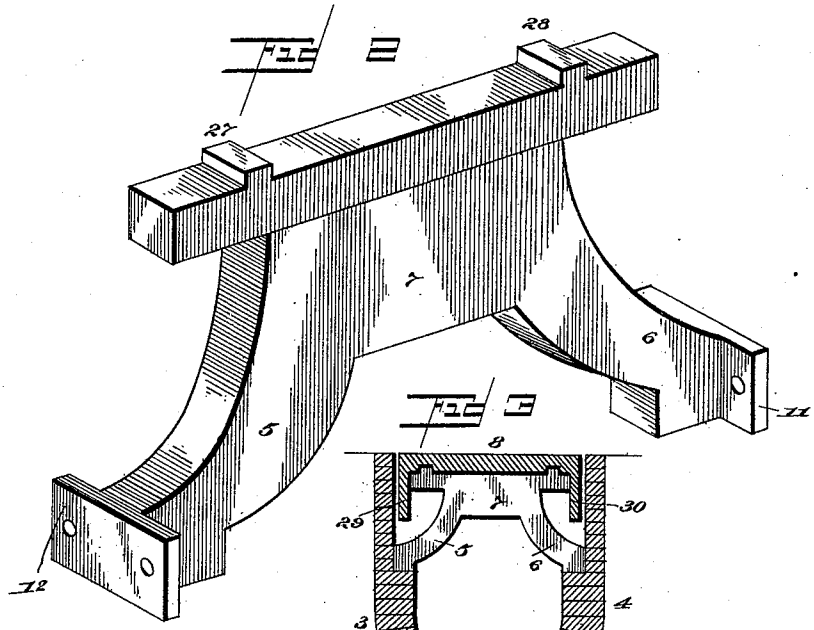


Fig 3

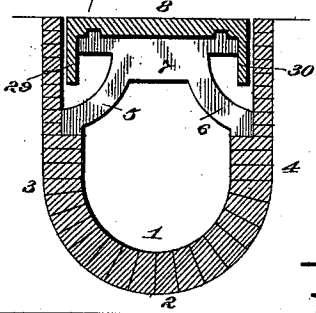


Fig 4

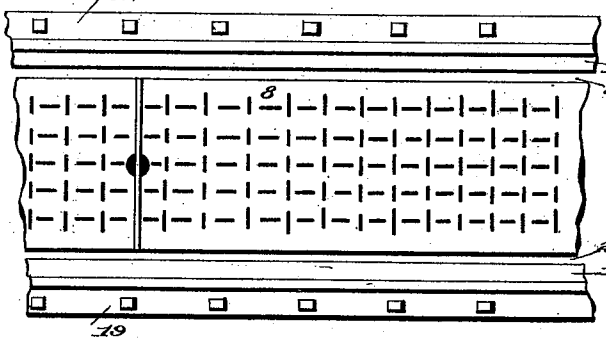


Fig 5

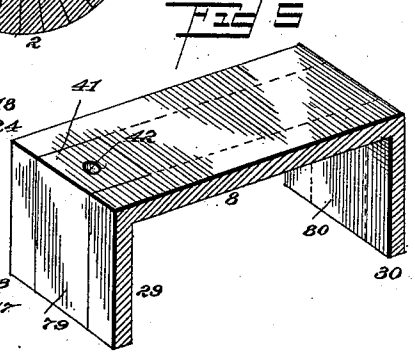


Fig 6

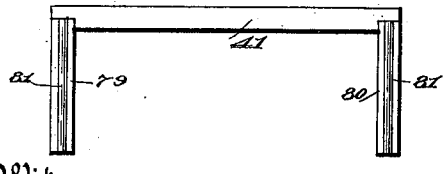
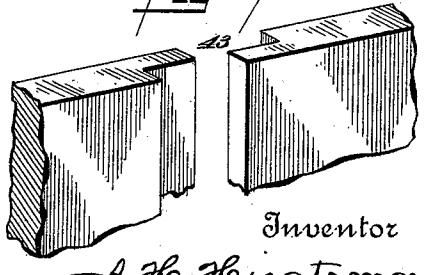


Fig 7



Witnesses
John Shaw.
F. Brashears Jr.

Inventor
A. H. Hieatzman
By his Attorney
F. Brashears

(No Model.) 4 Sheets—Sheet 3.

A. H. HIEATZMAN.

ELECTRIC RAILWAY CONDUIT.

No. 498,169. Patented May 23, 1893.

Fig. 8.

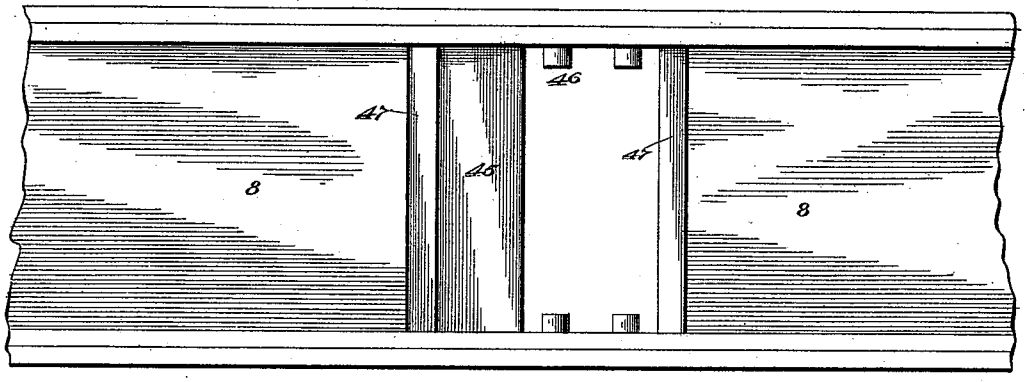


Fig. 9.

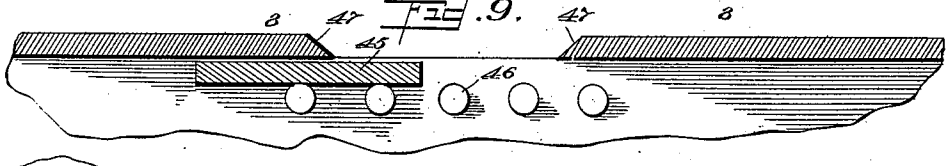


Fig. 10.

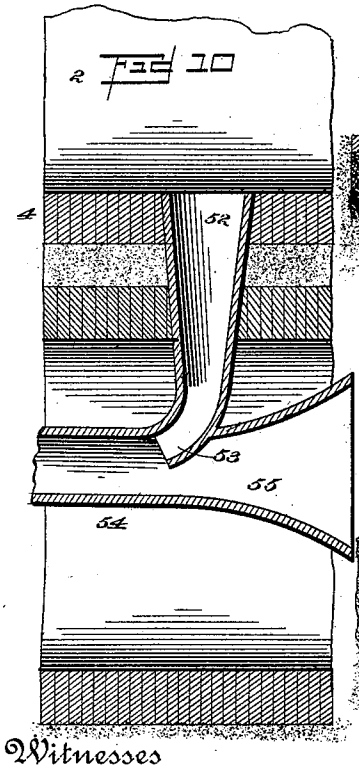


Fig. 11.

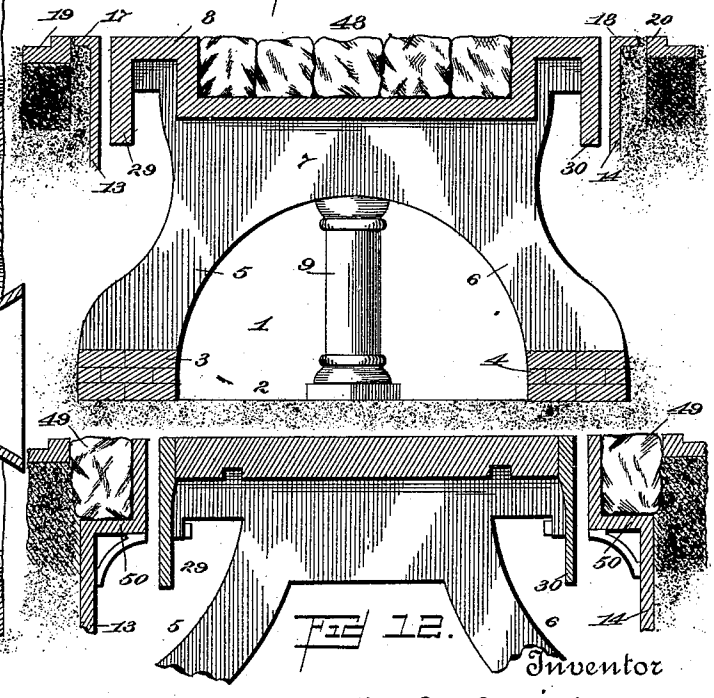


Fig. 12.

Witnesses
John Shaw
F. F. Brashears Jr

Inventor
A. H. Hieatzman
By his Attorney
F. F. Brashears

(No Model.) 4 Sheets—Sheet 4.

A. H. HEATZMAN.

ELECTRIC RAILWAY CONDUIT.

No. 498,169. Patented May 23, 1893.

Fig 13

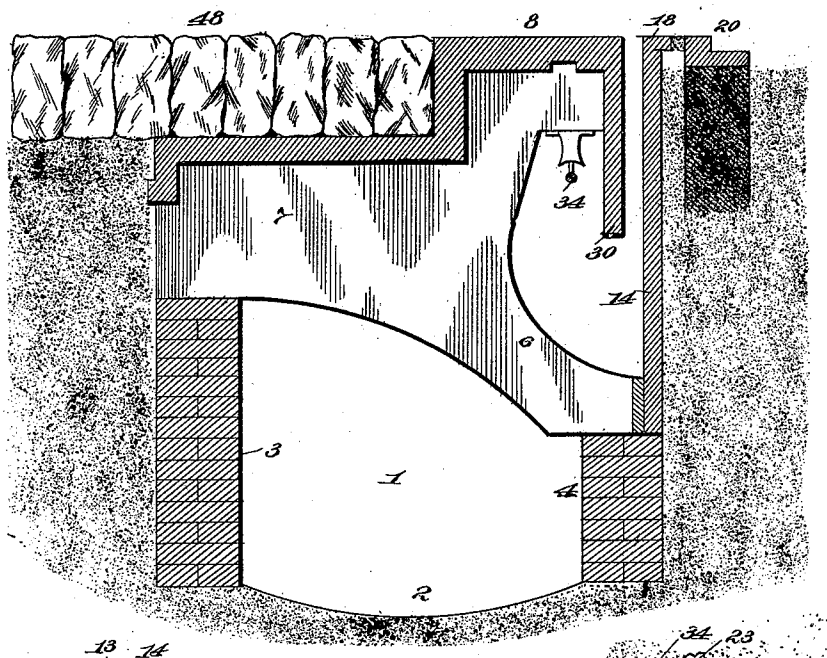


Fig 14

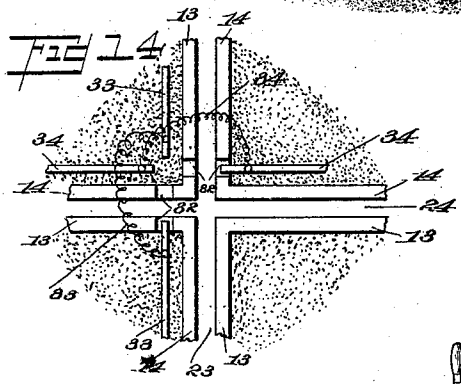


Fig 15

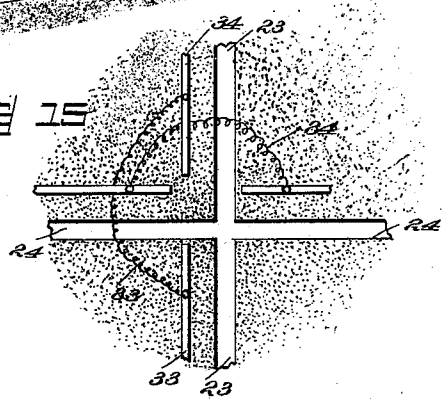


Fig 16.

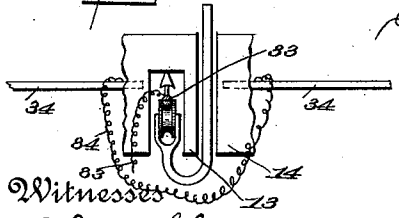
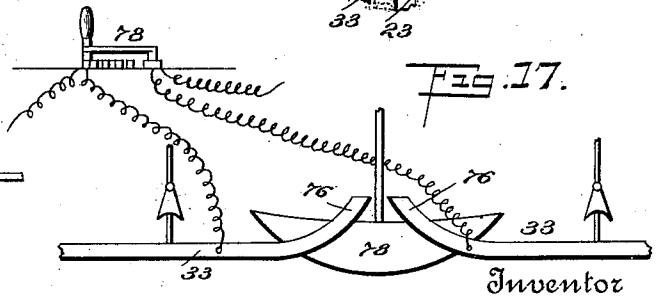


Fig. 17.



Witnesses
John Shaw
F. Brashears Jr.

Inventor
A. H. Heatzman
By his Attorney
F. Brashears

UNITED STATES PATENT OFFICE.

ARTHUR H. HIEATZMAN, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO HARRY D. HIEATZMAN, OF SAME PLACE.

ELECTRIC-RAILWAY CONDUIT.

SPECIFICATION forming part of Letters Patent No. 498,169, dated May 23, 1893.

Application filed July 28, 1891. Serial No. 400,928. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR H. HIEATZMAN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Electric Railways and Rolling-Stock Therefor; and I do declare the following to be a full, clear, and exact description of the invention, such 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to the conduit and roadway for electric railways of the class in which the motor is supplied with current from conductors in underground conduits or subways, and the rolling stock for such railways.

The objects of the invention are to construct a conduit entirely between the inner rails of double track railways so that the present tracks need not be removed in constructing such conduit, my improved conduit being arranged to serve as a drain or sewer also, for which reason I denominate it a "sewer conduit."

With these objects in view my invention consists in the improved construction, arrangement and combination of parts hereinafter fully described and afterward specifically pointed out in the claims.

In the accompanying drawings:—Figure 1 is a vertical cross sectional view through a double conduit and so much of the roadway (including the inside rails of a double track) as is necessary to illustrate my invention. Fig. 2 is a perspective view of one of the double yokes or brackets which support the conduit covering plates. Fig. 3 is a sectional view through the arch showing a modification thereof, the side walls being continued up to the surface and shoulders being provided for the legs of the yokes to rest upon. Fig. 4 is a top plan view of a portion of the roadway showing the inner rails of a double track road, the slots and the conduit covering plates between said rails. Fig. 5 is a perspective view of a section of covering plate showing one form of man hole or trap cover, a modification being indicated in dotted lines. Fig. 6 is a detail view showing a slightly modified form of man hole or trap cover. Fig. 7 is a view showing the manner of joining the side plates of the conduit. Fig. 8 is a top plan view of the roadway above the conduit, showing the covering plates and a modified form of man hole cover or trap door. Fig. 9 is a central vertical sectional view through the parts shown in Fig. 8. Fig. 10 is a sectional view through the conduit and the adjacent city sewer showing how they are connected together to keep the conduit drained. Fig. 11 is a cross sectional view through a portion of the roadway and conduit, including the inner rails of the double track, illustrating a slightly modified construction of the covering plates and roadway. Fig. 12 is a similar view of the same relative portions of the construction as are shown in Fig. 14, the covering plates, supporting yokes and side plates of the conduit being slightly modified in construction. Fig. 13 is a section through the conduit and roadway arranged to suit a single track, designed especially where a double track separates taking two streets. Fig. 14 is a bottom plan view of crossing slots showing arrangement for permitting free passage of the trolley and for connecting the conductors on opposite sides of the slots. Fig. 15 is a top plan view of the same. Fig. 16 is a vertical sectional view on a plane through the slot in the arrangement shown in Figs. 17 and 18, showing the trolley in position. Fig. 17 is a side elevation illustrating an arrangement whereby the trolley may be made to pass over a break in the conductor, and any portion of the conductor cut out of the circuit at will.

Like numerals of reference refer to the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings and said numerals, 1 is the main opening or sewer of the conduit, said opening extending below the metallic structures and having a bottom 2 and sides 3 and 4 said bottom and sides being preferably formed as an inverted arch of masonry as in Fig. 1 although good results might be obtained by substituting the constructions shown in Figs. 11 and 13 for the arch, in which

substitute constructions the sides 3 and 4 are of masonry and the bottom 2 of concrete or other suitable paving material.

Upon the sides 3 and 4 are supported the legs 5, 6 of yokes or brackets 7 which support the covering plates 8 such yokes being placed at intervals according to the judgment of the engineer building the conduit, and are further supported at their centers by pillars 9 resting at their bases on the central portion of the bottom 2 of the conduit. The legs 5 and 6 of the yokes 7 are secured to their foundations (the sides 3 and 4 of the conduit) by bolts 10 and are provided with lateral flanges 11 and 12 to which upright plates 13 and 14 are secured by bolts 15, 16. These plates 13 and 14 have horizontal flanges at their upper edges at 17, 18, which abut against the outer edge of the rails 19, 20, which are the inner rails of a double track, the conduit being constructed entirely within the vertical planes of said edges of the rails 19 and 20 so that the building of this conduit on a road already in use, to convert it to this class of railway, will not disturb the rails or the portions of the roadway between the rails of each track, small portions of such roadway being shown in Fig. 1 at 21, 22. The plates 13 and 14 form the outside of the conduit and consequently of the slots 23, 24, in which the trolley arm or plow works, said slots being located at the sides of the conduit and just outside the inner rail of each track.

In Fig. 3 it is shown how the sides 3 and 4 may be continued, of a less thickness up to the surface, thus forming the outer walls of the slots and shoulders being formed upon which to rest the legs of the yokes.

The covering plates 8 occupy all the space between the double tracks except that taken up by the slots and the upper edges of plates 17 and 18 and are provided with holes 25 and 26 in their under sides to rest over upward projections 27, 28, on the yokes 7 and at the outer edges of the plates are downward projecting plates 29, 30, which form aprons to separate the slots 23, 24, from the main body of the conduit. These aprons may be cast integral with the covering plates 7 as in Figs. 1, 11 and 13 or made separate and secured (as in Fig. 12) by bolts to the yokes.

Under the projecting ends of the yokes 7, adjacent to and protected from the weather or slot leakage by the aprons 29 and 30, are secured insulators 31 and 32 which are shaped as inverted cones, from the center of which are hung the current conducting wires 33 and 34, the conical shape of the insulators preventing any moisture dripping from them upon the conductors.

In engagement with the conductors 33 and 34 are the trolley wheels 35, 36, for collecting the current, said trolley wheels being supported by arms, or plows, 37, 38, leading up through and traveling in the slots.

39 and 40 are insulators attached to the pillars 9 (or it might be to the yokes 7) for carrying conductors for auxiliary currents, or it may be for telephone, telegraph, or light wires.

In order to introduce the trolley into the circuit, or to adjust or repair any of the underground mechanism, suitable traps or man holes are provided through the covering plates, the covers thereof being removable, one being shown at 41 in Figs. 5 and 6 provided with a sunk ring 42 for lifting it, such cover, when in place, forming one side of the plate and edge of the slot, and the opening, when the door or covering is removed, forming an enlargement of the slot. Of course it will be understood that at each of these traps there is a section of the apron cut away of a width equal to the width of the trap, and if desired the trap cover may have a downward projection at its edge next to the slot to fill in this cut away portion of the apron when the trap is closed. These traps may extend entirely across the covering plate and the covers have apron flanges at both ends. The covering plates 7 are formed with suitable joints 43 (see Fig. 7) and the side plates 13 and 14 with somewhat similar joints.

In Figs. 5 and 6 I illustrate the construction of said traps or man holes and their covers. In Fig. 5, in full lines, the trap cover 41 in this instance having a section of the apron 29 cast integral with it, and in dotted lines is shown how it may be extended clear across the plate 8 and have part of both aprons 28 and 29 cast with it, the trap section of apron 29 being marked 79 and that of apron 30 marked 80. In Fig. 6 the trap cover 41 extends entirely across the covering plate but the sections 79 and 80 of the aprons 29 and 30 are made separate from it. They may be provided with grooves or ribs 81 to fit corresponding constructions in the main body of the apron.

In Figs. 8 and 9 I have shown in top plan view and longitudinal section another form of trap or man hole. It extends entirely across the covering plates 7 from slot 23 to slot 24, and its cover or door is a plate 45 which is supported under the plates 8 by friction rollers 46, the plates 7 at the edges of the opening being beveled down as at 47. In these figures the trap is partly closed and the operation of the door will be readily understood.

In the modification shown in Fig. 11 the covering plates 7 are shaped to accommodate a section of pavement 48 between the tracks, thus dispensing with the metal surface, as may sometimes be preferred.

In Fig. 12 the side plates 13 and 14 are shaped to accommodate one or more rows of paving blocks 49 between the tracks 19 and 20 and the upper parts of said side plates 13 and 14, a bend 50 in such plates serving to support said paving blocks. This provision dispenses with the flanges 17 and 18 on such side plates and lessens the amount of metallic road surface between the tracks. This is readily permissible because there is no absolute necessity for the slot to be less than a

foot from the outer edge of the rail, all street cars projecting that much or more beyond the rails.

In Fig. 13 I show the form the conduit may take where a single track is used being especially adapted where one track of a double track is carried down one street to the right and the other straight along to the left. This construction is substantially one half of that shown in Fig. 12 with the side wall moved in, and will be readily understood.

In Fig. 10 I have shown how I propose to connect my conduit with the city sewer for the purpose of utilizing the current or flow in the city sewer in rapidly draining the conduit.

In Fig. 1 I show at 51 how the water which is liable to pass in through the slots will occupy the lower portion of the conduit. From this lower portion (see Fig. 10) I project pipes or tubes 52 at suitable intervals such pipes having their ends 53 reaching into the city sewer 54 and bent to discharge into an open mouthed funnel 55 in the city sewer, in the direction of the flow therein. The flow of water through the funnel 55 will cause a suction through pipes 52 and rapidly empty the conduit of any water it may contain, such draining of the conduit being more rapidly done when the sewer is full as it usually is during storms, and such other times as the conduit is most liable to gather water through the slots. When desired I can flush the conduit with city water a pipe being brought into it as shown in Fig. 1, and furnished with a suitable cock which may be manipulated through the man holes.

In Fig. 17 I have shown a construction whereby the trolley may be made to readily pass over a break in the conductor especially designed for use with switches whereby any section of conductor may be cut out as desired. The two ends 76 of the conductor 33 are separated and alongside of them is an insulator 78 which connects them mechanically but not electrically. They are separately connected electrically with a switch so that they may be electrically connected through the medium of the switch when desired or either of the sections of the conductor may be left out of circuit by carrying the current, by any suitable conductor, from the switch to the next section. The trolley 35 traveling on the conductor 33 will ride along the insulator 78 when it reaches the break in the conductor and pass to the next section beyond the break where it again strikes the current.

In Figs. 14, 15 and 16 I illustrate the means I provide where it becomes necessary to cross slots and conductors. In these figures the slots are shown at 23, 24 crossing each other, 29 and 30 being the aprons; and 13 and 14 the outer walls of the slots. The aprons and outer walls have upward extending slots cut in them at 82 so that they will not interfere with the passage of the trolley and sections of the conductors 33 and 34 are cut out, for the same purpose. The momentum of the car will carry the trolley over these short breaks and the current is kept unbroken by wires 83, 84, connecting the sections of each conductor, these wires being attached to the conductors on top to prevent interference with the trolley passing on their under surfaces, and thence carried down and under the trolley, aprons and slot walls to give free passage of the trolley over the wires.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A double conduit for electric railways provided with yokes at proper intervals, resting upon suitable foundations, covering plates supported upon said yokes, aprons at each side of said plates forming the inner walls of the slot openings and projecting into the conduits to separate them from the slots and side plates forming the outer walls of the conduit and the slot openings, as set forth.

2. A double conduit for electric railways provided with yokes at proper intervals having legs to rest upon suitable foundations, covering plates supported upon said yokes, aprons at each side of said plate forming the inner walls of the slot openings and projecting into the conduits to separate them from the slots and side plates secured to the feet of the yokes forming the outer walls of the slot openings and of the conduit, as set forth.

3. In combination the yokes resting at each end upon suitable foundations, the covering plates resting on the yokes the aprons at the outer edges of the covering plates, the side plates which with the aprons form the slot wall, and the aprons projecting into the conduits to separate them from the slots as set forth.

4. In combination the yokes resting at each end upon suitable foundations, the covering plates resting upon the yokes, the aprons at the outer edge of the covering plates, the side plates secured to the yoke feet and with the aprons forming the slot walls, and the pillars centrally supporting the yoke, substantially as set forth.

5. In combination the yokes provided with feet with lateral flanges, the side plates secured to said flanges, the covering plates supported to the yokes, and the aprons at the edge of the supporting plates as set forth.

6. The combination in an electrical conduit with yokes supporting suitable covering plates, separating aprons and slot walls, of an inverted arch of masonry upon the upper ends of which said yokes are supported, as set forth.

7. The combination with the yokes supporting suitable covering plates, and slot walls, of an inverted arch the upper ends of which serve as supports for the legs of the yokes, and central pillars resting in the center of the yokes as set forth.

8. An electric conduit for double track rail-

ways consisting of suitable foundations the outer edges of which are within the vertical lines of the inner rails of the two tracks, yokes resting upon said foundations, side plates in close proximity to the inner lines of said rails suitable covering plates supported on said yokes, and aprons supported at the edges of said covering plates all as set forth.

9. A double electric conduit, covering plates having downward flanges at their sides forming inner slot walls or aprons projecting downward into the conduits and separating them from the slot in combination with supporting yokes, and side plates carried by said yokes and forming the outer walls of the slots as set forth.

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

ARTHUR H. HIEATZMAN.

Witnesses:
S. BRASHEARS, Jr.,
F. J. BENJAMIN.