

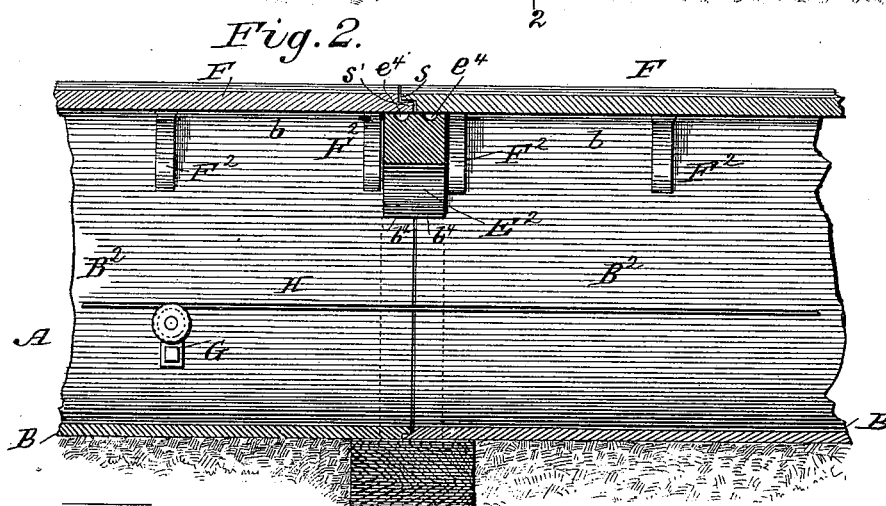
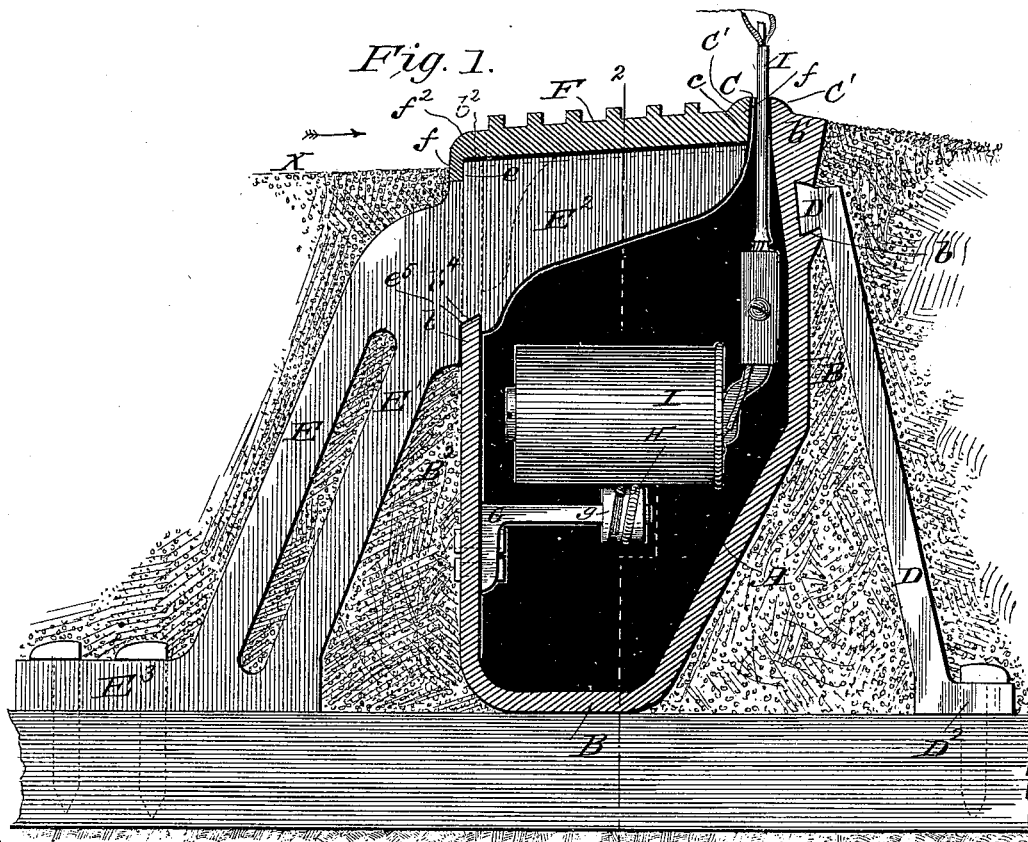
(No Model.)

2 Sheets—Sheet 1.

B. J. BLACK.  
CONDUIT FOR ELECTRIC RAILWAYS.

No. 419,308.

Patented Jan. 14, 1890.



WITNESSES:

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Fred G. Dutcher

W. D. Blondel

INVENTOR

*Bernard J. Black*

BY

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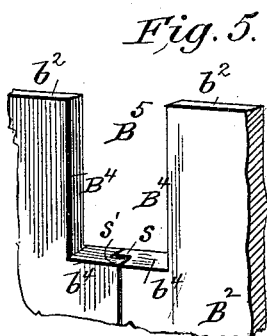
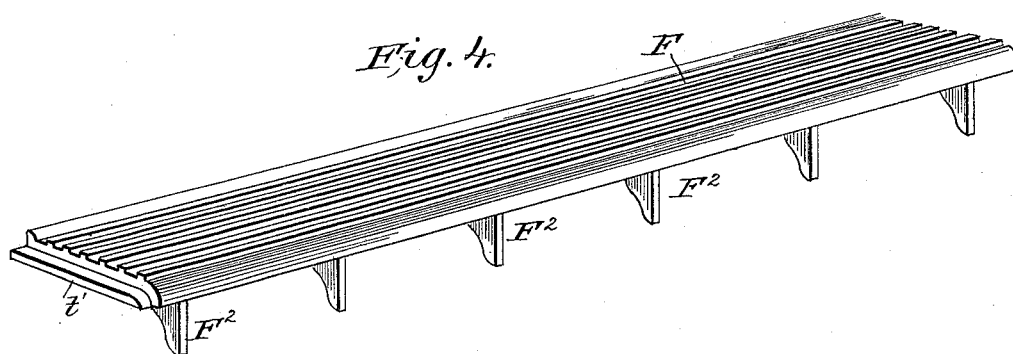
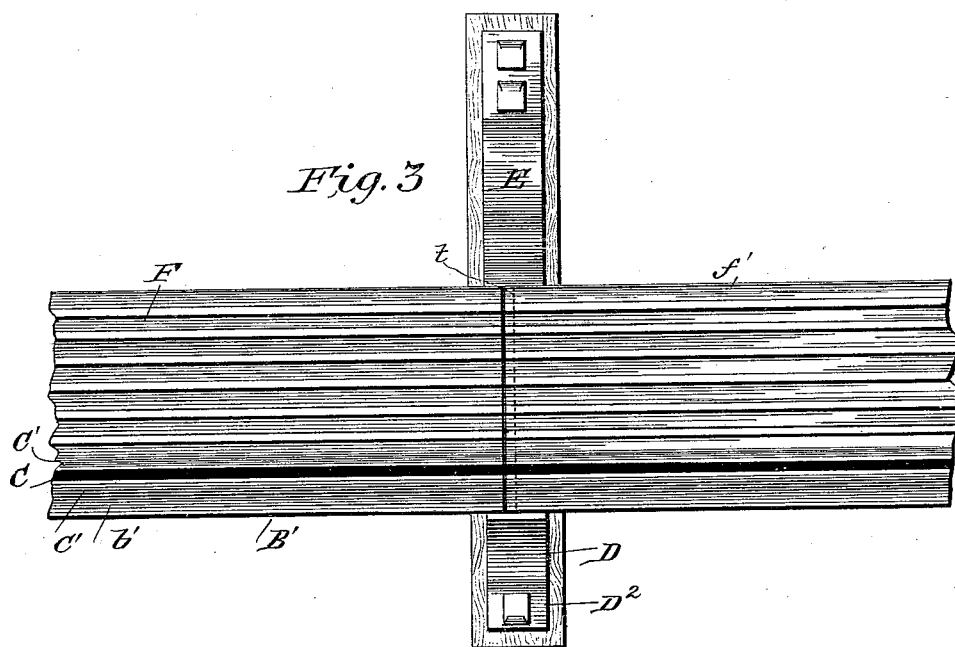
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*Fred G. Deterick*  
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# UNITED STATES PATENT OFFICE.

BERNARD J. BLACK, OF RICHMOND, VIRGINIA, ASSIGNOR TO HIMSELF,  
WILTON F. JENKINS, ERDMANN HOFFMANN, THEODORE HEINSON,  
AND DANIEL STEPHENSON, ALL OF SAME PLACE.

## CONDUIT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 419,308, dated January 14, 1890.

Application filed May 3, 1889. Serial No. 309,530. (No model.)

*To all whom it may concern:*

Be it known that I, BERNARD J. BLACK, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Conduits for Electric Railways, of which the following is a specification.

My invention relates particularly to underground conduits; and it has for its object to provide a conduit which will be of a strong and durable character, which is provided with detachable covers to admit of ready access to the interior of the same, and which is so constructed that but a minimum amount of water can enter the conduit, and in which the circuit-wires are disposed within the conduit to one side of the slot.

To this end my invention consists in certain novel features of construction and peculiar combination of parts, all of which will hereinafter be fully explained in the annexed specification, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a transverse vertical section of my improved conduit. Fig. 2 is a longitudinal vertical section on line 2 2 of Fig. 1. Fig. 3 is a plan view of a portion of my improved conduit. Fig. 4 is a detail view of one of the cover or top plates, and Fig. 5 is a detail.

In the accompanying drawings, A indicates the conduit, which is formed of a series of essentially U-shaped metallic yokes B, which are each about four feet long and about one foot deep. The side B' of each of the yoke-sections B is extended up above the surface, as at b, and forms one edge of the slot C, and the opposite wall B<sup>2</sup> extends upward, as at b'. The wall B' of the yoke B is provided with a horizontally-disposed dovetail groove b<sup>3</sup>, in which are fitted the dovetailed heads D' of a brace-arm D, the lower end of which is anchored, as shown at D<sup>2</sup>. These arms serve to brace one side of the conduit.

E denotes metal brace-arms, which are employed to brace the opposite side of the conduit and also to serve as supports for the conduit-covers. The construction of these arms is a particular feature of my invention.

Each of these arms, the construction of which is most clearly shown in Figs. 1 and 2 of the drawings, consists of a body portion E', of about two inches in width, the upper portion of which extends inwardly, as at E<sup>2</sup>, forming brackets for supporting the tops F of the conduit. The bracket portions E<sup>2</sup> extend, preferably, across the top of the conduit, as shown, and form with the inner ends of the top plates F the inner edge c of the slot C. By this construction it will be seen that the conduit-slot is disposed at the inner end of the conduit instead of the center, as is usually the case, for a purpose which will hereinafter appear.

E<sup>3</sup> denotes the foot portion of the arms E, which are securely anchored in place in any suitable manner.

The removable top plates F, one of which is shown in detail, Fig. 4, each consists of a plate four feet long, corrugated on its upper face to prevent animals from slipping thereon, and provided with a depending lip f, which projects over the upper end b<sup>2</sup> of the side wall B<sup>2</sup> of the yoke and is seated in a recess e, formed in the outer upper edge of the brackets E<sup>2</sup>, where said plates lap the brace-arms E. The inner ends f' of the plates F form, as before stated, one edge of the slot, and the said ends, as well as the upper end of the yoke-wall B', is rounded, as at C' C', to admit of the ready passage of vehicles over the slot and to prevent undue jars to the slot-walls. In adjusting the brace-arms in position they are disposed at the meeting ends of the yoke-sections B and the cover-plates F, and to form means to strongly brace the several parts together I form each of the meeting ends of the yoke-walls B<sup>2</sup> with cut-away portions B<sup>4</sup> B<sup>4</sup>, whereby an opening B<sup>5</sup> is formed when said sections are adjusted together for the brace-arm section E<sup>2</sup> to pass through. The portion b<sup>4</sup> of the wall B<sup>2</sup> engages a recessed portion e<sup>5</sup> in the arm E, as clearly shown in Fig. 1 of the drawings, and serves to hold the said parts from lateral displacement. The upper faces of the bracket portions E<sup>2</sup> of the arms E are provided with grooves or gutters e<sup>4</sup> e<sup>4</sup>, which serve to lead

the water to one side, as will be readily understood by reference to the drawings, and thereby prevent the same from entering the slot C. In placing the conduit in position the concrete or other material forming the street-surface is packed about the conduit up to the point indicated by line X in the drawings, which is about flush with the outer upper edge of the top plates F, which edges are rounded, as shown at  $f^2$ , and form, therefore, practically no obstruction to a vehicle passing in the direction indicated by the arrow in Fig. 1. Vehicles going in the opposite direction when passing over the slot and coming against the wall  $c$  of the slot tend to force said end down and thereby make the slot-opening irregular. To securely brace the said slot-wall, I provide the plates F with depending lugs  $F^2$ , which rest against the inner face of the yoke-wall  $B^2$ , thus throwing the strain exerted on said slot-wall against the conduit-wall  $B^2$ .

G denotes one of a series of horizontal brackets secured to the side wall  $B^2$  of the conduit, as clearly shown in Fig. 1, each of which has secured upon its outer ends knobs  $g$ , of any suitable non-conducting material—such as porcelain, glass, &c.—which support the electrical circuit-wire H. In adjusting the wire H the same is wound about the pulleys spirally, said pulleys being provided with spiral grooves forming seats for the wire. By this arrangement the wire can be firmly secured upon said pulleys without any unnecessary slack. The brackets G extend about half-way across the conduit, as shown, thus carrying the electric wire in the conduit to one side of the slot, as shown, thereby avoiding the danger to meddlesome persons who may endeavor to reach the wire H by means of inserting a stick or rod through the slot.

I denotes the trolley, which is carried by the car-body and which extends within the slot and carries the current from the wire H to a motor on the car. This trolley is arranged to project laterally in the conduit and to travel on the top of the wire H. As this trolley forms the subject-matter of a separate application, Serial No. 312,166, filed May 25, 1889, by Wilton F. Jenkins and myself, further description of the same here is deemed unnecessary.

As a means for preventing water entering the conduit between the several section-joints, I construct each section of the yokes and the cover-plates with projecting lips  $s$  and  $t$ , respectively, which overlap the adjacent ends  $s'$  and  $t'$  of the next succeeding sections in a manner clearly understood by reference to the drawings.

From the foregoing description, taken in connection with the drawings, the advantages of a conduit constructed as described will readily appear. It will be seen that the same is of simple but effective construction, and that the several parts are so adjusted as to readily admit of the expansion and contrac-

tion of the metal caused by variations of the temperature without weakening the strength of the same.

By arranging the top plates F as described access may be readily had to the conduit at any point thereof.

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

1. A conduit for electric railways, consisting of essentially U-shaped metallic yoke-sections, one wall of said yokes extended upward above the ground, forming one edge of the conduit-slot, and detachable cover-plates secured over the yoke-sections, the inner edges thereof forming the opposite edge of the conduit-slot, substantially as shown and described.

2. A conduit for electric railways, consisting of essentially U-shaped metallic yoke-sections, one wall  $B'$  of said sections extending up above the ground, forming one edge of the conduit-slot, and detachable cover-plates secured over the yoke-sections, the inner edges thereof forming the opposite wall of said slot, in combination with horizontally-disposed brackets secured to the wall  $B^2$  of the yoke and extended to about centrally of the conduit, said brackets provided with the electric-wire-supporting knobs, whereby the wire is disposed within the conduit to one side of the slot, substantially as and for the purpose described.

3. A conduit for electric railways, consisting of essentially U-shaped metallic yoke-sections, one wall of said sections extended upward above the ground, forming one edge of the conduit-slot, brace-arms D E, secured on opposite sides of the conduit, the arm E provided with an extension  $E^2$ , projected within the conduit, and detachable cover-plates F, supported on said extensions over the conduit, the inner ends of said plates forming the opposite edge of the conduit-slot, and means for anchoring said arms D and E, substantially as shown and described.

4. The combination, with the yoke-sections B, one wall  $B'$  of which extends upward and forms one edge of the conduit-slot, the meeting edges of the walls  $B^2$  of said sections provided with cut-away portions  $B^4$   $B^4$ , forming an opening  $B^3$ , of the bracket-arm E, anchored, as shown, to one side of the conduit-sections and disposed at the meeting ends of said sections, said arm provided with a projecting bracket portion  $E^2$ , extending through the opening  $B^3$  into the conduit, said portion  $E^2$  provided with a recess  $e^5$ , lapping over the end  $b^4$  of the wall  $B^2$ , and detachable cover-plates F, supported over the yoke-sections upon the brackets  $E^2$ , the inner ends of said plates forming the opposite edge of the conduit-slot, all arranged substantially as and for the purpose described.

5. The combination, with the yoke-sections B, one wall  $B'$  of which extends upward and forms one edge of the conduit-slot, the meet-

ing edges of the walls B<sup>2</sup> of the said yoke-sections provided with cut-away portions B<sup>4</sup>, forming an opening B<sup>5</sup>, of the bracket-arm E, anchored to one side of the conduit, as shown, and disposed at the meeting ends of said yoke-sections, said arm E provided with a bracket portion E<sup>2</sup>, extending through the slot B<sup>5</sup> within the conduit, the upper edge of said portion E<sup>2</sup> provided with water-discharge grooves or channels e<sup>4</sup>, said arm provided with a recess e<sup>5</sup>, lapping over the end b<sup>4</sup> of the wall B<sup>2</sup>, and the removable cover-plates F, supported at their meeting ends on the brackets E<sup>2</sup> over the conduit, the inner ends of said plates forming the edge of the slot, substantially as and for the purpose described.

6. The combination, with the yoke-sections B, one wall of which extends upward and forms the outer edge of the conduit-slot, and the brace-arm E, anchored to one side of the conduit, as shown, provided with an inwardly-projecting bracket portion E<sup>2</sup>, extending through a slot B<sup>5</sup> in the wall B<sup>2</sup> within the conduit-chamber, said projecting portion E<sup>2</sup> provided with a recess e<sup>5</sup>, lapping the edge b<sup>4</sup> of the wall B<sup>2</sup>, of the removable top sections F, supported on the brackets E<sup>2</sup>, provided with a depending lip f, lapping the outer edge of the wall B<sup>2</sup> and bracket portion E<sup>2</sup>, as shown, and a depending bracket or brackets F<sup>2</sup>, disposed against the inner side of said wall, the inner end of said top forming the outer edge of the conduit-slot, all arranged substantially as shown and described.

7. The hereinbefore-described improved conduit for electric railways, consisting of essentially U-shaped yoke-sections B, one wall B' of said sections extended upward, forming the outer edge of the conduit-slot, means for bracing the said wall B' of the sections B, as shown, the meeting ends of the walls B<sup>2</sup> of said sections provided with cut-away portions B<sup>4</sup>, forming an opening B<sup>5</sup>, horizontal brackets G, secured to said wall and extended to about centrally within said conduit, forming supports for the electric wire to one side of the conduit-slot, the brace-arm E, anchored to one side of the conduit, as shown, and disposed at the meeting ends of the sections, provided with a bracket portion E<sup>2</sup>, projecting within the conduit, provided with a recess e<sup>5</sup>, lapping the upper end b<sup>4</sup> of the wall B<sup>2</sup>, and removable top plates disposed over the yoke-sections and supported at their meeting ends on the brackets E<sup>2</sup>, the inner ends forming the inner edge of the slot, said plates provided with a depending lip f, lapping over the outer edge of the wall B<sup>2</sup> and the bracket E<sup>2</sup>, and a depending bracket or brackets F<sup>2</sup>, disposed against the inner face of said wall B<sup>2</sup>, all arranged substantially as and for the purpose hereinbefore described.

BERNARD J. BLACK.

Witnesses:

EUGENE C. MASSIE,  
JAMES T. READ.