

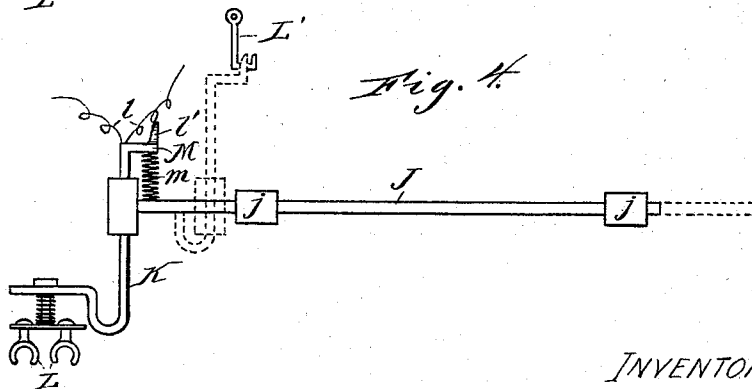
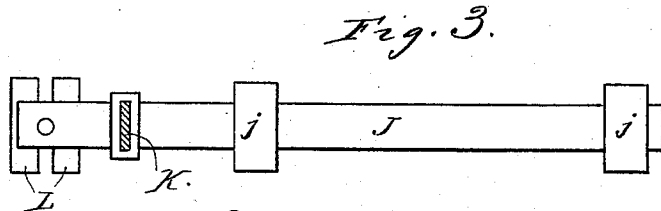
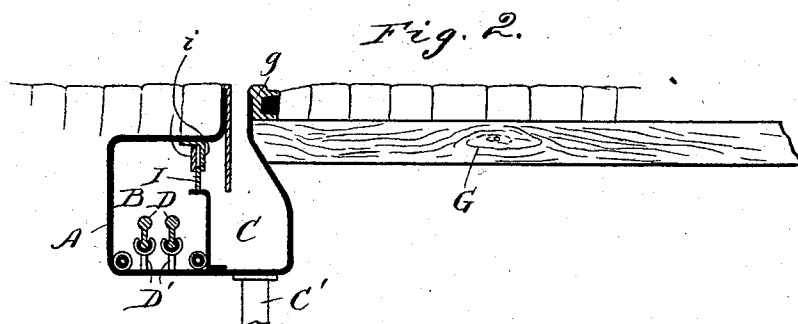
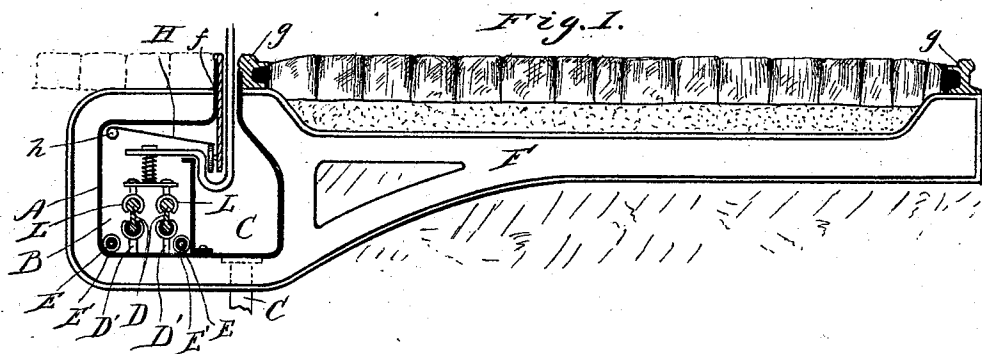
(No Model.)

H. A. F. PETERSEN.

## UNDERGROUND CONDUIT FOR ELECTRIC RAILWAYS.

No. 534,663.

Patented Feb. 26, 1895.



WITNESSES,

M. M. Wiles.

J. Lumborg Jr.

INVENTOR,

Herluf A. F. Petersen.

By John E. Miles.

ATTORNEY.

# UNITED STATES PATENT OFFICE.

HERLUF A. F. PETERSEN, OF MILWAUKEE, WISCONSIN.

## UNDERGROUND CONDUIT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 534,663, dated February 26, 1895.

Application filed March 26, 1894. Serial No. 505,208. (No model.)

*To all whom it may concern:*

Be it known that I, HERLUF A. F. PETERSEN, a citizen of the United States, residing at Milwaukee, county of Milwaukee, State of Wisconsin, have invented a certain new and useful Improvement in Underground Conduits for Electric Railways; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to new and useful improvements in underground conduits for electric railways and consists in the matters hereinafter described and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a transverse sectional view of a street-railway track provided with my improved form of conduit. Fig. 2 is a similar view illustrating a somewhat different form of construction. Fig. 3 is a plan view illustrating the arrangement of a contact carrier adapted to be secured to a car and arranged to engage with my improved form of conduit. Fig. 4 is a side elevation of the same.

In the construction of underground conduits for electric railways, it has been common heretofore to locate the conduit between the track rails and it therefore has been necessary to construct the yokes for supporting the track rails and the sections of the conduit specially so as to conform to the outside of the conduit and permit the same while in engagement therewith to rest wholly beneath the surface of the ground. It has been necessary furthermore in applying underground conduits to railway tracks which are already constructed to tear up the track and dig out the earth between the lines of the track rails for the reception of the conduit casing, and this necessarily prevents traffic upon the railway line during the operation of applying the underground conduit.

It is the object of my present invention to provide an improved form of conduit which may be located wholly outside of the line of the track rails, but in close proximity thereto, so that the conduit may be readily placed in

position adjacent to lines of railway track already constructed without the necessity of excavating between the track rails, or of tearing up the track during the operation of placing the conduit in position thereby enabling my improved form of conduit to be placed in position adjacent to the railway track without the necessity of interfering in any way with the traffic thereon.

In the drawings, A designates as a whole a longitudinal casing which may be of any desired or convenient form but which is divided into two longitudinal compartments or passages, B and C respectively.

Within the compartment B, are arranged suitable conductors D D which are conveniently supported upon suitable brackets D' D' in the manner shown in the drawings, but insulated therefrom.

The mains or feeders E E may be arranged to extend throughout the compartment B said mains or feeders being preferably inclosed within protective tubular coverings E' E', but insulated therefrom in a familiar manner. The mains or feeders E E are tapped at intervals by wires which connect said mains or feeders with the conductors D D in substantially the manner shown in my prior patent, No. 516,876, granted March 20, 1894.

In the particular construction illustrated in Fig. 1 of the drawings suitable yokes F are provided for supporting the conduit and also for supporting the track rails, this form of construction being designed for use more particularly in the construction of new tracks where the conduit and the track are simultaneously laid. At one end of each of the yokes, is provided an aperture or slot *f*, in its upper side, arranged adjacent to the support for one of the track rails, and an opening is formed in this end of the yoke for the reception of the casing A of the conduit, this end of the yoke being of course, enlarged sufficiently for the purpose.

In the particular construction illustrated in Fig. 2 of the drawings, my improved conduit is shown as applied to a track already constructed and having wooden ties G G of the ordinary construction, the casing A being arranged to rest wholly beneath the surface of the ground and adjacent to one of the track rails *g*.

In my improved conduit construction, I prefer to provide a suitable dividing wall for separating the main casing into the two compartments B C and to form a longitudinal opening leading from the compartment C into the compartment B which contains the conductors and to further provide a suitable closing device movably engaged in any suitable manner with the wall of the casing and arranged to rest upon or against the edge of the dividing wall. For this purpose I may employ any one of the forms of closing devices illustrated in my prior patent, No. 516,876, and my application for patent, Serial No. 490,354, filed November 8, 1893.

The particular closing device illustrated in Fig. 1 comprises a longitudinal flexible cover H pivotally supported as at *h* at one side of the casing A, and arranged to rest by gravity at its free edge upon the upper edge of the dividing wall between the two compartments, and adapted for engagement at its free edge by the contact carrier arm so as to be lifted and thereby admit the contact carrier arm with the contact devices secured thereto to the interior of the compartment or passage B. The particular device illustrated in Fig. 2 of the drawings for closing the compartment, comprises a vertically movable strip I engaged between depending flanges, *ii*, which are secured to the upper wall of the casing A. This closing device is adapted for engagement at its lower edge with the contact carrier arm, as the latter advances along the conduit and is arranged to open as said arm advances to permit a free passage of the arm and to close by gravity behind the arm, so as to keep the opening into the compartment B normally closed. Both of these forms of closing device are fully described in my aforesaid applications for patent, and need not be further described herein in detail.

In connection with my improved conduit located at the side of the track, it is necessary to provide an arm for carrying the contact devices so arranged as to extend downwardly through the slot into the casing at the side of the track. To this end, I may employ any desired form of laterally and downwardly projecting carrier arm, but in practice I find it convenient to employ substantially the form of arm shown in Figs. 3 and 4 in which an angular arm J is movably supported in suitable bearings *j j* beneath the car said arm being arranged to be adjusted longitudinally within said bearing, but laterally with respect to the track and the car. This arm normally extends past the side of the car so as to bring its outer end substantially into line with the slot in the conduit casing. From the outer end of said arm J, depends a contact carrier arm K, which is arranged in an angular bearing, at the end of said arm J and adapted to be adjusted vertically therein. This form of contact carrier arm extends downwardly, so as to enable it to pass through the slot and is then curved

laterally and preferably somewhat upwardly, so as to extend around the depending flange formed upon the slot rail at the side of the slot and thence into the compartment B which contains the conductors. At the end of the arm K are supported in any suitable or desired manner contact shoes L L adapted for engagement with the upper sides of the conductors D D, and from these contact shoes, suitable conducting wires *ll* are carried up through the arm K and lead off to the opposite poles of the motor upon the truck.

When the arm K is in operative position within the slot, the supporting arm J is in the position indicated by the full lines in Figs. 3 and 4, in which position said arm J is extended laterally in its bearings *j j* so as to project over the line of the track rail.

When the contact carrier arm K has been lifted from the slot, it is necessary that it should be moved laterally with respect to the car so as to occupy a position wholly within the car body, and to this end I prefer to arrange suitable means such as the hook L' upon any stationary part of the car with which the upper end of the arm L, may be engaged in an obvious manner to support the same in its elevated position, the position of said hook being such that in order to place the upper end of the arm L in engagement therewith, said arm must first be elevated to free it from the slot and the supporting arm J then slid backward beneath the car in its bearings *j j* until the parts assume the positions indicated by the dotted lines in Figs. 2 and 3. Upon the upper end of the arm L, is conveniently provided a loop or eye *l'* with which the hook L' engages to hold the arm L in its elevated and retracted position.

In order to provide a somewhat yielding engagement of the arm L which carries the contact shoes with the supporting bar or arm J, I find it convenient to provide upon the upper end of the arm L, a lateral projection M, for engagement with the upper end of a supporting spring *m*, which is arranged to rest upon the upper side of the arm or bar J as shown more particularly in Fig. 4. By this construction, the arm L rests by gravity upon the spring *m*, when in operative position within the conduit, and said spring permits of a slight yielding vertical motion of the arm L, so as to permit the same to rest in such a position within the slot as to maintain a constant and unbroken contact between the contact shoes and the conductors.

As indicated in the drawings in Figs. 1 and 2, the compartment C of the conduit is provided with tubular connections C' C' in its bottom wall, arranged at suitable intervals and leading to a sewer as is fully described in my aforesaid prior applications for patent.

Any suitable or desired form of manholes may be provided for obtaining access to the interior of the casing, such for instance as illustrated and described in both of my aforesaid prior applications for patent, and said

devices being fully described in said prior applications, and forming no essential part of this present invention, need not be described in detail.

5 By my improvements, I am enabled to provide an underground conduit for electric conductors of such construction that while it rests wholly beneath the surface of the ground, yet it is wholly outside of the line of the track, and so arranged that said conduit may be  
10 opened for the purposes of repair or inspection, without in any way interfering with traffic upon the track.

By my improvement I am also enabled to  
15 readily apply my improved conduit to street railroads which have been already constructed without the necessity of tearing up the track or in any way injuring the roadbed or interfering with the traffic on the road, as well as  
20 to apply my improved form of conduit to roads in the course of construction.

I would have it understood however, that I do not desire to limit myself to the precise form of construction illustrated in the drawings and herein described, as various modifications might be made in the details of construction without departure from the scope of my original invention.

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

1. The combination with a railway track and an underground conduit for electric conductors located adjacent thereto, but wholly  
35 outside of the line of said track, of a contact carrier adapted to be supported upon the truck of a car, and arranged to normally extend laterally past the line of one of the track rails, and downwardly so as to enter said conduit, and provided with contact devices, for  
40 electrical engagement with said conductors, and suitable means for raising and lowering said arm and for adjusting the same laterally when in its raised position, substantially as described.

2. The combination with a railway track and an underground conduit for electric conductors located adjacent thereto but wholly  
50 outside of the line of said track, of a contact carrier adapted to extend downwardly at the side of said track and into said conduit and provided with contact devices for electrical engagement with said conductors, and a horizontal adjustably supported arm or bar operatively engaged at its outer end with said contact carrier, substantially as and for the purpose described.

3. The combination with a railway track and a conduit for electric conductors extending longitudinally adjacent to one of the track rails, but wholly outside of the line of said track, and provided in its upper wall with a longitudinal slot, of a horizontal arm or bar, supported in suitable bearings and longitudinally adjustable therein, and a contact carrier arm operatively engaged with the outer  
65 end of said horizontal arm or bar and ar-

ranged to extend downwardly through said slot, in the conduit, and provided with contact devices for engagement with the conductors therein, substantially as described.

4. The combination with a railway track and a conduit for electric conductors, extending longitudinally adjacent to one of the track rails, but wholly outside of the line of said track, and provided in its upper wall with a longitudinal slot of a horizontal arm or bar, supported in suitable bearings and longitudinally adjustable therein, and a contact carrier arm having a vertically adjustable engagement with the outer end of said horizontal arm or bar and arranged to extend downwardly through said slot into the conduit, and provided with suitable contact devices for electrical engagement with said conductors, substantially as described.

5. The combination with a railway track and an underground conduit for electric conductors located adjacent thereto but wholly outside of the line of said track, of a horizontal longitudinally movable supporting arm or bar, adjustably engaged with suitable bearings upon a car truck, a contact carrier arm having a vertically adjustable engagement with the outer end of said arm or bar, and adapted to extend downwardly into said conduit and provided with contact devices for electrical engagement with said conductors, and a suitable spring support upon said horizontal arm, adapted for engagement with the upper end of said carrier arm, substantially as described.

6. The combination with a railway track and an underground conduit for electric conductors arranged to extend longitudinally adjacent thereto, but wholly outside of the line of said track, of a contact carrier arm adapted to normally extend laterally past the line of one of the track rails and downwardly into said conduit and provided with suitable contact devices, for electrical engagement with the conductors therein, suitable means for raising, lowering and laterally adjusting said arm, and suitable means adapted for engagement with said arm for holding it in its raised and retracted position, substantially as described.

7. The combination with a railway track, of a conduit arranged to extend longitudinally adjacent to one of the track rails, and located wholly beneath the surface of the ground, and wholly outside of the line of the track, said conduit being divided into two longitudinal compartments, one of which is provided in its upper wall with a longitudinal slot for the admission of a contact carrier, and the other compartment being arranged to contain the electric conductors, and communicating with the first-mentioned compartment by means of a longitudinal opening, and a vertically and laterally adjustable contact carrier adapted to normally extend outside of the line of the car, and through the longitudinal slot in the upper wall of the

first-mentioned compartment, and into the compartment containing the conductors, and provided with contact devices for engagement with said conductors, substantially as described.

- 5  
10  
15
8. The combination with a railway track, of a conduit arranged to extend longitudinally adjacent to one of the track rails, and located wholly beneath the surface of the ground, and wholly outside of the line of said track, said conduit being divided into two longitudinal compartments, one of which is provided in its upper wall with a longitudinal slot for the admission of a contact carrier, and the other compartment being arranged to contain the electric conductors, and communicating with the first-mentioned compartment by means of a longitudinal opening, a

suitable closing device movably engaged with the walls of said compartment adjacent to said longitudinal opening, and adapted to normally close the same, and a laterally and vertically adjustable contact carrier adapted to extend through said slot and said longitudinal opening into the compartment containing the conductors, and adapted for operative engagement with said closing device, and provided at its end with contact devices adapted for engagement with said conductors, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

HERLUF A. F. PETERSEN.

Witnesses:

JOHN E. WILES,  
M. M. WILES.