No. 744,246. PATENTED NOV. 17, 1903.

A. A. SHOBE & W. EMBLEY.

ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED JUNE 17, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

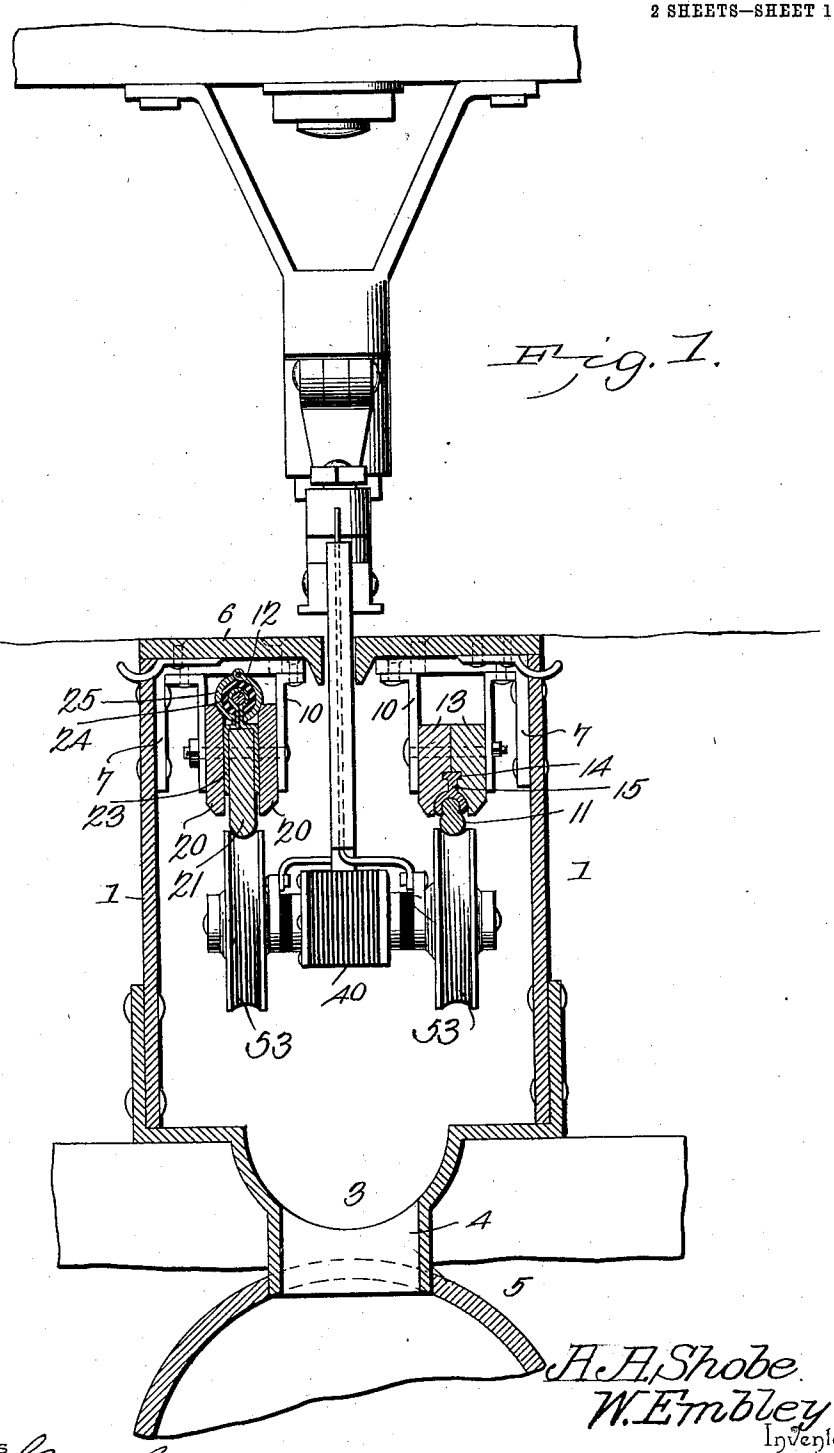

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

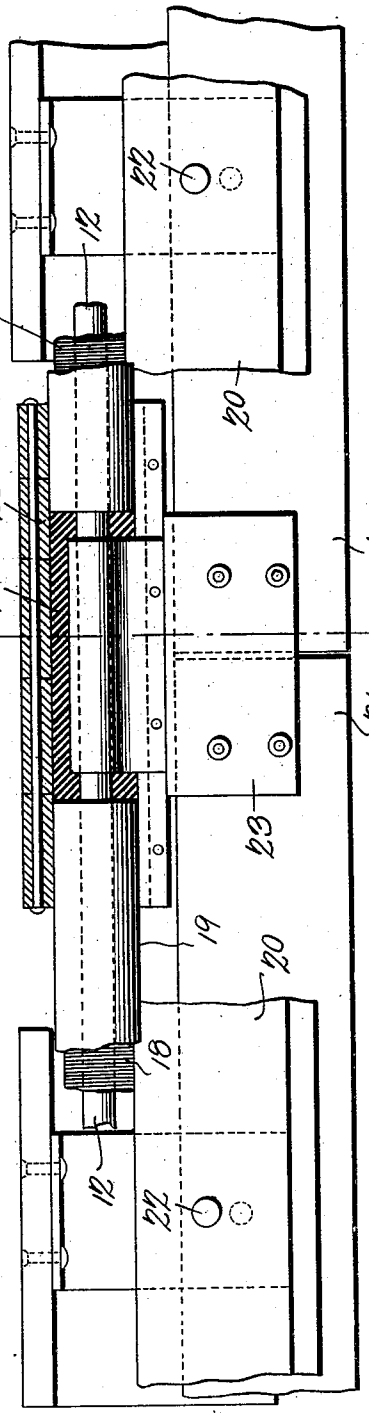


Fig. 4.

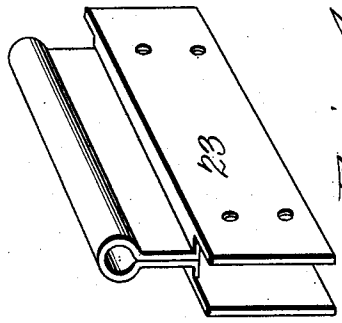


Fig. 5.

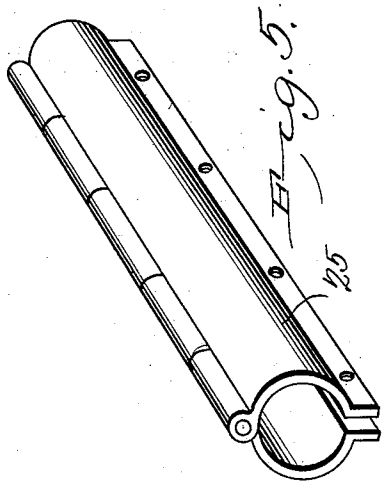
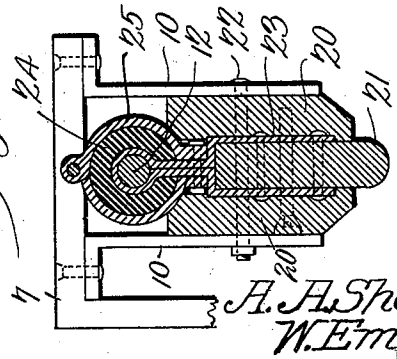


Fig. 3.



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UNITED STATES PATENT OFFICE.

ABRAHAM A. SHOBE AND WILLIAM EMBLEY, OF JERSEYVILLE, ILLINOIS.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 744,246, dated November 17, 1903.

Original application filed April 10, 1903, Serial No. 152,079. Divided and this application filed June 17, 1903. Serial No. 161,897. (No model.)

To all whom it may concern:

Be it known that we, ABRAHAM A. SHOBE and WILLIAM EMBLEY, citizens of the United States, residing at Jerseyville, in the county of Jersey and State of Illinois, have invented a new and useful Electric-Railway System, of which the following is a specification.

This invention relates to certain improvements in electric-railway systems, and has for its principal object to provide a thoroughly practical and efficient system which may be installed at a comparatively low cost.

A further object of the invention is to provide a system in which a continuous-current conductor is so arranged and supported as to permit free expansion and contraction due to thermal changes without injuring the conductor or its connections and without such distortion as would tend to impair the contact with the movable trolley used to convey the current to and from the car motor or motors.

A still further object of the invention is to provide a device of this character in which the current-conductor is thoroughly insulated and maintained out of contact with the trolley without interfering with its operation and without increasing the resistance to any material extent.

A still further object of the invention is to provide an improved form of supporting means for the current-conducting wire and to thoroughly insulate the wire proper without interfering with its free longitudinal movement during expansion and contraction, and, further, to prevent all wear on the wire by the employment of auxiliary strips for direct engagement with the trolley-wheels or similar current-collectors.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a transverse sectional elevation of an electric-railway system embodying the invention and showing the construction and arrangement of the current-conductor and the manner in which the same is supported in an underground conduit. Fig. 2 is an elevation, partly in section, of one of the current-conducting wires and the insulating and supporting means therefor. Fig. 3 is a transverse sectional elevation of the same on the line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of one of the bonding-plates used to connect the current-conducting wire with the trolley contact-strips. Fig. 5 is a similar view of a portion of one of the jacket or casing members which surrounds the bonding-strips and the adjacent ends of the armor or covering of the current-conductor.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The present invention relates more particularly to the arrangement and support of one of the current-conducting wires of an electric-railway system, the means for insulating the same, and the arrangement of the independent conducting-strips with which the current-collector engages, as fully disclosed and described in an application for United States Letters Patent filed by us on April 10, 1903, under Serial No. 152,079, and of which the present application is a division.

While the drawings show the application of the invention to only one of the current-conducting wires, the negative in the present instance, it is of course to be understood that the invention is not in any sense limited to this particular application, as it may be employed in connection with a positive wire and used on underground, surface, or overhead systems.

In the drawings there is shown a conduit comprising opposite side plates 1 and the concaved bottom 3, provided at intervals with drainage-openings 4, leading to a drain-tube 5, which extends, preferably, for the whole length of the conduit, and when used in cities the drain-pipe may be connected to the catch-basin usually found at street-corners. The top of the conduit is formed of plates 6. At suitable intervals are arranged brackets 7, having vertical arms firmly secured to the

inner walls of the side plates and provided with horizontal arms for the support of the top plates and the electrical conductors. To the under sides of the brackets are secured depending hangers 10, which serve as supports for the conductors and their connected parts, these hangers being arranged in pairs, as indicated in Fig. 1.

The hangers at one side of the conduit support the positive conductor 11, while those of the opposite sides serve as supports for the negative or return conductor 12. The opposite wire-supports are formed of two oppositely-disposed bars 13, preferably made of wood or other suitable non-conductor and are made in sections of sufficient length and coated with a suitable paint or preserving compound. The adjacent faces of the bars are provided with longitudinal slots 14 for the reception of the upper transverse cross-bar of a T-shaped hanger 15, the lower end of which is hook-like in form and is bent to engage the opposite sides of the positive wire 11, said wire being made of peculiar form in cross-section (illustrated in Fig. 1) in order that it may be properly supported by the hangers. The construction is such as to permit free sliding movement of the hangers in the grooves of the wooden or other supporting bars and permits of the placing of the wire in proper position during the preliminary installation, as well as permitting subsequent longitudinal movement of the wire due to the expansion or contraction, thus preventing breaking from this cause and further preventing such distortion of the wire as to impair the contact of the traveling current-collectors.

The negative or return wire 12 is formed of copper of the usual shape in cross-section, and in order to more fully protect the wire it is inclosed in a practically continuous tube 18, formed of insulating material, the latter being incased in a jacket 19, formed of sections of metal or other tubing of any appropriate character. The metal tubes are formed of lengths of about twenty feet in order that they may be readily handled and are supported at the tops of two bars 20, formed of wood or other suitable material secured at intervals to the hangers 10, the construction permitting perfect freedom of movement of the return-wire and also of the tube-sections during expansion and construction.

The active contacts of the return-wire, or those which are in direct electrical contact with the traveling collectors of the car, are formed of bars 21 of iron or other suitable material in sections of convenient length and supported in position by transversely-disposed bolts 22, which also serve to unite the wooden bars 20 to the hanger, insulating-sleeves being preferably introduced through the openings formed in the bars 21 in order to prevent leakage of the current and short-circuiting to ground through the conduit.

The adjacent ends of bars 21 are connected by bonding-plates 23, formed of copper or other good conducting material, the plates being first bent around the wire 12 at points adjacent to the spaced ends of the protecting-tubes and thence united to the several iron bars by rivets or other permanent fastenings, so that the current from the motor and trolley will pass through the iron bars to the proper conducting-wire with but little resistance and the wear will be exclusively on the iron bars, which may be readily renewed in case of wear or breakage.

In order to protect the wire at the bonding-spaces, said wire and the bonding-plates are surrounded by insulating-linings 24, and these are incased in jackets 25, each formed of a pair of substantially semicircular plates hinged together at their upper ends and riveted or otherwise secured together at their lower ends, the jackets embracing also the ends of the protecting-tubes in such manner as to permit free movement of the latter without danger of breakage or distortion.

In connection with the system there is used a current-collector comprising a bar or strip 40, carrying suitable wheels 53, adapted to engage the current-conductors and carried by a suitable supporting-bracket depending from the car.

Having thus described the invention, what is claimed is—

1. In electric-railway systems, a current-conductor free to expand and contract longitudinally, and a plurality of trolley contact bars or strips having their adjacent ends bonded to each other and connected at intervals to said conductor.

2. In an electric-railway system, a current-conductor free to expand and contract longitudinally, a sectional protecting means for the conductor, and trolley contact members having their adjacent ends bonded to each other and connected to the conductor.

3. In electric-railway systems, a current-conductor free to expand and contract longitudinally, a sectional protecting-tube covering the conductor, the adjacent ends of the sections being spaced, an insulating-lining between the conductor and the tubes, trolley contact-bars formed in sections, bonding devices for connecting the adjacent ends of the bars to each other and to the conductor at points between the spaced ends of the tubes, and auxiliary protecting-sleeves extending over the spaced portions and inclosing the ends of said conductor.

4. In electric-railway systems, a current-conductor free to expand and contract longitudinally, a protecting device inclosing the conductor and formed of a plurality of spaced tube-sections, an insulating-lining between the two sections and the conductor, trolley contact-bars formed in sections, bonding-plates connecting the adjacent ends of the bars to each other and to the conductor, and supporting-bars for both the trolley contact-bars and the conductor.

5. In electric-railway systems, the combination with a conductor, of a protecting device comprising a plurality of spaced tubes, an insulating-lining, a sectional trolley contact-bar connected to the conductor between the ends of the tube-sections, and an auxiliary sleeve inclosing and covering that portion of the conductor between the ends of adjacent tubes.

6. In electric-railway systems, the combination with a current-conductor, of a protecting device comprising a plurality of spaced tube-sections, an insulating-lining between the conductor and the tubes, a trolley contact-bar electrically connected to the conductor at points between the adjacent ends of the tube-sections, an insulating and protecting sleeve surrounding the conductor between adjacent tube-sections, and supports on which the sleeve and tube-sections rest and on which they are free to move with the current-conductor for expansion and contraction.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

ABRAHAM A. SHOBE.
WILLIAM EMBLEY.

Witnesses:
GEORGE W. WARE,
ROBERT N. MCCLURE.