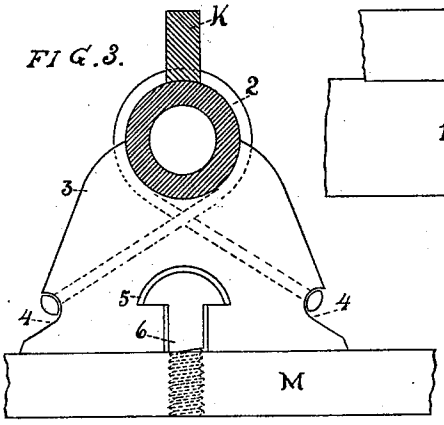
(No Model.) 2 Sheets—Sheet 1.

M. SHOEMAKER.

ELECTRIC RAILWAY CONDUIT.

No. 478,175. Patented July 5, 1892.

FIG. 3.



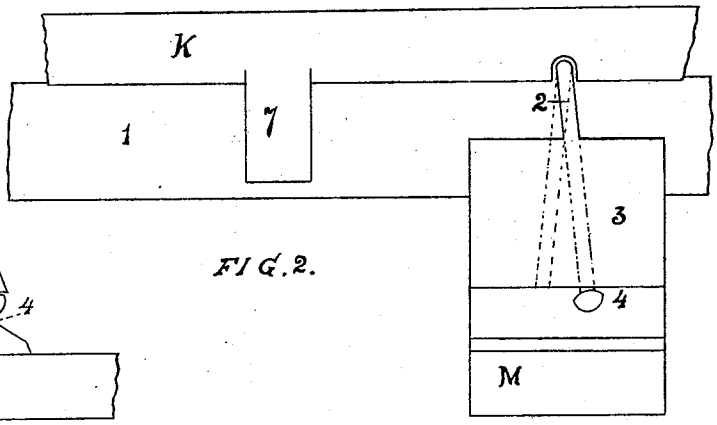


FIG. 2.

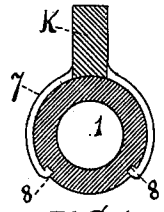
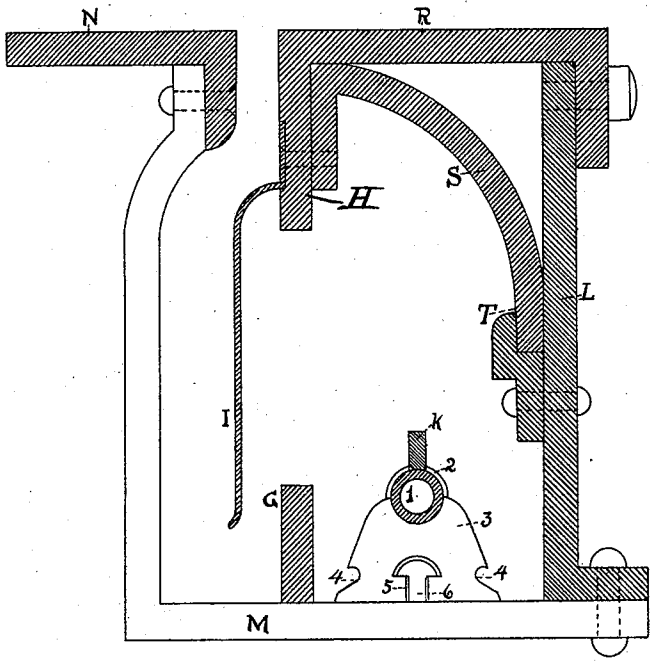


FIG. 4.

FIG. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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FIG. 8.

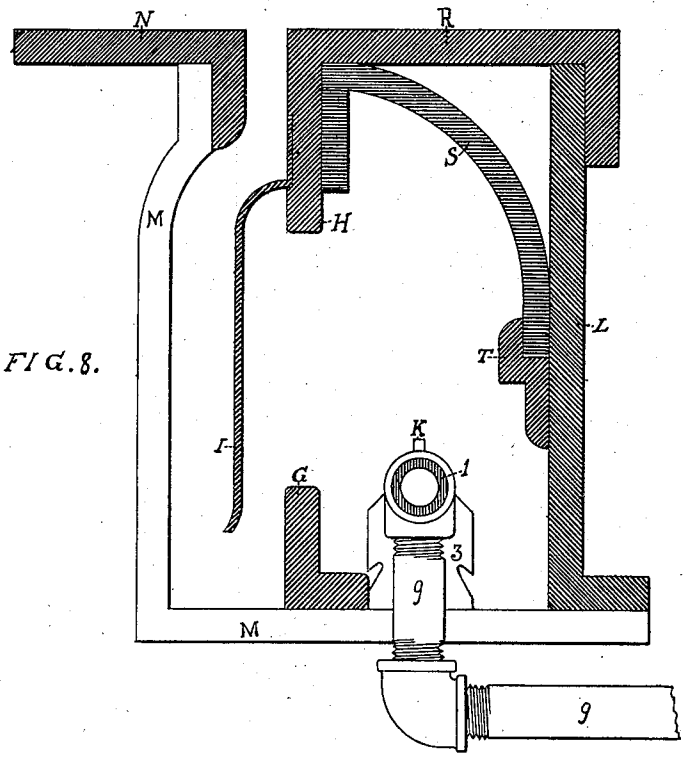


FIG. 5.

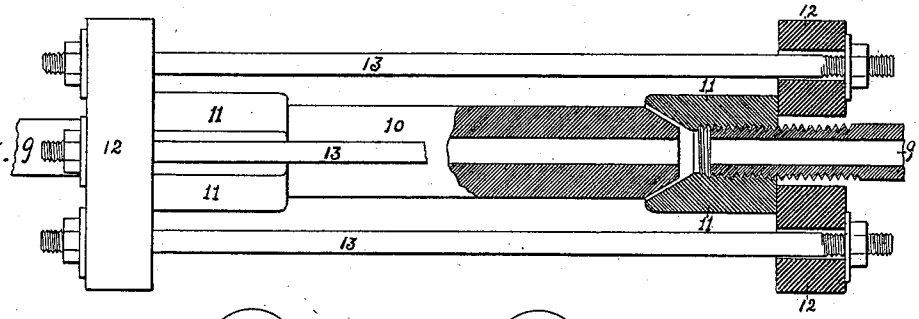


FIG. 6.

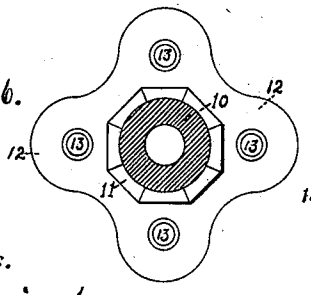
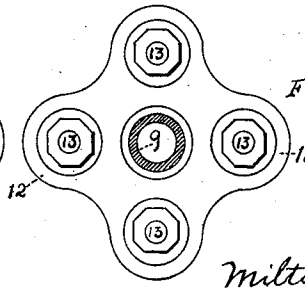


FIG. 7.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MILTON SHOEMAKER, OF SIOUX CITY, IOWA, ASSIGNOR OF TWO-THIRDS TO JAMES W. MARTIN, OF SAME PLACE, AND JASON PASSMORE, OF DUNCANNON, PENNSYLVANIA.

ELECTRIC-RAILWAY CONDUIT.

SPECIFICATION forming part of Letters Patent No. 478,175, dated July 5, 1892.

Application filed May 25, 1891. Serial No. 393,976. (No model.)

To all whom it may concern:

Be it known that I, MILTON SHOEMAKER, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented certain new and useful Improvements in Electric-Railway Systems; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has relation to electric railways; and the object is to provide an improvement upon my application for patent, relating to an electric-railway system, filed November 3, 1890, Serial No. 370,254.

My invention consists in providing against loss of power by moisture, and I accomplish this by substituting a metal tube set upon glass insulators in place of a wooden trolley-rail. Through this metal tube hot air is to be forced in such a manner and in such volume as to keep this trolley-rail upon which the conductor is laid in a perfectly-dry condition. In my former invention, above cited, a wooden trolley-rail was used, and in some cases moisture might have gathered upon the surface of said rail. By using metal tubing, through which a hot-air blast passes, no moisture can possibly gather on the trolley-rail and no loss of power from moisture be felt.

My invention therefore consists in the novel construction of the parts and the arrangement and combination thereof, as will be hereinafter fully described, and particularly pointed out in the claims.

I have fully and clearly illustrated my invention in the accompanying drawings, wherein—

Figure 1 is a view of a transverse vertical section of the slotted continuous metal case, as shown in my prior application before cited, showing metal-tube trolley-rail set upon glass insulators in place of a wooden trolley-rail. Fig. 2 is a side view showing conductor, metal tube, and glass insulator. Fig. 3 is a sectional view showing section through the conductor and metal tube, showing end of insulator in elevation with dotted lines, indicating method of holding the metal tube in place upon the insulators. Fig. 4 is a section through metal tube and conductor with metallic clip used for securing the conductor onto the metal tube. Fig. 5 in its right-hand half shows a vertical longitudinal section and in its left-hand half and elevation of the tubular glass insulating connection-piece between tubular metallic trolley-rail and service-pipe and the metal burr, the insulating-blocks and the metallic rods and nuts for holding said connection-piece in position. Fig. 6 represents a transverse section of the said tubular glass connection piece, and also shows the burr and the insulating block and rods for holding the same in place. Fig. 7 represents a transverse section of the service-pipe, and shows, also, the insulating-block and the rods before mentioned. Fig. 8 is a transverse vertical section of the slotted continuous metal case before mentioned, showing in elevation the connection of the service-pipe with the tubular metallic trolley-rail.

Referring now to the illustrations, wherein like parts are designated by the same notations or references, N designates a plate of rolled steel, iron, or other metal having its inner surface bent at a right angle in such a manner as to form the outer edge of the slot in the upper surface of the continuous metal case.

R designates the upper plate of the continuous underground metal case with its inner edge bent down in such a manner as to form the inner edge of the slot, and also forms the top rail H.

L designates a plate of rolled steel, iron, or other metal forming the inner shell of the metal case, and is riveted to the angle-bars M M, said angle-bars being placed at such intervals as may be deemed expedient, being firmly riveted to the inner plate L and to the top plate N.

I designates the metallic shield used to deflect away all débris—such as snow, ice, water, &c.—from the working parts.

T designates a metallic stud. These studs are to be placed at regular intervals and

firmly riveted to the plate L. The object of these studs is to afford a firm support for the bottom of the brace S.

S designates a continuous metallic brace firmly riveted to the inner side of the track H, its lower end resting on the stud T.

G designates the lower rail upon which the two larger wheels of the trolley-carriage run.

K designates a conductor, made of copper, delta metal, or any other suitable material.

All of the above parts being similar to those described in my previous application, a similar metal case is used.

Referring now to my improvement, 1 designates a metallic tube intended to lie longitudinally in the metal case and to take the place of the wooden trolley-rail J of my previous application. This metal tube is intended to set into glass insulators, as 3, which are placed at suitable distances apart on the angle-bars M M, each of said glass insulators being grooved at its upper surface to receive said metal tube, each also being provided with suitable openings running diagonally through the body of said insulator, as shown at 4 4, to receive a suitable wire, as 2, to hold said metal tube in place in the groove of the upper surface of the glass insulators. A slot or opening is also provided on the under side of each of said glass insulators, as shown at 5 in Fig. 3, to receive the bolt-head of bolt 6. Said bolt is screwed into the angle-bar M to hold said glass insulator in place on said angle-bar.

2 designates a suitable wire used to hold the metal tubes in place in the groove of the glass insulators. Said wire passes around said metal tube and downward diagonally through said glass insulators, as shown in Fig. 3, the ends of said wire being coiled up to form a head, as shown at 4 4 in said figure.

3 designates a glass insulator of a convenient shape for this purpose.

5 designates an opening on the under side of the glass insulator to receive the bolt-head of bolt 6.

7 designates a clip used to clasp around the metal tube 1 to hold the conductor K in place. These clips are to be placed at suitable distances from each other for this purpose.

8 8 designate grooves provided in the metal tube to receive the ends of the clips to hold it securely in place.

The metal tube 1 being hollow, it is intended to permit a blast of hot air to be forced through it to dissipate any moisture on the outer surface of the tube itself, on the conductor K, or the glass insulators, thus preventing any loss of power from condensation of moisture on these parts. This hot air may be supplied directly from the furnace of the power-station, said station easily being provided with a suitable pumping apparatus to force hot air through said tube at a very little expense.

The service-pipe through which the hot-air is to be forced through the metal tube 1 is shown (designated 9) in Fig. 8, and at all points of connection between the service-pipe 9 and the metal tube 1 the connections are to be made of glass or other suitable insulating material, as shown in Fig. 5, where 10 designates a tubular glass connection-piece interposed between the two ends of the service-pipe 9, a section of said service-pipe 9 being removed for that purpose. 12 designates a block of wood, glass, or other substance combining the necessary insulating qualities with sufficient strength to withstand the tension caused by tightening the rods 13 by screwing up the burrs with which they are provided at each end. Said blocks 12 are pierced through the center by an aperture large enough to admit of the passage of the service-pipe 9, and said ends of the service-pipe 9 are passed through said aperture. 11 represents a metal burr, which is to be screwed onto the end of the service-pipe 9, which is provided with a thread for that purpose. That side of the metal burr 11 which is next to the tubular glass connection-piece 10 is deeply hollowed and the end of the connection-piece 10 is suitably shaped to fit into said hollow, and by suitable packing or other means the connection between said metal burr 11 and said glass connection-piece 10 is made air-tight. The block 12 is pierced through near its circumference in four places to permit of the passage of the metal rods 13. Now the blocks 12 being slipped over the ends of the service-pipe 9 and the burrs 11 being screwed onto the ends of said service-pipe and the tubular glass connection-piece being interposed between said ends of the service-pipe 9 and fitted into the sockets or hollows in the burrs 11, said fitting being made as aforesaid air-tight, when the burrs at each end of the rods 13 are screwed up, the burrs 11 are drawn toward each other by the pressure of the blocks 12, the ends of the tubular glass connection-piece 10 are firmly driven into their sockets in the burrs 11, and the glass connection-piece is thus firmly and rigidly held in its place between the ends of the service-pipe 9, and thus the insulation of the metal tube 1 is preserved and an insulating connection is made between said metal tube 1 and the service-pipe 9, permitting the introduction of hot air into the metal tube 1, as aforesaid. If it becomes necessary in running long distances to reheat the air in said metal tube, a connection may be made with said metal tube 1 by a service-pipe to a coil in a hot-air furnace.

The object of my invention will be readily perceived from the foregoing description.

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

1. In an electric-railway system, a trolley-rail made of metal tubing, suitably set in glass insulators, which are located at suitable distances from each other, said metal tubing being rigidly held in place on said insulators by means of a suitable wire passing around said tubing and downward diagonally through

each of said insulators, said wire having its ends coiled to form a head on each side of the insulator, a conductor, and a suitable clip adapted to pass around said conductor and the metal tubing to hold said conductor in place thereon, all substantially as set forth, as and for the purpose specified.

2. In an electric-railway system, in combination, a trolley-rail made of suitable metal tubing set on glass insulators which are placed at suitable distances apart for this purpose, said metal tubing being set in the groove provided on the upper surface of each insulator and there rigidly held in place by a suitable wire passing around said metal tubing and thence downward diagonally through each of said insulators, suitable openings being provided in the insulators for this purpose, the ends of said wire being coiled or turned up to form a head on each side of the insulators, each of said insulators being rigidly held in place by means of a broad-headed bolt, the head of which fits into an opening provided on the under side of each insulator to receive it, the screw end of said bolt being rigidly secured to an angle-bar of the metal case, a conductor, and a suitable clip adapted to pass around said conductor, and the metal tubing to hold said conductor in place thereon, grooves being provided on the under surface of said metal tubing to receive the ends of said clip and to hold it securely in place, all substantially as set forth.

3. In an electric-railway system, the combination of the following parts, viz: the metal tube 1, provided with the grooves 8 8, the glass insulator 3, grooved at its upper surface to receive said metal tube, said insulator being provided with openings 4 4, running diagonally through the body of the insulator, and an opening 5, provided on its under surface, as shown, the wire 2, the conductor K, the clip 7, and a metal case provided with angle-bars M M, all arranged as set forth.

4. In an electric-railway system, the combination, with a slotted continuous underground metal case, of a metal tube, as 1, glass insulators, as 3, placed at suitable distances from each other in said underground case, said metal tube adapted to lie longitudinally in the grooves provided in the upper surface of each insulator for this purpose, said metal tube being rigidly held in place by a suitable wire passing around said tube and downward diagonally through each of said insulators, a head being formed on the ends of said wire at the points where they enter the sides of the glass insulator to keep said wire rigidly in place, each of said insulators being provided with suitable openings to receive said wire, and an opening to receive a broad-headed bolt, the bottom part of said bolt being firmly secured to an angle-bar, as M, similar angle-bars being placed at suitable distances from each other in the case, a conductor K, and a suitable clip, as 7, adapted to pass around said conductor, and the metal tube 1 to hold said conductor in place thereon, all as set forth.

5. In an electric-railway system, a trolley-rail consisting of a metal tube extending longitudinally inside of an underground metal case, said metal tube being set in glass insulators, and means for rigidly holding it in place therein, a suitable conductor, and suitable means for holding it in place on said metal tube, said metal tube being provided with glass connections at all points of connection between it and a service-pipe for forcing hot air from a hot-air furnace into and through said metal tube, all substantially as set forth, as and for the purpose specified.

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

MILTON SHOEMAKER.

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ERNEST J. LEES.