(No Model.)

S. L. PHILLIPS.

TRAVELING CONTACT FOR UNDERGROUND ELECTRIC RAILWAYS.

No. 562,484. Patented June 23, 1896.

Fig. 1.

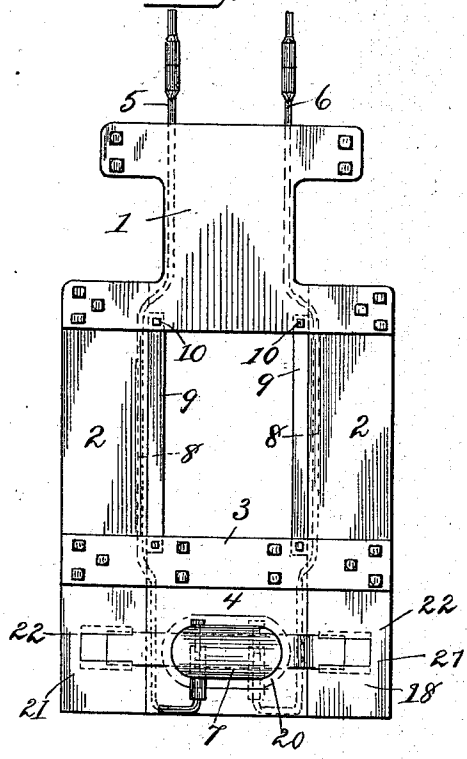


Fig. 2.

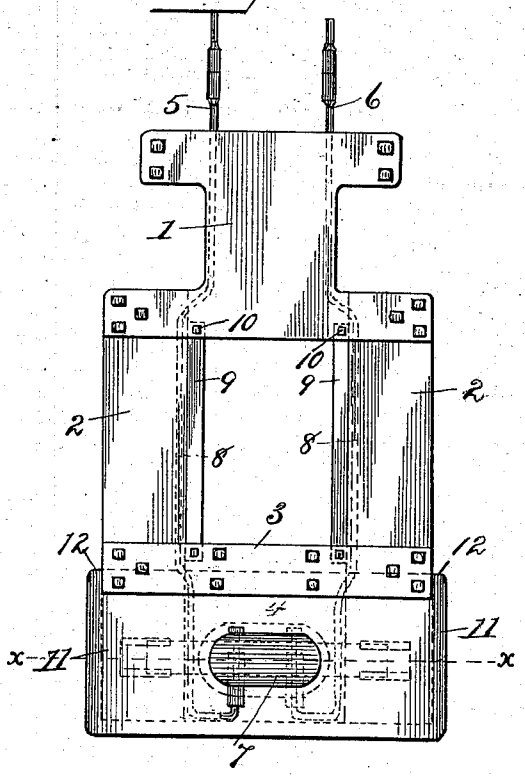


Fig. 3.

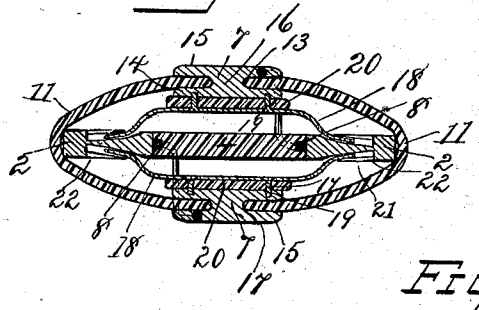


Fig. 4.

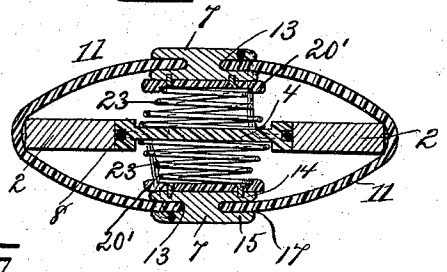


Fig. 5.

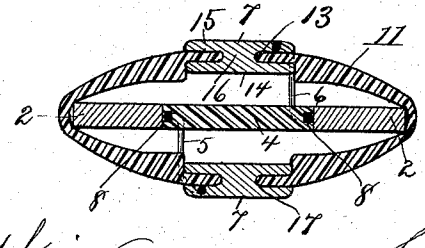
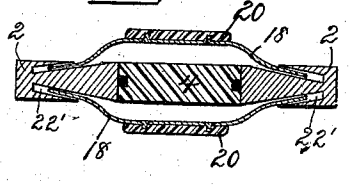


Fig. 6.



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TRAVELING CONTACT FOR UNDERGROUND ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 562,484, dated June 23, 1896.

Application filed January 21, 1896. Serial No. 576,325. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. PHILLIPS, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Electric-Railway Plows or Traveling Contacts and Coverings or Protectors for Same; and I do declare the following to be a full, clear, and exalt 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to traveling contacts or plows for underground electric-railway systems, and more particularly to improved means for insulating and protecting the plow from dampness, mud, &c.

The invention consists of an inclosing insulating-cover, as described hereinafter, and in the combination of such cover with the plow and contact shoes or wheels, whereby the construction of the plow is simplified, and an effective yielding contact of the shoes or wheels with the conduit-conductors assured.

In the accompanying drawings, Figure 1 is an elevation of the type of plow to which my improvements are adapted. Fig. 2 is a similar view of the plow with my improvements applied thereto. Fig. 3 is a transverse section on the line $x\,x$ of Fig. 2. Fig. 4 is a view of the device, showing the use of coiled springs in connection therewith. Fig. 5 is a sectional view of the device in which the cushioning-springs shown in the other figures are omitted or removed, the elasticity of the rubber or gutta-percha insulating-cover serving as a spring; and Fig. 6 is a detail cross-sectional view illustrating a modified form of grooves or slots in the depending bars to receive the free ends of the elliptical springs.

The plow comprises the frame-plates 1, depending plates or bars 2, cross-bars 3, and central lower plate or bar 4. The wire conductors 5 and 6, leading from the contact-shoes 7 to the motor on the car, (not shown,) are preferably supported in vertical grooves 8 of the depending bars 2 and lower plate 4, and clamped or secured by strips 9, held removably by bolts 10.

The numeral 11 indicates an inclosing casing or cover of vulcanite, rubber, or equivalent insulating material. The cover is preferably oval in general contour, closed at its ends and bottom, and open at its top to receive the lower end of the plow, as shown. While I do not limit myself to the exact form illustrated in the drawings, I preferably construct the casing or cover of a single piece of material, adapted to neatly inclose the lower portion of the plow, and secure its upper edges 12 by clamping them to the plow by means of the removable cross-bars 3. At diametrically opposite points the cover 11 is formed with openings 13 to receive the contact-shoes 7. While it is obvious that the form or shape of the shoes may be varied, I regard the form shown in the drawings as well adapted to the purpose, each shoe comprising an inner plate 14 and an outer plate 15 of substantially oval form, connected by a shank 16. The annular spaces 17 around the shanks 16 constitute seats for the portions of the cover surrounding the openings 13. However, if desired, the contact-shoe may consist of a metal plate suitably secured to the cover or wheels projected from said cover.

In Figs. 1, 2, and 3 I have shown each of the shoes 7 provided with an elliptical spring 18, secured by screws 19, passing through the springs and through insulating-plates 20, interposed between the shoes and springs and entering the shoes, as shown. The free or loose ends 21 of the springs bear upon opposite sides of the plates 2, said plates being suitably recessed, notched, or slotted at the points 22 to limit the spread of the springs, and at the same time to prevent displacement and retain them in their proper position.

It will be understood that the contact-shoes 7 are supported by their connection with the cover 11, and by means of the springs 18 they are permitted to yield in rounding curves, as is necessary in service.

In Fig. 4 I have substituted coil-springs 23 for the elliptical springs 18 shown in Figs. 1, 2, and 3. The outer ends of the coil-springs are suitably secured to the shoes, or to the insu-

lating-plates 20′, while their inner ends are properly secured to the central connecting-plate 4 of the plow, which is preferably made of material which is a non-conductor of electricity.

It will be understood that the coil-springs, as shown in Fig. 4, are so secured that the same cannot be displaced by the weight or drag of the traveling contact shoe or wheels. It will be apparent that the function of these springs 23 is similar to that of the springs 18, and the employment of the coil-springs obviates the necessity of notching the plow, as shown in Fig. 1.

In Fig. 5 of the drawings it will be seen that the springs shown in Figs. 3 and 4 are omitted, the required yielding movement of the shoes depending entirely upon the resiliency of the insulating-cover 11. In this instance the inclosing cover is made of rubber or other material combining the required resiliency with sufficient rigidity to insure a proper contact of the shoes with the conduit-conductors.

In Fig. 6 will be seen an illustration of a modified form of grooves or slots 22′, in the depending bars 2 of the plow, to receive the free or loose ends of the elliptical springs. These grooves or slots are so constructed and arranged that, while the ends of the springs may freely contract and expand, they are retained in their correct position and cannot be displaced by the weight or drag of the contact-shoes.

The conducting-wires 5 and 6 are connected with the shoes 7 in the usual manner to supply current to the car-motor from the conductors of opposite polarity supported within the conduit.

The cover 11 effectually protects and insulates the lower portion of the plow and reduces to the minimum the leakage of current and the deleterious effect of moisture, mud, and water.

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

1. The combination with a plow or traveling contact for underground railway systems, of an insulating-cover fully inclosing the lower portion of the plow proper, and provided with openings in each side of said cover through which the contacts project, substantially as shown and described.

2. The combination with a plow or traveling contact, of a cover of insulating material provided on opposite sides with openings, and yielding contacts secured in or projected from said openings, substantially as shown and described.

3. The combination with a plow or traveling contact, of a cover of insulating material provided on opposite sides with openings, contact-shoes secured in or projected from said openings, and springs interposed between the plow and contact-shoes, substantially as shown and described.

4. The combination with a plow or traveling contact, of a cover of insulating material closed at its ends to inclose the lower portion of the plow, and clamping-plates for firmly securing the upper edges of said cover to the plow, substantially as shown and described.

5. The combination with a plow or traveling contact, of an insulating-cover provided with contact-shoes, and serving as a spring and support for said shoes, substantially as shown and described.

6. The combination with a plow or traveling contact, of an insulating-cover provided with openings, and yielding contact-shoes, each comprising an inner and an outer plate connected together and fitting within the openings of the cover, substantially as shown and described.

7. The combination with a plow or traveling contact, of an insulating-cover of flexible material and contact-shoes yieldingly supported by said cover, substantially as shown and described.

8. The combination with a plow or traveling contact, recessed or notched on opposite side faces, of an insulating casing or cover inclosing the lower portion of the plow, contact-shoes extending through openings in said cover, and springs secured to said shoes but insulated therefrom, the ends of said springs having a sliding bearing upon the plow, substantially as shown and described.

9. The combination with a plow or traveling contact, recessed or notched on opposite side faces, of an elliptical spring having free ends which have a sliding bearing and rest in the recess or notch in the side face of the plow, substantially as and for the purpose specified.

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

SAMUEL L. PHILLIPS.

Witnesses:
J. FRED. KELLEY,
CARRIE L. ACKER.