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C. T. LEONARD.

SLEET CUTTER AND CONTACT FOR ELECTRIC RAILWAYS.

APPLICATION FILED FEB. 29, 1904.

NO MODEL.

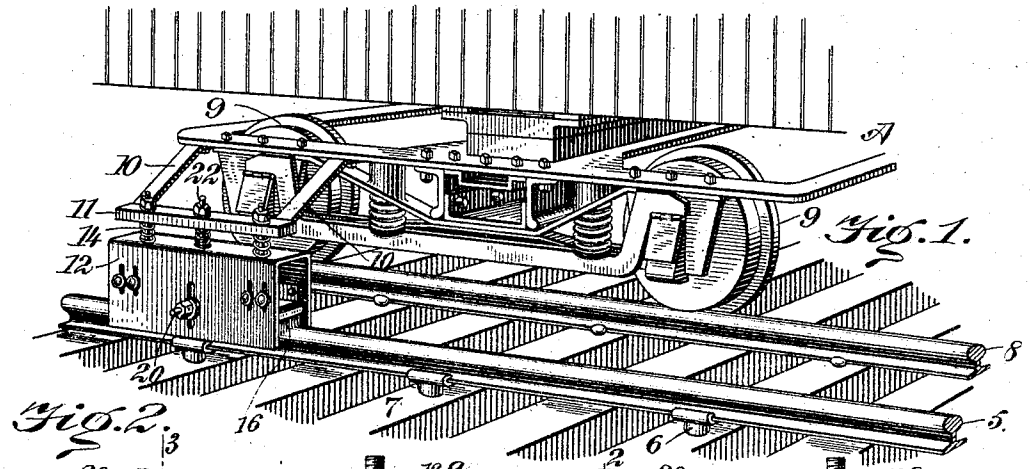



Fig. 1.

Fig. 2.

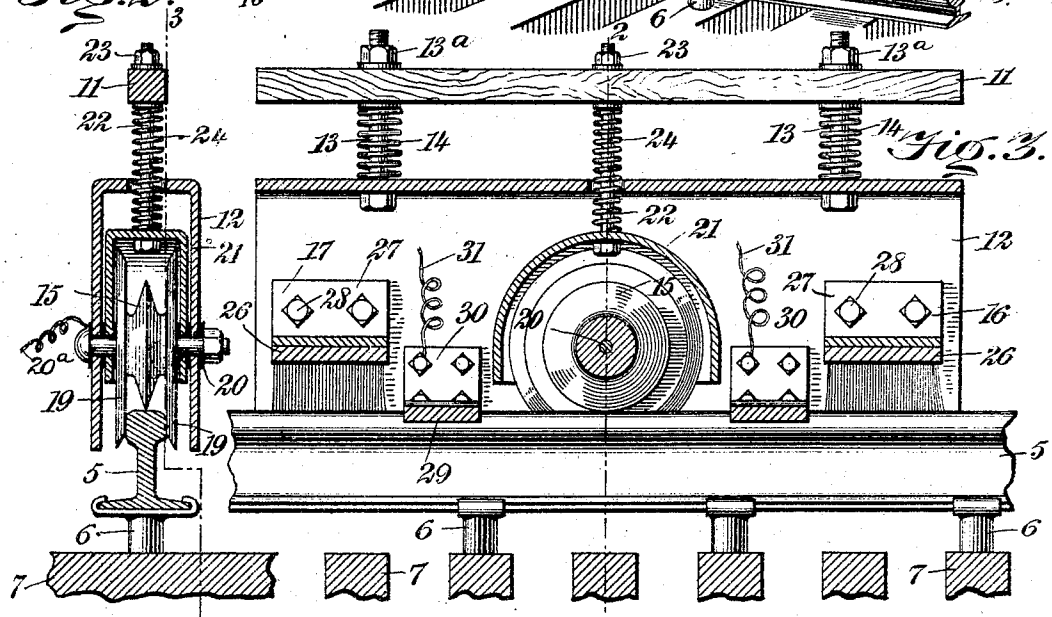



Fig. 3.

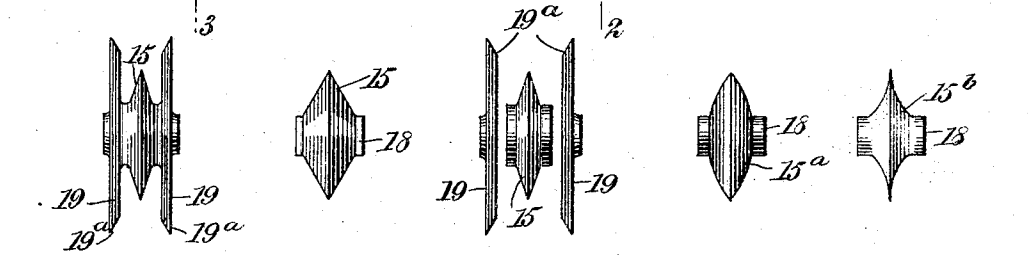



Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8.

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No. 772,282. Patented October 11, 1904.

# UNITED STATES PATENT OFFICE.

CHARLES THOMAS LEONARD, OF LEONARDO, NEW JERSEY.

## SLEET-CUTTER AND CONTACT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 772,282, dated October 11, 1904.

Application filed February 29, 1904. Serial No. 195,792. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES THOMAS LEONARD, a citizen of the United States, and a resident of Leonardo, in the county of Monmouth and State of New Jersey, have invented a new and Improved Sleet-Cutter and Contact for Electric Railways, of which the following is a full, clear, and exact description.

My invention relates to improvements in a conductor-contact and sleet-cutter for electric railways, the same being more especially adapted for use in connection with the third rail of an electric-railway system, although some of the features of my invention may be used on overhead electric conductors and in other kinds of railways.

One object of the present invention is the provision of a simple and inexpensive contrivance for insuring good electrical contact with a conductor-rail and for rapidly and thoroughly cutting sleet adhering to the head of such rail, thus loosening the sleet and placing it in a condition which admits of its ready removal.

A further object of the invention is to provide means for clearing away the ice and sleet, so that good electrical contact may be secured between the rail and the contact and cutter wheel, and, furthermore, to yieldably hold the parts under pressure in their working positions.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the novelty will be defined by the annexed claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of a portion of a railway-car and third-rail system, illustrating the application of my improved sleet-remover and the cutter and contact wheel to the third rail of said system. Fig. 2 is a vertical transverse sectional view, on an enlarged scale, and taken in the plane indicated by the dotted line 2 2 of Fig. 3 Fig. 3 is a vertical longitudinal sectional elevation taken in the plane of the dotted line 3 3 of Fig. 2; and Figs. 4 to 8, inclusive, are detached detail views of various forms of the sleet-cutter and contact-wheel.

In Figs. 1, 2, and 3 I have shown a portion of an electric railway in order that others skilled in the art may understand the application and use of my improvements, and in these figures 5 designates a conductor-rail supported by insulated bearings 6 on the ties 7 of an ordinary railway-track, one of the rails of the latter being indicated at 8 for the accommodation of the wheels 9 of an ordinary car-truck A. This truck is equipped with means for suspending the parts of my improved sleet-cutter and contact-wheel, and in Fig. 1 said truck-frame is shown as having laterally-extending arms 10, adapted to support a carrying-bar 11 in a position over the conductor-rail 5. From this carrying-bar is suspended any suitable form of frame, casing, or housing; but in Figs. 1 to 3, inclusive, this part of the invention is shown as a housing 12, which is suspended yieldably from the bar 11, although it will be understood that I reserve the right to use any means which those skilled in the art may supply for supporting the various operating devices of the sleet cutter and remover. The casing or housing 12 is of inverted-U shape in cross-section, as shown by Fig. 2, and through the top part of this housing pass the suspension-bolts 13, the heads of which are shown by Fig. 2 as engaging with the closed upper part of said housing. These bolts pass loosely through suitable openings which are provided in the carrying-bar 11, and between the housing and this carrying-bar are interposed the coiled cushion-springs 14. Said springs are fitted loosely around the suspension-bolts and seated at their respective ends against the bar 11 and the housing 12 in order to forcibly press the latter toward the conductor-rail 5.

The suspension-bolts 13 are provided with nuts $13^a$, adapted to be seated on suitable metallic washers, and the springs 14 are seated at their upper ends against other metallic washers, which engage with the bar 11, said nuts $13^a$ being adjustable on the bolts for the purpose of regulating the tension of the springs 14.

Within the yieldable suspended housing 12 is arranged a cutter and contact device 15 and a series of scrapers or brushes 16 17. I prefer to place the cutter and contact device between the scrapers or brushes and to dispose the latter at or within the open end portions of the housing, although the special arrangement of these parts is not essential.

The cutter and contact device 15 is one of the important features of the present invention, and it contemplates the employment of a revoluble wheel having a continuous annular cutting edge. The particular shape or contour of the wheel is not material, and in Figs. 5, 7, and 8 I have shown various styles of wheels which may be employed. The wheel 15 (shown by Fig. 5) has its sides beveled reversely to meet in a thin annular edge, which constitutes the cutting-periphery of said wheel, whereas the wheel $15^a$ of Fig. 7 has convex faces meeting in the central annular cutting edge, and the cutting-wheel $15^b$ of Fig. 8 has concave faces meeting in the continuous annular cutting edge. Of course the angle or contour of the faces of the wheel may be varied within wide limits; but I prefer to provide the cutting-wheel of whatever contour with a hub 18.

In one form of the invention the wheel has associated therewith a pair of face-plates 19, (see Figs. 4 and 6;) but it is evident that these face-plates may be used in connection with each style of cutter-wheel shown by Figs. 4 to 8, inclusive. The face-plates are of larger diameter than the cutter-wheel, and they are fitted on the hub 18 thereof, said face-plates being spaced a suitable distance apart to embrace the sides of the conductor rail-head 5, as shown by Fig. 2. The face-plates are employed to keep the wheel from displacement relatively to the rail, and when the wheel is raised a slight distance to clear its cutting edge from contact with the rail the face-plates still remain in engagement with said rail for the purpose of collecting electrical energy therefrom. The wheel and its associated face-plates are revolubly mounted on an axle 20, which is journaled in a hood-shaped hanger 21, and from this axle extends a suitable electrical conductor $20^a$. The hood or hanger 21 is suspended from the housing 12 and capable of movement therewith and of a limited independent movement therein. The hanger 21 is shown in the form of a hood arranged to partly inclose the cutter-wheel and its face-plates; but said wheel 15 and the plates thereof depend a suitable distance below the lower open side of the hood. To the upper part of the hood is attached a suspension-bolt 22, which passes loosely through an opening provided in the closed upper side of the housing 12, the said suspension-bolt 22 being prolonged or extended through the carrying-bar 11 and having a nut 23 at its upper end. This nut is seated on the carrying-bar 11, and around the bolt 22 is fitted a coiled cushion-spring 24, the upper end of said spring being seated against a metallic washer that bears against the carrying-bar 11, while the lower end of the spring bears on the top of the hanger 21.

Each brush 16 17 may be made of metallic bristles or bristles of any other suitable nature; but I prefer to employ brushes having exceedingly stiff and coarse bristles for the purpose of removing the cut sleet and ice positively from the conductor-rail 5. The bristles are fastened to a suitable head 26, attached to a hanger-plate 27, which is bolted at 28 within the housing 12. The brushes or scrapers are thus mounted within the housing near the end portions thereof and in positions to engage with the head of the rail 5, said brushes being held yieldably in contact with the rail owing to the employment of the pressure-springs 14 between said housing and the supporting-bar. It is evident, however, that the brushes may be arranged outside of the housing, thus minimizing the tendency of sleet and ice to accumulate within the housing and obstruct the proper operation of the parts. The housing also serves as a means for supporting the contact-shoes 29, which are carried by suitable hangers 30, attached to the housing within the latter, and from these contact-shoes lead suitable conductors 31, adapted to transmit the electric current to a motor on the car.

The contact and cutter wheel is arranged to ride on the head of the conductor-rail 5 at the middle thereof, while the face-plates 19 engage with the sides of said rail-head, said face-plates serving to maintain the cutter-wheel in proper position and to make the edge of the wheel operate on the sleet or ice at the middle of the rail. These face-plates 19 are shown by the drawings as having beveled edges $19^a$, which assist the cutter device in removing the accumulations of sleet and ice from the rail.

If desired, the apparatus may be equipped with any suitable means, such as a lever, for raising the housing and its contained parts out of position for service; but if such an adjusting device is employed the contact-shoes 29 should be mounted independently of the housing and the means for cutting and removing sleet from the rail.

In some cases I may dispense with the contact-shoes 29 and rely solely upon the wheel 15 or its equivalent as the means for collecting the current and for cutting through the sleet or snow, so as to insure the necessary contact with the rail. When the wheel 15 is used as the cutter and the contact, it is evident that in stormy weather it should be lowered to cut the sleet and collect the current; but at other times the wheel should be raised slightly for its cutting edge to be clear of the

rail, while the face-plates 19 will remain in engagement with the rail, so as to collect the current therefrom.

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

1. In a device of the class described, the combination with a suitable frame or housing, of a contact and sleet-cutter wheel mounted therein and adapted to be presented in operative relation to a conductor-rail.

2. In a device of the class described, a revoluble contact and cutter wheel having its faces disposed in meeting relation and forming a peripheral cutting edge, in combination with means for mounting said cutter-wheel and presenting it in operative relation to an electrical conductor.

3. In a device of the class described, the combination of a frame or housing, means for yieldably suspending the same with relation to a conductor, and a revoluble contact and cutter wheel provided with an active edge and mounted in said frame or housing.

4. In a device of the class described, the combination with a frame or housing, of a scraper carried thereby, and a contact and cutter wheel revolubly mounted in said frame or housing adjacent to said scraper.

5. In a device of the class described, the combination with a frame or housing, of scrapers carried by said frame or housing, a contact and cutter wheel revolubly mounted in said frame or housing between said scrapers, and means for yieldably presenting said scrapers and said wheel to a conductor.

6. In a device of the class described, the combination of a yieldably-suspended frame or housing, scrapers and brushes carried thereby, and a contact and cutter wheel mounted in said frame or housing under pressure independently of the scrapers or brushes, making of itself at all times a sure contact cutting through the sleet to the rail, the scrapers and brushes being for the removal of the loosened sleet or snow.

7. In a device of the class described, the combination of a carrying-bar, a frame or housing suspended therefrom, pressure devices coöperating with such frame or housing, scrapers and brushes mounted on said frame, a contact and cutter wheel mounted in said frame or housing under pressure independently of the scrapers or brushes, making of itself at all times a sure contact, cutting through the sleet to the rail, the scrapers and brushes being for the removal of the loosened sleet or snow.

8. In a device of the class described, a cutter-wheel having spaced face-plates adapted to fit a conductor.

9. In a device of the class described, the combination with a carrying-bar, of a frame or housing yieldably suspended therefrom, brushes mounted in said frame or housing, a revoluble cutter-wheel, and a yieldable hanger in which said cutter-wheel is mounted for free rotation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES THOMAS LEONARD.

Witnesses:
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EVELYN R. SNYDER.