(No Model.)

R. D. CUSHING.

OVERHEAD CONDUCTOR FOR ELECTRIC RAILWAYS.

No. 440,789. Patented Nov. 18, 1890.

FIG. 5

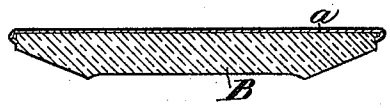


FIG. 4

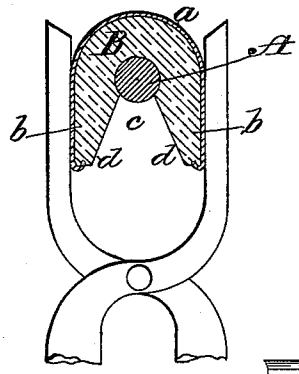


FIG. 3

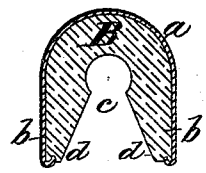


FIG. 1

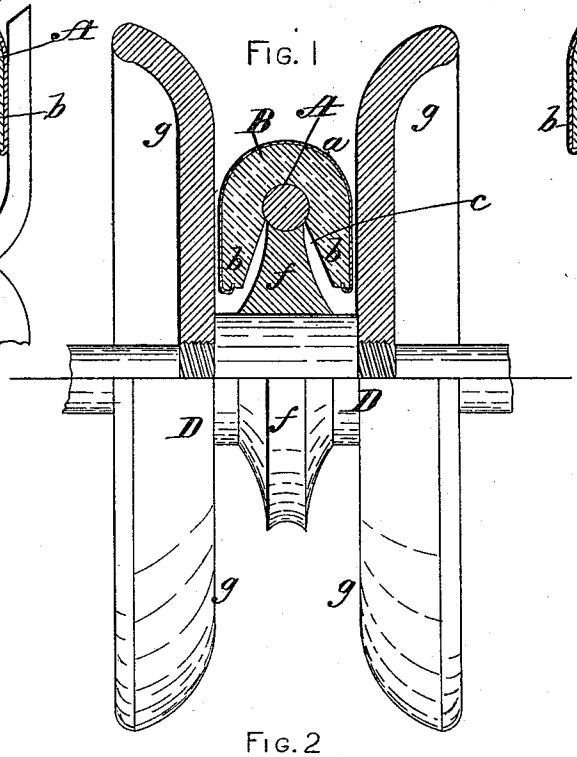
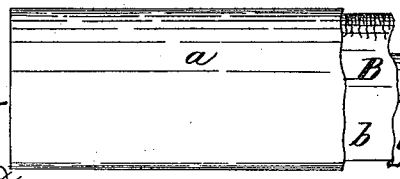


FIG. 2



WITNESSES

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OVERHEAD CONDUCTOR FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 440,789, dated November 18, 1890.

Application filed December 16, 1889. Serial No. 333,985. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. CUSHING, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Overhead Conductors for Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section through an overhead conducting-wire of an electric railway having my improved insulator applied thereto, and showing the trolley-wheel which runs in contact with said wire. Fig. 2 is a side elevation of a portion of a conducting-wire having my improved insulator applied thereto. Fig. 3 is a vertical section of the insulator before it is applied to the conducting-wire. Fig. 4 is a section illustrating one method of applying the insulator to the wire. Fig. 5 is a section representing the insulator and its covering before being bent into U shape.

In operating electric railways employing what is known as the "overhead system" of suspended electric conductors much danger arises from the fact that an uninsulated wire carrying a heavy current is used, which, when suspended over the railway-track, is liable to be crossed by telegraph, telephone, and other wires used for commercial purposes, and in case these wires should fall upon the conducting-wires of the railway a dangerous current would be transmitted through said commercial wires, which is liable to set fire or endanger life, and, furthermore, these overhead wires are also liable to come into contact with firemen and other persons in discharge of their duties.

My invention has for its object to overcome these dangers and objections, and to provide overhead conducting-wires used for electric railways with a covering of insulating material, which is so arranged that it will protect the upper portion of the wire and serve as a guard to prevent the transmission of any dangerous current to a person who may come into contact with the same or to a wire which may accidentally fall thereupon, and at the same time leave the under surface of the overhead wire exposed, as is necessary, to permit the trolley-wheel of the railway car or carriage to run directly in contact therewith.

To this end my invention consists in an insulating-guard of novel construction applied directly to the overhead conducting-wire in such manner as to leave its under surface exposed and uninsulated, as hereinafter more particularly set forth.

In the said drawings, A represents an overhead conducting-wire for electric railways, which is of the usual diameter and may be suspended in any suitable or well-known manner.

B represents my improved covering or guard, which is of U shape in cross-section, and is composed of papier-maché, vulcanized fiber, or other suitable insulating material. This insulating-guard B is preferably provided with an exterior covering *a* of sheet metal, which serves to strengthen it and reduce to a minimum the effects of induction on neighboring telephone-wires.

In constructing my improved insulating-guard I take a strip *a*, of galvanized iron or other suitable sheet metal, of any convenient length and of two inches or more in width, according to the diameter of the wire to be covered. This metallic strip is then placed upon a strip of insulating material and turned down thereupon at the edges, as seen in Fig. 5, a layer of cement being preferably introduced between the two. The whole is then bent into U shape, as seen in Fig. 3, by any suitable tool or mechanism, thus binding the two tightly together, when it is ready to be applied in an inverted position to the conducting-wire, as seen in Fig. 4.

The above-described insulating-guard is prepared in suitable lengths to be placed on the wires, which may be accomplished by forcing it tightly thereupon with pliers specially constructed for the purpose, as seen in Fig. 4, or in any other suitable manner; or it may be closed together slightly and then sprung onto the wire, cement being preferably introduced between the wire and its coving to hold the latter securely in place. The joints between the lengths of insulating material are soldered together, the metallic covering *a* at one end being allowed to lap or project over the insulating material of the adjoining length, so that the joints in the insu-

lating substance and metallic covering will not come in line with each other.

The sides *b b* of the U-shaped insulator extend to a considerable distance below the under surface of the conducting-wire A, thus preventing any portion of the latter from coming into contact with a fireman or other person who may take hold of the same or with a wire which might accidentally fall thereon. The U shape, however, of the insulator leaves the under surface of the conducting-wire exposed and uninsulated in what might be termed a "deep groove" *c*, formed between its two downwardly-projecting sides *b b*, the sides of this groove being preferably flared outward, as shown at *d d*.

The trolley-wheel D, which is used in connection with a conducting-wire provided with my improved insulator, is constructed with a central rib or flange *f*, which is suitably shaped to fit within the groove *c* between the sides *b b* of the insulator and run directly in contact with the uninsulated under surface of the conducting-wire A, from which the current passes, as usual, through the trolley-wheel to the motor of the railway car or carriage upon the track below. On each side of the trolley-wheel is a wide flange *g*, which is composed of vulcanized fiber or other suitable insulating material, whereby it is insulated from the remaining portion of the wheel, thus preventing the electric current from passing to the outer metallic casing of the insulating-guard.

These flanges *g* extend upon either side of the downwardly-extending sides of the insulator, which thus forms a guide for the trolley-wheel and serves to keep the latter in a central position with respect to the wire A, as is necessary, to maintain the central flange *f* constantly in contact with the wire A, and it will be obvious that the flanges *g g* of the trolley-wheel will serve to prevent any tendency of the insulator to turn upon the wire, thus insuring its being at all times kept in its proper position.

The above-described U-shaped insulator can be easily and cheaply manufactured, and, furthermore, can be readily placed upon lines now in use, while it is subjected to no strain, as it is entirely supported by the conducting-wire upon which it is placed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an overhead conducting-wire for electric railways, of a bifurcated covering or guard composed of insulating material applied directly to said wire and adapted to fit upon and inclose the upper surface of the same and extending longitudinally and continuously over its entire upper surface, leaving its under surface exposed and uninsulated to permit the trolley-wheel of the car or carriage to run in direct contact therewith, substantially as described.

2. An overhead conducting-wire for electric railways, provided with a covering or guard composed of insulating material applied directly thereto and extending over its upper surface, leaving its under surface exposed and uninsulated, said insulating-guard being provided on its exterior surface with a metallic covering, substantially as and for the purpose set forth.

3. An overhead conducting-wire for electric railways, provided with a U-shaped covering or guard of insulating material adapted to inclose the upper surface of the wire and leave the lower surface exposed for contact with the trolley-wheel and having its sides extended down below the conducting-wire to form a guide-groove for the trolley-wheel, whereby the latter is kept in a central position with its central flange in contact with the under side of the wire, substantially as set forth.

4. The combination, with an overhead conducting-wire provided with a bifurcated or U-shaped covering or guard of insulating material extending over the upper surface of the wire, leaving its under surface exposed and having its sides extended down below the wire, as described, of a trolley-wheel having side flanges extending up on either side of the U-shaped insulating-guard, and a central rib or flange adapted to run in the groove formed between the downwardly-extended sides of the insulating-guard and in contact with the conducting-wire, substantially as described.

5. The combination, with an overhead conducting-wire provided with a U-shaped covering or guard of insulating material extending over the upper surface of the wire, leaving its under surface exposed and having its sides extended down below the wire, as described, of a trolley-wheel having insulated side flanges extending up on either side of the U-shaped insulating-guard, and a central rib or flange adapted to run in the groove formed between the downwardly-extended sides of the insulating-guard and in contact with the conducting-wire, substantially as described.

Witness my hand this 12th day of December, A. D. 1889.

ROBERT D. CUSHING.

In presence of—
P. E. TESCHEMACHER,
HARRY W. AIKEN.