

No. 729,826.

PATENTED JUNE 2, 1903.

B. WILLARD.  
OVERHEAD STRUCTURE FOR ELECTRIC RAILWAYS.

APPLICATION FILED FEB. 25, 1899.

NO MODEL.

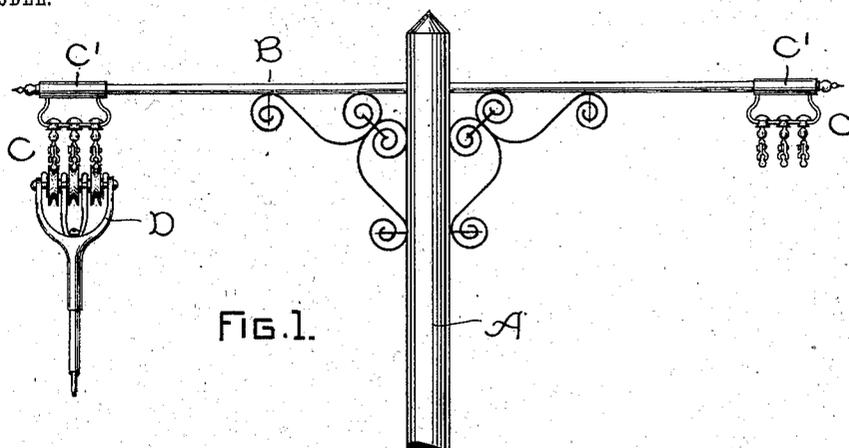


FIG. 1.

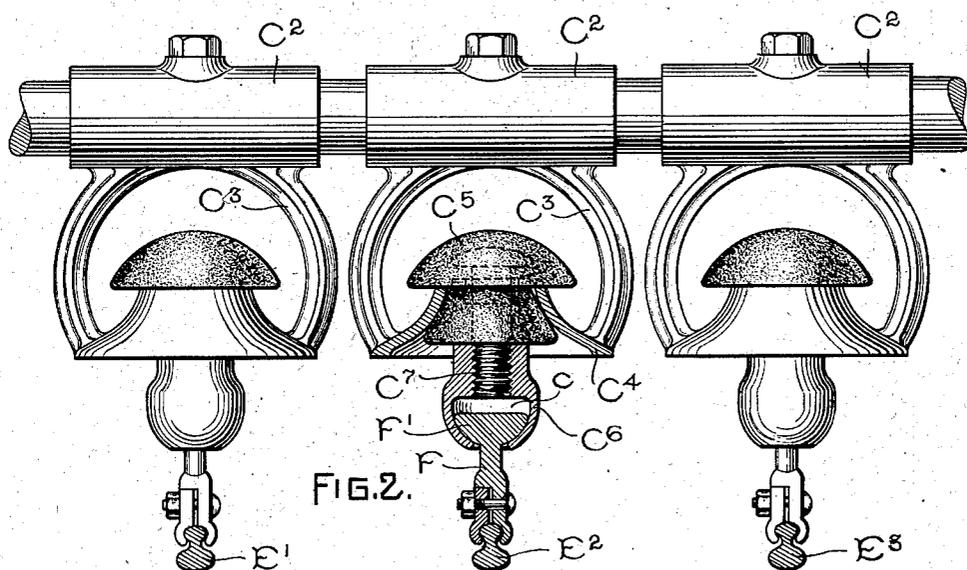


FIG. 2.

WITNESSES.

*A. Ernst Altempohl*

*A. F. Macdonald*

INVENTOR.

Ben Willard.

by *Alfred G. Davis*  
Atty.

# UNITED STATES PATENT OFFICE.

BEN WILLARD, OF NEW ORLEANS, LOUISIANA, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## OVERHEAD STRUCTURE FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 729,826, dated June 2, 1903.

Application filed February 25, 1899. Serial No. 706,778. (No model.)

*To all whom it may concern:*

Be it known that I, BEN WILLARD, a citizen of the United States, residing at New Orleans, parish of Orleans, State of Louisiana, have invented certain new and useful Improvements in Overhead Structures for Electric Railways, of which the following is a specification.

My present invention relates to the overhead structures of electric railways, and is useful more particularly in that class of roads which utilize large currents for the operation of electric locomotives or motor-cars. Difficulty has arisen with such roads because the ordinary trolley-wire is insufficient to carry the required current. Some forms of overhead structure have been used in which a sliding shoe has been employed as the trolley, running in a box-like structure of iron. This, however, is costly and unsightly. I propose to replace such devices by utilizing a number of ordinary trolley-wires connected in multiple with a trolley which will always make contact with all of the wires. Inasmuch as it is difficult to string the wires so that the catenaries are identical even with the utmost care, and as under service conditions wires stretch to different degrees, I have provided a certain amount of flexibility in both the supporting structure and the trolley.

My invention consists in providing ears for the wires, which are connected to their supports by loose ball-and-socket or equivalent joints, whereby each wire is free to move sidewise or vertically for a limited distance at the points of suspension.

The drawings show a convenient application of the invention, Figure 1 being an elevation of a post with two sets of trolley-wires connected according to the invention, showing a trolley running upon one of them. Fig. 2 is an enlarged view, partly in section, of one of the sets of trolley-wires.

In Fig. 1, A is a post, of which B is the cross-arm. C C are the sets of trolley-wires supported by sleeve C', adjustable to a proper

position upon the cross-arm. D is the trolley.

The construction will be better understood from Fig. 2. In this figure, C<sup>2</sup> C<sup>2</sup> are the sleeves supporting the different trolley-wires on the cross-arm. For reasons which are well understood it is commercially preferable to make the three supports identical in character, as thus they may be made a "standard" and the expense lessened, although it would of course be within the invention to embrace the three insulating-supports in one structure, as shown in Fig. 1. From each of the sleeves C<sup>2</sup> depends a bail C<sup>3</sup>, supporting the protecting iron petticoat C<sup>4</sup> of the insulator C<sup>5</sup>, the latter being of the well-known cap-and-cone construction, in accordance with the patent to Thomson, No. 435,870. The bolt C<sup>7</sup> supports a thimble C<sup>6</sup>. The lower part of this is compressed in a cup around the shank of a mechanical ear F, which supports one of the trolley-wires E<sup>1</sup> E<sup>2</sup> E<sup>3</sup>, while the shank of the ear is formed at F' into a hemisphere, so that with the cup-shaped portion of the thimble C<sup>6</sup> it forms a ball-and-socket joint. A little space c is left above the ear, so that the joint may have not only a rocking motion in any direction necessary, but may lift slightly, if desired. In this way the three wires, being supported so that they may either move slightly sidewise or lift under the pressure of the trolley, will practically be all in contact at all times in spite of inequalities of tension or of the shape of the catenaries or of unequal wear in the trolley-wheels.

It will be observed in Fig. 1 that the trolley-wheels have some horizontal play along their axes, and this gives increased flexibility, by which the following of the wire is greatly facilitated.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A conductor-support, which comprises a suitably supported and insulated thimble, having a contracted opening, and an ear having an enlarged portion mounted within the

thimble for free lateral and vertical movement, and adapted to receive the conductor.

2. The combination with a supporting-ear for the conducting-wire, of a fixed insulator, and a ball-and-socket joint between the ear and the insulator.

3. The combination with a supporting-ear, of a fixed insulator, and a ball-and-socket joint

between the two adapted to permit relative vertical movement.

In witness whereof I have hereunto set my hand this 20th day of February, 1899.

BEN WILLARD.

Witnesses:

W. H. KECK,  
LOUIS EBERT.