(No Model.)

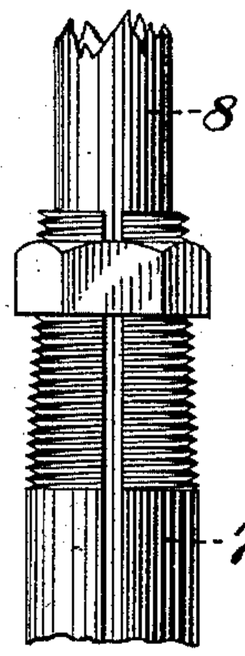
2 Sheets—Sheet 1.

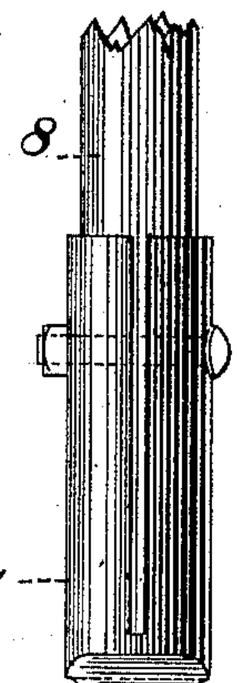
W. DUNCAN.

ELECTRIC RAILWAY TROLLEY.

No. 495,695. Patented Apr. 18, 1893.

Fig. 7





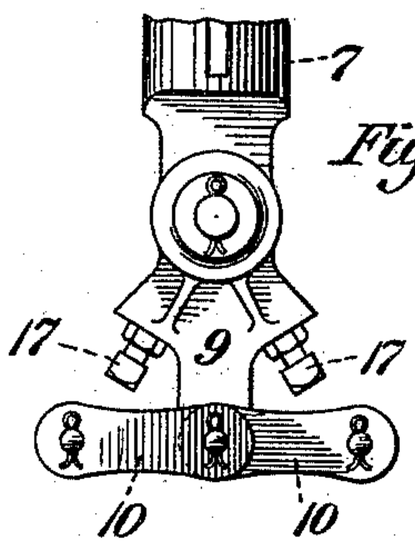
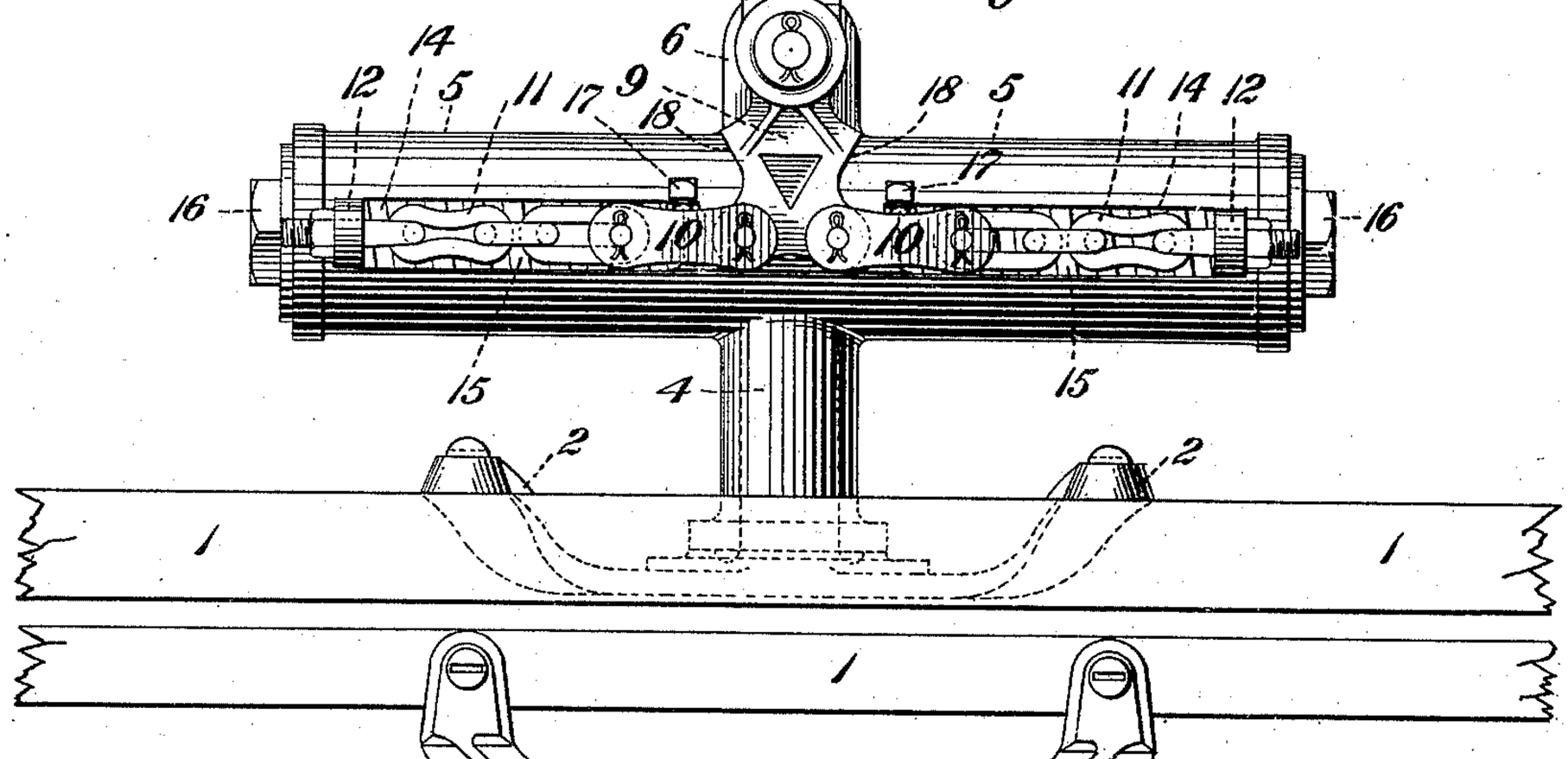


Fig. 8.

Fig. 1.



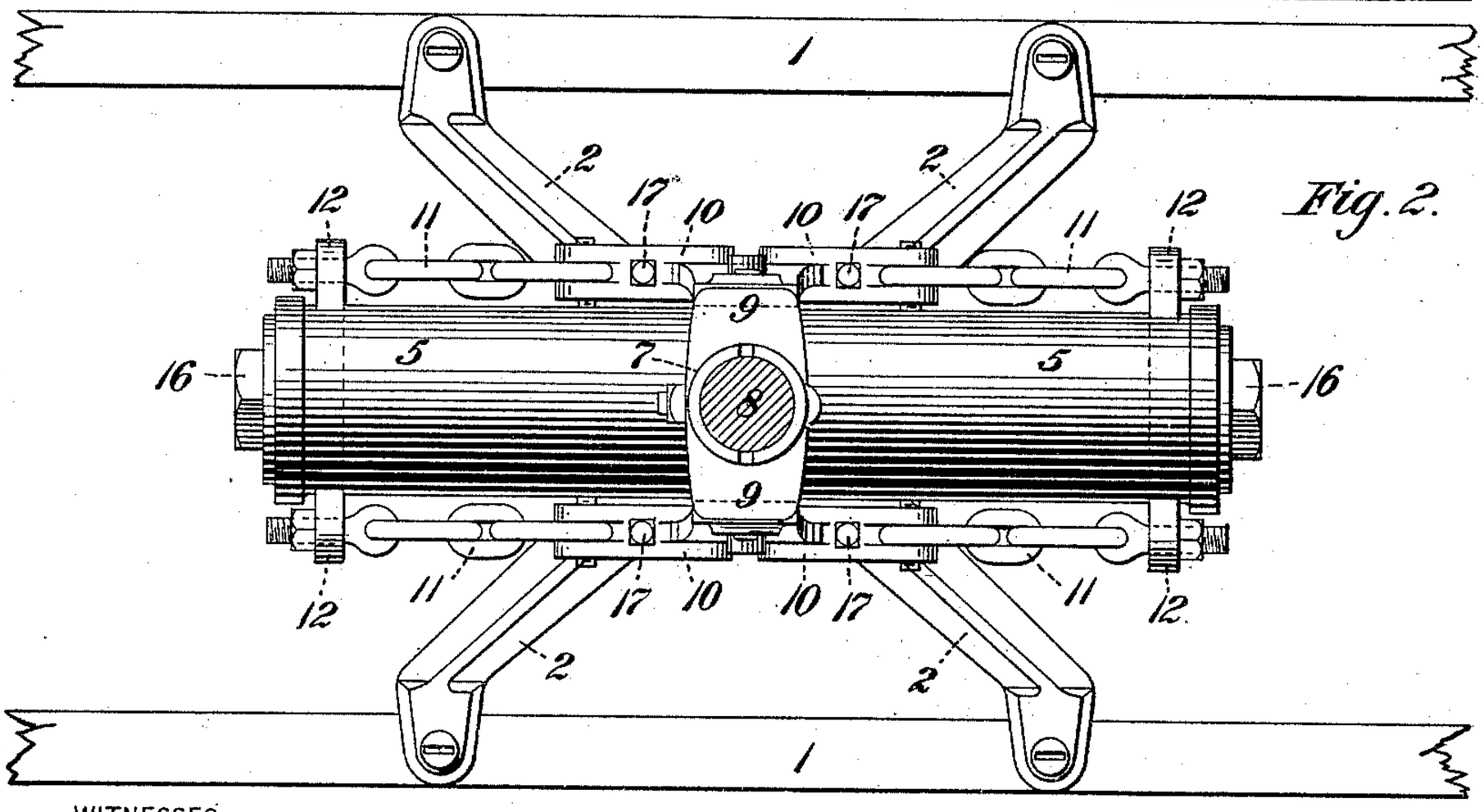


Fig. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

W. DUNCAN.

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Fig. 9.

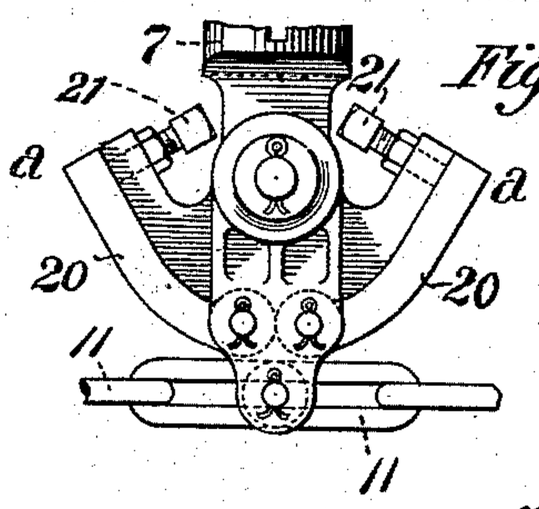


Fig. 6.

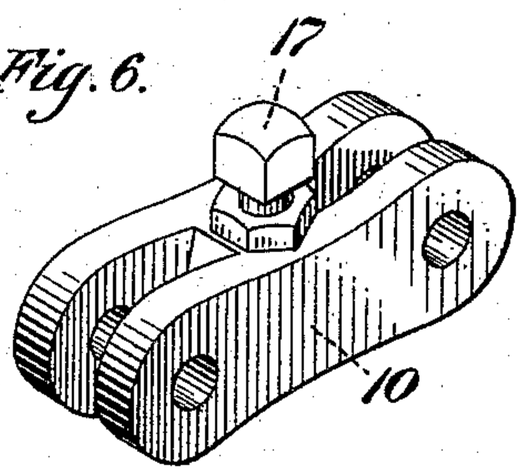


Fig. 3.

Fig. 4.

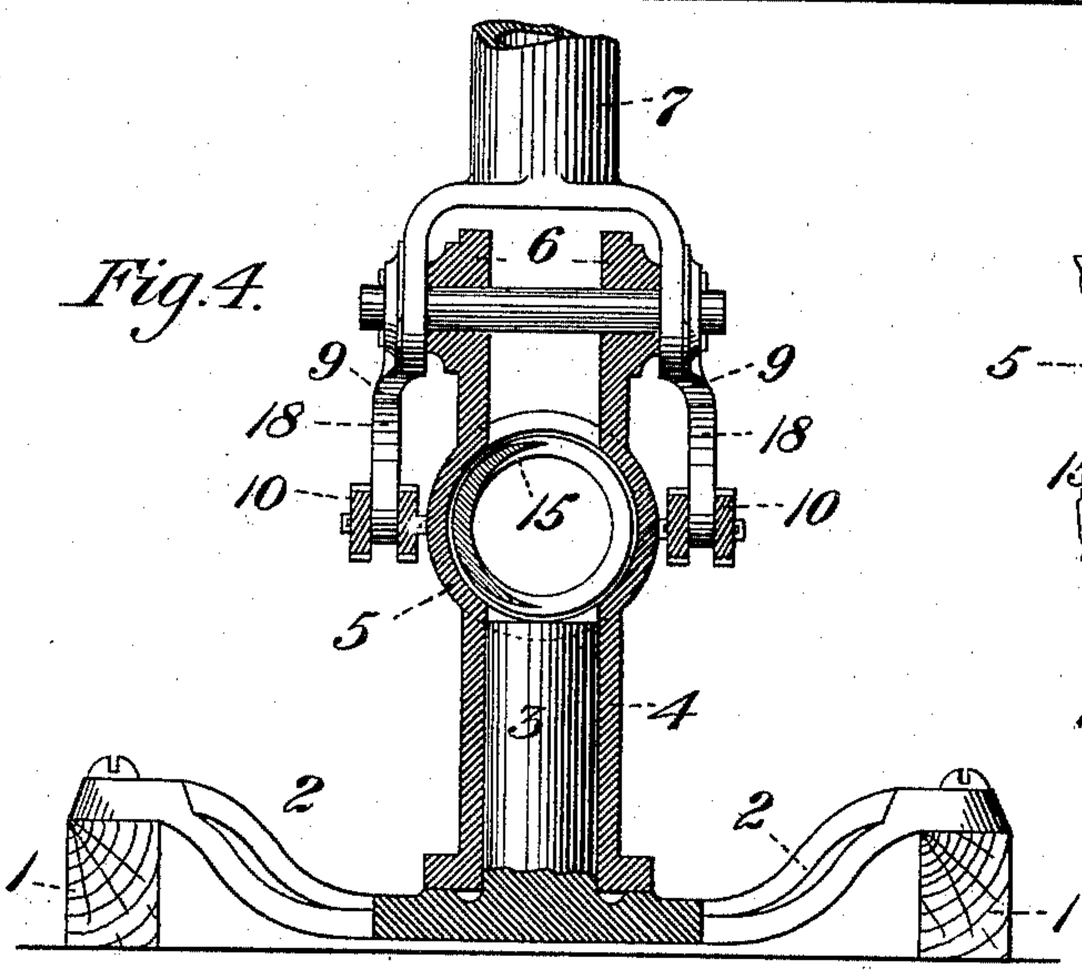
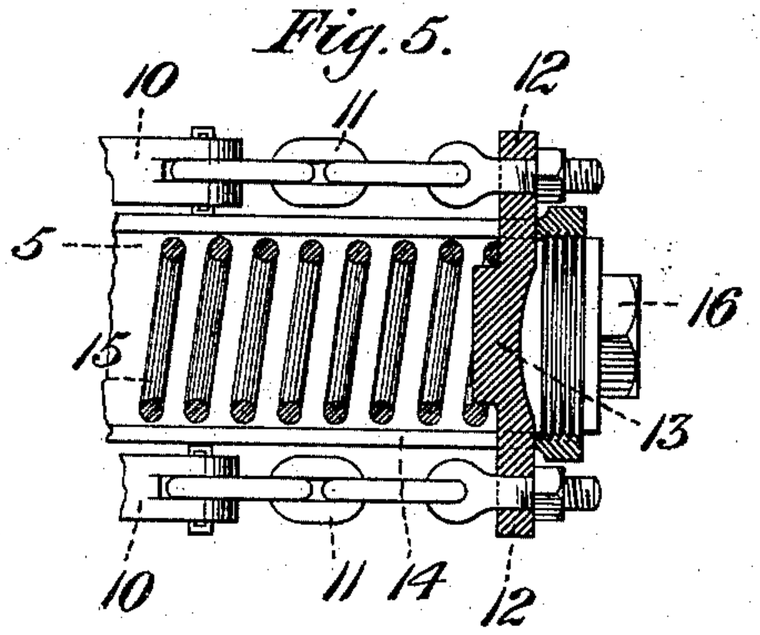


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM DUNCAN, OF ALLEGHENY, PENNSYLVANIA.

ELECTRIC-RAILWAY TROLLEY.

SPECIFICATION forming part of Letters Patent No. 495,695, dated April 18, 1893.

Application filed July 20, 1891. Serial No. 400,143. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DUNCAN, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Trolleys for Electric Cars, of which improvements the following is a specification.

The invention described herein relates to certain improvements in trolley supports for electric cars. As trolley supports have heretofore been constructed, the spring will properly hold the mast at any angle from ninety to forty-five degrees, but if for any reason the conductor has to be lowered so that the mast arm will form an angle therewith or with the top of the car less than forty-five degrees, the spring will not have such a tension as to hold the trolley properly against the conductor.

The object of this invention is to provide an efficient resilient support for the mast at any angle which the height of the conductor may cause the mast to assume with regard to the conductor or top of the car, from ninety degrees to approximate parallelism therewith.

In general terms the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a view in side elevation of my improvement secured to the top of a car. Fig. 2 is a top plan view of the same. Fig. 3 is a view similar to Fig. 1, showing the mast at an angle less than forty-five degrees with the top of the car. Fig. 4 is a sectional elevation of the support. Fig. 5 is a sectional detail of one end of the device. Fig. 6 is a perspective view of one of the connecting links. Fig. 7 is a detail view showing the manner of securing the mast in its socket, and Figs. 8 and 9 are views on a reduced scale, showing certain modifications in the construction of the device.

In the practice of my invention I bolt or otherwise fasten upon beams 1 on the top of the car, a spider or frame 2, provided with a central stud 3, the arms of said spider curving downwardly from the outer ends, thereby lowering the stud between the supporting beams 1. Over the stud is placed the sleeve 4 formed integral with or secured to the shell or cylinder 5, provided on its upper side with ears or lugs 6, which form the bearing or support for the pivot pin of the socket 7 for the mast 8. The socket is provided with arms 9 which extend down on both sides of the cylinder or shell 5 and have links 10, pivotally connected to their lower corners as shown. The opposite ends of these links are connected by chains or other suitable means 11 to the arms 12 of the cross heads 13, which are arranged within the cylinder, the arms projecting out through slots 14, formed in the sides of the cylinder, as shown. These cross-heads are arranged at opposite ends of the cylinder and between them is placed a spring 15, which is compressed by the inward movement of either of the cross-heads, against one end of the spring, the opposite end thereof bearing against the plug 16 screwing into the end of the cylinder. By screwing these plugs 16 in or out the tension of the spring can be adjusted as required.

From the foregoing it will be readily understood that the one spring operates equally under compressive strains to support the mast when swung in either direction. The construction thus far described will afford an effective support for the mast in all positions it may occupy from a vertical to an angle of forty-five degrees with the top of the car or between the positions shown in Figs. 1 and 3. In case of any further downward movement of the outer end of the mast from that shown in Fig. 3, the point of attachment of the links 10 to the arms 9 will have an upward and but very slight outward movement, so that there cannot be any increase in the compression of the spring sufficient to properly sustain the additional load due to the changed position of the mast.

In order to increase the compression of the spring as the mast moves down from a position where it forms an angle of about forty-five degrees with the car toward approximate parallelism with the car abutments 17 are formed on the links 10 which are adapted to bear against shoulders 18 on the arms 9 above the points of connections of the links to the arms. As the arms approach and move be-

yond the position shown in Fig. 3, the shoulders 18 will strike against the abutments which will then operate as a fulcrum for the links operating as levers, thereby causing the ends of the links connected to the chains 11 to move along in a direction to compress the spring, thereby producing the increased resistance necessary to counter balance the mast in its lowered position. While the abutments may be formed integral with the links, it is preferred to construct them in the form of headed bolts screwing into the links, so that they may be screwed out or in, thereby providing for their earlier or later engagement with the shoulders on the arms 9. If desired the abutments may be formed on the arms 9, by screwing the bolts thereinto as shown in Fig. 8.

While it is preferred to connect the links independently to the arms as shown in Figs. 1 and 3, they may be connected to a common pivot pin as shown in Fig. 8.

In Fig. 9 is shown a further modification of my invention which consists in forming semi-circular enlargements or drums at the ends of the arms 9 and connecting the cross-heads thereto by chains as shown. These semi-circular enlargements are formed by pivoting blocks 20 to the arms near the points of connection of the chains thereto, the outer ends of these blocks being adjusted as required by set screws 21, as shown in Fig. 9.

It will be readily understood that the portions of the drums between the points of connection of the chains thereto and the points *a* form abutments around which the chains bend, operating in the same manner as the constructions shown in Figs. 1 and 3.

The socket 7 is split as shown, and the parts thereof are drawn together by a bolt or by a nut screwing down a tapering threaded portion, as shown in Fig. 7.

I am aware that trolley poles have been held as against lateral displacement by single springs arranged transverse of the car, the cross heads at the ends of the springs having rigid connections to the lower ends of the poles.

I claim herein as my invention—

1. In a trolley for electric cars, the combination of a spring, a cross-head arranged at the end of the spring, and a pivoted mast socket connected to said cross-head, the mast socket being so constructed as to effect an inward movement of the cross-head, and a corresponding compression of the spring at every point of movement of the mast socket, substantially as set forth.

2. In a trolley for electric cars, the combination of a spring, cross-heads arranged at opposite ends of the spring, a pivoted mast socket provided with arms connected to said cross-heads, and abutments arranged to operate in connection with the arms of the pivoted socket and the connections between them and the cross-heads, for increasing the inward traverse of the latter, substantially as set forth.

3. In a trolley for electric cars, the combination of a spring, a cross-head bearing against one end of said spring, a pivoted mast-socket provided with arms, connections from the arms to the cross-head and abutments on said connections and adapted to engage the arms as the mast-socket approaches and passes a point where it forms an angle of forty-five degrees more or less with the car, substantially as set forth.

4. In a trolley for electric cars, the combination of a spring, cross-heads arranged at opposite ends of the spring, a pivoted mast-socket provided with arms, connections from said arms to the cross-head and adjustable abutments so arranged on said connections, as to engage the arms in certain positions of the mast-socket, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM DUNCAN.

Witnesses:

DARWIN S. WOLCOTT,

J. S. MCCORMICK.