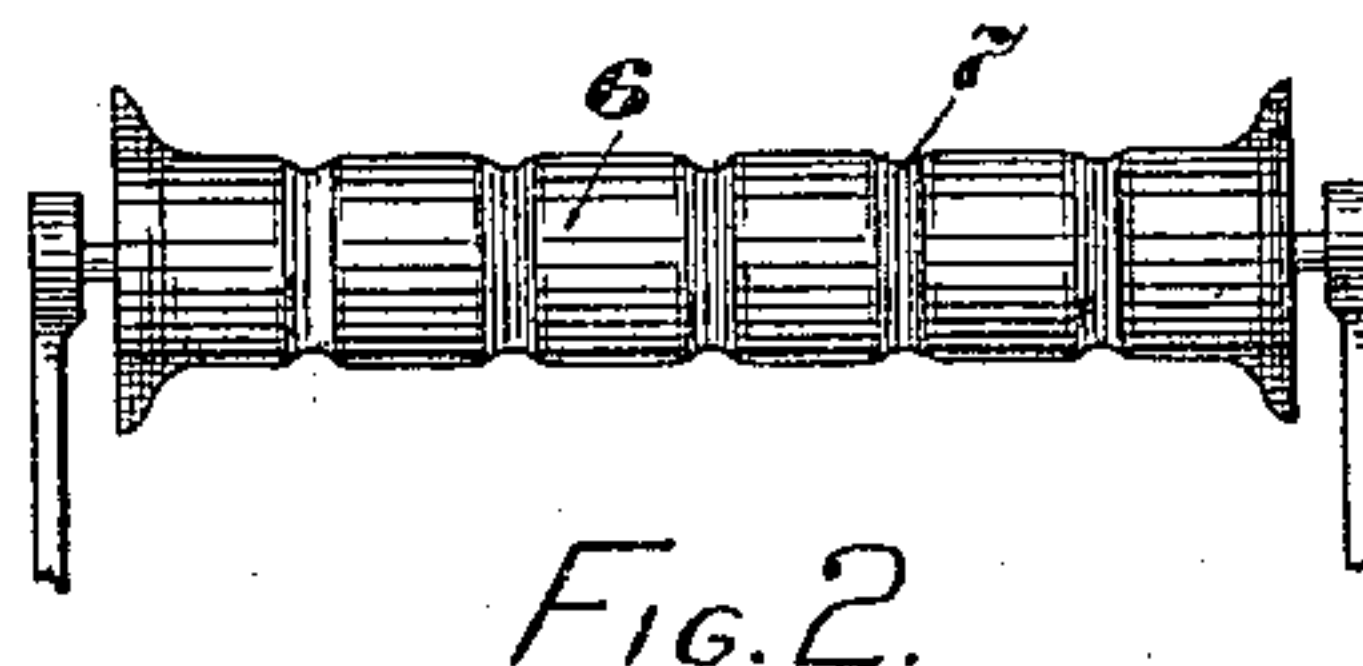
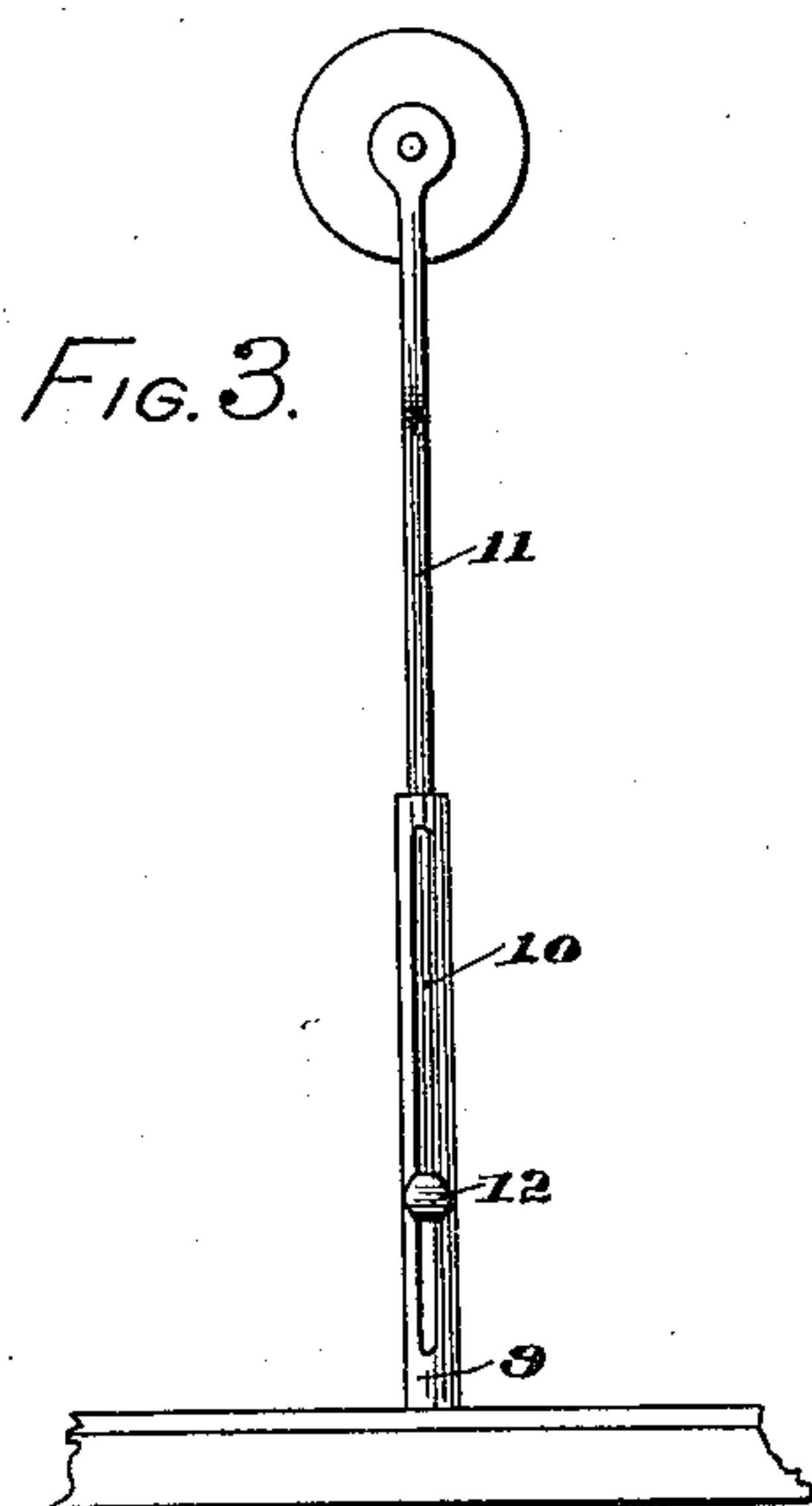
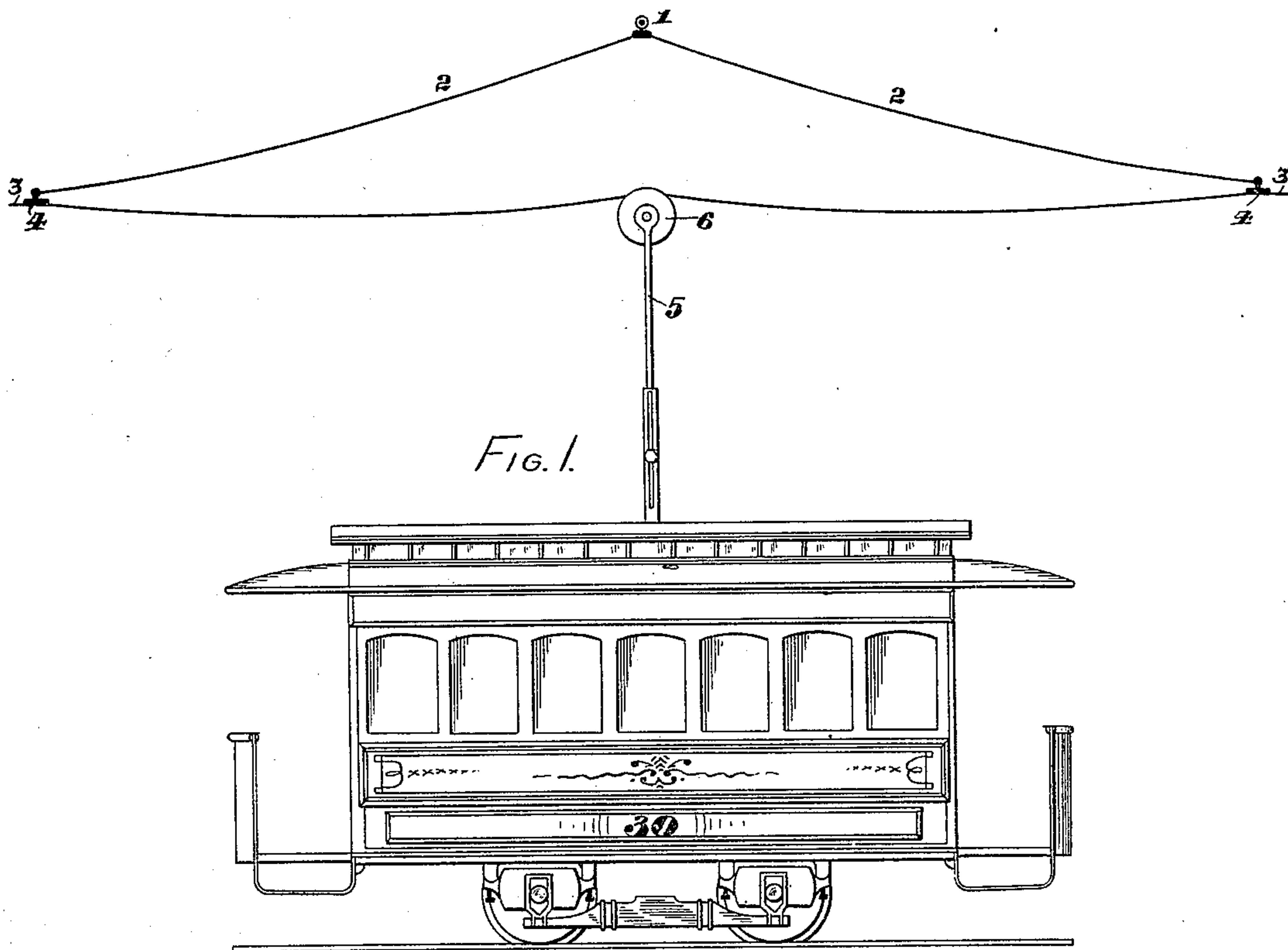


(No Model.)

G. WESTINGHOUSE, Jr.
ELECTRIC RAILWAY SYSTEM.

No. 584,911.

Patented June 22, 1897.



Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA, ASSIGNOR
TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY,
OF SAME PLACE.

ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 584,911, dated June 22, 1897.

Application filed November 26, 1892. Serial No. 453,197. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric-Railway Systems, (Case No. 506,) of which the following is a specification.

My invention relates to that class of electric railways wherein an overhead wire is used, the current being brought to a motor on the car by means of an upwardly-extending contact device, generally on the roof of the car.

The object of my invention is to simplify the contact device so used and to render all attention thereto on the part of the conductor or motorman unnecessary.

A further object which I have had in view is the more secure attachment of the overhead wires by providing a greater number of points of attachment therefor without increasing the number of poles and cross-wires in use.

In the accomplishment of these ends I employ the devices shown in their preferred forms in the accompanying drawings, wherein—

Figure 1 is a side elevation of a portion of overhead wire and of a trolley as used therewith, showing the mode of attachment of the former. Fig. 2 is a front elevation of a preferred form of trolley. Fig. 3 is a side elevation of an optional form of adjustment for my trolley.

It has not been hitherto possible to collect the current from overhead wires by means of rigid contact devices owing to the fact that the mode of attachment of the overhead wires has produced such a sag therein between supports as to necessitate the use of some form of contact-arm capable of following the vertical curves in the wire. The horizontal curves have been easily allowed for by means of a contact-trolley sufficiently long transversely to accommodate the wire in various positions in the horizontal plane. The vertical curves, however, have always been so great as to forbid the use of a rigid trolley, for if such trolley be placed high enough to touch the wire at points of support it would have to raise the wire midway between such supports to an ex-

tent not permissible owing to the excessive horizontal strain thereby produced. On the other hand, if the trolley be placed low enough to conveniently make contact midway between supports it will not reach the wire at the supports. It has therefore been necessary to use vertically-yielding trolleys to follow the large catenaries of the wires as hitherto supported, and springs have ordinarily been employed in this connection. The consequence is that slanting poles have been used, which were necessarily provided with vertical pivots and with pull-down ropes, whereby the conductor could reverse the direction of slant at the termini of the road. When such trolleys leave the wire, as frequently occurs at crossings, they are violently thrown against the roof of the car or against cross-wires, thus producing considerable damage. In order to avoid these inconveniences and to free the men on the cars from all care in this respect, the use of rigid and immovable trolleys is very desirable.

In Fig. 1 the usual support 1 is used in connection with a supplemental wire 2, which is attached, as shown, to the conductor 3 at points on each side of the support, as shown at 4. The fastenings 4 are of any well-known type at present used and should, of course, insulate the wire 3 from the wire 2, although this is not absolutely necessary. The support 1 may be held by any known form of pole, standard, or wire now in use for this purpose. I make the wire 2 preferably about fifty feet in length, thus reducing a two-hundred-foot span to a fifty-foot span, and that without increasing the number of poles and cross-wires. This decrease in span renders the variation in height of wire far less, and I am thus able to use a rigid trolley-arm 5, as above explained.

In order to do away with devices permitting transverse movement of the trolley, I preferably employ a cylindrical contact-roller 6, sufficiently long to reach the wire on curves and in spite of all transverse swing of the car. This is found convenient in relieving the trolley from all necessity of supervision by carmen. I wish it distinctly understood, however, that the ordinary trolley-wheel may be

employed in this connection without departing from the spirit of my invention.

The roller 6 is preferably provided with grooves 7 at intervals for the purpose of securing a greater contact-surface. These grooves are so shallow as to permit easy movement in and out of them by the conductor. This, however, is also not necessary to my invention. The roller is mounted on the ends of arms 8, preferably rigidly fixed to the roof of the car, and said roller should be placed at a height a little above that of the points of suspension 4, so as to insure good contact at such points. Of course a flexible contact might be used.

When it is necessary to hang the wire 3 at different elevations in various parts of the line, the arms may be made adjustable in length. Such adjustability may be secured by any well-known means, and in Fig. 3 I have shown an example of such means. In Fig. 3 the part 9 is fixed to the car and is preferably rigid. Said part 9 is provided with a slot 10, through which projects a bolt affixed to the trolley-bearing arm 11, said bolt having a nut 12, whereby the arm 11 is clamped in position. An advantage secured

by this mode of suspension is that pull-off wires at curves can be directly attached to the clamps 4, thus rendering unnecessary the use of additional clamps.

I find it advantageous in constructing the roller to make it of thin spun-metal sheets, but this is only one of many useful forms of roller.

What I claim is—

In an electric-railway system, the combination of a continuous trolley-wire, a contact-cylinder having a plurality of grooves and making uninterrupted engagement with said wire, a fixed vertical support for said contact-cylinder, a car on which said support is mounted, and yielding supports for said trolley-wire each consisting of a centrally-supported sustaining-wire, and attachments between the ends of said sustaining-wire and said trolley-wire, substantially as described.

In testimony whereof I have hereunto subscribed my name this 21st day of November, A. D. 1892.

GEO. WESTINGHOUSE, JR.

Witnesses:

JAMES WM. SMITH,
HAROLD S. MACKAYE.