

(No Model.)

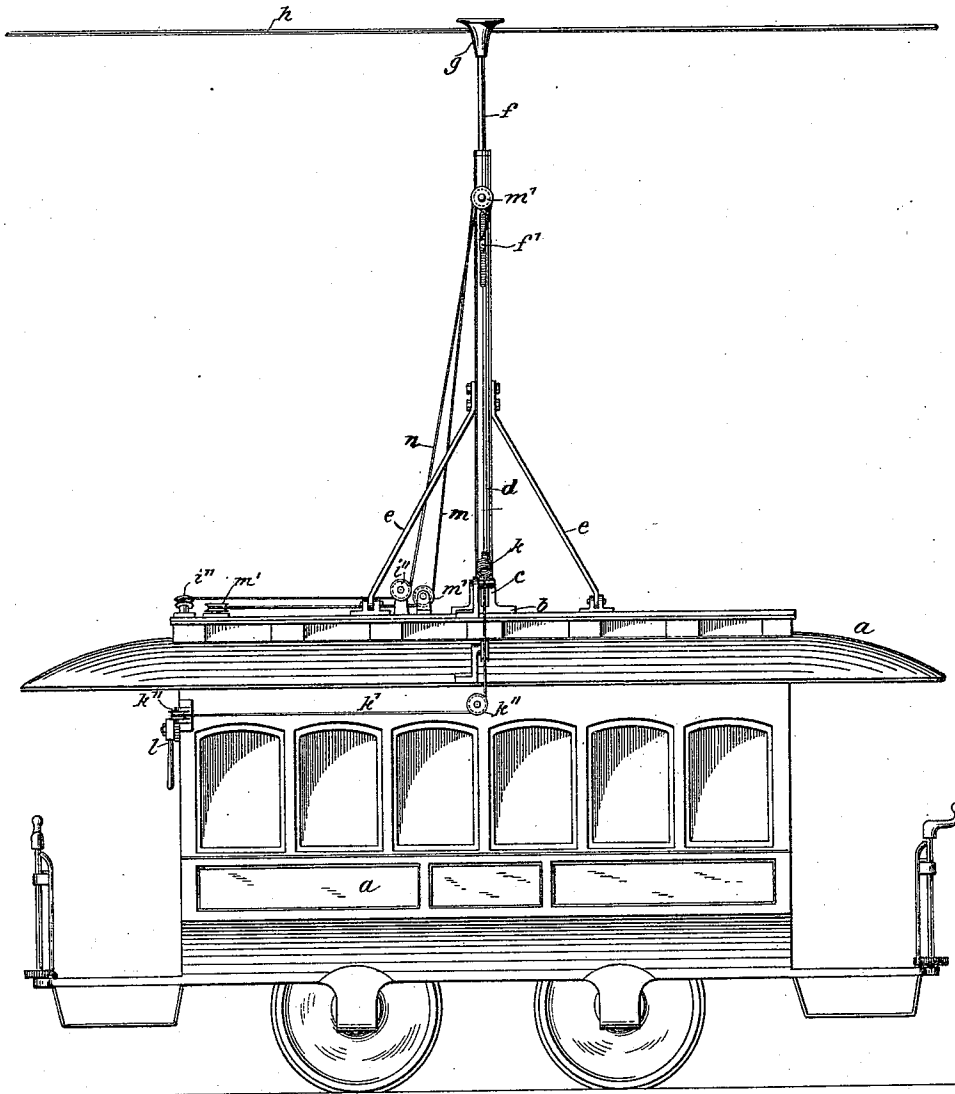
3 Sheets—Sheet 1.

G. WESTINGHOUSE, Jr.
ELECTRIC RAILWAY.

No. 550,465.

Patented Nov. 26, 1895.

Fig. 1



Witnesses:

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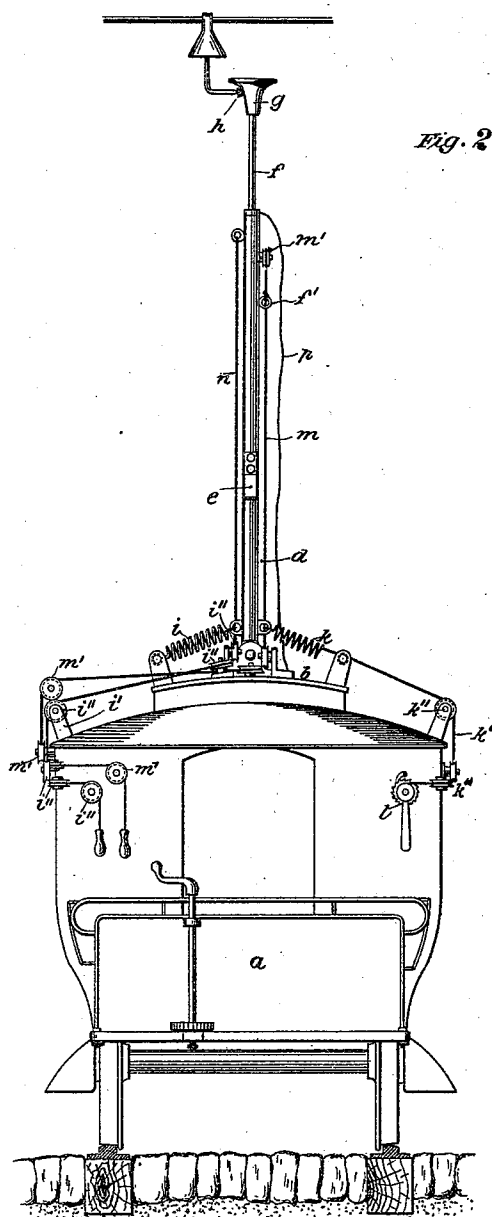
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3 Sheets—Sheet 3.

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Fig. 3

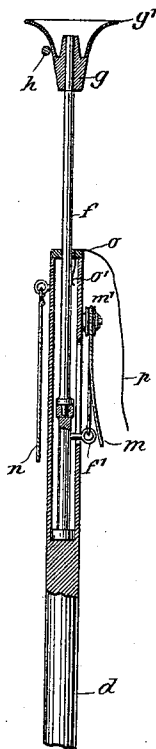


Fig. 4

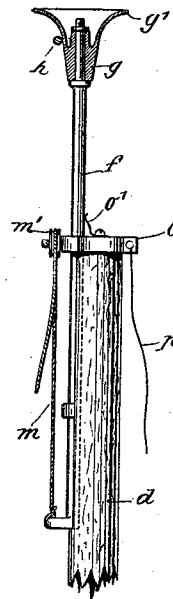


Fig. 5

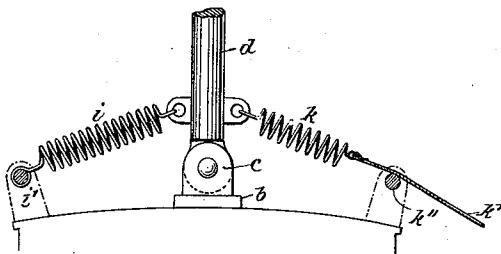
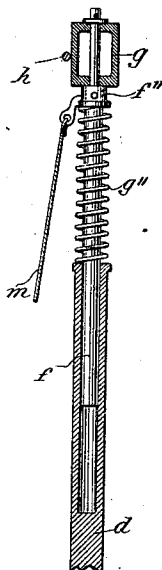


Fig. 6

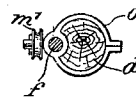
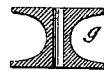


Fig. 7



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UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 550,465, dated November 26, 1895.

Application filed June 13, 1890. Serial No. 355,332. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Railways, of which the following is a specification.

My invention relates to the contact devices of electric railways using overhead conductors for conveying and distributing the electric energy to the cars, and particularly to the supporting-arm which carries the trolley or collector.

It has heretofore been customary to make use of collectors which make contact either with the upper surface or the under surface of the conductor. These devices are known as "upper" and "under" contacts. Side-contact devices consisting of trolleys mounted upon and supported by the conductors are old.

My invention relates to that class of side-contact collectors which are supported by the car, and it has important advantages in construction, maintenance, and operation over upper and under contacts.

To enable others skilled in the art to make and use my invention, I will now describe it by reference to the accompanying three sheets of drawings, in which—

Figure 1 is a side elevation of a street-car provided with one form of my improved side-contact construction. Fig. 2 is an end elevation of the car. Fig. 3 is a detail view of the contact-arm. Figs. 4 and 5 are modifications of the contact-arm. Fig. 6 is a cross-section on *x x*, Fig. 4. Fig. 7 is a modified form of the collector.

Like letters of reference indicate like parts. At any suitable place on the top or roof of the car *a* is a base plate or step *b*, to which is hinged in suitable lugs *c*, so as to swing laterally to the length of the car, a rigid arm or pole *d*, which is further supported by pivoted braces *e* to prevent motion longitudinally of the car. The upper end of the arm *d* is hollow or tubular for the purpose of receiving a round rod or tube *f*, which fits loosely enough within the bore to be capable of both axial and radial movement therein, and is provided at its outer end with the elec-

trical contact piece or collector *g*. The collector *g* is preferably made of a tapering or inverted-bell form, having a wide flange *g'* to extend over the top of the line conductor with which it is to be used in order more certainly to preserve contact between the collector and the conductor. The collector *g* is held against the side of the line conductor *h* by an elastic pressure produced by one or the other of the springs *i k*, secured at opposite sides of the arm near the lower end. The spring *i* is fastened to a lug *i'* and is normally stronger than the spring *k*, so that it has a tendency to draw the arm over in its direction and thereby cause it to bear against the opposite side of the conductor *h*. When, however, it is desired to cause the arm to be drawn in the opposite direction and bear against the other side of the conductor *h*, greater tension is put upon the spring *k* by means of a cord, wire, or chain *k'*, leading around sheaves *k²* to a crank or windlass *l*, situate on the end of the car or other accessible place where it can be conveniently manipulated by the motorman to give the required tension to the spring *k*. The rod *f*, on the upper end of which the collector or contact-roller *g* is mounted, operates as the journal of the roller, turning with it, or the collector *g* may be capable of turning on the end of the rod, as shown in Fig. 4. To provide for variations in the altitude of the conductor *h*, the rod *f* may be raised by a cord or rope *m*, attached to a block or step *f'* below its lower end, inside of the hollow arm *d*. The cord *m* passes around sheaves *m'* to the platform of the car. There is also a cord *n* attached to the same side of the arm *d* to which the spring *i* is attached, which leads by means of sheaves *i''* to the platform of the car, the purpose of which is to enable the motorman to adjust the collector *g* to the desired side of the conductor *h*.

The manner of adjusting the collector is as follows: Suppose it is desired to make contact with the conductor *h* on the *i* side. The motorman increases the tension upon the spring *k* until it overcomes the normally-greater strength of the spring *i* and pulls the arm *d* over to the *i* side by means of the cord *n*. He then raises the collector above the

level of the conductor *h* by means of the cord *m*, then slackens the cord *n* until the collector strikes the side of the conductor *h*, and finally slackens the cord *m* until the collector descends to its place, with the flange *g'* extending over the top of the wire. The tension of the spring *k* will cause the collector *g* to hug the side of the conductor *h* closely, and in case the distance between the top of the car and the conductor *h* increases the flange *g'* will cause the rod *f*, carrying the collector, to draw out of its sheath sufficiently to compensate for such increase of distance, while if such distance is decreased the rod *f* will descend into its sheath by gravity, and thus contact will be preserved between the collector *g* and the conductor *h*, regardless of variations of distance between the top of the car and the conductor. If the arm *d* is made of iron, the rod *f* may be insulated therefrom in any convenient way. Electrical connection is made with the motor on the car by means of a conducting-collar *o*, encircling the rod *f*, contact being preserved between the collar *o* and rod *f* by means of a spring *o'* or other suitable device. The insulated circuit-wire *p* leads from the collar *o* to the motor on the car by any suitable course.

In Figs. 4 and 6 the rod *f* is placed in a groove in the side of the arm *d*, which is here shown as made of wood, and the collector *g* turns on the rod *f*.

In Fig. 5 I show the collector *g* (in section) as a straight-sided cylinder maintained at the level of the conductor *h* by a spring *g''*. In this instance the cord *m* is fastened to a collar *f''* on the rod *f* above the spring *g''*, so that when the cord is drawn down it depresses the follower and thereby the collector. The principal object of this construction is to enable the collector to be passed from side to side under the conductor *h*. It may also be useful in adjusting the altitude of the collector to correspond with that of the conductor. In this instance the cord *n* (shown in Figs. 1 and 2) may be omitted, because the cord *m* performs its functions.

In Fig. 7 I show another form of collector which may be used with advantage, as its upper and lower flanges will enable it to adapt itself vertically to the position of conductor *h*, whether up or down.

I do not confine myself to any particular form, the important point being to secure a side contact; nor do I limit myself to the use of revoluble collector, because I can use a rubbing or sliding collector, the substitution of which for a rolling contact being well known and often practiced in the art.

The collector *g* in Figs. 1 and 2 has a tapering body; but it is apparent that this may be cylindrical. Its characteristic features are the lateral flaring flange at its upper end and its narrower body. This construction enables it to engage the conductor *h* and preserve

its contact therewith, as described, in case the distance between the car and the conductor is increased. It is apparent that it may be used in an inverted position. It is made with a tapering recess in one end, which in casting may be cored out, as will be understood. The shell form thus secured gives lightness and saves in cost of manufacture.

The cord *m* is used in the construction shown in Figs. 1 and 2 to raise the collector *g* into position to engage the conductor *h* and in the construction shown in Fig. 5 to depress it to a fixed position or to enable it to pass under the conductor. In either case it is the means provided for moving the extensible end or rod *f* for the purpose of adjusting the collector.

The drawings are not made to scale, but are intended only to illustrate the invention, so that persons skilled in the art can make and use it.

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

1. The combination of an electric railway car, an overhead conductor extending parallel to the track, an arm mounted on the car upon a horizontal pivot, and swinging transversely to the car, said arm supporting a collector which makes contact with the side of the conductor, and means for moving the arm.

2. The combination of an electric railway car, a pivoted arm mounted upon a horizontal pivot on the car and adapted to swing transversely to the car, a collector mounted on the end of the arm, an overhead conductor extending parallel to the track with which the collector makes electrical connection, and a spring for causing the collector to bear elastically against the side of the conductor.

3. The combination of an electric railway car, a pivoted arm mounted on the car and swinging laterally, a collector supported by the pivoted arm whereby electrical connection may be made with an overhead conductor, springs acting on the opposite sides of the pivoted arm, one of which is normally stronger than the other, and a tension device connected with the second spring so that its tension may be increased at will to overcome the strength of the first spring, substantially as and for the purposes described.

4. The combination of an electric railway car, a normally vertical pivoted arm mounted thereon and swinging laterally and an electrical collector extensibly connected with the arm so as to be capable of making contact with overhead conductors of varying altitudes and of being dropped below the conductor for the purpose of transferring it from side to side, substantially as described.

5. The combination of an electric railway car, an overhead conductor extending parallel to the track, a vertical flanged collector bearing against the side of the conductor and supported on the car by a loosely moving ex-

tensible support, whereby it may adapt itself to varying altitudes of the conductor, substantially as described.

5 6. A collector for the overhead conductor of an electric railway having a lateral flange around its end and a tapering body, substantially as and for the purposes described.

7. A collector for overhead conductors having a lateral flaring flange at one end, and a

tapering cored out body, substantially as described.

Signed and witnessed this 3d day of June, 1890.

GEO. WESTINGHOUSE, JR.

Witnesses:

THOMAS B. KERR,
LEONARD E. CURTIS.