

No. 816,467.

PATENTED MAR. 27, 1906.

P. E. HERKNER.
SYSTEM OF TROLLEY WIRE SUSPENSION.

APPLICATION FILED SEPT. 10, 1904.

2 SHEETS—SHEET 1.

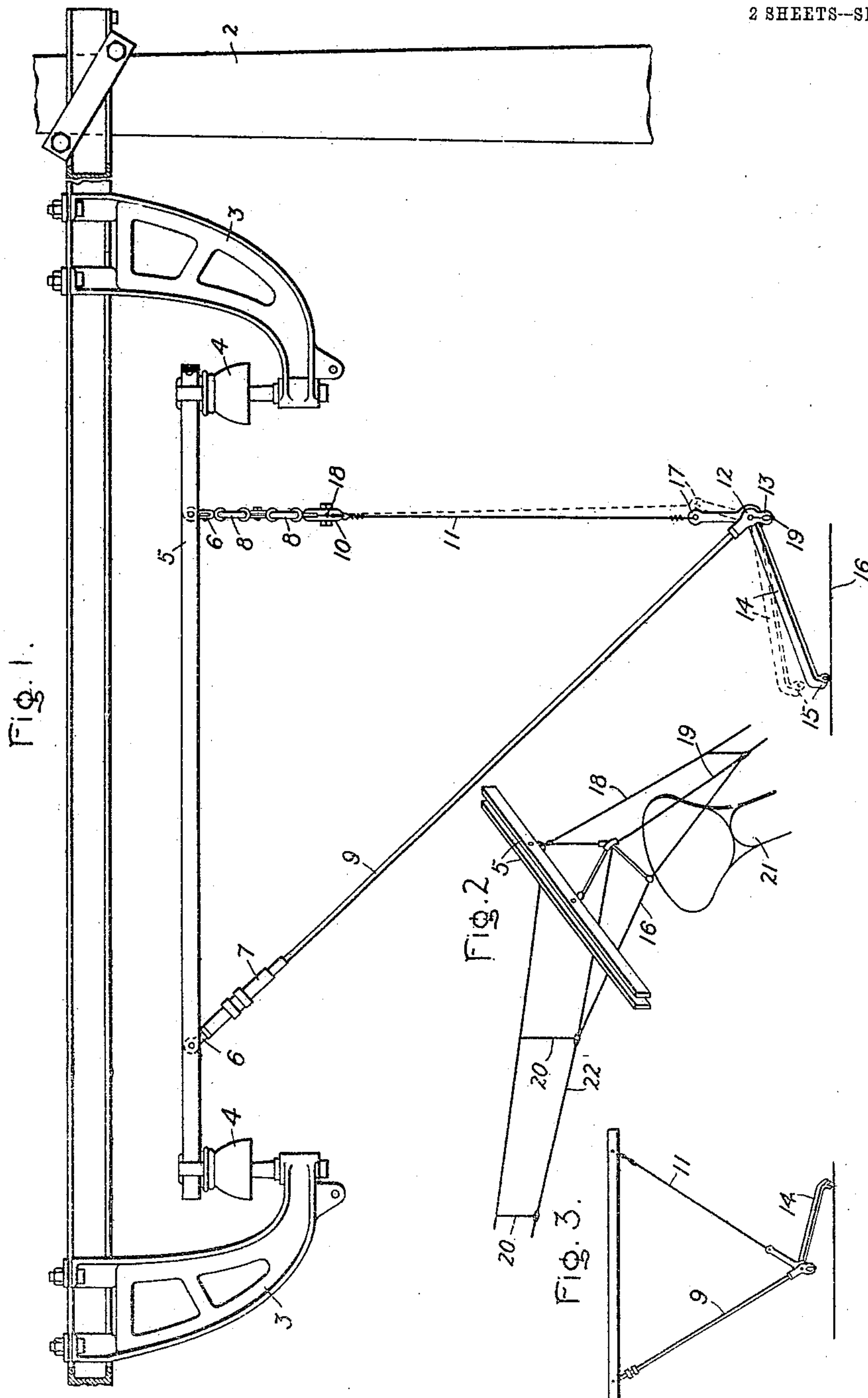


Fig. 1.

Fig. 2.

Fig. 3.

Witnesses.

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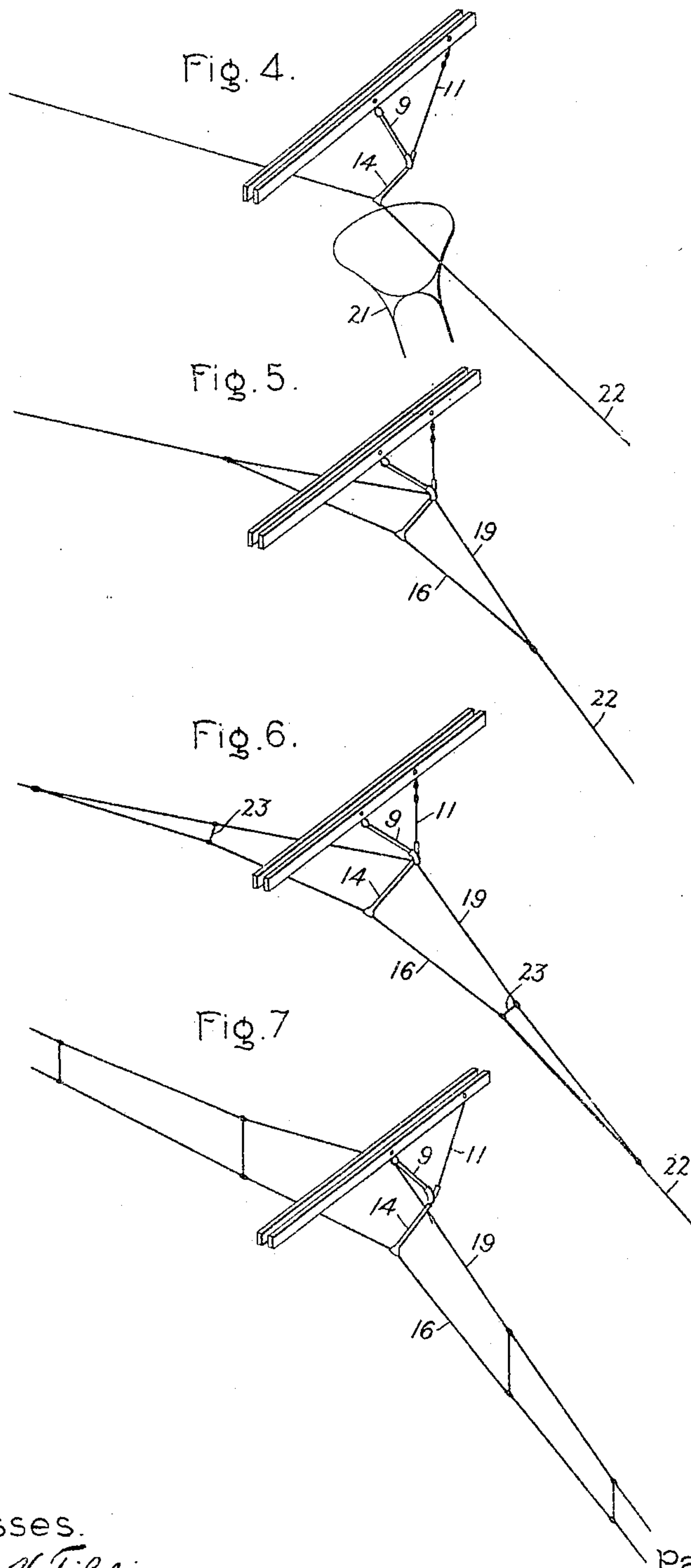
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2 SHEETS—SHEET 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

PAUL E. HERKNER, OF BERLIN, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SYSTEM OF TROLLEY-WIRE SUSPENSION.

No. 816,467.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed September 10, 1904. Serial No. 223,945.

To all whom it may concern:

Be it known that I, PAUL E. HERKNER, a subject of the German Emperor, residing at Berlin, Germany, have invented certain new and useful Improvements in Systems of Trolley-Wire Suspension, of which the following is a specification.

The present invention relates to the suspension of overhead trolley-wires for electric railways, and more particularly to the suspension of trolley-wires at the curves of the road.

The object of my invention is to provide a suspension for trolley-wires at the curves which will effectually overcome the difficulties experienced in the use of the suspending devices heretofore in use.

Where trolley-cars are run at high speeds, it is essential that the trolley-wire be tensioned until substantially all the sagging between points of suspension disappears. This tensioning of the wire gives rise to a horizontal strain on the suspending devices at the curves which tends to break the connections between the wire and the supporting means, and the supporting means are often rendered so rigid and unyielding vertically that the current-collector in passing beneath strikes a hammer-blow at either side of the suspension, which soon tends to rupture the wire, besides producing a spasmodic operation of the current-collector.

In carrying out my invention I provide a bell-crank lever having its longer arm connected to the trolley-wire and its short arm connected to a strain connection, and so arranged that the curve pull or the strain produced in a horizontal direction by the tension of the wire is availed of to yieldingly resist the movement of the wire vertically by the passage thereunder of the current-collector.

For a more complete understanding of my invention reference may be had to the following detailed description and the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of an overhead catenary suspension embodying my invention; Fig. 2, a perspective view of the same drawn to a reduced scale. Fig. 3 is a side elevation of a suspension with the long arm of the bell-crank directed toward the outside of the curve. Fig. 4 is a perspective view of the

bell-crank connected directly to the main wire. Fig. 5 is a similar view with the bell-crank connected to an auxiliary wire by which the angularity of the trolley-path is reduced. Fig. 6 is a similar view with the auxiliary wire connected to the main wire at a plurality of points, and Fig. 7 is a similar view of a catenary suspension with the bell-crank connected directly to the main wire.

As shown in Fig. 1, a cross-beam 1 extends across the roadway at the curve and is supported at its ends by posts 2, only one being shown. Secured to the under side of the beam 1 are two bent brackets 3, carrying at their inner ends high-tension insulators 4, to the tops of which are secured two horizontal supporting-rods 5. Extending up between the rods 5 and pivotally connected thereto are metallic eyepieces 6, which connect with insulators 7 and 8 of any well-known construction. The insulator 7 is rigidly connected to a thrust-rod 9, and insulator 8 is connected to a wire-clamp 10, which is in turn connected to a draw-wire 11, which normally extends in a substantially vertical position, while the thrust-rod 9 extends in an oblique direction toward the lower end of the wire 11. The thrust-rod 9 carries at its lower end a hinge-piece 12, provided with a wire-clamp 13 and has pivoted thereon the bell-crank lever 14. The lever 14 is provided at the free end of its long arm with an ear 15 for the working wire 16, and its short arm is bent upwardly at an obtuse angle and provided with an eye 17, to which the draw-wire 11 is connected. The clamp 10 receives the catenary suspension-wire 18, and the clamp 13 receives the tension-wire 19, as better shown in Fig. 2, the tension-wire being suspended from the catenary wire by vertical ties 20, and the auxiliary wire 16 is connected at its ends to the tension-wire 19 on opposite sides of the clamp 15 in such manner that the angle in the main wire is subdivided into a number of lesser ones and the working wire made to conform to the track curve by a plurality of short chords.

It is apparent that the tension on the main wire 19 exerts a pull to the left in Figs. 1 and 2, thereby putting the wire 11 under tension, and by reason of the obtuse angle of the lever 14 the auxiliary wire 16 is held somewhat below the horizontal plane of the wire 19, so that as the current-collector 21 passes be-

neath the auxiliary wire 16 its tendency to move upward into the dotted-line position shown in Fig. 1 is yieldingly opposed by the angular movement produced by the wire 11 on the short arm of the lever.

In Fig. 4 the bell-crank suspension is shown applied directly to the main wire 22 without catenary suspending-wire or auxiliary wire at the angle.

In Fig. 5 the main wire 22 is connected as in Figs. 1 and 2, but without catenary suspending-wire and with the auxiliary wire connected at its middle point to the bell-crank and at its ends to the main wire, so that there are formed three angles.

In Fig. 6 the main and auxiliary wires are supported as in Fig. 5; but intermediate tie-wires 23 are connected across from one to the other, so that five angles are formed.

In Fig. 7 the main wire is directly connected to the bell-crank and the catenary suspending-wire is connected to the thrust-rod 9.

This curve suspension is not only capable of use for current-collectors in the form of a loop, but also for the ordinary grooved trolley-wheel and roller-form, and it is immaterial whether the auxiliary wire is arranged on the outer curve side, as in Fig. 3, or on the inner curve side, as shown in the other figures of the drawings, it being of course understood that in the latter form the auxiliary wire is the one engaged by the current-collector and accordingly constitutes the working conductor at the curve.

I do not desire to restrict myself to the par-

ticular form or arrangement of parts herein described and shown, since it is apparent that they may be changed and modified without departing from my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The means for suspending trolley-wires comprising a thrust member, a flexibly-supported tension member, and a bell-crank lever pivoted to said thrust member and connected at one end to the tension member and at the other end to the trolley-wire.

2. The means for suspending trolley-wires at curves comprising a thrust member, a flexibly-supported tension member arranged to receive the curve pull of the wire, and a bell-crank lever with arms of unequal length pivoted on said thrust member and connected at its short arm to said tension member and adapted to engage at its long arm with the trolley-wire.

3. In a system of trolley-wire suspension at curves, the combination with a main conductor-wire having a section thereof joined at a plurality of points by an unequal section of an auxiliary wire, means for supporting the longer section vertically and horizontally and means for yieldingly resisting vertical movement of the shorter section.

In witness whereof I have hereunto set my hand this 26th day of August, 1904.

PAUL E. HERKNER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.