

No. 681,933.

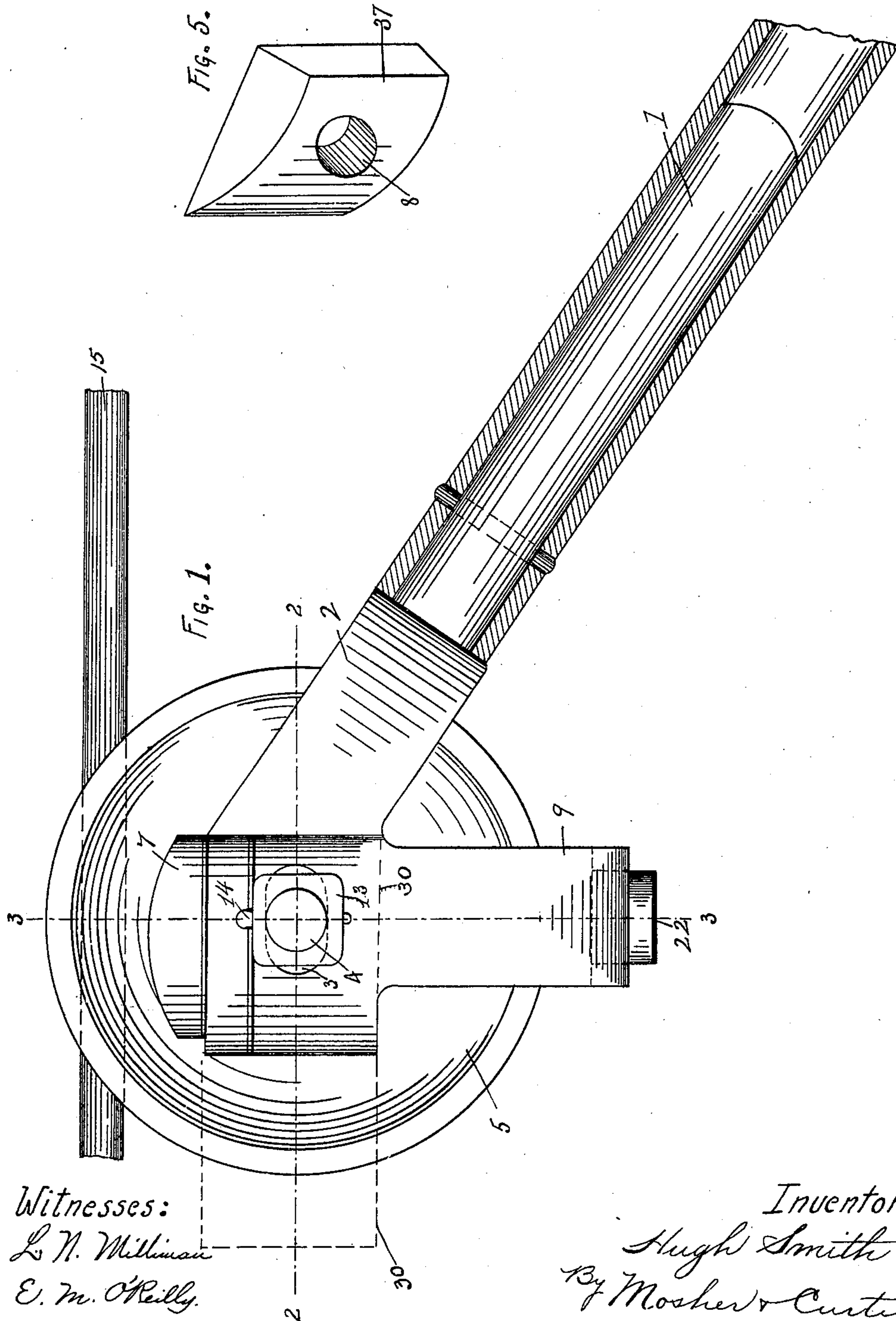
Patented Sept. 3, 1901.

H. SMITH.
TROLLEY.

(Application filed Jan. 7, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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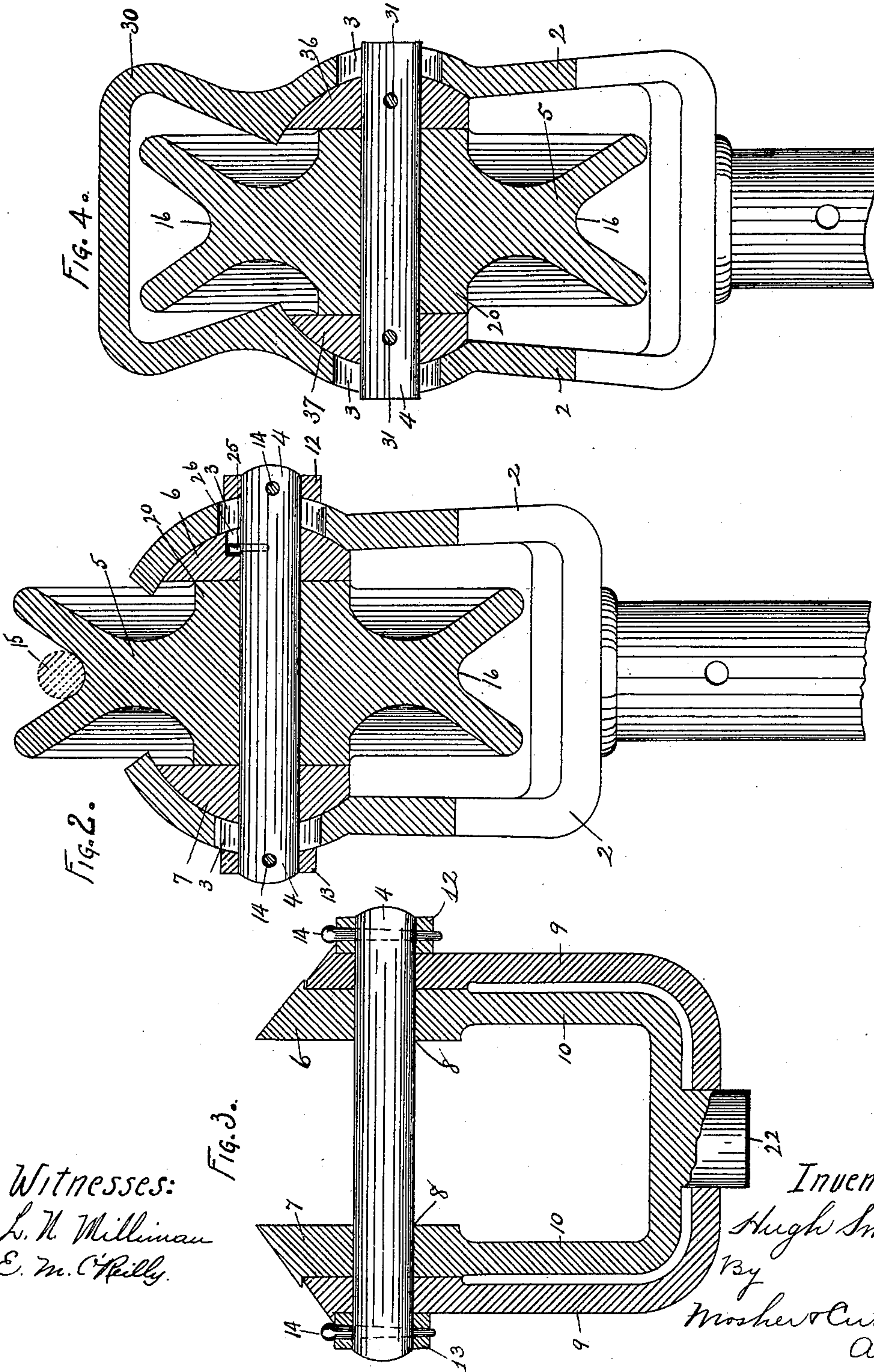
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(No Model.)

2 Sheets—Sheet 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

HUGH SMITH, OF WATERVLIET, NEW YORK, ASSIGNOR OF ONE-HALF TO
JOHN H. JONES, OF SAME PLACE.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 681,933, dated September 3, 1901.

Application filed January 7, 1901. Serial No. 42,346. (No model.)

To all whom it may concern:

Be it known that I, HUGH SMITH, a citizen of the United States, residing at Watervliet, county of Albany, and State of New York, have invented certain new and useful Improvements in Trolleys, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

Figure 1 of the drawings is a side elevation of the upper end of the trolley-pole, the trolley-wheel, and the trolley-wheel holder. Fig. 2 is a horizontal section of the same, taken on the broken line 3 3 in Fig. 1. Fig. 3 is a vertical section of the same, taken on the broken line 3 3 in Fig. 1. Fig. 4 is a similar view to that shown in Fig. 2, showing a modified form of construction. Fig. 5 is a view in perspective of an apertured convex bearing-segment.

My invention relates more particularly to an improved form of holder for securing a trolley-wheel on the upper end of a trolley-pole, such as is commonly used in connection with electric-railway cars.

The object of the invention is to provide means for supporting the trolley-wheel in such a manner that it will automatically adapt itself to the peculiar condition of trolley-wires in curved portions of the railway in connection with which they are used.

The principal feature of my invention consists of a trolley-wheel holder comprising a suitable mechanism whereby the trolley-wheel is oscillatory upon a vertical axis passing through the plane of the wheel, whereby the wheel is caused by the wire itself to assume a position with relation to the wire such that the plane of the wheel is maintained approximately tangential to the curve of the track beneath the wire, as is herein-
after more fully described, and pointed out in the claims.

The trolley-wheel holder comprises a shank 1 and bifurcate arms 2, which arms are provided at their end with an inner concave surface and outer convex surface, whereby the concavo-convex portions of the arms are made each to form a segment or part of a cylinder. Each of these segments is provided with an elongated opening or slot 3, adapted to receive one end of an axle 4, upon which the trolley-wheel 5 is rotary. Within the concave segments are located convex segments 6 and 7, the latter segments being convex upon their outer surfaces upon approximately the same radius of curvature as the radius of the concave surface on the cylindrical segments of the bifurcate arms. The convex segments are each provided with an aperture 8, adapted to receive one end of the wheel-axle. The concave segments are connected not only by the bifurcate arms of the holder, but by a depending yoke 9, which passes around beneath the wheel, and the convex segments are similarly connected by a depending yoke 10 within the yoke 9, as shown in Fig. 3.

To assemble the parts, it is only necessary to place the yoke 10 within the yoke 9 and the trolley-wheel within the inner yoke and then pass the wheel-axle through the slot in one of the segments of the outer yoke and the aperture 8 in one of the segments of the inner yoke, then through the wheel, and through the apertures in the other two segments to the position shown in Fig. 2. After the wheel-axle has been inserted as described the concave washers 12 and 13 are placed on the projecting ends of the axle and the pins 14 inserted through apertures in the ends of the axle to hold the washers and other parts in place, as seen in Fig. 2. The concave segments being concavo-convex or cylindrical, so that the outer surfaces are convex and parallel with the inner concave surfaces, the concave washers will travel freely along such convex surfaces when the axle is oscillated. The parts so assembled permit the wheel to rotate upon its axis and permit the axle of the wheel to be oscillated upon a vertical axis which passes through the middle plane of the wheel. When such oscillatory movements take place, the convex segments 6 and 7 con-

stitute bearing-segments which move upon the concave surface of the concave segments. The ends of the axle during such oscillatory movements travel in the guide-slots 3, the ends of which slots serve to limit such oscillatory movements. I am able, therefore, to secure the limited oscillatory movement of the trolley-wheel and its axle upon a vertical axis, which will permit the wheel to be so oscillated automatically by the trolley-wire 15, which rides in the groove 16 of the trolley-wheel. As the movement required is a comparatively small one and the movement is absolutely limited to a small degree of oscillation by means of the guide-slot 3, there is no danger that the wheel will oscillate upon its vertical axis to such a degree as to cause the wheel to leave the wire or to interfere with replacing the wheel upon the wire in case it should be removed at any time. Furthermore, no springs or other mechanism are necessary to maintain the axle of the wheel in a normal position, for the reason that the limited oscillatory movement of the wheel-axle is not sufficient to interfere with the free operation of the device at all times.

The two depending yokes may be pivotally connected with each other at their lower parts, as by the pivot 22 on the lower end of the inner yoke, which projects down through an aperture in the outer yoke adapted to receive it.

By having the wheel-axle supported in the holder below the axial line of the pole extended to intersect the vertical plane in which the axis of the wheel is located the lateral strains exerted upon the wheel by the wire will not have sufficient leverage to perceptibly twist the pole, and thereby cause the wheel to slip sidewise from the wire, as would be the case if the axial line of the pole intersected the vertical plane containing the axis of the wheel below instead of above the axle.

The novel form and location of the bearing surfaces between the concave and convex segments are important features of the holder.

A bearing between the wheel-hub 20 and the convex segments extends up about halfway between the axis and the bottom of the peripheral groove of the wheel in a favorable position to resist side strains upon the peripheral parts of the wheel, and the large bearing-surfaces between the convex and concave surfaces of the segments prevent rapid wear and increase the stability of the movable parts. The concave washers and holding-pins also increase the stability by preventing the yokes from spreading.

When desired, the depending yokes which connect, respectively, the concave and convex segments may be dispensed with and the bifurcate arms connected by a yoke 30, as

shown in Fig. 4 and by dotted lines in Fig. 1, the convex segments 36 37 being secured to the axle, as by pins 31. When so made, the concave washers and washer-holding pins may also be dispensed with, as the axle will be held in place by the pins 31 and the walls of slots 3 in the bifurcate arms. When the depending yokes are employed, the wheel-axle may be secured against rotary movements by means of a pin 25, projecting from the axle into the open slot 26 in one of the convex segments, as seen in Fig. 2.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a trolley-wheel, and a trolley-pole; of a wheel-holder on the upper end of the pole comprising bifurcate arms having concave segments each with a guide-slot, and apertured convex bearing-segments movable, in such concave segments, revolvably about a vertical axis; a wheel-axle having its ends projecting through the apertured convex segments respectively into the guide-slots in the concave segments, and means for securing the axle against end thrust, substantially as described.

2. The combination with a trolley-wheel, and a trolley-pole; of a wheel-holder on the upper end of the pole comprising bifurcate arms having concave segments, each with a guide-slot, and apertured convex bearing-segments movable, in such concave segments, revolvably about a vertical axis; depending yokes, one within the other, pivotally connected with each other at their lower extremities in the axial line of such concave and convex segments, the outer yoke connecting the concave segments, and the inner yoke connecting the inner segments; a wheel-axle; and means for securing the axle in such segments and against end thrust, substantially as described.

3. The combination with a trolley-wheel and a trolley-pole; of a wheel-holder on the upper end of the pole comprising bifurcate arms each having a cylindrical segment with a guide-slot and apertured convex bearing-segments movable in such cylindrical segments revolvably about the axis of the cylindrical segments; a wheel-axle having its ends respectively projecting through both segments; concave washers, one at each end of the axle, bearing upon the convex surface of the adjacent cylindrical segment; and means for securing the washers upon the axle ends, substantially as described.

In testimony whereof I have hereunto set my hand this 28th day of December, 1900.

HUGH SMITH.

Witnesses:

JOHN C. SHILAND,
CHARLES T. MOORE.