

No. 684,133.

Patented Oct. 8, 1901.

E. G. THOMAS.
ELECTRIC TROLLEY CONSTRUCTION.

(Application filed Apr. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.

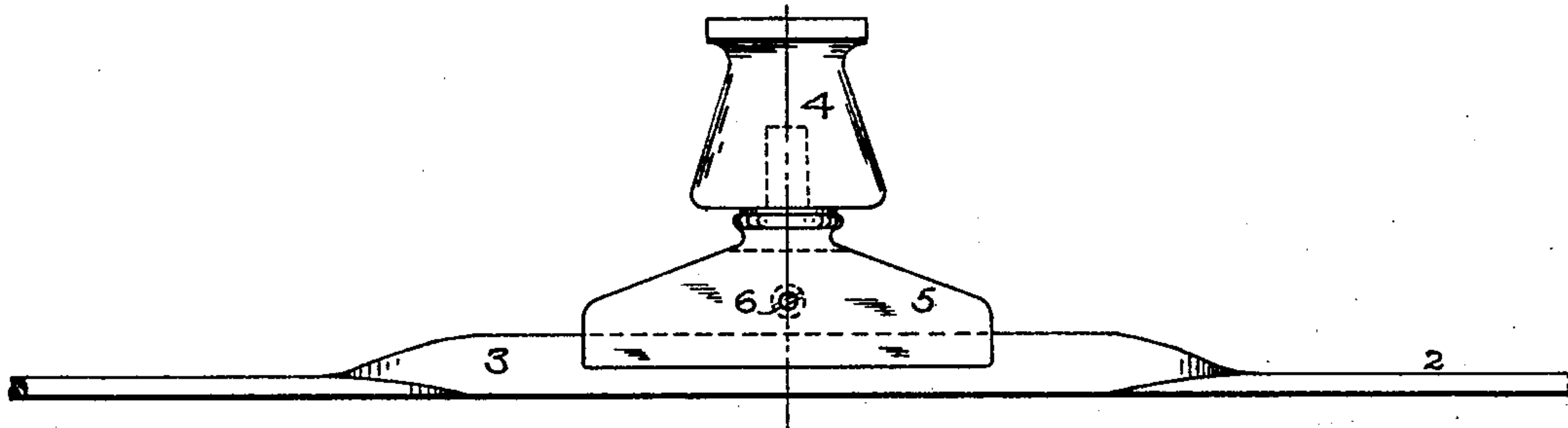


Fig. 1.

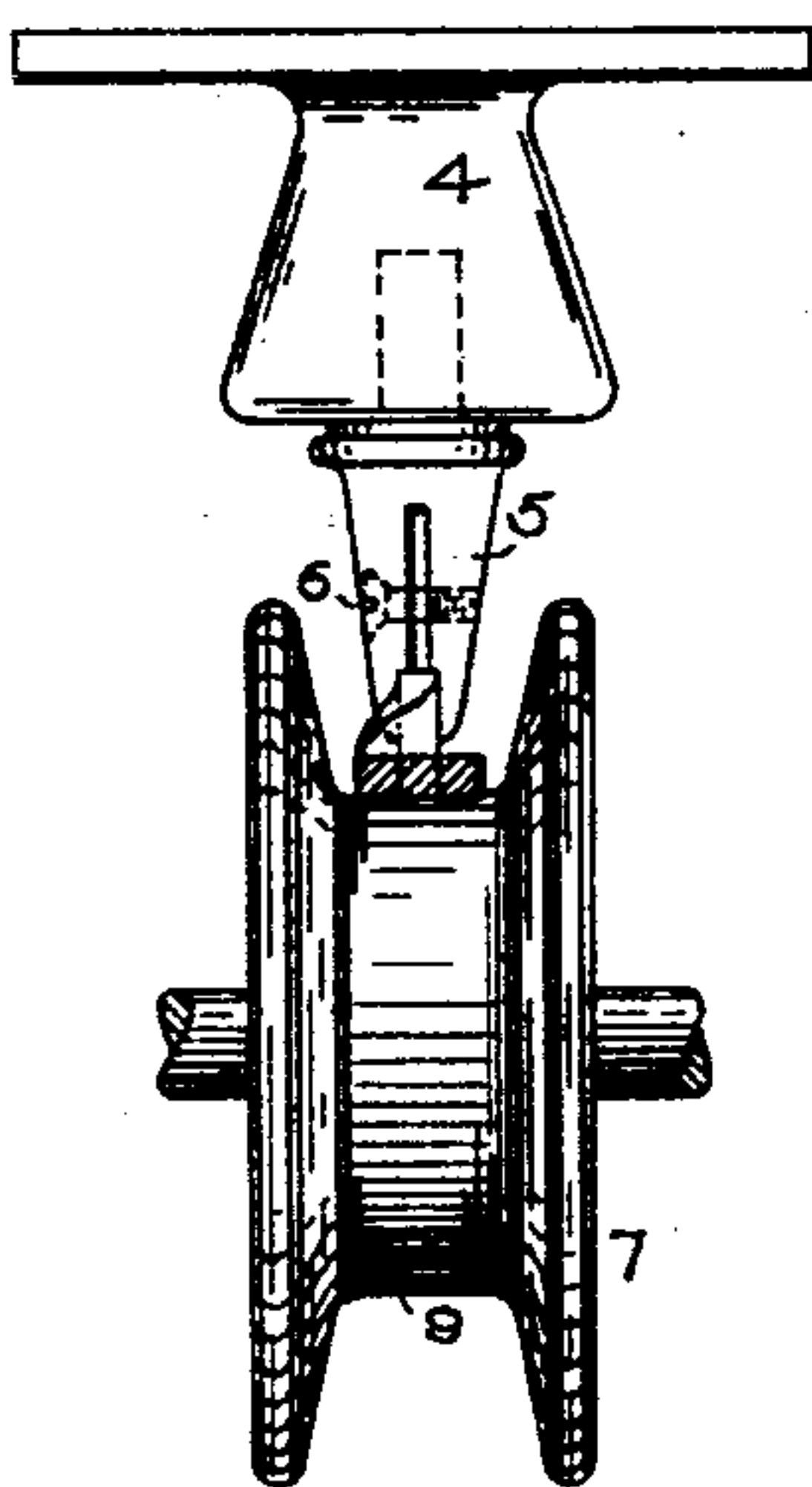


Fig. 2.

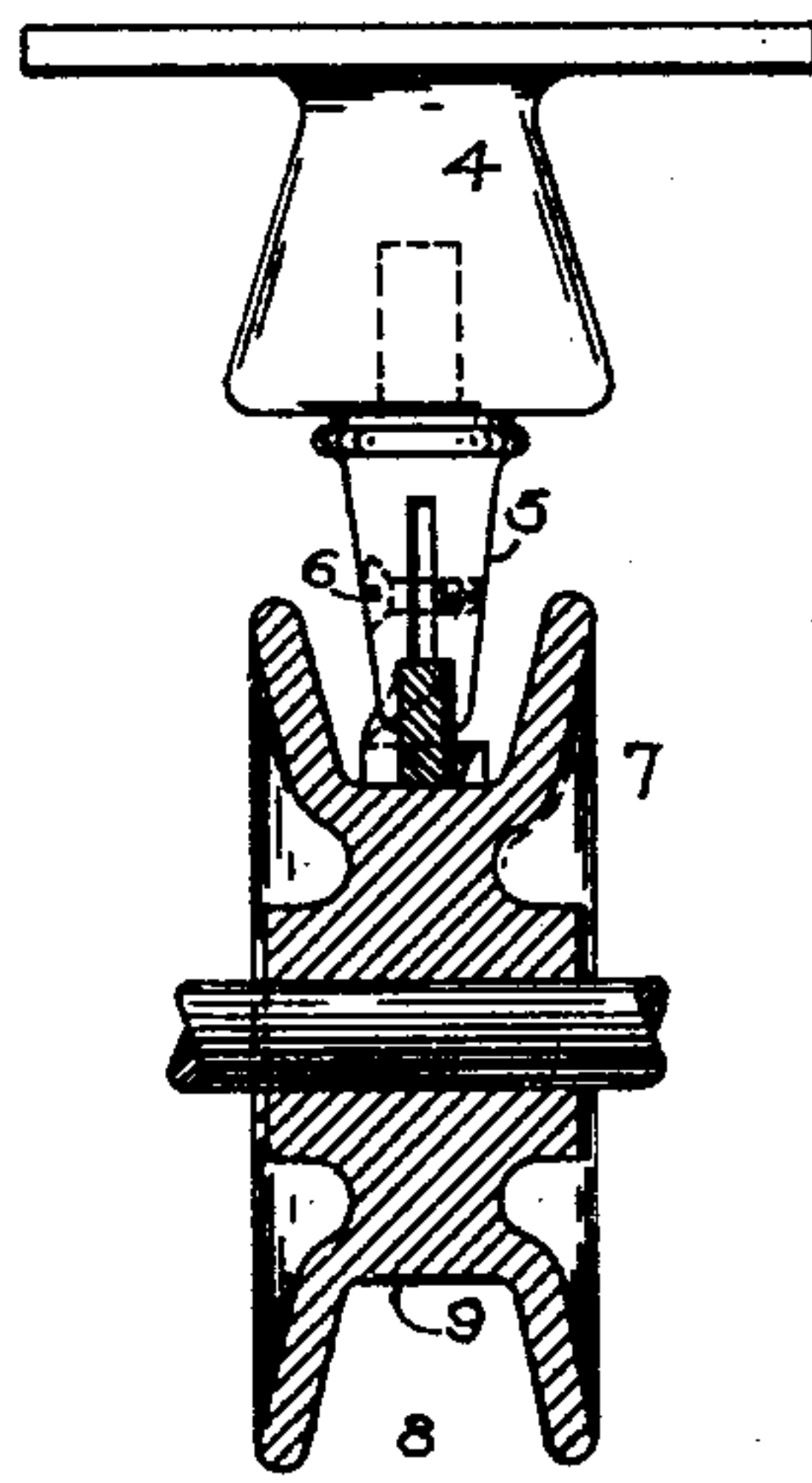


Fig. 3.



Fig. 4.

WITNESSES.

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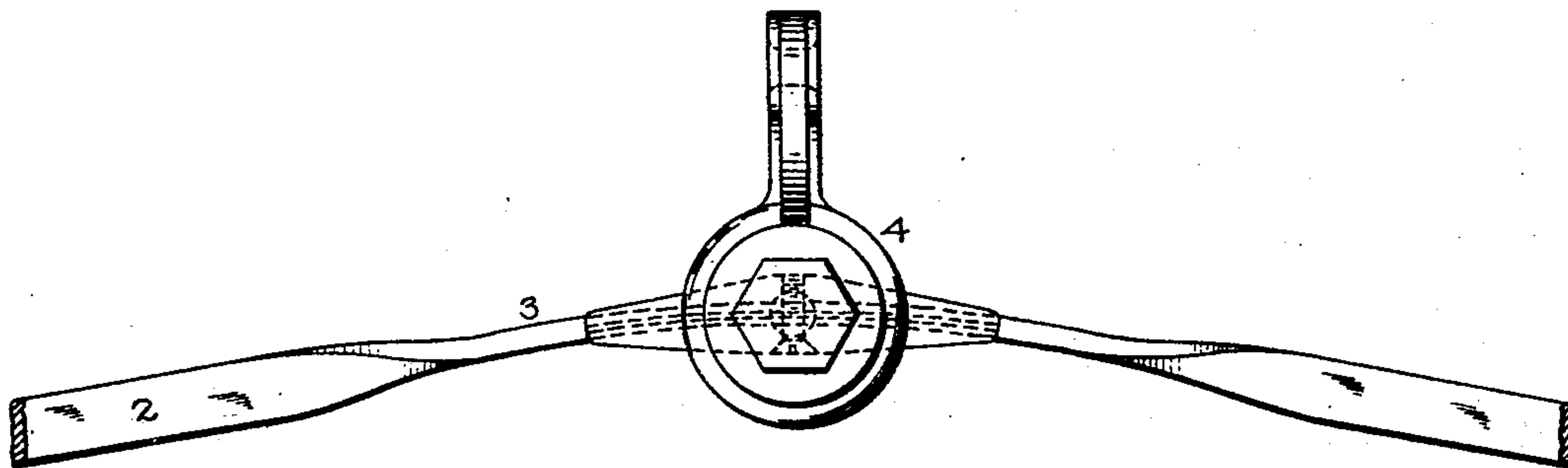


Fig. 5.

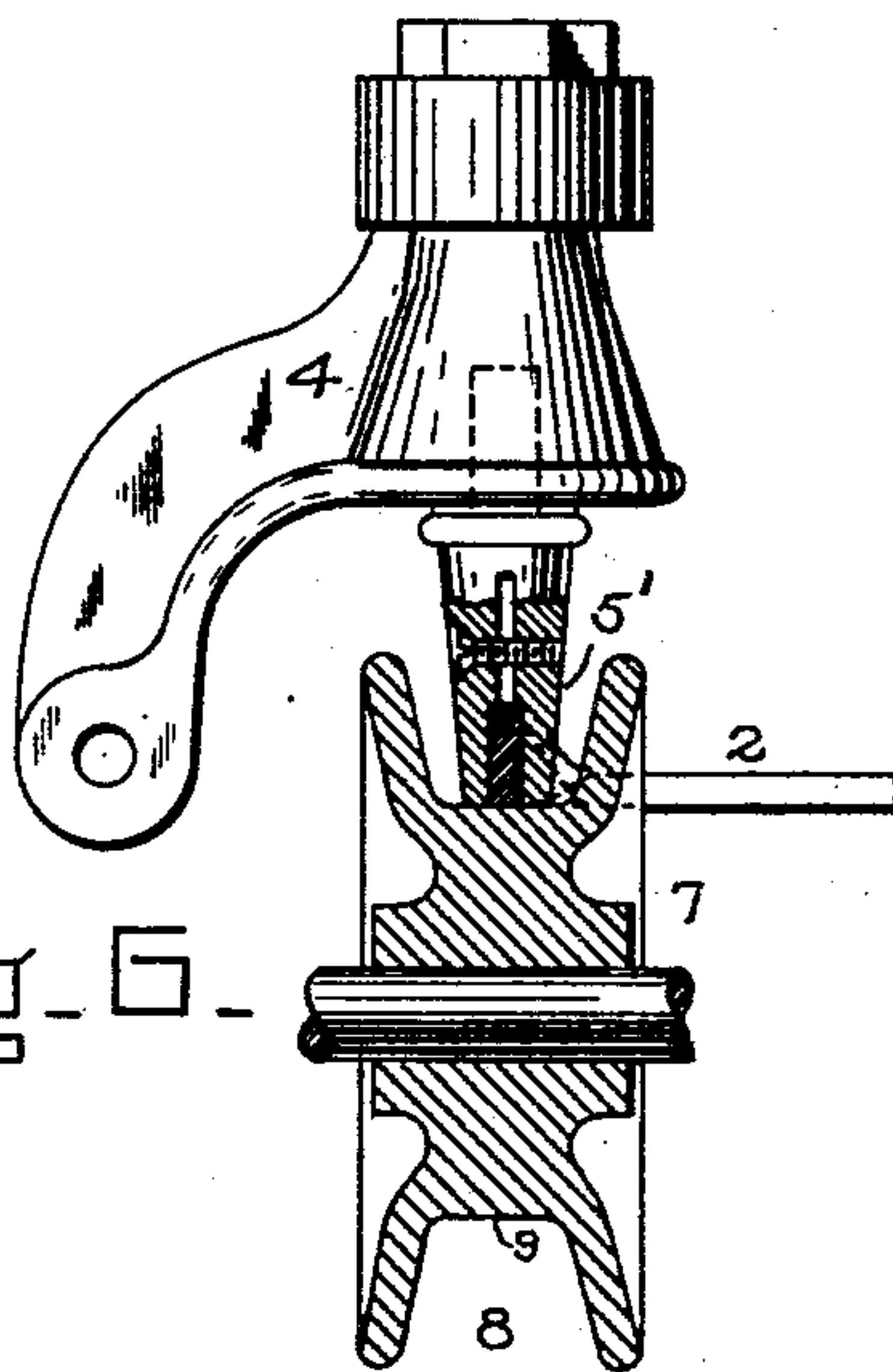


Fig. 6.

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ELECTRIC TROLLEY CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 684,133, dated October 8, 1901.

Application filed April 18, 1901. Serial No. 56,417. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. THOMAS, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Trolley Construction, of which the following is a specification.

My invention relates to systems for the electrical transmission of power such as are now in common use for the propulsion of street-cars, according to which each car receives its current through a grooved trolley-wheel running along the under side of a conducting-wire suspended at suitable intervals by insulated hangers. It has been found practically necessary that such wires shall have a substantially constant cross-sectional area throughout their lengths in order that both the strength of the wires and also their conducting power may be uniform at all points. It is also desirable that the under surface of these wires shall be as level and continuous as possible in order that the trolley-wheel may not be thrown away from the wire by passing rapidly over inequalities contained in it. It is therefore impracticable to support these wires from beneath or to perforate the substance of the wire in order to attach it to the hangers, and consequently in order to provide for a firm attachment the hangers have been so constructed as to extend along the top of the wire and down and around its sides to a considerable extent, with the result that the lower portions of the hangers have projected laterally from the sides of the wire and made the combined width of the hangers and wire greater than the width of the wire between the hangers. It has also been found in practice that by continued usage of a trolley-wheel a groove is worn in it having the same lateral dimensions as the wire on which the wheel runs, and this has been found to be true regardless of the shape or size of the groove with which the wheel is originally provided. The consequence of the wearing of a supplementary groove of the size of the wire, as above described, is that when a trolley-wheel so worn passes a hanger both sides of the groove strike against the lower portions of the hanger which project laterally from

the wire and throw the wheel downward away from the wire. As a result the contact is broken between the trolley-wheel and wire and much sparking is produced, which not only increases the wear of the wheel, but also introduces a high resistance into the circuit, often sufficient to affect the motors on the car. Moreover, the trolley-wheel is not infrequently thrown entirely off the wire, especially at high speeds, so that from this cause and from the increased resistance above referred to the speed which is attainable by the car is undesirably limited.

My invention provides a trolley-wire and hanger of novel construction and arrangement, which are free from the objections above set forth and also possess certain other advantages hereinafter described, my invention being illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of an insulating-hanger having a portion of my improved trolley-wire secured thereto. Fig. 2 is an end elevation of the same, showing the wire in cross-section between hangers. Fig. 3 is a view similar to Fig. 2, but showing the trolley-wire in cross-section at a hanger and showing the wheel in cross-section also. Fig. 4 is a cross-section of a modified form of trolley-wire embodying my invention. Fig. 5 is a plan view of a hanger adapted to be used at curves combined with my improved trolley-wire, and Fig. 6 is a sectional side elevation of the hanger shown in Fig. 5.

My invention may be briefly described as residing in a trolley-wire which in cross-section is thicker in one direction than at right angles thereto and has limited portions of its length twisted through substantially a right angle at the intervals necessary for its proper support. This wire is so suspended as to present its greater transverse dimension to the trolley-wheel by means of hangers the lower portions of which embrace and clamp between them the lesser transverse dimension of the twisted portions of the wire and are of such size that the combined width of the wire and hangers at the points of suspension is not greater than the width of those portions of the wire which are located between the hangers. The result of this construction is that

inasmuch as by far the greater part of the travel of the trolley-wheel is along the wider surface of the wire the groove worn in said wheel by continued use will be as wide as
 5 the greater transverse dimension of the wire, and therefore no matter how much said trolley-wheel may be worn it will be impossible for its flanges to strike both sides of a hanger at the same time, and hence it cannot be
 10 forced down and away from the wire by coming in contact with the hanger, so that the displacement of said wheel and the consequent sparking and introduction of increased resistance into the circuit will be wholly
 15 avoided.

My preferred form of wire is that illustrated in Figs. 1, 2, and 3, in which is shown a flat wire 2, of greater width than thickness, said wire having limited portions 3 of its
 20 length twisted through substantially a right angle and secured to hangers 4 in such manner that the greater transverse dimension of said twisted portions is vertical, so that those portions of the wire extending between the
 25 hangers will have their greater transverse dimension horizontal. The portions 3 are so formed that their lower edges lie practically in the same straight line with the under surface of the intermediate portions of the wire,
 30 and thus form a level and continuous track for the trolley-wheels.

It will be evident that the flat vertical sides of the portions 3 provide an ample surface to be engaged by the hangers and that sufficient space is provided adjacent to said
 35 vertical sides to receive clamping or attaching means of substantial thickness without danger of making the combined thickness of the hanger and portions 3 greater than the
 40 width of the wire itself. To provide for the attachment of said portions 3 to the hangers 4, I prefer to provide the lower portion of each hanger with two longitudinal plates 5, between which the portions 3 are clamped by
 45 means, such as screws 6, passed through the plates 5 and acting to draw the same together. As above stated, said plates 5 are of such thickness that they will not project laterally beyond the edges of those portions of the
 50 wire 2 which extend from one hanger to another. If desired, the lower end of the hanger may extend to the bottom of the portions 3, as shown at 5' in Fig. 6, without danger of forcing the trolley-wheel away from the wire,
 55 this construction being desirable on curves, where there is more or less tendency for the wire to be pulled laterally out of the hangers, because it provides an attaching-surface extending below the center of the wire.

60 The trolley-wheel 7 is provided with a groove 8, having a flat bottom 9, as shown, which conforms to the under surface of the flat wire, said trolley-wheel being carried by the car or other vehicle in the usual manner.

65 The construction above described has certain other advantages, one of which is that

on curves the pressure of the trolley-wheel against the wire will have no component capable of rolling the wire out of the hanger, as is the case with the constructions now com-
 70 monly used. Another advantage is that the flat wire has a tendency to be pressed into contact with the trolley-wheel in case one or the other is slightly tilted. Also the broader surface of contact between the wheel and the
 75 wire diminishes the rate of wear of the former and gives a greater contact-surface per unit of weight of the wire, thus diminishing the resistance at this point. It will be seen that the under edges of the portions 3 of the
 80 wire being in the same straight line with the intermediate portions will have no tendency whatever to throw the trolley-wheel downward as it passes over them.

Instead of making the wire flat it may be
 85 made elliptical in cross-section, as shown at 2' in Fig. 4, the main advantages of the flat wire being retained in such a construction, as will be evident, and I do not consider my invention to be limited to any specific form of
 90 wire so long as one of its transverse dimensions is greater than the other and is so changed in its direction at the hangers as to provide for the suspension of the wire thereby without making the combined width of the
 95 hanger and the attached portion of the wire greater than the greatest transverse dimension of the wire itself. Furthermore, my invention is not limited to any specific form of hanger nor to any particular arrangement for
 100 securing the twisted portions of the wire thereto.

I claim as my invention—

1. A trolley-wire having one of its transverse dimensions greater than the dimension
 105 at right angles thereto, and having limited portions of its length turned circumferentially through substantially a right angle, for the purpose set forth.

2. A flat trolley-wire of greater width than
 110 thickness, having limited portions of its length twisted through an angle, for the purpose set forth.

3. A trolley-wire of greater width than thickness, having limited portions of its length
 115 twisted through an angle, in combination with hangers secured to said twisted portions and holding the intermediate portions of the wire with its greater transverse dimension horizontal.
 120

4. The combination of a trolley-wire of greater width than thickness, and having limited portions of its length twisted through substantially a right angle, and hangers secured to said twisted portions and holding the
 125 same with the greater width of the twisted portions vertical, the combined thickness of said hangers and twisted portions being not greater than the width of said wire.

5. The combination of a hanger provided
 130 at its lower end with an attaching-surface, and a wire of greater width than thickness and

having limited portions of its length twisted through substantially a right angle, said twisted portions being secured to said surface.

5 6. The combination of a trolley-wire of greater width than thickness, and having limited portions of its length twisted through substantially a right angle, hangers each provided with a longitudinal portion embracing the twisted portions of said wire and extend-

ing to the lower edges thereof, and means for securing said twisted portions to said longitudinal portions.

In testimony whereof I have hereunto subscribed my name this 15th day of April, 1901.

EDWARD G. THOMAS.

Witnesses:

E. D. CHADWICK,
ALMEDIA F. HICHBORN.