No. 653,549. Patented July 10, 1900.

T. DERRICK.

ELECTRIC TROLLEY.

(Application filed Jan. 27, 1900.)

(No Model.) 2 Sheets—Sheet 1.

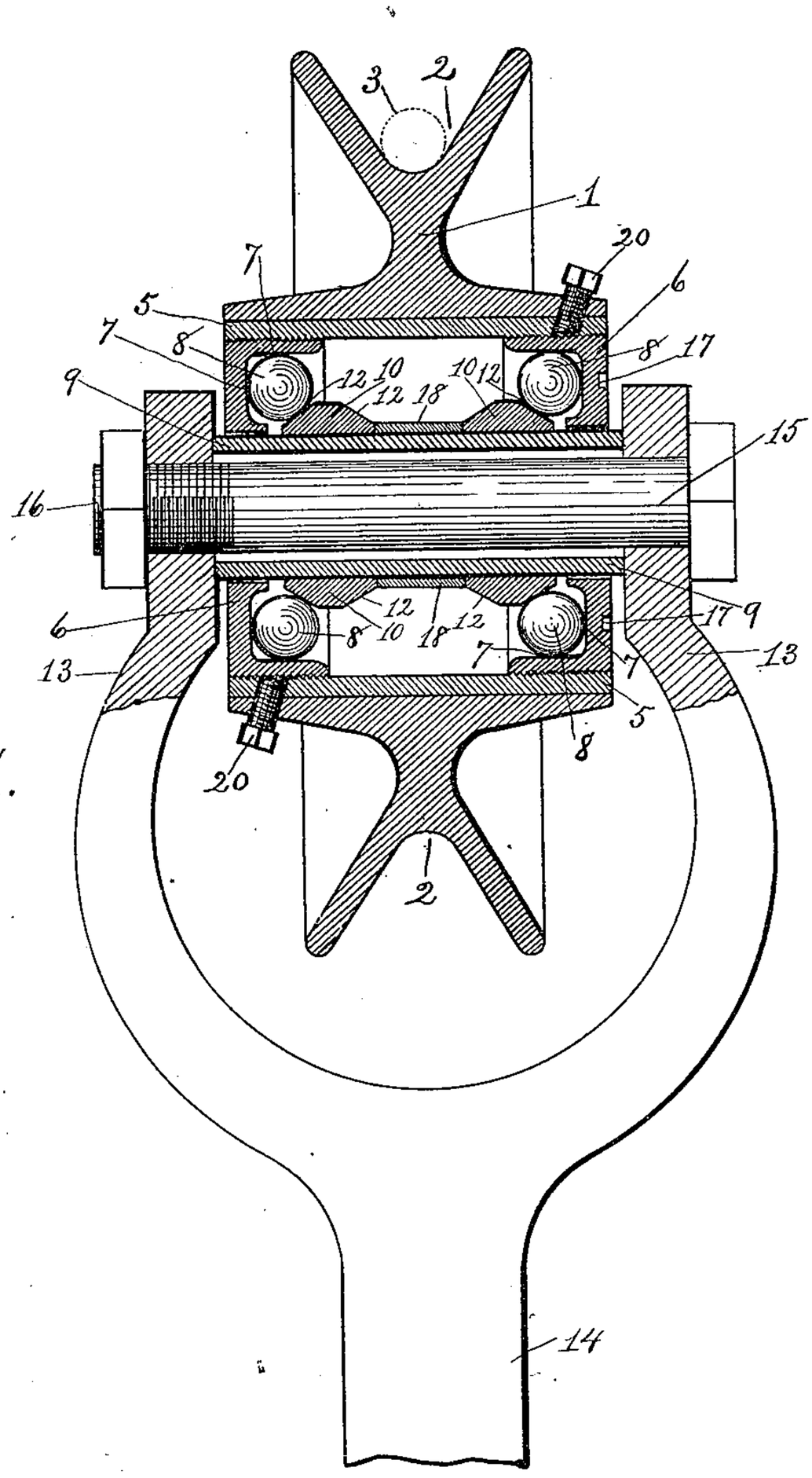

Fig. 1.

Witnesses:
E. M. O'Reilly.
E. H. Mail

Inventor:
Thomas Derrick
By Mosher & Curtis
Attys

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Fig. 2.

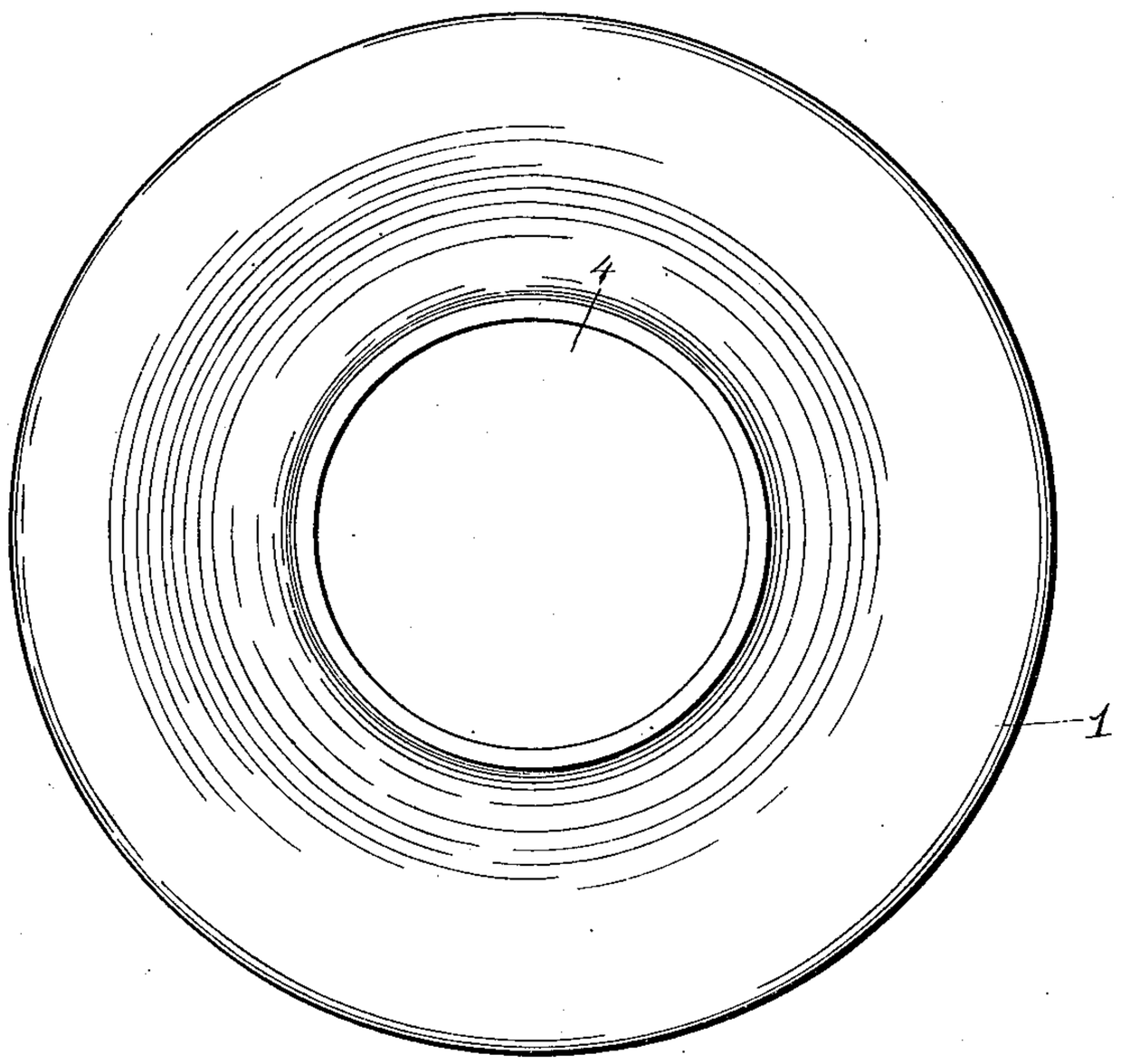


Fig. 3.

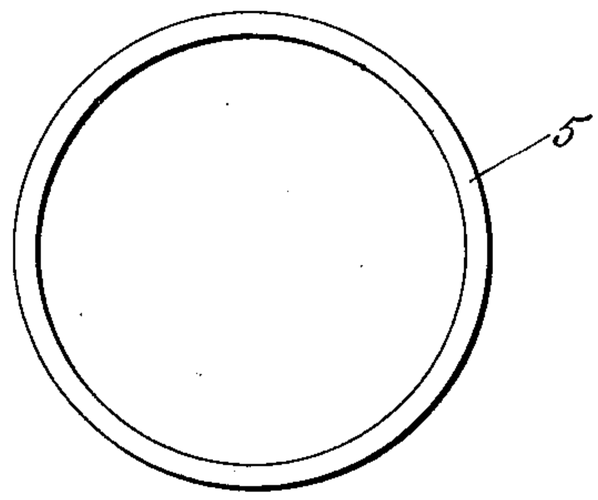


Fig. 5.

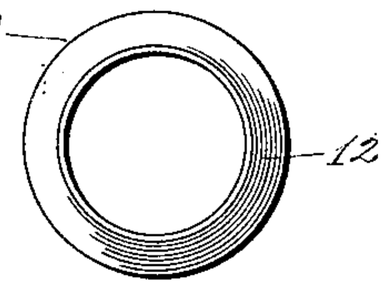
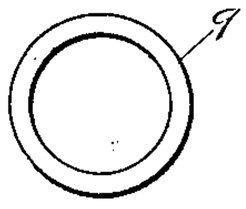


Fig. 4.



Witnesses:
E. M. O'Reilly.
E. H. Mott

Inventor:
Thomas Derrick,
By Mosher & Curtis
attys.

UNITED STATES PATENT OFFICE.

THOMAS DERRICK, OF LANSINGBURG, NEW YORK, ASSIGNOR OF THREE-FOURTHS TO ADAM DERRICK, GEORGE VANDERCOOK, AND GEORGE A. DICKER, OF SAME PLACE.

ELECTRIC TROLLEY.

SPECIFICATION forming part of Letters Patent No. 653,549, dated July 10, 1900.

Application filed January 27, 1900. Serial No. 3,020. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DERRICK, a citizen of the United States, residing at Lansingburg, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Electric 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 central transverse section showing the trolley attached to a trolley-pole. Fig. 2 is a side view of the trolley-rim detached. Fig. 3 is an end view of the bushing inserted in the rim. Fig. 4 is an end view of the tubular shaft or support. Fig. 5 is an end view of one of the reversible sleeves detached from the support.

It is well known that in electrical trolley systems the conductor with which the trolley or grooved wheel engages is made of copper, which is a very soft metal. It is very desirable that the trolley-rim should be made of the same or an equally-soft metal to minimize the wear upon the wire while the trolley is in use, and electrical trolleys are so constructed almost universally. They are also made very small in diameter to secure a minimum weight on the pole and an economical use of copper. The trolleys being of small diameter revolve very rapidly in use and soon wear out their bearings, so that new trolleys are required. The wear is so great in a very short time that independent contact-pieces are required to maintain electrical contact and unbroken connection between the trolley rim and pole. These contact-pieces consist of spring-straps secured to the bifurcate arms on the upper end of the pole and bearing upon the sides of the trolley. As the bearings of the trolley wear away the irregular wabbling movements of the trolley often destroy the contact of these contact-pieces. I have ascertained that by securing to the comparatively-soft copper rim a comparatively-hard metal, as steel, having a hardened raceway I am able to interpose between such comparatively-hard metal and a stationary support any known form of roller or ball bearings. By making the support and bearing connections of conducting material and electrically connecting the support with the pole I am able to substitute for the old slide-contacts rolling contacts, thereby greatly reducing the frictional resistance to the rotary movements of the trolley-wheel. The importance of such reduction of frictional resistance will be understood when it is borne in mind that the trolley-wire is expensive and made of a very soft metal, which would wear rapidly if the trolley were permitted to slide instead of roll along the wire. The trolley-wheel is necessarily so small and heavy that only a slight resistance to its rotary movements is necessary to overcome the friction between the trolley rim and wire, which is the only means for imparting to the trolley its very rapid rotary movement. By substituting the rolling for the sliding contact I not only reduce the frictional resistance of the electrical contact between rim and pole, but provide a much more perfect and durable bearing for the trolley-wheel, which still further reduces the frictional resistance to its rotary movement.

When the electrical roller-contact is composed of metallic balls, there are sure to be a plurality of perfect contacts at all times. Furthermore, the ball-bearings can be so adjusted as to make the contacts with a considerable degree of pressure without materially increasing the frictional resistance due to such contacts.

I have shown in the drawings a preferred form of construction embodying my invention in which the trolley-wheel is composed of a soft-metal or copper rim 1, having the peripheral groove 2, adapted to receive the trolley-wire, (indicated by the dotted line 3,) and the central aperture 4, adapted to receive the metallic bushing 5, of iron or steel. The bushing is interiorly screw-threaded

to receive the similarly-threaded steel bearing-blocks 6, having on their inner surfaces raceways 7, adapted to form bearing-seats for a plurality of steel bearing-balls 8. The tubular iron support 9 is also provided with steel sleeves 10, fixed thereon and provided with raceways 12, adapted to form bearing-seats for the bearing-balls. The support is clamped tightly between the bifurcate arms 13 of the pole 14 by means of the screw-threaded bolt 15, which is passed through an aperture in one of the bifurcate arms and its screw-threaded end 16 screwed into a corresponding screw-threaded aperture in the other bifurcate arm until the arms are drawn in against the ends of the tubular support with sufficient force to hold the support firmly in place in the relative position shown in Fig. 1 of the drawings.

The bearing-blocks 6 are each provided with wrench-apertures 17 for screwing the blocks into and out of the bushing, by means of which any desired contact-pressure can be maintained between the balls and their bearing-seats.

A short sleeve 18 is interposed between the bearing-sleeves 10 to keep them the proper distance apart on the tubular support.

It will be observed that the bearing-sleeves are provided with a raceway or bearing-seat 12 on each end, whereby the bearing on these sleeves can be renewed in case of wear or damage by simply removing the sleeves or either of them from the support and reversing them end for end, so that when replaced on the support a fresh bearing-seat will be provided for the balls.

The bearing-blocks 6 may be locked in an adjusted position by the set-screws 20.

I am aware that it is not new to provide electric trolleys with ball-bearings, and I do not broadly claim the same.

By the use of a central tubular support within and concentric with the rim, as shown and described, I am able to adjustably lock the mobile parts, such as the balls, securely within the rim and provide means for detachably securing the wheel to the trolley-pole and removing the same without disturbing the adjustably-locked parts, thus avoiding long delays in changing wheels on the pole.

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

1. In an electric trolley and in combination, a rim having a peripheral groove for the trolley-wire; a circular raceway secured to the rim; a tubular support surrounded by and concentric with the rim; a circular raceway secured to the support; a plurality of bearing balls or rolls interposed between the rim and support raceways respectively, and means for detachably securing the support to the trolley-pole, substantially as described.

2. A bearing for wheels comprising a tubular support having exterior bearing-surfaces, a wheel-rim having interior bearing-surfaces; a detachable locking-sleeve having thereon one of such bearing-surfaces and detachably secured to the rim or support, and means for detachably securing the tubular support to a frame without disturbing the bearing connections between the rim and support, substantially as described.

3. In an electric trolley the combination with a rim having a peripheral groove for the trolley-wire, of a pair of raceway-sleeves detachably secured to the rim interiorly; a tubular support inserted within the rim; raceway-sleeves secured upon the support exteriorly and coöperative with the rim-raceways; a plurality of bearing-balls interposed between the rim and support raceways respectively, whereby the support and balls are locked within the rim and the rim is revoluble about the support; and a clamping-bolt passing through the tubular support for detachably securing the support to the bifurcate arms of a trolley-pole, substantially as described.

In testimony whereof I have hereunto set my hand this 18th day of January, 1900.

THOMAS DERRICK.

Witnesses:
GEO. A. MOSHER,
FRANK C. CURTIS.