No. 805,572. PATENTED NOV. 28, 1905.

A. H. MATHESIUS.

TROLLEY WHEEL.

APPLICATION FILED MAY 24, 1900.

Fig. 1.

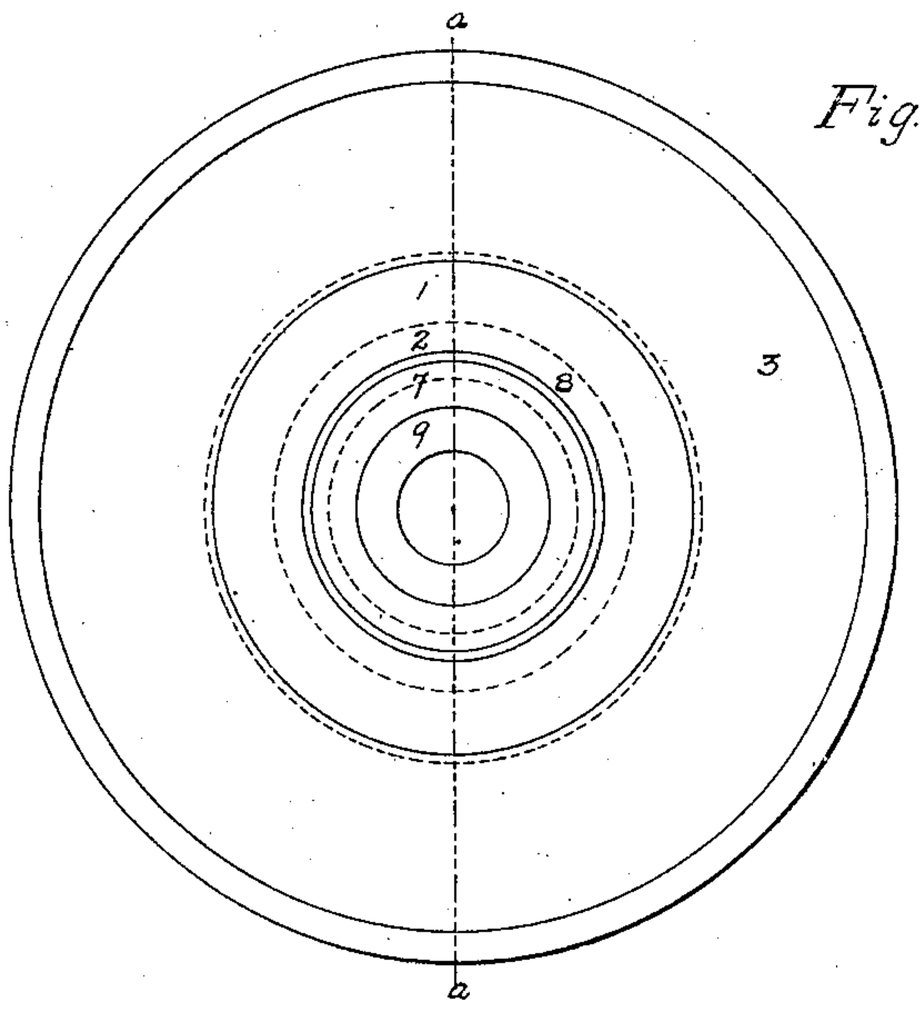


Fig. 2

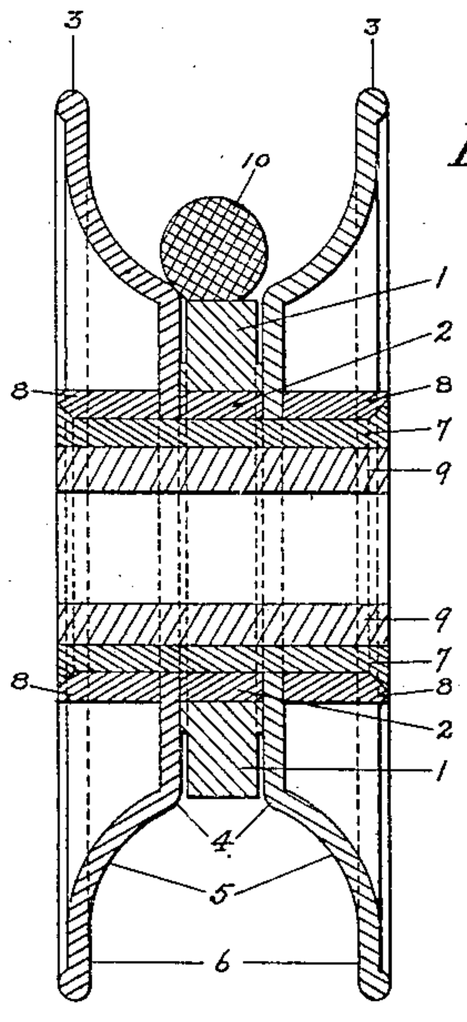
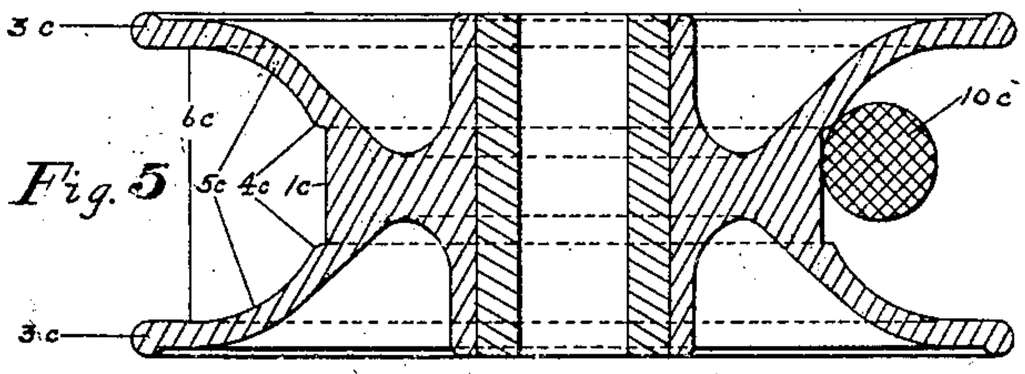


Fig. 3.

Fig 4

Fig. 5



Witnesses:

George A. Mathesius.

L. S. Romane

Inventor:

Alexander H. Mathesius.

UNITED STATES PATENT OFFICE.

ALEXANDER H. MATHESIUS, OF BROOKLYN, NEW YORK.

TROLLEY-WHEEL.

No. 805,572. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed May 24, 1900. Serial No. 17,883.

To all whom it may concern:

Be it known that I, ALEXANDER H. MATHESIUS, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Trolley-Wheels, which improvements are fully set forth in the following specification and accompanying drawings.

My invention has relation to means for conveying power from electrical conductors and also relates to certain details and apparatus to be used in connection therewith.

This application relates to improvements in trolley-wheels, and comprehends certain modifications of improvements upon the general construction set out in Letters Patent No. 432,757, granted to me July 22, 1890.

In my Letters Patent above referred to I have disclosed an original type of guide-wheel having for its special novelty the divided central bearing, which is made of a number of separate sections in a manner that each section is free to revolve with a velocity in correspondence to the length of its radius, thereby reducing the slipping and abrasion of the contact-lines of the guide, rope, or the like with which it may revolve in contact and of the central bearing of the guide-wheel.

My present invention has for its object a further development of the same general features—namely, reducing to a minimum the slipping and abrasion of the contact-lines of the guide, rope, or the like and of the trolley-wheel.

In carrying out my invention I provide the central bearing of the trolley-wheel with straight or approximately straight transverse contact-lines which are generated with radii of equal length in order to form the circumference of a cylinder. Thereby I prevent sliding and abrasions of the transverse contact-lines of the central bearing of the trolley-wheel and of the trolley-wire. In order to retain the cylindrical form of the central bearing of the trolley-wheel, I provide the trolley-wire with which my trolley-wheels are to run in contact with straight transverse contact-lines and adjust all the trolley-wheels which are employed in a given circuit in a manner that all the straight transverse contact-lines of their central bearings are parallel to each other and to the transverse contact-lines of the trolley-wire. Where the trolley-wires are already installed in a system of trolley-railroads and their transverse contact-lines are curvilinear, I make the straight transverse contact-lines of the central bearings of my trolley-wheels of harder material than the material of which the trolley-wire is made with which it may revolve in contact for the purpose of crushing the curved transverse contact-lines of the trolley-wire into straight transverse contact-lines.

It should be understood that central bearings of trolley-wheels, which are necessarily of small diameter, when provided with straight transverse contact-lines and forced in contact with the usual pressure of about fifteen pounds against the curved transverse contact-lines of a small circular trolley-wire, the contact may not be more than one hundredth part of one square inch. Consequently the pressure of fifteen pounds with which the trolley-wheel is forced against the trolley-wire is equal to one hundred and fifty thousand pounds per square inch. The trolley-wires as generally used at present are made of different compositions of metal, with a view of hardening it as much as possible without losing too much of its conductivity. The hardest of these trolley-wires will bear a compressive strain of about twenty thousand pounds per square inch within the limit of elasticity. Therefore the harder transverse contact-lines of the central bearing of my trolley-wheel will crush the curved transverse contact-lines of the trolley-wire into straight transverse contact-lines until the area of contact is in proportion to the applied pressure. If under these conditions of the trolley-wire the transverse contact-lines of the trolley-wheel are made of softer material than the material of which the trolley-wire is made, the curved transverse contact-lines of the trolley-wire will crush the transverse contact-lines of the central bearing of the trolley-wheel as soon as the contact is established. Under these conditions a slight groove will be crushed into the circumference of the central bearing as soon as the trolley-wheel commences to revolve. This groove is composed of different lengths of radii, measured from the axis of the central bearing, which causes a sliding and abrasion of the central bearing and also of the trolley-wire. The sliding and abrasions of the metals in contact are very small at first, but increase very rapidly in pro-

portion to the depth of the groove, and if many trolley-wheels are allowed to run in such a state in a circuit the grooves destroy the trolley-wheels and the trolley-wire in a short time.

In one form of my invention of the trolley-wheel I employ an independently-revolving cylindrical or approximately cylindrical central bearing, which has for its object to reduce the slipping and abrasion of the metals of the contact-lines of the flanges of the trolley-wheel and of the sides of the trolley-wire. The independently-revolving central bearing of the trolley-wheel has also for its object to reduce the inertia which prevents producing flat faces on its circumference. For this reason a trolley-wheel fitted with the independently-revolving central bearing will also revolve in contact with a trolley-wire under considerably less pressure and with less abrasion of metal than an ordinary solid trolley-wheel.

My improvement will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a side view of a trolley-wheel fitted with an independently-revolving cylindrical central bearing. Fig. 2 is a vertical section *a a* of the side view shown in Fig. 1 and an end view of a trolley-wire of circular cross-section, except straight transverse contact-lines. Fig. 3 is a side view of a modified trolley-wheel fitted with a removable cylindrical central bearing. Fig. 4 is a vertical section *b b* of the side view shown in Fig. 3 and an end view of a trolley-wire of angular cross-section. Fig. 5 is a cross-section of another modified trolley-wheel fitted with a cylindrical central bearing made of the integral part of the rest of the wheel and with shoulders adjoining the transverse contact-lines of the central bearing.

Similar figures denote like parts throughout the various views of the drawings.

The trolley-wheel shown in Figs. 1 and 2 is made of suitable material and fitted with an independently-revolving central bearing 1, which is suitably fitted to revolve upon the separating-ring 2 and independently of the flanges 3 3, whereby slipping and abrasion of the metals in contact of the flanges, the central bearing, and also of the trolley-wire 10, may be reduced by enabling the central bearing and the flanges to revolve independently with a velocity in proportion to the length of the radii of their contact with the contact of the trolley-wire. The central bearing is made of a cylindrical form, which presents straight transverse contact-lines parallel to the straight transverse contact-lines of the trolley-wire. I thereby reduce the slipping between the trolley-wire and the central bearing of the guide-wheel and the abrasion of the metals in contact. The cylindrical form is best adapted for the central bearing of a guide-wheel which is to revolve in contact with a flat contact-surface of a trolley-wire on account of its transverse contact-lines being formed by radii of equal length. Consequently every point in the line of contact revolves with an equal velocity of all the other points of that line, and no slipping between the contact-surfaces can ensue thereby. The central bearing may be made of any suitable material; but I prefer to make it of harder material than the material of which the trolley-wire is made. Thereby the contact-lines are retained nearer to that of its cylindrical form and will correct any unevenness of the contact-faces of the trolley-wire. In the drawings I have shown straight transverse contact-lines of the central bearing of the guide-wheel; but it is evident that here, as well as with the trolley-wire, the transverse contact-lines of the central bearing when approximately straight are also embraced in my invention.

The flanges 3 3 (shown in Figs. 1 and 2) are made of suitable material and of a shape to guide the trolley-wire to the central bearing and allow it to assume the different angles with the center line of the guide-wheel, which are required to go around curves. The flanges are provided with small convex curves 4 4, which project a little above the contact-lines of the central bearing and adjoin thereto. These projections of the flanges serve to guide the guide-wheel centrally upon the central bearing in contact with the trolley-wire and also serve to reduce the slipping between the sides of the trolley-wire and the flanges. The curved cavity 5 5 of the flanges next to the convex curve serves to allow the guide-wheel to assume the different angles with the trolley-wire which are required to go around curves. The vertical lines 6 6 serve to prevent the guide-wheel from leaving or jumping the trolley-wire when the guide-wheel is forced sidewise by jolting or otherwise. The flanges are provided with central holes for mounting upon the hub 7 between the separating-ring 2 and the clamping-rings 8 8, where they are clamped to revolve in unison with the hub.

The separating-ring 2 (shown in Fig. 2) is made of suitable material and provided with a central longitudinal hole into which the hub is received. The circumference is suitably finished as a journal for the central bearing. It is made wide enough to separate the flanges sufficiently to allow the central bearing to revolve freely.

The clamping-rings 8 8 (shown in Figs. 1 and 2) are made of suitable material and provided with central longitudinal holes into which the hub is pressed. The clamping-rings are pressed upon the hub and against the flanges with sufficient force to prevent them from turning. In addition to the friction of the pressure with which they are

forced upon the hub they are prevented from moving endwise by riveting the ends of the hub.

The hub 7 (shown in Figs. 1 and 2) is made of suitable material and provided with a central hole to retain the bushing 9. The circumference is suitably finished for pressing it into the separating-ring, into the central holes of the flanges, and into the clamping-rings. After the different details are placed upon the hub in their proper positions and the central bearing is placed upon the separating-ring heads are then formed at both ends of the integral part of the hub, which serve to hold the details of the guide-wheel in their proper places.

The bushing 9 (shown in Figs. 1 and 2) is made of suitable material. Its circumference is made of a size and shape to be pressed into the hub, where it is held in place by friction. It is provided with a central longitudinal hole, which is fitted as a journal to revolve around a shaft.

Figs. 3, 4, and 5 show modifications of the construction of the guide-wheel shown in Figs. 1 and 2. Their design is governed by the general principles which are employed in the design of the first two figures. Consequently I will restrict myself to the description of the details which differ from those shown in Figs. 1 and 2. The central bearing 1^a (shown in Figs. 3 and 4) is a modification of the one shown in Figs. 1 and 2, in that it is not fitted to revolve independently of the flanges. It is of a cylindrical form and provided with a central longitudinal hole which is fitted to receive projections 5^a 5^a of the flanges, which guide it centrally with the rest of the guide-wheel. The flanges 3^a 3^a (shown in Figs. 3 and 4) are provided with a cavity composed of similar curves and vertical lines as the flanges shown in Figs. 1 and 2; but these flanges are provided with projections 5^a 5^a, which are fitted into the central hole of the central bearing, and with projections 6^a 6^a, which serve as a hub for receiving the bushing 9. The central bearing is clamped between the flanges, which are held together by bolts 4^a 4^a.

Fig. 5 is a vertical cross-section of a modified solid trolley-wheel made of suitable material, of which all its members are circular. The central bearing 1^c is made of the integral part of the rest of the wheel. It is also made of a cylindrical form. Its straight transverse contact-lines are joined by small convex curves 4^c 4^c, which are joined by concave curves 5^c 5^c, which are joined by straight lines 6^c 6^c of the flanges to perform the same function as the similar ones explained of Figs. 1 and 2.

What I claim as my invention is—

1. A trolley-wheel for use with an electrical conductor, having a central bearing fitted with straight transverse contact-lines and made of harder material than the material of which the electrical conductor with which it may revolve in contact is made, shoulders which adjoin and project beyond the central bearing, but which are smaller than the largest diameter of the circular flanges of the trolley-wheel, for the purpose specified.

2. A trolley-wheel for use with an electrical conductor, having a central bearing fitted with straight transverse contact-lines and made of harder material than the material of which the electrical conductor with which it may revolve in contact is made, convex curves which adjoin and project beyond the central bearing, but which are smaller than the largest diameter of the circular flanges, for the purpose specified.

3. A trolley-wheel for use with an electrical conductor, having a central bearing fitted with straight transverse contact-lines and made of harder material than the material of which the electrical conductor with which it may revolve in contact is made, flanges which are provided with a cavity which is composed of straight lines near their largest diameter, and concave curves joined thereto near the central bearing, for the purpose specified.

4. A trolley-wheel for use with an electrical conductor, having a central bearing fitted with straight transverse contact-lines, flanges which are fitted with convex curves near the central bearing, and concave curves joined thereto, for the purpose specified.

5. A trolley-wheel for use with an electrical conductor having a central bearing fitted with straight transverse contact-lines, flanges which are fitted with convex curves near the central bearing, concave curves joined thereto, and straight lines near their largest diameter, for the purpose specified.

In testimony whereof I have hereunto set my hand.

ALEXANDER H. MATHESIUS.

Witnesses:
GEORGE A. MATHESIUS,
FRANCIS PRUD.