

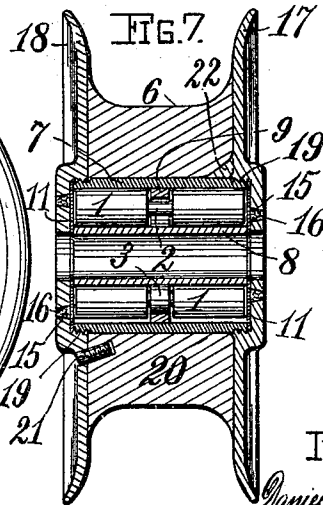
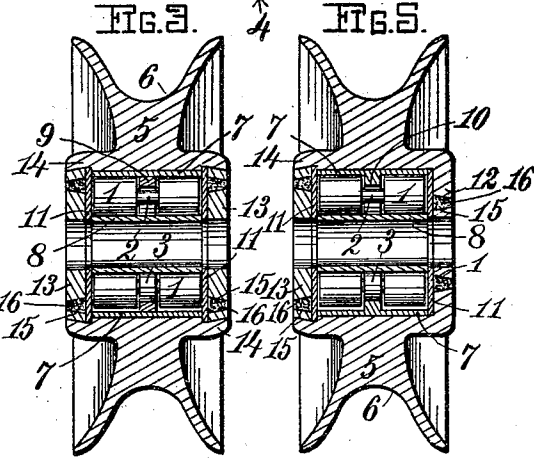
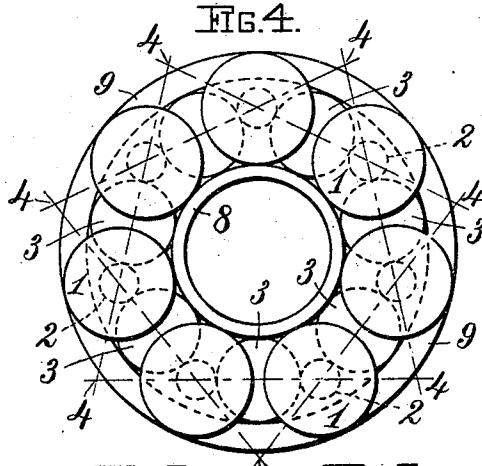
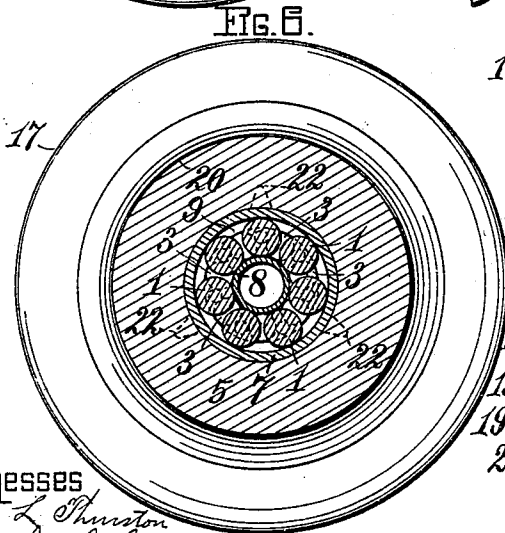
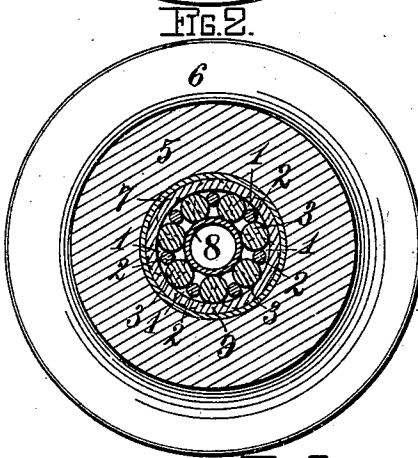
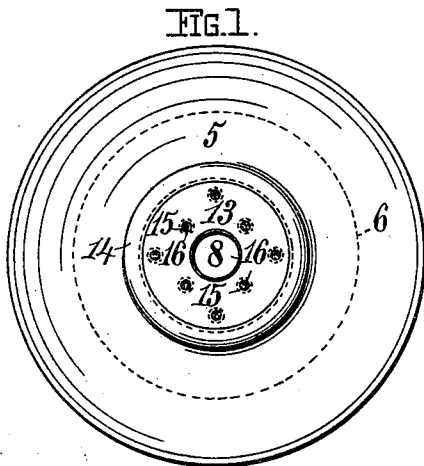
No. 683,772.

Patented Oct. 1, 1901.

D. E. KEMPSTER.
TROLLEY WHEEL.

(Application filed Apr. 1, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

DANIEL E. KEMPSTER, OF BOSTON, MASSACHUSETTS.

TROLLEY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 683,772, dated October 1, 1901.

Application filed April 1, 1901. Serial No. 53,833. (No model.)

To all whom it may concern:

Be it known that I, DANIEL E. KEMPSTER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Trolley-Wheels, of which the following is a specification.

This invention relates to improvements in trolley-wheels used upon the cars of an electric railroad and for similar purposes; and it has for its objects to introduce a roller-bearing within the body of the wheel which will eliminate friction from the spindle upon which the wheel is mounted, whereby dust and dirt will be excluded from the moving parts of the roller-bearing, and to otherwise improve the wheel, as will be understood by the complete description of the invention.

The invention consists in the novel construction, arrangement, and combinations of parts, as will be fully described hereinafter and set forth in the claims hereunto annexed.

The invention is carried out substantially as illustrated on the accompanying drawings, which form an essential part of this specification, and whereon—

Figure 1 represents a side elevation of my improved trolley-wheel. Fig. 2 represents a central section of the wheel shown in Fig. 1 in a plane at right angles to the axis of rotation of said wheel and showing a section of the parts of the roller-bearing contained within said wheel. Fig. 3 represents a central vertical section of the wheel shown in Fig. 1 in a plane which contains the axis of rotation of the wheel, also showing a section of the roller-bearing contained within the body of the wheel. Fig. 4 represents a detailed end view of the preferred form of roller-bearing to be used in my improved trolley-wheel, showing the bearing assembled and removed from the wheel. Fig. 5 represents a section similar to the section shown in Fig. 3, but showing a slightly-modified form of the body of the wheel. Fig. 6 represents a section similar to that shown in Fig. 2, but showing another modified form of the body of the wheel. Fig. 7 represents a section similar to that shown in Fig. 3, but showing the form of body of the wheel shown in Fig. 6.

Like characters of reference refer to like parts wherever they occur on the different parts of the drawings.

The preferred form of roller-bearing to be used in my improved trolley-wheel and which has been illustrated on the different views of the drawings consists of a series of rolls 1 1, provided with annular grooves thereon forming reduced portions or necks 2 2, substantially as shown. Within these grooves on the rolls, one between each two of the rolls in the series of rolls and engaging the necks of the rolls and traveling thereon, is placed a series of rolling separators or disks 3 3, which separate the rolls between which they are placed. These separators are of lesser diameter than the rolls they separate and by engaging the reduced portions or necks of the rolls can be made of such a diameter as to separate said rolls but a very little, thus enabling the use of as many rolls as possible in the series of rolls. As the rolls act to sustain the load carried by the bearing, it is essential that the greatest possible number of rolls should be used in order to distribute the load as much as possible. By the construction above described it will be seen that this desired distribution of the load is obtained, as the adjacent rolls could be so located that their surfaces will just clear each other when the bearing is operated.

The separators are so proportioned to the necks of the rolls that the axis of rotation of each separator will lie within or substantially within a plane passing through the axes of rotation of the two rolls separated by said separator, as shown by broken lines in Fig. 4 at 4 4 thereon.

The body 5 of the trolley-wheel is provided on its exterior with an annular groove 6 for the reception of the trolley-wire and by which the wheel is kept in contact with said wire. The body of the wheel is also provided with a central cylindrical chamber formed therein for the reception of the roller-bearing to be used in the wheel, which chamber is bushed with an annular bushing or lining 7, made from hardened or wear-resisting material, preferably from hardened steel. This bushing forms an outer track for the series of rolls 1 1 of the roller-bearing, while an annular sleeve or bushing 8, of similar hardened or wear-resisting material, forms an inner track for said rolls, thus confining the rolls between an outer and an inner track formed by the

bushing 7 and the sleeve 8, made from hardened or wear-resisting material. The sleeve 8 is adapted to fit upon the spindle or shaft upon or around which the trolley-wheel is to turn, which spindle or shaft has not been shown on the drawings. The sleeve 8 also forms an inner track for the separators, preventing them from accidentally moving inward toward the center of the bearing, while the inner circumference of a loose ring 9, as shown in Fig. 2 or in Fig. 3, or the inner circumference of an annular inwardly-projecting rib 10 on the interior of the bushing 7, as shown in Fig. 5, forms an outer track or retaining means for the separators to prevent them from accidentally moving outward from the center of the bearing. On account of the spinning movement imparted to the separators by their contact with the necks of the rolls which they separate, which necks have surface movements in opposite directions, said separators will bear with a very light pressure upon either of their retaining-tracks, if in fact they bear at all upon said tracks, and consequently said tracks may be made in one piece with the inner or outer tracks for the rolls or they may be made as separate and independent pieces, as desired, without adding materially to the friction of the bearing, and I have shown the retaining means or tracks for the separators as being constructed in various ways on the different views of the drawings.

Within the cylindrical chamber in the wheel 5 for the reception of the roller-bearing and at each end of the rolls 1 1 of said bearing is placed a hardened or wear-resisting plate or washer 11, which washers may be inserted from opposite sides of the wheel, as shown in Fig. 3, or both washers may be inserted from the same side of the wheel, as shown in Fig. 5, in which latter case the body 5 of the wheel will be provided with the inwardly-projecting flange 12, which flange preferably projects sufficiently near to the spindle or shaft upon which the wheel turns to cover the end of the sleeve 8 and acts to hold said sleeve within its proper place within the bearing. The washers 11 are of such a size that they cover the ends of the bushing 7, and the holes in the center of the washers are just large enough to admit of the easy insertion of the spindle or shaft within the sleeve 8. Thus the washers 11 11 when secured in place, as hereinafter described, act both to prevent wear caused by the ends of the rolls coming into contact with said washers and also to hold the parts of the roller-bearing from moving sidewise from their proper places within the wheel.

In order to hold the washers 11 11 in place within the cylindrical chamber in the wheel to reinforce or strengthen said washers and to provide means for retaining a suitable lubricating material to lubricate the joints between the sides of the wheel and the trolley-harp or other article in which the wheel is

journaled, I place a second washer 13 upon the washer 11 and within the cylindrical chamber in the wheel and compress, rivet, or otherwise secure it in place; but I prefer to secure it in place by making the part of the wheel in which these washers rest in the form of a sidewise-projecting flange 14, slightly tapering the periphery of said washer 13 and compressing the projecting flange upon the tapered periphery of the washer, substantially as shown in Figs. 2 and 3. The washers 13, (shown in Figs. 3 and 5,) as well as the flange 12, (shown in Fig. 5,) are provided with the tapered perforations 15 15, which are covered at their inner ends by the washers 11 11 when in place within the wheel, and thereby form tapered recesses for the reception of a suitable lubricating material 16, which lubricant is preferably made in a plastic state and pressed into the cavities formed by the perforations 15 and washers 11, and which serves to lubricate the joint between the sides of the trolley-wheel and the fork, harp, or other article which carries the wheel, or between the sides of the wheel and the contact-springs, which bear against the sides of the wheel and convey the current of electricity from the wheel to the motor of an electric car when the wheel is used upon an electric car, substantially as shown in Figs. 1, 3, and 5.

From the above description of my device it will be seen that by the construction of the roller-bearing used I am able to practically eliminate all friction from the bearing; that the bushing 7, sleeve 8, and washers 11 11 form an annular chamber surrounding the spindle or shaft upon which the wheel is to turn and within which the moving parts of the roller-bearing are located, the entire walls of which chamber are formed of hardened or wear-resisting material, and that by the construction of this chamber dust and dirt are excluded from coming into contact with any of the moving parts of the roller-bearing and causing them to quickly wear out.

It is a fact that when a roller-bearing as above described is used in a trolley-wheel for an electric-railroad car and the wheel is made in the shape illustrated in Figs. 3 and 5 the outer groove and the body of the wheel become worn out long before the roller-bearing wears out. This is caused by the contact of the trolley-wire with the outer groove in the wheel and the great speed at which the wheel travels upon said trolley-wire, and it is also caused by the friction produced between the wheel and the trolley-wire when the direction of the wire is changed from a direct or straight course. To obviate the necessity of discarding a partly-worn roller-bearing because the outer groove or body of the wheel has worn out or the necessity of entirely renewing the body of the wheel when the groove has worn out, and also to lessen the wear or friction between the wheel and trolley-wire when the course of the wire is changed

from a straight line, I may construct the body of the wheel in a manner substantially as shown in Figs. 6 and 7, which construction is substantially as follows: The flanges 17 and 18 of the wheel, which flanges constitute the side flanges of the groove 6 in the wheel, extend on each side of the spindle or shaft upon which the wheel is mounted, and these flanges are provided with the tapered recesses or perforations 15 for the reception of the lubricating material 16. The cylindrical bushing 7, which forms the outer track for the rolls 1 1 of the roller-bearing, is screwed at its opposite ends into screw-threaded recesses 19 19 in the flanges 17 and 18 and acts to hold the parts of the wheel assembled. The flanges 17 and 18 are preferably made of hardened or wear-resisting material similar to the bushing 7, sleeve 8, and washers 11 11, in order to prevent the wire from wearing said flanges. The tread portion of the groove 6 in the wheel shown in Figs. 6 and 7 is formed upon the exterior of an annular body or ring 20, of bronze or other suitable material, which ring is placed upon the outside of the bushing 7, between the side flanges 17 and 18. It will be seen that this ring 20 receives the wear due to the trolley-wire and can be replaced by another ring without disturbing the adjustment of the parts of the roller-bearing contained within the bushing 7. The flanges 17 and 18 and the ring 20 are locked in an assembled position by means of the screw 21 and the fins or fillets 22 on the flange 17, which enter recesses on the interior of the ring 20, as shown, or they may be locked in any other and well-known manner, if so desired. The roller-bearing contained within the wheel shown in Figs. 6 and 7 consists of the series of rolls 1 1, series of separators 3 3, sleeve 8, loose ring 9, forming a track for the separators, and the washers 11 11, substantially as shown and described in relation to Figs. 2 and 3.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. A trolley-wheel provided with a central cylindrical chamber, a roller-bearing within said chamber, thin wear-resisting end washers placed within said chamber at each end of the roller-bearing, and reinforcing plates or washers secured within said chamber outside said wear-resisting washers, for the purpose set forth.

2. A trolley-wheel provided with a central cylindrical chamber, a roller-bearing within said chamber, thin wear-resisting end washers placed within said chamber at each end of the roller-bearing, perforated reinforcements outside said wear-resisting washers, and a lubricant in the perforations in said reinforcements, for the purpose set forth.

3. A trolley-wheel provided with a central cylindrical chamber, a roller-bearing within said chamber, retaining-washers placed within said chamber from the end of the chamber, and a side flange on the wheel compressed upon the periphery of said washers to hold said washers and the roller-bearing in place, for the purpose set forth.

4. A trolley-wheel provided with a central cylindrical chamber, a roller-bearing within said chamber, a sleeve also within said chamber and forming an inner track for the rolls of the roller-bearing, retaining end washers placed within the said chamber from the end thereof, and a side flange on the wheel compressed upon the periphery of the said washers to hold said washers, roller-bearing and sleeve in their places within the said chamber, for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

DANIEL E. KEMPSTER.

Witnesses:

HENRY CHADBURN,
ANNA B. GILCHRIST.