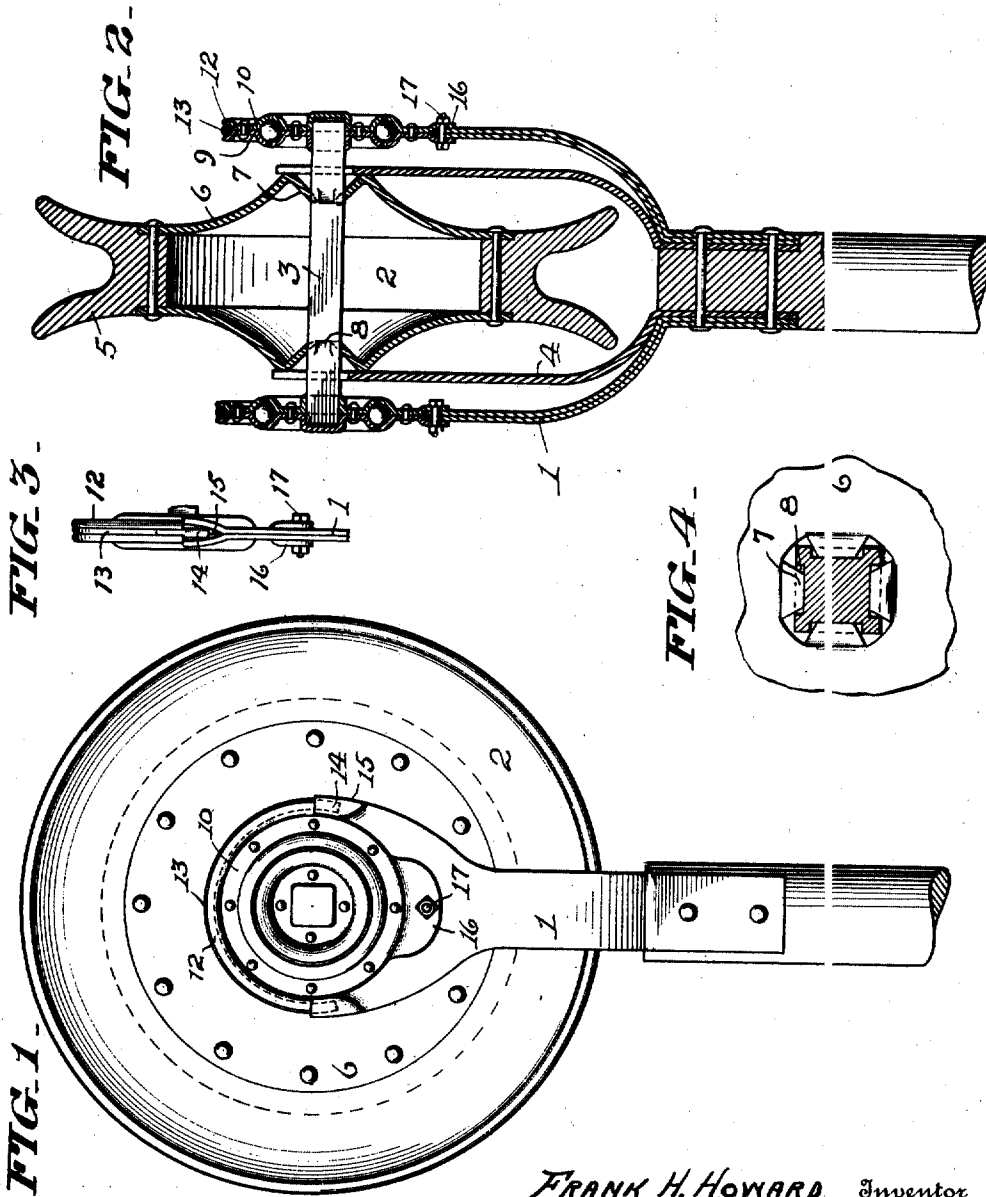


F. H. HOWARD.  
TROLLEY.  
APPLICATION FILED APR. 8, 1911.

1,008,543.

Patented Nov. 14, 1911.



FRANK H. HOWARD Inventor

Witnesses

Daniel Webster, Jr.  
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# UNITED STATES PATENT OFFICE.

FRANK H. HOWARD, OF READING, PENNSYLVANIA.

TROLLEY.

1,008,543.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed April 8, 1911. Serial No. 619,799.

*To all whom it may concern:*

Be it known that I, FRANK H. HOWARD, citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Trolleys, of which the following is a specification.

This invention relates to improvements in trolleys intended for use on electric street railways employing overhead feed wires.

The object of the invention is to provide a device of comparatively simple construction in which the friction is reduced to a minimum; one in which the bearings are insulated from the electric current, and one in which the wheel together with its shaft and bearings may be easily removed from the harp and replaced either in the same or in reversed position.

The invention consists of a harp provided with contact springs adapted to convey the current from the wheel to the trolley pole, and a wheel secured to a shaft of suitable insulating material, which shaft carries on each end the inner section of a ball race, the outer section of which is provided with means for engaging the ends of the harp when placed in position thereon.

The invention is more fully described in the following specification and clearly illustrated in the accompanying drawing, in which:—

Figure 1 is a side elevation of my trolley. Fig. 2 is a central sectional view thereof. Fig. 3 is an edge view of one of the ball races and the upper end of the harp. Fig. 4 is a detail view, showing how the shaft is secured to the wheel.

The numeral 1 designates the harp which is preferably composed of two sheets of metal, and 2 designates the contact wheel.

3 designates a rectangular shaft of fiber or other suitable non-conducting material, to which the wheel is secured in a novel manner, which will be later described.

The numeral 4 designates the contact springs intended to convey the current from the contact wheel to the trolley pole, these springs are slotted at their upper ends to permit the shaft to pass through them without contact, while the said upper ends bear against the wheel hub.

The numeral 5 designates the contact member or bearing surface of the wheel and is shown in the form of a metal ring with the

usual groove in its outer edge for contact with the feed wire.

6 designates the side plates which make the web and hub of the wheel. These plates are secured to the rim member 5 in any suitable manner, as by rivets, and before being secured their centers are perforated to permit the shaft to pass through them, as shown more clearly in Fig. 4. In perforating these plates, tongues 7 are permitted to remain in the cut portion of the sheet, and these tongues are bent inwardly at an angle.

The shaft 3 is formed with a series of depressions, 8, corresponding in number and adapted to register with the bent tongues 7 of the plates. The depressions are tapered in opposite directions so that the shaft may be entered from either side. On each end of the shaft is carried the inner section of a ball race formed with a rectangular central chamber adapted to receive the ends of the wheel shaft 3. The outer sections of the ball races comprise members 9 and 10, secured together with rivets.

The casing members 9 and 10 are formed with flanges 12 around the upper half of their diameters and between these flanges I locate a spring catch 13 whose free ends 14 extend below the horizontal center line when the parts are in position as shown. These lower ends of the catch 14, are adapted to enter pockets 15 formed in the upper ends of the harp by spreading the sheets at that point, as shown in Fig. 3. The casing members 9 and 10 are also formed with a smaller flange 16 at the lower or under side thereof, and these flange members are adapted to engage the harp edge, and means in the form of bolts 17 may be provided for securing the casings to the harp when so placed.

The wheel in my device, is insulated from its shaft, even though the shaft is substantially an integral part thereof, when secured as above described. It is evident that to remove the wheel from the harp, it is only necessary to remove the bolts 17 and the entire wheel and its bearings may be lifted from the harp, the catch members 14 being of spring material will easily permit this removal. To replace the parts, either in the same or in reversed position, the shaft is placed in the open upper ends of the contact springs and the flanges 16 will seat on the harp while the catches 14 will spring in

the pockets 15 and hold the parts together. As an extra precaution however, against accidental disengagement of the wheel and bearings from the harp, I have provided 5 the fastening bolts 17.

Having thus fully described my invention what I claim and desire to secure by Letters Patent is:—

1. In a trolley the combination with a harp having pockets in its upper ends and open ended contact springs, of a shaft, a wheel permanently secured to the shaft, said shaft being formed of non-conducting material, the inner section of a ball race located 15 on each end of the shaft, outer ball race sections, a spring located in each of said outer sections adapted to engage the pockets in the harp, and means for securing the ball races to the harp.

2. In a trolley the combination with a harp comprising two metal sheets formed with pockets at the upper ends and contact springs for the wheel, of a contact wheel, a non-conducting shaft secured to the wheel, 25 the inner sections of ball races carried on the ends of the shaft, outer ball race sections, a peripheral spring secured in each outer section whose ends are adapted to engage the pockets in the harp, flanges formed 30 on the bearing casings adapted to engage

the harp, and means for securing said flanges to the harp.

3. In a trolley the combination with a harp comprising two metal sheets formed with pockets at the upper ends and contact 35 springs for the wheel, of a contact wheel comprising a solid rim and sheet metal plates forming the web and hub portion, tongues pressed from the hub portion and bent inwardly, a non-conducting shaft 40 formed with depressions adapted to be engaged by the tongues, ball races on the ends of the shaft, and means for securing the ball races to the harp.

4. In a trolley, a harp, a wheel, a shaft 45 of non-conducting material fixed to the wheel, contact springs engaging the wheel and the harp, ball races comprising inner and outer sections, the inner sections of which are carried by the shaft and the outer 50 sections being provided with springs for engaging the harp, said wheel, shaft and ball races being collectively removable from and interchangeable in the harp.

In testimony whereof I affix my signature 55 in presence of two witnesses.

FRANK H. HOWARD.

Witnesses:

ED. A. KELLY,  
CLARA E. YOUNG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."