(No Model.)

# B. O. PAINE.

## TROLLEY WHEEL.

No. 532,812. Patented Jan. 22, 1895.

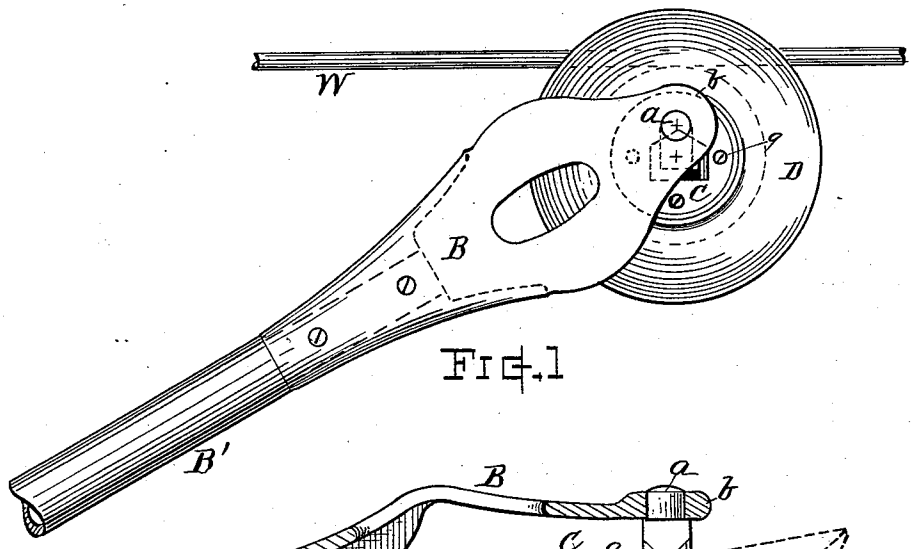


FIG. 1

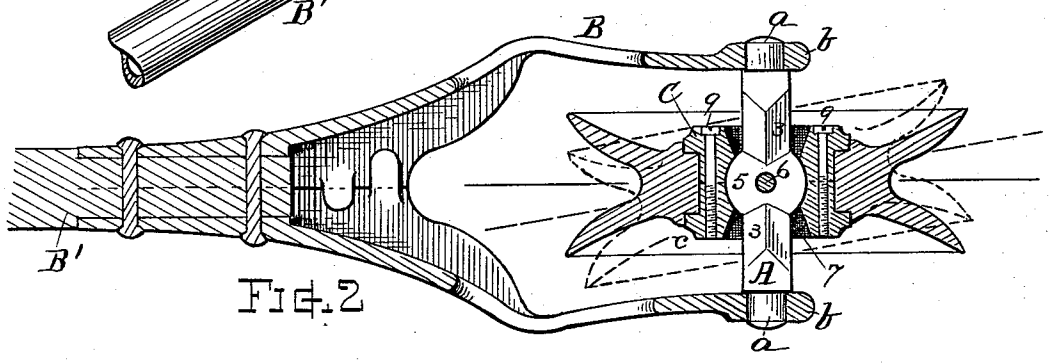


FIG. 2

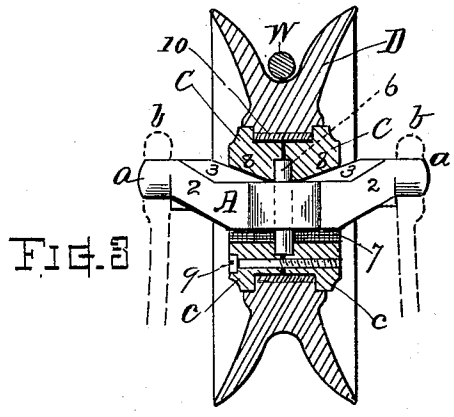


FIG. 3

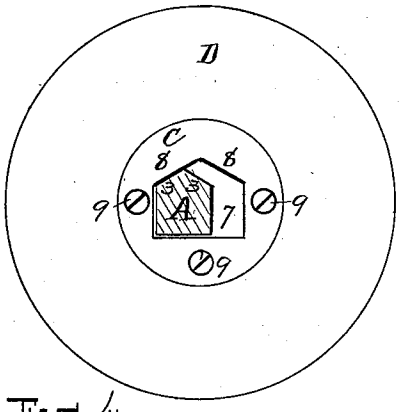


FIG. 4

**Witnesses.**

J. R. Barton

Ella P. Blenus.

**Inventor.**

Benjamin O. Paine

By Chas. A. Burleigh

Attorney.

# UNITED STATES PATENT OFFICE.

BENJAMIN O. PAINE, OF MILLBURY, MASSACHUSETTS.

## TROLLEY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 532,812, dated January 22, 1895.

Application filed June 11, 1894. Serial No. 514,147. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN O. PAINE, a citizen of the United States, residing at Millbury, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Trolleys for Electric Cars, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

My invention relates to the construction of the trolley and the manner of hanging or supporting the wheel in connection with the fork or pole-end; the object being to provide a simple and efficient trolley that will follow the line wire with greater ease and precision; conform its position to curves and switches, and maintain its connection and proper relation under the varying conditions of service. These objects I attain by mechanism constructed as shown in the drawings, wherein—

Figure 1 is a side view of my improved trolley. Fig. 2 is a section at horizontal position. Fig. 3 is a vertical section of the trolley-wheel, its axle-bar shown in side view, and Fig. 4 is a diagram showing the relative action of the inclined surfaces.

In my improved trolley an oscillating bar or axle A is hung by its end journals *a* to swing free in bearings *b* at the end of the pole-head or fork B, which latter is formed of two suitable side pieces that are rigidly attached to the end of the trolley-pole B′ or to a rod that constructively forms a part of the pole. The axle-bar A is preferably downwardly offset at 2 between the bearings *a* and the central part, and is fitted with inclined top surfaces 3 at either side. Its center portion is formed with a circular horizontally flat boss or disk 5 having a vertical central opening containing a stud or pin 6, the end of which projects above and below the axle-bar, as shown in Fig. 3.

A two-part non-rotative hub C having a central opening 7 that fits the circular surfaces of the disk 5 is mounted on the axle-bar A and centrally confined loosely by the pin 6 in a manner to have lateral swiveling action. The opening 7 through said hub is vertically somewhat greater than the thickness of the axle-bar so as to afford slight upward play, and the top of said opening is formed with inclined surfaces 8 that correspond with the inclines 3 on the axle-bar, and rest thereon at both sides when the parts are axially in alignment with each other. The sides of the opening are flared to permit limited sidewise rocking or swivel action of the hub on the center-pin 6. The two parts of the hub are secured together by screws or rivets 9 and their exterior surface is turned off and properly fitted as a bearing for supporting the trolley-wheel D which is mounted to revolve thereon, suitable flanges *c* being provided for retaining the wheel in place laterally on its bearing while allowing its free rotation thereon. The periphery of the trolley-wheel is grooved in suitable manner for receiving and running upon the line-wire W. If desired anti-friction bushing or material 10 can be introduced at the bearing surfaces between the hub and trolley-wheel. (See Fig. 3.)

This trolley can be applied to the ordinary trolley-pole employed on electric cars.

In the operation, the trolley-wheel when it strikes a curve or switch in the line-wire can freely assume an oblique or inclined position between the forks by the swiveling of the hub on the axle-bar, (see dotted lines Fig. 2) and thus automatically adjusts itself to conform to the direction of the line at the point of contact, thereby avoiding cramping the line-wire within the groove of the trolley-wheel, or excessive wear on the wire or wheel by reason of side pressure and drag. When this swiveling action occurs the inclined surfaces 8 and 3 on the interior of the hub and top of the axle-bar slide upon each other and cause the parts to lift on the pin 6 (see Fig. 4) and by a reaction thereof to automatically return to normal central position when the curve or deviation of the line is passed. The inclines also serve to maintain a normal tendency for the wheel to remain at central position of alignment. The rocking of the axle-bar serves to relieve the shock when the trolley-wheel strikes the switch or line-supporters; prevents strain on the mechanism, and avoids the jump or throwing off of the trolley-wheel from the line-wire. This rocking of the axle-bar also allows the parts to always stand in upright position whether the pole is at higher or lower inclination, thereby permitting the

wheel to easily conform its position to every crook or deviation in the wire in a sensitive and ready manner. The trolley-wheel automatically adjusting itself to the direction of the line avoids crosswise action of the wire in the groove, reduces the liability of running off and renders the running friction and wear very light.

The non-rotatable swiveling hub can be used with an axle-bar formed straight instead of downwardly offset, if in any instance preferred.

What I claim as my invention herein, to be secured by Letters Patent, is—

1. In a trolley for electric cars the downwardly offset axle-bar journaled at its ends and arranged to swing or oscillate in the bearing-fork, in combination with the bearing-fork and a trolley-wheel mounted to rotate about a bearing on said axle-bar, the axis of the trolley-wheel being lower than the axis of the axle-bar bearings, for the purpose set forth.

2. In a trolley for electric cars the rotatable trolley-wheel mounted to have lateral swiveling action, in combination with a backwardly and forwardly swinging axle-bar horizontally journaled in the trolley-pole head or fork.

3. The combination of the axle-bar having the inclined surfaces thereon, the non-rotatable hub centered for swiveling laterally on said axle-bar and internally fitted with inclines that act against the inclined surfaces on said axle-bar; and the trolley-wheel supported on and rotatable upon said hub, for the purpose set forth.

4. A trolley comprising a peripherally grooved wheel, a non-rotatable peripherally flanged hub formed in two parts, and having a central circular cavity, means for attaching the two parts of the hub, and a non-rotatable axle-bar having a circular disk and center-pin fitting within said hub, the ends of said axle-bar supported in the fork or bifurcated head attached to the trolley-pole.

5. A trolley mechanism comprising the oscillating downwardly offset axle-bar journaled in the pole-head or fork, a non-rotatable hub mounted on said axle-bar, a centering pin connecting said hub and axle-bar on which said hub has lateral swiveling action, oppositely inclined seating surfaces on the hub and axle-bar that normally maintain said parts in central alignment, and the grooved trolley-wheel rotatable on said hub.

Witness my hand this 7th day of June, A. D. 1894.

BENJAMIN O. PAINE.

Witnesses:
CHAS. H. BURLEIGH,
ELLA P. BLENUS.