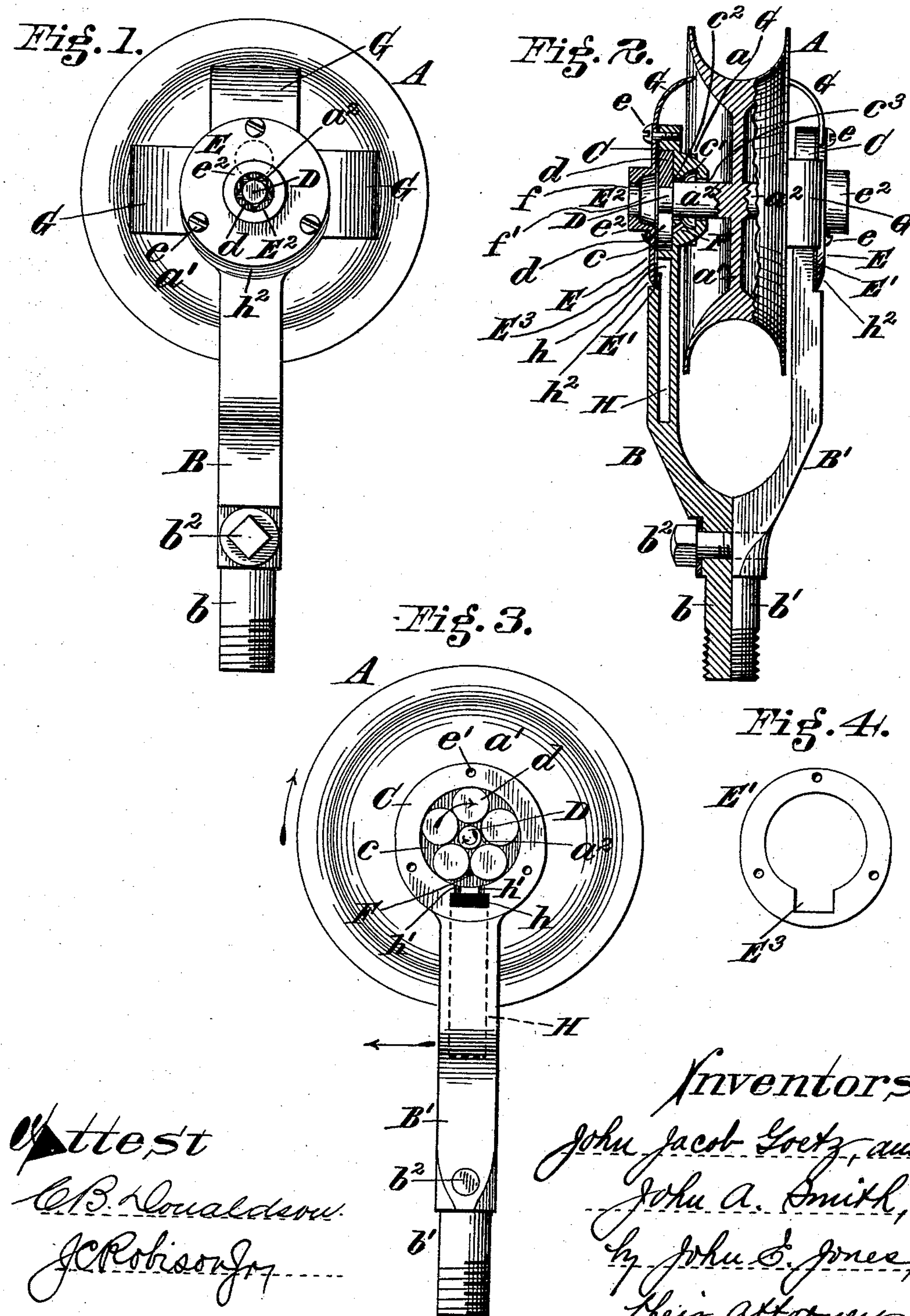
(No Model.)

J. J. GOETZ & J. A. SMITH.

TROLLEY WHEEL.

No. 491,014. Patented Jan. 31, 1893.



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UNITED STATES PATENT OFFICE.

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TROLLEY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 491,014, dated January 31, 1893.

Application filed May 20, 1892. Serial No. 433,767. (No model.)

To all whom it may concern:

Be it known that we, JOHN JACOB GOETZ, residing at Covington, in the county of Kenton, and JOHN A. SMITH, residing at Dayton, in the county of Campbell, State of Kentucky, citizens of the United States, have jointly invented certain new and useful Improvements in Trolley Devices for Electric Railways, of which the following is a specification.

Our invention relates,—more particularly—to improvements in the bifurcated-arm or "harp" and the accompanying bearings for the trolley, which are mounted at the upper or outer end of the customary supporting-pole or current conductor-arm carried by the car, the arrangement, construction and operation of which will be fully hereinafter described and particularly pointed out in the claims.

In the accompanying drawings,—Figure 1 is a side elevation of a trolley-device embodying our invention; Fig. 2 a front elevation with one-half thereof broken and in transverse section on a central vertical line through the axis; Fig. 3 an elevation similar to Fig. 1, but of the other side of the device, and omitting the outer face-plate or journal-cap, to present a clear view of the trolley-bearing and lubricant passages; and Fig. 4 a detail front elevation, clearly showing one of the gaskets or packing-washers used under the outer face-plate or journal-cap of both the arms in said "harp."

A represents the trolley-wheel, having the usual conductor-groove *a*, and preferably constructed with web *a'* and horizontal journals a^2, the latter projecting laterally and integrally from both sides of said web, as best seen in Fig. 2. The usual bifurcated supporting-frame or "harp"-arm for said trolley is constructed in two corresponding parts B, B', united at their lower ends *b*, *b'*, by means of a screw b^2. The ends *b*, *b'*, are semi-cylindrical in cross-section, and screw-threaded, to form a male-shank or tang for engagement with a suitable socket at the upper end of the customary trolley supporting-pole and current conductor-arm (not necessarily shown herein), carried by the car.

C, C, represent journal-boxes constructed at the upper ends of the "harp"-arm B, B', each box containing a large, outwardly-facing cylindrical recess or chamber *c*, and an inner circular cup-shaped recess or chamber *c'*, both recesses having corresponding central openings or orifices c^2 and c^3, respectively, of slightly larger diameter than that of the said journals a^2, for the free outward protrusion of said journals.

D, D, represent the outer shouldered ends of journals a^2, and *d* represents each one of an annular or circular series of rollers in the recesses or chamber *c* of both journal-boxes C, C. These rollers fit just loosely enough in said outwardly-facing cavities or recesses to permit each to freely rotate or turn upon its axis and also to move around the journals within the cavity without materially affecting or interfering with the free rotation of the other rollers and the shouldered outer ends D, D, of said trolley journals rest within and engage said rollers, thereby forming an anti-friction roller-bearing for both said journals. By giving the small amount of play to the rollers, the weight of the trolley wheel will be born upon the lower rollers which will cause the adjacent faces of the rollers to be held in such relation to each other as to permit of the surfaces of the rollers to move in opposite direction without any material friction, and especially as the rollers are partially submerged in the oil cup at that point. The weight of the trolley wheel thus being taken up by the lower rollers, the frictional contact between the upper rollers is only that which is occasioned by their own weight, which is practically nothing. In fact the contact of the rollers around the journal of the trolley wheel, one with the other, is so slight, that at times the rotation of some of the rollers above the trolley wheel is momentarily stopped or made to go in the opposite directions from that shown by the arrows in Fig. 3 of the drawings.

E, E, represent face-plates or caps fitting over the outwardly-facing recesses or cavities *c* of the journal-boxes, being secured in place by means of screws *e*, whose shanks engage threaded holes *e'* in the rims of said journal-boxes. E' represents a gasket or packing-washer of any suitable material, fitting

between each of the face-plates and their attaching box-rims or flanges. The caps E are preferably constructed with central openings or orifices E^2 having outwardly projecting hubs e^2, as best seen in Fig. 2. The bore or central orifice of each of these caps is shouldered, to form two diameters, the outer diameter f being less than the inner one f', and the latter inclined or tapered forming an inner countersink, as seen in said Fig. 2. This construction prevents any excess of oil from escaping out of the outer end of the bore until it has had time to flow down the inclined wall of the inner counter sunk portion and escape into the larger oil receptacle, or be taken up by the rollers or axle.

F represents a downwardly inclined aperture constructed in both the journal-boxes, and leading from the inner recess c' to the recess c.

G represents each one of three radial arms constructed on and projecting from the periphery of both journal-caps E, and flaring or curved inwardly toward the trolley, as shown in Figs. 1 and 2. The inner ends of arms G project within the outer line of the concave faces of the trolley at both sides, and at sufficient distance from the trolley to prevent touching or arcing contact, and thereby form guards and guides to ward off the trolley-wire and prevent its entering or being caught in the spaces between the trolley and "harp"-arms.

H represents a vertical receptacle or cavity constructed within that portion of each harp-arm, commencing with the journal-box at the top, and terminating on or about a line with the lower end of the straight portion of both said "harp"-arms, as clearly shown in Fig. 2, and in dotted lines in Fig. 3, and having an opening or orifice h, at its upper end.

h', h', are vertical grooves cut in the outer face of each journal-box, and leading from the outer orifices h of the receptacles H, to the roller-bearing recesses c.

E^3 represents a notch cut in each gasket or packing-washer E', to make due allowance for the orifice h, and grooves h', and provide an unobstructed vertical passage between each of said receptacles H and recesses c.

The caps E are each provided with a lower rounded extension h^2, and the lower portions of the gaskets are also extended to correspond therewith, said cap-extensions being provided to form suitable coverings for said receptacle-orifices h.

In the operation of our trolley-device the oil or other lubricant is suitably injected or applied through the journal-caps, the open central orifices therein facilitating said application of the lubricant, and also permitting a clear and ready view or inspection of the interior of the roller-bearings at all times, and for any other suitable purpose. The lubricant circulates freely within each box, the inwardly flaring orifices tapered holes of the journal caps and the semi-circular walls of the recesses c' serving to maintain it within said boxes and properly guide it toward the roller-bearings, and the apertures F permitting it to flow freely from one recess c' to the other c, and the vertical grooves h', h', furnishing suitable passages leading to the orificed-cavities H, h, below. The cavities H with their outlets h, h', can be used in two ways, viz: on the one hand to form catch-basins or receptacles to receive and contain the overflow or waste, such as sediment, dust, metal-wearings, and the like from the bearings; and, on the other hand, to form storage-reservoirs for the lubricant, which may be placed therein before the caps E are secured in place, the said lubricant being drawn or projected therefrom to the journal-bearings by the centrifugal action of said bearings, or the movements of the device caused by the swinging or rocking motion of its supporting pole or arm, which latter action would rock or agitate the lubricant upward, and cause more or less of it to overflow, spray, or otherwise ooze out of the orifices h, and thence through or along the grooves h' to the bearings. This anti-friction form of bearings for the trolley, constructed and mounted in boxes at the upper ends of the harp; and the means provided within said harp for lubricating the same, are at once simple, durable and economical, and the wear usual in trolley-devices is, by our invention, reduced to a minimum and barely perceptible. It is obvious that, instead of constructing the journals integral with the web of the trolley, a central bore or hub could be made in said web, and a transverse shaft or spindle rigidly secured therein with its opposite ends projecting beyond said hub at both sides, for proper engagement with the roller-bearings.

We claim—

1. In a trolley device, the combination, with a bifurcated harp-arm, the lower end of which is adapted to be secured to the trolley pole, and the upper end of each portion of the arm is perforated and provided with an outwardly facing cylindrical recess around the perforation, a trolley wheel journaled in the arm, and provided with an axle rigidly secured thereto, the ends of which axle project through the said perforations into the respective recesses, a series of rotary bearings within each recess around each end of the axle, and a cap upon the outer surface of each portion of the arm, substantially as set forth.

2. In a trolley device, the combination, with a bifurcated harp-arm, the lower end of which is adapted to be secured to the trolley pole, and the upper end of each portion is perforated and provided with an outwardly facing cylindrical recess around said perforation, also with a circular substantially cup-shaped recess to the rear of said outwardly facing recess, said recesses communicating with each other by means of an aperture, a trolley wheel journaled in the arm and provided with an axle rigidly secured thereto, the ends of said axle projecting through the registering per-

forations of the arm, and into the cylindrical recesses, a series of rotary bearings around each end of the axle within the cylindrical recess, and a cap upon each portion of the arm, substantially as set forth.

3. In a trolley device, the combination, with a bifurcated harp-arm, the lower end of which is adapted to be secured to the trolley pole, and the upper end of each portion of the arm is perforated and provided with an outwardly facing recess around each perforation, a trolley wheel journaled in the arm, the axle of which is rigidly secured thereto and rotates therewith, and the outer ends of which axle are shouldered, each shoulder being even with the bottom of the recess upon that side, a cup upon each portion of the arm, a series of cylindrical rollers around the reduced portion of each end of the axle within its respective recess, whereby the end thrust and the rotary motion of the axle is taken up by the rollers, substantially as set forth.

4. In a trolley device, the combination, with a bifurcated harp-arm, the lower end of which is adapted to be secured to the trolley pole, and the upper end of each portion of the arm is perforated and provided with an outwardly facing cylindrical recess, each of said portions being also provided with a recess or an oil receptacle, a trolley wheel journaled in said perforations, the end of the axle of which projects into its respective recess, a series of rotary bearings in each recess around the axle, a perforated cap upon each portion of the arm, the inner portion of which perforation is enlarged or counter-sunk, and a gasket between the cap and the bearings, the inner edge of which is cut away to form a communication between the two recesses, substantially as set forth.

5. In a trolley device, the combination, with a bifurcated arm, the lower end of which is adapted to be secured to the trolley pole, and the upper end of each portion is perforated and provided with an outwardly facing recess around each perforation, a trolley wheel journaled in said perforations, the sides of which are each concave, rotary bearings around each end of the axle within its respective recess, and a cap for each recess, said cap being provided with three arms, the outer end of each of which projects into the concave portion of the wheel, substantially as set forth.

In testimony of which joint invention we have hereunto set our hands.

JOHN JACOB GOETZ.
JOHN A. SMITH.

Witnesses:
JOHN E. JONES,
L. M. JONES.