(No Model.)

M. T. GRAF.

TROLLEY FOR ELECTRIC RAILWAYS.

No. 562,132. Patented June 16, 1896.

Fig. 1.

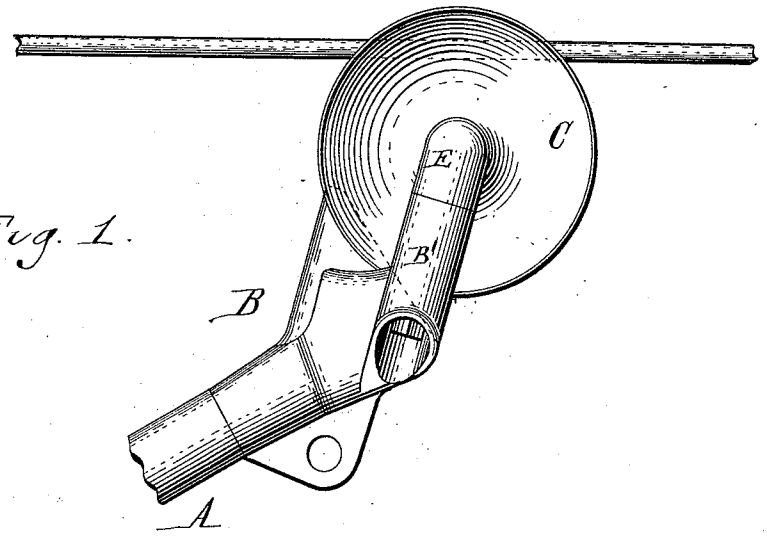

Fig. 2.

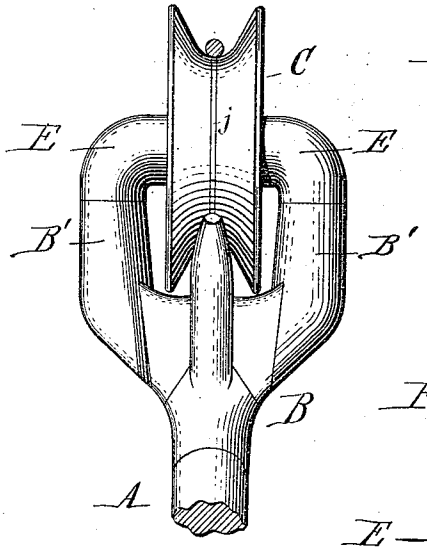

Fig. 6.

Fig. 3

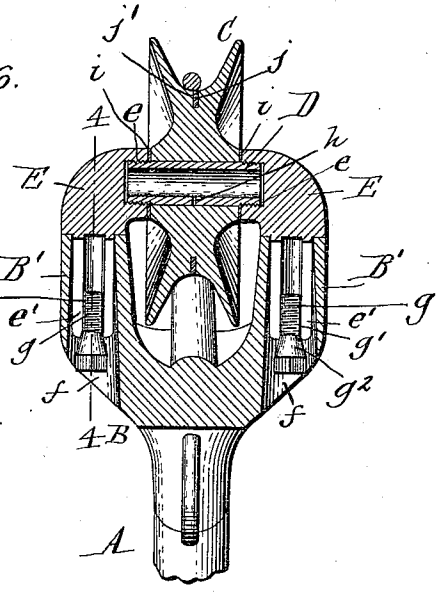

Fig. 4

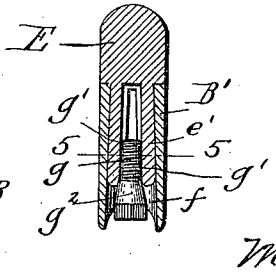

Fig. 5.

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UNITED STATES PATENT OFFICE.

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TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 562,132, dated June 16, 1896.

Application filed January 14, 1896. Serial No. 575,424. (No model.)

To all whom it may concern:

Be it known that I, MARTIN T. GRAF, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Trolleys for Electric Railways, of which the following is a specification.

This invention relates to trolleys for electric railways.

One of the objects of my invention is to render the trolley-wheel readily removable from the yoke or head of the trolley-pole for repairing the same and renewing it when worn out and to enable an ice-breaking wheel to be quickly substituted for the same when desired for removing ice from the trolley-wire.

My invention has the further object to provide the trolley-wheel with simple means for preventing excessive wear of the sides of its groove and the cutting off of the flanges of the wheel resulting therefrom.

In the accompanying drawings, Figure 1 is a side elevation of my improved trolley. Fig. 2 is an elevation at right angles to Fig. 1. Fig. 3 is a sectional elevation thereof. Fig. 4 is a longitudinal section in line 4 4, Fig. 3. Fig. 5 is a cross-section in line 5 5, Fig. 4. Fig. 6 is a detached perspective view of one of the contact-springs interposed between the hub of the trolley-wheel and its supporting-arms.

Like letters of reference refer to like parts in the several figures.

A is the upper portion of the trolley-pole, which is provided with a bifurcated head or yoke B, secured at its lower end to the trolley-pole by any suitable fastening.

C is the grooved trolley-wheel and D its axle, which is preferably stationary and upon which the wheel turns. The projecting ends of the axle are supported in arms E E, which are removably secured to the branches B′ of the yoke B and are provided in their opposing upper ends with screw-threaded sockets *e*, which receive the externally-screw-threaded ends of the wheel-axle, as shown in Fig. 3. The supporting-arms E are provided with split tubular shanks or extensions *e′*, which extend downward therefrom and fit into sockets *f*, formed lengthwise in the yoke branches B′. The split shanks *e′* are removably secured in these sockets by clamping screws or bolts *g*, which engage with internal screw-threads *g′*, formed in the lower portion of the shanks, and which are provided with conical necks g^2, whereby the jaws of the divided shanks are spread and wedged outward against the surrounding wall of the yoke-sockets and firmly clamped therein. The bore of each of the split shanks *e′* is made conical in its lower portion to correspond to the neck of the clamping-bolt, as shown in Figs. 3 and 4. The sockets *f* are open at their lower ends to admit the clamping-bolts and permit the insertion of a suitable wrench for turning the same, and they are preferably tapered upward, as shown, so as to effectually prevent withdrawal of the split shanks when the clamping-screws are tightened.

Upon loosening the clamping-bolts *g* the split shanks of the supporting-arms E are allowed to contract, thus releasing the same and permitting the arms, with the trolley-wheel carried thereby, to be withdrawn from the sockets of the yoke B. Upon unscrewing one of the supporting-arms from the wheel-axle the trolley-wheel can be removed from the axle and replaced by a new wheel, if worn out, or by an ice-breaking wheel. After replacing a wheel upon the axle the removed supporting-arm is again screwed upon the axle and the shanks of the supporting-arms are replaced in the sockets of the yoke and are clamped therein by tightening the bolts *g*. This construction is very simple and comparatively inexpensive and permits the trolley-wheel to be quickly removed and replaced with the use of but a single tool.

The axle of the trolley-wheel is preferably hollow and open at its ends and filled with a suitable hard lubricant, which is introduced into the axle by removing one of the supporting-arms E in the manner hereinbefore described. The lubricant is melted by the heat produced by the rotating wheel and flows into the hub of the wheel through an opening or passage *h*, extending through the wall of the hollow axle.

i represents the usual contact-springs, which are interposed between the hub of the trolley-wheel and the adjacent ends of the supporting-arms E, for insuring the proper electrical connection between the wheel and the metallic yoke.

The frequent turns which trolley-cars are usually required to make cause the groove of the trolley-wheel to run against the trolley-wire on one side of its central or deepest portion, forming supplemental or side grooves near the bottom of the main groove. It often happens that after such side grooves are started the wheel continues to run against the wire in one of these grooves instead of in the bottom of its main groove, rendering the wheel not only more liable to run off the wire, but eventually cutting off one of its flanges by the constant wear of the trolley-wire. In order to prevent the formation of such side grooves and cause the middle of the wheel-groove to run against the wire, the wheel is provided in the bottom or deepest portion of its groove with a filling *j* of softer material than the body of the wheel—such, for instance, as lead. This filling extends continuously around the wheel-groove and is seated in a recess or supplemental groove *j'*, formed centrally in the main groove. The filling is flush with the bottom of the wheel-groove and narrower than the diameter of the trolley-wire, as shown in Fig. 3, so that when the middle of the groove runs in contact with the wire the latter bears partly on the soft filling and partly on the harder portions of the wheel on opposite sides of the filling. When the wire bears against the center of the groove, rapid wear of the soft central filling is prevented by these harder body portions of the wheel; but when the wheel-groove bears against the wire on one side of its center, as shown in Fig. 3, the wear is received partly by the soft filling and partly by the hard portion of the wheel on one side of the filling, and as the resistance to wear of the soft material is less than that of the hard material the former wears away to a greater extent than the latter. The result is that a groove is formed in the soft material which draws or leads the trolley-wire toward the center of the groove, and hence the wheel always has a tendency to run with its middle or deepest portion against the wire. By this provision the trolley-wire is caused to wear into the wheel-groove at right angles to its axis instead of wearing laterally into its flanges and ultimately cutting them off, thus lengthening the life of the wheel. The soft filling causes the hard edges of the supplemental groove *j'* to be worn off round, and such edges therefore do not cut the trolley-wire, and the filling also provides a greater wearing-surface than is the case when an open or vacant supplemental groove is formed in the bottom of the main wheel-groove.

While the soft filling of the trolley-wheel is preferably continuous, it is not necessarily so, but may be segmental or consist of a broken series of filling-sections, in which case the bottom of the wheel-groove is formed with a corresponding annular row or series of recesses for the reception of such filling-sections.

I claim as my invention—

1. The combination with the yoke of the trolley-pole having sockets, of a trolley-wheel and its axle, and supporting-arms carrying said axle and having shanks or extensions seated in the yoke-sockets, substantially as set forth.

2. The combination with the yoke of the trolley-pole having sockets, of a trolley-wheel and its axle, supporting-arms carrying said axle and having shanks or extensions seated in the yoke-sockets and clamping devices for securing said shanks in the yoke-sockets, substantially as set forth.

3. The combination with the yoke of the trolley-pole having sockets, of a trolley-wheel and its axle, supporting-arms carrying said axle and having split tubular shanks seated in the yoke-sockets, and clamping-bolts engaging in said split shanks, substantially as set forth.

4. The combination with the yoke of the trolley-pole having sockets, of a trolley-wheel and its axle, supporting-arms carrying said axle and having split internally-screw-threaded shanks seated in said yoke-sockets, and clamping-bolts engaging in said shanks and having conical necks for spreading said shanks, substantially as set forth.

5. The combination with the yoke of the trolley-pole having sockets, of a trolley-wheel having an axle provided with externally-screw-threaded ends, supporting-arms provided with screw-threaded sockets which receive the threaded ends of the wheel-axle and with shanks or extensions seated in the yoke-sockets, and clamping devices for securing said shanks in the yoke-sockets, substantially as set forth.

6. A grooved trolley-wheel provided in the bottom of its groove with a filling or bearing surface of softer material than the body of the wheel, substantially as set forth.

7. A grooved trolley-wheel provided in the bottom of its groove with a narrow supplemental groove or recess and a filling of softer material than the body of the wheel seated in said recess and forming the central portion of the bottom of the wheel-groove, substantially as set forth.

Witness my hand this 2d day of January, 1896.

MARTIN T. GRAF.

Witnesses:
CARL F. GEYER,
KATHRYN ELMORE.