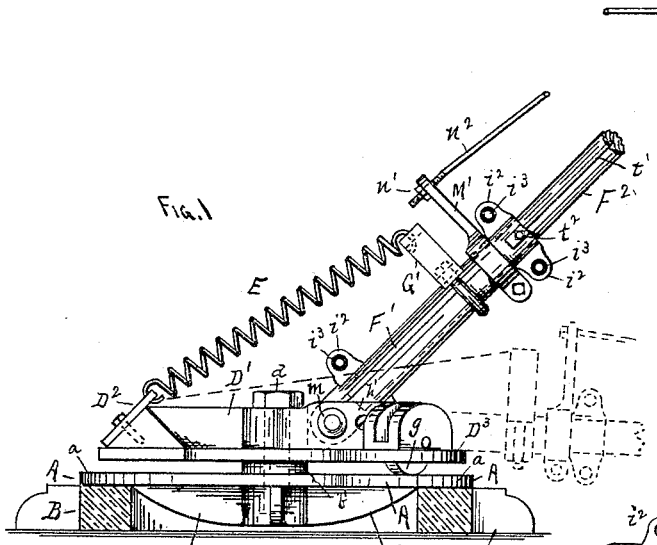
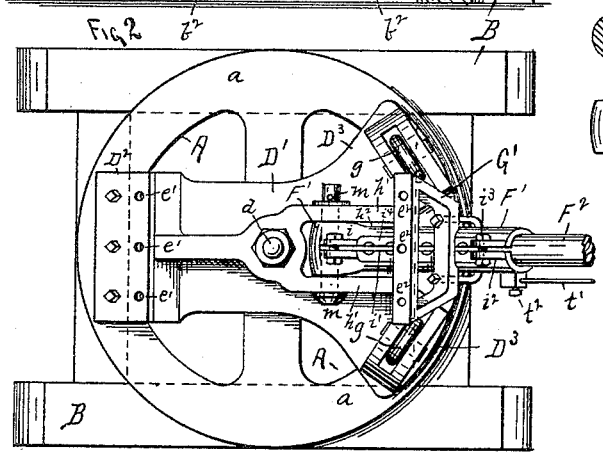
(No Model.)

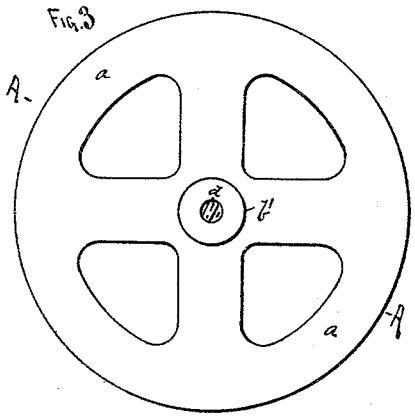
G. H. LARKIN & J. TOMKINS.

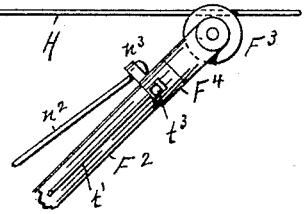
TROLLEY POLE MECHANISM.

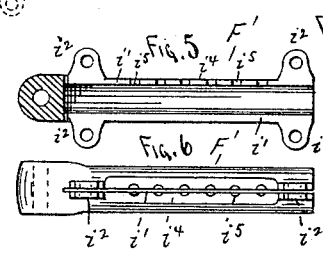
No. 454,522. Patented June 23, 1891.

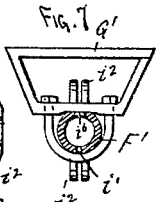












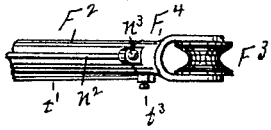
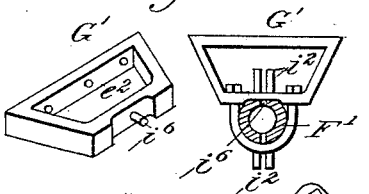
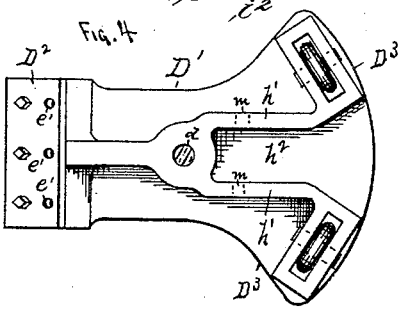


Fig. 8.





Witnesses.
H. J. Webster.
A. H. Webster

George H. Larkin, James Tomkins,
Inventors By
Charles N. Woodward Atty.

UNITED STATES PATENT OFFICE.

GEORGE H. LARKIN AND JAMES TOMKINS, OF ST. PAUL, MINNESOTA.

TROLLEY-POLE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 454,522, dated June 23, 1891.

Application filed February 17, 1891. Serial No. 381,749. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. LARKIN and JAMES TOMKINS, both citizens of the United States, and both residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented, jointly, certain new and useful Improvements in Trolley-Pole Mechanism, of which the following is a specification.

This invention relates to the trolley supporting and controlling mechanism of electric cars; and it consists in the construction, combination, and arrangement of parts, as hereinafter shown and described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a side elevation, and Fig. 2 is a plan view. Fig. 3 is a plan view of the stationary base or bed plate, and Fig. 4 is a plan view of the swinging trolley-pole base-frame detached. Figs. 5, 6, and 7 are detached details of the socket-frame of the trolley-pole, illustrating its construction more fully. Fig. 8 is a perspective view of the adjustable spring-supporting frame detached.

In the operation of electric railways wherein the overhead conducting-wire is employed great annoyance is caused by the tendency of the trolley-wheels to run off from the conducting-wire in passing around curves or under switches or crossings, and to avoid this tendency and to produce a device that will be so sensitive to the slightest change of direction of the conducting-wire as to remain in contact therewith at all times is the principal object of our invention, which consists in a circular base-plate A, mounted centrally upon the upper deck of the car by a supporting frame-work B, and with its upper surface or rim *a* forming a track or bearing-surface. At the center of this base-plate is a hub *b'*, connected by arms to the rim *a* and with strengthening-ribs b^2 upon the under side. Passing upward through this hub *b'* is a stud *d*, forming a bearing for a swivel-frame D', as shown. This frame D' extends both sides of the stud *d*, one end having an inclined plate D^2 secured thereto and provided with a series of perforations *e'* for supporting one end of a number of springs E, and the other end D^3 of the plate D' extending in the opposite direction and curved in the same line as the plate A and provided with bearing-wheels *g*, traveling upon the surface *a* when the frame D' is revolved around the stud *d*.

Between the bearing-wheels *g* the frame is provided with ribs *h'*, forming a cavity h^2, into which is pivoted as near the stud *d* as possible the socket F' of the trolley-pole F^2, the socket F' being "split" into two parts, as shown at *i'*, and adapted to be clamped tightly upon the pole F^2 by ears i^2 and bolts i^3.

The socket F' is pivoted by a horizontal cross-bolt or pin *m*, so that it will freely swing perpendicularly upon the frame D', while at the same time the latter will freely turn upon the stud *d* and permit the necessary lateral movement to the pole. The upper surface of the socket F' is flattened, as shown at i^4, and provided with a series of perforations i^5, into one of which a small stud i^6 on the lower side of an angular frame G' fits when the latter is clamped fast to the socket F', as shown in Figs. 6 and 8, so as to assist in holding it in place upon the socket. By this means the angular frame may be clamped to the socket at any desired point and adjusted farther from or nearer to the pivot *m* to regulate the tension of the springs E, the upper side of the angular frame G' corresponding with the plate D^2 and provided with perforations e^2, similar to those in the said plate, and adapted to support the other ends of the springs E, as shown in Fig. 1. By this means the springs exert their force upon the pole F^2 to keep the trolley-wheel F^3 in contact with the conducting-wire H, and may be easily and quickly adjusted to alter the tension by setting the frame G' along the socket.

Attached in any suitable manner to the socket F' near its free or outer end, but preferably by a simple and easily-detachable clamp, is an arm M', into whose outer end is secured by an adjusting-nut *n'* a truss-rod n^2, the other end of the truss-rod being secured in the trolley-wheel head or socket F^4 at n^3. By this simple means the trolley-pole F^2 is greatly strengthened and stiffened and any tendency to sag or bend out of shape corrected and prevented. It also enables us to employ a lighter pole F^2 than we otherwise could, which is also an advantage. The feed-

wire t' is secured by sockets t^2 t^3 on the trolley-wheel head F^4 and socket F′ in the usual manner.

There are two essentials requisite in a mechanism for supporting a trolley-pole: first, the two movements—viz., the perpendicular motion of the pole carrying the trolley-wheel, by which it is kept in contact with the conducting-wire, and the lateral movement, by which it is enabled to run around curves or under switches or crossings or be reversed when the car is to run in the opposite direction, and adapted to yield readily and quickly to the force employed to produce the movement—and, second, to enable the trolley-pole to be lowered down parallel with the top of the car, and to remain in that position without further fastening when not in use. Another very important feature required in a trolley mechanism in many locations is that it shall not project above the deck any farther than is absolutely necessary, so as to enable the car to run under low bridges and other obstructions. The accomplishment of these several requisites is what we have sought for and obtained in the form of trolley mechanism illustrated in this invention.

The relative positions of the pivotal point m of the socket F′ and the carrier-wheels g are an important feature of the invention to secure the requisite sensitiveness to the lateral movement of the pole and the frame D′, while at the same time by placing the pivot m close to the central stud d the socket F′ of the trolley-pole is not thrown off to one side when the lateral movement takes place in running around curves. This side movement is very detrimental to the action of the trolley-wheel, causing it to assume too great an angle sidewise to the conducting-wire, and thereby "clamp" the trolley-wheel by its flanges upon the wire and causing it to run off from the wire.

Another important advantage gained by placing the pivotal point m of the socket F′ near the stud d and the bearing-wheels g at the rim a of the base-plate A is the fact that this arrangement greatly lessens the downward thrust upon the bearing-wheels, thereby causing them to act much more readily, and greatly increases the sensitiveness of the lateral movement of the trolley-pole. The trolley-pole standing at an angle to the car, the trolley-wheel is some distance in the rear of the center line of the car, and as the conducting-wire H is arranged directly above the center line of the track, when passing around curves the central point of the car or pivotal point of the trolley-base passes some distance upon the curve before the trolley-wheel leaves the straight part of the conducting-wire, thereby causing the trolley-pole to move laterally in retaining the proper "contact" of the trolley-wheel upon the conducting-wire. If now there is a considerable degree of resistance to this lateral movement, caused by a sluggishness of action in the mechanism of the trolley-base, the trolley-wheel runs hard by its flange sidewise against the conducting-wire, which causes it to "climb" the wire and run off. If, however, the lateral movement of the trolley-base be very sensitive, so as to yield to a slight side pressure, the trolley-wheel will not be pressed sidewise against the conducting-wire, and will not, therefore, climb the wire and run off from it. This extreme sensitiveness to side pressure is therefore the essential function of the plate D′, which we secure, as before stated, by pivoting the trolley-pole socket close to the central pivotal point of the trolley-base and arranging the bearing-wheels near the outer end of the trolley-base as far from the central pivotal point as possible, whereby the downward thrust upon the bearing-wheels is minimized to increase their sensitiveness to lateral pressure.

As before stated, it is also advantageous that the mechanism should be so constructed that when the trolley-pole is drawn downward, so that it lies parallel with or at an angle below the deck-line of the car, it will remain in that position, and in our construction when the pole is thus drawn down, as shown in dotted lines in Fig. 1, the lines of force of the springs E are so nearly through the pivotal point m that they will not have power sufficient, when in that position, to draw the pole up again, but it will remain in its downward position without other fastenings. If found necessary, the mechanism may be arranged so as to permit the pole to be drawn down to a still lower point by cutting away the plate D′ in the bottom of the cavity h^2. The parts are so arranged that the pivotal point m of the trolley-pole socket F′ is at all times substantially under the conducting-wire H, so that the least possible side draft is thereby secured.

Having thus described our invention, what we claim as new is—

1. In a trolley-pole mechanism for electric cars, a stationary base-frame A upon the deck of the car and having flat upper surface a, trolley-pole base-frame D′, pivoted centrally to said stationary base-frame and with bearing-wheels d d in its free outer end, the trolley-pole having the trolley-wheel and pivoted by its lower end in said trolley-pole base-frame contiguous to its pivotal point, and springs connecting said trolley-pole and trolley-pole base-frame, substantially as and for the purpose set forth.

2. In a trolley-pole mechanism, a stationary base-frame A, secured to the deck of the car and with surface a, trolley-pole base-frame D′, pivoted centrally to said base-frame and with spring-plate E upon one end and with bearing-wheels d d in its other end and adapted to run upon said surface a, cavity h^2, formed in said trolley-pole base-frame between said bearing-wheels and its pivotal point, trolley-pole socket G′, carrying the trolley-pole G^2 and pivoted in said cavity contiguous to the pivotal point of said trolley-pole

base-frame, frame H, clamped to said trolley-pole socket, and springs connecting said frame H and plate E, substantially as and for the purpose set forth.

3. In a trolley-pole mechanism, the base-frame D′, a trolley-pole socket F′, pivoted in said base-frame, the trolley-pole F^2, pivoted by its lower end in said socket, trolley-wheel socket F^4 on the free end of said pole and carrying the trolley-wheel, arm L^2, clamped to said trolley-pole socket, and a truss-rod L^3, connecting said arm and said trolley-wheel socket, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

GEORGE H. LARKIN.
JAMES TOMKINS.

Witnesses:
C. N. WOODWARD,
H. S. WEBSTER.