

(No Model.)

F. B. RAE.

OVERHEAD TROLLEY FOR ELECTRIC RAILWAYS.

No. 421,305.

Patented Feb. 11, 1890.

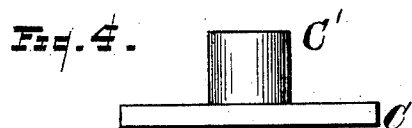
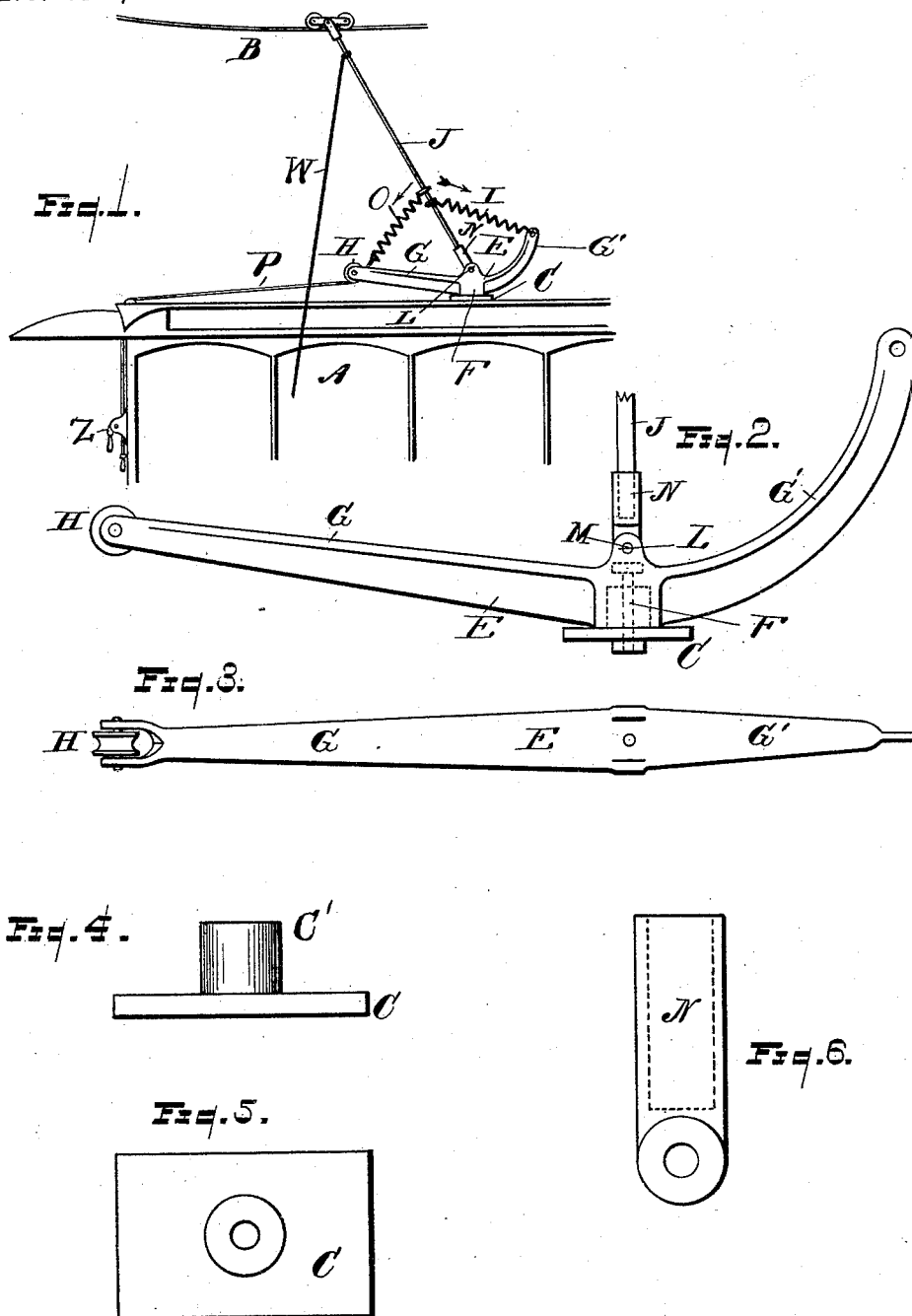


Fig. 5.

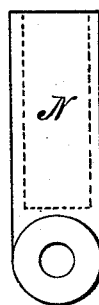
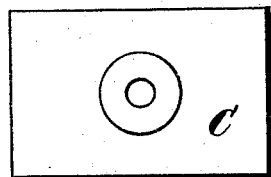


Fig. 6.

WITNESSES

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FRANK B. RAE, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT ELECTRICAL WORKS, OF SAME PLACE.

OVERHEAD TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 421,305, dated February 11, 1890.

Application filed July 1, 1889. Serial No. 316,179. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. RAE, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Overhead Trolleys for Electric Railways; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to traveling electrical contacts for electric railways, and especially has relation to an overhead trolley, adapted to travel upon the upper side of one or more suspended aerial conductors and connected in some approved manner to an electrically-propelled vehicle, which latter derives its propelling current from one or more stationary line-conductors through the medium of such overhead trolley.

I have found by experience that great difficulty is to be encountered in order to keep the sheave of the trolley upon the suspended conductor, which difficulty arises from numerous causes, among which may be enumerated the deviations of the trolley-line from alignment with the track, the variations of height of the trolley-line due to crossings, bridges, &c., and the lateral trailing of the trolley-pole or connection from the car at curves, due to the fact that the trolley itself is in both a different vertical and horizontal plane from the line of way when traversing such curves. Again, it is necessary, in order to meet the requirements and emergencies of operation, to so arrange the pole or other connection between the car and trolley that the same may practically have a duplex swing—that is to say, both a lateral and forward and backward movement at its joint or point of connection with the car. Accordingly my invention has for its object to provide a trolley so constructed and arranged as to meet the requirements mentioned above and to overcome the difficulties and disadvantages enumerated.

My invention consists in certain details of construction, arrangement, and combination of parts, all of which will be more fully described hereinafter, and the specific points of

novelty in which will be particularly designated in the appended claims.

In the accompanying drawings I have shown certain features of construction which I deem adequate for carrying out my invention in practice successfully. However, I wish to here state that I am not limited or restricted to the exact details of construction illustrated, since the scope of the claims forming a part hereof permits many changes and variations without departing from the spirit of my invention.

Referring to the drawings, Figure is a side elevation showing my invention complete. Fig. 2 is a detail view of part of the construction shown in Fig. 1. Figs. 3, 4, 5, and 6 are detail views of the several parts.

Like letters of reference indicate like or corresponding parts in the several views of the drawings.

Referring to the drawings by letter, A is the car, shown for sake of space with parts broken away, and having my invention applied to the top thereof. This car is provided with any desirable or approved type of propelling electric motor, which latter is designed to receive its actuating electric current from the overhead suspended wire B through the trolley and trolley-connections on top of the car, the return-circuit being completed from the motor through the track-rails to the ground or dynamo, as the case may be.

Approximately at the center of the roof of the car A is secured a metal bed-plate C, having a centrally-located upwardly-projecting hub C', formed integral with the plate C and provided with a vertical bore designed to receive a swivel-bolt. E is a swivel-plate consisting of the central stem F and the two diverging arms G G'. This stem F is hollowed out interiorly at its bottom to correspond to the diameter of the hub on the bed-plate, and is designed to slip over, encircle, and ride easily upon said hub, the swivel-bolt serving to keep the swivel-plate and the bed-plate together, and the whole forming a swivel-joint between said bed-plate and swivel-plate. The two arms or prongs G G' extend upwardly and outwardly from the stem F, but occupy

the same vertical plane, the arm G carrying at its free outward extremity a pulley-wheel H, while the other arm G' is attached at its outer end to the lower end of a spiral or helical spring I, the upper end of which is suitably and adjustably secured to the pole J at a predetermined point above the hinge-joint L, for a purpose that will appear hereinafter.

At the upper part of the stem F are formed two vertically-projecting bearing-lugs, which are placed in a horizontal line with each other, as shown, and serve to journal the hinge-bolt M, which in turn is connected with the pole-socket N by two lugs on the bottom of the pole-socket, thus forming a hinge between the pole-socket and the swivel-plate. The spring I is so arranged with relation to the pole J and the plate E that its pull or tension is constantly directed in the effort to pull the pole up vertically in the direction of the feathered arrow, whereas the spring O (which is also secured at its outer end to the pole J and at its other extremity to the hand-cord P, which latter passes over the pulley-wheel H) can be operated by the means of the hand-cord P to pull against the tension of the spring I, or can be released so that the spring I is free to exert its pull against the pole J. Thus it will be understood that the tension of the spring I varies inversely to that of the spring O. By tightening the spring O by cord P the spring I is elongated and the pole forced in the direction of the unfeathered arrow, and by releasing the cord P the retractability of the spring I tends to replace the pole in the direction of the feathered arrow. The cord P is run along the roof of the car and depends at one end thereof within easy reach and manipulation of the motor-man or other attendant. The pole J has its lower end secured in the tubular socket N and carries at its upper end any suitable or desirable form of trolley. This pole is of some light, strong, elastic, and ornamental material, and is under the control of the motor-man through the instrumentality of an operating-cord W, secured at its upper end to the trolley-pole near the trolley-wheel and at its other end attached to the car in such position that it can be reached and handled. By means of this string or cord W the pole J can be turned around on the swivel-joint at will.

The particular construction and arrangement of the two springs I and O are intended for the purpose of aiding the operation of the contact-wheel on the conductor, so that the same is properly maintained upon the wire irrespective of irregularities in the shape of curves, hangers, &c.

It will be readily appreciated that the spring I serves to hold the trolley-pole in an upright position when not neutralized by the action of the spring O. Thus if the spring O were not present the spring I would lift the trolley-wheel off the wire, so that no contact would be preserved. Therefore it becomes

apparent that the spring I relieves the weight of the trolley from the line-wire, while the adjustable spring O can be so adjusted as to bring the trolley down on the wire sufficiently to insure the necessary electrical contact without permitting the weight or gravity pressure of the trolley to be exerted upon the wire. By such arrangement the efficient operation of the pole and trolley is insured and is rendered under ready control. Furthermore, it is apparent that when the two springs are so adjusted with relation to each other to keep the trolley-wheel upon a conductor at a given height above the roof of the car, and the distance between the car and conductor should increase, (say at a bridge or crossing,) the spring O would permit the trolley-wheel to accommodate itself to the increased height without any change of its tension.

It will be understood that some means should be provided to hold the cord P in the desired position, and I have shown a well-known form of clamping device Z, attached to the end of the car within reach of the motor-man, which will accomplish this purpose, although other well-known clamps may be used.

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

1. In an overhead trolley for electric railways, the combination, with a trolley-pole, of a flexible joint between said pole and its base-support, a spring permanently connecting said pole with its base-support and capable of exerting tension to move the said pole in a prescribed direction, and a spring mechanically connected at one end to said pole and attached to a movable cord or cable at the other, and capable of being adjusted in its tension by the operator, all arranged to operate in the manner set forth.

2. In a trolley for an electric railway, the combination, with a trolley-pole connected to its base-support flexibly, and adapted to have practically a universal oscillation or swing at its base, of two springs mechanically connected to the said pole, and controlling the direction of swing of the same, one of said springs being permanently attached to the base-support of the pole and the other controlled in its action by an adjusting cable or cord.

3. In a trolley for an electric railway, the combination, with a trolley-pole carrying at its upper end a trolley wheel or wheels, of a pole-socket for said pole hinged to an intermediate support, an intermediate plate or support for said pole swiveled to the base-plate and having two outwardly-extending lateral arms, a spring permanently connecting one of said arms with the pole, and another spring arranged opposite the first spring and attached at one extremity to the pole and at its other secured to an adjusting-cord passing over a pulley journaled in

the end of the other arm of the intermediate plate.

4. The combination, with a trolley-pole flexibly jointed at its base to a support, of a
5 spring permanently connecting said pole with a base-support, means for adjusting said spring, and another spring attached at one extremity to said pole opposite the first spring and fastened at its other end to an
10 adjusting cord or cable passing over a guiding pulley or roller.

5. The combination, with the pole, of a bifurcated plate at the base of said pole, ca-

pable of a swiveling movement, and having two oppositely-extending lateral arms, one of
15 said arms being connected to the pole by a helical spring and the other carrying a guiding pulley or wheel, over which passes the controlling cable or cord for another spring
20 connected to the trolley-pole.

In testimony whereof I have hereunto set my hand this 17th day of June, 1889.

FRANK B. RAE.

Witnesses:

ALBERT KOEPCKE,
JOHN MACDONALD.