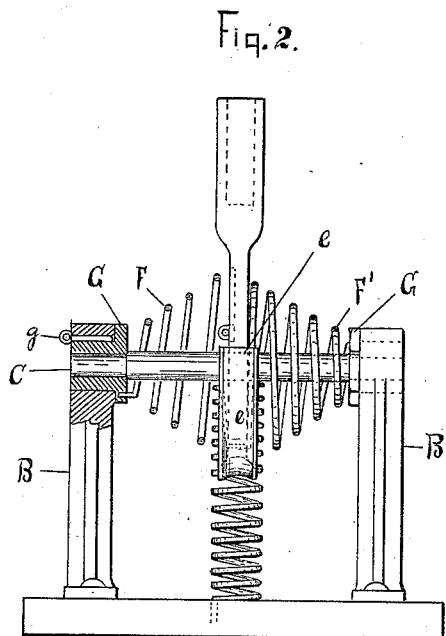
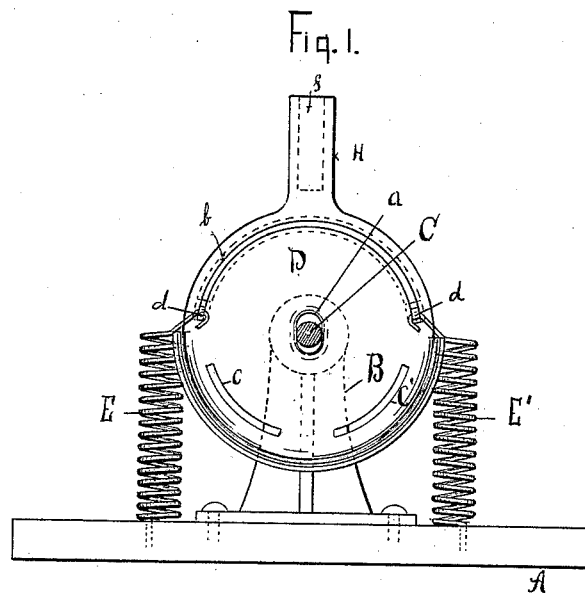


(No Model.)

2 Sheets—Sheet 1.

F. B. RAE.
TROLLEY FOR OVERHEAD ELECTRIC RAILWAYS.
No. 423,391. Patented Mar. 11, 1890.



WITNESSES.
D. H. Bradford
C. E. Burns

INVENTOR
Frank B. Rae

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

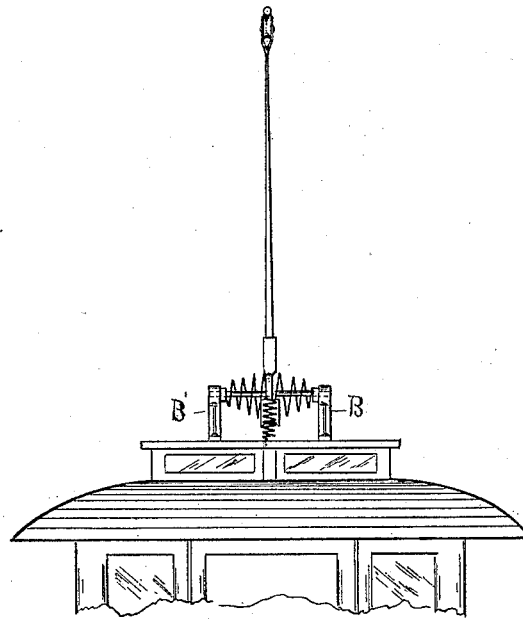
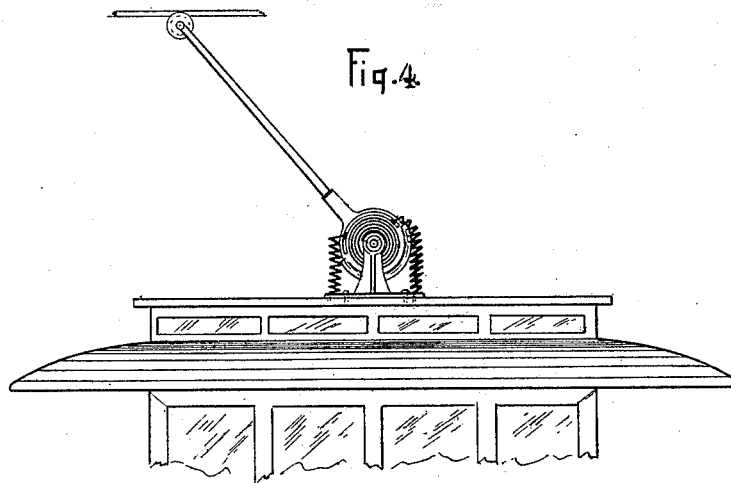


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK B. RAE, OF DETROIT, MICHIGAN.

TROLLEY FOR OVERHEAD ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 423,391, dated March 11, 1890.

Application filed November 14, 1889. Serial No. 330,363. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. RAE, a citizen of the United States, and a resident of the city of Detroit, in the county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Trolleys for Overhead Electric Railways; and I do hereby declare that the following specification 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 an overhead trolley for electric railways, and has for its object to provide a device of this character which will accommodate itself to all inaccuracies and conditions of the overhead line without becoming dislodged from its position in contact with the conductor.

Experience has demonstrated the fact that in order to provide an operative reliable trolley that will meet the demands of practice it is necessary that the pole carrying the sheave or trolley-wheel shall have practically a universal motion or swing at its base in order that it may accommodate itself to variations in the line—such as curves, differential heights, &c.; and with this object in view 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 designated in the appended claims.

In the accompanying drawings I have illustrated certain features and parts which I deem adequate for carrying out my invention in practice. However, I desire it to be here understood that I am not limited to the exact details of construction shown, since obvious changes and variations can be made without deviating from the fundamental principle of my invention as defined by the scope of the claims, forming a part hereof.

Referring to the accompanying drawings, Figure 1 is a side elevation of the pole-socket and its auxiliary mechanism. Fig. 2 is an end elevation of Fig. 1. Figs. 3 and 4 are respectively side and end elevations showing my invention complete.

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

Referring to Figs. 1 and 2, A represents a metal base-plate of the desired size and shape, designed to be secured on top of the car by bolts or otherwise, and B B' are two parallel bearing-plates bolted, respectively, at their lower extremities to the base-plate A and supported a distance apart approximately equal to the length of the horizontal shaft C, which latter is journaled at each end in suitable bearings upheld by said plates B B'.

D indicates a circular disk, mounted loosely on the shaft C, as shown clearly in Fig. 1, and capable of a certain play thereupon, according to the peculiarity of the shape of the orifice *a*; and *b* designates an arc-shaped slot extending circumferentially around the upper half of said disk D, while *c c'* respectively designate two oppositely-situated arc-shaped slots on the lower half of the disk.

E E' respectively indicate two helical or coiled springs, each of which is fastened at its lower extremity to the base-plate A, and at its upper end to a movable slide *d*, which in turn is free to move along in the slot *b* in the upper half of the disk. Thus it will be seen from an inspection of Fig. 1 that if the disk be oscillated in the direction of the arrow the spring E' will be elongated and will tend to retract the said disk, and, conversely, if the disk be moved in the other direction the spring E will similarly operate. It will also be obvious that while one spring is elongated the other is not compressed, since the resistance of the spring to be compressed will move its slide *d* around in the slot *b*, thus relieving the inactive spring from any compression.

F F' represent, respectively, two differential coiled helical springs, substantially conical in contour, as shown clearly in Fig. 2. Each spring F or F' is connected at its outer extremity to a tightening-nut G, while at its inner end it is secured in its respective slot *c* or *c'*. The function of these lateral or side springs F F' is to permit of a yielding lateral or oblique motion of the disk D when the latter is so actuated, and to replace the same in its normal vertical position when the actuating influence is removed. The edge of the lower half of the disk is formed with a broad grooved tread *e*, of sufficient width and depth to receive and guide the convolutions of the springs E E' when the latter are elon-

gated and stretched convexly over the edge of the disk D.

H designates the pole-socket, formed integral with the disk D, and is provided with a socket or seat F, in which the lower end of the pole carrying the trolley-wheel is introduced and secured.

Referring to Fig. 2, *g* designates a removable key, that is placed in the bearing at each end of the shaft C, between the adjusting-nut G and the bearing, in order to prevent the nut G from turning under the influence of the friction of the shaft C.

The tension of the spring F or F' may be adjusted at will by the adjusting-nuts G.

From the foregoing description of the different component parts it will be seen that the construction of the springs F-F' E E' and the disk D will permit the pole and trolley-wheel to accommodate themselves to any variation, irregularity, or deflection of the overhead conductor with perfect freedom, and furthermore will insure the ready replacement of the trolley and trolley-pole to its vertical position from any other position it has assumed on its travel along the conductor.

My improvement will be found especially useful and operative in connection with overhead lines, wherein there are many curves, bridges, switches, and varying heights of the conductor.

All the parts are simple, durable, and interchangeable, and capable of easy adjustment.

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

1. In a contact-arm for electric railways, the combination, with a suitable support, of a socket-piece for the arm provided with a disk having slots therein, and springs secured to the base on opposite sides of the disk and engaging the slots, substantially as described.

2. In a contact-arm for electric railways, the combination, with a suitable support, the

socket-piece having a disk shape provided with slots near its periphery, of springs secured to the base on each side of the disk and connected to slides moving in the slots of the disk, substantially as described.

3. In a contact-arm for electric railways, a socket-piece loosely mounted on a suitable support, in combination with springs connected to the support and to the disk, arranged to permit the partial rotation of the disk, and springs also mounted on the support arranged to bear laterally on the disk to permit lateral motion of the socket, substantially as described.

4. In a contact-arm for electric railways, the combination, with the shaft, and a disk-shaped socket-piece loosely mounted thereon, of springs mounted on the support and bearing laterally against the opposite sides of the disk, substantially as described.

5. In a contact-arm, the combination, with the support and a disk-shaped socket-piece having slots near its periphery, of springs mounted on the base-piece connected to slides arranged in said slots, and other springs surrounding the supporting-shaft and bearing laterally against the disk and having their ends engaging slots in the disk, substantially as described.

6. In a contact-arm for electric railways, the combination, with the shaft, of a disk-shaped socket-holder having a loose bearing on the shaft, springs connected with the socket-piece permitting forward and backward motion, other springs surrounding the shaft and bearing laterally against the faces of the disk, and means for adjusting the tension of said springs, substantially as described.

In testimony whereof I have hereunto set my hand this 10th day of October, 1889.

FRANK B. RAE.

Witnesses:

CHAS. BRUNDAGE,
F. R. HARDING.