

(No Model.)

W. S. SMITH.
ELECTRIC RAILWAY.

No. 469,280.

Patented Feb. 23, 1892.

Fig. 1.

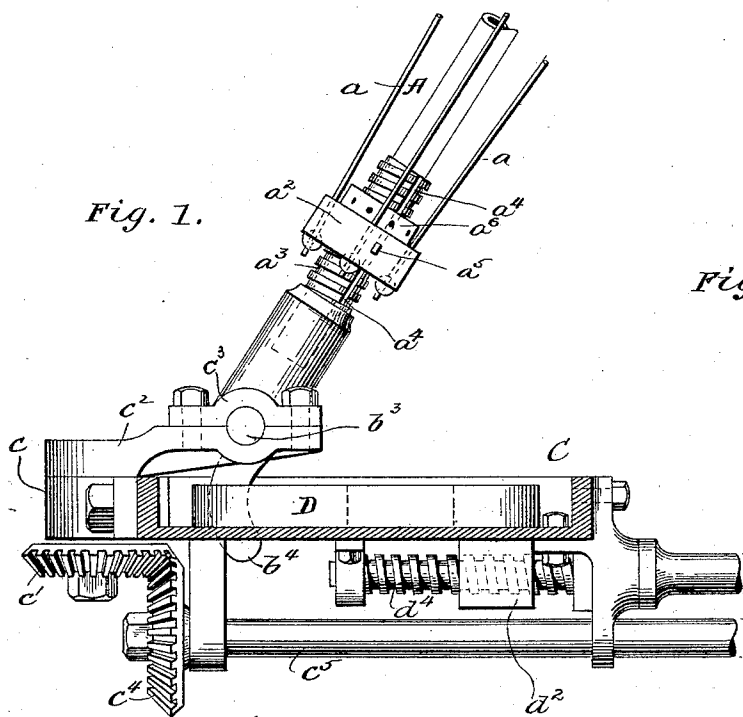


Fig. 2.

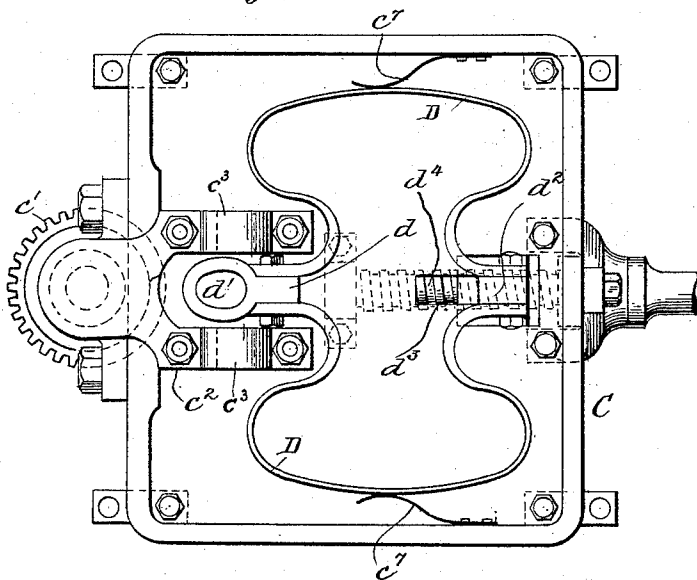


Fig. 3.

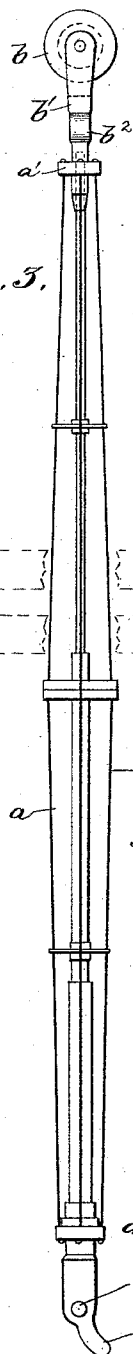
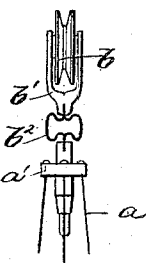


Fig. 4.



WITNESSES:

Frank S. Ober
James F. Kavanagh.

INVENTOR
William S. Smith.

BY
W. S. Smith
ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM STUART SMITH, OF BERKELEY, CALIFORNIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 469,280, dated February 23, 1892.

Application filed September 3, 1891. Serial No. 404,642. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM STUART SMITH, a citizen of the United States, residing in Berkeley, in the county of Alameda and State of California, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

My invention relates to electric railways, and has special reference to the trolleys which are used for collecting and conveying current from an overhead conductor to the moving vehicle.

The object of my invention is to provide a trolley which shall be simple in its construction and operation.

The invention consists of the details hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of the trolley base or support, a portion of the frame being shown in section. Fig. 2 represents a plan of the same with the trolley-arm removed. Fig. 3 represents the trolley-arm, and Fig. 4 a detail showing the manner of attaching the collecting-wheel to the end of the arm.

Referring to the drawings by letter, A represents the trolley-arm. It consists of a number of telescoping sections which are adjusted with respect to each other for the purpose of varying the length of the arm by screw-threaded joints or otherwise. The arm is made very light, but is strengthened by truss rods or wires *a*, the upper ends of which are secured in a collar *a'* and the lower ends in a similar collar *a''*, which is adapted to slide longitudinally without turning along a short threaded portion *a'''* at the lower end of the arm. This threaded portion is provided with a groove *a''''*, and the collar carries a key *a'''''*, which moves in the groove and prevents rotary movement of the collar.

a'''''' is a nut which is used to force the collar up and down to vary the tension of the truss rods *a*. The collecting-wheel *b* is mounted in a fork *b'*, which is secured to the upper end of the arm through a double U-shaped spring *b''*. This spring permits of a slight lateral or angular movement of the wheel with respect to the arm. The wheel is therefore able to maintain itself in a vertical position under the conductor. The particular value of this flexible connection of the trol-

ley-wheel with the arm, however, is that when in action the springs are compressed and in case of unevenness in the wire or jarring of the vehicle the spring will move quickly and maintain the wheel in close contact with the wire. A spring located at this point and of comparatively small size will act over short distances much more suddenly than the main spring which normally holds the wheel against the wire. At the base or lower end of the arm it is provided on opposite sides with two trunnions *b'''*, and extending below these and slightly curved to the rear is a finger *b''''*, the function of which will be explained hereinafter.

C represents a rectangular frame or box to be secured to the roof of the vehicle. To the forward side of it is bolted a bracket *c*, containing a vertical bearing in which is mounted a short vertical shaft carrying at its lower end a bevel gear-wheel *c'* and at its upper end secured to a bifurcated bracket *c''*. The arms of this bracket are provided with horizontal bearings *c'''*, in which the trunnions *b'''* of the trolley-arm are mounted. It will thus be seen that by turning the wheel *c'* the arm A may be swung in the arc of a circle.

c'''' is another bevel gear-wheel engaging with the wheel *c'*. It is on the end of a shaft *c'''''*, which extends along the top of the vehicle to the forward end thereof, where it is provided with a handle *c''''''* in reach of the motor-man. This shaft has its bearings in extensions of the frame C and at other places along the roof of the vehicle, if desired.

D represents a large double-U-shaped spring of the same general shape as the small spring *b''*. These springs are made of strap metal set on edge and resting upon the bottom of the box or frame C. The forward ends of the springs are connected together and to a block *d*, having an elliptical opening or socket *d'*. This block normally stands on the centerline of the frame C, just below and between the arms of the bifurcated bracket *c''*. The rear ends of the spring D are bolted to a nut *d''*, which extends through a slot *d'''* in the bottom of the frame C, and embraces a threaded shaft *d''''*, located under the frame and running parallel to it. The nut is threaded to fit the shaft, so that when the latter is turned the nut will be caused to

move in a longitudinal direction. The shaft d^4 extends through a bearing in the rear end of the frame C and along the roof of the vehicle to the end thereof, where it is provided with a handle d^5 , within reach of the motor-man.

c^7 c^8 represent two flat springs which may be used to increase the power of the spring D by permitting them to bear upon the latter in the manner shown in Fig. 2.

When the parts are properly assembled and in working order, the finger b^4 at the base of the arm projects into or through the socket d' .

In operation the trolley-arm is given an upward tendency by the spring D, which pulls on the finger b^4 . The tension of the spring may be varied by rotating the shaft d^4 , thus sliding the nut d^2 along and tightening or loosening the spring, and it will thus be seen that the trolley may be raised to any angle between the horizontal and the vertical positions and held in that position by a yielding force acting in two directions. In these vertical adjustments the tension of the spring will never become excessive owing to the increase of distance between the trunnions and the point of application of the spring as the arm is lowered. The finger engaging with the spring is curved to cause the pull on the spring to be always at right angles to its length and thus prevent a tendency to lift the forward end of the spring. The main spring, it will be observed, is free to move at all points except at the rear end d^2 . In case the trolley leaves the wire the two handles d^5 and c^6 , controlling the screw and bevel-gears, will enable the motor-man to catch the wire again in a moment, for by working the screw with one hand the trolley can be lowered beneath the wire, and by turning the bevel-gears with the other hand it can be swung into line with the wire. Any movement of the trolley from the center line of the vehicle will be resisted by the spring, which tends to keep it in the central position. At the same time the spring allows the arm to swing in case the wire is out of line. If the trolley leaves the wire, the arm is thrown forward and the tension of the spring rapidly decreases until at a certain position (which is under the control of the motor-man) it becomes zero. The momentum of the arm carries it beyond and the spring becomes strained in the opposite direction and acts as a buffer, thus stopping the motion of the arm and preventing the striking of a cross-wire. If the spring has a tendency to lift at the for-

ward end, a stop judiciously placed would prevent it without interfering with its action.

Having thus described my invention, I claim—

1. The combination, with a trolley-arm, of a frame supporting the same, gearing for swinging the trolley-arm about a vertical pivot, and a shaft for operating said gearing provided with a handle for the motor-man.

2. The combination, with a trolley-arm, of a spring controlling the same, consisting of two U-shaped pieces or strips placed with their ends abutting and respectively secured together, substantially as shown and described, one of the jointed ends being fixed and the other connected with the trolley-arm.

3. The combination, with a pivoted trolley-arm provided with a curved finger, as b^4 , in combination with a spring carrying a socket freely embodying said finger.

4. The combination of the pole A, provided with a threaded base, the truss-rods a , fixed rigidly at their upper ends and attached to a sleeve a^2 , surrounding the threaded end of the pole, and a nut working on said thread to adjust the position of the sleeve, for the purpose set forth.

5. The combination, with a pivoted trolley-arm provided with an extension below its pivot, of a spring carrying at its free end a socket d' , in which the extension of the trolley-arm projects.

6. The combination, with a pivoted trolley-arm provided with a curved extension below its pivot, of a spring carrying at its free end a socket d' , in which the extension of the trolley-arm projects.

7. The combination, with a pivoted trolley-arm, of a spring connected therewith, mechanism for adjusting the spring, and a shaft for operating said mechanism extending within reach of the motor-man.

8. The combination, with a trolley-arm, of a spring for controlling it, the same consisting of two U-shaped strips secured together at their respective ends, one pair of the jointed ends being connected with the trolley and the other pair being fixed, for the purpose described.

In witness whereof I have hereunto affixed my seal and signed my name in the presence of two subscribing witnesses.

WILLIAM STUART SMITH. [L. s.]

Witnesses:

G. H. SCIDMORE,
R. MINRA.