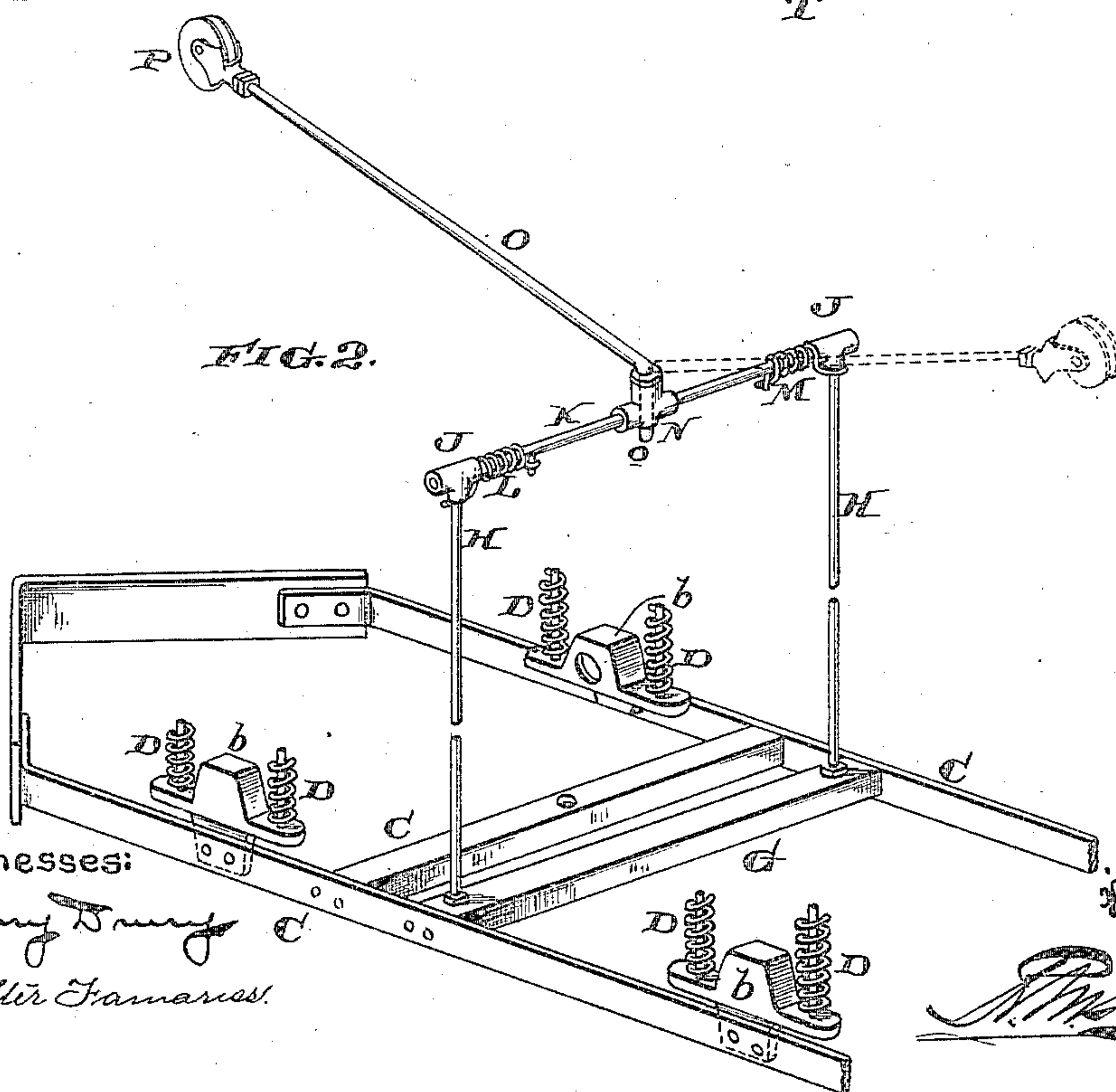
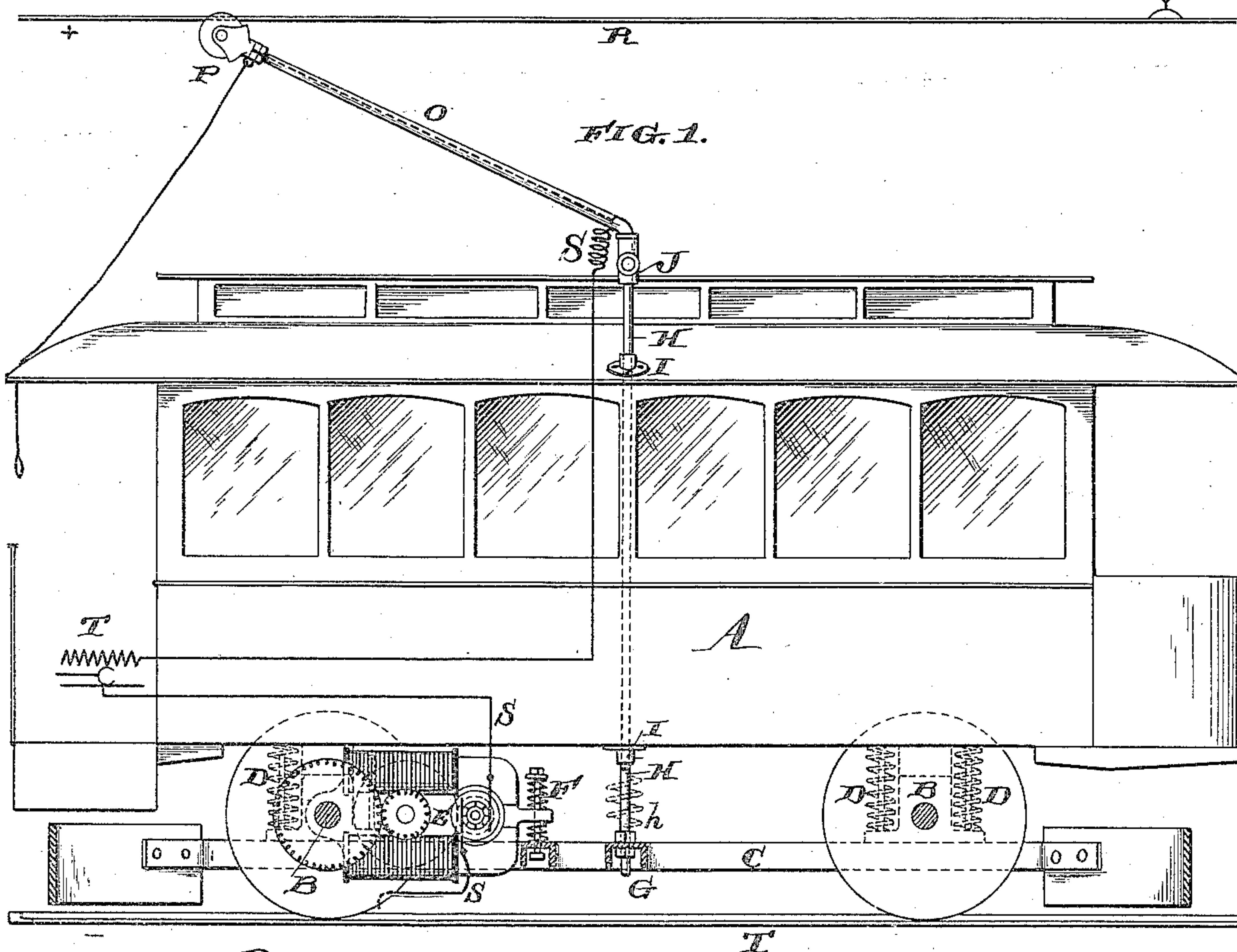


(No Model.)

R. M. HUNTER.  
ELECTRIC RAILWAY.

No. 430,580.

Patented June 17, 1890.



Witnesses:

Henry D. Dwyer

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 430,580, dated June 17, 1890.

Application filed April 4, 1890. Serial No. 346,587. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Electric Railways, of which the following is a specification.

My invention has reference to electric railways; and it consists of certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form a part thereof.

The object of my invention set out in this application (Case 135) is to provide an electrically-propelled vehicle with a current-collecting device carried upon a frame supported upon the axles independently of the car-body and adapted to make a traveling connection with a conductor preferably suspended overhead. The electric motor which is employed to propel the car is also supported upon a frame independently of the car-body. By this means the vertical movements of the car-body do not affect either the connection of the motor with the axle nor the trolley or current-collecting device with respect to the conductor.

By the employment of my invention the conductor can be suspended at a fixed distance with respect to the track, and as the trolley or current-collecting device is supported and moved without variations as to elevation with respect to said track any movement required of the trolley to follow the variations in the conductor will be but slight as compared with what has heretofore been the case when the trolley arranged upon the car was secured to the car-body and caused to rise and fall with every movement of said car-body, as set out in Letters Patent No. 400,916 and No. 398,402, of 1889, granted to me.

Referring to the drawings, Figure 1 is a side elevation of an electrically-propelled vehicle with part in section, showing my improvement as applied to an electric railway; and Fig. 2 is a perspective view illustrating my improved current-collecting device and the frame supporting it.

A is the car-body.

B are the axles, and are journaled in the axle-boxes *b* in the usual way.

C is a frame, which is secured to the axle-boxes, and is thereby supported by the axles independent of the car-body A, which latter is directly supported upon the springs D. It is quite evident that the frame C might be secured upon the axles in any other convenient manner, and hence I do not limit myself to its connection with the axle-boxes, as shown.

E is the electric motor, and is shown as sleeved upon the axle B at one end and supported at the other end by the frame C through an elastic connection or support F. The motor-shaft is connected with the axle by means of gearing. Any other suitable form of motor-connection may be employed, if desired; but in all cases I prefer to support the motor upon the axles independently of the car-body.

R is a suspended conductor arranged above the vehicle, and T are the rails. The suspended conductor may be the positive circuit of the railway, and the rails may be the return-circuit or negative conductors.

Secured upon the cross-bar G of the frame C are two upright rods or tubes H, preferably extending through the side walls of the car-body and guided in bearings I, one of which may be arranged under the car or at its side and the other on the roof of the car. Upon the tops of these rods or tubes H are journal-bearings J, and supported within these journal-bearings J is a transverse rod or rock-shaft K, having upon its central portion a casting formed with a vertical or substantially vertical journal-bearing N. Pivoted in this vertical journal-bearing N is the trolley-arm O, which is preferably formed to extend rearwardly and upwardly, and may contain at its free end any suitable form of contact—such, for instance, as a grooved roller or wheel P, adapted to make an under contact with the suspended conductor R. The lower end of the trolley-arm O is bent, as at *o*, which construction allows the free end of the trolley-arm to swing laterally to follow lateral variations in the conductor, or compensate for lateral swinging movements of the car-body.

L and M are two springs, of which L is under tension with the trolley shown in solid lines in Fig. 2. When the trolley-arm O is



turned around for the car to run in the opposite direction and assumes the dotted position, then the spring M is the one which becomes under tension. The rocking of the shaft or rod K causes the free end of the trolley-arm O to be pressed upward, so as to keep its contact in connection with the suspended conductor. It is quite evident from this construction that the car-body may ride freely upon its springs D without in the least raising or lowering the support for the trolley. This overcomes the necessity of employing such strong springs to maintain contact between the contact device and the conductor.

If desired, the lower part of the upright rods or tubes H may be connected with the frame C or cross-bar G, through springs h or other flexible connections, which will permit slight lateral movement of the car-body without binding upon the bearings I.

The advantage of employing the car-body with bearings I is that it provides a positive support at the upper end of the rods or tubes H and prevents excessive torsional strains upon the said rods H. It is evident, though, that these rods H may be made sufficiently heavy, and might be supported independent of the car-body and project outside of the walls of said car-body; but I prefer the construction shown as being best adapted for the purpose.

S is the motor-circuit and leads from the trolley to the motor, and includes a current regulator or controller T, which extends to the platform, and may be operated by the man in charge.

I do not limit myself to the details of construction here shown, as they may be greatly modified without departing from the spirit of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a car-body supported upon the axle by means of springs, with a frame supported upon the axles independent of the car-body, a suspended conductor, and a trolley or current-collecting device carried by the frame independently of the car-body and making a traveling connection with the suspended conductor.

2. The combination of a car-body supported upon the axles by means of springs, with a frame supported upon the axles independent of the car-body, a suspended conductor, a trolley or current-collecting device carried by the frame independently of the car-body and making a traveling connection with the suspended conductor, and an electric motor supported upon the frame independently of the car-body.

3. The combination of a suspended conductor, a car having its car-body supported upon axles by means of springs, a frame supported upon the axles independently of the car-body, and an upwardly-extending current-collecting device carried by said frame

and making a connection with the conductor above the car-body.

4. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, and a current-collecting device carried by said parts and movable upon a transverse axis for making connection with the conductor.

5. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, a current-collecting device carried by said parts and movable upon a transverse axis for making connection with the conductor, and a spring to press said contact against the conductor.

6. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, and a current-collecting device carried by said parts and movable upon a vertical or substantially vertical axis for making connection with the conductor.

7. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, a current-collecting device carried by said parts and movable upon both a transverse and vertical or substantially vertical axis for making connection with the conductor, and a spring to press said contact against the conductor.

8. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, a current-collecting device carried by said parts and movable upon a transverse axis for making connection with the conductor, and an electric motor to propel said car, supported by the frame independently of the car-body and mechanically connected with the axle to rotate it.

9. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, a current-collecting device carried by said parts and movable upon a transverse axis for making connection with the



conductor, a spring to press said contact against the conductor, and an electric motor to propel said car, supported upon the frame independently of the car-body and mechanically connected with the axle to rotate it.

10. The combination of a suspended conductor, a car having its car-body supported upon the axles by means of springs, a frame supported upon the axles independently of the car-body, upwardly-extending parts extending above the car-body and carried by said frame, a current-collecting device carried by said parts and movable upon a vertical or substantially vertical axis for making connection with the conductor, and an electric motor to propel said car, supported upon the frame independently of the car-body and mechanically connected with the axle to rotate it.

11. The combination of a suspended conductor, a car having its car-body supported on springs, a frame supported upon the axles independently of the car-body, two upwardly-extending parts carried by the frame and located one on each side of the car-body, a rock-shaft journaled in the upper portions of said parts, and a contact device carried upon said rock-shaft for making connection with the suspended conductor.

12. The combination of a suspended conductor, a car having its car-body supported on springs, a frame supported upon the axles independently of the car-body, two upwardly-extending parts carried by the frame and located one on each side of the car-body, a rock-shaft journaled in the upper portions of said parts, springs to rotate said rock-shaft, and a contact device carried upon said rock-shaft for making connection with the suspended conductor and pivoted on a vertical or substantially vertical axis.

13. The combination of a suspended conductor, a car having its car-body supported on springs, a frame supported upon the axles independently of the car-body, two upwardly-extending parts carried by the frame and located one on each side of the car-body, a rock-shaft journaled in the upper portions of said parts, a contact device carried upon said rock-shaft for making connection with the suspended conductor, and a motor supported upon said frame independent of the car-body and mechanically connected for rotating the axle.

14. The combination of a suspended conductor, a car having its car-body supported on springs, a frame supported upon the axles independently of the car-body, two upwardly-

extending parts carried by the frame and located one on each side of the car-body, a rock-shaft journaled in the upper portions of said parts, springs to rotate said rock-shaft, a contact device carried upon said rock-shaft for making connection with the suspended conductor and pivoted on a vertical or substantially vertical axis, and a motor supported upon said frame independently of the car-body and mechanically connected for rotating the axle.

15. The combination of a car-body supported on the axles by means of springs, a motor-frame carried by the axles independently of the car-body, a frame-work supported upon said motor-frame and extending upward to the roof of the car, and a current-collecting device carried upon the upper end of said frame-work above the car-body, whereby the car-body may move vertically without raising or lowering the current-collecting device.

16. A current-collecting device for an electrically-propelled vehicle, consisting of a rock-shaft movable about a transverse axis and provided with a spring to resist its rotation under the action of the trolley-arm, and also provided with a vertical or substantially vertical journal-bearing, and an upwardly and rearwardly extending trolley-arm having a contact device at its free end and formed at its lower end with a bent or angular journal fitting into the vertical or substantially vertical journal-bearing of the rock-shaft.

17. A current-collecting device for an electrically-propelled vehicle, consisting of a rock-shaft movable about a transverse axis and provided with springs to resist its being rotated in either direction except by abnormal pressure, and an upwardly and rearwardly extending trolley-arm journaled upon said rock-shaft upon a vertical or substantially vertical axis, about which it may be rotated.

18. The combination of a car-body supported on the axles through springs, a frame carried upon the axles independent of the car-body, upwardly-extending parts extending above the car-body and connected with the frame by flexible connections, and a contact device or trolley carried upon the upper end of said parts and located above the roof of the car-body.

In testimony of which invention I have hereunto set my hand.

R. M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,  
A. J. DUNN.