

(No Model.)

R. M. HUNTER.
ELECTRIC RAILWAY TROLLEY.

No. 498,435.

Patented May 30, 1893.

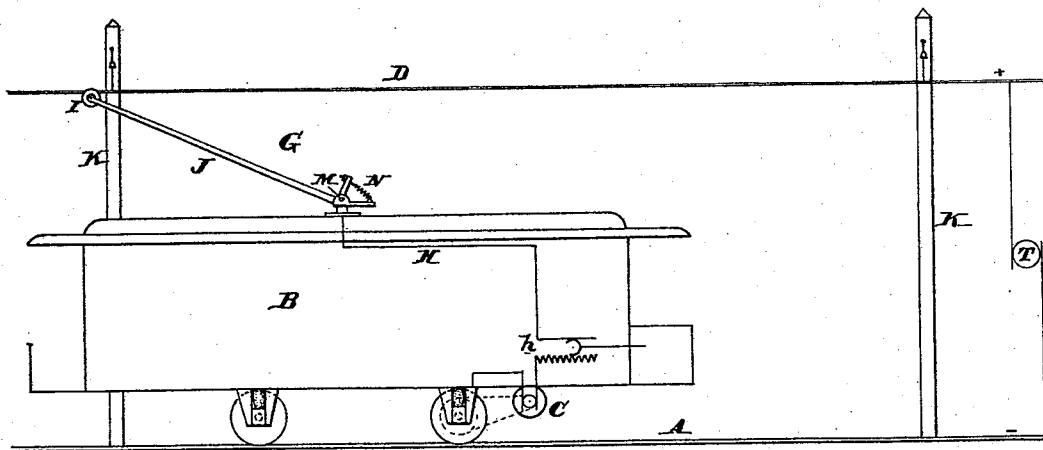


FIG. 1

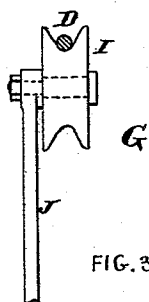


FIG. 3

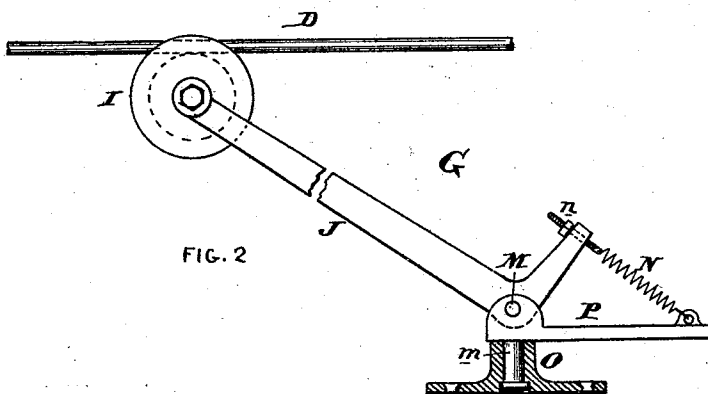


FIG. 2

Attest
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ELECTRIC-RAILWAY TROLLEY.

SPECIFICATION forming part of Letters Patent No. 498,435, dated May 30, 1893.

Original application filed June 7, 1888, Serial No. 276,362. Divided and application filed November 8, 1888, Serial No. 290,302.

Again divided and this application filed March 4, 1892, Serial No. 423,697. (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 consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

This application, (Case 217,) is a division of my application (Case 72), Serial No. 290,302, filed November 8, 1888, which in turn was a division of my application, Serial No. 276,362, filed June 7, 1888.

This invention relates to electric railways, and with particular reference to the means for supplying electric current to a traveling electrically propelled vehicle from a suspended conductor, arranged above the car or at a higher elevation than the roof of the car so as to be out of reach of persons on the side walk or road way.

The essential features of my invention may be stated as follows:—A suspended conductor is insulated from the ground and arranged parallel to the railway tracks and at a higher elevation than the car roof, and the car is provided with a suitable contact device adapted to be pressed upward against the under side of the suspended conductor with capacity for extending rearwardly toward either end of the car, thereby making a traveling or trailing contact with the suspended conductor, the relation between the conductor and collector being such that the collector may follow all irregularities of the suspended conductor and compensate for any variations in its parallelism with respect to the rails.

Specifically considered, my improvement comprehends an upwardly and rearwardly extending arm pivoted to the roof of the car body, and carrying at its top or free end a grooved contact wheel or contact device running in close contact with the under side of the conductor. The arm is held up preferably by a spring device. By my improvement the rearwardly extending current col-

lecting arm is connected to the car by means of a movable support or turntable plate which is adapted to swing about a vertical axis, and to which plate the arm is pivoted. A spring connection is arranged between the lower part of the arm and the turntable plate and is adapted to revolve freely with the arm and turntable plate or movable support. From this construction it is evident that the heavy or massive parts of the current collecting device are arranged near the roof of the car while the lighter movable parts extend rearwardly and upwardly toward the suspended conductor so that the action of the conductor upon the free end of the collector arm may cause the turntable plate or movable support to swing about the vertical axis.

In the drawings:—Figure 1 is a side elevation of an electric railway embodying my improvements. Fig. 2 is an enlarged side elevation of the current collecting device shown in Fig. 1, and Fig. 3 is a cross section of the conductor and shows an end view of the collector at its upper part.

A represents the railway track and may be the return conductor if desired when but a single overhead conductor is used.

B is the electrically propelled vehicle or car, C is the electric motor carried thereon and adapted to rotate the axle of the car to propel it, and H is the motor circuit on the car connecting the current collecting device G with the wheels and including the motor and the current regulator *h*, which latter is employed to control the speed of the motor.

G is the current collecting device and is supported above and by the roof of the car.

K are the supporting posts arranged at intervals along the railway, and D is the suspended conductor which is preferably circular in cross section and suspended at intervals along the length of the railway by insulating supports in any suitable manner. As shown the suspended conductor is supported from cross wires which are secured to the posts transversely to the railway track. By this construction it is evident that the suspended conductor has its under surface unobstructed or exposed throughout its length.

The current collector is shown as consisting of a grooved collector wheel I, into the deep groove of which the conductor fits, and against the side walls or flanges of which it acts in guiding the current collecting arm to which the wheel is connected. The grooved wheel I is journaled on the free or upper end of the arm J which is pivoted on a transverse axis at M at its lower end. The transverse axis is carried by a turntable or swinging supporting plate P which is journaled on a vertical axis *m* to the bracket O on the carbody, which bracket is located at or about the middle of the roof of the car. A spring N connects the plate support or turntable P with the projection or short arm of the current collecting arm J by which the rear or free end of the arm J is caused to be thrust upward so as to press the contact or grooved collector device against the under side of the suspended conductor with an elastic pressure. An adjusting nut and screw *n* may be employed for varying the tension of the spring. This construction will allow of lateral play as well as vertical, play to the collector, and the grooved wheel will insure the collector vibrating laterally so as to follow the lateral excessive variations of the conductor, and will also permit of reversing the collector for propelling the car in the opposite direction. This reversibility is an important feature as it permits the car to run in either direction with the same velocity and without danger of the contact device of the collector arm leaving the suspended conductor. The collector may swing entirely around so as to trail to the rear end of the roof of the car to correspond to the direction of movement it may have. By this construction, it is seen that the entire current collecting device swings about the bracket O, and at the same time is maintained in any position assumed by the connection of the grooved contact with the suspended conductor. The spring or means employed for holding contact in connection with the suspended conductor also moves with the turntable plate or support and the collector arm.

The tension of the spring N may be adjusted by the nut and screw *n* to vary the upward pressure of the wheel I against the conductor as the circumstances may require, and also to compensate for any weakening of the spring after being used. By this construction of current collecting device for electric railways the conductor has not to support the weight of the collector as the latter has its weight wholly supported by the car. It will be further observed that the conductor D may be supported from above, which is very advantageous in crossings and switches. In this invention the collector is supported between the conductor and the car.

The obliquity of the current collecting arm J may be varied to suit the requirements of the case, and will be governed by the height

of the conductor D above the railway, the height of the car roof, and the length of the collector arm, any or all of which may be varied to suit the pleasure of the constructor. By making the current collecting device complete and movable so as to be directed in either direction with respect to the ends of the car, the cars need not be turned end for end when returning over the track, and this provision is desirable in single track railways employing turnouts to permit the passage of cars. The greater part of the weight of the current collecting device is arranged comparatively near to the carbody structure, and only the lighter portions are extended to any great distance from the car and required to make large movements, thereby obtaining great stability of structure with perfect movement under all conditions and permitting the employment of a light suspended conductor. The current is collected from the suspended conductor by the current collecting wheel I, and then conveyed down the arm J which may act as the conductor to the bracket O and thence by the motor circuit H and regulator *h* to the motor, and finally to the wheels. The current returns by the track to the source of electrical energy T which has one pole connected with the track and the other pole with the suspended conductor.

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

1. In an electric railway, the combination of the rails acting as the return conductor, a suspended working conductor arranged above the car, an electric generator having its poles respectively connected with the suspended working conductors and rails to supply electricity thereto, a car, an electric motor mechanically connected to rotate the axle of the car, an obliquely extending current collecting arm connected with the roof of the car by a joint permitting universal movement and complete reversal of the arm and having an upward pressure contact upon its free end traveling against the under side of the suspended conductor, a motor circuit for supplying current from the current collecting contact to the motor, and a suitable regulator arranged upon the car for controlling the speed of the motor.

2. The combination of a suspended conductor, a traveling vehicle, a current collecting device carried by the vehicle and located between the vehicle and conductor, movable on a transverse axis, and a support for the collector as a whole hinged to the vehicle and movable completely about a vertical axis.

3. An electrically propelled vehicle in combination with a suspended conductor, an arm connected to the vehicle on a movable joint and extending obliquely upward and capable of being turned in either direction of travel of the vehicle, and a contact wheel carried by the free end of said arm and making a

running contact with the under side of the conductor.

4. An electrically propelled vehicle in combination with a suspended conductor, an arm connected to a movable frame or part attached to the vehicle by a movable joint forming a substantially vertical axis, the said arm extending obliquely upward and capable of being turned with its supporting frame or part in either direction of travel of the vehicle, and a contact wheel carried by the free end of said arm and making a running contact with the under side of the conductor.

5. The combination of a suspended conductor, a traveling vehicle, an upwardly extending oblique arm hinged to the vehicle at or about its middle and capable of being turned toward either end of the car, and a contact wheel carried by the free end of said arm and adapted to make contact with the conductor.

6. An electrically propelled vehicle in combination with a suspended conductor, an arm connected to the vehicle on a movable joint and extending obliquely upward and capable of being turned in either direction of travel of the vehicle, and a contact carried by the free end of said arm and making a running contact with the under side of the conductor.

7. An electrically propelled vehicle in combination with a suspended conductor, an arm connected to a movable frame or part attached to the vehicle by a movable joint forming a substantially vertical axis, the said arm extending obliquely upward and capable of being turned with its supporting frame or part in either direction of travel of the vehicle and guided by the conductor, a contact carried by the free end of said arm making a running contact with the under side of the conductor, and a spring connection between the supporting frame or part and the arm for causing the arm and its contact to be pressed upward against the conductor.

8. The combination of a suspended conductor, a traveling vehicle, an upwardly extending oblique arm hinged to the vehicle at or about its middle and capable of being turned toward either end of the car, and a contact carried by the free end of said arm and adapted to make contact with the conductor.

9. In an electric railway, a suspended working conductor arranged above the carbody, a traveling electrically propelled car, an upwardly extending and laterally movable arm carried by the car having its upper end free, and adapted to trail toward either end of the car and a contact device carried by said arm at its free end and adapted to run in contact with the under surface of said working conductor.

10. In an electric railway, a suspended working conductor, a traveling electrically propelled vehicle, an upwardly extending arm carried by the vehicle and movable on a vertical axis and having its upper end free, and

adapted to trail toward either end of the car and a grooved roller contact carried by said arm at its upper or free end, and adapted to receive and run in contact with the under surface of said working conductor.

11. The combination of a railway track, an electrically propelled vehicle or car, a suspended electric conductor arranged above the vehicle or car and parallel to the railway, an electric motor to propel the vehicle or car, and a current collecting device having its weight sustained by the vehicle or car extending upward and rearward with provision for vertical and lateral movement at its free end and having a contact at its free end making an under contact with the suspended electric conductor, and a support for the collecting device carried above the roof of the vehicle or car and supporting the current collecting device so that it may be turned rearwardly with respect to either end of the vehicle or car.

12. The combination of a railway track, an electrically propelled vehicle or car, a suspended electric conductor arranged above the vehicle or car and parallel to the railway, an electric motor to propel the vehicle or car, and a current collecting device having its weight sustained by the vehicle or car extending upward and rearward with provision for vertical and lateral movement at its free end and having a contact at its free end making an under contact with its suspended electric conductor, and a support for the collecting device carried upon the middle of the roof of the vehicle or car and supporting the current collecting device so that it may be turned rearwardly with respect to either end of the vehicle or car.

13. The combination of a suspended conductor located above the vehicle, an electrically propelled vehicle, a grooved collector wheel pressing upon the under side of the conductor, an arm or support hinged on a transverse axis and extending from the vehicle rearward supporting the grooved collector wheel, and a spring to press said collector wheel upward against the conductor, means to adjust the tension of the spring to vary the degree of upward pressure of the contact against the conductor, and a support for the arm and spring supported by the roof of the car and completely reversible.

14. In an electric railway, the combination of the railway track, a suspended conductor arranged parallel to the track at a higher elevation than the car roof and having its under surface unobstructed, a car, an electric motor to propel the car, a turntable or movable support secured to the car with provision to turn freely in a horizontal plane, an upward and rearwardly extending collector arm supported at its lower part by the turntable or movable support and movable with it, a power device carried by the turntable or movable support acting upon the arm to press it upward with an elastic pressure, a contact carried upon the free end of the arm making a traveling contact with the under side of the

conductor, and a motor circuit on the car electrically connecting the collector with the motor.

15 In an electric railway, the combination of the railway track, a suspended conductor arranged parallel to the track at a higher elevation than the car roof and having its under surface unobstructed, a car, an electric motor to propel the car, a turntable or movable support secured to the car with provision to turn freely in a horizontal plane, an upward and rearwardly extending collector arm supported at its lower part by the turntable or movable support and movable with it, a spring device carried by the turntable or movable support acting upon the arm to press it upward with an elastic pressure, means to adjust the tension of the spring, a contact carried upon the free end of the arm making a traveling contact with the under side of the conductor, and a motor circuit on the car electrically connecting the collector with the motor.

16 In an electric railway, a track in combination with a suspended electric conductor, a car, a motor to propel the car, a current collecting device consisting of an oblique arm having a grooved contact part at its free end guided against the under side of the suspended conductor and connected at its lower and forward end to the car so as to revolve freely laterally but resisted in its vertical movements by a spring, and a motor circuit connecting the collector with the motor.

17 In an electric railway, the combination of the rails, a suspended conductor suspended above the rails and having its under side exposed and unobstructed, a car, a motor to

propel the car, a movable support secured to the roof of the car on a vertical or upright axis and free to revolve thereon, a rearwardly extending oblique arm carrying at its top and free end a grooved contact making a traveling connection with the under side of the conductor and hinged at the bottom to the movable part and further provided with a lateral extension, a spring connected between the movable part and lateral extension of the collector arm to hold the arm upward, and a motor circuit between the collector and motor.

18 In an electric railway, the combination of the rails, a suspended conductor suspended above the rails and having its under side exposed and unobstructed, a car, a motor to propel the car, a movable support secured to the roof of the car on a vertical or upright axis and free to revolve thereon, a rearwardly extending oblique arm carrying at its top and free end a grooved contact making a traveling connection with the under side of the conductor and hinged at the bottom to the movable part and further provided with a lateral extension, a spring connected between the movable part and lateral extension of the collector arm to hold the arm upward, means for adjusting the tension of the spring to vary the pressure of the contact against the conductor, and a motor circuit between the collector and motor.

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

R. M. HUNTER.

Witnesses:

S. T. YERKES,

ERNEST HOWARD HUNTER.