(No Model.) 3 Sheets—Sheet 1.

C. J. VAN DEPOELE, Dec'd.

C. A. COFFIN & A. WAHL, Administrators.

OVERHEAD CONTACT DEVICE AND SWITCH.

No. 495,383. Patented Apr. 11, 1893.

Fig. 2.

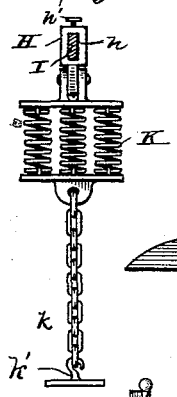


Fig. 1.

Fig. 10

Fig. 3.

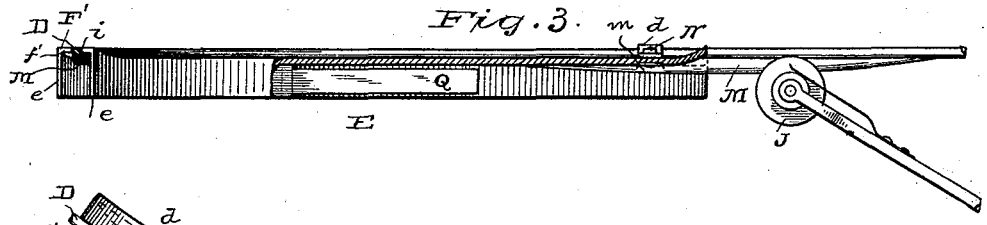
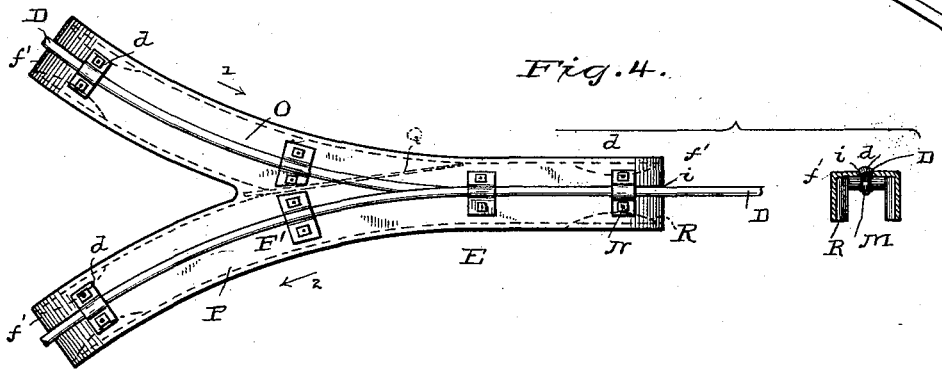


Fig. 4.



Witnesses

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(No Model.) 3 Sheets—Sheet 2.

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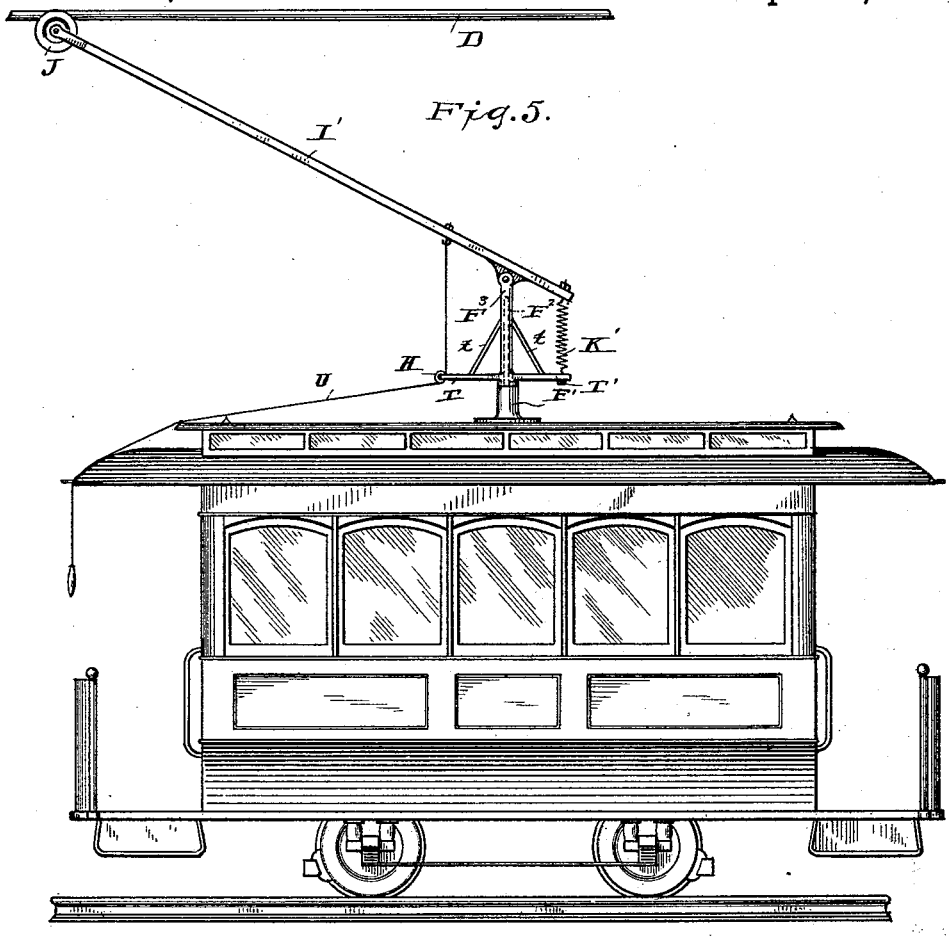

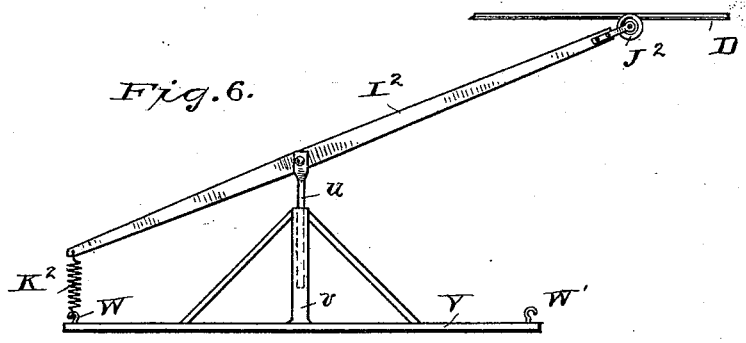

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(No Model.) 3 Sheets—Sheet 3.

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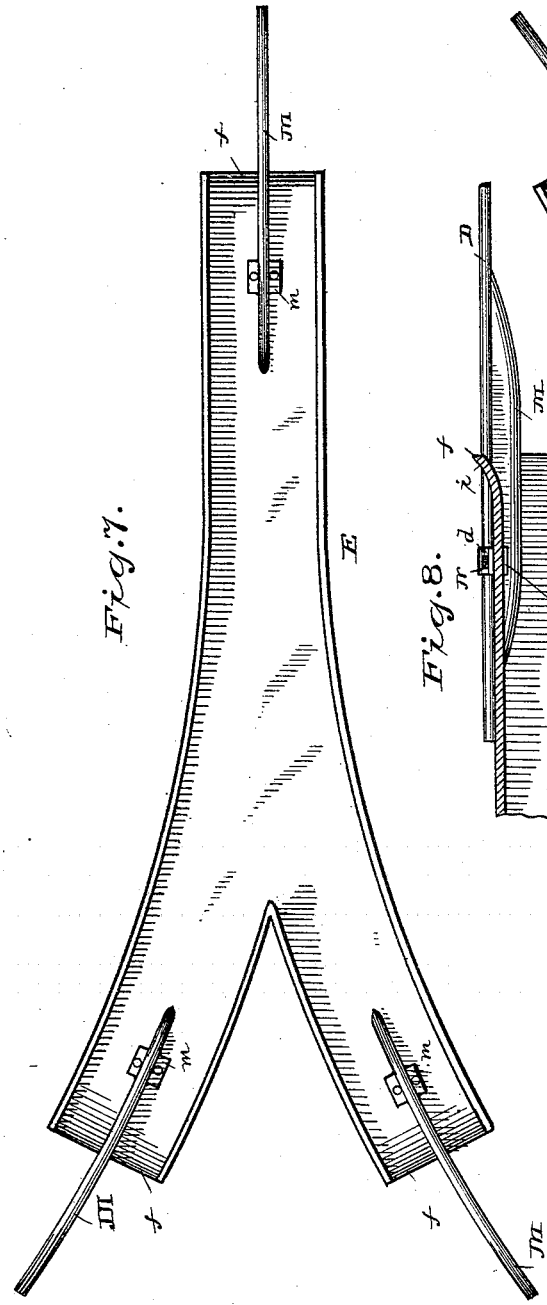

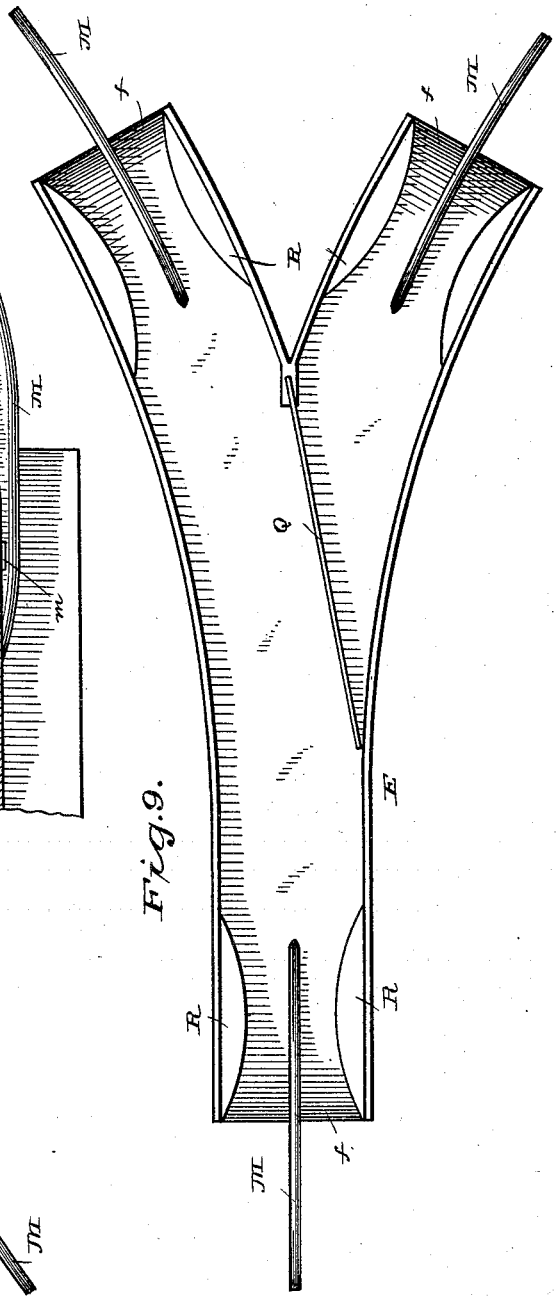

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UNITED STATES PATENT OFFICE.

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OVERHEAD CONTACT DEVICE AND SWITCH.

SPECIFICATION forming part of Letters Patent No. 495,383, dated April 11, 1893.

Application filed June 18, 1888. Serial No. 277,425. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Overhead Contact Devices and Switches, of which the following is a description.

My invention relates to improvements in electric railways, and includes improvements upon the invention forming the subject matter of a prior application for Letters Patent, filed by me March 2, 1887, Serial No. 230,649.

The novel features of the present application comprise an improved switch for upward pressure suspended contact devices; an improved apparatus whereby the upward pressing contact is maintained against the conductor; improved devices connecting the conductors with the switches and acting to lessen or eliminate all sudden, jerky, and rough movement of the traveling contact on entering and leaving the switches.

The invention furthermore includes means for reversing the position of the contact arm upon the car, together with various details of construction and arrangement hereinafter pointed out and referred to in the appended claims.

In the accompanying drawings—Figure 1 is an elevation showing an electric railway motor car and suspended conductor with switches and contact devices embodying my invention, a portion of the front of the car being broken away to show the motor. Fig. 2 is a detail view showing the tension spring by which the upward contact is maintained. Fig. 3 is an elevation showing one of the switches, a portion of the main conductor and the contact device, the switch box being partly broken away to show the interior arrangement. Fig. 4 is a plan view showing a branch from the suspended main conductor, and the switching devices therefor. Fig. 5 is an elevation showing an electric motor car in which the contact arm is centrally mounted and arranged to be reversed when desired. Fig. 6 shows another form of reversible contact arm. Fig. 7 is an inverted plan view showing my improved switch and the ribs extending from the extremities thereof, all on an enlarged scale. Fig. 8 is a fragmentary elevation partly in section showing one of the extremities of the switch shown in Fig. 7. Fig. 9 is an inverted plan view also on an enlarged scale, showing the switch with the addition of the fixed guides at the extremities. Fig. 10 is a detail showing the pivoted fork sustaining the contact arm.

Similar letters denote like parts throughout.

As illustrated in the drawings, A, is a car of the type in use on street railways, and arranged to be propelled by an electric motor B, suitably located thereon in any desired position, and having its armature in mechanical connection with the carrying wheels thereof.

C, is the track upon which the car moves.

D, is the main supply conductor suitably supported from its upper side at any desired height above the car, and extending at substantially the same height along the line of travel of the car.

An insulated post standard or socket F, is mounted upon the top of the car, and provided at its lower portion with an enlarged base *f*, or other means by which it may be attached to the roof of the car; a brace rod *f'*, may also be provided. A bifurcated support G, fits down into and is free to turn within the post F, as indicated in Fig. 10. A metallic frame or clamp H, is hinged at *g*, between the arms of the pivot G, being thereby both hinged and pivoted upon the post F. Extensions or solid portions *h*, upon the frame H, are longitudinally apertured to receive the contact lever or arm I, which is secured in the desired position in its hinged and pivoted supporting frame H, by set screws *h'*. The arm I, consists desirably of a light flexible bar, which may be of metal or wood, and is bifurcated at its outer extremity to receive the grooved contact wheel J, which is suitably pivoted between the extremities thereof. One or more tension springs K, three being shown in the present instance since by a plurality of springs I gain increased strength, flexibility and capacity. The springs *k* are secured either

to the lower end of the frame H, as indicated in Fig. 2, or to an adjustable clamp h^2, movable upon the arm I. The springs K, are adjustably secured to the roof of the car by chain and hook k, k', or equivalent means, and act to press the outer end of the contact arm upward, and hold the grooved contact wheel J, in electrical contact with the suspended conductor D. A cord or chain L, is attached at one end near the lower extremity of the arm I, and at its other also to the arm I, but near its outer extremity or at any convenient point on the opposite side of its fulcrum to that upon which the springs K, directly act. In case of accidental displacement of the contact wheel J, the cord or chain L, being provided with a suitable stop l, will prevent the arm I, moving upward or swinging laterally beyond a predetermined distance, and affords a convenient means of replacing the contact wheel in operative relation with the conductor. The pivotal connection between the contact arm I, and car, through the frame H, and post F, will allow the contact wheel J, to remain in operative relation with the conductor, notwithstanding the swaying of the car due to unevenness of the track, sufficient lateral as well as vertical action being permitted by the elasticity of the springs K, and further freedom of movement being allowed by the resiliency of the arm I.

As shown in Figs. 5 and 6, the mounting of the contact arm may be somewhat varied and I find that in many instances it is desirable to place the post upon which said contact arm is carried centrally upon the top of the car and so mounting the contact arm that instead of turning the car preparatory to making the return trip the position of the contact arm can be reversed and the armature of the motor caused to rotate in the opposite direction.

As shown in Fig. 5, the post F', is rigidly secured in any suitable manner, at about the center of the top of the car, and said post is provided with an upward extending shank shown in dotted lines at F^2. Upon the shank F^2, is placed a tubular support or sleeve F, in the upper extremity of which the contact arm I', is hinged. From the lower portion of the sleeve F^3, extend horizontal arms T, T', which may be of metal and rigidly secured to or integral with the sleeve F^3. The arms T, T', may also be additionally supported by brace rods t, t. The arm T, may be provided with a roller or other friction reducing device t', and a cord U, passing through the end of the arm T, over the pulley t', and extending upward and secured to the contact arm I'. The lower extremity of the cord U, is in convenient position to either the motorman or conductor as may be desired, and by means thereof the outer end of the contact arm can be drawn down for the purpose of being placed in engagement with the conductor, or the entire device can be rotated upon its pivot and its position reversed. A tension device which may be a group of springs such as shown in Fig. 2, is secured to the lower end of the arm I', and connected to the arm T', permanently, as indicated, or adjustably, as in Figs. 1 and 2. The contact arm may be constructed of wood or metal, or part wood and part metal. When the latter is used it may be most convenient to bring the current from the conductor down through the arm to suitable connections attached to the base of the posts F, F', and leading to the motor. When, however, a non-metallic arm is used the current will be conveyed through a separate conductor carried by said arm.

In Fig. 6 is shown a very simple means of reversing the position of the contact arm. Upon the top of the car is secured a board V, at the central portion of which is secured a vertical post v, in the upper extremity of which is pivotally supported a forked stem u, between the bifurcated extremities of which is secured a contact arm I^2, the outer extremity of which is provided with a metallic contact wheel J^2, engaging the under side of the conductor D. To the other extremity of the contact arm I^2, is attached a tension spring K, which is secured to the base board V, by engagement with a stationary hook W. The board V, is provided with a similar hook, W', at its opposite extremity, and the position of the contact arm can be readily reversed by detaching the tension spring K, from one end, turning the arm upon its pivot, and attaching the spring at the opposite side end of the board V. It will be obvious that the pivotally supported frame shown in Fig. 5, in connection with the reversible contact arm I', may be substituted for the rigidly mounted post F, and adjusting frame H, shown in Fig. 1. Also that the adjusting springs shown in Fig. 2, may be used in connection with the structure shown in Fig. 5, the simple form of spring shown at K', being merely for the purpose of illustrating the action of the apparatus. It will also be understood that the cord U, might be otherwise attached than is shown in said Fig. 5, and that hooks for attachment of the tension spring may be provided at the extremity of each of the arms T, T'.

The contact carrying arm is described and claimed as being hinged and pivoted, by which is meant that the said arm is capable of universal movement upon its pivot. Ordinary forms of pivoted hinge connections between the contact carrying arm and its support are herein shown and described but it will be obvious that many different means of effecting a connection capable of the desired freedom of movement might be substituted for what I have shown and described without in any way departing from the invention.

At points where the conductor D, unites with other conductors, or diverges, are located switching devices for uniting the several conductors and properly guiding the contact wheel. The switching devices consist of hollow boxes or frames E, preferably of metal

and comprising side walls *e*, and a top wall F', the sides forming guide ways and being separated sufficiently to allow the contact wheel to pass freely therethrough. The conductor D, may extend along the exterior of the top wall F, of each switch box, or it may terminate at clamps *d*, by which it is preferably secured in position. The boxes E, are in metallic contact with the conductors with which they are connected, and the current passes from the box to the contact wheel without interruption. The extremities *f'*, of the top wall F, of the switch are curved upward to prevent the contact wheel J, striking thereagainst and receiving a sudden and severe blow on entering the switch, an occurrence that would be likely to derail the contact wheel. Said extremities are apertured or notched at *i*, for the passage of the conductor D.

To prevent wabbling or violent oscillation of the contact wheel J, within the switch and particularly as it enters and leaves the same, I provide ribs M, which are secured to the under side of the conductor a short distance in advance of where it enters the switch and continue into the switch a short distance, and act to guide the contact wheel smoothly thereinto. The ribs M, are narrow, tapering strips of metal grooved along a portion of their upper edge to fit against the under side of the conductor and are rounded off toward their lower edges to fit the groove of the contact wheel, and said lower edges are tapered from their longitudinal center toward each extremity so as to present oppositely disposed planes meeting at the entrance to the switch.

The guide ribs M, may be strips of metal soldered, brazed, riveted, or made integral with the main conductor and by it retained in the described position, a portion thereof projecting into the switch box. As shown in Figs. 3 and 8 however, it will be found convenient to provide the said ribs with extensions or lugs *m*, which may rest against the under side of the top wall of the switch box and receive the bolts N, by which conductor-retaining clamps *d*, are held in position.

When the interior cross section of the switch box is made wider than the face of the contact wheel, as will be found necessary on sharp or complicated curves in order to prevent the wheel pinching or binding during its passage therethrough, additional guide ribs R, Fig. 9, are formed or provided at the exits from the switches where the guide ribs M, begin, so that the contact wheel will be gradually brought to the proper position before leaving the switch. When, however, the groove in the contact wheel J, is of ample width, and only working play allowed on the interior of the switch box, this precaution will be wholly unnecessary as the contact wheel will be unable to issue from the box without its groove engaging the guide rib M. The suspended switches correspond in direction with the track switches.

As shown in Figs. 3, 4, and 9, by way of illustration, conductors from two directions converge and unite. It is assumed for the purpose of this description that one contact device will move through the switch in the direction of the arrow marked 1, on Fig. 4, and that a contact device will also move through said switch in an opposite direction as indicated by the arrow 2. In order to secure their uninterrupted passage without interference or injury, the intersecting portions O, P, are separated by a flexible tongue Q, attached to the point of divergence of the portions O, P, its outer extremity normally resting against the side wall of the part O. A contact wheel passing through the switch in the direction of the arrow 1, will come in contact with the tongue Q, move it sidewise and pass, the tongue then returning to position. A contact wheel entering in the direction of the arrow 2, the presence of the tongue Q, will prevent it passing out through the portion O, and deflect it, causing it to follow the portion P, and issue upon the rib M, from which it passes smoothly into contact with the under side of the conductor D.

It will be understood that contact wheels and tension devices of other forms than that described may be used in connection with my improved switch with good results, and it will be obvious that the switch itself may be used without the guide ribs M. Also that the advantages ensuing from the use of the guide ribs M, are wholly independent of the employment of the switch tongue Q, or deflecting ribs R.

In my patent No. 397,451, which was issued to me February 5, 1889, on application Serial No. 290,553, taken from the present application and filed November 12, 1888, I have made claim to so much of the invention herein disclosed as relates to special features of the improved switch and also to certain details of improved apparatus whereby the upward pressing contact is maintained against the conductor, such details being referred to in claims 3, 4, 5, 6, 7, 8, 9, 10 and 11 of the said patent, and consisting in brief of the contact carrying arm longitudinally adjustable, the tension spring adjustably secured, and a rope or other flexible connection secured both to the outer and inner extremities of the contact carrying arm, together with the particular construction of the switch. It is intended, therefore, in this application to make claim broadly to that part of the invention disclosed which includes the improved switch and also means for reversing the position of the contact arm upon the car, and the various details thereof, although I desire it to be understood that I except the following claim; to wit:

"The combination of a car, an overhead conductor, a contact device making underneath contact with the conductor, a standard on the roof of the car, an arm carrying the contact device pivoted on the standard on a transverse axis but free to swing around the

standard, a spring connected to the pole for pressing the contact device upward against the conductor, and a line connected with the arm above its pivot for moving the arm:" as such a claim is now pending in a divisional application serially numbered 370,738, filed November 8, 1890.

I do not limit myself to the precise details shown and described, since various minor changes of form and arrangement may be made consistently with the foregoing description.

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

1. In electric railways the combination of a supply conductor suspended along the line of travel, a car or other vehicle having a support extending upward from the upper part thereof, and an arm hinged and pivoted to swing freely upon the support and carrying a contact adapted to engage the suspended conductor, substantially as described.

2. In electric railways the combination of a car, a supply conductor suspended along the line of travel of the car, a post or support upon the upper portion of the car, an arm carrying a contact adapted to engage the suspended conductor, said arm being hinged and pivoted upon the post or support upon the car whereby said arm may freely swing vertically and laterally with respect to the top of the car and be turned entirely around upon its pivot to operate from either direction, substantially as described.

3. In electric railways the combination of a car, a supply conductor suspended along the line of travel of the car, a post or support upon the upper portion of the car, an arm carrying a contact adapted to engage the suspended conductor, said arm being hinged and pivoted upon the post or support upon the car whereby said arm may freely swing vertically and laterally with respect to the top of the car and be rotated upon its pivot to operate from either direction, and a tension spring for pressing said arm upward and maintaining said contact, substantially as described.

4. In an electric railway the combination of a vehicle, a support mounted thereon, a contact carrying arm hinged and pivoted to swing freely upon said support and a rope or other flexible connection secured to the contact carrying devices and to the said pivoted support and arranged upon the exterior of the vehicle whereby the contact carrying arm can be lowered and the pivoted support and arm be moved into any desired position, substantially as described.

5. The combination with a car, of a post or standard mounted thereon, a sleeve pivotally supported upon the post and having laterally extending arms, a contact carrying arm hinged in the uppor portion of the sleeve, a tension spring or springs secured to one of the arms and to the lower part of the contact carrying arm for maintaining an upward tension at its outer extremity, and a cord passing through the other arm for manipulating the rotatable contact arm carrying frame, substantially as described.

6. The combination of a car, an overhead conductor, a contact device making underneath contact with the conductor, a standard on the roof of the car, an arm carrying a contact device pivoted on the standard and also on a transverse axis and free to swing thereon, a spring connected to the arm for pressing the contact device upward against the conductor, and a line or lines connected with the arm for moving the same.

7. In an electric railway, the combination of a car, an overhead conductor situated above the car, a standard on the car, an arm carrying a contact device at its free extremity, said arm being pivoted upon the standard and also upon a transverse axis and adapted to swing freely thereon to permit the contact device carried by its free extremity to follow the line of the conductor, and a line connected with the arm for moving the same.

8. In an electric railway, the combination of a car, an overhead conductor, a standard on the car, an inclined pole carried by a transverse axis upon said standard and free to swing around said standard, and a grooved or flanged contact device carried by said pole and engaging said conductor at its lower side, substantially as described.

9. In an electric railway, the combination of a car, an overhead conductor situated directly above said car, a contact device making underneath contact with said conductor, and a pole carried by the car and carrying said contact device and pivoted so as to swing freely around a vertical axis, substantially as described.

10. In an electric railway, the combination of a car, an overhead conductor above the car, an arm carrying a contact device at its outer end said arm mounted upon a transverse axis, a spring connected to the arm for pressing the contact upward against the conductor, a line for moving the arm, having a stop for limiting the upward movement of the arm.

11. In an electric railway, the combination of a car, an overhead conductor, a standard on the car, a rotating support thereon, an inclined contact carrying arm hinged upon said support, and a tension spring secured so as to rotate with the support and acting upon the said arm for holding the contact device in position.

12. In an electric railway, the combination with a car, of a standard on the car, a rotating support thereon, an arm hinged upon said support and provided with a grooved or flanged contact device for engaging with a suspended conductor, and a tension spring secured so as to rotate with the support and acting upon the said arm for holding the contact device in position.

13. A reversible contact device for an electric railway vehicle, consisting of a standard, a rotating support thereon, a contact carrying arm hinged upon said support, and a tension spring secured so as to rotate with the support and acting upon the contact carrying arm for holding the contact device in position.

14. The combination with a hinged contact carrying arm for an electric railway vehicle pivotally mounted upon a support, of a plurality of tension springs acting on the contact carrying arm for maintaining the upward tension at its outer extremity.

15. The combination with a hinged contact arm for an electric railway vehicle pivotally mounted on a support, of a plurality of tension springs secured to a clamp attached to the said arm.

16. In an electric railway the combination with an overhead conductor, a contact device making underneath contact with the conductor, and a switch plate attached to the conductor and provided with means for depressing the contact device.

17. In an electric railway, the combination with an overhead conductor for receiving underneath contact, of a switch plate attached thereto and provided at its extremities with means for depressing the contact device.

18. A switch for suspended electric railway conductors, comprising a box suspended from the conductor and formed with two or more branching compartments leading therethrough, the outer extremities of each compartment sloping upward toward the conductor, substantially as described.

19. A switching device for electric railways, consisting of an open bottom metallic box or frame secured to and depending from the under side of a suspended conductor and formed with upwardly inclined outer extremities.

In testimony whereof I hereto affix my signature in presence of two witnesses.

CHARLES J. VAN DEPOELE.

Witnesses:
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JOHN EASON.