

(No Model.)

C. J. VAN DEPOELE, Dec'd.

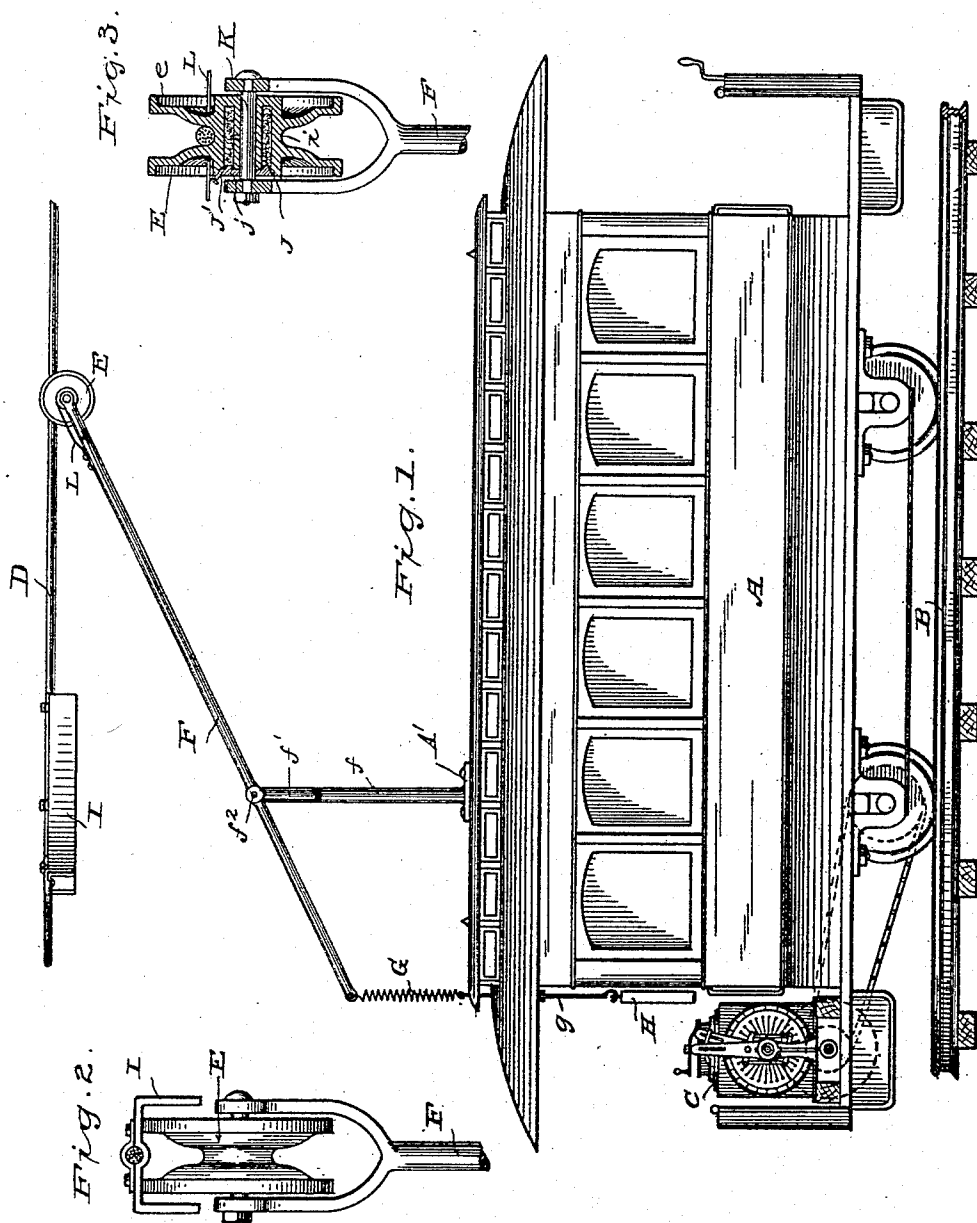
3 Sheets—Sheet 1.

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

TRAVELING CONTACT FOR ELECTRIC RAILWAYS.

No. 495,443.

Patented Apr. 11, 1893.



Witnesses
H. A. Lamb,
Geo. W. Campbell.

Inventor
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(No Model.)

3 Sheets—Sheet 2.

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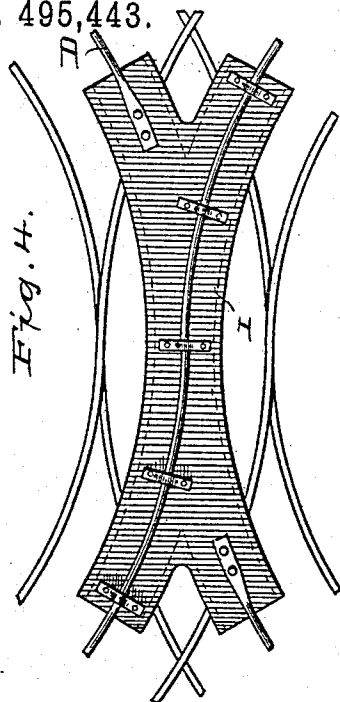


Fig. 4.

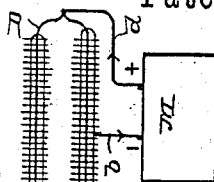


Fig. 6.

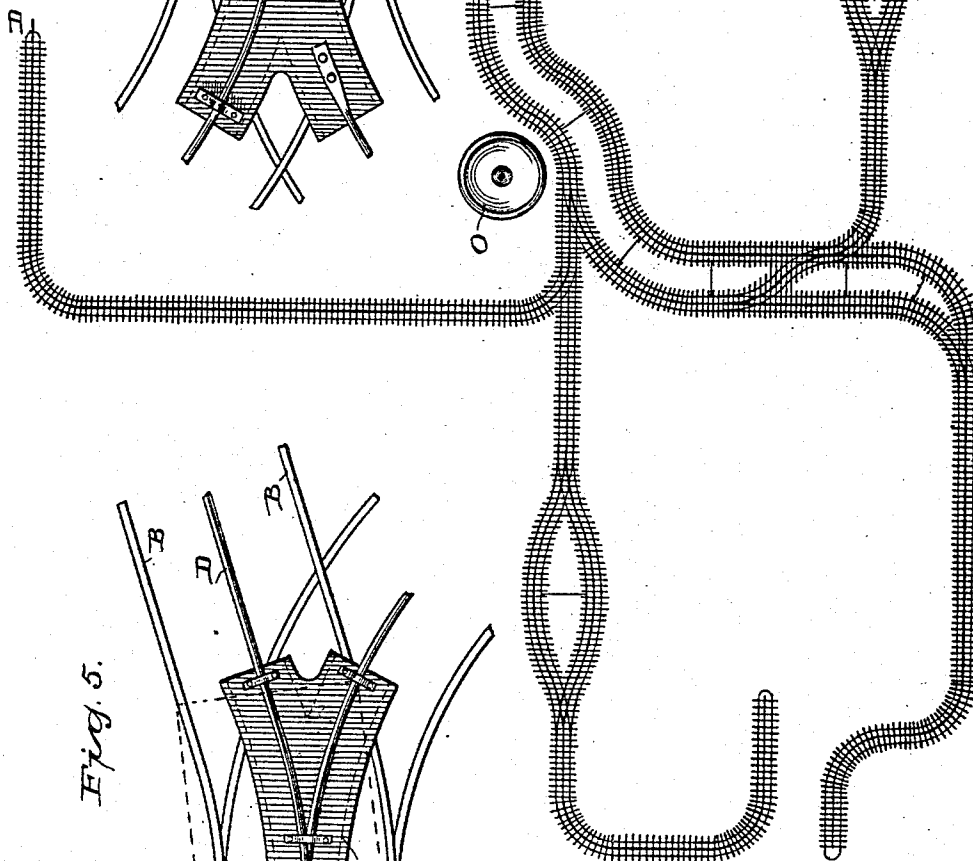


Fig. 5.

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Fig. 8.

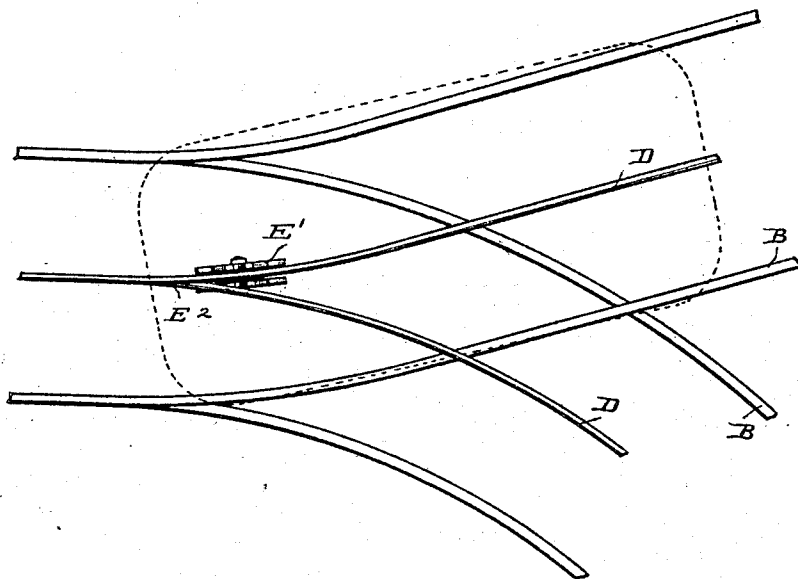
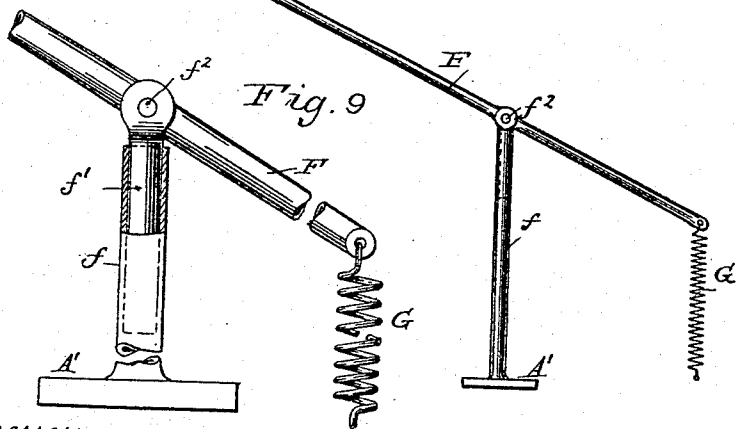


Fig. 7.



Fig. 9



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UNITED STATES PATENT OFFICE

CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS; C. A. COFFIN AND ALBERT WAHL, ADMINISTRATORS OF SAID VAN DEPOELE, DECEASED, ASSIGNORS TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

TRAVELING CONTACT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 495,443, dated April 11, 1893.

Application filed March 12, 1887. Serial No. 230,649. (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 and State of Illinois, have invented certain new and useful Improvements in Suspended Switches and Traveling Contacts for Electric Railways, of which the following is a specification, reference being had therein to the accompanying drawings.

My present invention relates to electric railways of the class in which a suspended conductor is used to convey the working current, a traveling contact carried by the car for taking off the current for use in operating the motor by which the car is propelled, and the return circuit completed through the rails.

The invention consists more particularly in an improved traveling contact and in improved arrangement and construction of the switches by which the said traveling contact is directed onto the proper conductor; these devices for switching the traveling contact from one conductor to another have been already claimed in my patent No. 424,695, which was issued as a division of this application on April 1, 1890. I therefore do not lay claim to them herein, but the description and illustration of them is retained to show how my traveling contact is adapted to meet one of the essential requirements of railway service without special arrangements or other complications.

It also consists in various details of construction and arrangement which will be hereinafter pointed out.

In the accompanying drawings—Figure 1 is a side elevation of a car provided with my improved contact devices and otherwise embodying my invention. Fig. 2 is an enlarged detail showing the contact wheel in position in the switch box. Fig. 3 is a sectional detail showing the construction of the contact wheel. Fig. 4 is a top plan view of a portion of track showing the conductor, the switch box, and the rails. Fig. 5 is also a plan view

and is similar to the preceding with the addition of a car shown in dotted lines. Fig. 6 is a diagrammatic representation of an electric railway system. Fig. 7 shows a modified form of contact wheel. Fig. 8 is a diagrammatic representation thereof. Fig. 9 is an elevation on an enlarged scale, partly in section, showing the vertical and transverse axes upon which the contact carrying arm is sustained.

Similar letters denote like parts throughout.

The car A, is supported upon the track B, and provided with a motor C, which is connected with the wheels thereof in any of the methods already described by me.

D, is the suspended working conductor, E, is the traveling contact wheel, and F, is a hinged arm supported upon a post f, secured to or extending upward from the roof of the car. To the lower end of the arm F, is attached a spring G, to the lower extremity of which is secured a cord which passes downward through suitable grooves or over suitable rollers and is provided with a weight H, which serves to hold the spring down and keep the contact wheel E, always pressed up against the underside of the conductor D, at the same time the spring will instantly yield to allow the wheel to pass under the switches or any obstruction. Being held in position by the weight, the motorman can at any time lower the contact wheel by raising the same rendering the arrangement very convenient for many purposes.

In order that the contact wheel E, shall be compelled to pass from one conductor to a branch, or one attached thereto leading in a different direction, I provide the inverted open bottom metallic boxes I, which are formed with branching compartments and constructed in the form of switches, conforming to the grooves and angles of the track switches by which the direction of the car is controlled. These boxes are in the form of open smooth curved passages and are free from obstructions within, so that the contact wheel E, which is slightly depressed on meeting the

end of the switch box may roll freely there-through in the desired direction without hinderance.

The conductors D, follow the line of the track or tracks and are preferably located centrally above them and at points where the tracks diverge or join the main line, switch boxes I, are placed, the conductors D, coming to the said boxes and being firmly attached to the tops or sides thereof so that were there no other support provided them, the said conductors would sustain the box in its proper position which is directly over the ground or track switch.

The switch box I, may take almost any shape, and may be made of thin sheet metal, or of cast metal, as is most convenient, but I prefer the castings. The contact wheel E, itself is a large deeply grooved pulley formed with thickened or flanged edges *e*, and a deep central groove *i*. The hub of this wheel is further provided with an annular recess or groove *J*, in which is packed cotton wicking or other absorbent material, the groove being closed by a front plate *j*, which is provided with an oil hole *J'*, and suitable screw for closing the same. There is also an oil hole extending from the groove *J*, to the axis of the wheel so that one filling will serve to lubricate the wheel for many hours.

The arm F, is of a length that will place the contact wheel E, about over the rear pair of wheels of the car, and the position of the post *f*, and the length of the arm F, itself will therefore vary with the length of the body of the car, the particular proportions shown being only by way of illustration. The arm F, is hinged and should in most instances be also pivoted to the top of its post *f*, although a reasonable amount of looseness in the hinged joint will answer the purpose of the pivot and prevent binding or straining at that point due to the swaying of the vehicle. As shown on an enlarged scale in Fig. 9, the post *f* is formed with a hollow portion or socket at its upper end, although it might be hollow throughout. The forked pivot *f'* is adapted to fit into the upper part of said post *f*, and be rotatably sustained therein. The arm F is carried in the forked upper end of the pivot *f'* upon the transverse bolt or pin *f''*, which passes through said arm and constitutes a transverse axis therefor. Hence the said arm is both hinged and pivoted upon its supporting post *f*. The post *f* is secured to a suitable base *A'*, which is fastened upon the top of the car. The outer end of the arm F, is forked and provided with an axle bolt K, passing through the hub of the contact wheel E. A fender spring L, is also attached to the arm F, and passes on each side of the wheel E, as far as its hub and in case of detachment of the wheel from the wire D, prevents its getting caught between the hub of the wheel and the forks of the arm F, rendering it an easy matter for the motorman by raising the weight

H, to lower the contact wheel and replace it again in operative position.

In the diagram Fig. 6, M, is the generating station furnishing the electric current for operating the motors on the cars, which current passes to the suspended conductors D, by way of conductor *d*, returning to the station by way of the track B, and conductor *b*. The possibilities of operation with my improved switch are shown in this diagram which represents an actual installation in the city of Montgomery, Alabama, the principal curves and several additional switches being necessitated by reason of a large public fountain O. The electric switches I, are to be placed directly over their counterparts, the track switches and the contact wheel as before stated is to be located above the rear wheel, or at any rate back of the vertical center of the car so that as the front portion of the car swings in the desired direction as the front wheels pass the track switch, the contact arm will be deflected and the direction of the wheel E, correspondingly changed while still on the straight wire so that, on reaching the switch box the wheel will be depressed and pass thereinto and naturally pass through and out of the proper compartment thereof. The switch boxes I, being connected directly to the conductors D, are similarly charged and when the wheel E, is passing therethrough the current passes through the box I, and thence into the contact wheel through its flanges *e*, passing thence through the arm F, or a separate conductor to the motor C. Since there are no moving tongues, or springs or points, to catch or impede the progress of the wheel when three or four grooves as the case may be, exist in one switch box, the wheel will intersect the grooves and pass along in the desired direction and pass along without any difficulty whatever, its direction being previously indicated by the movement of the front portion of the car. Thus it will be seen that by locating my traveling contact wheel in the position shown or one equivalent thereto I obviate all the difficulties of switching from conductor to conductor and with the smallest possible amount of special construction.

In Figs. 7 and 8, I have shown a modification of the foregoing in which a star wheel E', takes the place of the contact wheel E, and the suspended conductors are permanently connected together above the track switches as at *e'*, the result being that as the front part of the car swings onto the diverging track the teeth of the wheel will catch across the joint of the wires and by preventing the contact wheel slipping sidewise, as it would at that moment be otherwise liable to do, its passage onto the conductor above the track upon which the car is, is assured.

The contact carrying arm described and claimed in the present application, possesses substantial practical advantages over any other means yet proposed for establishing

moving contact between a vehicle and a stationary supply conductor, in that, by the use of a hinged flexibly mounted arm, much greater freedom of movement is compatible with the maintenance of a positive mechanical connection and electrical contact between the vehicle and supply conductors.

In a previous application filed June 22, 1885, Serial No. 169,410, I have shown and described a contact device consisting of a grooved roller mounted upon a spring and sustained thereby a short distance above the roof of the car, but this was in practice found deficient in capacity to follow the sinuosities and deflections of the overhead conductor as ordinarily put up, and moreover necessitated the conductor being supported in inconvenient proximity to the ground, and it also required for its operation a conductor suspended with substantially impracticable accuracy above an ideal track. By the use of such an arm as here described, which may be of any suitable length, the conductor is supported at a height entirely out of the way of passing teams and the like, and moreover the outer end of the arm being the longest may also swing laterally through a distance of several feet to follow deflections or bends in the conductor, without undue or injurious strain upon its pivotal connections. Another great advantage is found in the fact that the outer end of an arm such as described, will maintain its contact under great variations of height of conductor, as well as lateral displacement thereof and may even be depressed to a horizontal position, where it is desired to pass under bridges into buildings or other places where it may be desirable to place the conductor in a lower plane than in the other portions of the track.

Many modifications and minor changes in the invention just described will readily suggest themselves to persons skilled in the art and I therefore do not propose to limit myself to the precise details of construction or arrangement shown, as they may be modified without departing from the scope of the invention.

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

1. The combination of a car, an overhead conductor above the car, an upwardly extending and laterally movable arm carried by the car and having its upper end free, and a contact device carried by the arm at its free end, and making underneath contact with the conductor.

2. The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the conductor, and an arm carried by the car and carrying the contact device, and pivoted so as to swing freely around a vertical axis.

3. The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the con-

ductor, and an arm hinged to the car on a transverse axis and carrying the contact device, and a spring to press the contact device upward against the conductor.

4. The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the conductor, and an arm on the car movable on both a vertical and a transverse axis and carrying the contact device.

5. The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the conductor, an arm on the car movable on both a vertical and transverse axis, carrying the contact device, and a spring for pressing the contact device upward against the conductor.

6. In an electric railway, the combination with a suitable track and a supply conductor suspended above the track, of a car provided with a swinging arm carrying a contact device in its outer extremity and means for imparting upward pressure to the outer portion of the arm and contact, to hold the latter in continuous working relation with the under side of the supply conductor, substantially as described.

7. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, a swinging arm supported on top of the car, a contact device carried by one extremity of the arm and held thereby in contact with the under side of the electric conductor, and a tension device at or near the other end of the swinging arm for maintaining said upward contact, substantially as described.

8. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, an arm pivotally supported on top of the car and provided at its outer end with a contact engaging the under side of the suspended conductor, and a tension spring at or near the inner end of the arm for maintaining said upward pressure contact, substantially as described.

9. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, a contact carrying arm pivotally supported on top of the car and provided at its outer end with a contact roller engaging the under side of the suspended conductor, and a weighted spring at or near the inner end of the arm for maintaining said upward contact, substantially as described.

10. The combination of a suitably suspended conductor, a railway track below said conductor, switches in the track and in the conductor, a car traveling upon the track and provided with an upwardly extending swinging arm pivotally supported upon the car, a contact device carried by the arm for establishing contact with the suspended conductor, said device engaging the conductor, at a point in rear of the front wheels of the car, substantially as described.

11. The combination of a conductor suit-

- ably suspended along the line of travel, a railway track below said conductor, similar switches in the track and in the conductor, a car traveling upon the track and provided with a pivotally supported laterally movable swinging arm carrying a device for establishing contact with said suspended conductor, the connections between the said contact device and the car being positive and in fixed relation thereto, substantially as described.
12. In an electric railway, the combination with a car, of a post extending upward therefrom and carrying a suitable bearing, an arm or lever carrying at its outer end a suitable contact roller and pivotally supported in said bearing, and provided at its inner end with a tension spring for pressing the outer end of the lever carrying the contact wheel upward against a suitable suspended conductor, substantially as described.
13. In an electric railway, the combination of an electrically propelled car, a supply conductor suspended over the line of travel of the car, a swinging arm mounted upon the car, and carrying a contact device at its free end, said contact arranged to bear against said conductor, suitable switching devices upon the track traversed by the wheels of the car and corresponding switches on the suspended conductor located above those on the track and arranged to engage the contact devices, substantially as described.
14. In an electric railway the combination

of a car, a conductor suspended above the line of travel of the car, a rearwardly extending arm pivotally supported on top of the car and provided at its outer end with a contact device engaging the under side of the suspended conductor, and a tension spring for maintaining an upward pressure contact with the conductor, substantially as described.

15. In an electric railway the combination of a car, a conductor suspended above the line of travel of the car, a rearwardly extending arm pivotally supported on top of the car so as to swing laterally and provided at its outer end with a contact device engaging the under side of the suspended conductor, and a tension spring for maintaining an upward pressure contact with the conductor, substantially as described.

16. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, an arm pivotally supported on top of the car and provided at its outer end with a grooved contact wheel engaging the under side of the suspended conductor, and a tension spring for maintaining an upward pressure contact with the conductor, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:

FRANKLAND JANNUS,
H. A. LAMB.