

(No Model.)

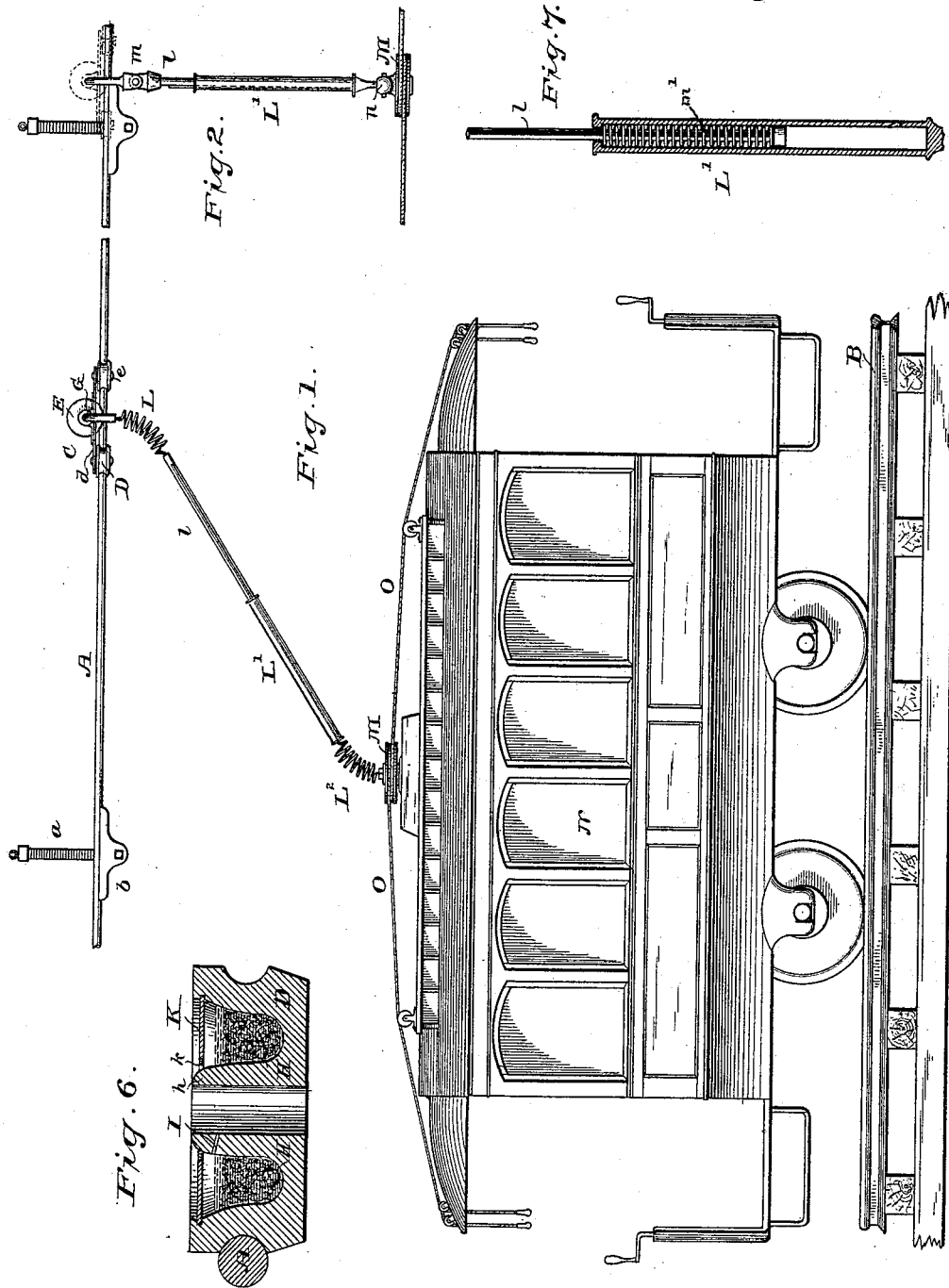
2 Sheets—Sheet 1.

C. J. VAN DEPOELE.

ELECTRIC RAILWAY TRAVELER AND SWITCH OPERATOR.

No. 347,901.

Patented Aug. 24, 1886.



Witnesses
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(No Model.)

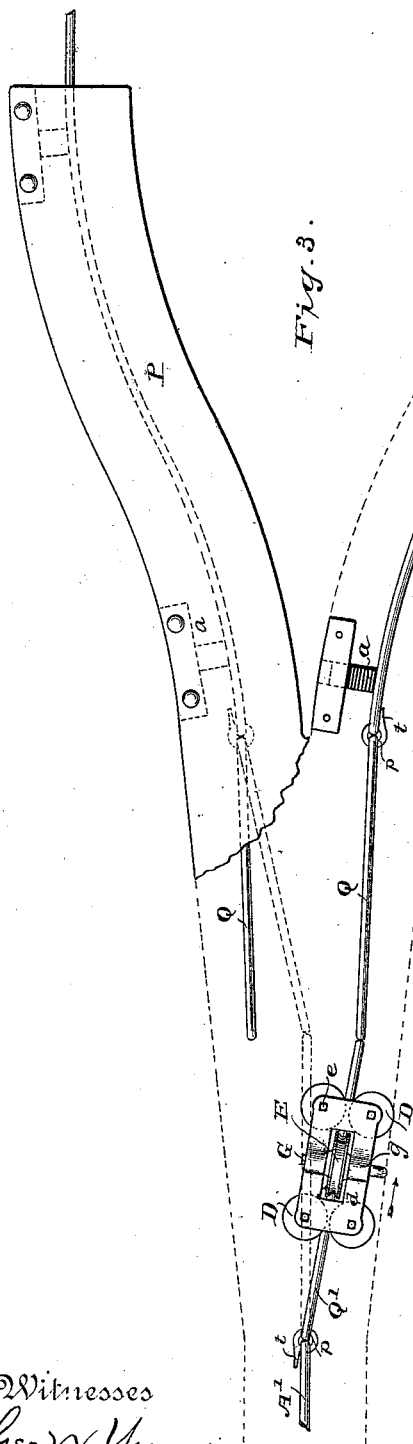
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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS.

ELECTRIC-RAILWAY TRAVELER AND SWITCH-OPERATOR.

SPECIFICATION forming part of Letters Patent No. 347,901, dated August 24, 1886.

Application filed March 15, 1886. Serial No. 193,210. (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 Electric-Railway Travelers and Switch-Operators, of which the following is a description.

The present invention relates to improvements in that class of electric railways using a suspended conductor and a contact device traveling thereon; and it consists in an improved form of traveling contact, a set of aerial switches by which said contact may be shunted from one line to another, and means carried by the car for operating the aerial switches and directing the traveling contact to the desired conductor, the details whereof will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a view in elevation showing a portion of a railway, a car, a portion of the suspended conductor, a traveler upon said conductor, and the means whereby the traveler is connected to the car and the switches operated. Fig. 2 is a view also in elevation, and shows a modified form of connection between the car and the traveler. Fig. 3 is a top plan view of one set of the switching devices, a portion of the cover of the top plate being broken away to more clearly exhibit the parts. Fig. 4 is a side elevation of the parts shown in Fig. 3. Fig. 4^a is a detail view showing a modified form of retracting-spring. Fig. 5 is a plan view on a reduced scale, showing a complete system of switches such as are used on a single-track street-railway. Fig. 6 is a sectional elevation showing the particular construction of one of the horizontal wheels of the traveling contact. Fig. 7 is a detail of part of the connection between the car and the contact-carriage.

Similar letters denote like parts throughout.

A represents the suspended conductor of an electric railway, which is suspended from or supported by poles or in any other convenient manner above the center of the track B at a sufficient height therefrom to be out of the way of passing vehicles, and should be as nearly as possible at the same height therefrom throughout, and supported from its under side by suitable hangers, *a*, and bails or ears *b*, or any other suitable devices.

C is a contact-carriage secured upon and traveling freely along the conductor A. This carriage is provided with horizontal contact-wheels D and a vertical wheel, E, all rigidly secured within a suitable frame consisting of upper and lower plates, *d d'*, or to a single top plate, *d*, through which the axle-bolts *e* of the horizontal wheels pass, and to which they are firmly secured. The vertical wheel is placed at about the center of the carriage and mounted upon a bush or sleeve placed upon the pin or rod G, which is pivotally supported in bearings *g*, extending across the central portion of the top plate of the carriage, and to which the draft as well as the electrical connections are secured. With this construction it will be understood that the several parts of the contact-carriage are fixed with respect to each other and most thoroughly protected against accidental displacement, the use of a combination of vertical and horizontal contact-wheels making derailment almost impossible, even when the parts are considerably worn.

In order to provide for the proper lubrication of the wheels of the contact-carriage, I construct the horizontal wheels as shown in Fig. 7, in which the wheel D is formed with an annular chamber, H, at its upper side, which chamber communicates with the interior of the hub *h* through one or more small openings, I, leading from the upper portion of the chamber H through the hub *h* to the axis of the wheel. The top of the chamber H is closed from its circumference to a point quite near the hub *h* by means of a thin metallic ring, K, which is spun or soldered into position after the chamber has been formed or finished, leaving a narrow annular opening, *k*, between its inner edge and the circumference of the hub *h*. I have described this chamber as being completed by the insertion of the plate K after the wheel was finished; but I may equally well form said chamber by means of a suitable core when the wheel is being cast. Within the chamber H is preferably placed some loose fibrous material, after which it is partially filled with oil, which, while the carriage is in motion, is thrown to and held by centrifugal force at the upper circumferential portion of the chamber and away from the hub, and when the carriage is at rest a portion thereof will find its way through the oil-hole I. In

this manner a constant and reliable supply of oil is insured to the rapidly-moving parts, and at the same time the contact-wheels themselves are made lighter and more durable.

5 For the vertical wheels I provide automatic oil-cups *i*, of any well-known pattern, which are attached to the bearings in any convenient manner.

From the axis *G* of the carriage *C* extends 10 a spiral spring, *L*, which is rigidly secured to a rod, *l*, that is free to move longitudinally, but cannot rotate, within a tubular arm, *L'*, from the lower end of which extends a second spiral spring, *L''*, the other end of which is secured 15 to the axis of a pulley, *M*, which is pivotally supported on the top of the car *N*. The rod *l* is formed with a slot registering with a pin or projection on the tube, or the rod is of some irregular form in cross section, 20 whereby it is prevented from turning. A retracting-spring, *m'*, is secured within the tube and connected to the rod *l*, and acts to draw it in when the distance between the top of the car and the conductor varies, and vice versa, 25 forming a perfectly flexible connection between the car and the conductor, and one that will automatically compensate for any small irregularities in either the height or the direction of the suspended conductor, and that 30 may be moved equally well in either direction. A single spiral spring may be used to connect the pulley *M* and contact-carriage *C*, instead of the two springs and the telescopic portion; but the latter is preferred.

35 The modification shown in Fig. 2 includes a hinged joint, *m*, at its upper connection with the contact-carriage, instead of the spiral spring *L*, and a universal joint, *n*, at its lower end, where it is connected to the pulley *M*, instead of the spiral spring *L''*. The operation 40 of the two devices is substantially the same, although I prefer the form shown in Fig. 1. I may, however, substitute the hinged joint *m* or the universal joint *n* for one or other of the spiral springs *L* *L''*, if found desirable, and may also dispense with the retracting-spring *m'*, for while useful it is not absolutely essential to the operation of the devices shown and 45 described. From the pulley *M*, which is shown on the top of the car, but may of course be placed on the under side of the roof or any other convenient position, extend cords *O*, which pass over suitable rollers and are carried to points at either end of the car, where 50 they will be in convenient reach of the driver, conductor, or engineer, their purpose being to enable the operator, by pulling upon one or other of them and without moving from his position, to impart rotary motion to the pulley 55 *M* and connecting devices, and thereby press the carriage *C* laterally against one side or other of the conductor, so that upon reaching the switch being approached its tongue will be thrown in the desired direction by the said 60 carriage, and the carriage shunted to the proper portion of the system.

The particular advantage of using the spiral-spring form of connection resides in the fact that the handle may be pulled some time in 70 advance of reaching the switch and held there or secured in any suitable manner until the car has passed the switch, leaving the devices to operate automatically without danger of injury to any of the parts, whereas with the 75 other and more positive connections it would not be desirable to apply much lateral pressure until the carriage was actually upon the tongue of the switch to be operated.

The aerial switches hereinbefore referred to follow the direction of the track below, and are 80 formed of short pivoted portions, which are spring-held in certain normal positions, from which they are deflected by the lateral pressure applied to the carriage by the driver or conductor of the car or engineer of the train. 85

P represents a metallic plate or frame 90 formed to extend in three or more directions—one portion along the main track and the other portions branching therefrom, one to each of the switches. Each switch includes a 95 double set of apparatus, as indicated in Fig. 5; but for convenience I have illustrated one end portion only on a larger scale, Figs. 3 and 4. From the under side of the bifurcated plate depend hangers *a*, to the lower end of 100 which are secured ears or bails *b*, before referred to. One of these bails, *b'*, is placed close to the end of the conductor, and is formed with a hinge, *p*, at its forward edge. A section of conductor, *Q*, is provided with a web, *q*, con- 105 nected to the hinge *p*, by which it is secured to the bail *b'* in such manner that the continuity of the conductor is practically secured, the hinged portion or tongue *Q* and the stationary part *A* forming a continuous line. The fixed 110 conductor *A'*, coming from the other direction, is also provided with a hinge and a tongue, *Q'*, similar in every respect to the one just described.

The tongues *Q* *Q'* are connected with the 115 stationary portions of the conductor from which they respectively project by springs *R*, which in the present instance are shown as rods secured to the lower edges of the webs *q* *q'* and clamped in extensions *r*, projecting 120 from the ears *b* *b'*, by which the conductor is supported; but it will be obvious that the webs themselves may be formed of resilient material connected directly to the support of the fixed conductor, and the hinge between 125 the tongue and said fixed portion dispensed with, as indicated in Fig. 4. The central tongue, *Q'*, is formed at its outer end with a clip or recess, *S*, adapted to receive a suitable projection, *T*, extending from the tongues *Q*, 130 and by means thereof hold said tongue firmly in position while the carriage is passing from one to the other, and also afford passage for the current.

Stops *t* are provided in the form of exten- 135 sions from the hinges *p*, in order to prevent the tongues *Q* *Q'* being forced too far outward,

as the tendency of a carriage moving rapidly in the direction shown in Fig. 3 would be to throw the tongue Q farther outward than was desirable, for in the position there shown the retracting-springs would have their smallest opposing force to such movement, and a stop can be very conveniently applied without in any way interfering with the connection between the carriage and the car.

10 In order to prevent the switch being used in more than one direction, a stop may be applied to the tongue Q', so that it may move from its central position laterally in one direction; but this can be omitted or made removable, according to circumstances.

15 Instead of the metallic plate or frame P, a wooden frame may be used to support the switching devices, in which case by connecting all of the hangers *a* by an additional conductor, as shown in dotted lines in Fig. 4, the electrical continuity of the line will be preserved under all circumstances, no matter what the positions of the tongues of the switches.

25 The drawings illustrate the system as adapted for use with a single-track street-railway, the three terminals at each end of every switch being hinged tongues. In this manner the fullest possible use can be made of the apparatus, and the carriage can be switched to the right or the left from either direction and from one track to another, where more than one track or set of tracks are used. So extensive a system as just described will not, however, be necessary in all cases, for where the cars travel in one direction only on each track a single tongue at each end of the switch will answer all purposes.

It will be obvious that various other modifications may be made in the use and arrangement of the devices hereinbefore described without in any way departing from the spirit of the invention—as, for instance, a rod or rods connected to each other by universal joints or bevel gearing and to the pulley M in a similar manner or direct to the flexible connection itself can be substituted for the cords or ropes O by which (as shown) the switching devices are controlled and operated.

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

1. In a system of electric railways, the combination, with a suspended conductor, branch conductors, and switches, of a traveling contact upon the conductor, a flexible mechanical connection between the car and the contact, and means for rotating said connection, and thereby imparting lateral pressure to the contact and operating the switches, as desired.

2. In a system of electric railways, the combination, with a suspended conductor, and conductors branching therefrom and provided with pivoted switches, of a suitable track or tracks, a car on said track, a contact-carriage upon the conductor, and means carried by the car and

extending between said car and the contact-carriage, whereby lateral pressure is imparted thereto in either direction, as desired, for operating the switches, substantially as set forth.

3. In a system of electric railways, the combination, with a suspended conductor, and conductors branching therefrom and provided with suitable switches, of a track or tracks, a car on said track, a contact-carriage upon the conductor, and means carried by the car and extending between said car and the contact-carriage, whereby lateral pressure is imparted thereto and said carriage diverted in either direction, as desired, as set forth.

4. In a system of electric railways, the combination of suspended main and branch conductors and suitable switches, the track, a car on said track, and a longitudinally-yielding flexible connection between the top of the car and the traveling contact, and means, substantially as described, for imparting rotary motion to the connection between the car and the carriage, and thereby causing the latter to throw the switch in the desired direction, as set forth.

5. In a system of electric railways, the combination of suspended main and branch conductors and suitable switches, the track or tracks, a car on said track, a contact traveling on the conductor, a longitudinally-yielding device provided with a spiral spring at each end and connected, respectively, to the contact-carriage and to a pivoted wheel or drum at the top of the car, and a rope or ropes connected to said drum and located within reach of the operator, whereby the suspended switches are controlled from the moving car, substantially as shown and described.

6. In a system of electric railways, a contact-carriage consisting, essentially, of a plurality of wheels bearing horizontally against each side of the conductor, a rigid plate or plates, to which said wheels are secured, centrally-located transverse bearings, an arm or connection axially mounted within said bearings, and a vertically-placed contact-wheel mounted upon the aforesaid connection and bearing upon the upper side of the conductor, substantially as shown and described.

7. The combination, with the plate *d*, of the rollers D depending therefrom, centrally-located bearings *g* upon said plate, a depending arm, G, pivotally mounted within said bearings, and an additional vertical wheel, E, mounted upon the axis of the depending arm, as set forth.

8. In a system of electric railways, a contact-carriage having wheels D, formed with the oil-chamber H, and provided with means, as described, for automatically regulating the escape of oil therefrom.

9. In a system of electric railways, the combination, with suspended main and branch conductors, of a supporting plate or frame, electrically-connected main and branch con-

ductors depending therefrom and provided with laterally-moving terminals or tongues adapted to be connected to unite the main conductor with either of the branch terminals, and suitable springs acting upon the tongues and normally holding them apart, substantially as described.

10. In a system of electric railways, the combination, with suspended main and branch conductors, of a supporting plate or frame, electrically-connected main and branch conductors depending therefrom and provided with laterally-moving terminals or tongues provided with stops for limiting their lateral throw and adapted to be connected to unite the main conductor with either of the branch terminals, and suitable springs acting upon the tongues and normally holding them apart, substantially as described.

11. In a system of electric railways, the combination, with the suspended main and branch conductors, of switching devices consisting, essentially, of a supporting-plate or its described equivalent, main and branch conductors depending therefrom and electrically connected therethrough and provided with pivoted terminals or tongues adapted to be connected to unite the respective conductors, as desired, and suitable springs acting upon the tongues for normally holding them apart, as set forth.

12. In a system of electric railways, the combination, with suspended main and branch conductors, of a supporting plate or frame, electrically-connected main and branch conductors depending therefrom and provided with laterally-moving terminals or tongues adapted to be connected to unite the main conductor with either of the branches, and having clips at their free extremities for securing the connecting conductor, substantially as shown and described.

13. In a system of electric railways, the combination, with suspended main conductors and conductors branching therefrom and suitable switches, of the track or tracks, a car traveling on said tracks, a contact device traveling on the conductor, a longitudinally-flexible connection extending between the top of the car and the contact device, and a cord or cords on the car and attached to the connecting device and located within reach of the operator, whereby the suspended switches are controlled and operated from the moving car, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:

AARON K. STILES,
JOHN R. HOLLISTER.