

UNITED STATES PATENT OFFICE.

JOHN C. LOVE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE LOVE ELECTRIC TRACTION COMPANY, OF SAME PLACE.

CONDUIT-RAILWAY TROLLEY.

SPECIFICATION forming part of Letters Patent No. 511,342, dated December 26, 1893.

Application filed May 17, 1892. Serial No. 433,366. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. LOVE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Traveling Contact Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked
10 thereon, which form a part of this specification.

This invention relates to traveling contact devices such as are carried by an electric railway car, and move in contact with an electric
15 conductor, for conveying the current from the conductor to the motor on the car, and it consists in the matters hereinafter described and pointed out in the appended claims.

In the accompanying drawings illustrating
20 the invention: Figure 1 is a side view of a contact device embodying the same. Fig. 2 is a plan view thereof. Fig. 3 is a detail section on line 3—3 of Fig. 1. Fig. 4 is a detail
25 plan view of one of the two contact devices illustrated, showing by dotted lines changed positions thereof.

As shown in the said drawings, A A indicate two parallel wires or line conductors, C
30 a supporting bar which is attached to the car and which carries the contact devices proper. The particular apparatus illustrated is intended for use in connection with an underground slotted conduit, through the slot of
35 which the bar C extends, and the contact devices are attached to the lower end of said bar.

D indicates a block of insulating material attached to the lower end of the bar C, and to the opposite sides of which are secured
40 supporting plates E E adapted to sustain the said contact devices, of which, in the drawings, two are shown, one for each of the conductors A A.

It will of course be understood that in railway systems having only one conducting wire,
45 as for instance, those in which the return conductor of the circuit is formed by the track rail, only one of the contact devices herein illustrated will be employed. As shown in
50 the drawings, however, two of said contact devices are present, one of which is located

at either side of the supporting bar C, and inasmuch as these contact devices are exactly alike, one only will be referred to in the following description, which applies equally to
55 both.

The plate E is made of brass, copper or other good conductor of electricity, and the same is secured to the block D so as to be insulated from the supporting bar C, the
60 conducting wires *c c*, which are shown as extending along the edge of said supporting bar, being attached to said plate E.

Those parts of the contact device which are in immediate contact with and act upon the
65 conductor consists of two shoes or contact pieces B B', which are provided with deep grooves to receive the wire, and provided on their inner surfaces with recesses containing masses or plugs *b b* of a lubricating substance
70 capable of conducting electricity, such as graphite or plumbago, mixed, if desired, with some oil or oleaginous lubricant. The shoes or contact pieces B B' are not only grooved as described, but are curved longitudinally so
75 as to give the surface in contact with the wire a convex or rounded form, or, in other words, the working or contact surface of the contact piece as a whole has the form of a segment of
80 a grooved wheel.

The contact shoes or pieces described are supported from the car or vehicle by means affording freedom of movement in the contact pieces relatively to the car body whereby
85 said contact pieces may closely follow the wire and will be held in contact with the same notwithstanding lateral or other movement of the car with relation to the wire, while at the same time enabling the shoes to
90 smoothly and closely follow the wire in passing around curves. The devices herein shown for the purpose of so supporting the shoes are made as follows: Projecting laterally from
95 said plate E is a stud *e* preferably made integral therewith, and pivoted upon the stud *e* is an arm, indicated as a whole by F, the free end of which is adapted to rise and fall in a vertical plane by swinging about the said
100 stud *e*. The said arm F consists of three separate pieces or sections F', F², F³ of which the part or section F' is engaged directly with the stud *e* and is adapted to swing in a verti-

cal plane about said stud. At its outer or free end said part F' is provided with a cylindrical pin *f* which enters a socket *f*² in the section F² and forms a swivel joint between said sections F' and F² so that said section F² is adapted to swing and rotate about a central longitudinal axis. The section F² is shown as held in engagement with the pin *f* by means of a screw-stud *f*³ which passes through a transverse slot *f*⁴ in the section F² and is secured in the said pin; the said stud holding the parts from shifting endwise or becoming detached, while at the same time the transverse slot *f*⁴ permits a limited oscillatory movement of the section F². Said section F² is provided at its outer end with a lug *f*⁵ through which is inserted a transverse bearing pin *f*⁶ on which is pivoted the outer section F³, which section is provided with a lug *f*⁷ apertured for the passage of the said stud *f*⁶. The stud *f*⁶ is arranged in a vertical plane and forms a transverse pivotal axis on which the said outer section F³ is adapted to swing or oscillate laterally. Such oscillatory movement of the free end of the section F³ is limited by shoulders *f*⁸ *f*⁹ on the adjacent parts of the sections F² F³ in the manner shown, Fig. 2. In the outer end section F³ is secured a horizontal pivot stud *g* on which are mounted two oppositely extending arms G G'; said arms being provided with overlapping parts engaging with the stud *g* in the manner shown. At their outer ends the studs G G' are provided with transverse sockets *g*' *g*² in which are inserted stems *b*' *b*² attached to the shoes B B'; said sockets being arranged in the same vertical plane, so that when the arms G G' are swung about the stud *g* the sockets will remain in the same plane with the wires A which are engaged by the said shoes B B'. The said shoes are shown as held in engagement with the sockets by means of screw-threads *g*³ *g*⁴ inserted through slots in the sockets *g*' *g*² and entering the stems *b*' *b*²; the slots in the sockets being elongated transversely so as to allow a limited oscillatory movement of the said shoes or contact pieces. The arm F with which the contact pieces are connected, as above described, is held upwardly at its free end so as to maintain the contact pieces in position to engage the wire by means of a coiled spring H connected at one end with the insulating block C and at its opposite end with said arm F conveniently by means of an eye *h* secured in the end of the pivot stud *f*⁶ of the arm. The opposite end of the said spring H is shown as extended over a cross-bar D' secured to one end of the insulating block D in the manner illustrated.

I is a second coiled spring connected with the under side of the arm F and with the block D to limit the upward movement of the said arm when the shoes are free from the wire, and to prevent the end of the arm from being thrown backwardly past or over the

pivot *e*. In the particular construction illustrated the spring I is attached at one end to an eye *i*' secured in the lower end of the pivot stud *f*⁶, the spring being attached to the block D by means of a cross-bar D² attached to the end of the bar in the manner illustrated.

For holding the arms G G' in an approximately horizontal position and to maintain the contact pieces yieldingly in position for engagement with the wire, a coiled spring J is secured at its opposite ends to the outer ends of said arms G G' at points above a horizontal line passing through the pivot of said arms; said spring thus arranged serving to maintain the shoes B B' approximately vertical, while allowing freedom of movement in a vertical direction of both arms and the shoes or contact pieces carried thereon.

From the construction described it is obvious that each of the contact pieces is adapted to swing or rotate horizontally on its own vertical axis to adjust its bearing surface to the wire while at the same time each shoe or contact piece is adapted to yield downwardly independently of the other by swinging of the arms G G' upon their horizontal pivots. It is further obvious that both contact pieces together are adapted to swing laterally on the vertical transverse pivot of the arm F which is formed by the stud *f*⁶, thereby allowing the said contact pieces to easily follow the wire without lateral pressure thereon in passing around curves, while at the same time enabling the said contact pieces to shift or move bodily sidewise when any lateral movement of the supporting bar C takes place with reference to the said wire. By reason of the pivotal joint between the sections F' F² of the arm the contact pieces are adapted to maintain a laterally inclined position so as to bear directly against the wire when the lower part of the arm is moved or shifted laterally from its position beneath the wire.

The particular features of construction described in the arm F and arms G G' are described and claimed in a separate application for patent, Serial No. 433,367, filed on the 17th day of May, 1892, and are not by themselves herein claimed as part of the present invention which relates more particularly to the shoes or contact pieces B B'; but which includes in connection with said contact pieces, supporting devices sustaining the same in such manner that they may bear with a uniform pressure against the wire and follow the same smoothly notwithstanding lateral movement or vibrations of the vehicle, or of the supporting bar by which the contact device is sustained from the vehicle.

An important advantage is obtained by the hollow or grooved contact piece, curved longitudinally, as shown, for the reason that a contact piece of this form presents a uniform surface or contact with the conductor notwithstanding changes in the angular position thereof due to the swinging of the arms G G'

about their pivotal supports. It is obvious, furthermore, that such changes of the angular position in the shoes will change the point of contact with the wire so that such point of contact will continually change or shift during the continuous vertical movements or vibrations of the vehicle and supporting bar, thereby distributing the wear upon the shoe lengthwise thereof and preventing it from coming continually upon one part of the shoe.

I claim as my invention—

1. The combination with an electric conductor and vehicle, of a traveling contact device comprising a grooved contact piece or shoe, and means for supporting the same comprising a main arm adapted to swing in a vertical plane, and consisting of two parts connected by a transversely arranged pivot adapted to allow lateral oscillatory movement in the outer end of the arm, a horizontally arranged arm pivoted to the outer end of the main arm and adapted to swing in a vertical plane and to which the said shoe is connected by a vertical pivot, and springs yieldingly

sustaining said main and horizontal arms, substantially as described.

2. The combination with an electric conductor and vehicle, of a contact device comprising a grooved shoe or contact piece, a main arm adapted to swing in a vertical plane and consisting of three parts connected with each other by intermediate longitudinal and transverse pivots, a spring holding said arm elevated, and a horizontal arm pivoted to the outer part of said main arm and provided at its free end with a socket affording pivotal connection of the said shoe therewith, and a spring or springs yieldingly sustaining said shoe in contact with the conductor, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN C. LOVE.

Witnesses:

C. CLARENCE POOLE,
G. W. HIGGINS, Jr.