No. 704,093. Patented July 8, 1902.

T. B. PATCH.

CONTACT SYSTEM FOR ELECTRIC RAILWAYS.

(Application filed Apr. 4, 1902.)

(No Model.) 2 Sheets—Sheet 1.

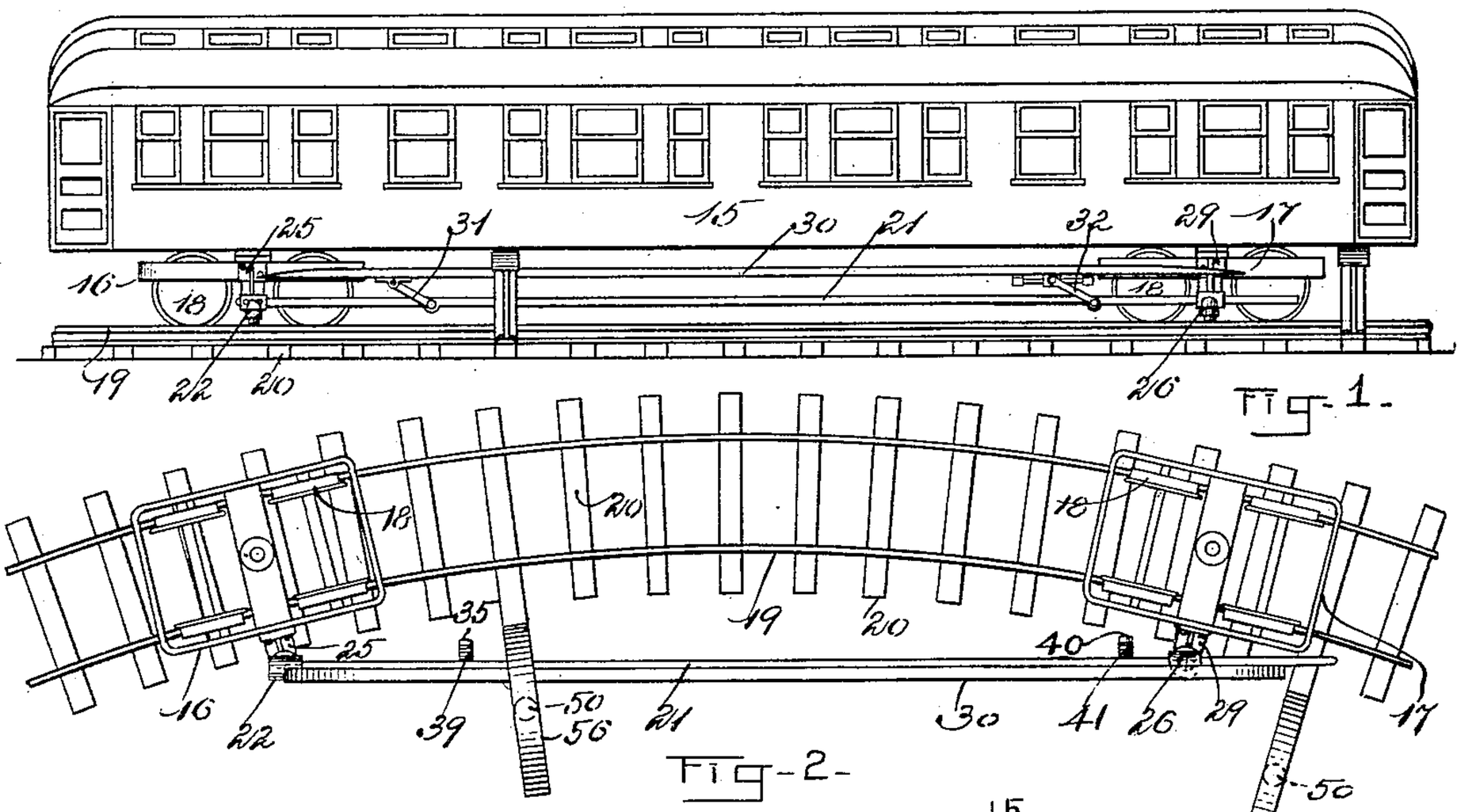

Fig-1-

Fig-2-

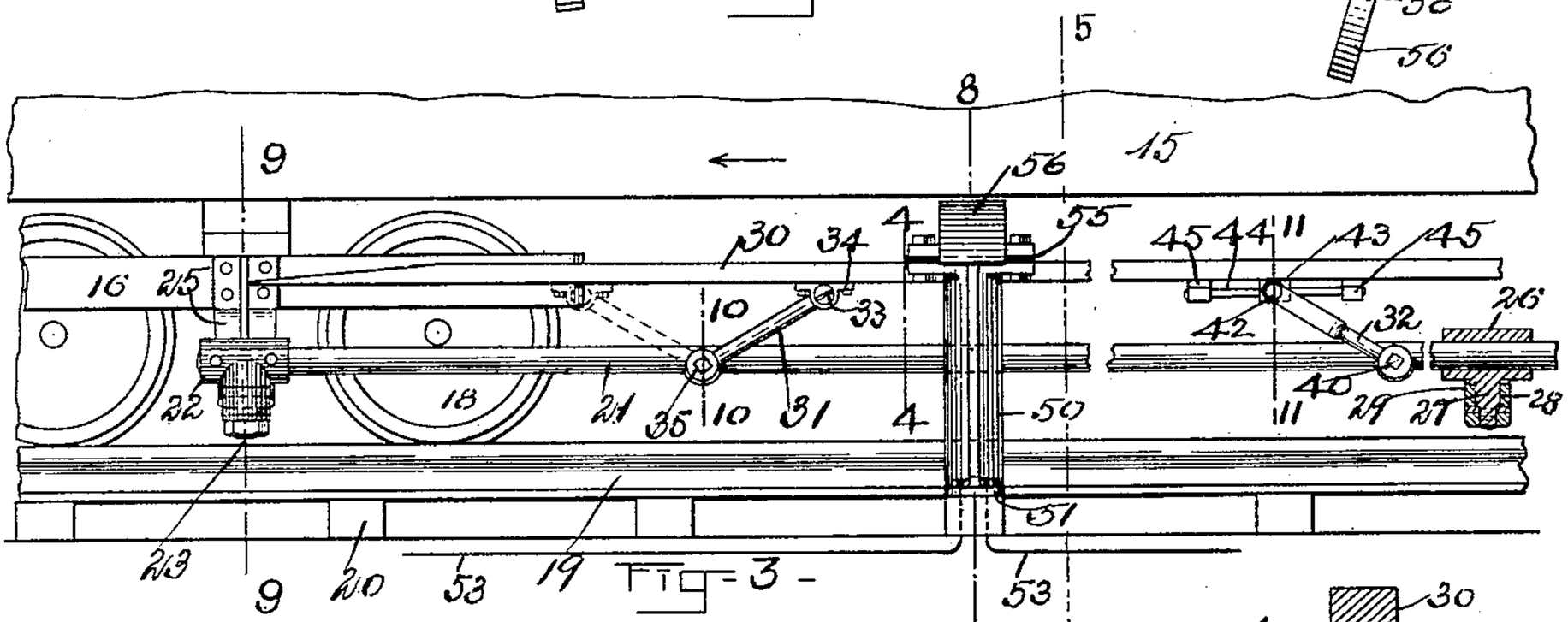

Fig-3-

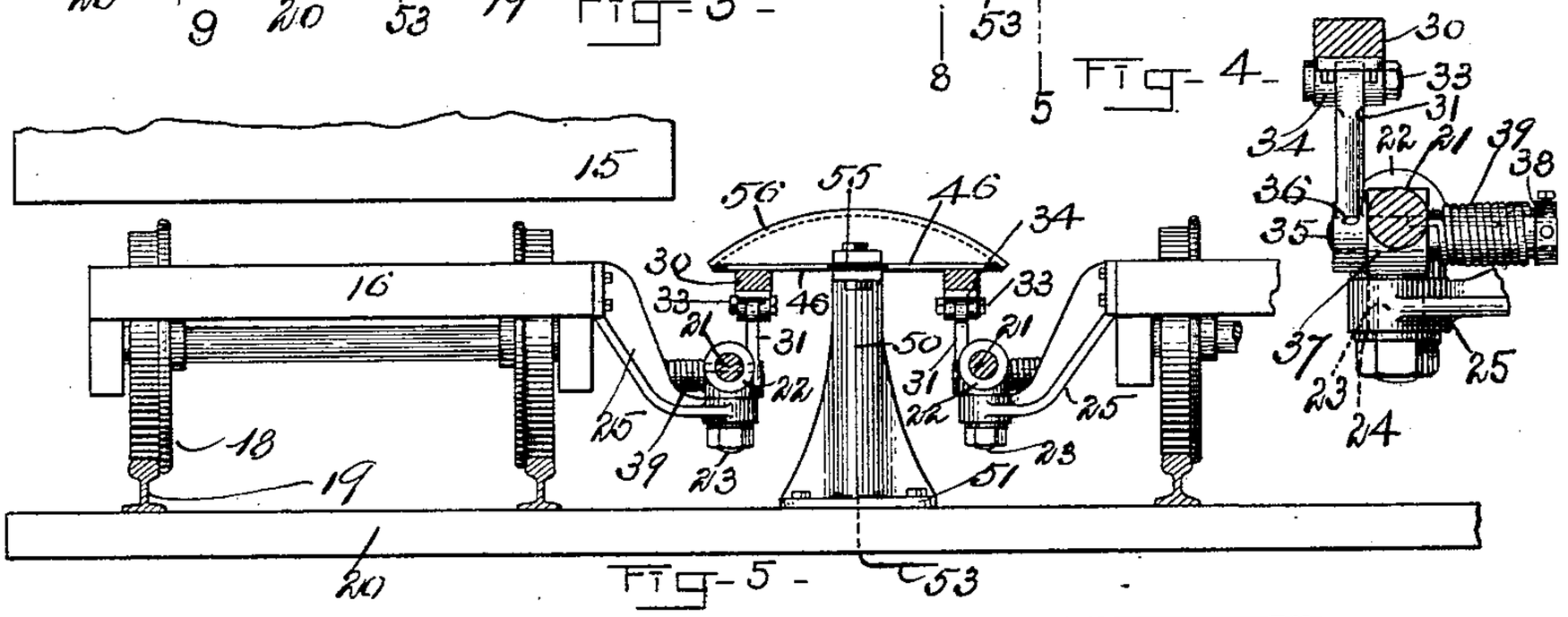

Fig-4-

Fig-5-

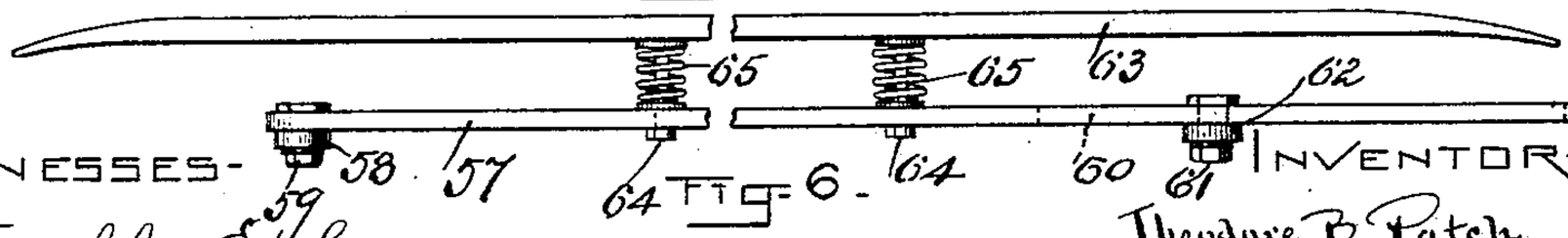

Fig-6-

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No. 704,093. Patented July 8, 1902.

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CONTACT SYSTEM FOR ELECTRIC RAILWAYS

(Application filed Apr. 4, 1902.)

(No Model.) 2 Sheets—Sheet 2.

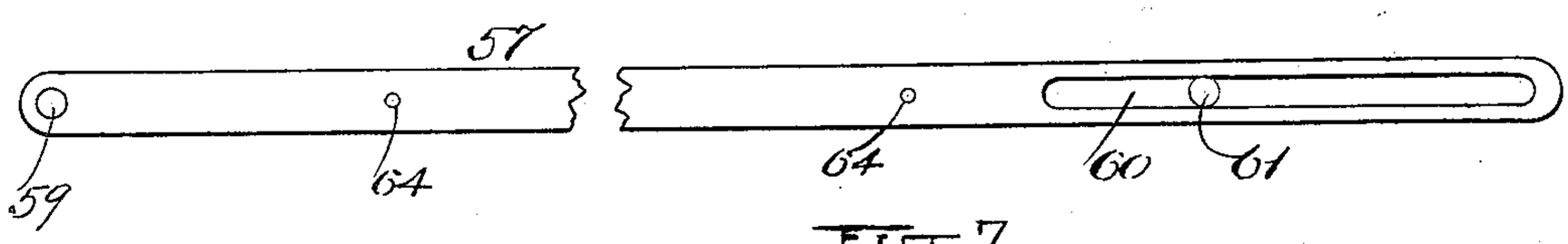
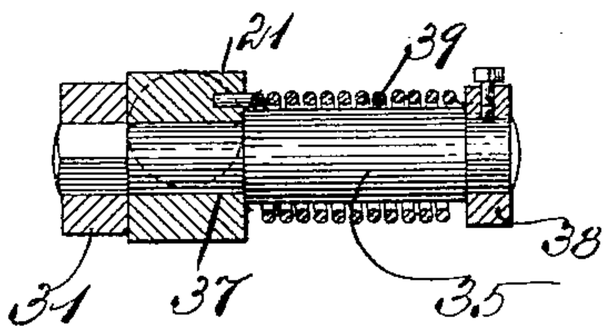


FIG. 7.

FIG. 10.



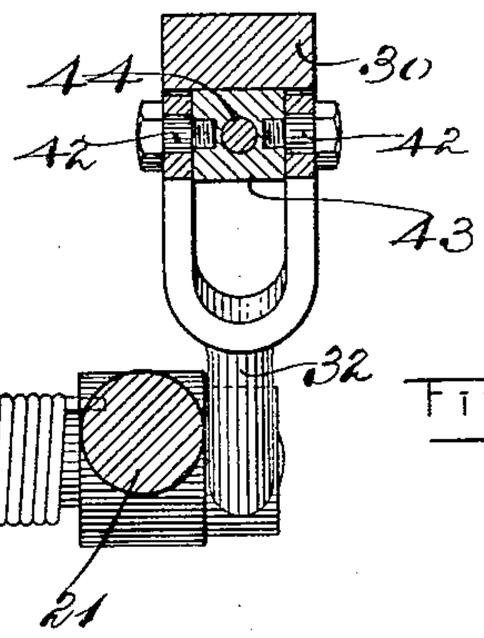
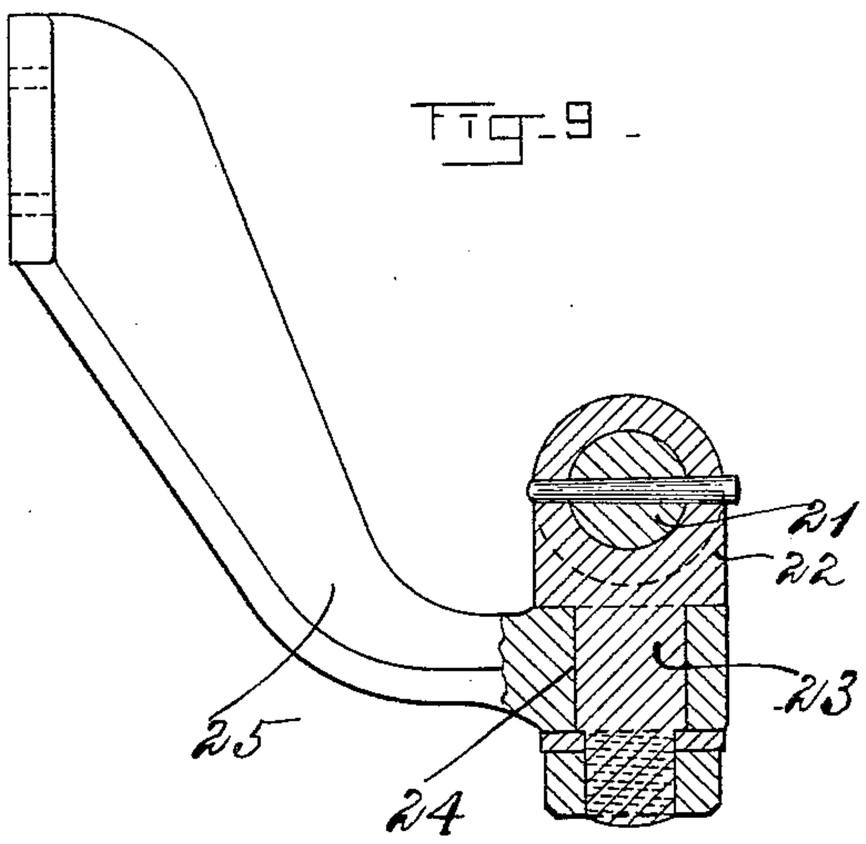


FIG. 11.

FIG. 9.



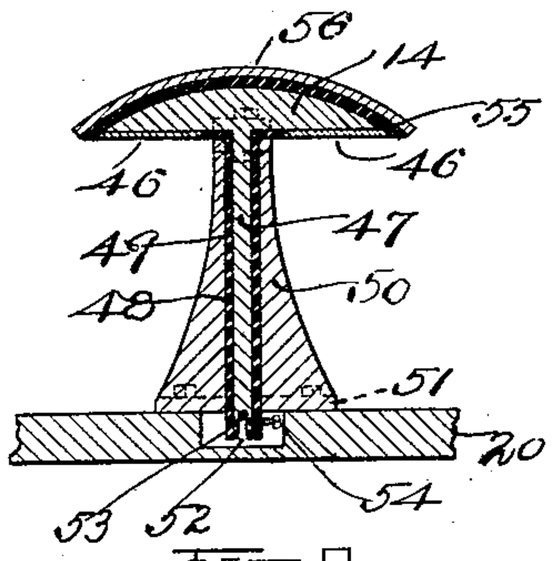


FIG. 8.

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UNITED STATES PATENT OFFICE.

THEODORE B. PATCH, OF NORTH CAMBRIDGE, MASSACHUSETTS.

CONTACT SYSTEM FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 704,093, dated July 8, 1902.

Application filed April 4, 1902. Serial No. 101,321. (No model.)

To all whom it may concern:

Be it known that I, THEODORE B. PATCH, a citizen of the United States, residing at North Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Contact Systems for Electric Railways, of which the following is a specification.

The object of this invention is to provide a cheap, durable, practical, and safe contact system for electric railways and is an improvement upon another invention having the same object in view for which I have made application for Letters Patent, Serial No. 84,006.

The present invention employs a series of standards and a contact-plate fast to each of said standards and insulated therefrom, said contact-plates electrically connected to each other, as in the application hereinbefore referred to. The improvement consists in the manner of supporting the shoe upon the trucks of the car so that said shoe may be made of a length substantially equal to the length of the car and adapt itself to the variations in position of the car-trucks as the same are traveling around a curve.

The invention therefore consists in a series of standards located outside the tracks of an electric railway, a series of plates, one of said plates fast to each of said standards and extending laterally therefrom toward said track, said plates being insulated from said standards and connected to a source of power, in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having sliding engagement with the other of said trucks, and a shoe supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

The invention again consists in the instrumentalities hereinbefore set forth, the shoe being pivotally and spring supported upon said shoe-support.

The invention finally consists in the combination and arrangement of parts set forth in the following specification, and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a side elevation of an electric car, showing my improved contact system and spring-supported shoe in connection therewith. Fig. 2 is a plan view of a pair of trucks with my improved shoe and shoe-support connected thereto and showing the relative position of the same to a pair of standards as said trucks are traveling around a curve. Fig. 3 is an enlarged side elevation of a portion of a car-truck with my improved shoe and shoe-support attached thereto, showing the position of said shoe with relation to a single standard, said shoe-support being broken away to save space in the drawings. Fig. 4 is an enlarged transverse vertical section taken on line 4 4 looking toward the left in Fig. 3. Fig. 5 is a transverse sectional elevation taken on line 5 5 of Fig. 3, showing my improved contact system as applied to two tracks located between said tracks, a portion of a truck being shown upon each of said tracks and a portion of a car-body being shown at the left of said figure in diagram. Fig. 6 is a side elevation, partly broken away, of a modified form of shoe and shoe-support. Fig. 7 is a detail plan of the shoe-support illustrated in Fig. 6. Fig. 8 is a section taken on line 8 8 of Fig. 3. Fig. 9 is an enlarged section taken on line 9 9 of Fig. 3. Fig. 10 is an enlarged section taken on line 10 10 of Fig. 3, and Fig. 11 is an enlarged section taken on line 11 11 of Fig. 3.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 15 is an electric car of any desirable construction; 16 17, the trucks of said car; 18 18, the wheels, and 19 19 the rails, supported in the usual manner upon ties 20 20. A shoe-support 21 is rigidly fastened at its left-hand end to a swivel-block 22, provided with a vertical shank 23, arranged to turn in a bearing 24, provided in a bracket 25, fast to one side of the truck-frame 16. The right-hand end of the shoe-support 21 is arranged to slide longitudinally in a swivel-block 26, provided with a vertical shank 27, arranged to turn in a bearing 28, provided in a bracket 29, fast to the truck-frame 17. As the car passes around a curve the trucks assume varying angles, as shown in Fig. 2, and the shoe-support 21 swings upon the pivotal center shank 23 and slides in the swivel-block 26, said swivel-block turning upon its shank 27 to accommodate the vary-

ing positions of the shoe-support as the trucks pass around a curve.

The shoe 30 is supported upon the shoe-support 21 by two links 31 and 32. These links, as shown in Fig. 1, are both inclined in the same direction substantially parallel to each other. As illustrated in Fig. 3, they are inclined in opposite directions. The link 31 is pivotally connected at its upper end by a bolt 33 to a bracket 34, fast to the under side of the shoe 30. The lower end of the link 31 is fast to a shaft 35, said shaft being square in cross-section where it passes through said link and cylindrical in cross-section throughout the rest of its lengh, being secured to the shaft 35 by a pin 36, Fig. 4. Said shaft rocks in a bearing 37, formed in the shoe-support 21, and has fast to the rear end thereof a collar 38, said collar being fast in turn to one end of a torsional spiral spring 39, the other end of said torsional spring being fast to the shoe-support 21. By means of the collar 38 the tension upon said spring may be increased or diminished. The torsional spring 39 encircles the shaft 35 and acts to throw the link 31 upwardly and support the shoe 30. The link 32 is connected at its lower end to the shoe-support 21 by means of a shaft 40 and torsional spring 41 in exactly the same manner as that hereinbefore described with relation to the link 31. The upper end of the link 32 is pivotally connected by screws 42 to a slide 43, arranged to slide upon a stationary rod 44, fast by brackets 45 45 to the under side of the shoe 30.

The shoe 30 is rounded or beveled off at each end and engages the contact-plates 46 as the car moves in either direction. Each of the contact-plates 46 is fast to a plate 14, provided with a stem 47, projecting downwardly therefrom into a sleeve 48, formed of insulating material and supported in a vertical chamber 49, extending from the top to the bottom of a standard 50. The standard 50 has a base-plate 51, which rests upon the top of one of the ties 20 and serves as a means for fastening said standard to said ties by means of lag-screws. The lower end of the stem 47 has a slot 52 therein, which engages the main conducting-wire 53, bent upwardly to engage said slot and held firmly in position therein by a set-screw 54. The plate 14 is covered by an insulating-plate 55 and by a cap 56, except upon the under side thereof, said cap being attached by means of cap-screws to the standard 50.

The hereinbefore-described construction of the standard and contact-plates is substantially the same as that set forth in my application for Letters Patent hereinbefore referred to, except that in the present application I have illustrated the same constructed and applied to a double-track system, the said standards being placed between the tracks and the contact-plates extending laterally from said standards in opposite directions toward both tracks, thus affording means to collect electricity from said contact-plates by shoes upon trucks running on either or both of said tracks.

In Figs. 6 and 7 I have illustrated a modified form of shoe and shoe-support, in which the shoe-support 57 is pivotally connected to a bracket 58, Fig. 6, by a stud 59 and is slotted at the opposite end thereof at 60 to engage a stud 61, fast to a bracket 62. The shoe 63 is connected to the shoe-support 57 by bolts 64 64, said bolts being encircled by spiral springs 65 65, extending between said shoe and shoe-support and tending to hold said shoe upwardly against the contact-plates, hereinbefore described.

The operation of my improved device is as follows: The upper surface of the shoe 30 is at all times in contact with the under face of one or two, as the case may be, of the contact-plates 46, said shoe being of sufficient length to engage a second contact-plate before leaving the one with which it is already in engagement. As the contact-plates may be of different height with relation to the shoe, said shoe is spring-supported upon the links 31 and 32, as hereinbefore set forth, so that said shoe adjusts itself to the said inequality in height of the contact-plates. Assuming a car to be moving in the direction indicated by the arrow, Fig. 3, the advancing edge of the shoe 30 encounters the under face of the contact-plate, and if said contact-plate is somewhat lower than the contact-plate immediately at the rear, with which the shoe is already in engagement, the link 31 will be thrown downwardly, the spiral spring 39 yielding to allow of said movement, while the rear end of the shoe or the right-hand end, Fig. 3, will tend to tip upwardly, and as the shoe passes under the standard said right-hand end will also be depressed, the torsional spring, by which the link 32 is supported, yielding or the slide 43 sliding along the rod 44, either or both of said movements allowing the link 32 to descend and the shoe 30 therewith to accommodate itself readily and with ease to the particular height to keep the upper surface of said shoe in contact with the under surface of said contact-plate. As the trucks pass around a curve the shoe-support 21 adapts itself to the varying angles of said trucks by swiveling upon its pivotal center upon the left-hand truck 16 and by sliding in the swivel-block 26, said swivel-block in turn adjusting itself by turning upon its pivotal shank 27 in the bracket 29, fast to the truck 17, as hereinbefore set forth. It will thus be seen that with my improved construction the shoe 30 is held constantly in contact with the different contact-plates of the system, whether said plates vary in height with relation to the car-truck or whether the trucks are passing around a curve or along a straight line. By my improved construction hereinbefore set forth I am enabled to use a much longer shoe, thus

necessitating fewer contact-posts and reducing the cost of the system as compared with the device described and shown in my application Serial No: 84,006, hereinbefore referred to.

In the modified form shown in Figs. 6 and 7, the operation of the device is substantially the same as that hereinbefore described, the shoe 63 being supported upon the shoe-support 57 by bolts 64, each encircled by a spiral spring 65 and said spring yielding to accommodate varying heights of contact-plates, said support 57 being pivotally supported upon the truck 16 by means of the bracket 58 and stud 59 and having a sliding engagement with the stud 61, supported upon the bracket 62, said bracket being fast to the truck 17 and the shoe-support 57 being slotted at 60 to engage said stud 61, sliding lengthwise thereof when the trucks travel around a curve in a similar manner to that hereinbefore described with relation to the shoe-support 21.

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

1. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

2. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, a cap covering each of said contact-plates, except upon the under side of said plate, and insulating material between said cap and plate, said plates being connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

3. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of plates, one of said plates fast to each of said standards and extending therefrom laterally in such a manner as to present only its under side to an upward-bearing shoe of sufficient length to contact with two of said plates simultaneously, said contact-plates being insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

4. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe spring-supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

5. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending laterally therefrom toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe pivotally supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

6. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, and a shoe pivotally and spring supported upon said shoe-support and arranged to engage two of said contact-plates simultaneously.

7. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, a shoe supported upon said shoe-support, and links pivotally connected to said shoe and to said shoe-support.

8. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks

and having a sliding engagement with the other of said trucks, a shoe supported upon said shoe-support, links pivotally connected to said shoe and to said shoe-support, and a torsional spiral spring operatively connected to one of said links and acting to press said shoe against said contact-plates.

9. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks and having a sliding engagement with the other of said trucks, a shoe supported upon said shoe-support, a link pivotally connected to said shoe-support at one end, and a slide upon said shoe to which the other end of said link is pivotally connected.

10. In a contact system for an electric railway, a series of standards located outside the tracks of said railway, a series of contact-plates, one of said plates fast to each of said standards and extending therefrom laterally toward said track, said plates insulated from said standards and connected to a source of power; in combination with two car-trucks, a shoe-support pivoted to one of said trucks, a swivel rotary block supported upon the other of said trucks, with which block said shoe-support has sliding engagement, and a shoe supported upon said shoe-support.

11. In a contact system for an electric railway, a series of standards located between two tracks of a double-track system, a series of contact-plates, two of said plates fast to and extending laterally from each of said standards in opposite directions toward said tracks, said plates insulated from said standards and connected to a source of power.

12. In a contact system for an electric railway, a series of standards located between the two tracks of a double-track system, a series of contact-plates, two of said plates fast to and extending laterally from each of said standards in opposite directions in such a manner as to present only their under sides to an upward-bearing shoe of sufficient length to contact with two plates upon two of said standards simultaneously, said contact-plates being insulated from said standards and connected to a source of power.

13. In a contact system for an electric railway, a series of standards located between the two tracks of a double-track system, a series of contact-plates arranged in pairs, each pair of said plates fast to and extending laterally from each of said standards in opposite directions toward said tracks, a cap covering each of said pairs of contact-plates, except upon the under side of said plates, and insulating material between said cap and plates, said plates being connected to a source of power.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THEODORE B. PATCH.

Witnesses:

CHARLES S. GOODING,

FRANKLIN E. LOW.