No. 842,852. PATENTED FEB. 5, 1907.

J. C. BOYD.

ELECTRICAL CONTACT APPARATUS.

APPLICATION FILED DEC. 16, 1905.

3 SHEETS—SHEET 1.

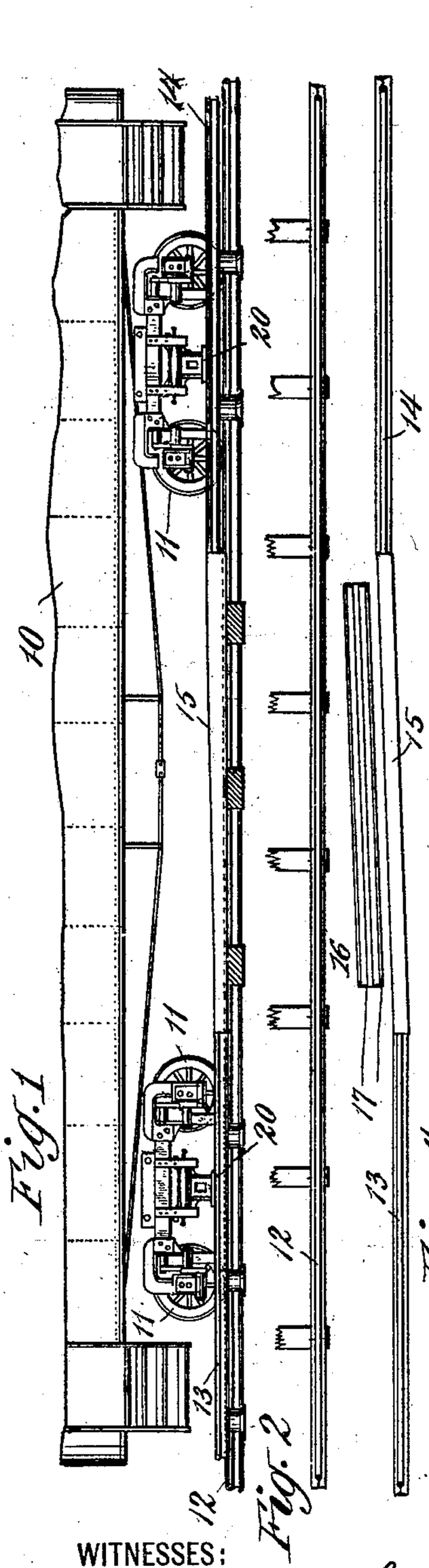

Fig. 1.

Fig. 2.

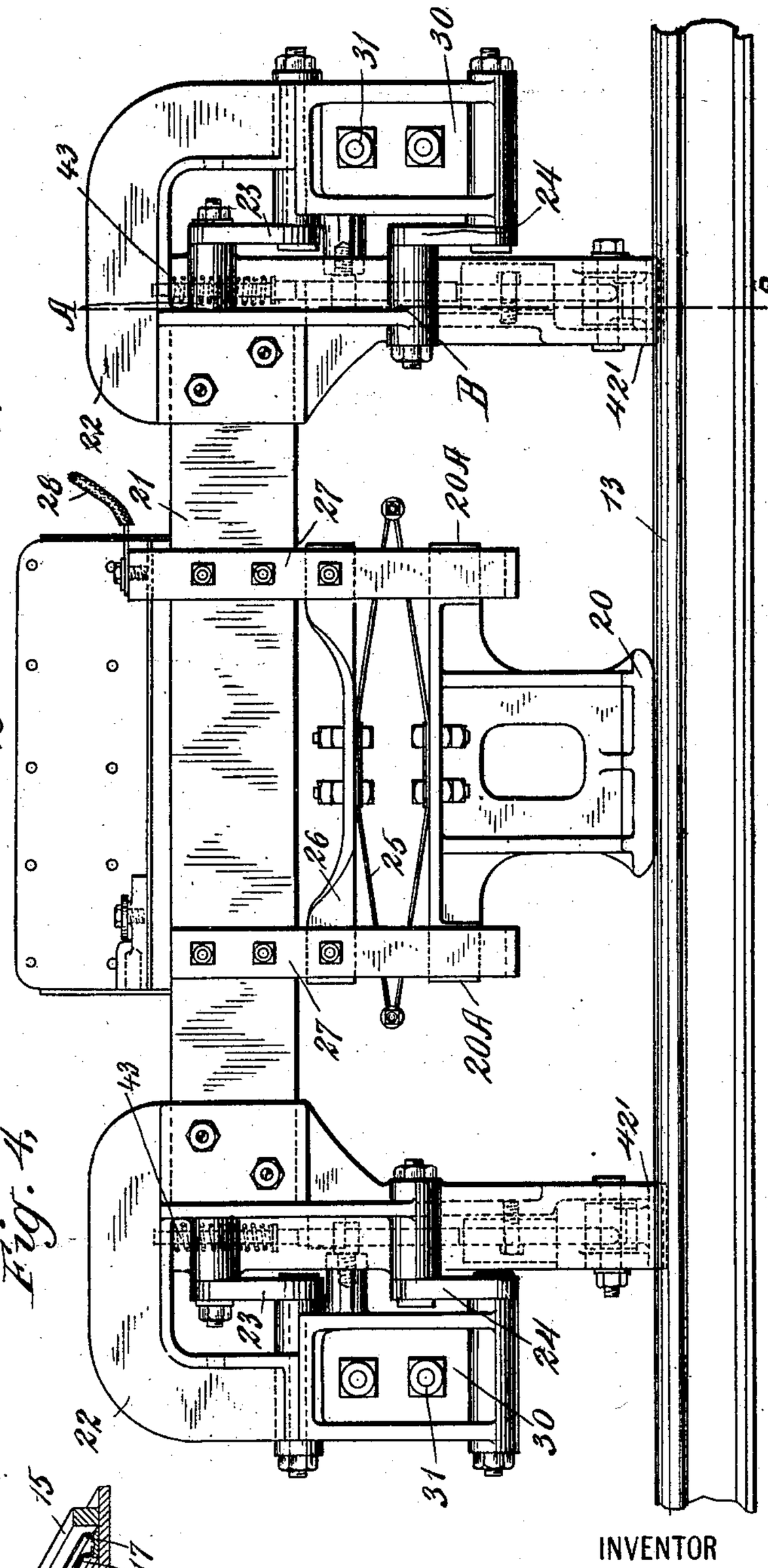

Fig. 4.

Fig. 3.

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3 SHEETS—SHEET 2.

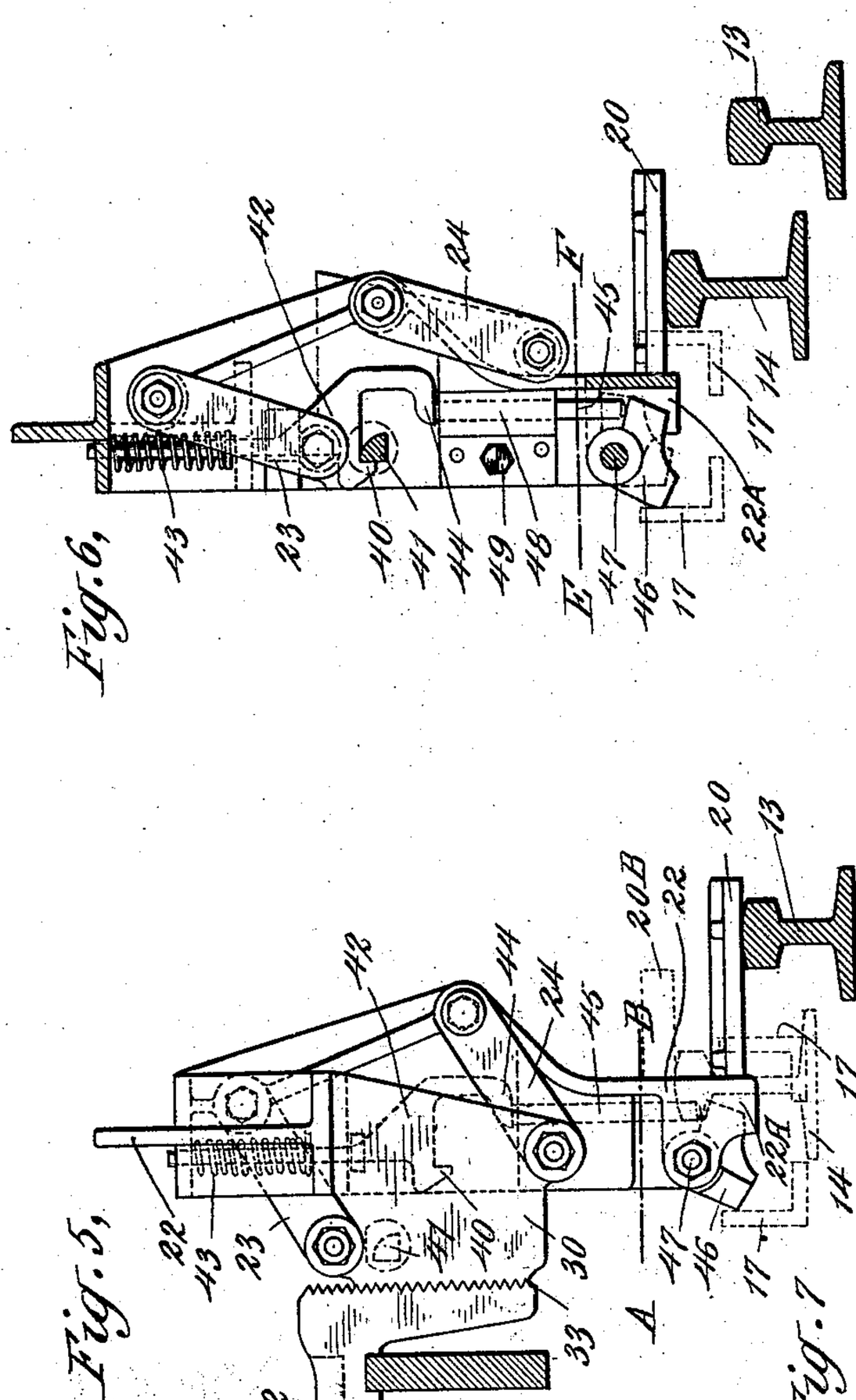

Fig. 6.

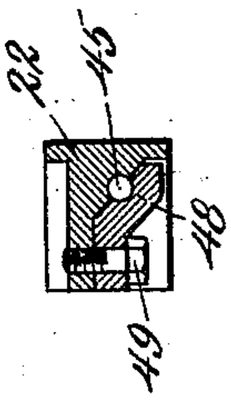

Fig. 9.

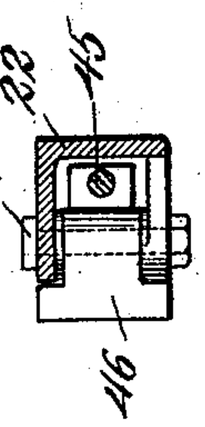

Fig. 8.

Fig. 5.

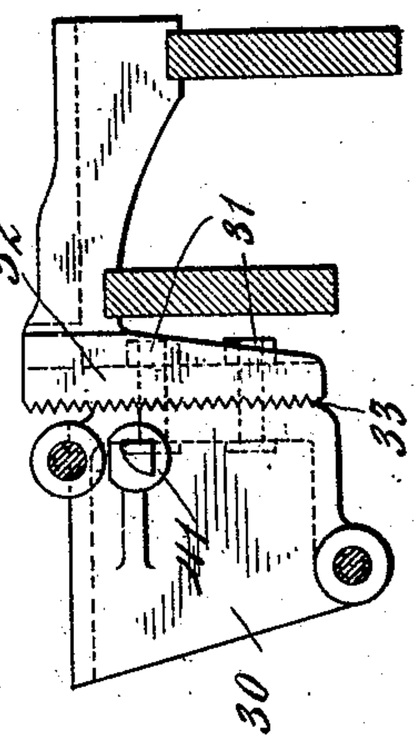

Fig. 7.

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3 SHEETS—SHEET 3.

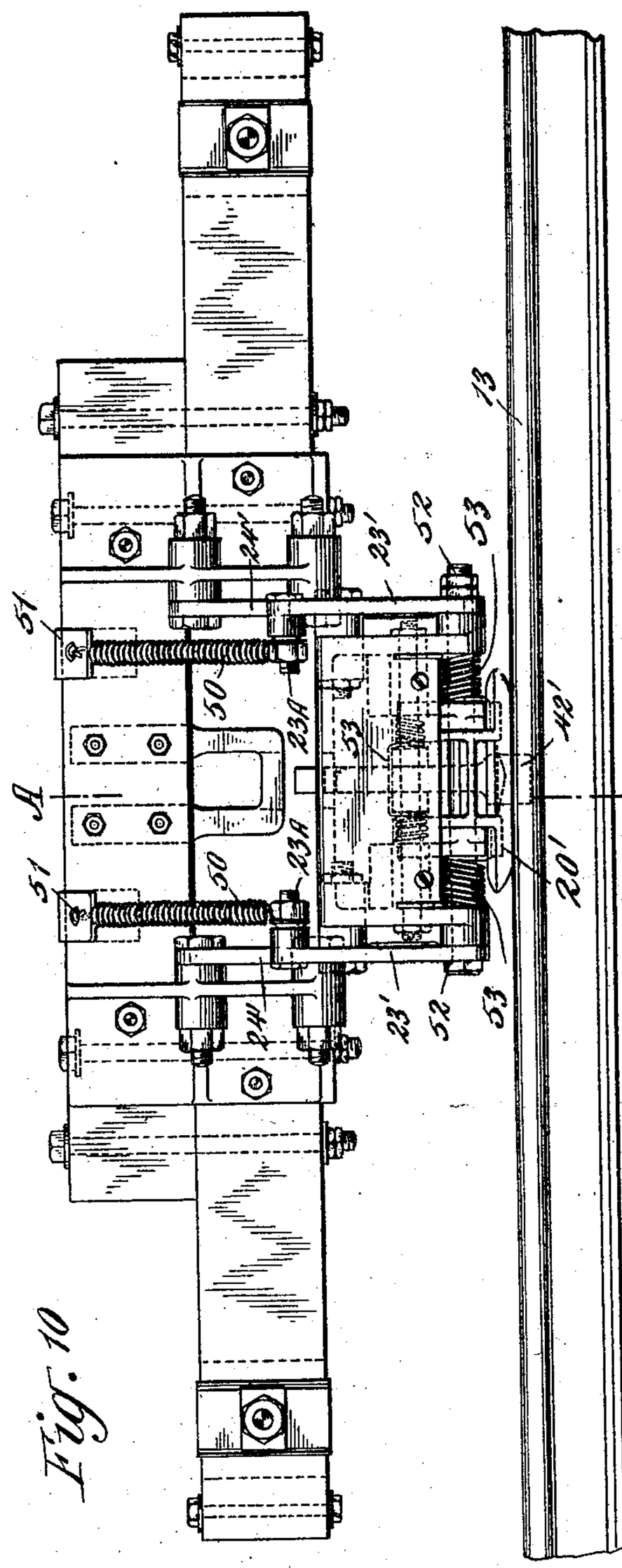

Fig. 10

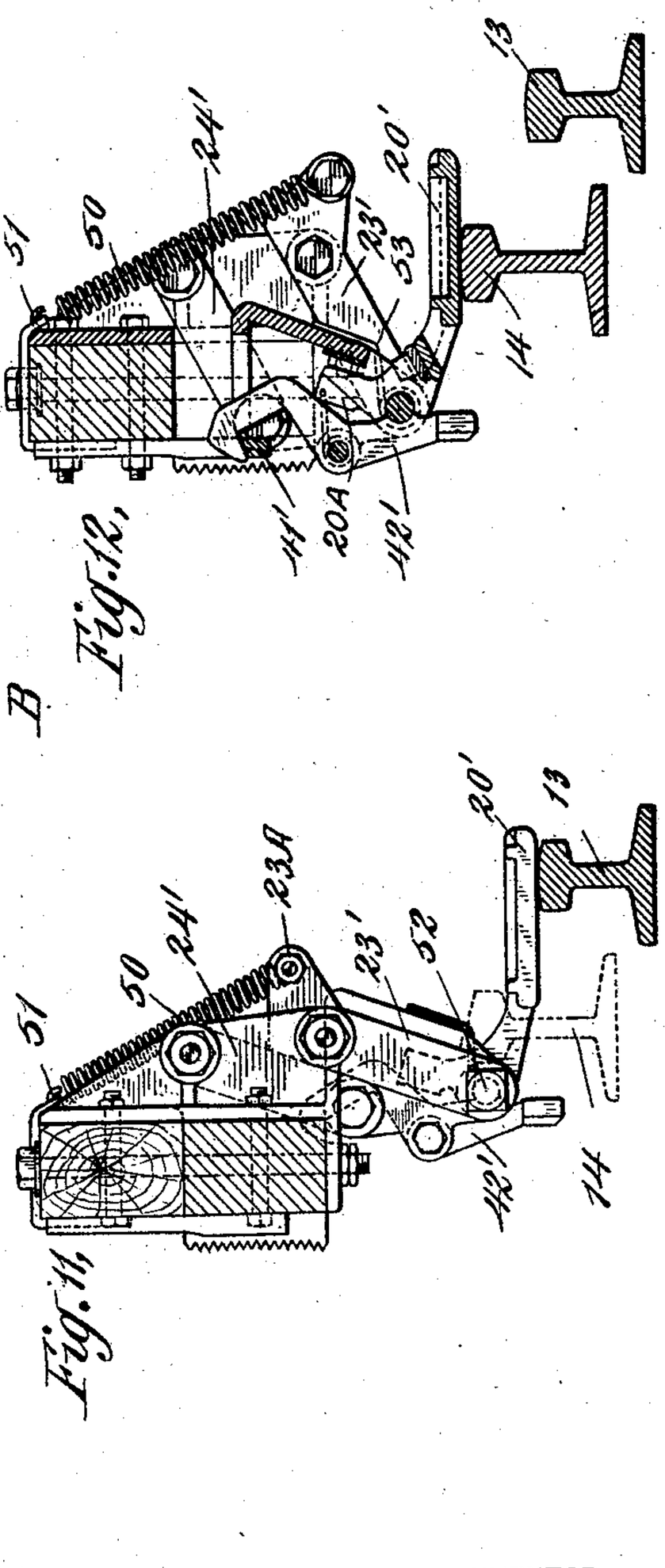

Fig. 12.

Fig. 11.

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JAMES CHURCHILL BOYD, OF NEW YORK, N. Y.

ELECTRICAL CONTACT APPARATUS.

No. 842,852. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed December 16, 1905. Serial No. 291,961.

To all whom it may concern:

Be it known that I, JAMES CHURCHILL BOYD, a citizen of the United States, and a resident of the borough of Brooklyn, city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Electrical Contact Apparatus, of which the following is a specification.

My invention relates to electrical contact apparatus, and more particularly to such apparatus as is used on cars on electrical railways employing a third-rail system. Its object is to provide a simple and efficient apparatus which may be used in connection with two or more third rails which are placed at different relative positions to the running-tracks of the road.

I will now describe my invention in the following specification and point out the novel features thereof in claims.

Referring to the drawings, Figure 1 shows in side elevation a portion of a railway-car with my invention attached thereto and with two adjoining portions of third-rails in different relative positions to the running-tracks also shown. Fig. 2 is a plan view of the above-mentioned third rails and also shows an arrangement which I use for automatically changing the position of the contact apparatus when the car which carries it passes the place where these different third rails adjoin each other. Fig. 3 is a perspective view of a small portion of a part of the apparatus shown in Fig. 2, showing a portion of the supporting-beam 15 and the angle-irons 17. Fig. 4 is a side elevation of the contact-shoe and its supporting parts, the latter made according to my invention. Fig. 5 is an end view of the parts shown in Fig. 4 with the contact-shoe resting upon one of the third rails. Fig. 6 is a sectional view of the same parts shown in Fig. 5 with the parts in this case shown in a different position and with the contact-shoe resting upon another of the third rails. The section of this figure is taken through the line A B of Fig. 4. Fig. 7 is an end view of stationary brackets 30 and 32, showing how these parts are fastened together. Figs. 8 and 9 are small detail views showing the construction of an arrangement of the releasing member 45 and the trigger 46 shown in the preceding figures. Fig. 10 is a side elevation of a modification of my invention. Fig. 11 is an end view of the parts shown in Fig. 10 with the contact-shoe resting upon one of the third rails. Fig. 12 is a sectional end view of the same parts in a different position with the contact-shoe resting upon another of the third rails, the section being taken through line A B of Fig. 10.

Like characters of reference represent corresponding parts in all of the figures.

10 designates a railroad-car of any preferred design or construction. 11 11 are its wheels, and 12 one of the rails over which the car is arranged to run.

13 is a third rail or power-rail connected to a suitable source of electrical supply. 14 is another such third rail at a different relative position to the running-track.

15 is a support for a contact-shoe, which is arranged to carry the shoe when it is being moved by the car from one of the third rails to the other.

16 is a device arranged to shift the position of the contact-shoe from one of the third rails to another.

20 is a contact-shoe of a well-known design and construction. It is designed to be carried by the car by a supporting-beam 21. The ends of this supporting-beam are provided with brackets 22 22 of a special design, which are supported upon links 23 23 and 24 24, which are pivotally connected to stationary supporting-brackets 30 30 upon the car. When the parts are in this position, (shown in the left-hand portion of Fig. 1 and in Figs. 2 and 5,) the contact-shoe will rest upon the third rail 13. The springs 25 are provided for the purpose of pressing this shoe upon the third rail and for connecting the contact-shoe to the supporting-beam 21. These springs are connected to the supporting-beam by a cross-arm 26, which is rigidly connected to contact-arms 27 27. The lower ends of these upright arms are provided with slots which serve as a guide for the shoe 20 and in which the upper portions 20^A 20^A of the contact-shoe play. This is a well-known construction and needs no further description here.

28 is an electrical conductor which is arranged to carry the current from the third rail, which passes through the contact-shoe 20 to the electrical equipment on the car. As this electrical equipment forms no part of the present invention, it is not shown in the drawings. The stationary supporting-brackets 30 30 may be attached to the body of the car by means of bolts 31 31 and a supporting-piece 32 upon the car itself. Where

the stationary bracket 30 comes against the supporting-piece 32, their edges may be corrugated, as shown at 33, so that the height of supporting-bracket 30 may be adjusted at will.

Referring now to Fig. 5, it may be seen that the links 23 and 24, which connect the supporting-beam 21 to the car, hold the contact-shoe 20 in the proper position for it to bear upon the third rail 13. The parts will be held in this position by their own weight and will remain in this position so long as the car runs along the part of its track which is provided with a third rail which is in the position designated in the drawings at 13. The third rail may of course be provided upon either or both sides of the running-track 12. Now when it is desired to run the car from a part of its running-track 12 which is provided with a third rail, such as 13, onto another portion of the running-track 12 which is provided with a third rail, such as 14, it is desired to change the position of the contact-shoe 20 and its supporting parts so that it will bear upon the third rail 14. This new position of the parts is shown in Fig. 6.

It is the purpose of this invention to provide a simple and efficient device for causing the motion of the car to automatically shift the position of these parts. For this purpose the supporting-beam 15 and the shifting device 16, which are illustrated in Figs. 1 and 3, are provided. As the car moves over this portion of its track the contact-shoe 20 will first run off from the third rail 13 onto the beam 15. The end of this beam which is next to the third rail 13 is slightly inclined, so that the contact-shoe 20 and its supporting parts will be lifted thereby against gravity and the compression of the supporting-spring 25 into the position designated in dotted lines in Fig. 5 at 20^{B}. This will raise the contact-shoe above the angle-irons 17 17. A further compression of the supporting-spring of the contact-shoe will have the effect of swinging the links 23 and 24 farther about their pivots and causing all of the movable supporting parts of contact-shoe 20 to be raised into the positions in which they are shown in Fig. 6. The beam 15 is so shaped that as it carries the contact-shoe from third rail 13 to third rail 14 it will hold the contact-shoe 20 above and clear of the angle-irons 17 17. This beam 15 may be constructed, if desired, of conducting material in order to carry current from the power-rails to the electrical equipment on the car while the contact-shoe is being carried from one of the power-rails to the other; but I prefer to make it of non-conducting material, such as wood.

The two angle-irons 17 17 may be securely attached to a supporting-timber 18 and placed at the desired angle or curve in relation to the running-track to assist in shifting the parts which support the contact-shoe. The movement of the car over a portion of its track opposite to this shifting arrangement will carry a portion 22^{A} of the bracket 22 which extends downwardly to a position preferably lower than the top of the third rails between the angle-irons 17 17, as shown in Fig. 5. The angle or curve at which these angle-irons 17 17 are set will cause one of them to push the portion 22^{A} over toward the body of the car 10 and assist the supporting-beam 15 in swinging the links 23 and 24 and their connected parts and moving all of the movable parts of the supports for the contact-shoe upward into the positions in which they are shown in Fig. 6. A hook 40 will at the same time be moved over a stationary catch 41 and will lock the various parts in their positions until further acted upon in a manner which will be described later. The hook 40 is a part of the locking-piece 42, the upper portion of which is extended up through bracket 22 and is provided with a spring 43, which tends to push this locking-piece and the hook 40 downward. The lower end 44 of the locking-piece 42 is shaped as shown at 44, so that it carries upon it the sliding releasing-bar 45, which is preferably an integral part of the locking-piece 42. The lower end of the releasing-bar 45 rests upon a trigger 46, which is pivoted at 47 to the supporting-bracket 22. When the car is run in the opposite way or when it is run onto another section of the track 12, which is provided again with a third rail in the position of the third rail 13, the operation will be reversed. The contact-shoe will then run onto the beam 15 and will be supported thereby. Now as the portion 22^{A} of the bracket 22 again enters into the trough formed by the angle-irons 17 17 one of the angle-irons will push the portion 22^{A} away from the car. Its effect will be, however, to first press against the pivoted trigger 46 until it assumes the position designated by dotted lines in Fig. 6. This will push the sliding releasing-bar 45 upward and will thereby raise the locking-piece 42 against the compression of spring 43 until the hook 40 is raised above the stationary locking-piece 41. This will leave the various movable parts free to be moved upward and downward by the combined effect of one of the angle-irons and by the weight of the parts until they again assume the positions in which they are shown in Fig. 5.

The detail view shown in Fig. 8 is a sectional plan view of some of the parts shown in Fig. 6, the section being taken through line E F of Fig. 6 and shows the trigger 46 and its pivot 47 and also shows how these parts are attached to the lower portion of the frame 22.

In the detail shown in Fig. 9 it may be seen that the sliding releasing member 45 may be

held in its position by a small angle-iron 48, which may be bolted to the bracket 22 by means of a bolt 49.

In the modification shown in Figs. 10, 11, and 12 the contact-shoe 20′ is of a different form, but constructed and operated after the same principles. In this case the contact-shoe 20′ is supported directly upon the links 23′ and 24′. These links are in this case arranged to hold the contact-shoe 20′ upon the contact-rail 13 when they are in their lower position and to be held in this position by means of springs 50, which are connected to an extension 23ᴬ of the link 23′ and to a stationary part 51 on the car. The contact-shoe 20′ is arranged to be pivoted at 52 to the lower links 23′ 23′ and to be pressed against the power-rails by springs 53. The locking-piece 42′ is somewhat different in shape in this case and is arranged to hook into a stationary strap 41′ to hold the parts in their raised position after they have been pushed into this position by the movement of the car.

The operation of this device is similar to that of the other form. In this case, however, the contact-shoe 20′ is provided with a projecting lug 20ᴬ, and when the contact-shoe 20′ runs up on the supporting-beam 15 this projecting lug 20ᴬ will strike against the hub of the locking-piece 42′, so that any further upward movement of the contact-shoe will be transmitted to its supporting parts, and they will be raised by the supporting-beam 15 until the locking-piece 42′ is brought into engagement with the stationary strap 41′. In the opposite direction an angle-iron similar to one of those shown at 17 17 may be arranged to press against the dependent lug 46ᴬ and to release the hook of the locking-piece 42′ from the stationary strap 41′, and then the springs 50 will move the links and the contact-shoe 20′ back to their original positions.

This invention is not necessarily limited to its use in connection with two power-rails of different relative positions to the running-track, as it is but a matter of mechanical design to arrange the parts to be moved into the proper operative positions for the contact-shoe to bear upon power-rails in more than two relative positions to the running-track. I believe it is broadly new to support by parallel links a contact-shoe which is arranged to be automatically moved from one position to another directly by the movement of the car and to arrange means for locking the supporting members of the shoe in different operative positions

I have shown more than one construction of this invention, and of course it may be made in many other ways than those herein shown and described.

I have shown and described the power-rails 13 and 14 as constructed in a well-known manner, but they may of course be electrical conductors of any desired form or construction.

What I claim is—

1. A car, a running-track therefor, a contact-shoe, links arranged to connect the contact-shoe to the car, an adjustable bracket for connectingthe links to the car, a movable bracket for connecting the links to the contact-shoe, a dependent projection from said movable bracket, a plurality of power-rails in different relative positions to the running-track, a fixed guide near said running-track arranged to engage with said dependent projection and to automatically shift the contact-shoe from one of said power-rails to the other of said power-rails by the movement of the car.

2. A car, a running-track therefor, a contact-shoe, links arranged to connect the contact-shoe to the car, an adjustable bracket for connecting the links to the car, a movable bracket for connecting the links to the contact-shoe, a dependent projection from said movable bracket, a fixed guide near said running-track arranged to engage with said dependent projection and to shift the contact-shoe from one of said power-rails to the other of said power-rails by the movement of the car, and a hook arranged to lock said movable bracket in its shifted position.

3. A car, a running-track therefor, a contact-shoe, links arranged to connect the contact-shoe to the car, an adjustable bracket for connecting the links to the car, a movable bracket for connecting the links to the contact-shoe, a dependent projection from said movable bracket, a fixed guide near said running-track arranged to engage with said dependent projection and to shift the contact-shoe from one of said power-rails to the other of said power-rails by the movement of the car, a hook arranged to lock said movable bracket in its shifted position and a spring arranged to actuate said hook in one direction.

4. A car, a running-track therefor, a contact-shoe, links arranged to connect the contact-shoe to the car, an adjustable bracket for connecting the links to the car, a movable bracket for connecting the links to the contact-shoe, a dependent projection from said movable bracket, a fixed guide near said running-track arranged to engage with said dependent projection and to shift the contact-shoe from one of said power-rails to the other of said power-rails by the movement of the car in one direction, a hook arranged to lock said movable bracket in its shifted position, a spring arranged to actuate the hook in one direction, a trigger arranged to release the hook, said guide also arranged to engage with the trigger and to release the hook against the action of the spring and to shift the movable bracket back to its former position by

the movement of the car in the opposite direction.

5. A car, a running-track therefor, a movable bracket, links arranged to connect the movable bracket to the car, an adjustable bracket for connecting the links to the car, a contact-shoe loosely connected to said movable bracket, a spring connecting the contact-shoe and the movable bracket, a dependent projection from said movable bracket, a fixed guide near said running-track arranged to engage with said dependent projection and to shift the contact-shoe from one of said power-rails to the other of said power-rails by the movement of the car in one direction, a hook arranged to lock said movable bracket in its shifted position, a spring arranged to actuate the hook in one direction, a trigger arranged to release the hook, said guide also arranged to engage with the trigger and to release the hook against the action of the spring and to shift the movable bracket back to its former position by the movement of the car in the opposite direction, and a supporting-beam for holding the contact-shoe during said shifting.

6. A car, a running-track therefor, a contact-shoe carried by the car, a power-rail parallel to the running-track and opposite one portion of the running-track, another power-rail parallel to the running-track and opposite another portion of the running-track, said power-rails being in different relative positions to the running-track, means for positively holding the contact-shoe in operative position over one of the power-rails, a locking device for holding the contact-shoe in operative position over the other of the power-rails, a guide arranged to shift the contact-shoe from the first of said operative positions and to cause the contact-shoe to be locked in the second of said operative positions when the car is running in one direction and to unlock and to shift the contact-shoe from the second of said operative positions to the first of said operative positions when the car is run in the opposite direction.

7. A car, a running-track therefor, a contact-shoe, links arranged to connect the contact-shoe to the car, a power-rail parallel to the running-track and opposite one portion of the running-track, another power-rail parallel to the running-track and opposite another portion of the running-track, said power-rails being in different relative positions to the running-track, means for positively holding the contact-shoe in operative position over one of the power-rails, means for locking the contact-shoe and thereby holding the contact-shoe in operative position over the other of the power-rails, and a guide arranged to positively move and cause the links to be locked and thereby hold the contact-shoe in operative position over one of the power-rails when the car is moved in one direction, and to unlock and to move the links back and thereby shift the contact-shoe into its operative position over another of the power-rails when the car is run in the other direction.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES CHURCHILL BOYD.

Witnesses:
BRONSON H. SMITH,
ERNEST W. MARSHALL.