No. 700,689. Patented May 20, 1902.

C. M. HOBBS.

THIRD RAIL CONSTRUCTION FOR ELECTRIC RAILWAYS.

(Application filed June 21, 1901.)

(No Model.) 2 Sheets—Sheet 1.

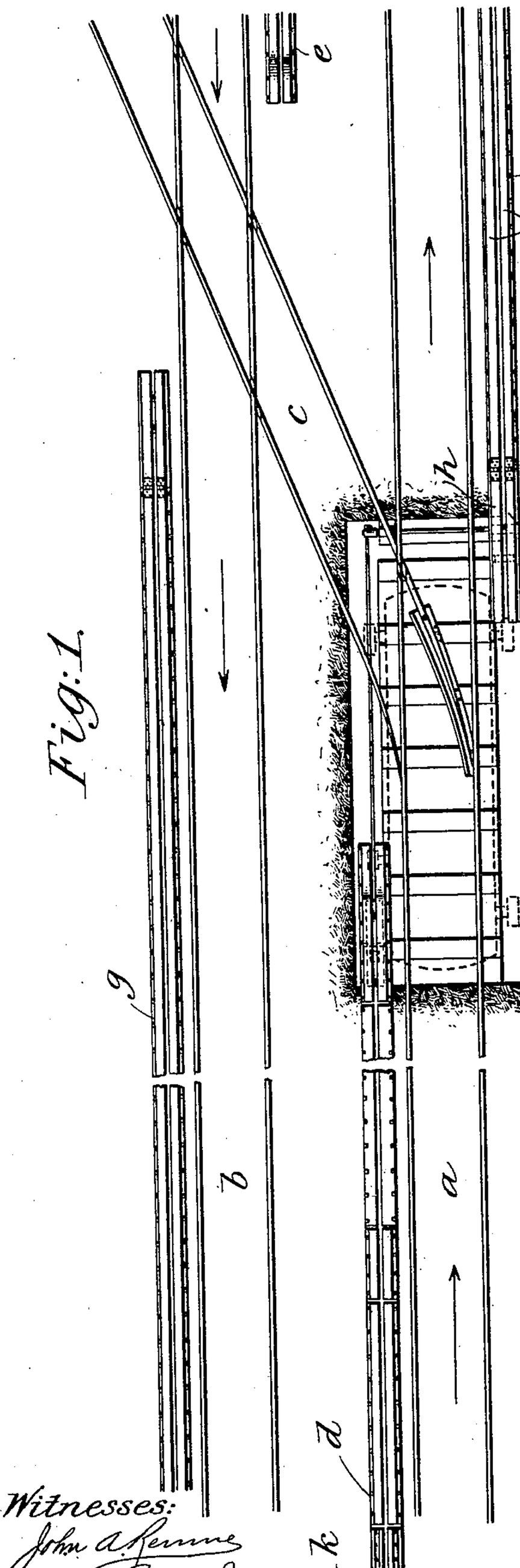

Fig. 1.

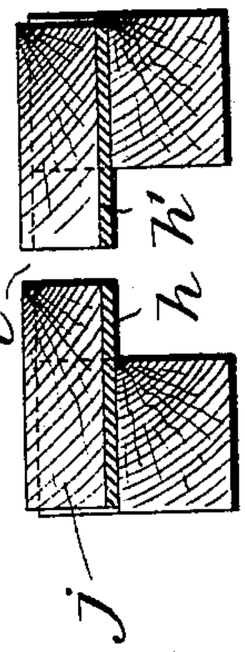

Fig. 4.

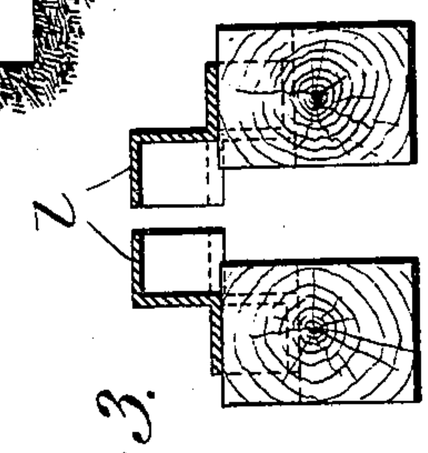

Fig. 3.

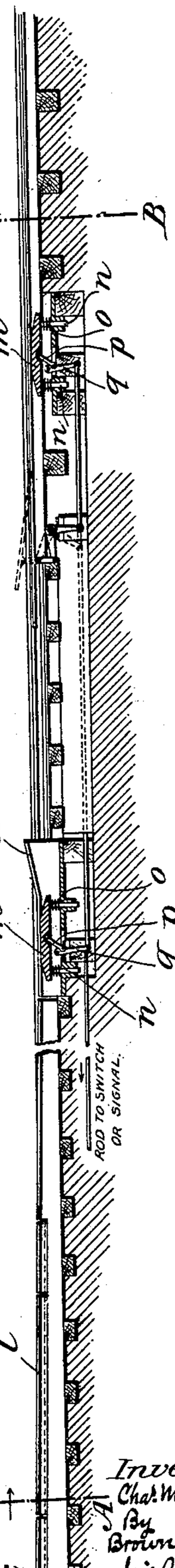

Fig. 2.

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THIRD RAIL CONSTRUCTION FOR ELECTRIC RAILWAYS.

(Application filed June 21, 1901.)

(No Model.) 2 Sheets—Sheet 2.

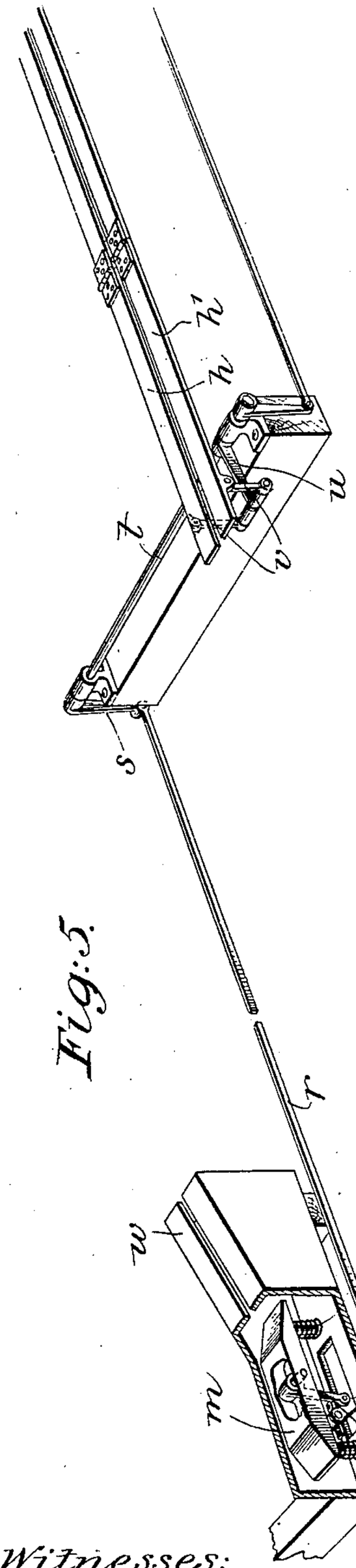


Fig. 5.

Fig. 7.

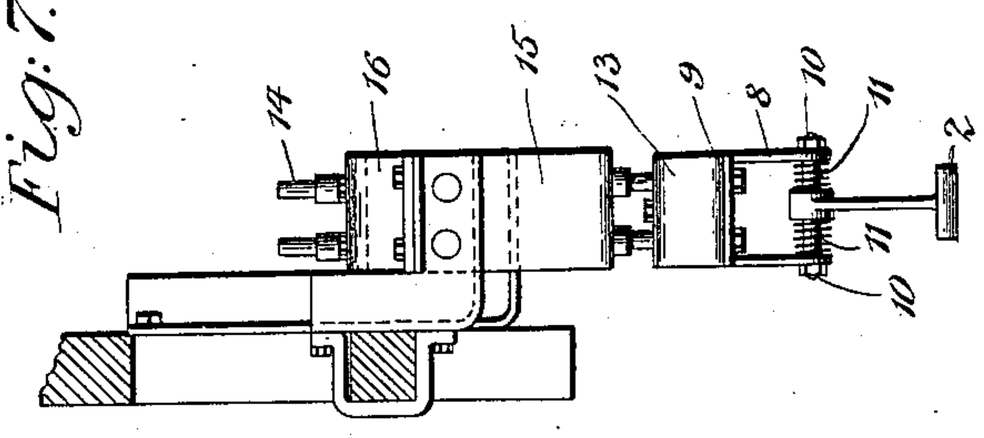


Fig. 8.

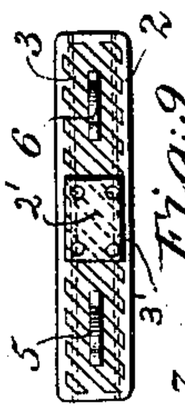


Fig. 9.

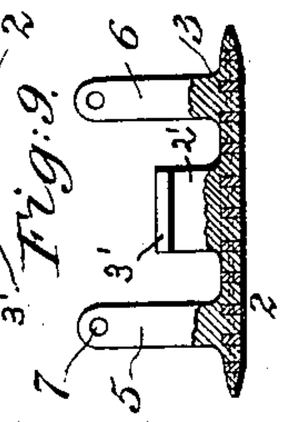
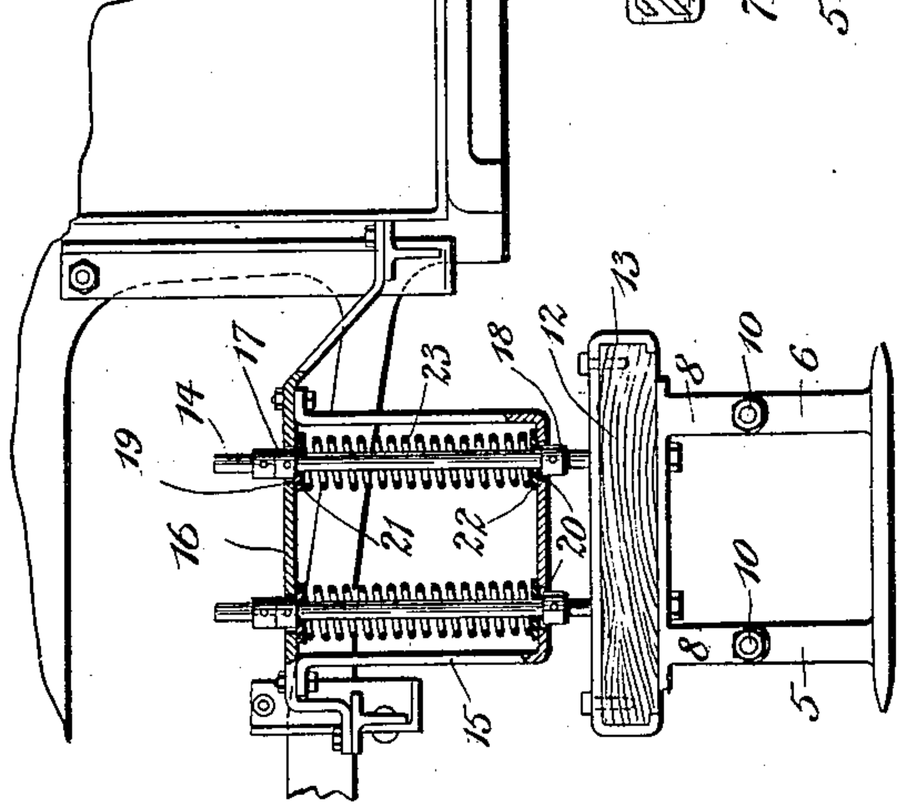


Fig. 6.



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UNITED STATES PATENT OFFICE.

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THIRD-RAIL CONSTRUCTION FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 700,689, dated May 20, 1902.

Application filed June 21, 1901. Serial No. 65,385. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HOBBS, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have invented a new and useful Third-Rail Construction for Electric Railways, of which the following in a specification.

My invention relates to third-rail construction for electric railways, and more particularly to means for maintaining electrical contact between the motor and the conductor when the latter for any cause is either for an interval or permanently offset from its normal path or position.

My invention also contemplates a sliding contact-shoe and means for supporting it in such a manner that it will maintain an extended electrical contact with the conductor when the latter is either in its normal or in an abnormal position relative to the track.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a plan view of a portion of a track, showing an arrangement for transferring the contact between the motor and conductor from one side of the track to the other and at the same time depressing the conductor to a level with or below the top of the track-rails. Fig. 2 is a view of the same in side elevation, partly in section. Fig. 3 is an enlarged transverse section on the line A A of Fig. 2 looking toward the right, as indicated by the arrow. Fig. 4 is a similar view on the line B B of Fig. 2. Fig. 5 is an enlarged view in detail, showing in perspective the connection between the treadle and the hinged guide, the one under the control of the sliding contact-shoe on one side of the motor to lift the other for the reception of a sliding contact-shoe on the opposite side of the motor. Fig. 6 is a view in detail in side elevation, representing the sliding contact-shoe and the manner of supporting it. Fig. 7 is a view of the same in end elevation. Fig. 8 is a top plan view of the shoe in detail, and Fig. 9 is longitudinal section through the shoe.

The portion of track which I have selected for the purpose of showing a practical embodiment of my invention is that in which a switch-track crosses the two tracks of a railway, as often happens at or near a station and where it is desirable to depress the conductor below the planking, which is commonly laid on a level with the faces of the track-rails. It is obvious that this is only one of numerous instances in track construction where it is desirable to transfer the conductor temporarily from one side of a track to the other and to depress the conductor; but it will serve to show the parts which coact to produce the result desired.

The main tracks are denoted by *a* and *b*, it being assumed that the motors are running on the track *a* in the direction shown by the arrows and in the reverse direction on the track *b*, as indicated by the arrows thereon. The shunt-track crossing the tracks *a* and *b* is denoted by *c*. The normal position of the conductor for the track *a* is shown at *d*, and the normal position of the conductor for the track *b* is shown at *e*. For purposes of crossing the shunt-track *c* and still maintaining contact between the conductor and the motor the conductor is for an interval transferred to the opposite side of the track *a*, as shown at *f*, and the opposite side of the track *b*, as shown at *g*.

The interval conductors, located at *f* and *g*, are represented in Fig. 4, and consist of plates *h h'*, located on the opposite sides of the slot *i*, along which the shank of the sliding contact-shoe passes. The plates *h h'* are surmounted by planks *j*, the upper surfaces of which are intended to be on a plane with or slightly above the top of the track-rails.

The third rail, on which the shoe slides, is indicated at *k*, Fig. 1, just at the point where the sliding contact-shoe leaves it and begins to be drawn downwardly by the Z-bars *l*, Figs. 2 and 3.

The end portions of the depressed conductors *h h'* toward the approaching motor are hinged, as shown in Fig. 5, to the main portions of the said conductors, so that they may be lifted into position to catch the shoe of the motor and direct it downwardly into its depressed position below the surface of the rails.

Within the space between the Z-bars *l*, preferably at the point where the position of the main conductor is to change from one

side of the track to the opposite side—for example, from the left-hand side of the track *a* to the right-hand side—there is located a vertically-movable treadle *m*, mounted in the present instance upon guide-posts *n* and held normally lifted into engagement with the undersides of the tops of the Z-bars by springs *o*. The treadle *m* has its ends beveled, as shown, to permit the end of the sliding contact-shoe to enter between the upper surface of the end of the treadle and the under surface of the tops of the Z-bars to depress the treadles against the tension of the springs *o*.

Connected with the treadle *m* is a swinging arm *p*, (see Fig. 5,) which connects with a rocking lever *q*, pivotally secured to the treadle-casing and connected at its free end by a connecting-rod *r* with an arm *s* on a rocking bar *t*, which crosses beneath the rails of the track and carries on its opposite end an arm *u*, connected with the hinged portions of the conductors *h h'* by links *v*. The structure is such that when the treadle *m* is depressed the rocking bar *t* will be rocked in a direction to lift the hinged conductors *h h'* into the position shown in dotted lines in Fig. 2. The distances measured along the track *a* between the treadle *m* and the hinged portion of the conductors *h h'* are such that the shoe on the forward right-hand corner of the motor will enter beneath the lifted hinged portions of the conductors *h h'* while the rear left-hand shoe of the motor is depressing the treadle *m*, and this will cause the forward right-hand sliding contact-shoe to be guided by the lifted portions of the conductors *h h'* downwardly into contact with the under surfaces of the conductors *h h'* along that portion where it is desirable to have the conductors depressed below the planking in proximity to the tracks, as at crossings and at stations. As soon as the shunt-track *c* has been passed the return to the third rail may be effected by simply permitting the shoe to pass out of contact with the opposite ends of the conductors *h h'* whenever the shoe on the opposite side of the motor shall have engaged the third-rail conductor on that side. In backing a train on the same track the shoe on the left-hand side of the motor is received and guided down into position between the Z-bars *l* by means of an upwardly-inclined hood *w* at the end of the Z-bar structure.

It is obvious that where there is no cross-track *c* and it is desired to depress the conductor for purposes of a crossing the depressed conductors *h h'* may be arranged to form a continuation of the downwardly-inclined Z-bar structure without the necessity of placing the conductor for an interval upon the opposite side of the track.

If it be desired to guide the rear shoe on the right of the motor into engagement with the conductors *h h'*, a second treadle *m'*, similar to the treadle *m*, may be located beneath the depressed conductors *h h'* and connected back by a rod *r'* with the arm *s'* on the rock-shaft *t* to lift the hinged portions of *h h'* at the proper moment to admit the rear shoe on the same side. The arm *q* may also, if desired, be connected with the ordinary switch or signal mechanism (not shown) by a connecting-rod r^2, so that the hinged portion of the conductors *h h'* may be positively lifted when the signal and switch are set to pass the motor along the track—in the present instance track *a*.

The preferred form of sliding contact-shoe is shown in Figs. 6 to 9, inclusive. It is flat, oblong in shape, having its ends tapered, and has two standards uprising from its upper surface and practically midway of its width for the purpose of attaching it to its support. It is composed of a good conducting metal—such, for example, as brass or copper—and of a hard metal—as, for example, steel. In the present instance the shoe consists of a skeleton frame 2, of soft metal—such, for example, as brass or copper—and has diagonally arranged in its interstices hard metal 3—such, for example, as steel. These may be either cast together or the steel may be held by a suitable fastening device in its position at intervals through the softer metal. The object of the hard metal is to prevent the shoe from rapidly wearing away under the pressure which it is found desirable to exert upon it in order to make it press against the rail throughout an extent sufficient to insure an efficient electric contact. The hard metal 3 by its arrangement forms a series of diagonal scrapers and serves the additional purpose of scraping the surface of the rail free from oxid, sleet, or other foreign substance which would tend to impair the electrical contact. The arrangement of the hard and soft metals which compose the shoe is obviously capable of a variety of combinations, so far as the relative amounts and arrangements of the two are concerned. The standards which uprise from the top of the shoe are denoted by 5 and 6 and are preferably provided at or near their upper ends with perforations 7. They are connected with the depending arms 8 of a bracket 9 by means of bolts 10. In Figs. 8 and 9 the shoe is shown provided with a lug or bracket 2', extending upwardly therefrom and having laterally-projected perforated ears 3' for the attachment of an electric conductor in a well-known manner. The bolts 10 pass through the arms 8 and standards on the shoe, and the arms are separated far enough to admit between their inner faces and the opposite faces of the standards 5 and 6 coiled springs 11 for the purpose of centering the shoe yieldingly between the arms 8 of the bracket 9. The bracket 9 is bolted to the under side of a wooden block 12, which is conveniently provided with a shield 13, extending over its upper side and ends, and from the shield 13 there uprise rods 14. In the present instance four rods are arranged in pairs at the front and rear. These rods extend through the bottom of a U-shaped bracket 15 and through a plate 16 at the top of the bracket 15, which plate is attached to

the motor and forms a support for the bracket 15. The rods 14 are each provided with adjustable collars at their opposite ends—in the present instance two collars, denoted, respectively, by 17 18, the former near the top of the rod and the latter near the bottom. These collars are arranged to pass through openings 19 and 20, formed, respectively, in the plate 16 and bottom of the bracket 15, while between the plate 16 and the bottom of the bracket 15 there are located loose washers 21 and 22, free to slide relatively to the rod 14, but so large that they will not pass through the openings 19 and 20. Intermediate of the washers 21 22 there is located a spiral spring 23, the tension of which serves to hold the shoe depressed and at the same time permit it to yield either upwardly or downwardly, as may be required. For instance, assuming each of the rods 6 to be provided with the same parts as hereinabove described with respect to the rod 14, and assuming the shoe to be in its normal position supported by the springs 23 and the bottom collar 18 to be in contact with the washer 22 and the upper washer 21 in contact with the spring and the plate 16, and further assuming that the shoe in such normal position be an inch, more or less, below the surface of the third rail, on which it is intended to ride, it will appear that when the shoe is forced onto the rail it will press the spring 23 sufficiently to permit it to assume its positions on the rail, and under such spring tension, tending to press it toward the rail, it will travel along the rail. When in the course of its travel it comes to the downwardly-inclined Z-bars *l*, hereinabove described, and is drawn down by them into the position to finally pass beneath the conductors *h h'*, the springs 23 will serve to draw it upwardly into contact with the under side of the conductors *h h'*, the electrical contact being between the upper side of the shoe and the under side of the conductors *h h'*. This will be so, for just as soon as the shoe has passed below its normal position (assumed in Fig. 6) the further drawing down of it will tend to compress the spring by the action of the collar 17 in engagement with the washer 21. On the other hand, just as soon as the guides for depressing it will permit it to do so it will rise under the spring tension into the position to again travel on the third rail slightly above the level of the track-rails. The tapered ends of the shoe permit it to readily enter between the treadle *m* and the under sides of the Z-bars to force the treadle down and lift the hinged portion of the conductors *h h'*.

It is obvious that changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. The combination with consecutive parts of a main conductor having their contact-faces disposed in different directions, of a movable contact-piece and means for directing it into engagement with the said contact-surfaces during its movement along the consecutive parts of the main conductor, substantially as set forth.

2. The combination with consecutive parts of a main conductor having their contact-faces disposed in opposite directions, of a movable contact-piece and means for directing it into contact with the two oppositely-disposed faces of the parts of the conductor as it moves continuously along them, substantially as set forth.

3. The combination with consecutive parts of a main conductor, one of the parts being depressed below another and having their contact-surfaces oppositely disposed, of a movable contact-piece and means for directing it into contact with the oppositely-disposed faces of the parts of the conductor as it moves continuously along them, substantially as set forth.

4. The combination with consecutive parts of a main conductor, one depressed below the other and having their contact-surfaces oppositely disposed, of a downwardly-inclined guide connecting the said parts of the conductor and a contact-shoe adapted to engage the guide as it moves continuously along the conductor, the said shoe being yieldingly supported to permit it to be drawn by the guide into contact with the depressed part of the conductor, substantially as set forth.

5. The combination with consecutive parts of a main conductor located upon opposite sides of a track and movable contact-pieces arranged to move along the opposite sides of the track, of means under the control of a contact-piece on one side of the track for throwing a contact on the opposite side of a track into contact with the conductor, substantially as set forth.

6. The combination with consecutive parts of a main conductor located upon opposite sides of a track, of intermediate mechanism arranged to set the conductor on one side of the track in position to make contact, before contact is broken on the opposite side of the track, substantially as set forth.

7. The combination with consecutive parts of a main conductor located upon opposite sides of a track, one of the said parts being provided with a movable portion, of a treadle connected with said movable portion and arranged to be operated to throw the movable portion into position to make contact before contact is broken at the treadle, substantially as set forth.

8. The combination with consecutive parts of a main conductor located upon opposite sides of a track, one of the parts being depressed below the other and provided with a movable portion, of a treadle at the opposite side of the track from the movable portion and under the control of a contact-shoe on

that side of the track, to operate the said movable part of the conductor to throw another shoe into engagement with the depressed part of the conductor, substantially as set forth.

9. A sliding contact-shoe composed of harder and softer metals alternately disposed and exposed at its contact-face, substantially as set forth.

10. A sliding contact-shoe comprising harder and softer metals alternately disposed on its upper and lower faces, substantially as set forth.

11. A sliding contact-shoe composed of harder and softer metals alternately disposed, the harder metals being arranged obliquely to the longitudinal axis of the shoe and exposed on its contact-face, substantially as set forth.

12. A sliding contact-shoe having oppositely-disposed contact-faces, a vertically-movable shoe-support and means for holding the vertically-movable support under pressure to force the shoe into engaging contact both upwardly and downwardly, substantially as set forth.

13. A sliding contact-shoe, a plurality of rods for supporting the shoe, each rod being provided with a spring, a support and means interposed between the support and the spring and rod for holding the shoe under the pressure of the spring in each of two opposite directions, substantially as set forth.

14. A sliding contact-shoe support comprising a primary support, a rod connected with the shoe free to move relatively to said support, a spring surrounding the rod, washers located intermediate of the spring and the primary support at the opposite ends of the spring and free to move relatively to the rod, and adjustable stops on the rod forming abutments for the washers but free to move relatively to the primary support, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 17th day of June, 1901.

CHAS. M. HOBBS.

Witnesses:
HAROLD P. BROWN,
EDW. C. SEWARD.