(No Model.) 2 Sheets—Sheet 1.

J. J. GREEN.

CONTACT BAR FOR ELECTRIC LOCOMOTIVES.

No. 522,710. Patented July 10, 1894.

Fig. 1.

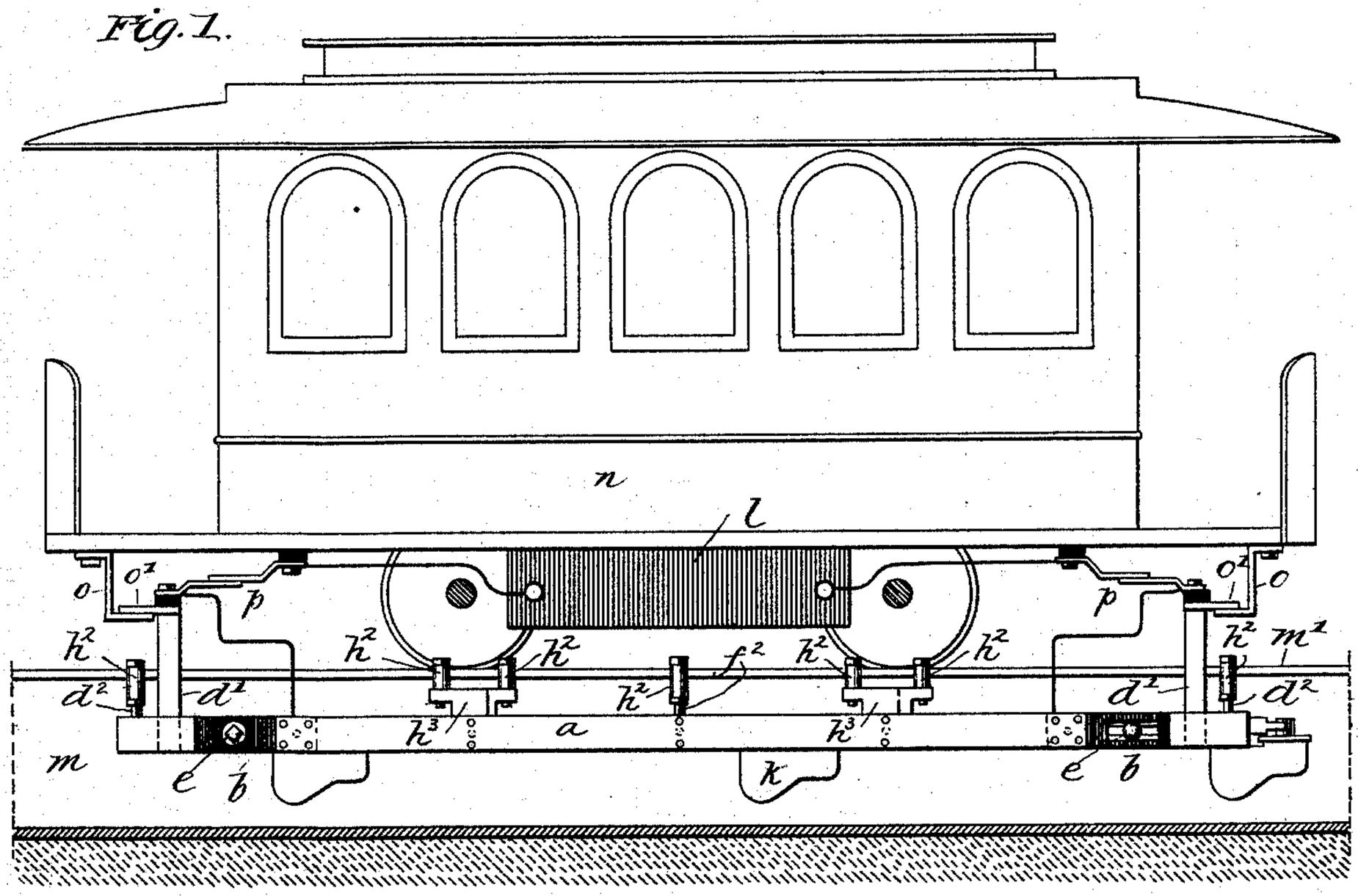
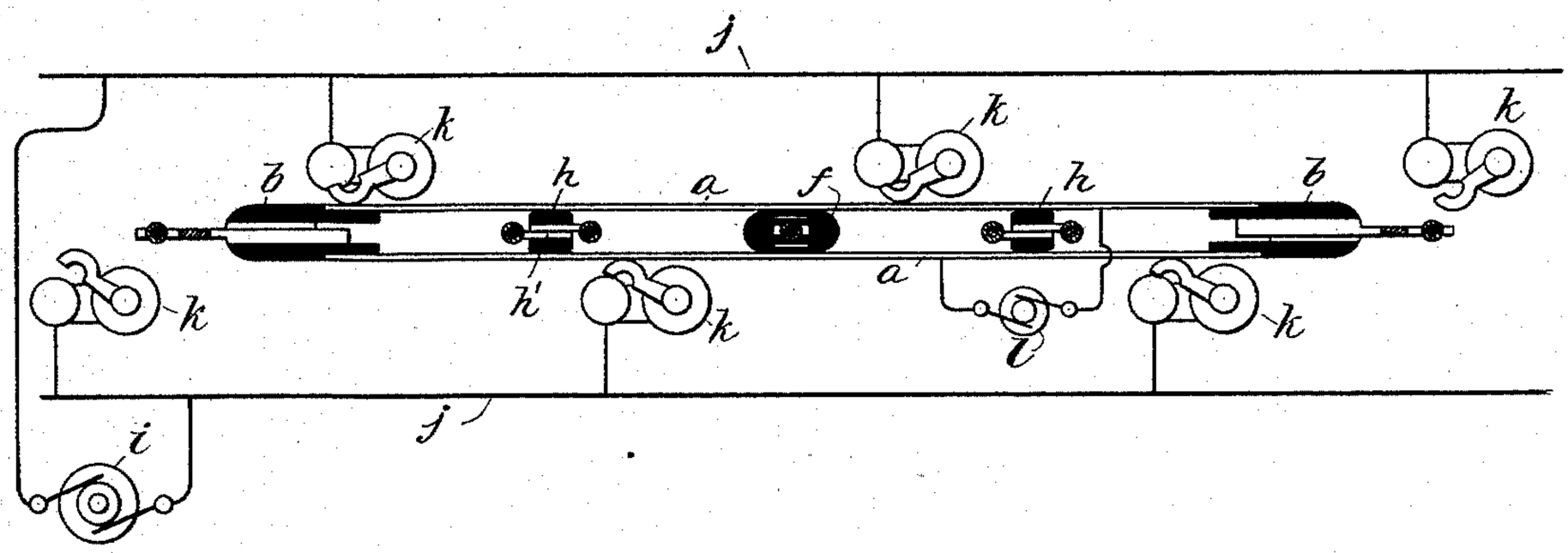


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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CONTACT BAR FOR ELECTRIC LOCOMOTIVES.

No. 522,710. Patented July 10, 1894.

Fig. 3.

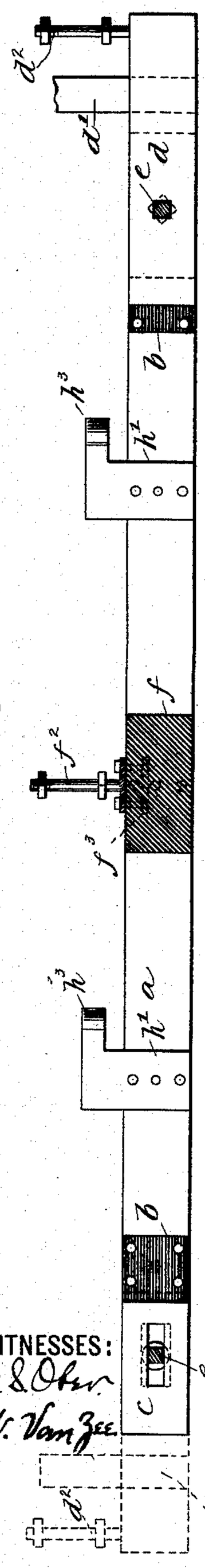

Fig. 4.

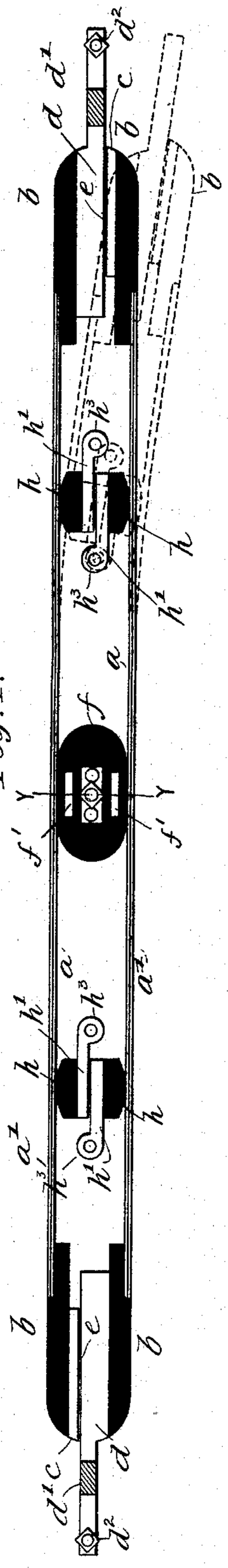

Fig. 6.

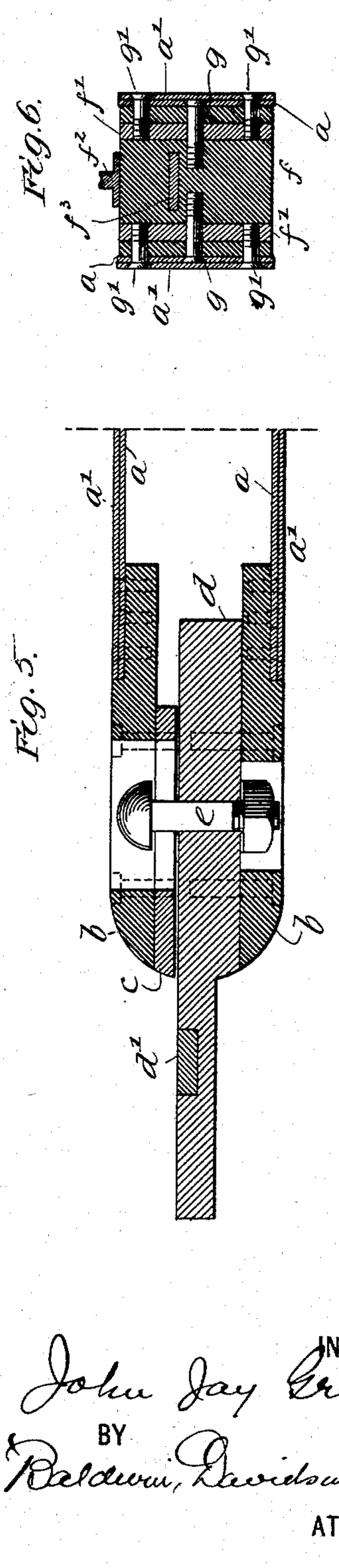

Fig. 5.

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UNITED STATES PATENT OFFICE.

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CONTACT-BAR FOR ELECTRIC LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 522,710, dated July 10, 1894.

Application filed October 9, 1893. Serial No. 487,637. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAY GREEN, a citizen of the United States, residing at Boonton, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

This invention consists of an improved form of contact shoe for electric motor cars which derive their current from electric lines and contact boxes located in a conduit; and it has for its object to so construct the contact shoe that it shall be freely flexible throughout its length to allow it to readily conform to the curvatures of the conduit, be firmly guided and controlled by the slot of the conduit, and be simple, strong and not liable to get out of order. This shoe consists chiefly of two contact plates held parallel by spacing pieces at intervals without any longitudinal bar or supporting piece between them so that said plates only have to be bent when the shoe is passing curves in the conduit, the spacing pieces or blocks and the rigid and sliding connections being so arranged as to insure the contact strips curving regularly and maintaining parallelism.

The construction will be clearly understood by the following description of the drawings.

Figure 1 is a side elevation of my improved shoe in operative position in a conduit and attached to a motor car. Fig. 2 is a plan view of the shoe showing the electrical connections. Fig. 3 is a longitudinal sectional elevation on an enlarged scale. Fig. 4 is a plan view of the shoe. Fig. 5 is a horizontal section of one end of the shoe, and Fig. 6 is a transverse section on the line Y Y.

The two side strips comprise the main portion of the shoe, and are solely depended upon for longitudinal strength and stiffness. They are each preferably composed of two pieces of metal, the inner pieces *a a*, which are permanent and constitute the body, and the outer pieces *a' a'*, which are subjected to the wear of the contact brushes or plates and which are arranged to be readily removed and replaced by new ones when worn out. To the ends of the strips *a a'* are secured by means of screws or rivets the pieces of insulating material *b b* rounded at their outer ends and having secured to their inner faces the plates of metal *c c* and *d d*. The plate *c* at one end of each of the strips lies against the plate *d* at the adjacent end of the other strip, and these plates *c* and *d* are connected and held together by means of bolts *e*, each of which fits snugly in the plate *d* but passes freely through a slot formed through the plate *c* thus admitting of a sliding action between the plates. The heads and nuts of these bolts *e* are within the surface of the insulating pieces *b b*, which are slotted to receive them as shown at Fig. 5.

Bars *d' d'* project upwardly from the pieces *d d* and it is by means of these bars that the shoe is supported in the conduit. At the center of the shoe between the strips *a a* is placed the spacing block of insulating material *f*, and to this block both strips are permanently secured, and this is the only place throughout their length where they are held together, as regards longitudinal movements. The manner in which the strips are connected to this block *f*, without electrical connection between them is clearly shown at Fig. 6, in which *f' f'* represent plates of metal let into the block; *g g* screws passing through the inner strips *a a* and the plates *f' f'*, to hold these strips firmly on the block *f*, and *g' g'* screws tapped into the plates *f' f'* for holding the outer wearing strips *a' a'*. Connected to the contact strips between block *f* and end plates *b b* are other spacing blocks each being composed of a piece of insulating material *h*, adjacent to the strips *a*, and a metallic rubbing plate *h'* which with the pieces *h h* are secured to the strips *a*, but in no way are the plates *h' h'* connected together, their adjacent faces merely rubbing on one another when the shoe is bent, as do the adjacent faces of the plates *c* and *d*, as shown by the dotted lines in Fig. 4 which represent one half of the shoe in the position it assumes when passing around a curve in the conduit.

To cause the shoe to follow the curves correctly, guide rollers h^2 h^2 are fitted on studs projecting from the plates *h' h'*, which have overhanging arms h^3 h^3 to receive them, as well as on studs d^2 d^2 projecting upwardly from the end plates *d d*, and on stud f^2 on the

central block *f*. All of these rollers h^2 h^2 work in the slot of the conduit and insure the two contact strips assuming the proper curvature, and as there is no longitudinal central bar to be bent, but only the resistance to flexure of the contact strips to be overcome, these rollers are called upon to perform but little work.

The stud f^2 is fastened to the top of the block *f* by means of bolts which pass through the upper part of the block and screw into the nut plate f^3 embedded therein, as shown at Figs. 3 and 6.

Of course it will be understood that the contact strips may be made of one piece instead of two pieces of metal, but the construction shown is advantageous, for in making renewals of the wearing surfaces, the main structure is not disturbed.

In the diagram view Fig. 2, the electrical connections of a system in which this contact shoe can be used are shown, *i* representing the dynamo; *j j* the conductors; *k k*, the contact boxes located at intervals so that each of the contact strips of the shoe is always in contact with two of the contact switches of the boxes; and *l* the motor carried by the car, to which the shoe is attached. In Fig. 1, *m* represents the conduit; *m'* the slot thereof, *n* a car to the under side of which the motor is secured. The manner in which the shoe is attached to the car is also shown here, the car is provided with the bracket bearers *o o*, on which rest the bearing plates *o' o'* secured to the top of the bars *d' d'*. These plates *o' o'* are fastened with insulating connections to the springs *p p*, and these springs are connected electrically with the terminals of the motor, and the springs *p p* are connected each one to one of the contact plates of the shoe. This construction admits of the car being displaced either by accident or design, without disturbing or injuring the shoe, which by reason of its releasing connections will remain in position in the conduit, under such circumstances.

I claim as my invention—

1. A contact shoe for electric railways consisting mainly of flexible side strips connected together at or near their ends by loose or sliding connections and rigidly connected at or near the middle.

2. A contact shoe for electric railways, consisting mainly of flexible side strips connected together at or near their ends by loose or sliding connections and rigidly at or near the middle, and spacing blocks with sliding faces located between the ends and central connections.

3. A contact shoe for electric railways, consisting mainly of flexible side strips connected together at or near their ends by loose or sliding connections and rigidly at or near the middle, said connections being provided with guide rollers adapted to work in the slot of a conduit.

4. A contact shoe for electric railways, consisting mainly of flexible side strips connected together at or near their ends by loose or sliding connections and rigidly at or near the middle, spacing blocks with sliding faces located between the ends and central connections, said connections and spacing blocks being provided with guide rollers adapted to work in the slot of a conduit.

5. A contact shoe for electric railways, consisting of two flexible side strips, an insulated suspending bar at one end of each, sliding connections between the suspending bar of each strip and the adjacent end of the other strip, and a central insulating spacing block to which the strips at their middle parts are rigidly connected.

6. A contact shoe for electric railways, consisting of two flexible side strips, an insulated suspending bar at one end of each, sliding connections between the suspending bar of each strip and the adjacent end of the other strip, a central insulating spacing block to which the strips at their middle parts are rigidly connected, and an insulated piece and sliding plate secured to each of the strips about midway between the suspending bars and the central block.

7. A contact shoe for electric railways, consisting of two flexible side strips, an insulated suspending bar at one end of each, sliding connections between the suspending bar of each strip and the adjacent end of the other strip, a central insulating spacing block to which the strips at their middle parts are rigidly connected, an insulated piece and sliding plate secured to each of the strips about midway between the suspending bars and the central block, and a guide roller at each end of the shoe, at the central part, and on each of the sliding plates.

8. The combination in a shoe for electric railways, of two contact strips, an insulating block rigidly connected to the strips midway between their ends, an insulating piece connected with the strips at the opposite ends thereof, pieces of insulating material arranged between the middle insulating piece and the end insulating pieces, sliding plates on the end pieces and also on the intermediate pieces between the end pieces and the central block and sliding connections between the sliding plates at the ends of the shoe.

9. A contact shoe for electric railways, consisting of two flexible side strips, an insulated suspending bar at one end of each, sliding connections between the suspending bar of each strip and the adjacent end of the other strip, a central insulating spacing block to which the strips at their middle parts are rigidly connected, in combination with an electric motor car, and bearing or supporting brackets carried thereby.

10. A contact shoe for electric railways, consisting of two flexible side strips, an insulating suspending bar at one end of each, sliding connections between the suspending bar of each strip and the adjacent end of the other

strip, a central insulating spacing block to which the strips at their middle parts are rigidly connected, in combination with an electric motor car, bearing or supporting brackets carried thereby, an electric conduit, and contact boxes arranged within the conduit at intervals.

In testimony whereof I have hereunto subscribed my name.

JOHN JAY GREEN.

Witnesses:
FRANK S. OBER,
ALFRED W. VAN ZEE.