(No Model.) 2 Sheets—Sheet 1.

J. J. GREEN.

CONTACT SHOE FOR ELECTRIC LOCOMOTIVES.

No. 522,709. Patented July 10, 1894.

Fig. 1.

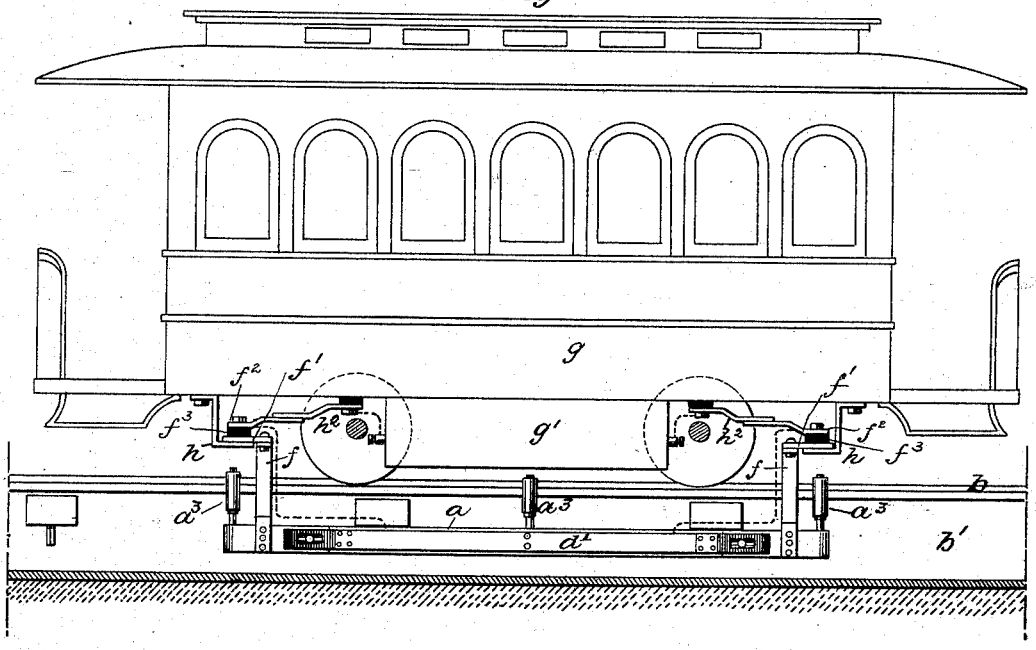
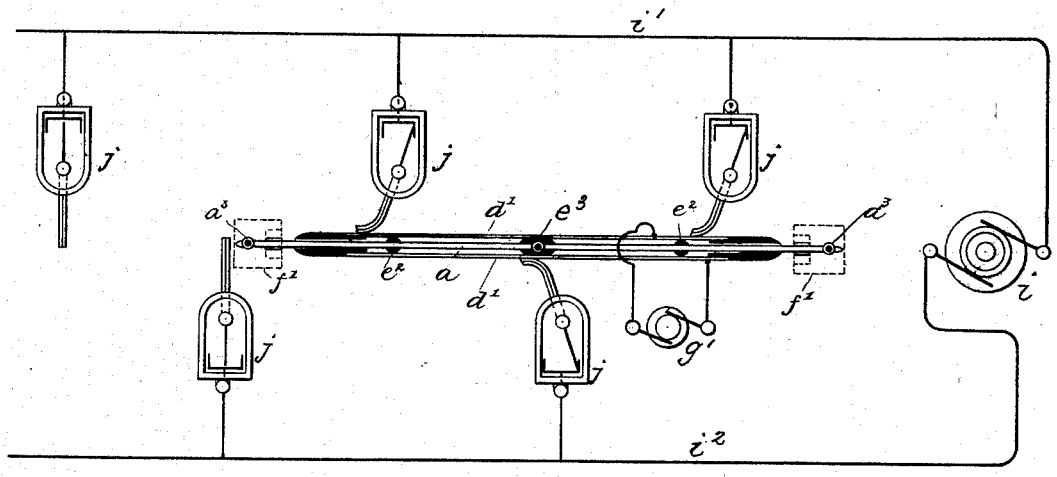


Fig. 2.



WITNESSES:

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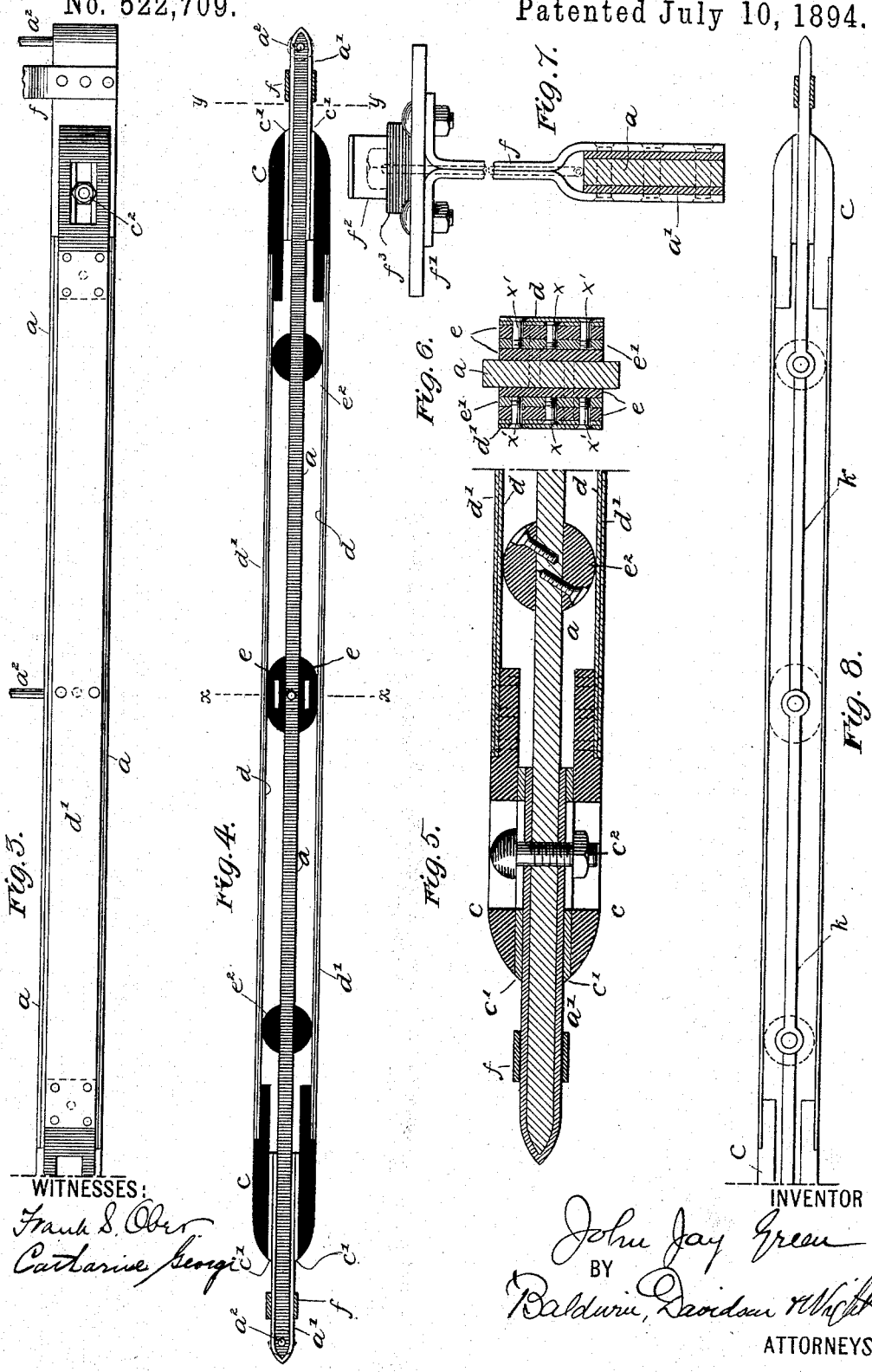

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UNITED STATES PATENT OFFICE.

JOHN JAY GREEN, OF BOONTON, NEW JERSEY, ASSIGNOR TO THE UNIVERSAL ELECTRIC COMPANY, OF NEW YORK, N. Y.

CONTACT-SHOE FOR ELECTRIC LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 522,709, dated July 10, 1894.

Application filed July 5, 1893. Serial No. 479,576. (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.

My invention relates to that class of electric railways in which a contact shoe or current collector carried by the motor car runs in a conduit between the tracks and effects the completion of the circuit through the motor on the car by acting upon contact devices arranged within the conduit.

The object of my invention is to provide an improved contact shoe or current collector that 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 which, at the same time, shall be simple, strong and durable.

My improved contact shoe comprises a flexible or yielding central bar, flexible metallic side strips and end pieces of insulating material loosely attached to the central bar and the side strips.

The invention also embodies novel features of construction, whereby the shoe is left in the conduit without injury thereto should the car, from any cause, become derailed. All of which will be fully hereinafter described by reference had to the accompanying drawings, in which—

Figure 1 represents a motor car with my improved shoe applied thereto, also part of an electric conduit. Fig. 2 is a diagram plan, showing the shoe, the electric conductors and contact boxes. Fig. 3 is a part side elevation of the shoes. Fig. 4 is a plan of the shoe. Fig. 5 is an enlarged sectional view of one end of the shoe. Fig. 6 is an enlarged transverse section on the line $x\ x$, Fig. 4. Fig. 7 is an enlarged, transverse section on the line y—y of Fig. 4, and Fig. 8 is a plan view of a modification.

The main brace or central bar a of the shoe is made of wood or other suitable material of an insulating character, and is sheathed on its ends with plates of metal $a'\ a'$. At its extreme ends and central part it is provided with studs $a^2\ a^2$, projecting upwardly, which carry the rollers $a^3\ a^3$, arranged to move and work in the slot b of the conduit b', and thereby cause the bar a and other parts of the shoe carried thereby to follow the slot on curves and maintain centralism with the conduit.

Pieces of insulating material $c\ c$, as hard vulcanized rubber, provided with friction plates $c'\ c'$ are attached to the bar a at each end and side thereof against the metal plates $a'\ a'$, bolts and nuts $c^2\ c^2$ being used for this purpose, which fit snugly in holes in the bar a and pass through slots formed in the insulating pieces $c\ c$ and the friction plates $c'\ c'$. The heads and nuts of these bolts are arranged so as not to project beyond the surface of the pieces $c\ c$.

To the two insulating pieces $c\ c$ on each side of the bar a are secured by screws the two strips of metal d and d', the interior ones $d\ d$ being so fastened independently of the outside strips $d'\ d'$, as to be permanently held in place, and the outside strips are secured by other screws, so as to be readily removed and replaced by new strips when worn out.

At the center at each side of the bar a is placed a block of insulating material $e\ e$, secured, if desired, to the bar a by the screws shown by dotted lines in Fig. 6, and to these blocks $e\ e$ the inside strips of metal are fastened by the middle screws x, and the outside contact strips $d'\ d'$ by the other screws x', as shown at Fig. 6, pieces of metal $e'\ e'$ being placed or embedded in the blocks $e\ e$ to act as nuts for all of these screws. Between the end insulating pieces $c\ c$ and the blocks $e\ e$ are placed the insulating bearing pieces or blocks $e^2\ e^2$ secured to the central flexible bar a by screws, as shown at Fig. 5.

The bar a may be made in two pieces and fastened together in any suitable way at the center, where they are secured to the block e^3 as shown in Fig. 2. The stud for the central guide roller a^3 may be secured in any suitable way to the block.

Secured to the central bar a near its ends are the carrying arms or bars $f\ f$ which extend upwardly through the slot of the conduit, and to the upper ends of these arms or bars are fastened the bearing plates $f'\ f'$

having secured to them the contact springs f^2 f^2 with interposing blocks of insulating material f^3 f^3. Each of the springs f^2 f^2 is connected to one of the contact strips d d' of the shoe as shown by dotted lines.

The car g carrying the motor g' is provided with bracket bearing plates h h upon which the bearing plates f' f' rest, and insulated arms or springs h^2 h^2 against which the springs f^2 f^2 bear; said arms or springs h^2 h^2 being connected to the terminals of the motor g', as shown at Fig. 1. The bearing plates h h have considerable area, as shown by the dotted lines in Fig. 2, thus admitting of the necessary amount of movement between the car body and the shoe, which is held in the conduit, during the normal working of the car, but this construction of car and shoe connection is such that when the car, from any cause, moves abnormally in relation to the track or becomes derailed, the connection between the car and shoe becomes broken, without injury to the shoe, leaving it in the conduit.

The manner in which the shoe operates is clearly shown at Fig. 2, in which i represents the electric generator, i' i^2 the lines therefrom, and j j the contact boxes, which may be of any suitable construction, so spaced and arranged in the conduit that the contact plates or strips d' d' before they leave or get clear of a contact box j, make contact with the succeeding one.

In the modification shown at Fig. 8, the flexible central wooden bar is substituted by a metal bar k, composed of sections which may be pivotally connected or joined at their adjacent ends; the pieces of insulating material c c, to which are secured the contact strips d d', being attached thereto, so as to slide thereon, when passing curves as before described.

The sliding connection between the central bar and the flexing side contact plates permits the shoe to readily conform to the curves of a conduit, and this action is facilitated and improved by securing the plates to the middle block e.

I claim as my invention—

1. A contact shoe for electric railways consisting of separate end pieces, side strips of flexible metal secured thereto, and a flexible or yielding central bar to which the insulated end pieces are loosely attached.

2. A contact shoe for an electric railway consisting of an elongated, central, yielding, flexible portion, and an elongated side contact plate carried by the central portion, and flexible laterally relatively thereto, said contact plate having a continuous or unbroken face, substantially as described.

3. A contact shoe for electric railways consisting of an elongated centrally yielding or flexible portion and an elongated flexible side contact plate carried thereby, the two being connected at or near the ends by loose or sliding connections, and rigidly connected at or near the middle portions of the plate, the plate between the ends and the middle, being out of contact with the central portion of the shoe.

4. A contact shoe for an electric railway, consisting of a central yielding or flexible bar, insulated end pieces connected therewith by sliding joints, flexible side contact plates connected with the end pieces, a central block of insulating material to which both the central bar and side contact plates are secured, and a block of insulating material secured to the central bar between each end and the central block.

5. The combination of an electric motor car, a contact shoe having a central bar or body portion and flexible side strips, an electric conduit below the top of which the shoe is arranged, studs or bars connected to the body portion of the shoe, and rollers carried by the studs and adapted to move in the slot of the conduit.

6. The combination of an electric motor car, bracketed bearing plates carried thereby, the contact shoe provided with upwardly extending bars, and bearing plates, and contact springs carried by these bars.

7. The combination of an electric motor car, bearing or shoe supporting plates carried thereby, and a contact shoe provided with upwardly extending suspending bars and bearing plates, substantially as and for the purpose set forth.

8. In a shoe for electric railways, the combination of the flexible central bar, pieces of insulating material attached to its sides at its ends free to slide thereon, and contact strips secured at their ends to the pieces of insulating material.

9. In a shoe for electric railways, the combination of the flexible central bar, pieces of insulating material attached to its sides at its ends free to slide thereon, contact strips secured at their ends to the pieces of insulating material, and intermediate blocks of insulating material between the central bar and the contact strips.

10. The combination of an electric motor car, an electric conduit, a contact shoe carried by the car, and consisting of a central body portion and flexible side contact strips, hangers secured to the car, supports detachably connected with the hangers and secured to the central body portion of the shoe, studs or bars mounted on the body portion of the shoe, and rollers carried by these studs and adapted to move in the slot of the conduit.

11. The combination of a car and an electric motor carried thereby, insulated plates or springs, connected to the terminals of the motor, bearing plates attached to the bottom of the car, a conduit, a contact shoe having arms projecting upwardly through the slot of the conduit, bearing plates at the upper ends of the arms, and insulated springs on these bearing plates, two contact strips secured to the shoe, said strips being electrically connected to the insulated springs.

12. The combination of a motor car, an electric conduit, contact boxes arranged within the conduit at intervals, and a flexible contact shoe within the conduit carried by the car and adapted to conform to the curves of the conduit, the shoe having a body portion flexible from end to end and having on one or more sides a contact plate flexible laterally relatively to the body portion and having a continuous or unbroken face which works against the switch arms of the contact boxes.

13. The combination of a motor car, an electric conduit, a contact shoe in the conduit, sliding connections between the shoe and the car, whereby the shoe is supported on the car, and contacts connected with the shoe and having a sliding connection with contacts carried by the car.

In testimony whereof I have hereunto subscribed my name.

JOHN JAY GREEN.

Witnesses:

FRANK S. OBER,

EDWARD C. DAVIDSON.