

No. 869,465.

PATENTED OCT. 29, 1907.

S. B. STEWART, JR.  
THIRD RAIL CONTACT SHOE.  
APPLICATION FILED JULY 5, 1902.

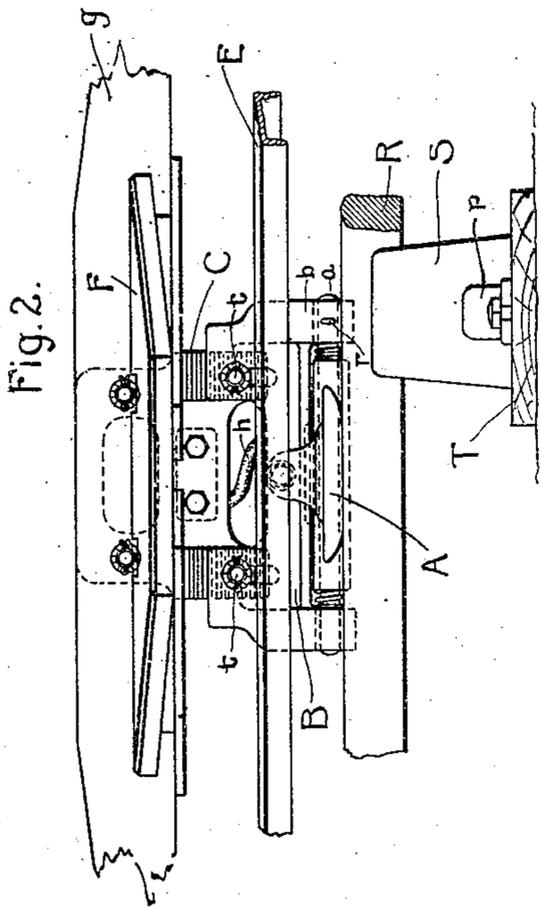


Fig. 2.

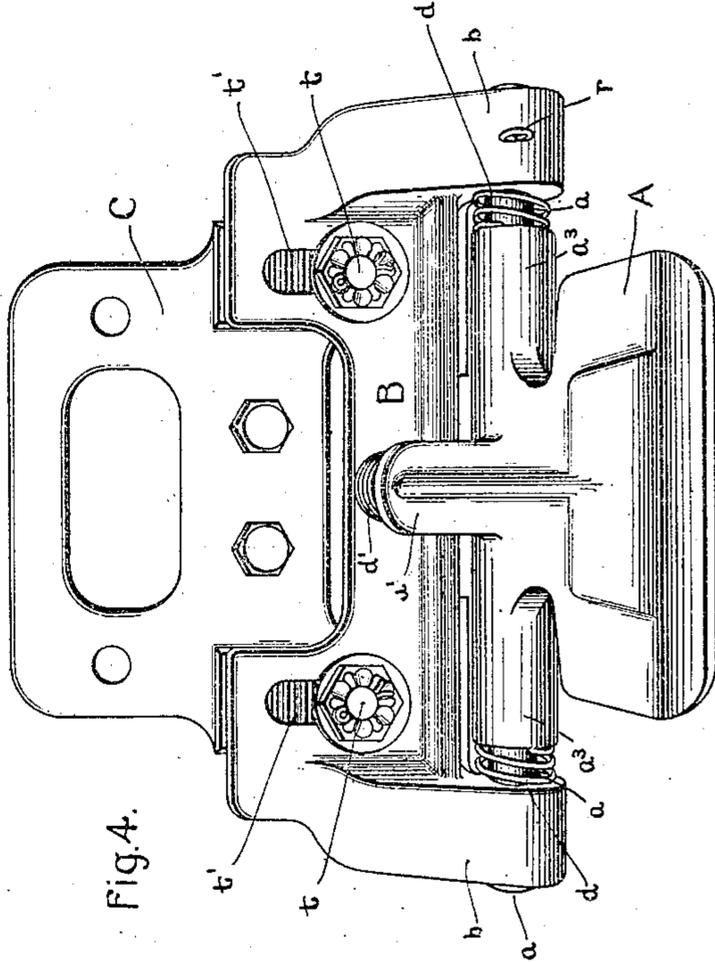


Fig. 4.

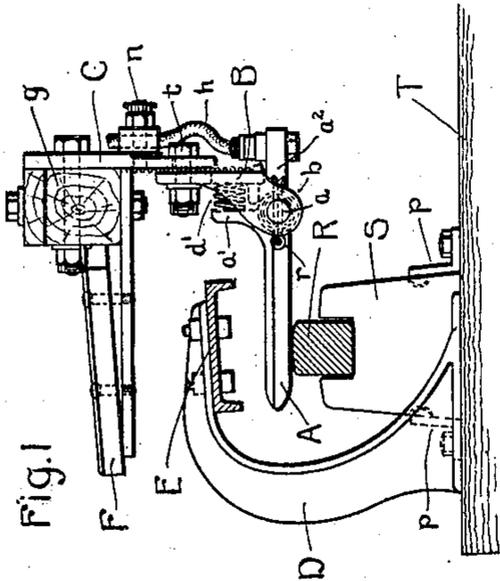


Fig. 1.

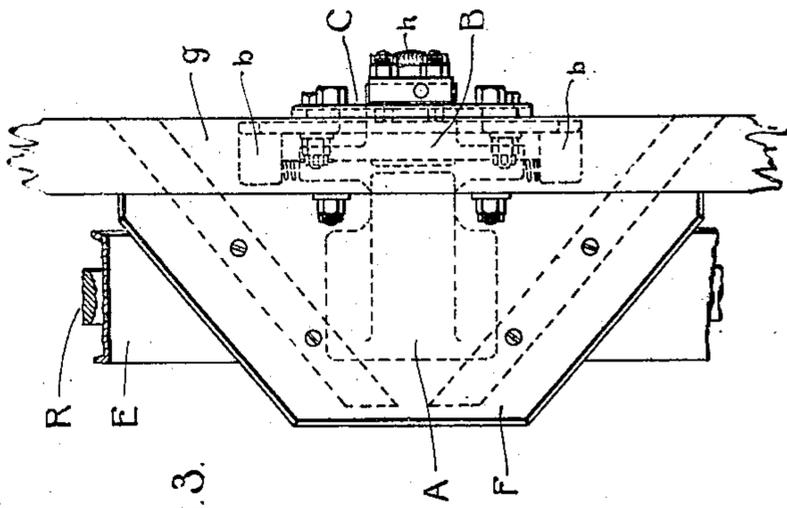


Fig. 3.

Witnesses.  
J. Ellis Klein.  
Helen Orford

Inventor.  
Samuel B. Stewart, Jr.  
by *Allen S. Davis*  
Atty.

# UNITED STATES PATENT OFFICE.

SAMUEL B. STEWART, JR., OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## THIRD-RAIL CONTACT-SHOE.

No. 869,465.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed July 5, 1902. Serial No. 114,342.

*To all whom it may concern:*

Be it known that I, SAMUEL B. STEWART, Jr., a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have  
5 invented certain new and useful Improvements in Third-Rail Contact-Shoes, of which the following is a specification.

My invention relates to improvements in electric railways of the type employing a third-rail conductor  
10 arranged parallel to the track rails and a collector or contact-shoe carried by the car which is adapted to contact with the upper surface of said third-rail.

The invention relates more particularly to improvements in the construction of the contact-shoe carried by  
15 the car.

The object of my invention is to provide an efficient collector or contact-shoe which is adapted to operate in connection with a protected third-rail having a small clearance between the top of the rail and the protecting  
20 strip or guard for the same, which will not be affected by slight irregularities of the rail or small obstructions thereon, and which will be capable of use in a number of systems in which the height of the third-rail above the road-bed varies greatly.

In the accompanying drawings, Figure 1 is a side elevation of the collector-shoe carried by the car, showing its position relative to the third-rail and guard therefor, the latter being shown in section; Figs. 2 and 3 are respectively front elevation and plan view of the same;  
30 Fig. 4 is a perspective view of the collector-shoe and supporting-frame therefor detached from the car.

Referring now to the drawings, A represents a thin, flat collector or contact shoe having a small moment of inertia, pivoted in the supporting frame B, which in turn  
35 is adjustably mounted on a hanger C rigidly attached to the beam *g* mounted on the car truck. The third-rail conductor is represented by R, and is supported in a series of insulating supporting blocks S, which are fastened to the cross-ties in any suitable manner, as, for  
40 instance, by means of the angle irons *p* shown in Fig. 1. A suitable guard which is here shown as formed of a strip E supported from the cross-ties T by a series of bracket-arms D acts as a protector for the third-rail. The specific form of third-rail supporting insulator and  
45 third-rail guard are merely shown herein to more clearly illustrate the operation of my improved collector-shoe but form no part of the present invention, and are not claimed herein since they form the subject-matter of two applications filed contemporaneously herewith,  
50 Potter, Serial No. 114,328, and Stewart, Serial No. 114,343.

Returning now to the specific construction of the collector shoe and supporting frame therefor, the supporting frame B has formed thereon projecting lugs *b*, which  
55 carry the shaft *a*. The shaft *a* is held in place by the

pin *r*. The collector-shoe A has formed integral therewith a sleeve *a*<sup>3</sup> which is pivotally and slidably mounted on the shaft *a*, thereby allowing a movement of said shoe relative to the supporting frame in a direction perpendicular to and also in a direction parallel to the  
60 third-rail, or, in other words, in a horizontal plane. Projecting upwardly from the sleeve *a*<sup>3</sup> is a lug *a*<sup>1</sup> between which and the supporting frame B is a spring *d*<sup>1</sup> which acts normally to force the shoe A downward so as to maintain it in contact with the third-rail. The collector-shoe is so constructed that it has a small moment  
65 of inertia and is made as thin as possible so that it will operate efficiently in a narrow slot in a third-rail housing or on a third-rail having a simple guard such as is shown in the figures of the drawing, said guard having a  
70 very small clearance between itself and the top of the third-rail.

The spring *d*<sup>1</sup> is made stiff enough to maintain the collector-shoe in good contact with the third-rail, and the shoe itself has such a small moment of inertia that  
75 it will ride over slight irregularities in the rail without jumping, where a gravity-pressed shoe or any shoe having a considerable moment of inertia would leave the rail. Buffer springs *d* are also provided between the ends of the sleeve *a*<sup>3</sup> and the lugs *b*, these springs  
80 serving to cushion the shoe against any blow delivered in a longitudinal direction. The downward movement of the collector shoe is limited by the lower edge of the supporting frame B against which the rearwardly projecting lug *a*<sup>2</sup> contacts when the shoe is not engaging  
85 the third-rail.

I have heretofore constructed and have shown in my application Serial No. 57,873, filed April 29, 1901, a thin, flat, horizontally-projecting collector-shoe yieldably supported and adapted for use where there is but  
90 a small clearance between the surface of the third-rail and the protecting guard, and I make no claim to such a construction broadly in this application. My present invention consists in so mounting such a shoe that it will not jump or leave the rail under any ordinary  
95 conditions to be met with in practice. By modifying the construction shown in my prior application above referred to so that the shoe will be positively held against the rail with a considerable pressure, I have succeeded in obtaining a shoe that will operate suc-  
100 cessfully under normal conditions where the irregularities in the surface of the third-rail are slight, but in case excessive irregularities are encountered the vertical component of the force acting on the shoe at the moment of impact will still be sufficient to cause the  
105 shoe to jump. In order to render the construction still more effective I have provided the springs *d* between the ends of the sleeve and the lugs which support the shaft on which the shoe is mounted. These springs permit a slight longitudinal movement of the  
110

shoe and thus reduce the force of the blow and consequently the force tending to cause the shoe to leave the rail. Such a yielding mounting also reduces the effect of the succession of hammer blows to which the shoe may be continuously subjected and which might result disastrously to the shoe if it were rigidly mounted.

It often becomes necessary to adjust the collector-shoe vertically relative to the car so as to accommodate it for use with the third-rails of different systems which vary considerably in their height above the road-bed or cross-ties and another feature of my invention consists in providing means for such adjustment. A hanger C, which is preferably supported from the journal-boxes, carries clamping bolts *t* which operate in slots *t'* in the supporting frame B. The engaging surfaces of the hanger C and the supporting frame B are roughened so as to more firmly hold the parts in position after they have been adjusted. To form a more perfect electrical circuit from the collector-shoe to the hanger a flexible conductor *h* is connected between the lugs *n* and *a*<sup>2</sup>, carried by the hanger and shoe respectively. A protecting shelf or guard F is fastened to the car truck a short distance above the third-rail to prevent contact therewith. The function of this guard is to prevent injury to persons or animals from contact with the collector-shoe, and also to protect the shoe itself from injury.

Although I have shown and described a specific means for supporting the collector-shoe, I do not intend to limit myself thereto, since many modifications may suggest themselves to persons skilled in the art which will not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,

1. In an electric railway, a third-rail conductor, a collector shoe having a broad flat contact face, a frame mounted upon a car, and means for yieldingly supporting said shoe upon said frame on an axis parallel to said rail for limited rotary and axial movements.

2. A collector shoe having a small movement of inertia,

a rigidly-supported frame carrying a shaft on which the shoe is pivotally mounted so as to allow a vertical movement, a spring for positively forcing said shoe into contact with the upper face of the rail, and buffer springs permitting a slight movement of said shoe in a direction parallel with said rail.

3. A collector shoe having a small movement of inertia, a rigidly supported frame in which the shoe is pivotally mounted so as to allow a vertical movement of the shoe, a spring for maintaining said shoe in contact with the third rail, and buffer springs permitting a slight movement of said shoe in a plane parallel to said rail.

4. In a third rail electric railway, a collector shoe yieldingly held against movement vertically and longitudinally and mounted on an axis parallel with the third rail with which the shoe is adapted to contact, a supporting frame for said shoe, a hanger carried by the car, means for adjusting said supporting frame on said hanger, and a flexible electrical conductor for connecting said shoe with said hanger.

5. In a third rail electric railway, a thin flat horizontally projecting collector shoe, a supporting frame in which said shoe is pivotally mounted, the pivot passing through the body of the shoe so as to give it a small movement of inertia, a spring for positively forcing said shoe downward into contact with the upper surface of the third rail, and means for permitting a slight movement of the shoe in a plane parallel with the rail.

6. In an electric railway, a collector shoe, and means for supporting said shoe on an axis parallel to the third rail and yieldingly holding it against rotary and axial movements.

7. In an electric railway, a collector shoe supported on an axis parallel to the third rail, and springs for yieldingly holding said shoe against rotary and axial movements.

8. In an electric railway, a collector shoe, a frame mounted upon a car for supporting said shoe on an axis parallel to the third rail, and means for yieldingly supporting said shoe upon said axis for limited rotary and axial movements.

9. In an electric railway, a collector shoe, a frame mounted upon a car for supporting said shoe on an axis parallel with the third rail, and springs yieldingly supporting said shoe for limited rotary and axial movements.

In witness whereof I have hereunto set my hand this first day of July, 1902.

SAMUEL B. STEWART, JR.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.