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PATENTED DEC. 26, 1905.

W. B. POTTER.

CONTACT SHOE FOR THIRD RAIL ELECTRIC RAILWAYS.

APPLICATION FILED JULY 25, 1903.

Fig. 5.

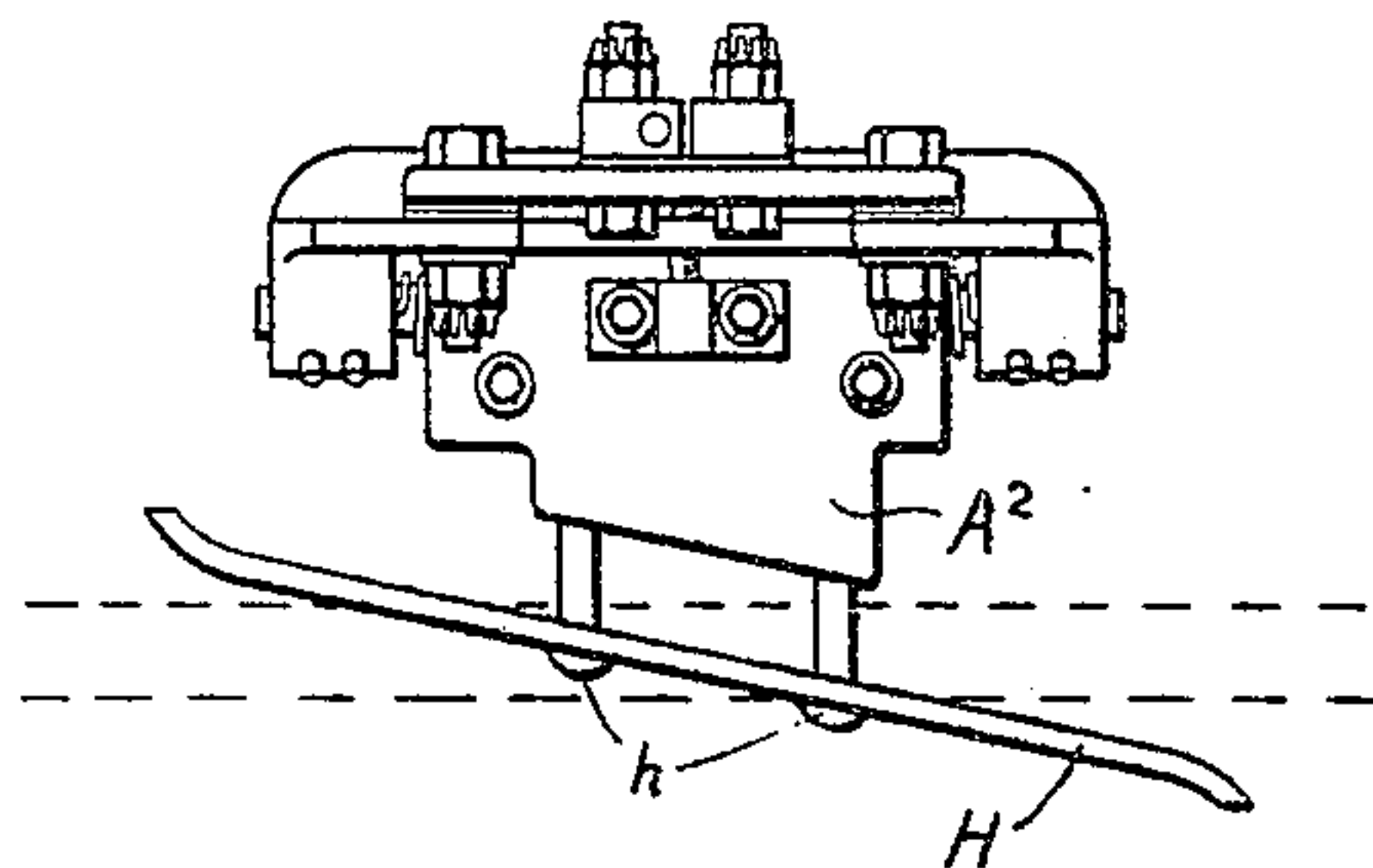


Fig. 6.

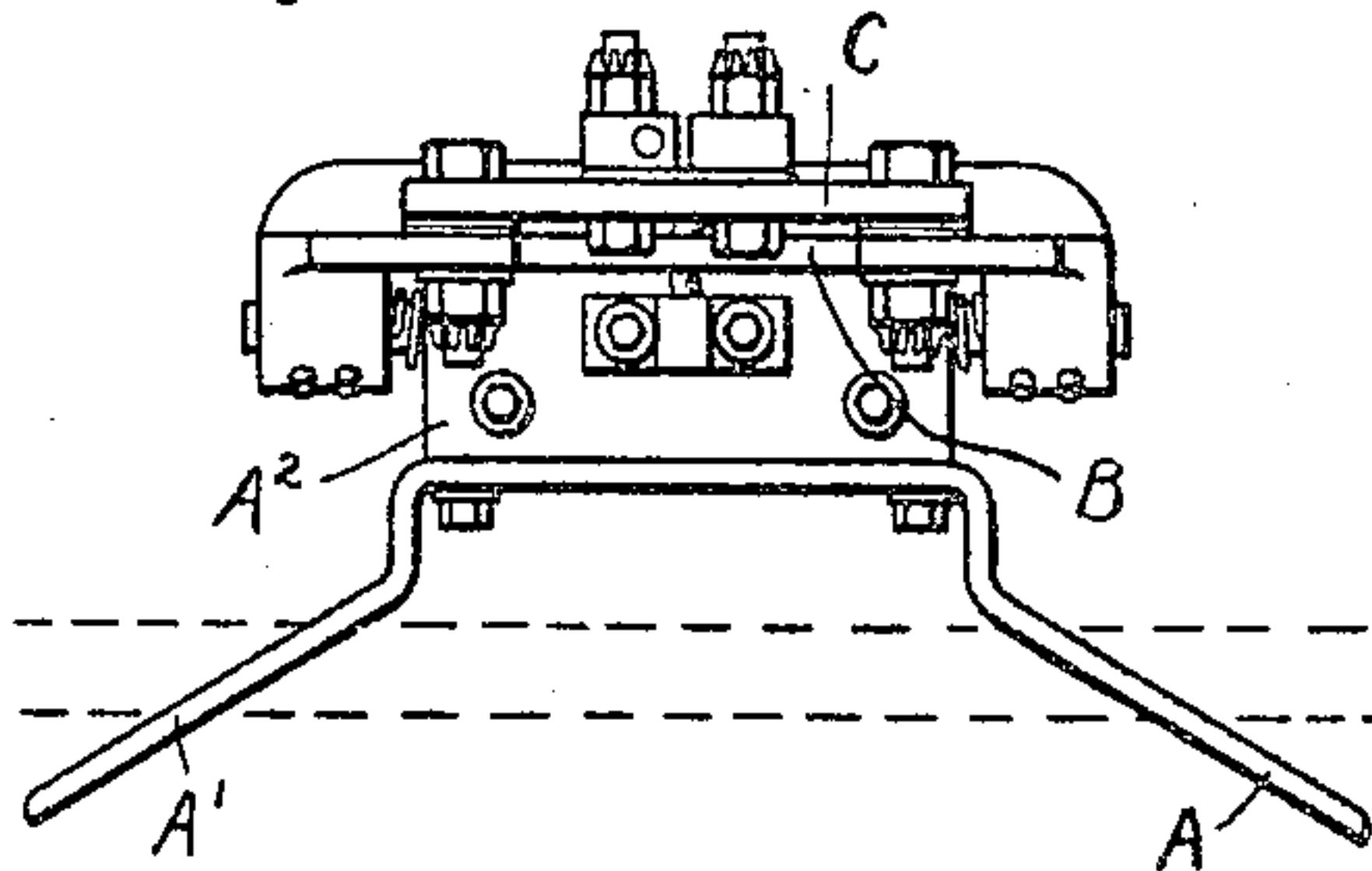


Fig. 3.

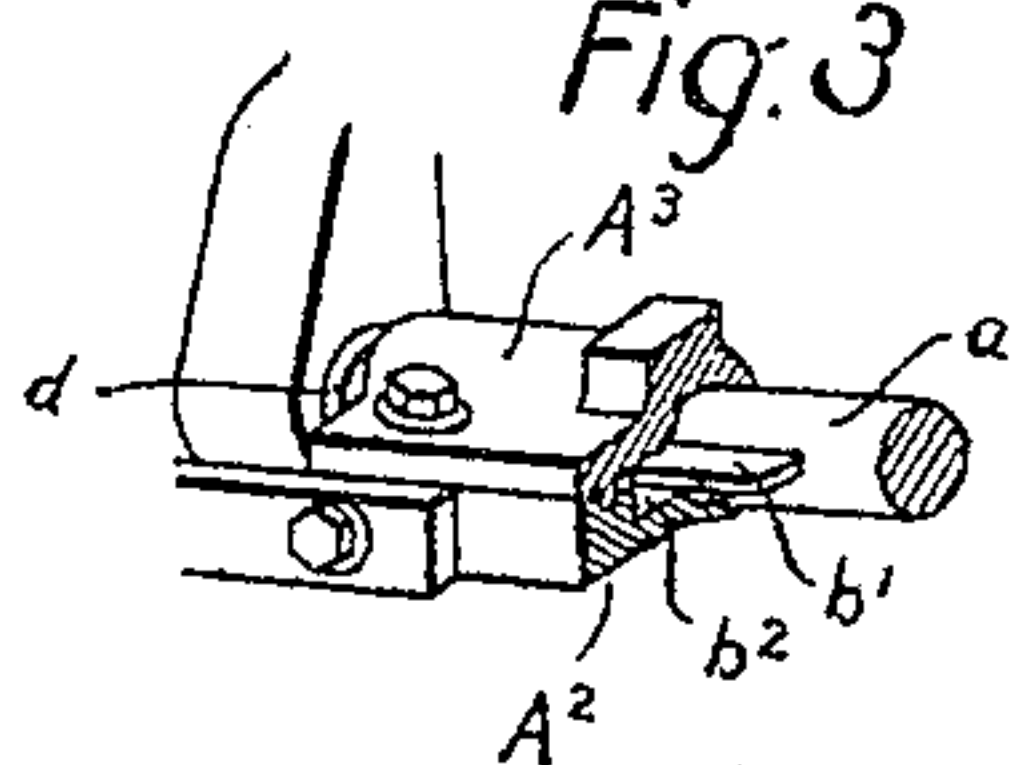


Fig. 4.

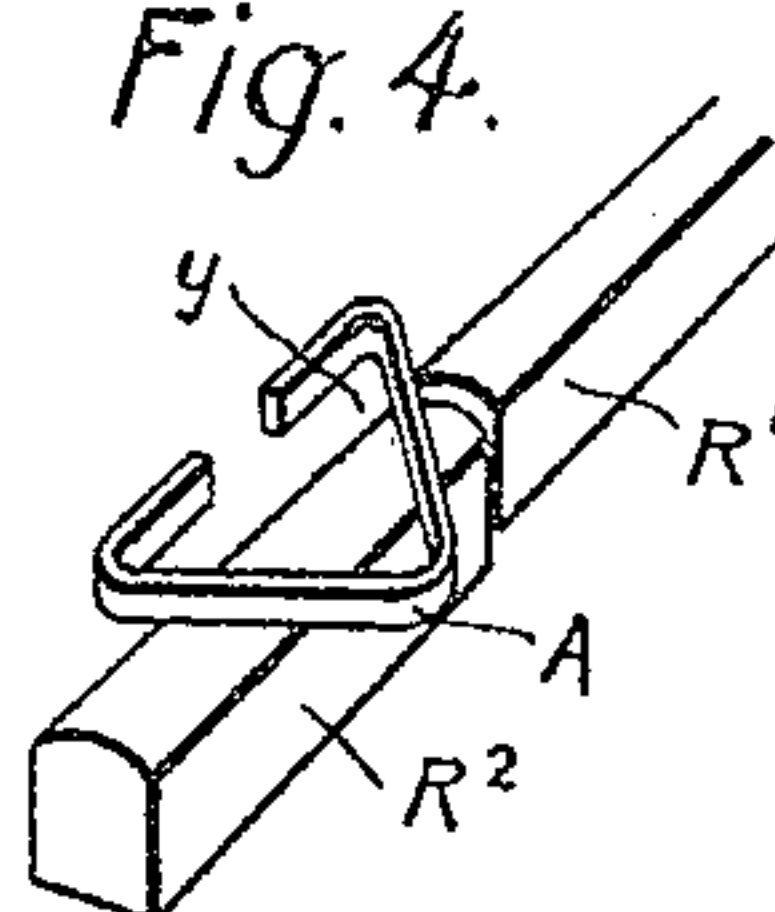


Fig. 1.

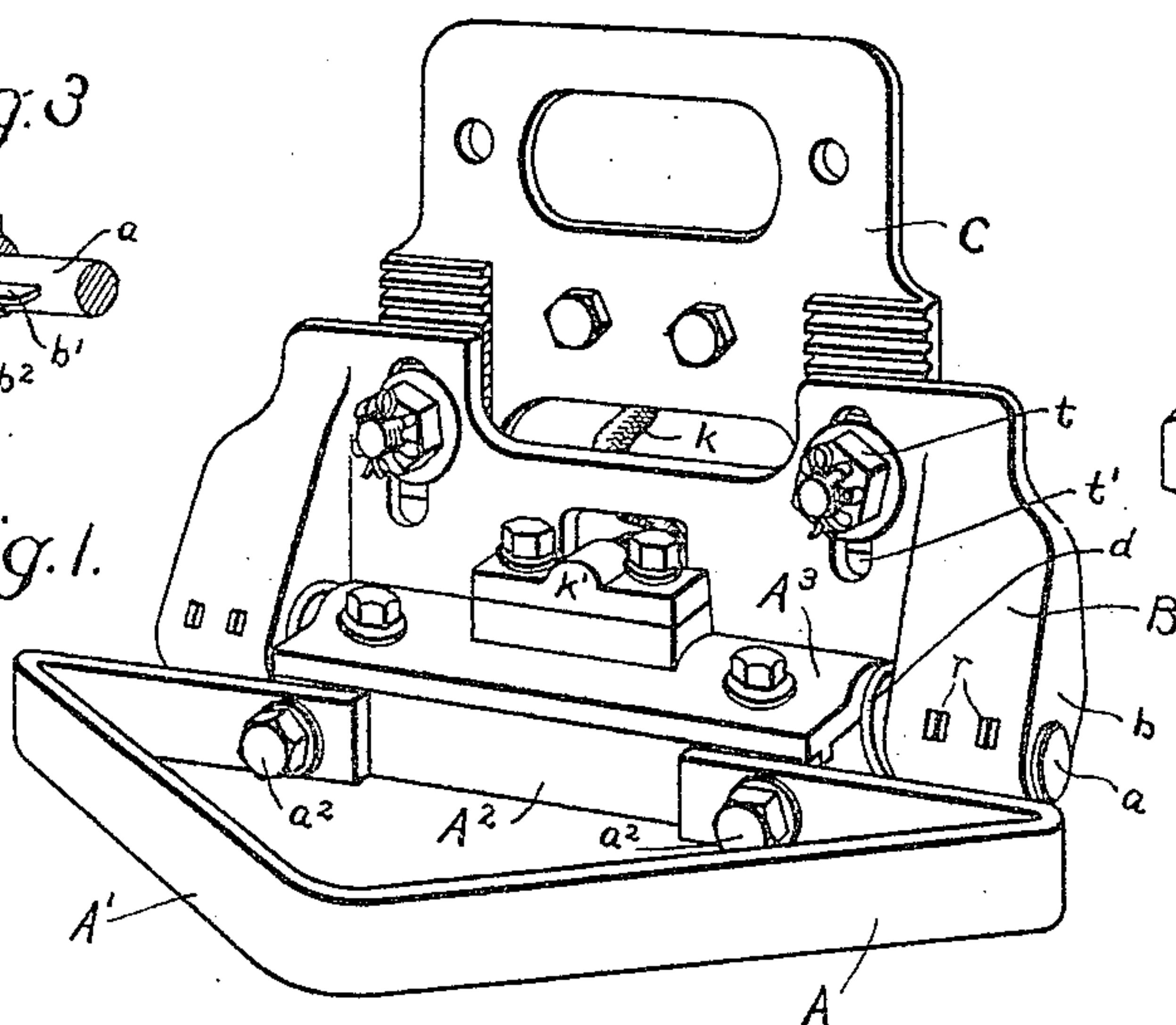
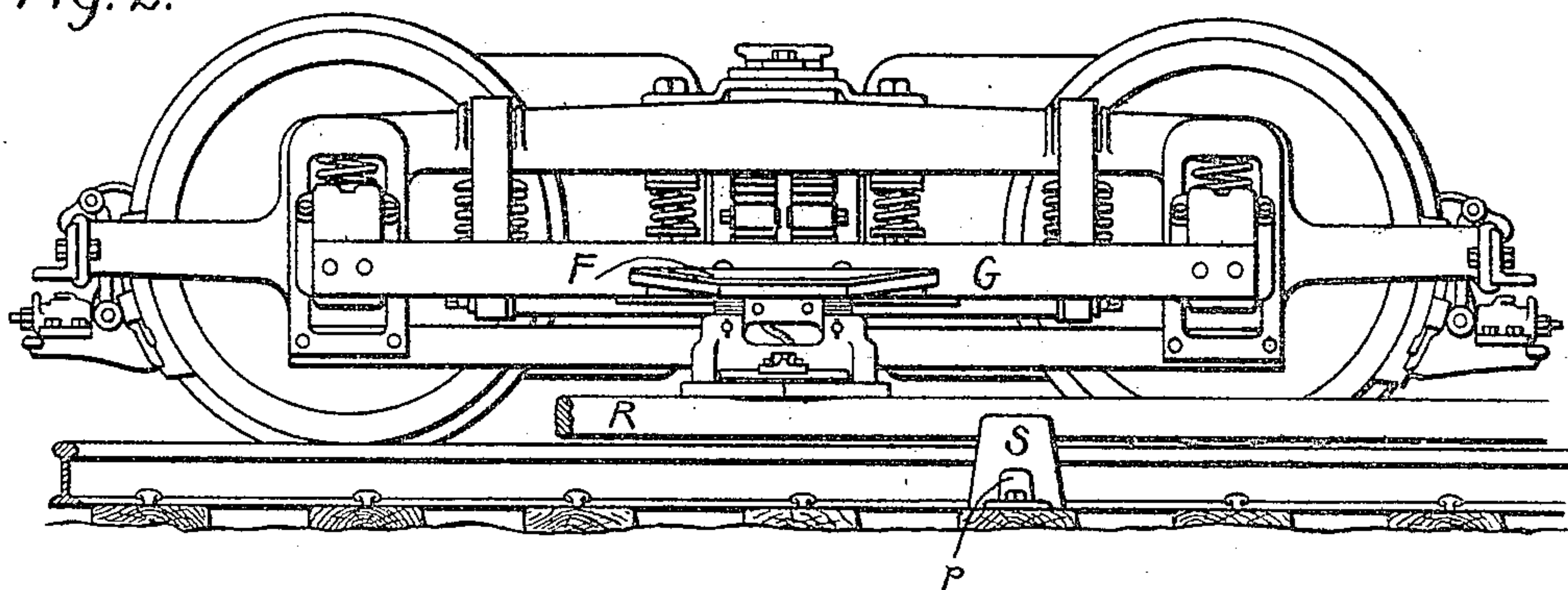


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM B. POTTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CONTACT-SHOE FOR THIRD-RAIL ELECTRIC RAILWAYS.

No. 808,213.

Specification of Letters Patent.

Patented Dec. 26, 1905.

Application filed July 25, 1903. Serial No. 167,000.

To all whom it may concern:

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

My invention relates to improvements in electric railways of the type employing a third-rail conductor arranged parallel to the track-rails and a collector or contact shoe carried by the car, said shoe being 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 the car.

In operating a third-rail system during the winter, at which time the third rail is liable to become coated with sleet or covered to a slight extent with a coating of snow, it has been found that the ordinary type of collector-shoe tends to pack the snow and ice between itself and the third rail, thereby forming a layer of ice, which acts to insulate the shoe from the third rail and causes considerable trouble, due to arcing and temporary loss of current in the motor-circuit. To obviate this difficulty, I have so constructed my collector-shoe that while still operating to collect sufficient current from the third rail to supply the motors it has a relatively small surface bearing on said rail and acts as a plow or scraper to remove the snow or ice from the surface of the rail.

More specifically considered, my invention consists of a combined collector-shoe and third-rail ice-scraper made up of one or more scraping blades or runners set at an angle to the third rail.

In the accompanying drawings, Figure 1 represents in perspective the preferred form of my improved collector-shoe. Fig. 2 illustrates a motor-truck equipped with my collector-shoe, showing the relation between said collector-shoe and the third rail with which it is adapted to cooperate. Fig. 3 is a perspective, partly in section, of a detail, illustrating the means adopted to prevent the collector-shoe dropping below a predetermined position when not in contact with the third rail. Fig. 4 illustrates the manner in which my improved collector-shoe rides over irregularities in the third rail; and Figs. 5 and 6 illustrate modi-

fications of the combined collector-shoe and ice-scraper.

Referring now to Figs. 1 and 2, the scraping blades or runners A and A' are formed of a single strip of metal and form the contacting member of the collector-shoe, the said strip being fastened to the block A², which is formed integral with or otherwise fastened to the sleeve A³, pivoted in the supporting-bracket B. The bracket B is adjustably mounted on a hanger C, which is here shown as rigidly attached to the beam G of the car-truck; but it may be attached to any other part of the car or truck. The third rail is represented by R and is supported by a series of insulating supporting-blocks S, which are fastened to the cross-ties in any suitable manner—as, for instance, by means of the angle-irons p. The third rail may be protected by a suitable guard, if so desired, without interfering with the effective operation of the shoe. Returning now to the specific construction of the collector-shoe and the support therefor, the supporting-bracket B has formed thereon projecting lugs b, which carry the shaft a. The shaft a is held in place by the pins r. The scraping blades or runners A and A' are fastened, by means of the bolts a², to the block A², attached to the sleeve A³, 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 parallel to the third rail. The scraping-runners are made removable and may be readily replaced when worn or damaged. Buffer-springs d are provided between the ends of the sleeve A³ and the lugs b, these springs serving to cushion the shoe against any blow delivered in a longitudinal direction. The ends of the buffer-springs are rigidly fastened to the ends of the sleeve A³ and to the adjacent lugs b. The springs are normally under torsional strain and act to force the shoe downward, thereby assisting gravity in maintaining the collector-shoe in contact with the upper surface of the third rail. The downward movement of the collector-shoe is limited by the device which is more clearly shown in Fig. 3. Formed integrally with or otherwise fastened to the shaft a is a lug b', adapted to operate in the slot b², which is formed in the block A². When the collector-shoe is out of engagement with the upper surface of the third rail, the lug b' is

in engagement with the upper side of the slot b^2 and holds the collector-shoe against the torsional action of the buffer-springs d at a slight angle below the horizontal. This means for limiting the downward movement of the shoe is entirely contained within and is protected from the snow and dirt by the sleeve A^3 .

The runners A and A' of my improved shoe are preferably formed of a single piece of wrought-iron or other relatively tough metal, having a rectangular cross-section and bent into the triangular shape shown in Fig. 1.

Considerable difficulty has been experienced in the past in the use of collector-shoes for third-rail railways due to the packing of snow and ice between the under surface of the collector-shoe and the upper surface of the third rail. By eliminating the rounded surfaces at the bottom of the shoe and by substituting for said rounded surfaces sharp corners between the bottom and the sides and by employing blades or runners having a relatively narrow contacting surface, said runners being set at a considerable angle relative to the third rail, I overcome the difficulty above referred to. This arrangement of the runners allows the shoe to act as a scraper, forcing the snow or ice to one side or the other of the third rail when the car is going in either direction and at the same time allows the shoe to ride over high joints or other irregularities in the third rail, if any such occur. It will be readily understood by referring to Fig. 4 that when the collector-shoe strikes a section of the third rail which is slightly above the section on which it is operating at the time the said shoe will ride to the top of the high section without injury to the shoe or scraping-runners. In other words, on account of the curvature of the top of the high section R' of the third rail and also on account of the angle at which the runners of the shoe are set—that is, the angle y —the portion of the runner A nearest the pivoted block A^2 in moving from the relatively low section R^2 onto section R' will take the lower point of the curvature of the high section, thus starting the shoe on said section.

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. To accomplish this adjustment, the hanger C carries clamping-bolts t , which operate in slots t' in the supporting-bracket B . The engaging surfaces of the hanger C and the supporting-bracket 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, a flexible conductor k is connected to the collector-shoe at the point k' . A protecting shelf or guard F is fastened to the car-truck a short distance above the collector-shoe. The function of this guard is to prevent injury to per-

sons or animals coming in contact with the collector-shoe and also to protect the shoe itself from injury.

In the modification shown in Fig. 5 instead of using a triangular-shaped contact-piece I have employed a single scraping-runner H , mounted on the pivoted block A^2 and set at an angle to the third rail. The runner H is fastened to the block A^2 by means of the bolts h . In the modification shown in Fig. 6 instead of bringing the outer edges of the contact members or scraping-runners together, thereby forming a triangular-shaped skeleton collector-shoe, I form said collector-shoe with these members or scraping-runners flaring outwardly, but still set at an angle to the third rail. These modifications produce substantially the same results that are produced by the preferred form shown in Fig. 1. A plurality of scraping-runners, as shown in the preferred form and in the modification shown in Fig. 6, increases the current-carrying capacity of the shoe without interfering with its efficient operation as a snow and ice remover.

Although I have shown and described a specific means for supporting my combined collector-shoe and ice-scraper, I do not herein claim said means, since that forms the subject-matter of a prior application of Samuel B. Stewart, Jr., Serial No. 114,342, filed July 5, 1902; but I aim in the claims hereto appended to cover all modifications of the invention as hereinbefore set forth which do not involve a departure from its spirit and scope.

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

1. In a third-rail electric railway, a collector-shoe made up of one or more thin scraping-runners set upon edge on the upper face of the third rail and approximately in the plane of said face.

2. In a third-rail electric railway, a collector-shoe made up of one or more thin scraping-runners set upon edge on the upper face of the third rail and approximately in the plane of said face, and means for maintaining said runners yieldingly in contact with said rail.

3. As an improved article of manufacture, a combined collector-shoe and ice-scraper for a third rail, comprising a plurality of runners set at an angle to each other.

4. In a third-rail electric railway, a collector-shoe made of a plurality of scraping-runners each having substantially a rectangular cross-section and set at an angle to the third rail, and bearing upon the rail along corresponding sides of the runners.

5. In a third-rail electric railway, a collector-shoe made of a plurality of scraping-runners having substantially a rectangular cross-section and arranged to bear upon the rail along corresponding sides of the runners and set at an angle to the third rail, a car-truck, and adjustable means for supporting said shoe from said truck.

6. A third-rail collector-shoe, comprising a plurality of scraping-runners set at an angle to the third rail and constituting the contact member of the shoe, a block on which said runners are detachably mounted, a bracket in which said block is pivotally mounted so as to allow a vertical and a horizontal movement of said shoe, and means for supporting said bracket from a car-truck.

7. In a third-rail electric railway, a collector-shoe formed of two scraping-runners of conducting material each having substantially a rectangular cross-section and arranged in the form of a triangle with each of said runners at an angle with the third rail so that they act to scrape the ice and snow from the surface of the third rail in either direction of movement of the car.

8. As an improved article of manufacture, a combined collector-shoe and ice-scraper for a third rail comprising a plurality of runners, rectangular in cross-section and arranged at an angle to each other.

9. As an improved article of manufacture, a combined collector-shoe and ice-scraper for a third rail comprising a thin runner rectangular in cross-section, one of the edges of the runner serving as a contact-face.

10. In a third-rail electric railway, a collector-shoe made up of one or more thin scraping-runners rectangular in cross-section and set at an angle to the third rail, said shoe bearing upon the upper face of the third rail along one of the edges of the runner or runners.

11. As an improved article of manufacture, a combined collector-shoe and ice-scraper for the third rail comprising a thin runner having a narrow flat contact-face and an angular scraping edge.

In witness whereof I have hereunto set my hand this 23d day of July, 1903.

WILLIAM B. POTTER.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.