Oct. 12, 1943. R. H. CLAPP 2,331,825

CONTACT SHOE ASSEMBLY

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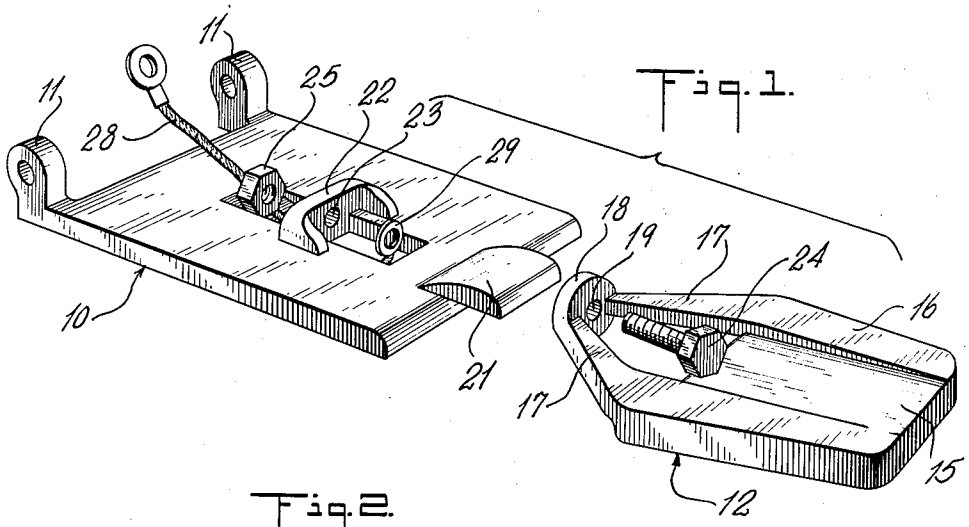


Fig. 1.

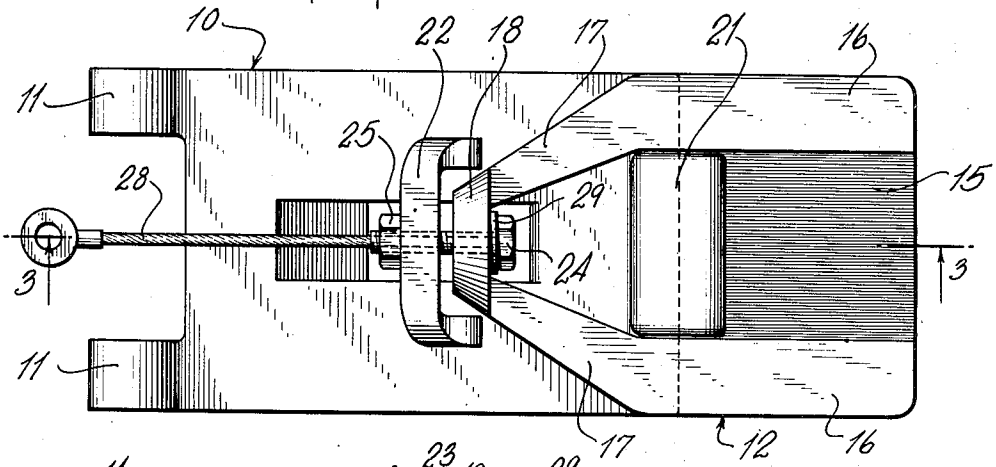


Fig. 2.

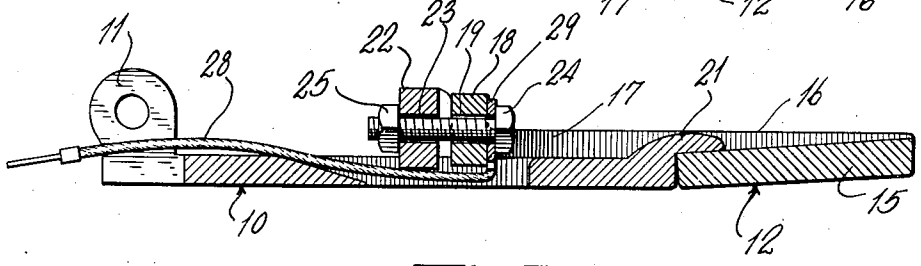


Fig. 3.

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Fig. 4.

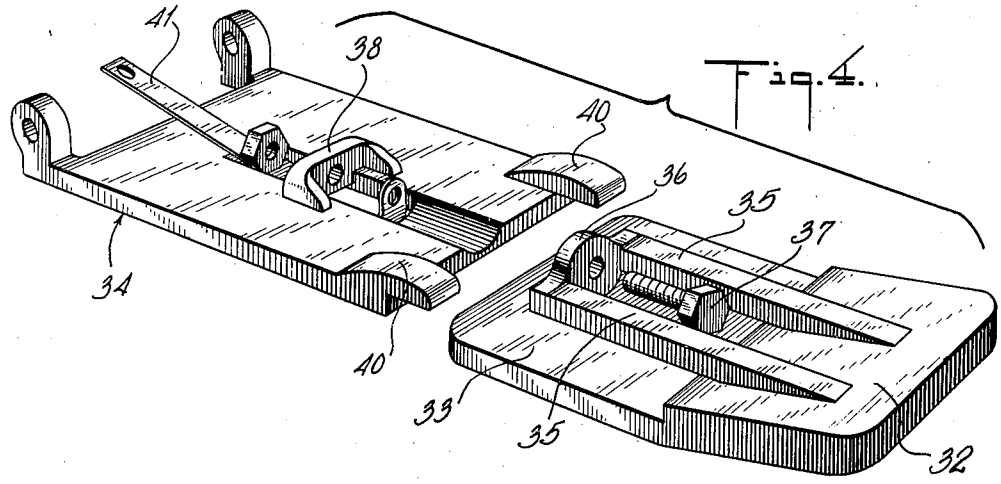
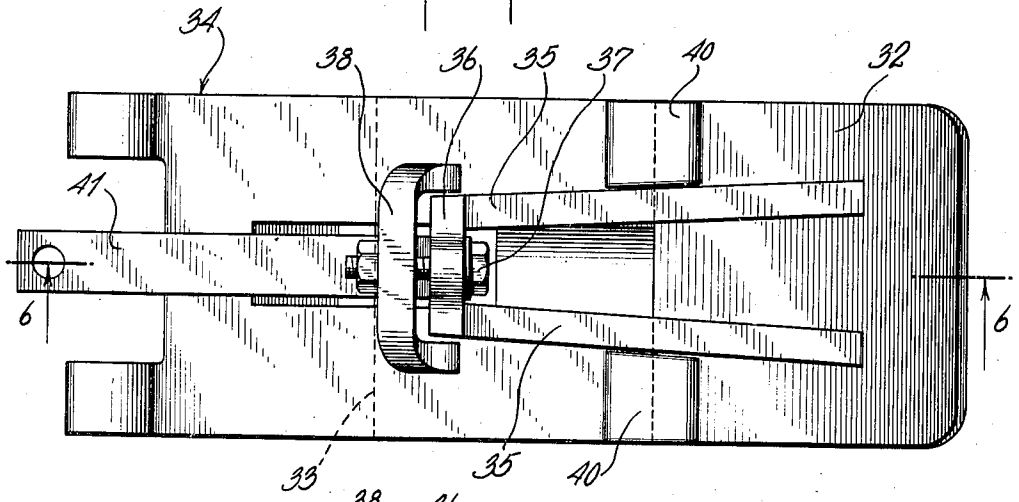


Fig. 5.



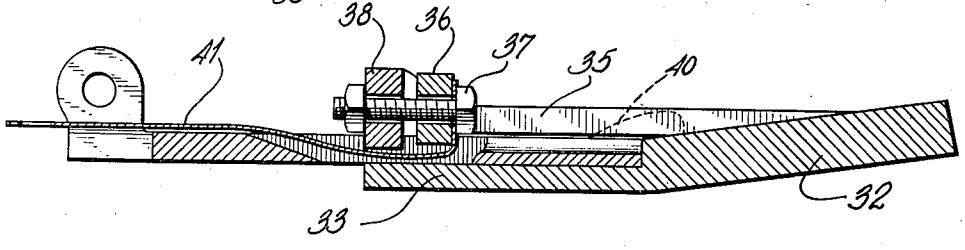


Fig. 6.

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UNITED STATES PATENT OFFICE

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CONTACT SHOE ASSEMBLY

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Application October 10, 1941, Serial No. 414,459

6 Claims. (Cl. 191—49)

This invention relates to contact shoe assemblies for third rail electric railway cars. Such assemblies include an arm pivotally mounted at one end on the car body and carrying at the other end the contact shoe itself. The latter being in constant frictional contact with the third rail wears out rapidly. It has been customary, therefore, to make the shoe separable from the arm which carries it.

The principal objects of this invention are to simplify, cheapen and improve the construction of this assembly, both mechanically and electrically.

The constructions embodying my invention are characterized by a minimum number of parts, a minimum number of machined surfaces and a minimum number of contacting surfaces in the electrical connections to the motor controls.

Various forms of clamping means may be employed for making the requisite mechanical connection between the shoe and its supporting arm. Bolts are cheap and convenient to use. Two or three bolts can be used to hold almost any two parts together. However, if it is desired for sake of simplicity to use a single bolt, it is necessary to provide interfitting parts on the arm and shoe which can be brought into firm engagement by the tightening of such bolt.

To reduce to a minimum the contacting surfaces in the electrical circuit from the shoe to the motor control, the shunt terminal is connected directly to the contact shoe.

From the point of view of electrical efficiency it is immaterial whether or not the same means which connect the shoe and arm mechanically alsyo connect the shoe and shunt electrically. From a constructional point of view it is highly advantageous that the same means accomplish both purposes. In the preferred form of my invention, therefore, a single bolt is employed to bring about all necessary mechanical and electrical connections.

Two suitable forms of construction are illustrated, by way of example, in the accompanying drawings, wherein:

Fig. 1 is a perspective view of one form of construction, the parts being shown separated;

Fig. 2 is a plan view of the same with the parts assembled;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of an alternative form of construction, the parts being shown separated;

Fig. 5 is a plan view of the same with the parts assembled; and

Fig. 6 is a section on the line 6—6 of Fig. 5.

The contact shoe assembly of Figs. 1, 2 and 3 comprises an arm 10 having apertured lugs 11 by which the arm may be pivotally connected to the car body. The contact shoe itself, 12, comprises a plate 15 with two side ribs 16 which extend at 17 beyond one end of the plate and are connected at their outer ends by a cross piece 18 having an aperture 19 therein. The extensions 17 overlie the side portions of the end of arm 10. The arm 10 is provided with a tongue 21 of substantially the same width as the space between the ribs 16 so that it can be passed therebetween and brought into engagement with the top of the plate 15. While all the engaging faces of the extensions 17, arm 10, tongue 21 and plate 15 are, to advantage, complementarily inclined to produce a wedging action when the shoe is drawn endwise towards the end of the arm, such construction is not essential to a firm mechanical connection.

Transversely disposed across the top of the arm 10 is an upstanding lug 22 having an aperture 23 adapted to register with the aperture 19 for the passage of a clamping bolt 24 when the arm and shoe are in interengaging position. A nut 25 enables the bolt to draw the lug 22 and cross piece 18 together and thereby releasably lock the shoe to the end of the arm.

The current from the third rail is picked up by the plate 15 and, to provide as good an electrical path as possible for the current flowing from this plate to the motor controls, provision is made for connecting the shunt terminal 28 directly to this plate.

One of the simplest and most satisfactory methods of doing this is to employ the bolt 24 and its nut 25 as the connecting means. For this purpose an eye 29 is placed at the end of the shunt terminal with an aperture large enough to permit the passage of the bolt 24. In assembling the apparatus the bolt is slipped through the eye 29 and then through the apertures 19 and 23. Nut 25 is then placed in position and tightened, thereby clamping the shoe firmly onto the end of the arm and, at the same time, pressing the eye 29 of the shunt terminal into good electrical contact with the cross-piece 18.

To obtain proper electrical contact with the third rail the underside of the plate 15 should be horizontal when the shoe is resting on the rail. Hence, the proper angle for the underside of the plate 15 with respect to the plane of the arm, depends on how far the point of pivotal connec-

tion of the assembly to the car body is above the third rail.

In some electric railway installations the contact shoe assembly has to operate alternatively on two third rail installations in which the spacing and height of the third rails with respect to the track rails differ. The construction shown in Figs. 4, 5 and 6 is designed to meet the situation in which the third rail which is nearer the track rails than the other is also the higher of the two. In this form of construction the plate **32** of the shoe has an extension **33** arranged to underlie the end of the arm **34**. The plate **32** rides on one third rail, while its extension **33** rides on the other.

Above the extension **33** and spaced therefrom approximately the thickness of the end of the arm **34** are two projecting arms **35** connected at their outer ends by a cross-piece **36**, apertured to receive a bolt **37**. Across the top of the arm **34** is an upwardly projecting lug **38** apertured to receive the same bolt.

While the extension **33** and the arms **35** might be relied upon to hold the shoe and arm in proper position, a stronger construction is obtained by placing tongues **40** on either side of the end of the arm to engage the upper side of the plate **32**.

The shunt terminal in this case is a copper strip **41** apertured at its ends for the connecting bolt.

What I claim is:

1. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said shoe having upper and lower portions formed with outwardly slightly diverging bottom and top faces, the free end of said arm having upper and lower surfaces for wedging engagement with said faces, and means for holding said faces and surfaces in wedged engagement.

2. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said shoe having a part underlying the free end of said arm and provided with a portion projecting towards the pivoted end of said arm and engaging the upper surface of said free end, apertured lugs on both the arm and shoe, and a bolt passing through said lugs and arranged with its axis substantially parallel to the longitudinal center line of the assembly for drawing the contact shoe towards said pivoted end to rigidly connect it to said free end.

3. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said arm and shoe having mutually overlapping portions with contacting surfaces substantially in said plane and positioned to produce a mutual wedging engagement between the free end of the arm and said shoe when the latter is moved longitudinally towards the arm, and means for holding said shoe in such wedged position.

4. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said arm and shoe having mutually overlapping portions with contacting surfaces substantially in said plane and positioned to produce a mutual wedging engagement between the free end of the arm and said shoe when the latter is moved longitudinally towards the arm, an upstanding apertured lug on the arm, a corresponding apertured lug on the shoe, said lugs being located along the center line of the assembly and spaced horizontally a considerable distance from the points at which the arm and shoe are in wedging engagement, and a bolt passing through said lugs for holding the shoe in wedging engagement with the free end of said arm.

5. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said arm and shoe having mutually overlapping portions with contacting surfaces substantially in said plane and positioned to produce a mutual wedging engagement between the free end of the arm and said shoe when the latter is moved longitudinally towards the arm, a bolt clamping said shoe to said arm in such wedged position, and a shunt terminal element held in electrical contact with said shoe by said bolt.

6. A contact shoe assembly comprising an arm having one end constructed for pivotal connection to a car, a contact shoe engaging the free end of said arm and extending outwardly therefrom in substantially the same plane as said arm, said arm and shoe having mutually overlapping portions with contacting surfaces substantially in said plane and positioned to produce a mutual wedging engagement between the free end of the arm and said shoe when the latter is moved longitudinally towards the arm, an upstanding apertured lug on the arm, a corresponding apertured lug on the shoe, said lugs being located along the center line of the assembly and spaced horizontally a considerable distance from the points at which the arm and shoe are in wedging engagement, a bolt passing through said lugs for holding the shoe in wedging engagement with the free end of said arm, and a shunt terminal element held in electrical contact with said shoe by said bolt.

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