Aug. 1, 1944. R. H. SIERK 2,354,885

THIRD RAIL CONTACT SHOE

Filed Feb. 19, 1942 3 Sheets-Sheet 1

Fig. 1

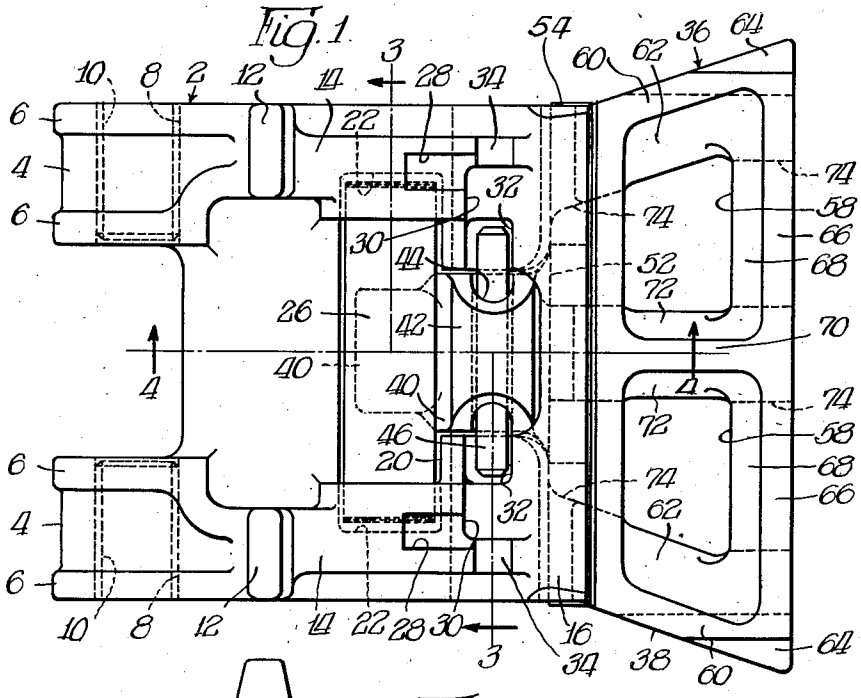


Fig. 2

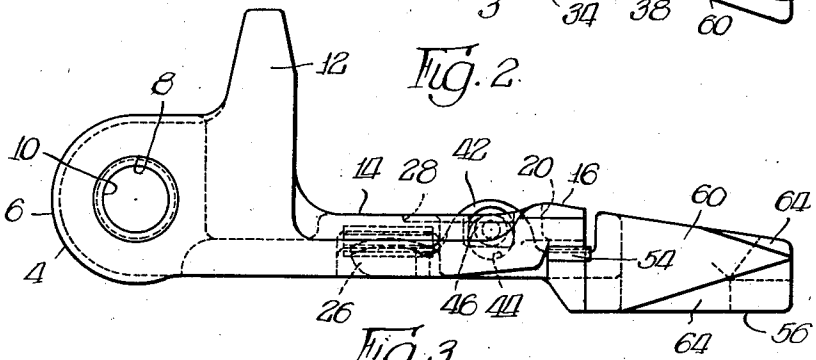


Fig. 3

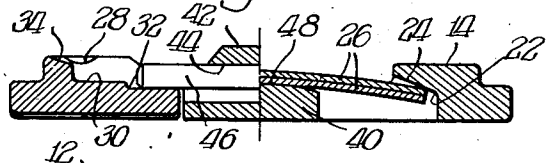
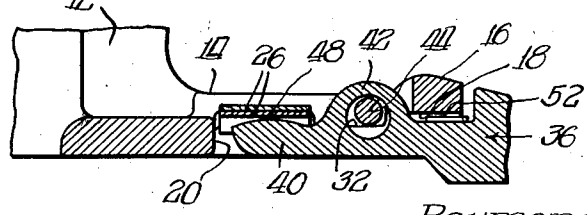


Fig. 4



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THIRD RAIL CONTACT SHOE

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Fig. 5.

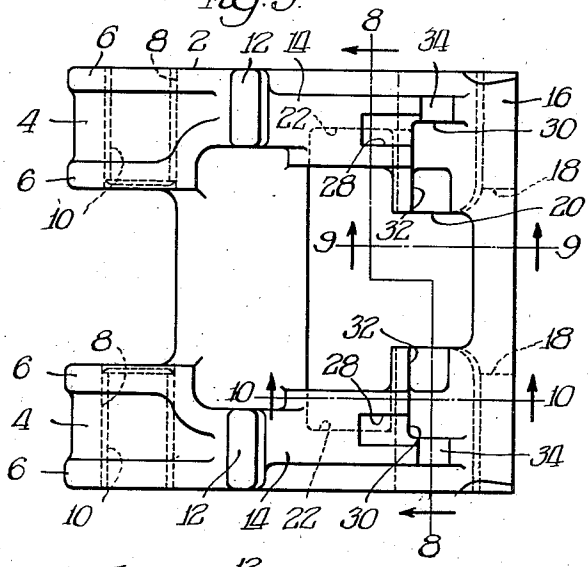


Fig. 9.

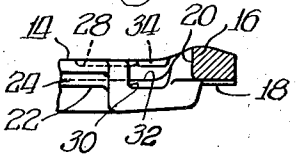


Fig. 10.

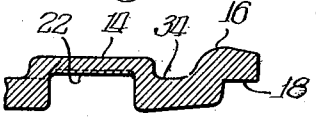


Fig. 6.

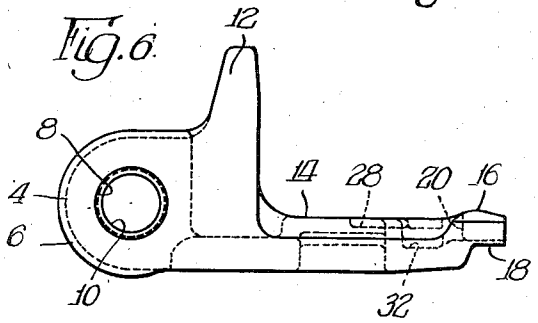


Fig. 7.

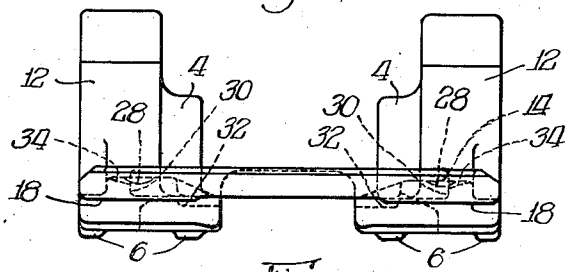
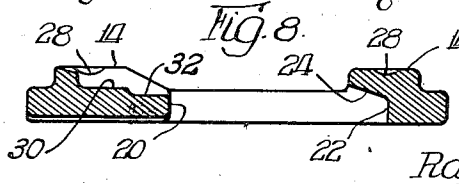


Fig. 8.



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THIRD RAIL CONTACT SHOE

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Fig. 11.

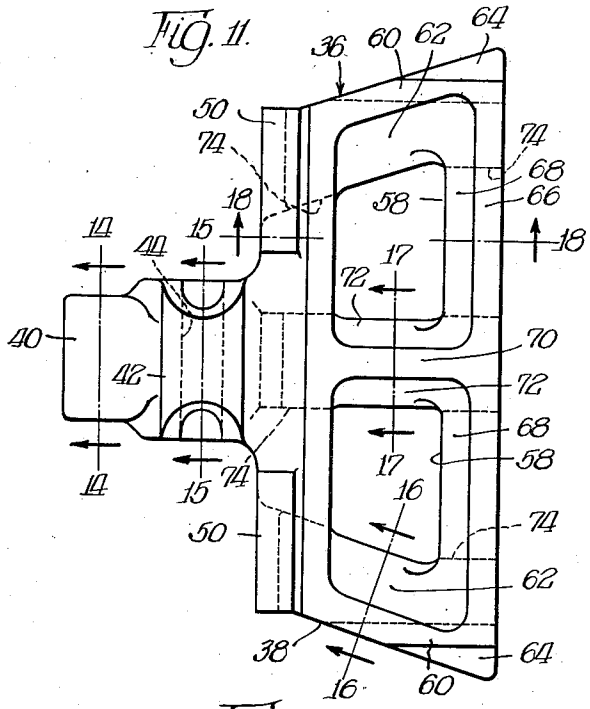


Fig. 12.

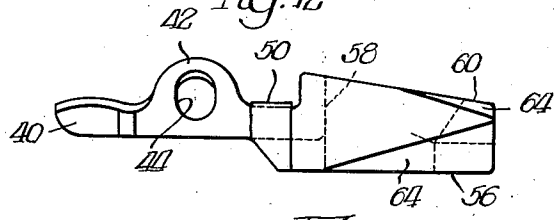


Fig. 13.

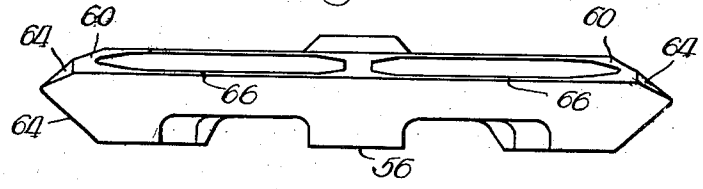


Fig. 18.

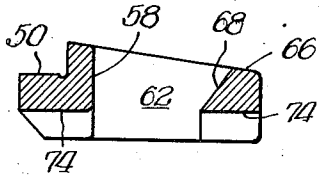


Fig. 14



Fig. 15

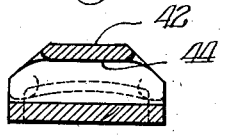


Fig. 16

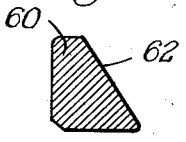
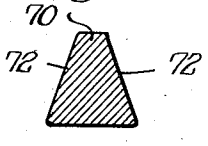


Fig. 17



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Patented Aug. 1, 1944 2,354,885

UNITED STATES PATENT OFFICE

2,354,885

THIRD-RAIL CONTACT SHOE

Raymond H. Sierk, New York, N. Y.

Application February 19, 1942, Serial No. 431,477

18 Claims. (Cl. 191—49)

My invention relates to electric railways using a third rail as a source of current and is directed more particularly to the collector or third rail contact means by which the current is taken from the third rail by the moving car.

An object of my invention is to design a contact mechanism which comprises a two-piece structure with a relatively simple method of connection therebetween, said arrangement being particularly efficient for the purpose described.

My invention comprehends a simplified method of removing and replacing the relatively inexpensive portion which is worn away by engagement with the third rail while retaining the costly major portion of the device for successive use.

My novel design is adapted for use in either cast steel, cast iron, malleable iron, forged or pressed steel, and may also be suitably constructed with either portion of cast steel and the other portion of cast iron or other combinations of suitable metals.

Generally speaking, the portion which is not designed to be worn away I have designated the fulcrum and the other portion of the device I have designated a wear pad. In the arrangement shown the fulcrum is preferably formed of gray iron in order that it may be easily broken off in case of emergency, and the pin retaining said fulcrum in engagement with the associated wear pad may be made of steel inasmuch as it is not necessary to break said pin in case of emergency in this arrangement.

My invention comprehends such an arrangement of parts as will permit the removal of a worn pad and application of a new pad with simple operations requiring a single tool used by one workman.

My invention also contemplates a novel arrangement whereby a copper shunt is positioned between the contact surfaces on the fulcrum and on the wear pad, said shunt not only acting as a gasket to afford said pad a good seat against said fulcrum, but also preventing oxidation between the contact surfaces, said oxidation frequently causing the heavy current to arc across the joint and to build up a rough deposit of steel on the underside of the fulcrum casting contact pads.

In the drawings, Figure 1 is a top plan view of the contact shoe or collector with the parts in normal assembled relationship.

Figure 2 is a side elevation of the structure shown in Figure 1.

Figure 3 is a transverse sectional view through the structures shown in Figures 1 and 2, the view being taken substantially in the transverse vertical planes indicated by the line 3—3 of Figure 1.

Figure 4 is a further sectional view of said structure taken in the longitudinal vertical plane indicated by the line 4—4 of Figure 1.

Figures 5 to 10 inclusive show in detail my novel form of fulcrum casting, Figure 5 being a plan view thereof, Figure 6 a side elevation, Figure 7 an end elevation taken from the right as seen in Figure 5, and Figures 8, 9, and 10 being sectional views taken respectively in the planes indicated by the lines 8—8, 9—9, and 10—10 of Figure 5.

Figures 11 to 18 inclusive show in detail my novel form of wear pad, Figure 11 being a plan view thereof, Figure 12 a side elevation, Figure 13 an end view taken from the right as seen in Figure 11, and Figures 14 to 18 inclusive being sectional views taken respectively in the planes indicated by the lines 14—14, 15—15, 16—16, 17—17, and 18—18 of Figure 11.

Describing my novel collector or contact shoe in detail, it may be noted that the fulcrum member generally designated 2 and preferably formed of gray iron in order that it may be broken in case of emergency as heretofore explained, comprises at one end thereof the spaced lugs 4, 4 comprising the reinforcing flanges 6, 6, said lugs having aligned fulcrum holes 8, 8 reamed therethrough for reception of a shaft (not shown), said shaft being mounted in any suitable manner upon the associated car truck. Each hole 8 is provided with a bushing 10 of any suitable material, preferably of case hardened seamless steel tubing. The lugs 4, 4 are upwardly extended into the vertical flanges 12, 12, said flanges contacting a portion of the associated car truck to provide correct height adjustment of the assembled contact shoe as will be clearly apparent to those skilled in the art. At opposite sides thereof the fulcrum is provided with raised portions 14, 14 merging with the end portion 16 opposite the lugs 4, 4, said end portion being beveled on the top surface thereof as best seen in Figure 2 and thus in alignment with the beveled surface on the top of the associated wear pad hereinafter more fully described.

The end portion 16 is provided with the spaced, machined contact surfaces 18, 18 (Figures 5, 7, and 9) on the bottom and at opposite sides thereof, said surfaces cooperating with similar surfaces formed on the associated wear pad as hereinafter more fully described. Intermediate the

ends thereof the fulcrum is formed with a slot 20, said slot being in the form of a T as seen in plan (Figures 1 and 5) and extending at opposite sides thereof beneath the raised portions 14, 14 to form spring pockets 22, 22, roofs of said pockets being beveled as at 24, 24 in order that the bar springs 26, 26 confined therebetween at the ends thereof as best seen in Figure 3 may be afforded additional flexure at the time of the insertion of the retaining key or pin as hereinafter more fully described.

Atop the raised portions 14, 14 are arcuate grooves 28, 28 formed and arranged for the reception of an assembly tool as will be clearly apparent to those skilled in the art. At opposite sides of the slot 20 are formed pockets 30, 30 and within said pockets are formed smaller pockets 32, 32 formed and arranged for the reception of the ends of the associated key as hereinafter more fully described, the raised portions 14, 14 being formed as at 34, 34 with beveled surfaces adjacent the pockets 30, 30 and 32, 32 in order to facilitate the application of said key.

The wear pad generally designated 36 comprises a body portion 38 and a tail portion 40 formed and arranged for insertion into the slot 20 in the fulcrum, said tail portion being crowned in two directions at the end thereof as may be clearly seen from a consideration of Figures 12 and 14. The tail portion comprises a bridge 42 with a keyway 44 designed to accommodate the steel key 46, said key being seated at the ends thereof in the pockets 32, 32 formed on the fulcrum. It will be clearly apparent to those skilled in the art that under normal circumstances the key 46 will be held in position within the pockets 32, 32 by the pressure of the springs 26, 26 bearing upon said tail portion in a manner hereinafter more fully described. In the event, however, that said springs should be defective, said key will be retained in its normal position by abutment with the ends of the pockets 32, 32, and in the event that said springs should be extremely weak, said key will abut the ends of the pockets 30, 30 and will thereby be retained in assembly.

Seated at opposite ends thereof in the spring pockets 22, 22 are the bar springs 26, 26 heretofore mentioned, said springs being of rectangular shape and abutting the crowned surface on the tail portion of the wear pad as at 48. It will be apparent that said crowned surface affords centralized pressure upon said tail portion by the springs 26, 26 and also permits additional flexure of said springs at the time of the insertion of the key.

The body portion 38 of the wear pad is formed with spaced contact surfaces 50, 50 (Figures 11 and 12) on the top thereof and adjacent the juncture of said body portion with the tail portion 40, and positioned between the contact surfaces 50, 50 and 18, 18 on the wear pad and on the fulcrum respectively is a flat copper shunt 52 (Figure 4), said shunt being bent over at the ends thereof as at 54 (Figures 1 and 2) and being held in place between the associated contact surfaces by the force of the springs 26, 26 as will be clearly apparent to those skilled in the art. The body portion of said pad also comprises on the bottom thereof a smooth surface 56 formed and arranged for engagement with the associated third rail (not shown), said surface being interrupted by the slots 58, 58, said slots being defined by side walls 60, 60 diagonally formed on the inner surface thereof as at 62, 62 and beveled on the outer surface thereof as at 64, 64, by the end wall 66 opposite the tail portion 40 and diagonally formed as at 68, 68 and by the integral, intermediate longitudinal wall 70 diagonally formed at each side thereof as at 72, 72, said slots being extended as at 74, 74 at the bottom thereof, as best seen in Figures 11 and 18, the entire length of the body portion 38 of the wear pad.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a third rail contact shoe, a fulcrum comprising spaced lugs at one end thereof, aligned openings through said lugs for reception of means securing said shoe to an associated truck, a vertical flange adjacent each lug formed and arranged for cooperation with said truck to provide adjustment of said shoe, a T-shaped slot through said fulcrum adjacent the opposite end thereof, spring pockets and key pockets at opposite sides of said slot and respectively aligned substantially transversely of said fulcrum, a wear plate comprising a surface on the bottom thereof formed and arranged for engagement with an associated third rail, and a tail portion received within said slot and comprising a keyway, a key positioned in said keyway and seated at the ends thereof in said key pockets, and a plurality of bar springs seated at opposite ends thereof in said spring pockets and bearing intermediate said last-mentioned ends upon said tail portion.

2. In a third rail contact shoe, a fulcrum comprising an opening therethrough, spring pockets at opposite sides of said opening each being defined at the top thereof by a diagonal surface, a wear pad comprising a tail portion received within said opening, means retaining said portion therewithin, and a bar spring seated at opposite ends thereof in said spring pockets and bearing against said tail portion, said diagonal surfaces permitting additional flexure of said spring during assembly of said shoe.

3. In a third rail contact shoe, a fulcrum comprising an opening therethrough, and spaced contact surfaces, spring retaining means at opposite sides of said opening, a wear pad comprising a tail portion received within said opening and pivotally secured therein, and a body portion presenting contact surfaces abutting said first-mentioned surfaces, and a substantially flat and straight spring secured at the ends thereof by said spring retaining means and urging the surfaces on said fulcrum and on said body portion into contact.

4. In a third rail contact shoe, a fulcrum comprising spaced lugs at one end thereof, aligned openings through said lugs for reception of means securing said shoe to an associated truck frame, a slot in said fulcrum, retaining means at opposite sides of said slot, a wear pad comprising a portion received within said slot, pivot means securing said portion therewithin, and resilient means secured by said retaining means and bearing against said portion, said resilient means lying in a plane substantially parallel to the plane of said pivot means.

5. In a third rail contact shoe, a fulcrum comprising an opening therethrough, spring pockets and key pockets at opposite sides of said open-

ing, a wear pad comprising a tail portion having a top surface crowned at the end thereof in two directions and having a keyway therethrough, a key positioned in said keyway and seated at the ends thereof in said key pockets, and a bar spring seated at opposite ends thereof in said spring pockets and bearing intermediate said ends against said crowned surface.

6. In a third rail contact shoe, a fulcrum comprising an opening therethrough, spring pockets and key pockets at opposite sides of said opening, a wear pad comprising a tail portion received within said opening, crowned in a plurality of directions, and comprising a keyway, a key pivotally mounted in said keyway and seated at opposite ends thereof in respective key pockets, and a spring seated at opposite ends thereof in respective spring pockets and bearing intermediate said ends against said crowned portion.

7. In a third rail contact shoe, a fulcrum comprising an opening therethrough, retaining means at opposite sides of said opening, a wear pad comprising a portion received within said opening and crowned at the end thereof in a plurality of directions, means retaining said portion within said opening, and resilient means secured at opposite ends thereof by said first-mentioned means and bearing against said crowned end.

8. In a third rail contact shoe, a fulcrum, a wear pad comprising a tail portion pivotally connected to said fulcrum, abutment means on said fulcrum cooperating with said pad to limit pivotal movement thereof, and a resilient retaining bar engaged with said fulcrum, said retaining bar being positioned substantially perpendicular to and bearing intermediate its ends against said tail portion to urge said pad into engagement with said abutment means.

9. In a third rail contact shoe, a fulcrum having means at one end thereof affording connection to associated support means, a wear pad comprising a tail portion pivotally connected to said fulcrum, abutment means on said fulcrum cooperating with means on said pad to limit pivotal movement thereof, and a resilient bar engaged with said fulcrum and extending transversely thereof, said bar being disposed substantially perpendicular to and bearing intermediate its ends against said tail portion to urge said pad into engagement with said abutment means.

10. In a third rail contact shoe, a fulcrum comprising a slot therein, a wear pad comprising a tail portion pivotally secured in said slot, and a resilient bar extending substantially perpendicular to and bearing against said portion, and support means on said fulcrum for said bar.

11. In a third rail contact shoe, a fulcrum comprising a slot therein, a wear pad comprising a tail portion in said slot, pivot means securing said portion therein, and a resilient bar engaged with said fulcrum, said bar bearing intermediate its ends against said portion, the longitudinal axes of said pivot means and said bar lying in substantially parallel planes.

12. In a third rail contact shoe, a fulcrum, a wear pad, pivot means affording a connection therebetween, abutment means on said pad at one side of said connection for limiting pivotal movement of said pad, and a resilient bar engaged with said fulcrum, said bar bearing intermediate its ends against said pad at the opposite side only of said connection whereby said pad is urged into engagement with said abutment means.

13. In a third rail contact shoe, a fulcrum having at one end thereof means affording connection to associated support means for said shoe, a wear pad comprising a tail portion pivotally connected to said fulcrum, means on said fulcrum limiting pivotal movement of said pad, and a substantially flat and straight resilient member engaged at opposite ends thereof with said fulcrum and extending transversely thereof, said resilient member bearing intermediate its ends on said portion to urge said pad into engagement with said limiting means.

14. A third rail contact shoe fulcrum consisting of a metallic member comprising means affording securement to an associated support beam, a slot for the reception of a portion of an associated wear pad, and key pockets and spring pockets at opposite sides of said slot, said key pockets and spring pockets being respectively aligned substantially transversely with respect to said member.

15. In a fulcrum for a third rail contact shoe, a metallic member comprising at one end thereof of securing means affording support from an associated beam and at the opposite end a seat for an associated wear pad, a slot in said member for reception of a portion of said pad, and key pockets and spring pockets at opposite sides of said slot, said key pockets and spring pockets being respectively aligned substantially transversely with respect to said member, the top surfaces of each of said key pockets sloping upwardly toward said slot.

16. In a wear pad for a third rail contact shoe, a body portion comprising a surface formed and arranged for engagement with an associated third rail, and a tail portion comprising pivot means and a surface crowned in a plurality of directions and adapted for engagement with an associated spring member.

17. In a third rail contact shoe, a fulcrum having at one end thereof means affording connection to associated support means, a wear pad comprising a tail portion pivotally connected to said fulcrum, means on said fulcrum limiting pivotal movement of said pad, and a resilient member engaged at opposite ends thereof with said fulcrum and extending transversely thereof, said resilient member bearing intermediate its ends on said portion to urge said pad into engagement with said limiting means.

18. In a shoe of the class described, a fulcrum member comprising means at one end thereof for attachment to associated support means, a wear pad member, means affording a pivotal connection between said members, cooperating means on said members at one side of said connection for limiting pivotal movement therebetween, and a resilient bar engaged with said fulcrum member and extending transversely thereof, said bar being flexed against said pad member at the opposite side only of said connection.

RAYMOND H. SIERK.