Jan. 3, 1939. M. B. CAMERON 2,142,176

ELECTRICAL CONNECTER

Filed March 26, 1938

Fig. 1.

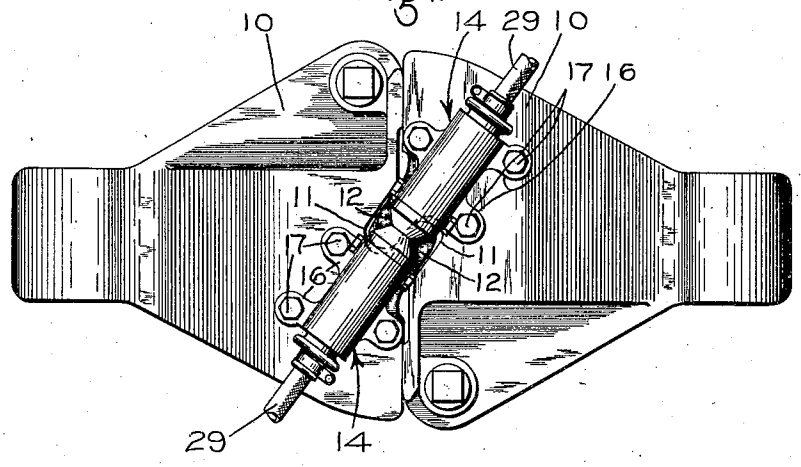


Fig. 2.

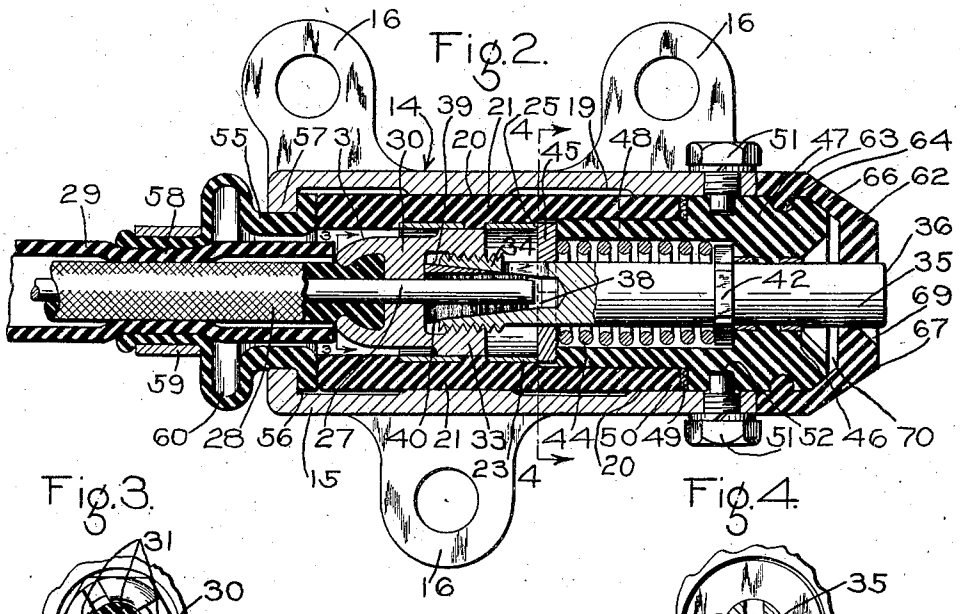


Fig. 3.

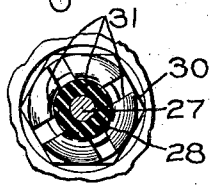


Fig. 4.

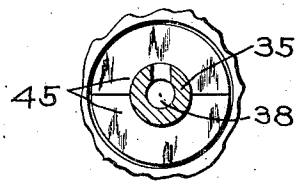


Fig. 5.

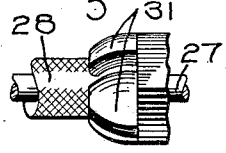
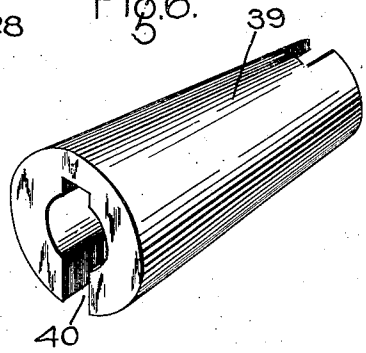


Fig. 6.



INVENTOR
MORTIMER B. CAMERON
BY
ATTORNEY

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ELECTRICAL CONNECTER

Mortimer B. Cameron, Edgewood, Pa., assignor to The Westinghouse Air Brake Company, Wilmerding, Pa., a corporation of Pennsylvania

Application March 26, 1938, Serial No. 198,241

4 Claims. (Cl. 173—332)

This invention relates to automatic couplers for railway cars, and more particularly to an electrical connecter mechanism adapted to be employed for connecting electric train line circuits between cars of a train.

The principal object of my invention is to provide an improved electrical connecter device of the type adapted to be carried on an automatic coupler head, which device embodies a movable butt contact member having means associated therewith for establishing a secure but readily detachable connection between the contact member and the train wire or cable, and a weatherproof casing including a flexible shield adapted to prevent access of moisture to the interior of the device past the outer end of the movable contact member.

Other objects and advantages of my invention will appear in the following detailed description thereof, taken with reference to the accompanying drawing, wherein:

Fig. 1 is a plan view of a pair of operatively engaged car coupler heads showing my improved electrical connecter mechanism applied thereto; Fig. 2 is an enlarged detail sectional view of an electrical connecter constructed according to my invention; Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 2; Fig. 5 is an elevational view of a portion of the clamping members shown in Figs. 2 and 3; and Fig. 6 is an enlarged detail view of the conical sleeve element shown in Fig. 2.

As shown in Fig. 1 of the drawing, an electrical connecter 14 embodying the invention is applied to each of a pair of counterpart car and pipe coupling mechanisms comprising coupler heads 10 provided with inclined interengaging recesses 11 and projections 12. Each electrical connecter 14 is mounted on the associated coupler head 10 in alignment with the projection 12 and recess 11 thereof, so that when the coupler heads on adjacent cars are brought into coupling engagement, the final movement as the coupler heads are locked together will be in the direction of the inclination of the recesses 11, with the result that the contact members of the connecters 14, hereinafter described, are firmly engaged.

Referring to Fig. 2 of the drawing, the electrical connecter 14 comprises a tubular casing 15, preferably made of cast iron, having formed thereon a plurality of bracket lugs 16 which are suitably apertured for receiving bolts 17, by means of which the casing is mounted on the coupler head, as shown in Fig. 1. Formed within the tubular casing 14 is a longitudinal bore 19, annular raised portions 20 of the wall of which bore are suitably finished to receive a cylindrical insulating member 21, which may be formed of any durable material such as "Bakelite", and which is adapted to have a snug fit with the portions 20 of the cylinder wall. A bushing 23 having several apertures is fitted within the longitudinal bore of the cylindrical member 21, this bushing being preferably molded into the material of which the insulating member is formed. The bushing 23, which may be made of grass or other suitable metal, is disposed intermediate the open ends of the bore of the insulating member 21, one end of the bushing forming an annular shoulder 25 adjacent an enlarged portion of the bore.

The train wire with which the electrical connecter is associated comprises the usual copper conductor 27 covered with a durable insulating material 28, the conductor and the insulating material being provided with an outer weather-resistant covering 29, which may consist of flexible rubber tubing. As shown in Fig. 2 of the drawing, the end of the conductor 27 is exposed and projects a suitable distance beyond the insulation 28, a portion of which insulation is likewise freed from the tubing 29. The exposed end of the conductor 27 is thus adapted to be inserted through a suitable bore in a clamping nut member 30, which has formed on one end thereof a plurality of lugs 31 adapted to be swaged inwardly so as to grip the insulation 28, as is best shown in Figs. 3 and 5. On the opposite end of the clamping nut member 30 is formed an enlarged annular portion 33, which is adapted to be slidingly fitted within the brass bushing 23 and is interiorly threaded to receive a similarly threaded end 34 of a butt contact member 35, the outer end 36 of which is adapted to engage a similar contact member of a counterpart electrical connecter when adjacent coupler devices are locked together, as shown in Fig. 1. Both the clamping nut 30 and the contact member 35 may be made of bronze.

The inner end 34 of the contact member 35 has a longitudinally disposed tapered bore 38 into which the free end of the conductor 27 is adapted to extend. Interposed between the end 34 and the conductor 27 is an elongated bronze sleeve member 39, which is made in the form of a frustum of a cone and is provided with a longitudinal slit 40 for enabling it to be tightly pressed against the conductor 27 as the clamping nut 30 and the contact member 35 are screwed together. It will be noted that the contact member 35 is provided

with a hexagonal portion 42 to which a wrench may be applied when the parts are being assembled. It will thus be seen that the means by which the butt contact member 35 is detachably secured to the conductor or train wire 27 serves to insure a perfect electrical connection between said elements.

A coil spring 44 is disposed around the contact member 35 between the hexagonal portion 42 thereof and a pair of counterpart semicircular retainer elements 45 abutting the bushing shoulder 25 for urging the contact member 35 outwardly. The portion of the contact member 35 outwardly of the hexagonal portion 42 is slidably guided in a bushing 46 secured in an insulating member 47, which is mounted in the casing 15 and has a sleeve portion 48 extending within and engaging the cylindrical insulating member 21. The bushing 46, which may be made of brass, is preferably molded into the "Bakelite" or other suitable substance of which the insulating member 47 is made. For insuring a tight joint, a gasket 49 may be interposed between a shoulder portion 50 of the insulating member 47 and the end of the insulating member 21. The insulating member 47 is held in place within the casing 15 by means of retainer screws 51, which extend through suitably threaded apertures formed in the casing 15 into an annular groove 52 formed in the insulating member.

As a further feature of my invention, the electrical connecter is provided with sealing means preventing access of dirt or moisture to the interior of the casing. As shown in Fig. 2 of the drawing, a flexible tubular shield 55 is provided, which shield may be made of any suitable material such as rubber composition and has formed on one end thereof an annular flange 56, which is secured within the casing 15 between an annular shoulder portion 57 thereof and the end of the cylindrical insulating member 21. The flexible shield 55 surrounds the protective covering 29 of the train cable and is so formed that, with the outer portion 58 of the shield securely clamped against the cable by means of a clamping member 59, an annular fold 60 is provided in the central portion of the shield, so that yielding movement of the cable and associated contact elements with respect to the connecter casing 50 may be effected during the coupling operation without straining said shield.

At the end of the electrical connecter 14 adjacent the butt contact member 35 there is provided a flexible shield 62, which may be made of the same material as the tubular shield 55. The shield 62 comprises a flange portion 63 having an interiorly disposed annular bead 64 adapted to fit snugly within an annular groove formed in the outer portion of the insulating member 47, and an inclined flexible web portion 66, which extends outwardly from the flange portion 63 and terminates in a relatively thick annular sealing portion 67 surrounding the outer end of the contact member 35. The annular sealing portion 67 of the shield 62 is adapted to grip the contact member 35 in such a way that when the contact member 35 is engaged by the counterpart contact member of another coupler mechanism as adjacent cars in a train are coupled together, the resultant yielding movement of the contact member 35 against the spring 44 will cause flexing of the web portion 66, while the sealing porion 67 will be distorted and retracted with the contact member until the outer surface of the sealing portion is engaged with the corresponding portion of the counterpart coupling device. It will be noted that an annular chamfer 69 is formed in the outer surface of the sealing portion 67 to accommodate displaced material as the shield is distorted in the manner above explained. Similarly, with the flexible shield 62 secured in place upon the insulating member 47, as shown in Fig. 2, the inclined web portion 66 defines a sufficient space 70 between the sealing portion 67 and the insulating member to permit the desired inward flexing.

From the foregoing description of the invention, it will be apparent that the electrical connecter constructed in accordance therewith is adapted to be quickly assembled, and may be readily taken apart if desired, as for inspection or repairs. In addition, the electrical connecter is provided with flexible weather-resistant shield means for preventing access of dirt or moisture to the interior of the casing, which flexible means is adapted to cooperate with the movable elements of the connecter so that wear of said shield means is reduced to a minimum.

Although a preferred embodiment of the invention has been described in detail, it is not my intention to limit its scope to that embodiment or otherwise than by the terms of the appended claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an electrical connecter for a train line, in combination, a casing having an opening therethrough, insulator means removably mounted in said casing and having a bore adapted to receive the end of the train line, a butt contact member movably mounted in said insulator means and extending outwardly of said casing, demountable means securing said contact member in electrical connection with said end of the train line, and a flexible weather-resistant shield closing the opening at one end of said casing and having a sealing portion adapted to grip said contact member, said sealing portion of the shield being adapted to flex upon movement of said contact member so as to maintain a tight fit therewith at all times for insuring minimum wear.

2. An electric train line connecter comprising, in combination, a casing having an opening through which the train line is adapted to extend insulator means removably secured in the opening and having a bore, a butt contact member yieldably mounted in said bore, means freely disposed within said insulator means and detachably connecting said contact member with said train line, a flexible weather-resistant sleeve member having a portion surrounding and snugly fitting said train line and another portion secured within the opening at one end of said casing, and a flexible weather-resistant shield closing the other open end of said casing and having an apertured portion encircling and tightly gripping said contact member, said flexible sleeve member and shield being adapted to yield upon movement of said contact member and train line so as always to prevent access of foreign matter into said casing.

3. In an electric train line connecter, the combination with a train wire having an insulating cover, of a casing having a bore adapted to receive an exposed end of said wire, a clamping member having a portion gripping said insulating cover and an annular portion encircling said exposed end of the train wire, a yielding tapered sleeve element fitted on the end of said wire

within said annular portion, and a butt contact member yieldably mounted on said casing and provided with a portion having a tapered bore, said portion being forcibly interposed between said sleeve element and said annular portion of the clamping member for maintaining electrical connection between said contact member and said train wire.

4. In an electric train line connecter of the type adapted to be coupled to a counterpart connecter in combination, a casing having an opening, a butt contact member suitably mounted in said casing and extending outwardly through said opening, and a weather-resistant shield comprising a resilient ring portion having retainer means for securing said shield to said casing, a flexible annular web portion sloping inwardly from said ring portion, and a relatively thick resilient sealing portion formed on said web portion and having an aperture through which said contact member projects, said sealing portion being adapted to tightly grip said contact member for preventing frictional wear of said portion during movement of said contact member in coacting with the counterpart connecter, and being also adapted to yield sufficiently during such movement to effect engagement of said sealing portion with that of the counterpart connecter.

MORTIMER B. CAMERON.