May 11, 1943. C. S. PENFOLD 2,318,650

ELECTRICAL CONNECTION MEANS

Filed April 1, 1940

Fig. 1.

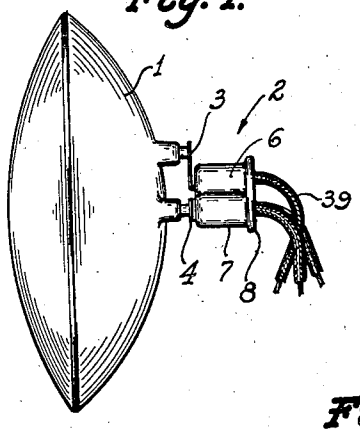


Fig. 2.

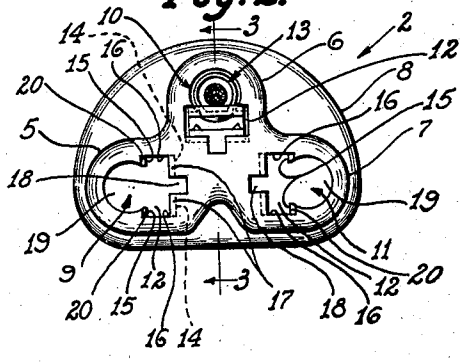


Fig. 3.

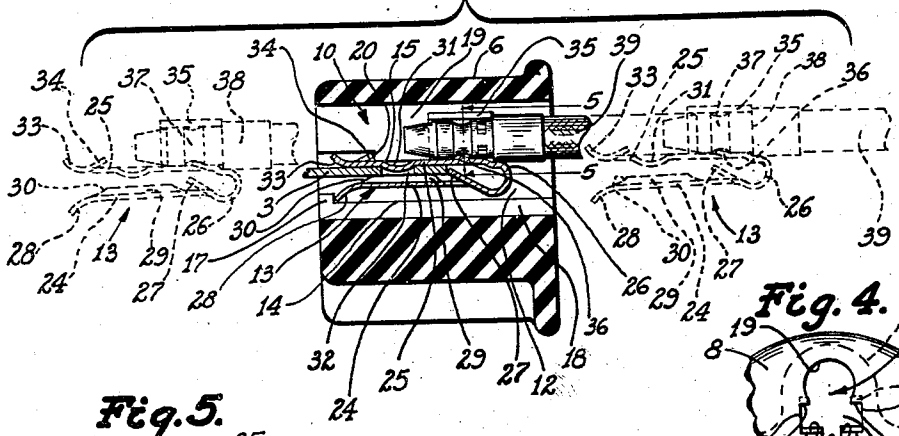


Fig. 4.

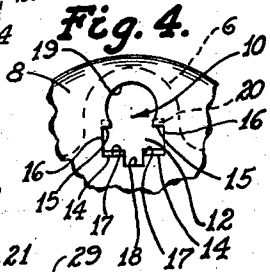


Fig. 5.

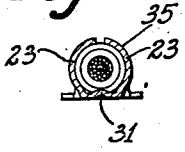


Fig. 6.

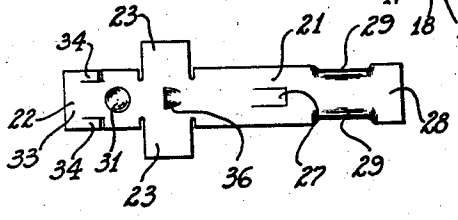
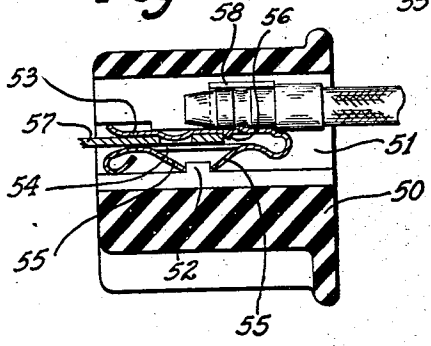


Fig. 7.



INVENTOR.

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ELECTRICAL CONNECTION MEANS

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Application April 1, 1940, Serial No. 327,143

5 Claims. (Cl. 173—328)

This invention relates generally to electrical connection means and particularly to connectors adapted for detachable association with respect to a lamp or other electrical apparatus for establishing a through connection between the source, line, and lamp.

More specifically, the invention is directed to a connector provided with a plurality of terminal posts or receptacles, each of which is adapted to detachably receive and resiliently retain one of a plurality of terminal studs, which project from the rear extremity of a headlamp.

One particular object is to provide a connector having at least a single terminal post or receptacle that is associated with a mounting member of insulating material in such a manner that the receptacle may adjust itself to accommodate a terminal stud when the latter is inserted into the receptacle.

Another object is to provide a construction of the character just referred to, in which each receptacle is so constructed and arranged that it may be inserted into either end of an opening or aperture provided in the mounting and snapped securely in place.

Another object of the invention is to provide a terminal receptacle which may be easily and quickly released from the mounting by which it is carried.

A further object of the invention is to provide improved auxiliary means on the receptacle for receiving a plug conductor terminal of the snap type, the arrangement being such that the latter may be attached to said auxiliary means before or after the receptacle is seated within the mounting.

A still further object is to provide a connector that may be economically manufactured and assembled on a production basis.

Other objects and advantages of this invention will be apparent after considering the description hereinafter set forth in conjunction with the drawing annexed hereto.

Referring to the drawing:

Figure 1 is a relatively small side view of one form of a connector embodying the invention, as applied to an electrical headlamp of a vehicle;

Figure 2 is a relatively large front or end view of the connector, showing one of the receptacles and conductors assembled therewith;

Figure 3 is a longitudinal section taken substantially on line 3—3 of Figure 2, showing certain details;

Figure 4 is a partial bottom view of the connector showing the configuration of certain apertures;

Figure 5 is a transverse sectional view, taken substantially on line 5—5 of Figure 3, through a receptacle;

Figure 6 is a surface development of a receptacle; and

Figure 7 is a longitudinal section taken through a modified form of a connector.

Referring particularly to Figure 1 of the drawing, numeral 1 generally designates a vehicle headlamp which is adapted to be supported within a suitable housing or to a mounting not shown, and 2 generally designates a connector which is adapted to be detachably connected to the headlamp. Obviously, the connector may be designed and constructed for use in connection with electrical apparatus other than a vehicle headlamp, and it is to be understood that the connector may be provided with one or a plurality of terminal receptacles, depending on the use or application of the connector.

The headlamp may be provided with any desirable number of terminal connections or studs, but as herein shown, is preferably provided with a terminal stud 3, and a pair of studs 4, the latter of which are arranged in spaced apart relation substantially equidistant from the focal axis of the headlamp, while stud 3 is located above said axis intermediate said studs 4. Only one of the studs 4 is shown in Figure 1. The studs 3 and 4 may be constructed as desired, but as herein shown, are preferably comprised of sheet metal, and formed with angular projections, which extend rearwardly of the headlamp, each projection being preferably provided with a circular aperture as clearly shown in Figure 3, the purpose of which will be described later. The free extremities of the studs are preferably made planar or flat, the extremity of the stud 3 being arranged horizontally and the extremities of studs 4 preferably vertically or at right angles to the plane of stud 3.

The connector 2 includes a mounting or carrier preferably in the form of a block of moulded insulating material, and as clearly shown, is preferably provided with longitudinally extending substantially parallel tubular portions 5, 6, and 7, arranged more or less in triangular formation, the portions being provided with composite openings generally designated 9, 10, and 11, respectively, arranged in circumferential relation. The tubular portions 5 through 7 are preferably joined together by suitable radially extending partitions.

In order to assist in assembling or disassembling the connector with respect to the terminal studs, the rear extremity of the mounting is preferably provided with a flange 8, preferably annular in form, except for a beveled portion adjacent its lower extremity. The portions of the flange, particularly intermediate the extremities of the portions 5 through 7, provide finger holds for assembling and disassembling the connector with respect to the lamp.

Inasmuch as the tubular portions, receptacles, and conductors are substantially identical, it is believed that a description of one of the tubular portions and a receptacle will be sufficient. Referring to the tubular portion 7, it will be noted that the composite opening 10 includes a passage 12 adapted to receive a resilient terminal receptacle 13. Passage 12 is preferably rectangular in cross-section and bounded by side walls 14 and 15, and end walls 16, as most clearly shown in Figures 2 and 4. The side wall 15 is shown as being composed of a pair of spaced apart parallel portions. The front extremity of the side wall 14 preferably terminates in a pair of spaced apart abutments 17, which project a predetermined distance across the front end of the opening 10, so as to provide an entrance of a size slightly smaller than the cross-sectional size of said opening. The side wall 14 is also interrupted by a channel or slot 18 which preferably extends entirely longitudinally through the mounting. The purpose of this slot will be described in detail later.

The opposite marginal side wall 15 of the passage 12 is interrupted by a generally circular or cylindrical terminal receiving channel or groove 19. Thus, the channels or slots 18 and 19 are arranged substantially at right angles to the rectangular passage 12, and are communicatively connected together. Specifically, the passage is disposed tangentially to the channel 19. The outer extremity of each of the portions forming the wall 15 is preferably slightly offset to enlarge the opening 10, and provide a pair of shoulders or abutments 20, spaced axially from the abutments 17.

The receptacle 13 as shown in Figure 6, preferably takes the form of a Latin cross, and includes a main extremity 21 aligned with a smaller extremity 22, and transverses wing portions 23. These extremities and wing portions are preferably made rectangular in form. The extremities are folded back upon themselves to provide spaced apart substantially parallel contacting leg portions 24 and 25 to form a U-shaped receptacle, jointed at one extremity by an offset substantially cylindrical portion 26, as clearly shown in Figure 3. However, it is desirable that the receptacle be provided with some desirable means in order to prolong its life by increasing its resiliency.

The contacting leg portion 24 near the portion 26 is preferably provided with an inwardly extending finger 27, which provides a stop for limiting the inward movement of the stud 3 on the lamp. The free end of portion 24 is curved outwardly as at 28 to engage the abutments 17. In order to insure a good electrical contact between the stud 3 and the receptacle, the leg 24 is preferably provided with a pair of longitudinally inturned portions 29, which may be provided at any desirable location, but as herein shown, are preferably formed by turning inwardly the marginal side edges, the front extremities of the portions 29 being preferably beveled, as indicated at 30, in order to provide cam surfaces assisting to guide the stud 3 more directly in between the leg portions of the receptacle.

The leg or contacting portion 25 of the receptacle is preferably provided with a detent 31 in the form of a rounded projection, which extends into the receptacle opposite the portions 29 for cooperation with the aperture 32 provided in the stud 3. The free extremity of the stud by engaging the stop 27 will position the aperture 32 to be received by the detent 31, the stud being pressed to firmly engage the portions 29 to insure good electrical engagement. The free end 33 of the leg 25 is flared or curved outwardly substantially the same as the free end of the other leg so that the two together provide a tapered entrance opening for the stud. Tongues 34 are provided adjacent the free end 33, and project rearwardly and outwardly to engage the abutments 20. Thus, the tongues 34 and free end 28 of the leg portions prevent bodily displacement of the receptacle after it has once been snapped into place.

The leg 25 is also provided with an auxiliary terminal receptacle 35 which is preferably formed by bending the wing portions 23 into a substantially tubular cylindrical formation extending alongside said leg. An inturned projection 36 extends into the auxiliary receptacle to cooperate with a groove or cove 37 of a plug conductor terminal 38. This terminal is provided with cylindrical or annular portions which normally engage the inner walls of the receptacle 35, and an enlarged cylindrical skirt portion which receives the insulation of a conductor 39, and limits the inward movement of the terminal whereby to position the groove 37 to receive the detent 36 for detachably retaining the terminal thereto.

As clearly shown by the dotted line forms of the receptacle 13 in Figure 3, the same when made is slightly expanded, that is the legs diverge. The receptacle may be inserted either from the front or back. Assuming it is assembled from the front, it is only necessary to insert and press the bight or cylindrical end 26 into the front end of passage 12 of the opening 10, until the tongues 34 provided on the leg 25 engage the abutments 20, whereupon the free end 28 of the leg 24 snaps outwardly into engagement with the abutments 17, thereby locking the receptacle in place. To assemble from the rear, the free ends of the receptacle are pressed together and inserted into the rear end of the passage of said opening until the free end 28 of the leg 24 engages the abutments 17, whereupon the free end of the leg 25 snaps outwardly causing the tongues 34 to engage the abutments 20. Thus, it is clearly evident that when the receptacle 13 is inserted into the mounting a predetermined distance, it will expand into locking engagement with the abutments. It will also be evident that the plug conductor terminal 38 may be connected to the auxiliary receptacle 35 before or after the receptacle 13 is locked within the mounting, and may be removed therefrom as desired without releasing the receptacle.

In some instances, it has been found desirable to provide means whereby the terminal receptacle may be easily and quickly disconnected from its mounting. Such release may be accomplished by inserting a tool through either end of the channel or slot 18 preferably adjacent its front end, to a point whereby the free extremity of the leg 24 may be engaged by the tool and pressed inwardly out of engagement with the abutments 17, whereupon the receptacle may be pulled or

pushed outwardly, in a direction opposite to that which it entered the mounting. The leg 25 may also be pressed inwardly to release the tongues 34 from abutments 20, whereupon the receptacle may be pulled or pushed out through the rear of the opening 10. Obviously, it is not essential to provide releasing means of the character just referred to.

The embodiment of the invention disclosed in Figure 7, will now be described. In this embodiment, the parts substantially correspond to the parts above described, except that different means are employed for locking the receptacle to the mounting.

The mounting 50 is provided with a plurality of longitudinal openings, including the opening 51. In lieu of the abutments 17, one wall of opening 51 is provided with an abutment 52 more or less centrally disposed with respect to said opening. The terminal receptacle 53 is similar to the receptacle 13, except that one of the legs, preferably leg 54 is provided with a pair of resilient tongues 55 which project outwardly toward each other so that the space between the tongues is such that the abutment 52 will be disposed therein when the receptacle is properly snapped into place as clearly shown. The other leg is provided with a stop 56 whereby to limit inward movement of a terminal stud 57. Said leg is also provided with an auxiliary terminal receptacle 58 corresponding to the receptacle 35, above referred to, for receiving a plug conductor terminal. The parts are so constructed and arranged that the receptacle 53 may be inserted into the mounting 50 from either end, and the stud and plug conductor terminal may be attached to the receptacles as desired. A leg may have a loop 59 to improve certain effects.

Accordingly, it should be apparent that improved electrical connection means have been provided, including a receptacle having at least a pair of extremities, at least one of which is adapted to receive a terminal of a particular type, and another of which is adapted to receive a terminal of an entirely different character.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of the invention; and, therefore, I do not wish to be understood as limiting myself to the exact forms, constructions, arrangements, and combinations of parts herein shown and described.

I claim:

1. Electrical connection means including, a substantially U-shaped elongated terminal receptacle, a generally tubular receptacle, integrally connected to one of the legs of said U-shaped receptacle, means projecting into one of said receptacles from said one leg providing a detent for a terminal, and oppositely disposed resilient tongues provided on the other leg of said U-shaped receptacle for locking said connection means with respect to a support.

2. An electrical connector including, an insulator member having a hole therein, a portion of the insulator projecting into the hole, a conductor member insertable into either end of the hole disposed in the hole, and said conducting member having a wall provided with at least a pair of longitudinally spaced apart resilient fingers independently operable of each other engaging the sides of said portion for holding the members assembled, said conducting member having a second wall folded back upon said first-mentioned wall whereby to provide a receptacle adapted to receive a plug conductor terminal, and said second wall being provided with means projecting in a direction opposite to that of the fingers providing means to which a conductor may be secured.

3. An electrical connector including an insulator member having a hole therein, a portion of the insulator projecting into the hole, a conductor member insertable into either end of the hole disposed in the hole, and said conducting member having a wall provided with at least a pair of longitudinally spaced apart resilient fingers independently operable of each other engaging the sides of said portion for holding the members assembled, said conducting member having a second wall folded back upon said first-mentioned wall whereby to provide a receptacle adapted to receive a plug conductor terminal, said second wall being provided with means providing a receptacle for receiving a plug conductor terminal, and said second wall providing a common wall between both of said receptacles.

4. An electrical connector including, an insulator member having a hole therein, abutment means provided in the hole, and a conducting member insertable into either end of said hole disposed in said hole, said conducting member being provided with at least a pair of longitudinally spaced apart resilient independently operable fingers projecting laterally with respect to the conducting member and engaging said abutment means for holding the members assembled, said conducting member including a first wall from which said fingers project and a second wall arranged alongside of said first wall providing means between which a conductor terminal may be secured, and said second wall being provided with means apart from said first wall whereby a conductor terminal may be secured to said means on said second wall.

5. An electrical connector comprising, a single piece of insulating material provided with an aperture extending therethrough, said aperture being enlarged at its ends to form recesses joined by the remaining intermediate restricted portion, the base of each recess forming with the restricted portion a shoulder, an insert insertable into either end of the aperture disposed in said aperture, said insert having a first wall, yieldable portions of said insert projecting into the adjacent recess and engaging the corresponding shoulder whereby to hold said piece and said insert in assembly, said insert including a second wall arranged alongside of said first wall providing means for receiving a terminal between the walls, and said second wall being provided with a tubular portion providing a receptacle adapted to receive a plug conductor terminal of the snap type.

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