Aug. 15, 1939. S. M. DEL CAMP 2,169,961

SHIELDED PLUG AND SOCKET MEMBER

Filed Oct. 31, 1936

Fig. 1.

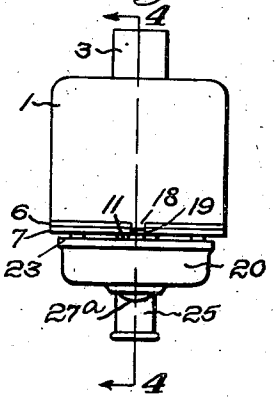


Fig. 2.

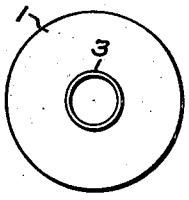


Fig. 3.

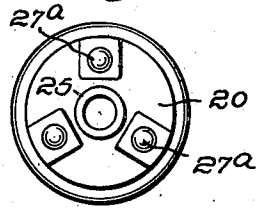


Fig. 5.

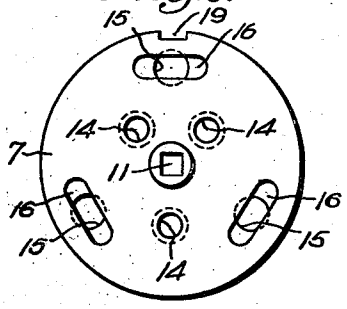


Fig. 4.

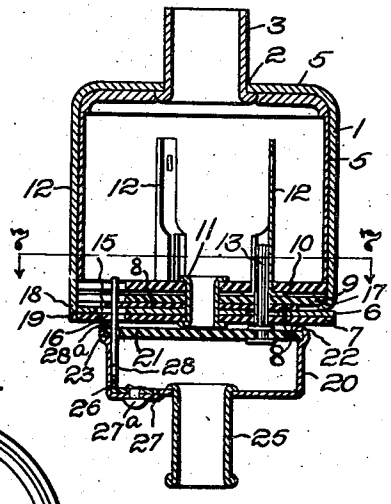


Fig. 8

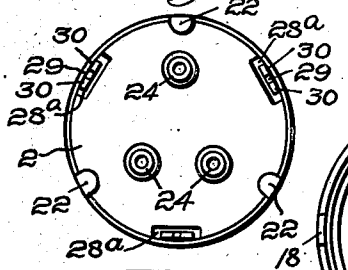


Fig. 6.

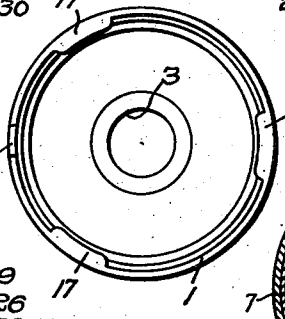


Fig. 7.

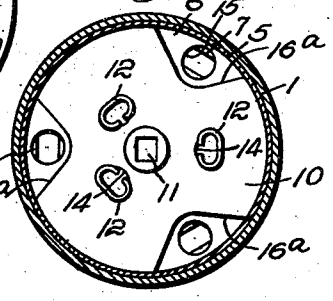


Fig. 9.

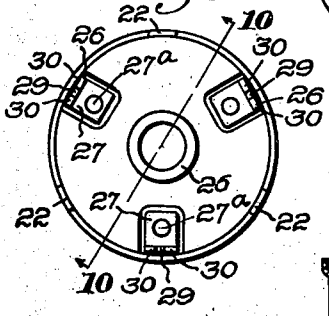
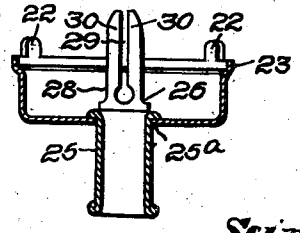


Fig. 10.



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UNITED STATES PATENT OFFICE

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SHIELDED PLUG AND SOCKET MEMBER

Scipione M. Del Camp, Maywood, Ill., assignor to Cinch Manufacturing Corporation, Chicago, Ill., a corporation of Illinois

Application October 31, 1936, Serial No. 108,613

4 Claims. (Cl. 173—332)

My invention relates to improved plug and socket members which are shielded against external electrical disturbances.

In the drawing, which represents a preferred embodiment of my invention:

Figure 1 is a side elevation showing my improved plug and socket members in connected relation;

Fig. 2 is a top plan view of the device shown in Fig. 1;

Fig. 3 is a bottom plan view of the device shown in Fig. 1;

Fig. 4 is an enlarged section taken along the line 4—4 of Fig. 1;

Fig. 5 is a bottom plan view of the base assembly of my improved socket member;

Fig. 6 is a bottom plan view of the shield part of my socket member;

Fig. 7 is a section taken along the line 7—7 of Fig. 4;

Fig. 8 is a plan view of the plug member of my connection;

Fig. 9 is a plan view of the shield part of my plug member; and

Fig. 10 is a section taken along the line 10—10 of Fig. 9.

Referring in detail to the drawing, the socket member of my invention as illustrated comprises a relatively deeply hollowed metal cup-shaped shield 1 which may be cylindrical or of any other suitable shape. The cup 1 has an open end and an aperture 2 at the other end to allow the entrance of a wire or group of wires into the shield 1. A neck portion 3, having a longitudinal opening, may be secured to the cup 1 with its longitudinal opening in alignment with the aperture 2. The neck 3 is preferably of sufficient length to permit a metallic shield (not shown), or other form of cover for insulated wire, to be drawn over or into and permanently electrically secured to the cup 1. This is one way my device may be grounded. Fiber linings 5 may be disposed around the interior of the cup 1 so as to insulate parts of the device disposed within the cup from the walls of the cup. A socket base assembly carrying contact terminals is secured to the open end of the cup 1 in a manner which will be hereinafter described.

The socket base assembly, as most clearly illustrated in Figs. 4 and 7, comprises a plurality of plates secured together and contact terminals carried by one or more of the insulating plates of the assembly. My preferred form of base assembly includes a metal plate 6, an insulating plate 7 of substantially the same diameter as the plate 6 disposed on one side of the plate, and an insulating plate 8 of lesser diameter on the other side. A pair of insulating plates 9 and 10, having a greater diameter than the plate 8 but less than the plate 6, are provided on the opposite side of the insulating plate 8 from the metal plate 6. The several plates are preferably connected together by a rivet means 11, as most clearly shown in Fig. 4. Socket contact terminals 12 are carried by the base assembly and each terminal is firmly secured to the same in my preferred device by reason of a flange portion 13 (Fig. 4) disposed between the plates 9 and 10 when the plates are in assembled relation. Each of the plates 6, 7, 8 and 9 have apertures 14 in alignment with the prong-receiving portion of the contact terminals 12 to allow entrance of the prongs of the cooperating plug member into the contact terminals. The prong-receiving aperture of the metal plate 6 has a relatively large diameter preventing the plug prongs from contacting the material of the plate 6 during entrance into the socket terminals. The metal plate 6 has a plurality of apertures 15 adapted to receive attaching means in electrical contact with the cup of the cooperating plug member, the apertures 15 being of such minimum diameter that the attaching means engage the walls surrounding the apertures providing electrical contact between the cup of the plug member and the plate 6. Apertures 16 are formed in the insulating plate 7 to allow entrance of the attaching means of the plug member into the apertures 15 of the metal plate. The insulating plates 9 and 10 may be notched as at 16a (Fig. 7) to allow the attaching means of the plug member to pass entirely through the base assembly of the socket, as most clearly shown in Fig. 4. The base assembly of the socket is attached to the cup 1 through means of ear-shaped portions 17 (Figs. 4 and 6) formed adjacent the open end of the cup 1 and crimped over the insulating plate 9, as most clearly shown in Fig. 4. It is important to notice that the insulating plate 8 spaces the plate 9 a proper distance from the plate 6 to allow the lugs 17 to engage the plate 6 when they are in clamped relation with the plate 9 for the purpose of attaching the base assembly to the cup. As a result of this construction the plate 6 is in positive electrical contact with the cup 1 when the parts of the socket member are in final assembly. A lug 18, integral with the material adjacent the open end of the cup 1, extends into a notch 19 provided in the peripheral edge of the plates 6 and 7 for the

purpose of preventing relative rotation of the cup and base assembly.

The plug member of my device comprises a metal cup-shaped shield 20 which is preferably of less diameter and depth than the cup 1 of the socket member. An insulating plate 21 is affixed to the bottom of the cup through means of lugs 22 (Figs. 4 and 8) integral with the open end of the cup and bent over to clamp the plate 21 within a narrow peripheral ridge 23 formed adjacent the open end (Figs. 4 and 10). Contact prongs 24, adapted for contact with the cooperating contact elements 12 of the socket member of the connection, are anchored to the plate 21. In my preferred form a cylindrical neck portion 25 is attached to an end of the cup 20 having a longitudinal opening in alignment with an opening 25a in the cup 20. The longitudinal opening of the neck 25 is wide enough to allow a wire or a group of wires to pass into the cup for attachment to the prong terminals 24, and the neck 25 is long enough to allow a metallic shield, or other form that covers insulated wire, to be drawn over or into it and to be permanently electrically secured to the cup 20. In order that electrical contact may be established between the cup 20 and the plate 6 of the socket member when the plug and socket members are in connected relation, I have provided attaching members 26, which are preferably three in number, as shown in Figs. 8 and 9. The attaching members 26, in my preferred form, have a foot portion 27 secured to the bottom of the cup member 20 in any suitable manner as by rivets 27a (Fig. 4) and a straight portion 28 substantially adjacent the side walls of the cup 20 and extending through apertures 28a in the insulating plate 21 and beyond the plate 21 a sufficient distance for complete engagement with the plate 6 of the socket member. At the free end of each of the attaching members a slot 29 is provided forming a pair of yieldable arms 30. The yieldable arms 30 are normally wider than the diameter of the apertures 15 of the metal plate 6 with the result that the arms 30 are compressed to pass through the aperture 15, after which action they expand to engage firmly the material surrounding the aperture. The arms 30 are preferably beveled at the outer edges of their respective free ends providing a camming action for easy insertion of the arms into their respective apertures.

In connecting the plug and socket members the prongs 24 of the plug member are aligned with the prong-receiving apertures of the plates of the socket member and at the same time the yieldable arms 30 of the attaching means of the plug member take a position in alignment with the apertures 15 in the metal plate 6. During movement of the prongs 24 into engagement with the socket contact elements 12, the yieldable arms 30 pass through the apertures 15 so as to engage the material surrounding the apertures in the manner which has been described. When the plug and socket members are in final connection there is complete electrical contact between the respective shields of the plug and socket members as a result of the fact that the plate 6, in electrical contact with the shield cup 1, is engaged by the attaching means of the plug member which is itself in electrical contact with the shield cup 20.

My invention is particularly useful in connection with automobile radios, with which installations it is essential to have electrical connections which are completely shielded from all outside interferences by suitably grounding the shielding means so as to insure clear radio performance. I do not, however, wish to limit the uses of my invention solely to radio installations as there are many other electrical appliances with which my shielded connector may be advantageously used.

I realize that the stud and socket parts of the respective members could be interchanged and many other modifications of the construction and uses of my invention made without departing from the spirit and scope thereof, and for that reason my invention is best defined by the following claims.

I claim:

1. An electrical shielded device comprising plug and socket members, each of said members having a hollow metal shield and carrying respective stud or socket electrical contact elements, the stud contact elements of one of said members adapted to extend into cooperative engagement with the socket contact elements of the other of said members when said members are in connected relation, one of said members carrying an apertured metal plate normally insulated from the respective contact elements of said member but in electrical contact with the shield thereof, and the shield of said other member carrying at least one yieldable fastener member normally insulated from the respective contact elements of said last mentioned member but in electrical contact with and projecting beyond the shield thereof, said yieldable fastener member extending through the aperture of said metal plate and directly engaging the material of said plate surrounding said aperture and within the shield thereof when said plug and socket members are in connected relation whereby said shields are electrically connected one with another without overlapping.

2. An electrical circuit device comprising plug and socket members each of which is provided with a hollow cup shape shield, one of said members having stud contact elements and the other having socket contact elements receiving said stud contact elements, one of said members carrying an apertured plate directly connected to its shield adjacent its open end and normally insulated from the contact terminals of said member, and the other of said members having a fastener stud means in electrical contact with its shield and extending through and in cooperating fastening engagement with said plate adjacent the aperture thereof within the shield of said first mentioned member to provide a compact shielded separable connection.

3. A socket member for an electrical connection including a metal cup having an open end, said cup having another opening through which at least one conduit may be entered into said cup, a metal plate at the open end of said cup, said plate having apertures to receive conducting members which are in electrical contact with the cup of a cooperating member of the connection, an insulating plate on the lower side of said metal plate, at least two insulating plates on the upper side of said metal plate, contact terminals carried by said last mentioned insulating plates, means connecting said plates together, and said cup having a number of integral ear-shaped portions at said open end in crimped engagement with the lower side of one of the insulating plates positioned on the upper side of said metal plate whereby said metal plate and said insulating plates are attached to said cup, and said ear-shaped means contacting said metal

plate when they are in engagement with said insulating plate whereby said cup and said plate are in electrical contact one with another.

4. A plug member for an electrical connection including a metal cup having an open end and another opening through which at least one conduit may be entered into said cup, an insulating plate secured to the open end of said cup, a plurality of contact terminals carried by said insulating plate and a plurality of L-shaped fastener members normally insulated from said contact terminals, said fastener members having one end secured to the bottom of said cup and the free end extending through said insulating plate to a position beyond the same, said free end having yieldable fastener means adapted to enter and engage the material surrounding the aperture of a metal plate, which plate is in electrical engagement with the shield cup of another member of said plug and socket connection.

SCIPIONE M. DEL CAMP.