

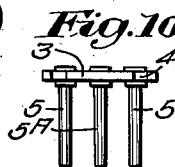
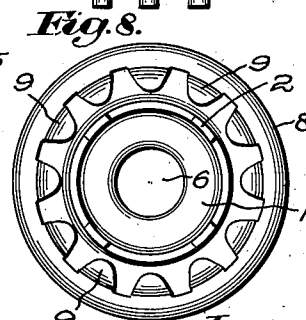
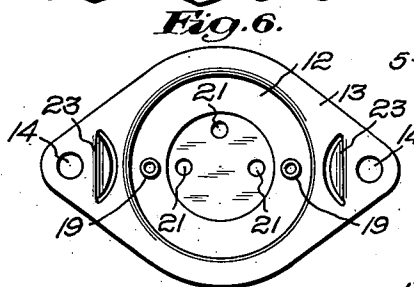
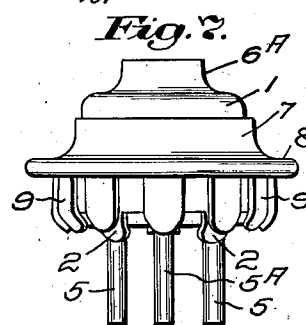
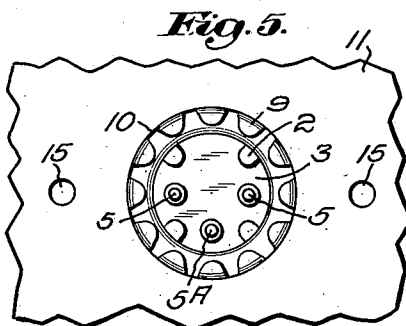
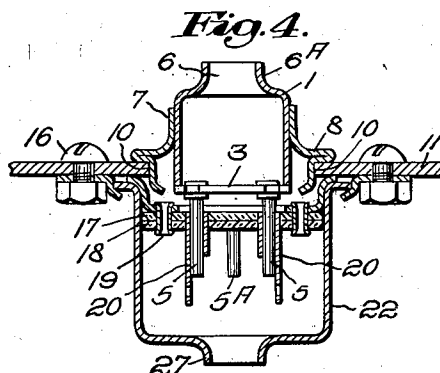
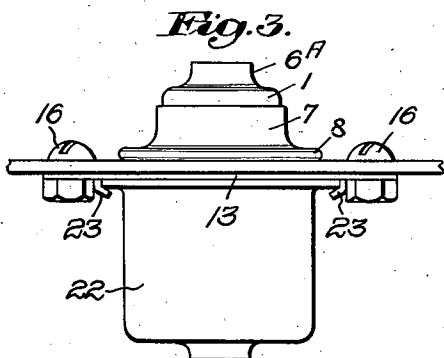
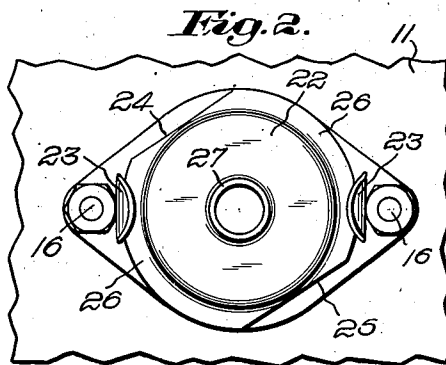
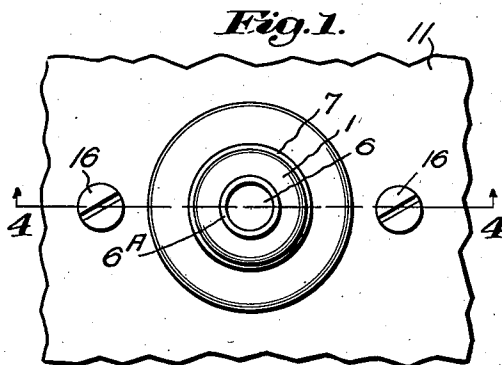
Nov. 24, 1936.

S. M. DEL CAMP

2,062,256

PLUG AND SOCKET SHIELD AND GROUND CONNECTER

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PLUG AND SOCKET SHIELD AND
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18 Claims. (Cl. 173-332)

My invention relates to a plug and socket shield and ground connecter and the combination with its support.

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

Figure 1 is a top plan view of my plug and socket connection installed with a supporting strip, only the plug member being visible;

Fig. 2 is a bottom plan view of my plug and socket connection installed with a supporting strip, only the socket member being visible;

Fig. 3 is a side elevation of my plug and socket connection and supporting strip;

Fig. 4 is a section taken on the line 4-4 of Fig. 1;

Fig. 5 is a plan view of the plug member attached to a supporting strip;

Fig. 6 is a front view of the socket member;

Fig. 7 is a side elevation of the plug member;

Fig. 8 is a front view of a plug member before an insulating plate with contact prongs has been attached;

Fig. 9 is a front view of the insulating plate carrying the contact prongs for a plug member; and

Fig. 10 is a side elevation of the plate and prongs shown in Fig. 9.

Referring now more in detail to the drawing, the plug of my invention, as illustrated, comprises a metal cup 1 which may be cylindrical or any other suitable shape. Integral with the open end are a plurality of finger-shaped elements 2 which are bent over, as shown in Fig. 7, to hold an insulating plate 3 in firm assembly therewith. The insulating plate 3, as shown in Figs. 9 and 10, is relieved in places around its outer periphery to form the notches 4 which are adapted to receive and hold in place the finger elements 2. A predetermined number of contact prongs or studs 5 are anchored to the plate 3 and adapted for contact with cooperating contact terminals of the socket member. In my preferred form, as illustrated, I have shown three prongs attached to the insulating plate, one of which (5^a) is employed as a positioner, but it is understood that the plate may be constructed to carry any number and in no matter what form without departing from the spirit of my invention.

An opening 6 is extruded on the side or end of the metal cup 1 directly opposite to the end carrying the plate 3. In my preferred form, as illustrated, the opening 6 has a neck 6^a which is large enough on the inside to allow the entrance of a wire or group of wires into the cup 1 for attachment to the prongs 5 of the plate 3, and

which is of sufficient length to permit a metallic shield or other form that covers insulated wire to be drawn over and permanently secured to the cup 1.

At a desired point along the cup 1 I have press-fitted a metal collar 7 having a flange 8 and a plurality of resilient fingers 9 (Figs. 7 and 8) integral with said flange and extending from beneath the flange in the form of an annular series of spring engagement through an aperture 10 of a predetermined size in the supporting strip 11 as shown in Figs. 4 and 5.

By this construction I have provided a plug which is readily and rigidly held in position upon the strip 11 and which at the same time will shield its conducting means from all interruptions.

The socket of my invention comprises a metal cup 12, a preferred form of which is shown in Fig. 6, of predetermined depth and diameter and of any suitable shape, having a flange 13 integral with its open edge. The flange 13 is provided in my preferred form with apertures 14 adapted to be aligned with cooperating apertures 15 (Fig. 5) in the strip 11 whereby the cup 12 may be secured to the strip by any suitable means such as a bolt and nut 16.

To the bottom of the cup 12 I have affixed two insulating plates 17 and 18 (Fig. 4) by means of the rivets 19. The bottom of the plates 18 will carry a predetermined number of suitable spring contact terminals 20 adapted to receive the prong members 5 of the plug. The upper plate 17 is provided with a number of apertures 21 in alignment with the entrances of the socket terminals 20 and adapted to allow the entrance of the prongs 5 of the plug member. The apertures 21 exactly match the layout of the prongs 5 and are also of sufficient thickness so that the said prongs will not come into contact with the socket prong-receiving terminals 20 until they are in perfect alignment, thus avoiding the possibility of the plug prongs coming in contact with any metal surrounding the socket other than the contact terminals intended for this purpose.

As a means of providing an uninterrupted electrical connection through the socket, I have assembled with the cup 12 a hollow flanged metal shield 22, and as a means for securing the shield to the cup 12, I have, in my preferred form, pressed a pair of ears or lugs 23 from the flange 13 of the cup member. The flange of the cup member is relieved at 24 and 25, as shown in Fig. 2, so that when pressed over the cup 12

and against the flange 13 it will clear the ears 23 and then, by turning the shield 22 through a predetermined number of degrees, the uncut flange portions 26 are forced under the ears 23 and snapped in position thus completing a metal shield for the socket member. The metal shield 22 is of sufficient depth so that when it is in assembled position up against the flange 13 it will completely surround and enclose the assembly of socket terminals. The bottom or side of the metal shield has, in my preferred form, a drawn neck 27 (Figs. 3 and 4) having an opening wide enough to allow a wire or wires to pass through for attachment to the socket terminals and the neck 27 being long enough to allow a metallic shield or other form that covers insulated wire to be drawn over and permanently secured to the shield 22.

In final assembly of my plug and socket installation the socket, together with its attached shield, is rigidly mounted on one side of the panel or support where the connection is to be used. The plug member is then inserted on the opposite side thus making an uninterrupted metal shield together with the wire shields for the wires leading from opposite directions respectively to plug and socket.

My invention is especially useful in connection with automobile radios for which installations shielded electrical connections are absolutely essential in order to minimize outside interferences and thereby 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:

1. In combination with a supporting strip, electrical plug and socket members located on opposite sides of said strip, each of said members having a hollow metal shield, the shield of each of said members secured on the opposite side of said strip independently of the other of said shields, one of said members having stud contact elements and the other having socket contact elements receiving said stud contact elements and each of said shields having an aperture whereby an electric conduit is passed into said member for attachment with the contact elements of said respective members.

2. In combination with an apertured supporting strip, electrical plug and socket members located on opposite sides of said strip, said socket member being rigidly affixed to said strip, said plug member including a cup and a metal shield attached thereto, one of said members having stud contact elements and the other having socket contact elements for receiving said stud elements, said socket member including a cup and a hollow shield affixed to said cup, and each of said members having an aperture whereby at least one conduit is passed into said member for attachment with the contact elements of said respective members.

3. In combination with an apertured supporting strip, electrical plug and socket members located on opposite sides of said strip, each of said members having a metal cup and carrying respective stud or socket electrical contact elements,

the stud contact elements of one of said members adapted to extend through an aperture of said strip for cooperative engagement with the socket contact elements of the other of said members when said members are in connected relation, the cup of said plug member having a metal collar attached thereto and a means connected with said collar for detachably securing said member to said strip, the cup of said socket member being rigidly attached to said strip, said latter cup having a hollow metal shield assembled therewith and completely enclosing said cup, and each of said members having an aperture whereby at least one conduit is passed into said member for attachment with the contact elements of said respective members.

4. In combination with an apertured supporting strip, electrical plug and socket members located on opposite sides of said strip, each of said members having a metal cup and carrying respective stud or socket electrical contact elements, the stud contact elements of one of said members adapted to extend through an aperture of said strip for cooperative engagement with the socket contact elements of the other of said members when said members are in connected relation, the cup of said plug member having a metal collar permanently fitted to said cup at a predetermined point along the length thereof, said collar having a flanged base and a plurality of resilient fingers extending from beneath said base for spring engagement with the walls surrounding an aperture of said strip, the cup of said socket member being rigidly attached to said strip, and said socket member having a hollow metal shield secured to said cup and enclosing at least a portion of the same, and each of said members having an aperture through which at least one conduit is passed into said member for attachment with the contact elements of said respective members.

5. In combination with an apertured supporting strip, electrical plug and socket members located on opposite sides of said strip, each of said members having a metal cup carrying at least one thin insulating plate, said plates carrying respective stud or socket contact elements, the stud contact elements of one of said members adapted to extend through an aperture of said strip for cooperative engagement with the socket contact elements of the other of said members when said members are in connected relation, the cup of said plug member having a metal collar permanently fitted thereto and means carried by said collar for cooperating with the walls surrounding an aperture of said strip whereby said plug member is detachably secured to said strip, the cup of said socket member having a flanged base and means connected with said base and said strip whereby said cup is secured to said strip, and said socket member having a hollow cup-shaped shield detachably secured to said cup and enclosing at least a portion of the same, and each of said members having an aperture through which at least one conduit is passed into said member for attachment with the contact elements of said respective members.

6. In combination with an apertured supporting strip, a pair of electrical plug and socket members located on opposite sides of said strip, each of said members having a metal cup and means connected with each of said cups whereby at least one thin insulating plate is attached thereto, respective male and female electrical contact elements carried by said plates, said

plug member having a metal collar permanently fitted to the cup of said member at a desired point along the length thereof and means carried by said collar for detachably securing said plug member to said strip, and said plug having a plurality of male contacting elements extending through an aperture of said strip for electrical engagement with the female contacting elements of said socket, the cup of said socket member having a flanged base, said base and said strip each having a means cooperating to secure said cup to said strip, and said socket member having a hollow metal shield assembled with said cup, said cup and said shield each having a means adapted to cooperate for detachably securing said shield to said cup, and each of said members having an aperture whereby at least one conduit is passed into said member for attachment to respective contact elements.

7. A plug for electrical connections including a cup open at both ends and having a means integral with one of said ends whereby at least one insulating plate is attached to said cup, said insulating plate having at least one contact terminal affixed thereto, and snap fastener means extending below one end of said cup and adapted to engage the material of a supporting strip for securing said plug thereto.

8. A plug for electrical connections including a sheet metal cup, said cup having a means at its open end whereby a thin plate of insulating material is attached thereto, said insulating plate having at least one contact terminal permanently affixed thereto, and a metal collar fitted permanently around said cup between opposite ends thereof, said collar having a flanged base and a plurality of resilient fingers extending downward from said base for spring engagement with the walls surrounding an aperture of a supporting strip whereby said plug is detachably secured to said strip, and said plug member having a drawn apertured neck whereby a conduit is passed into said member for attachment to said contact terminals.

9. A plug for electrical connections including a sheet metal cup open at both ends and having a means at one of said ends whereby an insulating plate is attached thereto, said plate having at least one contact prong permanently assembled therewith and extending from said plate for electrical connection with cooperating contact terminal or terminals of a socket member, and said cup having a metal collar permanently fitted around said cup between opposite ends thereof, said collar having a flanged base and a plurality of resilient fingers integral with said base and extending from beneath said base for spring engagement with the walls surrounding an aperture of a supporting structure whereby said plug is detachably secured to said support.

10. A plug for electrical connections including a cylindrical sheet metal cup having an opening at both ends, a plurality of fingers integral with one of said open ends, said fingers being bent over to hold a thin insulating plate in assembly with said end, said plate having a plurality of contact prongs permanently affixed thereto and descending from said plate for electrical connection with cooperating contact terminals of a socket member, and said cup having a sheet metal collar permanently fitted thereto between opposite ends thereof, said collar having a flanged base and said base having an annular series of relatively narrow resilient fingers extending from beneath said base for spring engagement with

the walls surrounding an aperture of a predetermined size in a supporting strip whereby said plug is detachably secured to said strip.

11. In a socket for electrical connection the combination of a cup member having fastening engagement with a supporting structure, said cup member having openings at both ends thereof, one of said ends having at least one insulating plate affixed thereto, said plate carrying at least one contact terminal for engagement with a cooperating contact terminal of a plug member and a hollow metal shield assembled with said cup, said shield enclosing said cup and having an aperture through which at least one conduit may be entered into said shield for connection with said contact terminal.

12. In a socket for electrical connection the combination of a cup member having fastening engagement with a supporting structure, said cup member having openings at both ends thereof, one of said ends having a plurality of insulating plates affixed thereto, at least one of said plates carrying contact terminals for engagement with the cooperating contact terminals of a plug member and a hollow metal shield assembled with said cup and enclosing at least a portion of the same, said cup and said shield having integral means cooperating to secure said shield to said cup, said shield having an aperture through which at least one conduit may be entered into said shield for connection with said contact terminals.

13. In a socket for electrical connection the combination of a cup member having a flange integral with an edge of the open end thereof, said flange having a means cooperating with a means on a supporting strip whereby said cup is attached to said strip, the end of said cup opposite said open end having an aperture to receive the contact studs of a cooperating plug member, said latter end having at least one insulating plate permanently affixed to the bottom thereof, said plate carrying a predetermined number of contact terminals for electrical connection with the contact studs of said plug member and a cup-shaped metal shield assembled therewith and enclosing said cup, said cup and said shield having means cooperating to secure said shield to said cup, and said shield having an aperture through which at least one electrical conduit may be passed for connection with said terminal contacts.

14. In combination with a supporting strip, a socket for electrical connection with a plug member including a metal cup having a flange integral with the open end thereof, said flange having a means cooperating with a means on a supporting strip whereby said cup is attached to said strip, said flange located adjacent to said supporting strip, said supporting strip having an aperture in alignment with the opening of said flanged end whereby the contact studs of a plug member located on the other side of said strip from said cup may be passed into said cup, the end of said cup opposite said open end having an aperture to receive said studs, said latter end having a plurality of insulating plates permanently affixed thereto, at least one of said plates carrying a predetermined number of contact terminals for electrical connection with the studs of said plug member, and a metal shield assembled with said cup, said cup and said shield having means cooperating for securing said shield to said cup, said shield being of sufficient width and depth to encompass said cup member and the contact ter-

minals assembled therewith, and said shield having an aperture through which conduits may be passed into said shield for connection with said contact terminals.

- 5 15. In combination with a supporting strip, a socket for electrical connection with a plug member including a metal cup having a flange integral with the open end thereof, said flange having a means cooperating with a means on a supporting strip whereby said cup is attached to said strip, said flanged end located adjacent to said supporting strip, said supporting strip having an aperture in alignment with the opening of said flanged end whereby the contact studs of a plug member located on the other side of said strip from said cup may be passed into said cup, the end of said cup opposite said open end having an aperture to receive said studs, said latter end having a plurality of thin insulating plates permanently secured to the material surrounding the opening of said latter end, at least one of said plates having a predetermined number of apertures to guide the contact prongs of said plug member, the remainder of said plates carrying a predetermined number of contact terminals for connection with said plug prongs, said terminals being in alignment with the apertures of said guide plate, and a hollow metal shield assembled with said cup, said shield having an aperture through which electrical conduits may be passed for connection with said contact terminals.

- 20 16. In combination with a supporting strip, a socket for electrical connection with a plug member including a metal cup having a flange integral with the open end thereof, said flange having a means cooperating with a means on a supporting strip whereby said cup is attached to said strip, said flange located adjacent to said supporting strip, said supporting strip having an aperture in alignment with the opening of said flanged end whereby the contact studs of a plug member located on the other side of said strip from said cup may be passed into said cup, the end of said cup

opposite said open end having an aperture to receive said studs, said latter end having a plurality of insulating plates permanently affixed thereto, at least one of said plates carrying a predetermined number of contact terminals for electrical connection with the studs of said plug member, said cup member having ears pressed from predetermined points on said flange, and a hollow metal shield member having a flange relieved at stated points whereby said shield may be placed over said cup and against the flange of said cup and turned so that the full sized flange of said shield is forced under said ears and said shield is detachably secured to said cup, said shield having a neck at the end opposite said flanged end, said neck having an aperture whereby a conduit may be passed into said shield for connection to said socket contact terminals.

17. A plug for electrical connections including a cup open at one end, said open end having a means whereby at least one insulating plate is attached to said cup, said plate carrying at least one contact terminal for engagement with a cooperating socket terminal, a collar assembled permanently with said cup and encircling said cup between opposite ends thereof, said collar having means whereby said plug may be attached to a supporting strip, and said cup having an aperture whereby an electrical conduit is passed in for attachment to said contact terminal.

18. In combination with an apertured metal supporting strip, electrical plug and socket members one of which is secured directly to said supporting strip, said plug and socket each having insulating parts carrying interengaging contact members, a metal shield associated with at least one of said members for the purpose of keeping out external interference and another metal part connected to said supporting strip and having yieldable means holding the shielded member in place.

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