Sept. 19, 1939. W. G. ROBY 2,173,323

SHIELDED PLUG AND SOCKET DEVICE

Filed Nov. 20, 1936

Fig 1

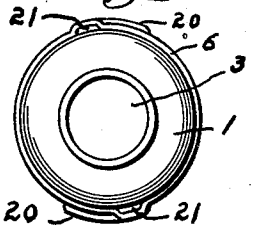


Fig 3

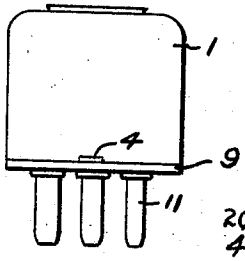


Fig. 6

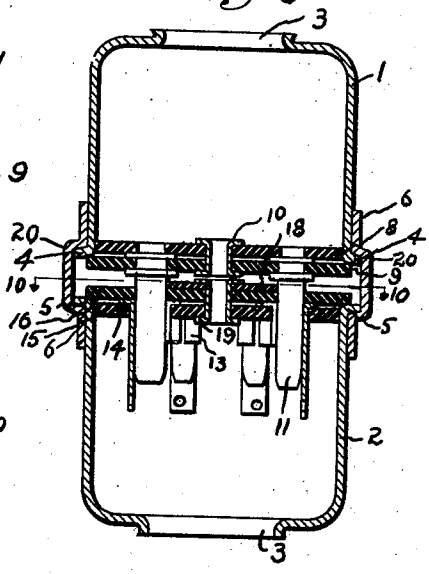


Fig. 2

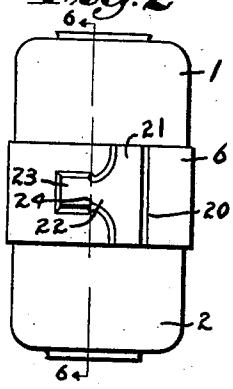


Fig. 4

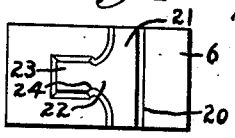


Fig. 5

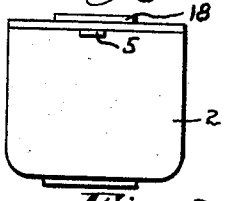


Fig. 7

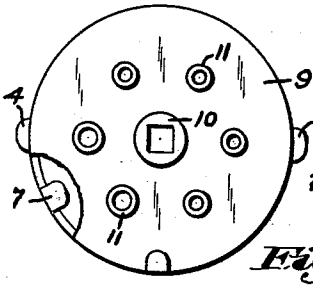


Fig. 8

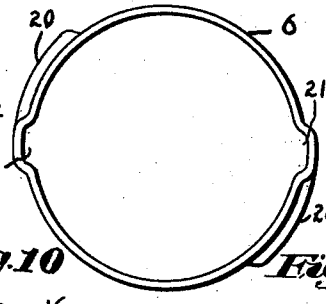


Fig. 9

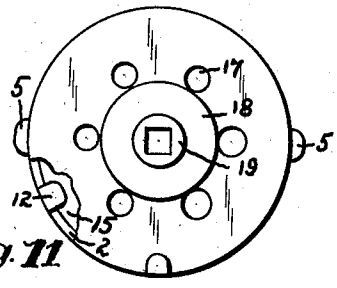


Fig. 10

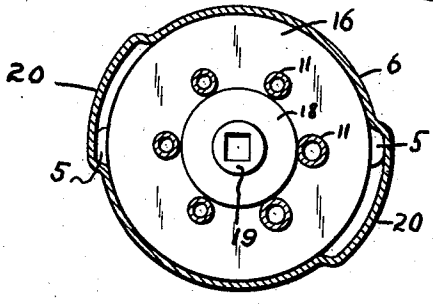
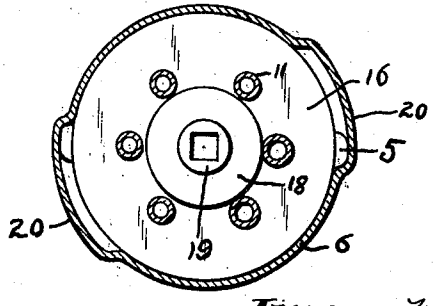


Fig. 11



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SHIELDED PLUG AND SOCKET DEVICE

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Application November 20, 1936, Serial No. 111,812

2 Claims. (Cl. 173—328)

My invention relates to an improved electrical plug and socket shielded device.

Referring to the drawing, in which I have illustrated a preferred embodiment of my invention:

Figure 1 is a top plan view showing my improved plug and socket members maintained against unintentional separation through means of my improved coupling device;

Fig. 2 is a side elevation of the device shown in Fig. 1;

Fig. 3 is a side elevation of the plug member of the device shown in Fig. 2;

Fig. 4 is a view of my improved fastener coupling per se;

Fig. 5 is a side elevation of the socket member of the device shown in Fig. 2;

Fig. 6 is an enlarged section taken along the line 6—6 of Fig. 2;

Fig. 7 is an enlarged bottom plan view of the plug member shown in Fig. 3, a portion being cut away to show one method of attaching the base assembly of the member to its respective shield;

Fig. 8 is an enlarged bottom plan view of the fastener coupling shown in Fig. 4;

Fig. 9 is an enlarged bottom plan view of the socket member shown in Fig. 5, a portion being cut away to show one method of attaching the base assembly of the member to its respective shield;

Fig. 10 is a section taken along the line 10—10 of Fig. 6 showing my fastener coupling in unlocking position; and

Fig. 11 is a section similar to that of Fig. 10 showing my fastener coupling in locking position.

Referring in detail to the drawing, my preferred device, as illustrated, comprises shielded electrical plug and socket members joined against unintentional separation, my device being constructed and arranged to provide an uninterrupted electrical connection between metal cup-shaped shields secured to parts of my device carrying respective plug and socket terminals to keep out external electrical interference.

The plug member of my device has a metal cup-shaped shield 1 and the socket member of my device has a similarly shaped shield 2. Each of the shields 1 and 2 has an open end normally closed by the plug and socket base assemblies of the respective member and an opening 3 at the other end to allow entrance of a wire or group of wires, preferably surrounded by a metal shield (not shown), into the respective shield. Through the cable shield the plug and socket shields are preferably grounded. The shields 1 and 2 have respective ear-shaped elements 4 and 5 cooperating with a cylindrical fastener coupling 6 when the contact terminals of the respective members are in connected relation locking the shields together in a manner hereinafter described. The coupling 6 serves also to make uninterrupted electrical connection between the shields, as will be hereinafter more fully described.

The plug member of my device, in my preferred form, as most clearly illustrated in Figs. 3, 6 and 7, comprises a metal cup-shaped shield 1 which may be cylindrical or any other suitable shape. Integral with the free end of the shield 1 at its open end are a plurality of finger elements 7, one of which is shown in Fig. 7 bent over to engage one of the insulating plates of the base assembly so as to attach securely the base assembly to the shield. Two ears 4 integral with the free edge of the shield 1 at its open end extend in substantially perpendicular relation to the shield and are preferably disposed diametrically opposite one to another, as most clearly shown in Fig. 7. The plug base assembly, as most clearly illustrated in Figs. 6 and 7, comprises a plurality of insulating 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 pair of insulating plates 8 and 9 (Fig. 6) connected together by means such as a rivet 10 (Fig. 6). A number of contact prongs 11, adapted for contact with cooperating socket terminals of the socket member of my device, are anchored to the plate 9.

The socket member of my device, in my preferred form, as most clearly shown in Figs. 5, 6, and 9, comprises a metal shield 2 which may be cylindrical or any other shape. The shield 2 in my preferred device has a socket base assembly secured to its open end by a means such as the lugs 12, one of which is shown in Fig. 9 integral with the free edge of the shield at its open end and bent to engage a surface of one of the insulating plates of the base assembly so as to secure rigidly the base assembly to the shield. Two ears 5 are formed integral with the free edge of the shield 2 at its open end and extend in substantially perpendicular relation to the shield (Fig. 6). The ears 5 are preferably located in diametrically opposite relation, as most clearly shown in Fig. 9. Socket terminals 13 are carried by the base assembly and, in my

preferred form, each terminal 13 is firmly secured to the same by means of a flange portion 14 (Fig. 6) disposed between superposed insulating plates 15 and 16 of the base assembly. The plate 16 has apertures 17 in alignment with the prong-receiving portions of the contact terminals 13 to allow entrance of the contact prongs 11 of the cooperating plug member into the socket terminals 13.

A guide disk 18, also preferably of insulating material, is mounted on the outer side of the plate 16 substantially centrally thereof to guide the prongs, or rod-like contacts, 11 of the plug member of my device into the socket terminals 13. The superposed insulating plates 15 and 16 and the guide disk 18 are connected together by a means such as a rivet 19 (Fig. 6).

In order to assure that the plug member will be connected with the socket member properly, that is, with the proper prongs 11 in engagement with the proper socket terminals 13, two of the prongs 11 are of larger diameter, as most clearly indicated in Fig. 7, than the other prongs and two of the apertures 17 in the insulating plate 16 of the socket base assembly are of correspondingly larger diameter than the other holes 17 (Fig. 9). In connecting the plug and socket members, the prongs 11 of the plug member are disposed on the insulating plate 16 over the guide disk 18 and the tube is turned axially until proper orientation is had. As a result of the variance in the diameter of the prongs 11 and the aperttures 17, the plug member may be applied to the socket member in only one circumferentially defined relative position. It will be noticed that when the contact prongs 11 are in engagement with proper socket terminals 13, the diametrically opposed ears 4 and 5 of each of the respective shields 1 and 2 are so disposed circumferentially of the shields 1 and 2 that they are in alignment one with another, as most clearly shown in Fig. 6.

My improved fastener coupling 6, as most clearly shown in Figs. 4 and 8, comprises, in my preferred form, a metal tubing of a substantially cylindrical shape having an opening at both ends and being of slightly greater diameter than that of either of the shields 1 and 2. T-shaped embossments 20 are located on said coupling in diametrically opposite relation. Each of the embossments 20 has a head portion 21 extending from a point adjacent to one open end of the coupling across the coupling to a point adjacent the other open end. A tapered guide portion 22 extends from substantially the center of the head portion 20 terminating in a locking portion 23 having a slightly greater width than the narrowest portion of the guide portion 22. As a result of the relative dimensions of the portions 22 and 23, relatively rounded shoulders 24 are provided adjacent the free end of the portion 22 at the junction of the portion 22 with the portion 23 (Figs. 2 and 4).

In assembling the parts of my device the contact prongs 11 of the plug member are moved into electrical connection with the terminals 13 of the socket member with the ears 4 and 5 of opposed pairs in alignment one with another as hereinbefore described. The fastener coupling 6 is then slipped over one of the shields 1 and 2 with the ears 4 and 5 of opposed pairs of aligned ears coinciding with the head portion 20 of the T-shaped embossments 19. When the fastener coupling 6 is in this position it encircles portions of the shields 1 and 2 adjacent their open ends, as most clearly shown in Fig. 6. The shields 1 and 2 are now pressed slightly together so that the ears 4 and 5 of each aligned pair move toward each other and the coupling 6 is then rotated a few degrees passing the ears of each pair through the guide portions 22 and into the locking portions 23. As the ears 4 and 5 of each aligned pair pass the shoulders 24 adjacent the free ends of the tapered guide portions 20, pressure upon the shields 1 and 2 for moving them together is relaxed enabling the ears 4 and 5 of each aligned pair to expand into locking position behind the shoulders 24. Contraction and expansion of the ears 4 and 5 of each aligned pair are brought about in the main through the natural resiliency of the superposed insulating plates of the respective plug and socket base assemblies. After the coupling 6 has been moved into locking position, the plug and socket members are rigidly held together and are not readily detachable until such action should be desired. At the same time the fastener coupling 6 maintains an uninterrupted electrical connection between the shields 1 and 2 as a result of the fact that portions of the metal coupling are in engagement with portions of each of the respective shields 1 and 2, as most clearly shown in Fig. 6. It is apparent that this uninterrupted electrical connection between the two shields continues so long as the shields are locked together by means of the coupling 6. When disconnection of the plug member from the socket member is desired, the coupling is rotated in an opposite direction until the ears 4 and 5 of each aligned pair are disposed within the head portions of the respective embossments 20, in which position the coupling 6 is free to be slipped off and the plug and socket members capable of being disengaged.

As a result of my invention the plug and socket members of my electrical device cannot become separated unless the coupling 6 is first removed so that there is no danger of the plug and socket members becoming disconnected unintentionally so as either to expose a live contact, whereby a person may be endangered, or to interrupt a flow of current either partly or completely. At the same time my fastener coupling acts as a guard for preventing dirt or metal particles contacting the terminals of the plug or socket members so as to cause a short circuit between the members. It is apparent that my improved electrical device may be used with any electrical appliance or in any electrical circuit where the plug and socket members should be connected in such a way that they cannot unintentionally become separated.

I realize that parts of the respective stud and socket members could be interchanged and many other modifications of the particular 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 device comprising plug and socket members, each of said members having a cup-shaped metal shield, each of said shields having two diametrically opposed integral ears, the ears of each of said respective shields extending outwardly in substantially perpendicular relation to said respective shield, respective ears of each of said shields aligning one with another when said plug and socket members are in connected relation, one of said members having stud contact elements and the other having socket contact elements receiving said stud contact elements, and a cylindrical metal coupling encircling said shields adjacent to the connected ends of said members,

said coupling having a pair of diametrically opposed embossments, said embossments having means receiving said aligned ears in the first position of said coupling relative to said ears, and said embossments having locking means receiving said ears upon rotation of said coupling for preventing unintentional separation of said plug and socket members, and said coupling having portions in electrical contact with each of said shields when the ears of said respective shields are in locked relation whereby said shields are in electrical connection with one another.

2. An electrical device comprising plug and socket members, each of said members having a shield, each of said shields having an integral projection, the projections of said shields aligning one with another when said plug and socket members are in connected relation, one of said members having stud contact elements and the other having socket contact elements receiving said stud contact elements and a cylindrical coupling encircling said shields adjacent to the connected ends of said members, said coupling having a T-shaped embossment comprising a head portion extending from edge to edge of the coupling parallel to the axis thereof, a tapered guide portion extending from the head portion and a locking portion at an end of the guide portion having a greater width than the narrowest portion of the guide portion, said head portion receiving said projections in the first position of said coupling relative to said projections and said locking means receiving said projections upon rotation of said coupling for preventing unintentional separation of said plug and socket members.

WILLIAM G. ROBY.