April 2, 1935. W. ERHARD 1,996,699

PLUG RECEPTACLE DEVICE

Filed Sept. 30, 1933 2 Sheets-Sheet 1

Fig. 1.

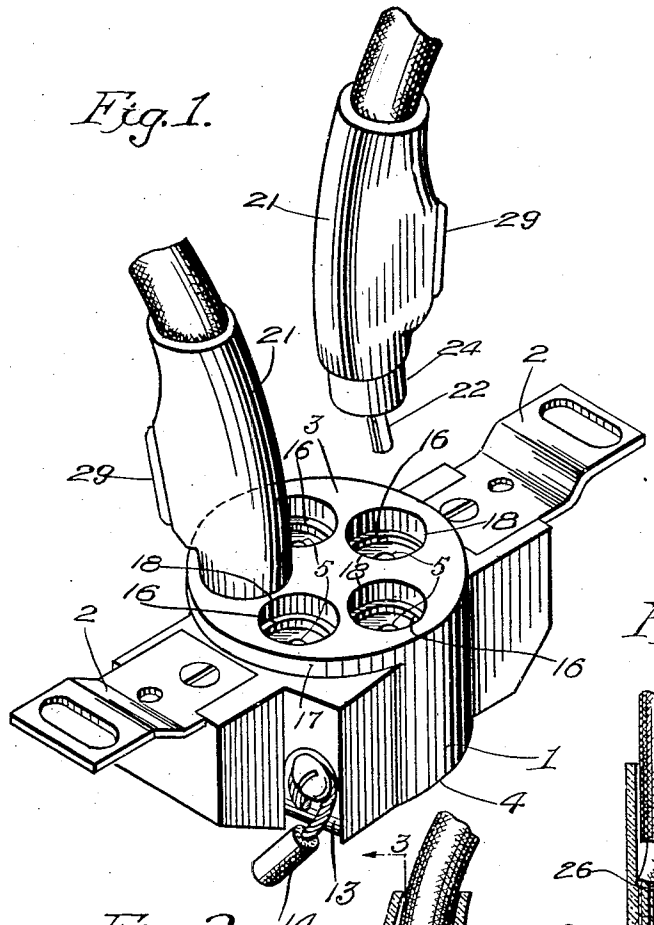


Fig. 3.

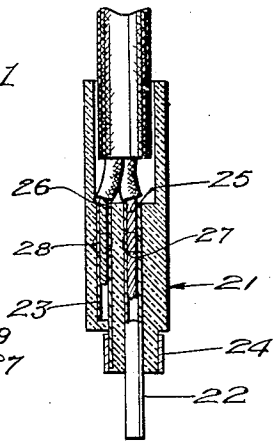
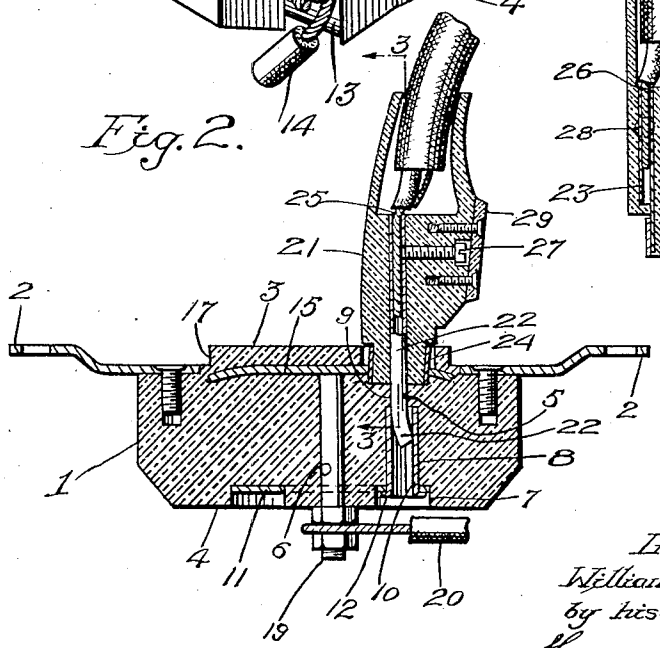


Fig. 2.



Inventor:—
William Erhard
by his Attorneys
Howson & Howson

April 2, 1935. W. ERHARD 1,996,699

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Filed Sept. 30, 1933 2 Sheets-Sheet 2

Fig. 4.

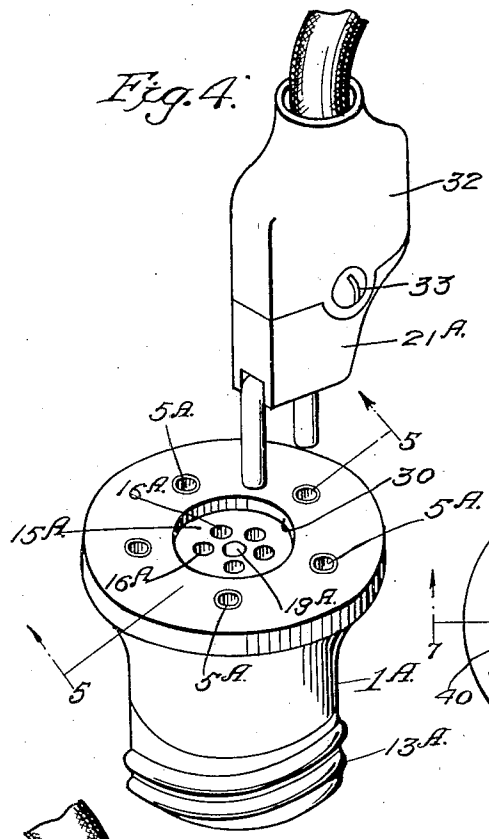


Fig. 6.

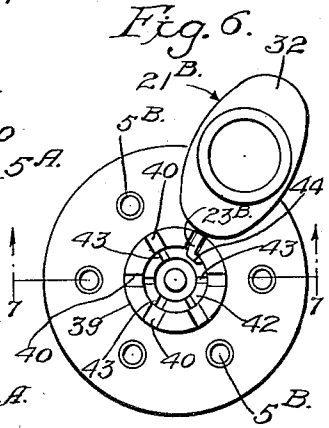


Fig. 5.

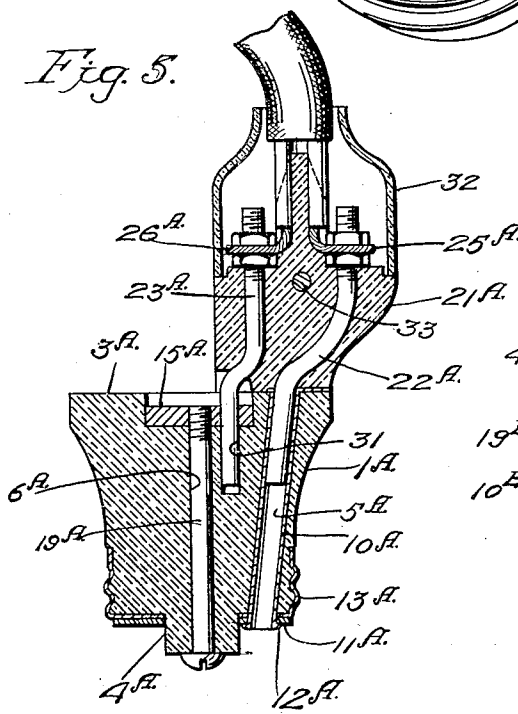
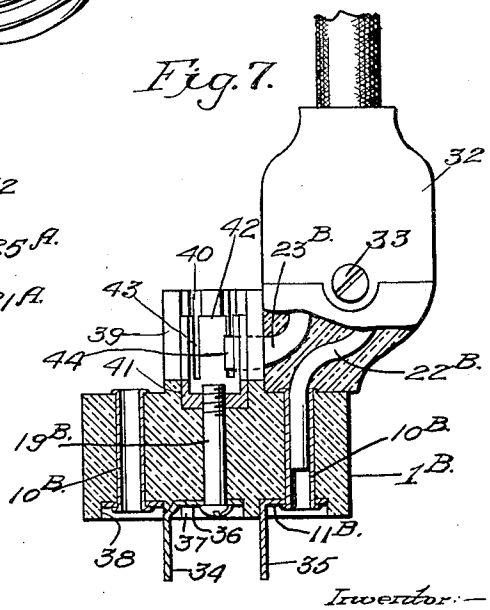


Fig. 7.



Inventor:—
William Erhard
by his Attorneys
Howson & Howson

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UNITED STATES PATENT OFFICE

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PLUG RECEPTACLE DEVICE

William Erhard, Philadelphia, Pa.

Application September 30, 1933, Serial No. 691,677

6 Claims. (Cl. 173—330)

This invention relates to electrical connector devices and particularly to plug receptacle devices for extending an electric circuit to one or more current-consuming devices. More particularly, the invention relates to "multiple" plug receptacle devices, which enable the extending of an electric circuit to a plurality of current-consuming devices at the same time, the receptacle being adapted to receive a plurality of plugs connected to the various current-consuming devices.

This application is a continuation in part of my copending application, Serial No. 603,850, filed April 7, 1932.

An object of the invention is to provide a compact and simple device which is capable of low cost production and which is highly efficient in performing its intended function.

Another object of the invention is to provide a device of small dimension which is constructed so as to comprise a minimum of simple parts and which is designed to permit the greatest possible number of electrical connections thereto.

A further object of the invention is to provide an improved device which is much easier to use than prior devices of the same class. Heretofore, plug receptacle devices, which are commonly used in the home and like places, have embodied a two-prong plug and a receptacle designed to receive the plug prongs. It is difficult to insert the plug prongs in the receptacle where the receptacle is in an out of the way place, such as behind a piece of furniture as is often the case. One must grope blindly with the plug and endeavor to align both of the prongs thereof with the receptacle openings. This difficulty is eliminated by the present invention which contemplates as its preferred form a device using a single prong plug and a receptacle designed for use therewith. In using this device, it is merely necessary to insert the single prong of the plug in a receptacle opening.

These and other objects of the invention, as well as the structural details of two embodiments thereof, will more clearly appear from the following detailed description and accompanying drawings, in which

Fig. 1 is a perspective view of a preferred form of the invention showing the manner of cooperation of one or more plugs with the receptacle;

Fig. 2 is a sectional view taken through the center of an operatively positioned plug and through the center of the receptacle device;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a perspective view of an alternative form of the device;

Fig. 5 is a sectional view along line 5—5 of Fig. 4 showing a plug in operative position.

Fig. 6 is a plan view of a further modification of the device, illustrating the manner in which the modified plug to be used with the device cooperates therewith; and

Fig. 7 is a sectional view along line 7—7 of Fig. 6.

In the drawings the same numerals are used to designate like elements in the several embodiments.

Referring to Figs. 1 to 3 of the drawings, the receptacle comprises a solid body 1 formed of any suitable insulating material such as "Bakelite", hard rubber, etc. In the form of the device illustrated, the body 1 is adapted for attachment by means of opposed straps 2 attached to the body. For example, the body may thus be attached to a conventional electrical outlet box so that the receptacle itself constitutes an electrical outlet. As will appear more clearly hereinafter, however, the device may take any other desired form, such as illustrated in the modifications described later.

Body 1 has opposed ends 3 and 4 and is provided with circularly arranged openings 5 and a central opening 6. These openings are preferably round in cross section but any other suitable form of opening may be utilized. Each of the openings 5 communicates with an annular recess 7 and each opening is preferably formed with portions of varying diameters, there being a portion 8 of certain diameter and a portion 9 of reduced diameter. A plug prong-receiving contact element 10, conforming in shape with portion 8, is disposed in each of the openings 5, as clearly illustrated in Fig. 2. In the event that the openings are round, as preferred, elements 10 may take the form of tubular metallic members. One end of each of elements 10 extends through circularly arranged perforations in an annular ring 11 seated in the annular recess 7. The said ends of elements 10 are bent or flared outward, as at 12, and are connected to ring 11. Ring 11 is provided with an extending ear or tab 13 which passes around the body to a point at the side thereof (see Fig. 1) so as to form a terminal for the attachment of an electrical conductor such as 14.

At or adjacent the end 3 of the body, there is provided a disk 15 having circularly arranged openings 16 therethrough which align with openings 5 in the body. Disk 15 may be molded in

the body, as shown clearly in Fig. 2. The portion 17 of the body may be raised as illustrated to provide a seat for plugs which may be operatively associated with the receptacle. Circularly arranged recesses or apertures 18 may be aligned with openings 16 and 5. A connector member 19 in the form of a pin or rod extends through central opening 6 and is connected at one end to disk 15, its other end projecting from end 4 of the body and constituting the other terminal of the device to which a conductor, such as 20, may be attached.

The plugs, which are adapted to be used with the receptacle above described, each comprises a unitary insulating body 21, through which tubular prongs 22 and 23 extend. Prong 22 is adapted for insertion in one of the openings 5 and is preferably bent as illustrated to effect good mechanical and electrical engagement with the contact element 10. It will be understood that any other refinement toward this end may be incorporated.

A contact ring or sleeve 24 surrounds prong 22 and is generally coaxial therewith. This ring is electrically connected to prong 23 and is adapted to enter openings 16 of disk 15 and contact the disk. The inner ends of the tubular prongs are adapted to receive the ends of electrical conductors 25 and 26 which may be securely anchored by means of screws 27 and 28 passing transversely through the body of the plug and through the respective tubular prongs. A cover plate 29 is provided to cover the heads of the screws and prevent contact therewith.

The plug is preferably arcuately shaped so as to more readily permit the use of a plurality of plugs at the same time. When operatively associated with the receptacle, each of the plugs curves outwardly, thereby permitting easier manipulation of the various plugs.

It will be seen that the tubular members 10 and ring 11 are adapted to extend an electrical connection from the prong or prongs 22 of one or more plugs to terminal 13, while disk 15 and the pin or rod 19 are adapted to extend an electrical connection from the ring or rings 24 of one or more plugs to the other terminal of the receptacle.

Referring now to the modification of Figs. 4 and 5 of the drawings, the receptacle comprises a solid body 1A also formed of any suitable insulating material, such as "Bakelite", hard rubber, etc. As illustrated, this body is formed in the manner of the ordinary plug type receptacle which is adapted to be screwed in an electrical socket device. Body 1A has opposed ends 3A and 4A and is provided with circularly arranged openings 5A and a central opening 6A extending therethrough from end to end. These openings are preferably round in cross section but any other suitable form of opening may be utilized. A plug prong-receiving contact element 10A conforming in shape with openings 5A extends through each of these openings. In the event that the openings are round, as preferred, elements 10A take the form of tubular metallic members. One end of each of elements 10A extends through circularly arranged perforations in metallic shell 13A, which forms one terminal of the device, and also through circularly arranged apertures in metallic ring 11A. The ends of element 10A are preferably flared as at 12A this serving to not only maintain the elements rigidly attached to body 1A, but also serving to electrically and mechanically connect the elements through ring 11A to shell 13A. If desired, the ring may be eliminated, since it is not absolutely necessary.

End 3A of the body is provided with a centrally located recess 30 adapted to receive a circular contact disk 15A having circularly arranged plug prong-receiving openings 16A, there being one such opening for each of the openings 5A. Openings 16A are substantially radially aligned with the corresponding openings 5A so that radial pairs of openings are provided for the reception of the plug prongs as illustrated. Preferably, although not necessarily, body 1A is also provided with circularly arranged recesses 31 which are aligned with openings 16A of disk 15A and adapted to receive the extended end of a plug prong, as shown in Fig. 5.

A metallic connector member 19A which preferably takes the form of a screw, extends through opening 6A in the body and is connected to disk 15A, being threaded into a central opening thereof.

The head of the screw serves as the other terminal of the device, as will be readily understood from the known construction of ordinary plug devices. It will now be quite obvious that tubular elements 10A are each adapted to extend an electrical connection from one of the prongs of a plurality of plugs to the shell terminal 13A, while screw 19A is adapted to extend an electrical connection from the other prong of each plug to the tip terminal.

A modified form of plug is provided. Each plug comprises an insulating body 21A which is adapted to removably receive an insulating shell or housing 32, a suitable screw 33 or other fastening means being provided to detachably secure these parts together. Prongs 22A and 23A extend through body 21A, as illustrated and the upper threaded ends of these prongs serve as terminal or binding posts to which the conductors 25A and 26A may be attached. By means of this construction, a small and narrow plug is provided so that a relatively large number of such plugs may be used with the receptacle as above noted. It should be noted that the plugs are elliptical shape, the front portions being narrow so as not to interfere with each other. The prong-receiving openings of elements 10A and disk 15A are of such dimension with respect to the prongs that the prongs slidably and positively engage the metallic surfaces to insure good electrical contact. The resiliency of the prongs further insures good contact.

In Figs. 6 and 7, there is illustrated a further modified form of device having a receptacle body 1B. In this device, the terminals take the form of flat prongs 34 and 35, which are adapted for insertion in a socket having slit-like openings adapted to receive them, as well known. Prong 34 forms an extended end of a strip 36 which is attached to the body by screw 19B. Prong 35 is integral with and extends from ring 11B which is secured to the end of the body by the flared ends of elements 10B. The strip and ring seat in central and annular recesses 37 and 38, respectively, provided in body 1B.

In this device, the body is also modified in that the upper end thereof is formed to provide an extending cup-shaped portion 39 having slots 40 cut therein. The upper end of the body is also recessed at 41 and a metallic cup-shaped member 42 rests nicely in the recess and within cup 39. The metallic cup-shaped member is provided with slots 43, each corresponding with a slot 40

and being substantially radially aligned therewith as shown more clearly in Fig. 6. Slots 40 are, however, preferably wider than slots 43, for a purpose which will appear more clearly hereinafter.

The plugs which are adapted to be used with this form of receptacle are generally similar to those above described, but are modified in that the prong 23B extends transversely from the body of the plug and is flattened and bent as at 44. The longitudinally extending prong 22B of each plug engages elements 10B as before but the end of each prong 23B engages the interior surface of the fingers of member 42 formed by virtue of the slots cut therein (see Fig. 6). The reason for having slots 40 wider than slots 43 will now be apparent since this prevents any possibility of engagement of prong 23B with the insulating fingers of the cup-shaped extension 39 and insures that the said prong will positively engage the fingers of member 42 and make good electrical contact therewith.

It will be obvious from the disclosure and the foregoing description that the invention provides a compact and simple device which may be readily and economically manufactured. Such device is also very efficient in operation and is more acceptable to users than bulky and cumbersome devices designed for the same general purpose. Although several embodiments of the device are disclosed herein, it will be understood that these are for the purpose of disclosure only and that other changes and modifications may be made within the scope and spirit of the invention.

I claim:

1. A plug receptacle device, comprising an insulating body having a plug-receiving end, a plurality of openings and another opening disposed axially with respect to the others, a plug-receiving contact element disposed in each of said plurality of openings, means connecting said contact elements together and to a terminal, a contact member adjacent said axially disposed opening at the plug-receiving end and having a plug-receiving portion corresponding to each of said contact elements, and a connector member extending through said axially disposed opening and connecting said contact member to a second terminal.

2. A plug receptacle device, comprising an insulating body having opposed ends and a plurality of openings and another opening disposed axially with respect to the others, all of said openings extending through said body from end to end, a plug-receiving contact element disposed in each of said plurality of openings, a terminal member connected to said contact elements, a contact member adjacent one end of said axially disposed opening and having a plug-receiving portion corresponding to each of said elements, each said plug-receiving portion and its corresponding contact element being arranged to receive the contact elements of the plug, a second terminal member, and a connector member extending through said other opening and connecting said contact member with said second terminal member.

3. A plug receptacle device, comprising an insulating body having a plurality of openings and another opening disposed axially with respect to the others, a plug-receiving contact element disposed in each of said plurality of openings, a terminal member connected to said contact elements, a contact member adjacent one end of said axially disposed opening and having a plug-receiving portion corresponding to and over-lying each of said elements, each said plug-receiving portion and its corresponding contact element being arranged to receive coaxial contact elements of a jack-type plug, a second terminal member, and a connector member extending through said other opening and connecting said contact member with said second terminal member.

4. A plug receptacle device, comprising a solid insulating body having opposed ends and a plurality of circularly arranged openings and a central opening, all of said openings extending through said body from end to end, a plug prong-receiving contact element extending through each of said circularly arranged openings and conforming in shape therewith, a terminal member connected to said contact elements, a centrally disposed contact member carried on one of said ends and having a plug prong-receiving portion for each of said elements, each said prong-receiving portion and its corresponding contact element being arranged to receive the prongs of a plug, a second terminal member, and a connector member extending through said central opening and connecting said contact member with said second terminal member.

5. A plug receptacle device, comprising a solid insulating body having opposed ends, one of which is centrally recessed, and a plurality of circularly arranged openings and a central opening, all of said openings extending through said body from end to end, a plug prong-receiving contact element extending through each of said circularly arranged openings and conforming in shape therewith, a terminal member connected to said contact elements, a centrally disposed contact disk carried on said recessed end in the recess thereof, and having a plug prong-receiving opening for each of said elements, each said prong-receiving opening and its corresponding contact element being arranged to receive the prongs of a plug, a second terminal member and a connector member extending through said central opening and connecting said contact disk with said second terminal member.

6. A plug receptacle device, comprising a solid insulating body having opposed ends and a plurality of circularly arranged openings and a central opening extending therethrough from end to end, a centrally disposed cup-shaped extension, having a slot therein for each of said circularly arranged openings, on one of said ends, a plug prong-receiving contact element extending through each of said circularly arranged openings and conforming in shape therewith, a terminal member connected to said contact elements, a cup-shaped contact member disposed in said cup-shaped extension and having plug prong-receiving slots aligning with the slots of said extension, each of said prong-receiving slots and its corresponding element being adapted to receive the prongs of a plug, a second terminal member, and a connector member extending through said central opening and connecting said cup-shaped contact member with said second terminal member.

WILLIAM ERHARD.