

ELECTRICAL ADAPTOR ASSEMBLY

This invention concerns improvements in electrical adaptor assemblies, and more especially to an assembly of the kind comprising an electrical plug and socket combination for adapting an AC mains power socket outlet to provide a plurality of available sockets.

Conventional adaptors of the above type that are provided in a compact single unit normally provide a maximum of three sets of outlet sockets and may also incorporate a fuse.

It is also known to provide in a mains power circuit incorporating a replaceable cartridge fuse, an indicator light, e.g. neon bulb, to indicate the availability of power at the appropriate power outlet. The absence of an illuminated indication thus provides a warning that the cartridge fuse may require replacement.

Although such adaptors can be formed in a relatively simple manner in which assemblies of electrical conductors are inserted into a moulded base and are held in place by a cover attached thereto, see for example GB 2,173,649A, known adaptors of this type provide only two sets of outlet sockets, the provision of three sets of sockets requiring a more complicated construction.

It is accordingly an object of the invention to provide a three way adaptor assembly wherein the electrical conductors interconnecting the respective poles of multiple power outlets of the adaptor assembly are arranged and supported in the housing of the assembly in a simple and economically constructed fashion.

This object is achieved by the arrangement of Claim 1.

Further preferred features and advantages of the invention will become apparent from the following description and accompanying drawings, in which:

Figure 1 is a front view of an electrical adaptor assembly according to the invention,

Figure 2 is an end view of the adaptor of Fig.1, in the direction of the arrow X of Fig.1,

Figure 3 is a view of a cover portion of the adaptor of Figs.1 and 2, taken in the direction of the arrows III-III of Fig.2,

Figure 4 is a view of the body portion of the adaptor of Figs.1 and 2 taken in the direction of the arrows IV-IV of Fig.2,

Figure 5 is a cross-sectional view of the adaptor of Fig.1 taken in the direction of the arrows V-V of Fig.1, and

Figure 6 is an exploded perspective view of the adaptor assembly of Figs.1 to 5.

Referring to the drawings, it will be seen that the adaptor according to the invention is formed by a shell 1, which is moulded integrally from synthetic plastics material, and a cover 2 that is likewise moulded integrally from synthetic plastics material. The shell 1 and cover 2 are held together to form the complete housing of the adaptor by means of self-tapping screws, not shown, that extend through moulded apertures 4 of the shell 1 and make screw threaded engagement in corresponding recesses 5 moulded into the cover 2. In conventional manner, the shell 1 and cover 2 are located in register with one another by means of projecting spigots 5A surrounding the recesses 5 and engaging in corresponding recesses 4A surrounding the apertures 4.

The housing defined by the shell 1 and cover 2 has, extending from a base wall thereof, terminal pins 6, 7, 8 arranged for insertion in an AC mains power socket of the conventional 13 amp ring main domestic power supply, and provides three sets of correspondingly shaped socket apertures 6A,7A,8A; 6B,7B,8B; and 6C,7C,8C, with which apertures are associated corresponding electrical conductor members coupled to the pins 6,7, and 8, as described in more detail below.

The cover 2 also incorporates a transparent or translucent window element 9 behind which is located a neon bulb 10 for indicating that the respective power sockets of the adaptor are coupled to AC mains voltage.

The shell 1 has formed integrally therewith a base recess 11 defining a compartment for receiving a cartridge fuse 12 of known type, the recess being closed in conventional manner by means of a cover plate 13 incorporating a web 13A for engagement around the cartridge fuse 12.

Referring more particularly to Figs. 4 to 6, it will be seen that the shell 1 incorporates a system of partitions extending between the outer side walls of the shell 1 and the recess 11, these partitions serving both to reinforce the structure of the shell 1 and recess 11 and to locate and compartment the internal components of the adaptor retained within the shell 1.

Thus, as seen more clearly in Fig. 5, there are a pair of transverse partitions 14,15, extending in the region of the ends of the recess 11 and joining respective bosses 16 formed in the side walls of the shell 1 to accommodate the apertures 4. Extending between walls of the recess 11 and respective end walls of the shell 1 there are further partitions 17,18,19,20. As shown in Fig. 4, ends 17A,18A,19A and 20A of the latter partitions are angled at points adjacent the side walls of the shell 1 to form slide ways for accommodating the conventional spring loaded shutters 21 that are associated with the socket apertures of the adaptor in known manner.

The terminal pins 6,7, and 8 are received as a sliding fit within corresponding apertures formed in the base wall of the shell 1, and, in manufacture of the adaptor assembly, are first connected to the associated electrical conductors to be located within the shell 1 and are then inserted in the respective apertures to bring the associated electrical conductors into the appropriate position in the shell 1.

Thus, the pin 8 which is to couple with the live terminal of the AC mains supply is first rivetted to a terminal strap 22 and this sub assembly is then located in position in the shell 1 by passing the pin 8 through the

appropriate aperture of the shell, whereupon the assembly is fastened into the shell by means of a rivet 23 passing through the base of the recess 11 and serving to secure together the strap 22 and a terminal clip 24 for receiving the cartridge fuse 12. A terminal clip 25 corresponding to the other pole of the cartridge fuse 12 is secured in like manner to an electrical conductor assembly 28 incorporating terminal springs 28A, 28B and 28C for association with the socket apertures 8A, 8B and 8C respectively. Although the conductor assembly 28 is held in the shell 1 solely by means of a rivet 29, and comprises a relatively complex assembly of electrically conductive straps (see Fig.4), the assembly is nevertheless securely located within the shell 1 by engagement against the partitions 18 and 19, whilst resting upon the upper edges of portions 14A and 15A of the partitions 14 and 15.

In like manner, a conductor assembly 27 riveted to the terminal pin 7 and included spring terminal portions 27A, 27B and 27C associated with the apertures 7A, 7B and 7C is held in place by engagement against the side of partitions 17 and 20 and by engagement over the upper edges of partitions 14 and 15.

It will be noted that the conductor assembly 27 is not permanently fixed within the shell 1 but is held in place by engagement of the terminal pin 7 in the base of the shell 1.

The assemblies 27 and 28 are further located between the upper edges of the partitions 14 and 15 and the lower edges of corresponding abutments 30 provided on the cover 2.

A conductor assembly 26 riveted to the pin 6 and including spring terminal portions 26A, 26B and 26C associated with the apertures 6A, 6B and 6C is held in place by engagement between the pairs of partitions 17, 18 and 19, 20 and by engagement of the pin 6 in the base of the shell 1. In addition, the cover 2 engages the conductor assembly 26 to hold the pin 7 in place.

The cover 2, in addition to containing the conventional shutter 21 associated with the socket openings 6A, 7A, 8A, contains, as mentioned above, the neon bulb 10 provided behind the indicator window 9. As can be seen from Fig. 3, the underside of the cover 2 has, adjacent the window 9 a pair of upstanding c-shaped walls 31 within which are held by friction a pair of compression springs 32 each of which engage with a corresponding wire lead-in of the neon bulb 10. The compression springs 32 extend beyond the underside of the cover 2 and, when the cover 2 is assembled to the shell 1 by means of the fastening screws referred to above, the compression springs 32 make corresponding contact with lugs 27D and 28D formed on the electrical conductor assemblies 27 and 28 respectively. Thus, in a simple manner, the neon bulb 10 is electrically connected between the terminal pin 7 and the terminal clip 25 within the cartridge fuse compartment 11. When the adaptor assembly is inserted into a AC mains power socket the neon bulb 10 becomes illuminated to indicate that power is available at the corresponding sockets of the adaptor assembly. When the neon bulb 10 is extinguished, a corresponding indication is provided that the cartridge fuse 12 may require replacement.

It will be appreciated that an adaptor assembly in accordance with the invention incorporates many novel and advantageous features in comparison with conventionally known arrangements. Whilst some aspects of the invention are outlined above, it is intended that the present disclosure should form a basis for claim to rights in any novel and inventive feature or combination of features described. Examples of potentially signifi-

cant features are mentioned below, it being understood that such features are capable of being used separately or in any combination and that the invention is not to be considered as limited by the presence of any such feature but will be defined by the claims of the Application.

1. The association of an illuminated indicator with a cartridge fuse.
2. The location of a cartridge fuse compartment in a central area of the body portion between two terminal pins of the adaptor.
3. The provision of partitions in the shell and corresponding abutments on the cover to engage and locate electrical conductor assemblies without the requirement for any supplementary insulating means.
4. The particular orientation and arrangement of sockets apertures that contribute to the simplified internal layout of the adaptor.
5. The provision of each terminal pin and conductor assembly as a separate unit for assembly into the shell of the adaptor.



Claims:

1. A three way electrical adaptor assembly comprising a housing defined by an open shell having extending externally from a base thereof, terminal pins for insertion in an electrical power socket, and a cover closing said open shell, the said housing having three sets of apertures forming sockets for the reception of terminal pins of power plugs for electrically powered appliances, and the said shell incorporating electrical conductor assemblies respectively electrically coupled to said terminal pins and extending into association with corresponding apertures of said three sets, the said open shell being formed integrally with a plurality of partitions for locating and maintaining said conductor assemblies in mutually spaced relationship, and at least some of said conductor assemblies each comprising three terminal pin receiving elements mounted on angled connecting straps which are held in place within said shell by abutments of the said shell engaging one side of the strap and abutments on the cover engaging the other side of the strap.

2. An adaptor assembly as claimed in Claim 1, wherein the said housing comprises a generally rectangular parallelepiped of which two faces extending along its major dimension are respectively comprised by the base of said shell and a top of said cover, and the number and positions of the said terminal pins and the said sets of apertures in relation to the dimensions of the parallelepiped are selected as follows:

- (a) the terminal pins comprise an earthing pin located at one end of said base and two further pins equally spaced therefrom in the direction of the longitudinal axis of the base,
- (b) one set of said apertures is located in the top of said cover and substantially in register with the axes of corresponding pins located in the base, and



(c) two further sets of apertures are located in respective end faces of the housing, in each case with an earthing pin aperture adjacent the base of the shell and two further apertures adjacent the top of the cover.

3. An adaptor assembly as claimed in Claim 2, wherein the external face of the base of the shell incorporates a compartment for a cartridge fuse located approximately centrally in said face and accommodated between said two further terminal pins.

4. An adaptor assembly as claimed in Claim 2 or 3, wherein the top face of said cover incorporates a window for an indicator lamp, said window being arranged adjacent that end of the cover remote from said earthing pin.

5. An adaptor assembly as claimed in any one of Claims 1-4, wherein there is connected to said earthing pin an electrical conductor assembly comprising a first terminal pin receiving element upstanding from said earthing pin and associated with respective earthing pin apertures in the adjacent end face of the housing and the top of the cover, an earthing strap extending adjacent said top cover, and a second terminal pin receiving element extending from said earthing strap towards the base of the housing and associated with the earthing pin aperture in the other end face of the housing.

6. An adaptor assembly as claimed in any one of Claims 1-5, wherein there is connected to a first one of said two further terminal pins an electrical conductor assembly comprising a first terminal pin receiving element upstanding from said first terminal pin and associated with adjacent terminal pin apertures respectively in one end face of the housing and the top of the cover, a connecting strap extending diagonally within said housing



and in spaced relation to said cover, and a second terminal pin receiving element associated with a respective terminal pin aperture in the other end face of the housing.

7. An adaptor as claimed in Claim 6 as appended to Claim 3, wherein a second one of said terminal pins is electrically coupled to a first cartridge fuse terminal within said compartment, and there is coupled to a second cartridge fuse terminal within said compartment an electrical conductor assembly including a first terminal pin receiving element associated with adjacent terminal pin apertures respectively in the top of the cover and in one end face of the housing, a connecting strap extending diagonally within said housing adjacent the base thereof, and a second terminal pin receiving element associated with a respective terminal pin aperture in the other end face of the housing.

8. An electrical adaptor assembly as claimed in any one of Claims 1-7 wherein the said cover incorporates a warning light and terminal means coupled to respective poles of the warning light, and the arrangement is such that the said terminal means are held in engagement with corresponding electrical conductors within said shell, by the assembly together of said shell and cover.

9. An adaptor assembly as claimed in Claim 8, wherein the said warning light comprises a lamp envelope provided with electrical lead in wires coupled to poles of the lamp, the said terminal means comprise compression springs located within recesses of said cover and arranged to extend away from said cover towards said open shell, the lamp envelope is located adjacent an indicator window of said cover with its lead in wires extending into said recesses and positioned below said compression springs,



and the arrangement is such that assembly of said cover and shell causes stressing of the compression springs between said lead in wires and corresponding electrical conductors coupled to terminal pins housed within said shell.

10. An adaptor assembly according to Claim 8 or 9, wherein said warning light is a neon lamp, and the arrangement is such that the lamp envelope is held in place adjacent such window by way of its lead in wires.

11. An electrical adaptor assembly substantially as described herein with reference to the accompanying drawings.