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(72) Inventor CHUNG YIU SHING



(54) COMBINED ELECTRICAL PLUG AND SOCKET DEVICES

(71) We, KIN KWOK BAKELITE ELECTRICAL ACCESSORIES MFY. LIMITED, of 2—4 Pat Tat Street, 2nd Floor, San Po Kong, Kowloon, Hong Kong, a body corporate organised and existing under the laws of Hong Kong, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention concerns combined electrical plug and socket devices.

When it is desired to connect more than one plug to a single electrical socket, it is usual first to plug an adaptor having two or more sockets into the socket and then to plug the plugs into the adaptor. If a first plug is already plugged into the socket it is necessary to unplug it before one or more further plugs can be connected by means of the adaptor. The supply of electricity through the first plug is therefore interrupted while the adaptor is fitted.

According to the invention there is provided a combined electrical plug and socket device comprising an insulating housing, one or more electrically conducting pins extending from said housing for connecting the device to an electrical socket outlet, a conductive terminal block and a conductive socket member electrically connected to the or each conductor pin and mounted in said housing, a first aperture in said housing for accommodating the end of a flexible electrical cable, and a second aperture or apertures in said housing for receiving the conductor pin(s) of an electrical plug, the or each of said second apertures being aligned with the or one of said socket members, and wherein the device includes a recess for a replaceable fuse electrically connected between the or one of said pins and the respective terminal block and socket member, said fuse recess being accessible from outside the housing of the device. Preferably the fuse recess comprises a chamber in which is located a cartridge fuse, two electrically conducting socket members releasably

supporting the fuse in the chamber and a cover plate having on one side a cylindrical portion including an aperture through which the body of the fuse passes, the cover plate being thereby held in position to close the recess.

Preferably the socket aperture or apertures and the pin or pins of the device are located on opposite sides thereof, the or each aperture being in axial alignment with the or one of the pins.

In an embodiment of the invention the socket aperture or apertures of the device are shuttered.

Further features of a preferred embodiment of the invention will become apparent from the following particular description with reference to the drawings in which:

Fig. 1 is a perspective view of a three pin plug or socket device according to the invention.

Fig. 2 is another perspective view of a three pin plug or socket device according to the invention.

Fig. 3 is a top view of the device with the upper part of the casing removed.

Fig. 4 is the section IV—IV shown in Fig. 3.

Referring to the drawings, a device 1 constructed according to the invention has an insulating housing or casing which consists of an upper part 2 and a lower part 3. Three pins 4A and 4B of rectangular cross section are located in the lower part 3 of the casing and three rectangular apertures 5 are provided in the upper part 2 of the casing. The apertures 5 are in axial alignment with the pins 4 and orientated to accept a plug having pins arranged in the same way as the pins 4A and 4B on the device 1. When the device is in use, the two parts are secured together, preferably releasably, by any suitable means. In this embodiment screws 6 pass through apertures 7 in the lower part 3 of the casing and engage threaded apertures in the upper part 2 of the casing.

In the embodiment illustrated, the aper-

tures 5 are shuttered by a member mounted inside the upper part 2 of the casing. The said member is spring loaded so that unless a plug is plugged into the device it remains in a position to block the apertures A.

A further aperture 8 is provided in the casing of the device, on the parting line between the parts 2 and 3. This aperture 8 permits an electrical cable to pass inside the casing of the device for connection to terminals 9A and 9B. A clamping bar 10 co-operating with screws 11 which pass through the lower part 3 of the casing is provided for mechanically securing the device to such a cable.

A U-shaped contact member 12 of resilient metal is positioned inside the casing of the device, directly beneath each of the apertures 5. Each contact member 12 is secured to the lower part 3 of the casing and is directly electrically connected to one of the terminals 9A and 9B. The mouth of each contact member 12 is directed upwardly towards the aperture 5 immediately above it in the upper part of the casing 2. When a plug is plugged into the device, the pins of the plug pass through the apertures 5 and engage the contact members 12. The mouth of one or more of the contact members 12 preferably has a restriction as shown at 13 which is narrower than the pin engaging the contact member. Thus the side limbs of the resilient metal contact members 12 must move apart slightly to accept the pins of the plug. In this way a plug is retained in the device by frictional engagement between its pins and the contact members 12.

The terminals 9A and their associated U-shaped contact members are electrically connected to the pins 4A by means of bolts 29. These bolts also serve to secure the terminals 9A, the contact member 12 and the pins 4A to the lower part 3 of the casing. The base of each of the pins 4 is recessed into the part 3, as shown at 14, so as to ensure that each pin is correctly orientated. The terminal 9B is electrically connected to one of the contact members 12 by means of a conductor strip 15 and is located on top of a fuse recess 16. Directly below the terminal 9B, in the fuse recess 16, is a U-shaped spring metal contact 17 for holding one end 18 of a cartridge fuse 19. The terminal 9B and the contact are secured to the lower part 3 of the casing by a bolt which passes through the contact 17 and the part 3 and engages a threaded aperture of the terminal 9B. The same bolt also serves to connect the terminal 9B to the contact 17 electrically. A further U-shaped spring metal contact 20 situated at the other end of the recess 16 receives the other end 21 of the fuse 19. The contact 20 is secured to the part 3 of the casing by a nut and bolt which also connects it elec-

trically to a conductor 23 connected to the pins 4B. It will be seen from Fig. 3 that one of the contact members 12 is located directly above the pin 4B. It is important, if the fuse 19 is to fulfill its function, that there should be no direct electrical contact between the contact member 12 and the pin 4B and to this end an L-shaped piece of insulating material 24 is located between them. The box of the L-shaped insulating piece 24 lies between the contact member 12 and the conductor 23 (where it connects to the pin 4B) and it is held in position by a clamping action between these two members. The upstanding portion of the L-shaped piece 24 can be seen in Fig. 4. Thus the terminal 9B and the contact member 12 are connected to the pin 4B through the fuse 19.

Before inserting the fuse 19 into the device, it is first passed through a cylindrical portion 26 of a cover plate 25 as shown in Fig. 2. The assembled fuse and cover plate is then pressed into the recess 16 where the ends 18 and 21 of the fuse engage the contacts 17 and 20 by snap-action. When the fuse 19 is in position, the cover plate 25 is located in a recess 27 which surrounds the mouth of the fuse recess. A bevelled lug 28 projects from one of the cover plate 25 so that the fuse can readily be removed from the device.

From Fig. 2 it can be seen that the fuse 19 is accessible from outside the casing of the plug so that it can be removed or replaced without separating the two parts 2 and 3 of the casing. It should also be noted that the positioning of the fuse recess on the bottom surface of the lower part 3 of the casing does not permit the fuse to be removed when the device is plugged into an electrical socket.

The parts 2 and 3 of the casing and the cover plate 25 may be made of any suitable electrically insulating such as wood, Bakelite (Registered Trade Mark) or other synthetic plastics material. The pins, contacts and conductors may be made of any suitable conducting metal such as brass.

It should be realised that although the device particularly described above has three pins of rectangular cross-section, the number and shape of the pins is immaterial to the invention and many variations are possible falling within the scope of the claims.

WHAT WE CLAIM IS:—

1. A combined electrical plug and socket device comprising an insulating housing, one or more electrically conducting pins extending from said housing for connecting the device to an electrical socket outlet, a conductive terminal block and a conductive socket member electrically connected to the or each conductor pin and mounted in said housing, a first aperture in said housing for accommodating the end of a flexible electrical cable,

tures 5 are shuttered by a member mounted inside the upper part 2 of the casing. The said member is spring loaded so that unless a plug is plugged into the device it remains in a position to block the apertures A.

A further aperture 8 is provided in the casing of the device, on the parting line between the parts 2 and 3. This aperture 8 permits an electrical cable to pass inside the casing of the device for connection to terminals 9A and 9B. A clamping bar 10 co-operating with screws 11 which pass through the lower part 3 of the casing is provided for mechanically securing the device to such a cable.

A U-shaped contact member 12 of resilient metal is positioned inside the casing of the device, directly beneath each of the apertures 5. Each contact member 12 is secured to the lower part 3 of the casing and is directly electrically connected to one of the terminals 9A and 9B. The mouth of each contact member 12 is directed upwardly towards the aperture 5 immediately above it in the upper part of the casing 2. When a plug is plugged into the device, the pins of the plug pass through the apertures 5 and engage the contact members 12. The mouth of one or more of the contact members 12 preferably has a restriction as shown at 13 which is narrower than the pin engaging the contact member. Thus the side limbs of the resilient metal contact members 12 must move apart slightly to accept the pins of the plug. In this way a plug is retained in the device by frictional engagement between its pins and the contact members 12.

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The parts 2 and 3 of the casing and the cover plate 25 may be made of any suitable electrically insulating such as wood, Bakelite (Registered Trade Mark) or other synthetic plastics material. The pins, contacts and conductors may be made of any suitable conducting metal such as brass.

It should be realised that although the device particularly described above has three pins of rectangular cross-section, the number and shape of the pins is immaterial to the invention and many variations are possible falling within the scope of the claims.

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- and a second aperture or apertures in said housing for receiving the conductor pin(s) of an electrical plug, the or each of said second apertures being aligned with the or one of said socket members, and wherein the device includes a recess for a replaceable fuse electrically connected between the or one of said pins and the respective terminal block and socket member, said fuse recess being accessible from outside the housing of the device.
2. A device according to claim 1, wherein the socket aperture(s) and the pin(s) of the device is or are located on opposite sides of the device.
3. A device according to claim 2, wherein the or each socket aperture is in axial alignment with the or one of the pin(s) of the device.
4. A device according to any preceding claim wherein the socket aperture(s) is or are shuttered.
5. A device according to any preceding claim, comprising, in combination, a three pin plug and a three aperture socket for accommodating a further three pin plug.
6. A device according to any preceding claim, wherein the fuse recess comprises a chamber in which is located a cartridge fuse, two electrically conducting socket members releasably supporting the fuse in the chamber and a cover plate having on one side a cylindrical portion including an aperture through which the body of the fuse passes, the cover plate being thereby held in position to close the recess.
7. A combined electrical plug and socket device substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 4.
- For the Applicants,
D. YOUNG & CO.,
Chartered Patent Agents,
9 & 10 Staple Inn,
London, W.C.1,

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