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Power supply device with illuminated handle

Abstract

A power supply device including a device body, a fan assembly, and a light source set and a handle. The device body includes a case and a control board, and the control board is disposed in the case. The fan assembly is disposed in the case. The light source set is disposed on the side of the fan assembly and includes a flexible printed circuit board and a wire. The wire is electrically connected to the flexible printed circuit board and connected to the control board. The handle is combined with the fan assembly, and at least a part of the flexible printed circuit board is disposed on an end surface of the handle facing the fan assembly. As a result, users may extract the power supply device under environments with insufficient light by exerting a force on the handle.

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Background/Summary

TECHNICAL FIELD

(1) The technical field relates to a power supply device, and more particularly, to a power supply device with an illuminated handle.

DESCRIPTION OF RELATED ART

(2) The Open Compute Project (OCP) organization provides the requirement for the Modular

Hardware System-Common Redundant Power Supply (M-CRPS) with the usage of illuminated handles. The configuration involves disposing flexible circuit board on the rear side of the handle and connecting it to the rear control board for controlling and providing the power required for the operation of the illuminated handle.

(3) However, the cost of flexible circuit board is higher, and when the flexible circuit board is connected to the rear control board, the flexible circuit board passes through the primary and secondary sides of transformers in the circuit, thereby the flexible circuit board requiring additional insulation components, such as double-layer high-temperature adhesive tape, to meet safety regulations. That results in further increased overall costs.

(4) In view of the above drawbacks, the inventor proposes this disclosure based on his expert knowledge and elaborate researches in order to solve the problems of related art.

SUMMARY OF THE DISCLOSURE

(5) This disclosure is a power supply device with an illuminated handle, which the fan assembly is combined with the light source set and the handle, and users may exert a force on the handle under environments with insufficient light to extract the power supply device.

(6) This disclosure is a power supply device with an illuminated handle including a device body, a fan assembly, a light source set, and a handle. The device body includes a case and a control board. The control board is disposed in the case. The fan assembly is disposed in the case. The light source set is disposed on a side of the fan assembly and includes a flexible printed circuit board and a wire. The wire is electrically connected to the flexible printed circuit board and connected to the control board. The handle is combined with the fan assembly, wherein at least a part of the flexible printed circuit board is disposed on an end surface of the handle facing the fan assembly.

(7) In comparison with the related art, the power supply device with an illuminated handle of this disclosure is to combine the light source set and the handle with the fan assembly. The light source set includes a flexible printed circuit board and a wire. The wire is electrically connected to the flexible printed circuit board and connected to the control board located on the rear side of the case. As a result, the length of the flexible printed circuit board is shortened, and the objective of reducing costs and complying with safety regulations are achieved.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The features of the disclosure believed to be novel are set forth with particularity in the appended claims. The disclosure itself, however, may be best understood by reference to the following detailed description of the disclosure, which describes a number of exemplary embodiments of the disclosure, taken in conjunction with the accompanying drawings, in which:

(2) FIG. **1** is a perspective schematic view of the power supply device with an illuminated handle in this disclosure.

(3) FIG. **2** is a partial perspective exploded schematic view of another side of the power supply device with an illuminated handle in this disclosure.

(4) FIG. **3** is a perspective schematic view of the separation of the power socket set from the power supply device in this disclosure.

(5) FIG. **4** is a perspective schematic view of the power socket set in this disclosure.

(6) FIG. **5** is a perspective exploded schematic view of the illuminated handle in this disclosure.

(7) FIG. **6** is another embodiment of the adapter board in this disclosure.

DETAILED DESCRIPTION

(8) The technical contents of this disclosure will become apparent with the detailed description of embodiments accompanied with the illustration of related drawings as follows. It is intended that the embodiments and drawings disclosed herein are to be considered illustrative rather than

restrictive.
(9) Please refer to FIG. **1** and FIG. **2**, which is a perspective schematic view of the power supply device with an illuminated handle in this disclosure and a partial perspective exploded schematic view of another side of the power supply device with an illuminated handle in this disclosure. This disclosure is a power supply device **1** with an illuminated handle **41** including a device body **10**, a fan assembly **20** and a light source set **42**. The device body **10** includes a case **11** and a control board **12**, and the control board **12** is disposed in the case **11**. The fan assembly **20** is disposed in the case **11**. Furthermore, the light source set **42** is disposed on one side of the fan assembly **20**. The light source set **42** includes a flexible printed circuit board **421** and a wire **43**. The wire **43** is electrically connected to the flexible printed circuit board **421** and connected to the control board **12**.
(10) It is worth noticing the control board **12** serves as the system controller within the power supply device **1**. That is, the control board **12** controls the central controller or specific circuits of the entire server system. Through the light source set **42** being electrically connected to the control board **12**, the system controller or specific circuits within the power supply device **1** may control the operation of the light source set **42**.
(11) In this embodiment, the power supply device **1** further includes an adapter board **30** disposed on one side of the light source set **42**. The arrangement of the adapter board **30** is described below.
(12) Specifically, the adapter board **30** includes a light conduction portion **32** and a wire connection portion **33**. The wire **43** is electrically connected to the wire connection portion **33** and further connected to the control board **12**. Moreover, the flexible printed circuit board **421** is electrically connected to the light conduction portion **32**.
(13) Please refer to FIG. **3** to FIG. **5**, which are a perspective schematic view of the separation of the power socket set from the power supply device in this disclosure, a perspective schematic view of the power socket set in this disclosure, and a perspective exploded schematic view of the illuminated handle in this disclosure. In this embodiment, the light conduction portion **32** of the adapter board **30** includes a flexible printed cable (FPC) connector. Additionally, the wire connection portion **33** includes a wire connector or a golden finger connection pad.
(14) It should be noted that the arrangement of the light conduction portion **32** and the wire connection portion **33** only needs to achieve the purpose of electrical connection and is not limited to the above embodiments. Moreover, the wire connection portion **33** may include a surface-mounted electronic component or a plug-in electronic component according to requirements of use. In the embodiment of this disclosure, the wire connection portion **33** includes a dip connector.
(15) Moreover, the power supply device **1** further includes a handle **41** combined with the fan assembly **20**. Additionally, at least a part of the flexible printed circuit board **421** is arranged on the end surface of the handle **41** facing the fan assembly **20**. In this embodiment, the handle **41** is combined on an outer surface of the fan assembly **20** away from the case **11**, and the handle **41** may be made of transparent plastic. The light emitted from the light source set **42** may penetrate into the handle **41** to make the handle **41** form a luminous handle. Therefore, users may identify the position of the handle **41** under the environments with insufficient lighting to facilitate user exerting a force on the handle **41** to extract the power supply device **1**.
(16) In one embodiment of this disclosure, the power supply device **1** further includes a power socket set **13** combined on one side of the fan assembly **20**. The power socket set **13** includes a socket body **131**, and the socket body **131** includes a socket bracket **132**. The socket bracket **132** may made of metal and includes a pin **133** being bended and extended.
(17) In this embodiment, the adapter board **30** is arranged on the socket body **131**. Specifically, the adapter board **30** is disposed on the socket bracket **132** of the socket body **131**. In more detail, a slot **310** is disposed on the circuit board **31** of the adapter board **30**. The adapter board **30** is positioned on the socket body **131** through the pin **133** being inserted in the slot **310**. The adapter board **30** is positioned on the socket body **131** through the pin **133** being inserted in the slot **310**.

(18) In one embodiment of this disclosure, the handle **41** is a U-shaped handle, and the two ends of the handle **41** are fixed on one side of the fan assembly **20** adjacent to the power socket set **13**.
(19) It is worth noticing that the socket bracket **132** is formed with a limiting slot **130** at the location of the pin **133**. Furthermore, the adapter board **30** is placed within the limiting slot **130**. Accordingly, the outer edge of the adapter board **30** is restricted by the limiting slot **130** and may not be moved.
(20) It should be noted that the socket bracket **132** is mainly used to fix the socket body **131** in the case **11**. Thus, the socket body **131** may be more stable when the power cord being plugged or unplugged.
(21) In this embodiment, the handle **41** includes a protrusion **411** disposed on the end surface of the handle **41** facing the fan assembly **20**. Additionally, a positioning hole **420** is disposed on the flexible printed circuit board **421** correspondingly. The flexible printed circuit board **421** is positioned on the end surface of the handle **41** through the protrusion **411** being inserted in the positioning hole **420**.
(22) In more detail, the light source set **42** includes at least one light source **422** disposed on the flexible printed circuit board **421**. In some embodiments, the light source **422** includes, but not limited, an LED. Moreover, the flexible printed circuit board **421** includes at least one conducting section **4211** and a connecting section **4212** connecting to the conducting section **4211**. The conducting section **4211** is combined with a light source **422** and positioned on the end surface of the handle **41**. The connecting section **4212** is connected to the light conduction portion **32** of the adapter board **30**.
(23) Accordingly, the light source **422** is connected to the adapter board **30** through the flexible printed circuit board **421** and the light conduction portion **32**, and is further connected to a wire **43** through the adapter board **30** and the wire connection portion **33** and then is connected to the control board **12** located at the rear side through the wire **43**. As a result, the control board **12** may control the light source **422**.
(24) As shown in FIG. **5**, the power supply device **1** further includes a plurality of fasteners **50**. Moreover, the fan assembly **20** includes a plurality of through holes **21** for insertions of the fasteners **50**. A perforation **4210** is disposed on the flexible printed circuit board **421**, and two screw holes **410** are disposed on two end surface of the handle **41** separately. Each fastener **50** passes through the through hole **21**, the perforation **4210** and the screw hole **410** sequentially to fix the handle **41**.
(25) Please refer to FIG. **6**, which is another embodiment of the adapter board in this disclosure. This embodiment is similar to the previous embodiment. The adapter board **30** includes a circuit board **31**, a light conduction portion **32** electrically connected to the circuit board **31**, and a wire connection portion **33′**. The difference of this embodiment is that the arrangement of the wire connection portion **33′**. In this embodiment, the wire connection portion **33′** is a surface mount electronic component.
(26) While this disclosure has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of this disclosure set forth in the claims.

Claims

1. A power supply device with an illuminated handle, comprising: a device body, comprising a case and a control board disposed in the case; a fan assembly, disposed in the case; a light source set, disposed on an end surface of the fan assembly, comprising a flexible printed circuit board and a wire, the wire electrically connected to the flexible printed circuit board and connected to the control board; and a handle, combined with the fan assembly, wherein at least a part of the flexible printed circuit board is disposed on an end surface of the handle facing the fan assembly; and a

plurality of fasteners, wherein the fan assembly comprises a plurality of through holes inserted by the plurality of fasteners, a perforation is defined on the flexible printed circuit board and two screw holes are respectively defined on two end surfaces of the handle, the handle is fixed through each fastener passing through each through hole, the perforation and one of the screw holes sequentially and illuminated by a light source.

2. The power supply device with an illuminated handle according to claim 1, further comprising an adapter board arranged on a side of the light source set.

3. The power supply device with an illuminated handle according to claim 2, further comprising a power socket set combined on a side of the fan assembly, wherein the power socket set comprises a socket body, and the adapter board is arranged on the socket body.

4. The power supply device with an illuminated handle according to claim 3, wherein the socket body comprises a socket bracket, and the adapter board is disposed on the socket bracket.

5. The power supply device with an illuminated handle according to claim 4, wherein the socket bracket comprises a pin extended curvedly, a slot is defined on the adapter board, and the adapter board is positioned on the socket body through the pin being inserted in the slot.

6. The power supply device with an illuminated handle according to claim 2, wherein the adapter board comprises a wire connection portion, and the wire is electrically connected to the wire connection portion.

7. The power supply device with an illuminated handle according to claim 2, wherein the adapter board comprises a light conduction portion, and the flexible printed circuit board is electrically connected to the light conduction portion.

8. The power supply device with an illuminated handle according to claim 1, wherein the handle comprises a protrusion disposed on the end surface thereof facing the fan assembly, a positioning hole is correspondingly defined on the flexible printed circuit board, and the flexible printed circuit board is positioned on the end surface of the handle through the protrusion being inserted in the positioning hole.

9. The power supply device with an illuminated handle according to claim 8, wherein the light source set comprises at least one light source disposed on the flexible printed circuit board, the flexible printed circuit board comprises at least one conducting section and a connecting section connected to the at least one conducting section, and the at least one conducting section is combined with the at least one light source and positioned on the end surface of the handle.