(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 995 832 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.11.2008 Bulletin 2008/48

(51) Int Cl.:
H01R 13/72 *(2006.01)*

(21) Application number: **08156737.2**

(22) Date of filing: **22.05.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **25.05.2007 TW 96118866**

(71) Applicant: **ASUSTeK Computer Inc.**
Peitou,Taipei (TW)

(72) Inventors:
- **Chang, Yi-Chieh**
  Taipei (TW)
- **Hung, Hung-Chang**
  Taipei (TW)

(74) Representative: **Viering, Jentschura & Partner**
Grillparzerstrasse 14
81675 München (DE)

(54) **Power Adapter and Cable Management Structure**

(57) A power adapter applied to a portable electronic device includes a casing (20), a cable management structure (240) and a power cable (223). The cable management structure (240) is disposed at the external surface of the casing (20), and the periphery of the cable management structure has at least a recessed edge (241). One end of the power cable (223) is connected to the casing (20), and the other end of the power cable (223) has a plug (220). The plug (220) may be assembled with the recessed edge (241) to allow the plug to be fixed at the cable management structure (241).

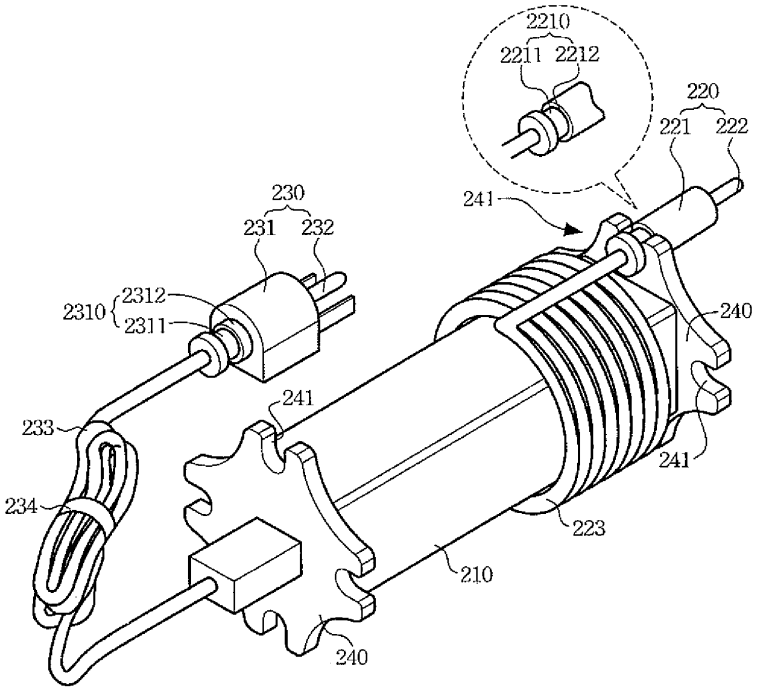

FIG. 2

EP 1 995 832 A2

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to a power adapter and, more particularly, to a power adapter with a cable management function.

Description of the Related Art

[0002] The power adapter is a connecting device connecting the electronic product and the external power source, and the power adapter is used to commutate and transform the alternating current of the external power source to provide suitable and steady voltage and current for the electronic product.

[0003] FIG 1 is a schematic diagram showing a conventional power adapter. As shown in FIG 1, a ordinary power adapter 100 on the market includes a casing 110, a first plug 120 and a second plug 130. A plurality of electronic elements and various circuits composed of the electronic elements are disposed in the casing 110, and they are used to commutate and transform the inputted alternating current.

[0004] The first plug 120 is connected to the casing 110 via a first power cable 123 and is electrically connected to the electronic elements in the casing 110. The first plug 120 includes a first body 121 and a first connecting terminal 122 covered by the first body 121. The first connecting terminal 122 is connected to the electronic products (such as a notebook computer, a projector and so on), and then the commutated or transformed voltage and the current are provided for the electronic product.

[0005] The second plug 130 is connected to the casing 110 via a second power cable 133 and is electrically connected to the electronic elements in the casing 110. The second plug 130 includes a second body 131 and a second connecting terminal 132 covered by the second body 131. The second connecting terminal 132 is connected to the alternating current power source of the external power source.

[0006] Since the electronic product is away from the external power source at a distance, the first power cable 123 and the second power cable 133 should have certain lengths. However, when the power adapter 100 is not used, the user often winds the power cable, and a band 124 is used to bind and fix the power cable. The above cable management mode causes large room to be occupied, which causes the power cable to be tangled, and then it is time-consuming and laborious when it is used next time.

[0007] Therefore, to solve the above problem to allow the power adapter to be used and stored easily is necessary.

SUMMARY OF THE INVENTION

[0008] One objective of the invention is to improve the casing of the power adapter and the body structure of the plug to allow the plug to be assembled on the casing of the power adapter.

[0009] Another objective of the invention is to dispose a cable management structure on the casing of the power adapter and to improve the body structure of the plug. When the power adapter is not used, the power cable may be wound at the casing surface of the power adapter, and the plug is assembled at the cable management structure. Thus, the power cable of the power adapter is stored easily, and it does not occupy the room.

[0010] The embodiment of the invention provides a power adapter applied to the power transfer and adaptation of a portable electronic device. The power adapter includes a casing, at least a cable management structure and at least a power cable. The cable management structure is disposed at the outer surface of the casing, and the periphery of the cable management structure has at least a recessed edge. One end of the power cable is connected to the casing, and the other end has a plug which may be closely assembled with the recessed edge, and then the plug may be fixed at the cable management structure.

[0011] The embodiment of the invention provides a cable management structure applied to a power adapter of a portable electronic device. The power adapter has a casing and at least a power cable. One end of the power cable is connected to the casing, and the other end has a plug. The cable management structure is installed at the outer surface of the casing, and the periphery of the cable management structure has at least a recessed edge. The plug may be assembled with the recessed edge.

[0012] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG 1 is a schematic diagram showing a conventional power adapter;

FIG. 2 is a schematic diagram showing a power adapter of embodiment of the invention;

FIG 3 is a schematic diagram showing the power adapter of the embodiment of the invention; and

FIG 4 is a schematic diagram showing the power adapter of another embodiment of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0014] FIG 2 is a schematic diagram showing a power adapter of the embodiment of the invention. The power adapter of the embodiment of the invention is applied to the power transfer and adaptation of a portable electronic device. The power adapter includes a casing 210, two cable management structures 240, a first plug 220, a second plug 230, a first power cable 223 and a second power cable 233.

[0015] The casing 210 is a plastic casing having two head surfaces and a ring surface. A plurality of electronic elements and various circuits composed of electronic elements are disposed in the casing 210, and they are used for commutating and transforming the alternating voltage.

[0016] The cable management structure 240 is disposed at the outer surface of the casing 210 and is protrudent from the side of the casing. In the embodiment, the cable management structure 240 may be disposed at any position of the two head surfaces or ring surface of the casing 210. As shown in FIG 2, in the preferred embodiment, each of the two head surfaces of the casing 210 has a cable management structure. The cable management structure 240 is a plate-shaped structure, and the periphery thereof is protrudent from the ring surface of the casing 210. The periphery of the cable management structure 240 has at least a recessed edge 241.

[0017] One end of the first power cable 223 is connected to one head surface of the casing 210 and is electrically connected to the electronic elements in the casing 110. The first plug 220 is connected to the other end of the first power cable 223, and the first plug 220 may be closely assembled with the recessed edge 241 to allow the first plug 220 to be fixed at the cable management structure 240.

[0018] One end of the second power cable 233 is connected to the other head surface of the casing 210 and is electrically connected to the electronic elements in the casing 110. The second plug 230 is connected to the other end of the second power cable 233, and the second plug 230 may be closely assembled with the recessed edge 241 to allow the second plug 230 to be fixed at the cable management structure 240.

[0019] The first plug 220 has a first body 221 which is made of an insulating and flexible rubber and is used for covering the first connecting terminal 222 of the first plug 220. The first connecting terminal 222 is connected to the portable electronic product (such as the notebook computer, projector and so on) to provide the commutated and transformed voltage and current for the electronic product.

[0020] The first body 221 has a first groove 2210 having a bottom 2211 and two side walls 2212. The bottom 2211 and the two side walls 2212 of the first groove 2210 may be closely assembled with the recessed edge 241 of the cable management structure 240 to allow the first plug 220 to be fixed at the cable management structure 240. In a preferred embodiment, the first groove 2210 is ring-shaped groove.

[0021] The recessed edge 241 of the cable management structure 240 may be embedded into the first groove 2210 and be against the two side walls 2212 of the first groove 2210. Thus, the first plug 220 does not easily separate from the cable management structure 240. Since the first body 221 is made of flexible material, the first plug 220 may further be fixed on the cable management structure 240 effectively.

[0022] As shown in FIG 2, when the power adapter is not used, the first power cable 223 may be wound at the ring surface of the casing 210, and the first plug 220 is fastened and fixed at the recessed edge 241 of the cable management structure 240 to finish cable management and store of the first plug 220 and the first power cable 223 thereof. The periphery of the cable management structure 240 is protrudent from the side surface of the casing 210 to be against the power cable wound at the ring surface of the casing 210 to prevent the power cable from slipping out from the two ends of the casing 210.

[0023] Similarly, the second plug 230 has a second body 231 which is made of insulating and flexible rubber and is used for covering the second connecting terminal 232 of the second plug 230. The second connecting terminal 232 is connected to the alternating current power source of the external power source.

[0024] In addition, the second body 231 has a second groove 2310, and the second groove 2310 has a bottom 2311 and two side walls 2312. The bottom 2311 and the two side walls 2312 of the second groove 2310 may be closely assembled with the recessed edge 241 of the cable management structure 240 to allow the second plug 220 to be fixed at the cable management structure 240. In a preferred embodiment, the second groove 2310 is a ring-shaped groove.

[0025] As shown in FIG 2, when the power adapter is not used, the second power cable 233 may be bound by the band 234 first, and then the second plug 230 is fastened and fixed at the recessed edge 241 of the cable management structure 240.

[0026] As shown in FIG 3, the second power cable 233 also may be wound at the ring surface of the casing 210, and then the second plug 230 may be fastened and fixed at the recessed edge 241 of the cable management structure 240 to finish the cable management and the store of the second plug 230 and the second power cable 233 thereof

[0027] The periphery of the cable management structure 240 of the embodiment of the invention may be only protrudent from one side of the casing 210. That is, the cable management structure 240 may only have one recessed edge 241 for fastening with the plug.

[0028] In the preferred embodiment, the cable management structure 240 may have more than one recessed edge 241. For example, the periphery of the cable management structure 240 may be protrudent from the four sides of the casing 210 and has four recessed edges

241. The recessed edges 241 are opposite in pairs and perpendicular to the adjacent one, as shown in FIG 2 and FIG 3. In this way, according to the length of the power cable, the plug (the first plug 220 or the second plug 230) may be assembled with the proper recessed edge 241.

[0029] In one embodiment of the invention, the casing 210 of the power adapter and the cable management structure 240 are integrally formed. In another embodiment, the cable management structure 240 may be assembled with the casing 210 in an extra locking mode. As shown in FIG 4, the cable management structure 240 is a plate-shaped structure, and head surfaces of the cable management structure 240 and the casing 210 have the corresponding guiding holes, respectively (not shown). A plurality of locking elements 242 (such as screws) are used to connect the cable management structure 240 to the head surface of the casing 210.

[0030] The design concept of the invention not only may be applied to the power adapter, and it also may be applied to the electronic device having components such as the external casing, power cable and plug connected to the casing via the power cable and so on.

[0031] To sum up, via the cable management structure disposed at the casing of the power adapter and improved body structure of the plug cooperated with the cable management structure, the power cable of the power adapter is managed easily, and the power cable does not tangle. In detail, when the power adapter is not used, the power cable may be wound at the casing surface of the power adapter, and the plug is assembled at the cable management structure to allow the power adapter to be stored easily and conveniently without occupying a large room.

[0032] Although the present invention has been described in considerable detail with reference to certain preferred embodiments thereof, the disclosure is not for limiting the scope of the invention. Persons having ordinary skill in the art may make various modifications and changes without departing from the scope and spirit of the invention. Therefore, the scope of the appended claims should not be limited to the description of the preferred embodiments described above.

Claims

1. A power adapter applied to a portable electronic device, the power adapter **characterized by**:

   a casing (210);
   a cable management structure (240) disposed at the outer surface of the casing (210), the periphery of the cable management structure (240) having at least a recessed edge (241); and
   a power cable (223), one end of the power cable is connected to the casing (210) and the other end of the power cable has a plug (220), wherein the plug (220) is capable of being assembled with the recessed edge (241).

2. The power adapter according to claim 1, **characterized in that** the plug (220) has a groove (2210) for fastening with the recessed edge (241).

3. The power adapter according to claim 1, **characterized in that** the casing (210) and the cable management structure (240) are integrally formed.

4. The power adapter according to claim 1, **characterized in that** the power adapter further has at least a locking element (242) for connecting the cable management structure (240) to the outer surface of the casing (210).

5. The power adapter according to claim 4, **characterized in that** the locking element (242) is a screw.

6. The power adapter according to claim 1, **characterized in that** the cable management structure (240) is a plate-shaped structure.

7. The power adapter according to claim 6, **characterized in that** the periphery of the cable management structure (240) has four recessed edges (241) which are opposite in pairs and perpendicular to the adjacent one.

8. The power adapter according to claim 1, **characterized in that** the plug (220) has a body (221) for covering the connecting terminal (222) of the plug (220), and the body (221) is made of flexible rubber.

9. The power adapter according to claim 1, **characterized in that** the power cable (223) is capable of being wound at the casing (210).

10. The power adapter according to claim 1, **characterized in that** the power cable (223) is connected to an external power source via the plug (220).

11. The power adapter according to claim 1, **characterized in that** the power cable (223) is connected to a portable electronic device via the plug (220).

12. A cable management structure (240) applied to a power adapter of a portable electronic device, the power adapter having a casing (210) and a power cable (223), one end of the power cable (223) being connected to the casing (210), the other end of the power cable (223) has a plug (220), **characterized in that** the cable management structure (240) is installed at the outer surface of the casing (210), the periphery of the cable management structure (240) has at least a recessed edge (241), and the plug (220) is capable of being assembled with the recessed edge (241).

13. The cable management structure (240) according to claim 12, **characterized in that** the plug (220) has a groove (2210) for fastening with the recessed edge (241).

14. The cable management structure (240) according to claim 12, **characterized in that** the cable management structure (240) is a plate-shaped structure.

15. The cable management structure (240) according to claim 14, **characterized in that** the periphery of the cable management structure (240) has four recessed edges (241) which are opposite in pairs and perpendicular to the adjacent one.

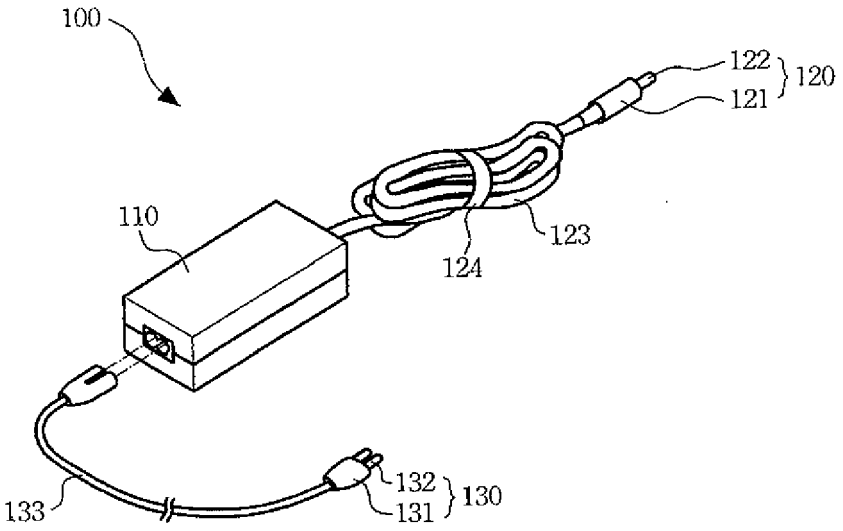

FIG. 1(Prior Art)

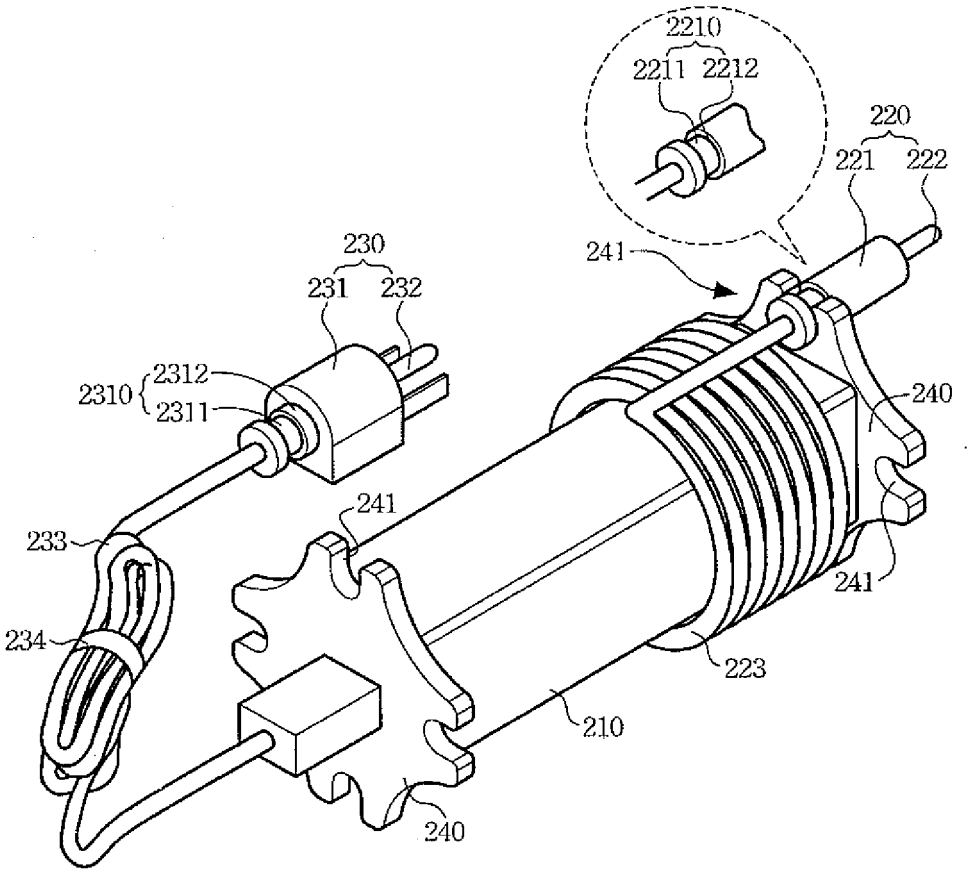
2210
2211
2212
220
221
222
230
231
232
241
2310
2312
2311
240
241
233
241
234
223
210
240

FIG. 2

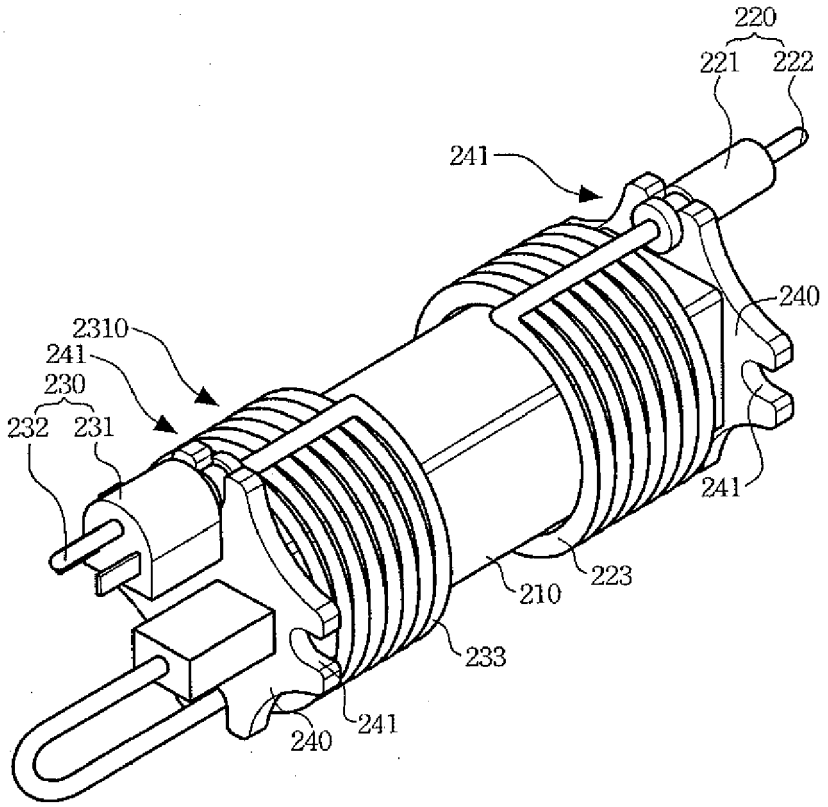

FIG. 3

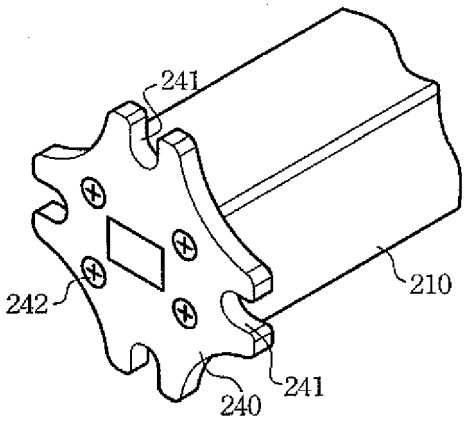

FIG. 4