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(54) **INPUT CONNECTION DEVICE**

EINGANGSANSCHLUSSVORRICHTUNG

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Description

FIELD OF THE INVENTION

[0001] The present disclosure relates to a connection device, and more particularly to an input connection device applied to an electronic device for reducing the cost and the volume and improving the electromagnetic interference thereof.

BACKGROUND OF THE INVENTION

[0002] Nowadays, input connection device has been widely applied to a variety of electronic devices or equipment for conveying electric power or transmitting signal information from an external source to the electronic device. With increasing development of science and technology, the general trends in designing electronic devices are toward minimization, high integration and low cost. The structure design and the practical demand of the input connection device are more difficult. Therefore, it is important to develop an input connection device with miniaturized size and low cost.

[0003] Generally, the input connection device includes a plurality of electric connectors, a plurality of first power wires, a printed circuit board, a second power wire and a switch. Each electric connector is mounted on a sidewall of a cabinet of the electronic device. One end of each first power wire is connected with the corresponding electric connector, and the other end of each first power wire is connected with the printed circuit board, which is disposed in the cabinet. One end of the second power wire is connected with the printed circuit board, and the other end of the second power wire is connected with the switch. Therefore, when the electric connector receives electric power or signal information from an external source, the electric power or the signal information is transmitted from the electric connector to the switch through the first power wire, the printed circuit board and the second power wire.

[0004] However, if the number of the electric connectors is increased, the number of the first power wires is increased accordingly. Consequently, the cost and the volume of the input connection device are increased. Moreover, assembly method of the input connection device is complicated and wire organization is difficult because of the plurality of first power wires, and incorrect connections between the first power wires and the electric connectors may occur easily. Furthermore, the first power wire generates additional electromagnetic interference on the input connection device, which may degrade the performance of the electronic device.

[0005] US 6 950 311 B1 relates to a telecommunication switch/server. The switch has a passive section and an active section or tray that may be docked to the passive section. The passive section contains only the physical interfaces to the switch's external data and telephony networks and power input. It is not intended to be a field replaceable unit and is therefore intended to be mounted in a rack system with all of the power and communications cables attached thereto. The telephony and data ports are routed from the passive section to the active section via connectors on the two sections as well as to a redundancy connector on the passive section that may be physically connected by a cable to a slave unit in a redundant application. The active section or tray contains all of the active components of the switch and is inserted via guides into the passive section. The tray is considered a field replaceable unit and can be inserted into and extracted from the passive section while the system is powered up and operational. As a result of its unique two-section design, the present switch has several advantages. For example upon failure, all active components of the system may be replaced without removing the mounting hardware from the rack in which the switch is mounted and without removing any cables connected to the switch. Also when the switch is part of a redundant system, when the switch fails, all of the active components of the switch may be replaced without interrupting system operations.

[0006] EP 0 094 823 A2 discloses a DC power supply unit. Described is an arrangement for mounting a DC power supply unit which includes a single circuit board on which there are provided an input circuit and a stabilizing circuit having circuitry for rectification of alternating current and for stabilization of direct current. The input circuit is composed of such electrical components as an input connector, a power supply switch and a fuse holder each of which has an operating portion which must be accessed from outside a cabinet housing the DC power supply unit. The cabinet is provided with an opening, and the electrical components are so arranged that the operating portions thereof are located at the opening for easy access from outside the cabinet.

[0007] US 2005/213300 A1 relates in general to a computer switch box. A computer system including a switch box and bracket assembly including one or more manual switches are provided for controlling the selective activation and deactivation of the computer systems' memory storage devices and network system. Preferably, the computer system includes a wire harnesses including a network cable for connecting a network to the bracket assembly's input port, a relay cable for connecting the bracket assembly's output port to the computer's network port and a manual switch. Instead of network communications being transmitted directly from the network to the network port, the signals are rerouted through the bracket assembly's input port, manual switch and output port, and then routed to the computer's network port. Access to the network is then controlled by simple manual manipulation of a button, toggle or knob to create an open or closed circuit.

[0008] Therefore, there is a need of providing an input connection device so as to overcome the drawbacks of the conventional technologies.

SUMMARY OF THE INVENTION

[0009] An object of the present disclosure provides an input connection device applied to an electronic device for reducing the cost and the volume and improving the electromagnetic interference thereof.

[0010] In accordance with an aspect of the present disclosure, an input connection device for an electronic device is provided. The electronic device includes a mother circuit board and a cabinet having a first wall. The input connection device comprises an insulation housing, a conductive connection unit, a circuit board, a switch, at least one first power wire and at least one second power wire. The insulation housing is disposed on the first wall and comprises a main body comprising a hollow channel. The conductive connection unit is disposed in the hollow channel and is engaged with the insulation housing. The circuit board is connected with the conductive connection unit directly. The switch has an input part and an output part. One end of the first power wire is connected with the circuit board. The other end of the first power wire is connected with the input part of the switch. One end of the second power wire is connected with the output part of the switch. The other end of the second power wire is connected with the mother circuit board.

[0011] In accordance with an aspect of the present disclosure, an input connection device for an electronic device is provided. The electronic device includes a mother circuit board and a cabinet having a first wall. The input connection device comprises a plurality of insulation housings, a plurality of conductive connection units, at least one circuit board, a switch, a plurality of first power wires and a plurality of second power wires. Each of the insulation housing is disposed on the first wall and comprises a main body comprising a hollow channel. Each of the conductive connection unit is disposed in the hollow channel of the corresponding insulation housing and is engaged with the corresponding insulation housing. The at least one circuit board is connected with the plurality of conductive connection units directly. The switch has an input part and an output part. One end of each first power wire is connected with the circuit board. The other end of each first power wire is connected with the input part of the switch. One end of each second power wire is connected with the output part of the switch. The other end of each second power wire is connected with the mother circuit board.

[0012] The above contents of the present disclosure will become more readily apparent to those ordinarily skilled in the art after reviewing the following detailed description and accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is a schematic perspective view illustrating an input connection device according to a first embodiment of the present disclosure;

FIG 2 is a schematic exploded view illustrating an insulation housing, a conductive connection unit and a fastening element of the input connection device of FIG 1;

FIG 3 is a schematic perspective view illustrating an input connection device according to a second embodiment of the present disclosure;

FIG 4 is a schematic perspective view illustrating an input connection device according to a third embodiment of the present disclosure;

FIG 5 is a schematic perspective view illustrating an input connection device according to a fourth embodiment of the present disclosure; and

FIG 6 is a schematic perspective view illustrating an input connection device according to a fifth embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] The present disclosure will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this disclosure are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

[0015] FIG. 1 is a schematic perspective view illustrating an input connection device according to a first embodiment of the present disclosure. FIG. 2 is a schematic exploded view illustrating an insulation housing, a conductive connection unit and a fastening element of the input connection device of FIG. 1. As shown in FIGS. 1 and 2, the input connection device 1 is applied to an electronic device 4 for receiving electric power or signal information from an external source, for example a DC power source, and conveying the electric power or transmitting the signal information to an internal device of the electronic device 4. The electronic device 4 includes the input connection device 1, a mother circuit board 2 and a cabinet 3. The cabinet 3 has a first wall 31 and a second wall 32 connected to the first wall 31. The first wall 31 has an outer side 311 and an inner side 312. The mother circuit board 2 is disposed in the cabinet 3. The input connection device 1 is disposed in the cabinet 3 and electrically connected with the mother circuit board 2. The input connection device 1 includes an insulation housing 11, a conductive connection unit 12, a circuit board 13, a fastening element 14, at least one electronic component 15, at least one first power wire 16, a switch 17, a second power wire 18 and a first connection element 19.

[0016] In this embodiment, the insulation housing 11 includes a main body 111 having a hollow channel 112. The hollow channel 112 runs through two ends of the main body 111 so as to form two openings at two ends. The hollow channel 112 includes a first channel section 113 and a second channel section 114. The main body

111 includes an inner surface 111a, an outer surface 111b, at least one first groove 115, at least one first protrusion 116 and at least one engaging element 117. The first channel section 113 has an aperture greater than that of the second channel section 114 and is served as a first accommodation space for receiving a matching electric connector (not shown). The at least one first groove 115 is formed on the inner surface 111a of the main body 111 and located at the second channel section 114. The at least one first protrusion 116 is formed on the inner surface 111a of the main body 111, adjacent to the first groove 115 and located at the second channel section 114. The at least one engaging element 117 is formed on the outer surface 111b of the main body 111. The insulation housing 11 is penetrated through and fitted in a first hole 313 of the first wall 31 of the cabinet 3. The at least one engaging element 117 of the insulation housing 11 is engaged with the edge of the first hole 313 of the first wall 31, so that the insulation housing 11 is fixed on the first wall 31 and portion of the insulation housing 11 is exposed from the outer side 311 of the first wall 31.

[0017] In this embodiment, at least portion of the conductive connection unit 12 is disposed in the hollow channel 112 of the main body 111 of the insulation housing 11. Preferably but not exclusively, portion of the conductive connection unit 12 is disposed in the second channel section 114 of the hollow channel 112. The conductive connection unit 12 includes a first end 121, a second end 122, at least one second groove 123, at least one second protrusion 124 and a second accommodation space 125. The at least one second groove 123 is formed on the periphery of the conductive connection unit 12 and is corresponding to the at least one first protrusion 116 of the main body 111. The at least one second protrusion 124 is formed on the periphery of the conductive connection unit 12 and is corresponding to the at least one first groove 115 of the main body 111. When at least portion of the conductive connection unit 12 is disposed in the hollow channel 112 of the main body 111 of the insulation housing 11, the second groove 123 of the conductive connection unit 12 is engaged with the first protrusion 116 of the main body 111 and the second protrusion 124 of the conductive connection unit 12 is engaged with the first groove 115 of the main body 111, so that the conductive connection unit 12 is securely fixed in the insulation housing 11. The first end 121 and the second end 122 of the conductive connection unit 12 are opposite to each other. The first end 121 of the conductive connection unit 12 is used to contact with a contact part of the matching electric connector (not shown) and is configured to receive the electric power or the signal information transmitted from the electric connector. In some embodiments, the first end 121 of the conductive connection unit 12 is a female connector, and the contact part of the matching electric connector is a male connector, which matches with the female connector. Alternatively, the first end 121 of the conductive connection unit 12 is a male connector, and the contact part of the matching electric connector is a female connector, which matches with the male connector. The second end 122 of the conductive connection unit 12 is exposed from the inner side 312 of the first wall 31. The conductive connection unit 12 outputs the electric power or the signal information through the second end 122 of the conductive connection unit 12. The second accommodation space 125 is formed at the second end 122 of the conductive connection unit 12. In some embodiments, the insulation housing 11 and the conductive connection unit 12 are formed into one piece. The conductive connection unit 12 is made of metal material.

[0018] In this embodiment, the circuit board 13 is disposed on the second end 122 of the conductive connection unit 12 and electrically connected with the second end 122 of the conductive connection unit 12 directly. Preferably but not exclusively, the circuit board 13 is perpendicular to the conductive connection unit 12 and the insulation housing 11. The circuit board 13 has a first side 131 and a second side 132 opposite to each other. The second end 122 of the conductive connection unit 12 is electrically connected with a contact pad (not shown) on the first side 131 of the circuit board 13. In this embodiment, the fastening element 14 is made of metal material. The fastening element 14 includes a first end 141 and a second end 142. The first end 141 of the fastening element 14 is penetrated through a hole 133 of the circuit board 13 and fitted in the second accommodation space 125 of the conductive connection unit 12. Namely, a part of the first end 141 of the fastening element 14 is disposed in the hole 133 of the circuit board 13, and the other part of the first end 141 of the fastening element 14 is engaged with the second end 122 of the conductive connection unit 12 so that the other part of the first end 141 of the fastening element 14 is fitted in the second accommodation space 125. The second end 141 of the fastening element 14 is disposed on the second side 132 of the circuit board 13. Consequently, the circuit board 13 is fastened on the second end 122 of the conductive connection unit 12 through the fastening element 14.

[0019] In an embodiment, the conductive connection unit 12 is disposed in the hollow channel 112 of the main body 111 of the insulation housing 11 before the second end 122 of the conductive connection unit 12 is connected with the circuit board 13. In other embodiment, the conductive connection unit 12 is disposed in the hollow channel 112 of the main body 111 of the insulation housing 11 after the second end 122 of the conductive connection unit 12 is connected with the circuit board 13.

[0020] In an embodiment, a first screw thread is formed on the outer surface of the first end 141 of the fastening element 14. A second screw thread is formed on the inner surface of the second end 122 of the conductive connection unit 12. Namely, the second screw thread is formed on the surface of the second accommodation space 125. The second screw thread of the conductive connection unit 12 is engaged with the first screw thread of the fas-

tening element 14 so that the fastening element 14 is fixed on the conductive connection unit 12. Consequently, the circuit board 13 is fastened on the second end 122 of the conductive connection unit 12 through the fastening element 14. In other embodiment, the shape of the second accommodation space 125 of the conductive connection unit 12 matches with the shape of the first end 141 of the fastening element 14 so that the first end 141 of the fastening element 14 is fixed on the second end 122 of the conductive connection unit 12.

[0021] In this embodiment, the at least one electronic component 15 is disposed on at least one of the first side 131 and the second side 132 of the circuit board 13. Preferably, the electronic component 15 is disposed on the second side 132 of the circuit board 13. The electronic component 15 is electrically connected with the second end 122 of the conductive connection unit 12 through the circuit board 13. The electronic component 15 may be an EMI suppressing element, for example but not limited to a capacitor. The electronic component 15 is used to suppress electromagnetic interference of the conductive connection unit 12.

[0022] In this embodiment, one end of the first power wire 16 is electrically connected to the second side 132 of the circuit board 13, and the other end of the first power wire 16 is electrically connected with the switch 17. Consequently, the conductive connection unit 12 is electrically connected to the switch 17 through the circuit board 13 and the first power wire 16. The switch 17 includes a first end 171, a second end 172, an input part 173 and output part 174. The input part 173 and the output part 174 are located at the first end 171. The first end 171 of the switch 17 is exposed from the inner side 312 of the first wall 31 of the cabinet 3. The input part 173 is electrically connected with the other end of the first power wire 16 for receiving the electric power or the signal information from the circuit board 13. A part of the second end 172 of the switch 17 is penetrated through a second hole 314 of the first wall 31 to connect with the first end 171 of the switch 17. The other part of the second end 172 of the switch 17 is exposed from the outer side 311 of the first wall 31 of the cabinet 3 and served as a selector, such as a button or a knob switch. The switch 17 is turned on or turned off for selectively allowing the electric power or the signal information to be transmitted from circuit board 13 to the mother circuit board 2. Namely, when the second end 172 of the switch 17 is pressed, the switch 17 is turned on for allowing the electric power or the signal information to be transmitted from circuit board 13 to the mother circuit board 2. When the second end 172 of the switch 17 is not pressed, the switch 17 is turned off for interrupting electric power or the signal information to be transmitted from circuit board 13 to the mother circuit board 2. Preferably but not exclusively, the switch 17 is a DC switch.

[0023] In this embodiment, one end of the second power wire 18 is electrically connected with the output part 174 of the switch 17, and the other end of the second power wire 18 is electrically connected with the mother circuit board 2. Consequently, the electric power or the signal information transmitted from the switch 17 is transmitted to the mother circuit board 2. In this embodiment, the first connection element 19 is connected to the other end of the second power wire 18. The first connection element 19 includes a first end 191 and a second end 192 connected with each other. The first end 191 of the first connection element 19 is connected with the mother circuit board 2, and the second end 192 of the first connection element 19 is connected with the other end of the second power wire 18, so that the second power wire 18 is electrically connected with the mother circuit board 2 through the first connection element 19. In some embodiments, the second power wire 18 is connected with the mother circuit board 2 directly and the first connection element 19 is omitted.

[0024] The mother circuit board 2 is disposed on the inner side of the second wall 32 of the cabinet 3. Preferably but not exclusively, the mother circuit board 2 is perpendicular to the circuit board 13.

[0025] In some embodiments, the input connection device 1 further includes at least one current sensor 21. The at least one current sensor 21 is disposed on at least one of the first side 131 and the second side 132 of the circuit board 13 for sensing the current flowing through the circuit board 13. Preferably, the current sensor 21 is disposed on the second side 132 of the circuit board 13.

[0026] FIG. 3 is a schematic perspective view illustrating an input connection device according to a second embodiment of the present disclosure. The structures and functions of the input connection device 1a of this embodiment are similar to those of the first embodiment. Component parts and elements corresponding to those of the first embodiment are designated by identical numeral references, and detailed descriptions thereof are omitted. Different from the input connection device 1 of FIGS. 1 and 2, in this embodiment as shown in FIG. 3, the second end 122 of the conductive connection unit 12 is connected with the circuit board 13 directly without any fastening element, and the second accommodation space of the conductive connection unit 12 is omitted. The conductive connection unit 12 includes a first end 121 and a second end 122. The second end 122 of the conductive connection unit 12 is electrically connected with the contact pad (not shown) of the circuit board 13 directly. Preferably, the conductive connection unit 12 and the circuit board 13 are formed into one piece. When portion of the conductive connection unit 12 is disposed in the hollow channel 112 of the main body 111 of the insulation housing 11, the circuit board 13 is connected with the insulation housing 11. In some embodiments, the second end 122 of the conductive connection unit 12 is electrically connected with the circuit board 13 through a conductive glue. In some other embodiments, the second end 122 of the conductive connection unit 12 is soldered on the circuit board 13.

[0027] FIG. 4 is a schematic perspective view illustrat-

ing an input connection device according to a third embodiment of the present disclosure. The structures and functions of the input connection device 1b of this embodiment are similar to those of the first embodiment. Component parts and elements corresponding to those of the first embodiment are designated by identical numeral references, and detailed descriptions thereof are omitted. Different from the input connection device 1 of FIGS. 1 and 2, in this embodiment as shown in FIG. 4, the input connection device 1b further includes a second connection element 22 connected to the end of the first power wire 16. The second connection element 22 includes a first end 221 and a second end 222 connected with each other. The first end 221 of the second connection element 22 is connected with the circuit board 13 and disposed on the second side 132 of the circuit board 13. The second end 222 of the second connection element 22 is connected with the end of the first power wire 16, so that the first power wire 16 is connected between circuit board 13 and the switch 17 for conveying the electric power or transmitting the signal information from the circuit board 13 to the switch 17.

[0028] FIG. 5 is a schematic perspective view illustrating an input connection device according to a fourth embodiment of the present disclosure. The structures and functions of the input connection device 1c of this embodiment are similar to those of the first embodiment. Component parts and elements corresponding to those of the first embodiment are designated by identical numeral references, and detailed descriptions thereof are omitted. Different from the input connection device 1 of FIGS. 1 and 2, in this embodiment as shown in FIG. 5, the input connection device 1c includes a plurality of insulation housings 11, a plurality of conductive connection units 12, a circuit board 13, a plurality of fastening elements 14, a plurality of electronic components 15, a plurality of first power wires 16, a switch 17, a plurality of second power wires 18a and a plurality of first connection elements 19. The numbers of the insulation housings 11, the conductive connection units 12 and the fastening elements 14 are the same. The first side 31 of the cabinet 3 includes a plurality of first holes 313, and the circuit board 13 includes a plurality of holes 133. Each insulation housing 11 is penetrated through and fitted in the corresponding first hole 313 of the first side 31 of the cabinet 3. Each conductive connection unit 12 is disposed in the hollow channel 112 of the corresponding insulation housing 11. Each fastening element 14 is penetrated through the corresponding hole 133 of the circuit board 13 and is engaged with the second end 122 of the corresponding conductive connection unit 12. The plurality of electronic components 15 are disposed on the circuit board 13. One end of each first power wire 16 is connected with the circuit board 13, and the other end of each first power wire 16 is connected with the input part 173 of the switch 17. One end of each second power wire 18 is connected with the output part 174 of the switch 17, and the other end of each second power wire 18 is connected with the mother circuit board 2. Each first connection element 19 is connected with the other end of the corresponding second power wire 18. Each second power wire 18 is connected with the mother circuit board 2 through the corresponding first connection element 19.

[0029] FIG. 6 is a schematic perspective view illustrating an input connection device according to a fifth embodiment of the present disclosure. The structures and functions of the input connection device 1d of this embodiment are similar to those of the fourth embodiment. Component parts and elements corresponding to those of the fourth embodiment are designated by identical numeral references, and detailed descriptions thereof are omitted. Different from the input connection device 1c of FIG. 5, in this embodiment as shown in FIG. 6, the input connection device 1d includes a plurality of circuit boards 13. Preferably but not exclusively, the input connection device 1d includes two circuit boards 13. Each circuit board 13 includes a plurality of holes 133. Portion of the plurality of the conductive connection units 12 are connected with one circuit board 13, and the residue of the plurality of the conductive connection units 12 are connected with the other circuit board 13. Portion of the plurality of the first power wires 16 are connected with one circuit board 13, and the residue of the plurality of the first power wires 16 are connected with the other circuit board 13. The structures and connections of the components of the input connection device 1d of this embodiment are similar to those of the fourth embodiment, and detailed descriptions thereof are omitted.

[0030] From the above descriptions, the present disclosure provides the input connection device applied in an electronic device. The input connection device includes a conductive connection unit and a circuit board, and the conductive connection unit is connected with the circuit board directly without any power wire. Therefore, the cost and the volume of the input connection device are reduced, the assembly method of the input connection device is simplified and the wire organization is easier. Moreover, the electromagnetic interference of the input connection device is improved.

Claims

1. An input connection device (1) for an electronic device (4), wherein the electronic device (4) includes a mother circuit board (2) and a cabinet (3) having a first wall (31), the input connection device (1) comprises:

   an insulation housing (11) disposed on the first wall (31) and comprising a main body (111) comprising a hollow channel (112);
   a switch (17) having an input part (173) and an output part (174);
   a conductive connection unit (12) disposed in the hollow channel (112) and engaged with the

insulation housing (11);
a circuit board (13) connected with the conductive connection unit (12) directly;
characterized by
at least one first power wire (16), wherein one end of the first power wire (16) is connected with the circuit board (13), and the other end of the first power wire (16) is connected with the input part (173) of the switch (17); and
at least one second power wire (18), wherein one end of the second power wire (18) is connected with the output part (174) of the switch (17), and the other end of the second power wire (18) is connected with the mother circuit board (2).

2. The input connection device (1) according to claim 1, **characterized in that** the hollow channel (112) runs through two ends of the main body (111) and includes a first channel section (113) and a second channel section (114), and the first channel section (113) has an aperture greater than that of the second channel section (114) and is served as a first accommodation space, wherein the main body (111) further comprises:

an inner surface (111a);
an outer surface (111b);
at least one first groove (115) formed on the inner surface (111a) of the main body (111) and located at the second channel section (114);
at least one first protrusion (116) formed on the inner surface (111a) of the main body (111), adjacent to the first groove (115) and located at the second channel section (114); and
at least one engaging element (117) formed on the outer surface (111b) of the main body (111), wherein the insulation housing (11) is penetrated through and fitted in a first hole (313) of the first wall (31), and the at least one engaging element (117) of the insulation housing (11) is engaged with an edge of the first hole (313) of the first wall (31), so that the insulation housing (11) is fixed on the first wall (31) and portion of the insulation housing (11) is exposed from an outer side (311) of the first wall (31).

3. The input connection device (1) according to claim 2, **characterized in that** at least portion of the conductive connection unit (12) is disposed in the second channel section (114) of the hollow channel (112) of the main body (111), wherein the conductive connection unit (12) comprises:

a first end (121);
a second end (122) opposite to the first end (121);
at least one second groove (123) formed on a periphery of the conductive connection unit (12) and corresponding to the at least one first protrusion (116) of the main body (111);
at least one second protrusion (124) formed on the periphery of the conductive connection unit (12) and corresponding to the at least one first groove (115) of the main body (111),
wherein the second groove (123) of the conductive connection unit (12) is engaged with the first protrusion (116) of the main body (111) and the second protrusion (124) of the conductive connection unit (12) is engaged with the first groove (115) of the main body (111), so that the conductive connection unit (12) is securely fixed in the insulation housing (11) and the second end (122) of the conductive connection unit (12) is exposed from an inner side (312) of the first wall (31), wherein the conductive connection unit (12) is made of metal material.

4. The input connection device (1) according to claim 1, **characterized in that** the input connection device (1) further comprises at least one fastening element (14), wherein the circuit board (13) is connected with a second end (122) of the conductive connection unit (12) through the fastening element (14), wherein the conductive connection unit (12) further comprises a second accommodation space (125) formed at the second end (122) thereof, wherein the fastening element (14) comprises a first end (141) and a second end (142), a part of the first end (141) of the fastening element (14) is disposed in a hole (133) of the circuit board (13), and the other part of the first end (141) of the fastening element (14) is engaged with the second end (122) of the conductive connection unit (12) so that the other part of the first end (141) of the fastening element (14) is fitted in the second accommodation space (125) and the circuit board (13) is fastened on the second end (122) of the conductive connection unit (12) through the fastening element (14).

5. The input connection device (1) according to claim 1, **characterized in that** the circuit board (13) is perpendicular to the conductive connection unit (12) and the insulation housing (11), wherein the circuit board (13) has a first side (131) and a second side (132) opposite to each other, the conductive connection unit (12) is electrically connected with a contact pad on the first side (131) of the circuit board (13), and the end of the first power wire (16) is connected to the second side (132) of the circuit board (13).

6. The input connection device (1) according to claim 1, **characterized in that** the input connection device (1) further comprises at least one electronic component (15) disposed on the circuit board (13) and electrically connected with the conductive connection

unit (12) through the circuit board (13), wherein the electronic component (15) is an EMI suppressing element.

7. The input connection device (1) according to claim 1, **characterized in that** the switch (17) includes a first end (171) and a second end (172) connected with each other, the first end (171) of the switch (17) is exposed from an inner side (312) of the first wall (31), a part of the second end (172) of the switch (17) is penetrated through a second hole (314) of the first wall (31), the other part of the second end (172) of the switch (17) is exposed from an outer side (311) of the first wall (31) and served as a selector, and the input part (173) and the output part (174) are located at the first end (171), wherein the switch (17) is turned on or turned off for selectively allowing electric power or signal information to be transmitted from the conductive connection unit (12) to the mother circuit board (2) through the circuit board (13) and the first power wire (16).

8. The input connection device (1) according to claim 1, **characterized in that** the input connection device (1) further comprises a first connection element (19) connected to the other end of the second power wire (18), wherein the second power wire (18) is connected with the mother circuit board (2) through the first connection element (19).

9. The input connection device (1) according to claim 1, **characterized in that** the input connection device (1) further comprises at least one current sensor (21) disposed on the circuit board (13) for sensing current flowing through the circuit board (13).

10. The input connection device (1) according to claim 1, **characterized in that** a second end (122) of the conductive connection unit (12) is connected with the circuit board (13) through a conductive glue or a second end (122) of the conductive connection unit (12) is soldered on the circuit board (13).

11. The input connection device (1) according to claim 1, **characterized in that** the input connection device (1) further comprises a second connection element (22) connected to the end of the first power wire (16), wherein the first power wire (16) is connected with the circuit board (13) through the second connection element (22).

Patentansprüche

1. Eingangsanschlussvorrichtung (1) für eine elektronische Vorrichtung (4), wobei die elektronische Vorrichtung (4) eine Hauptschaltungsplatine (2) und ein Kammer (3) mit einer ersten Wand (31) aufweist, wobei die Eingangsanschlussvorrichtung (1) umfasst:

ein Isoliergehäuse (11), das an der ersten Wand (31) angeordnet ist und einen Hauptkörper (111) mit einem hohlen Kanal (112) aufweist;
einen Schalter (17) mit einem Eingangsteil (173) und einem Ausgangsteil (174);
eine leitende Anschlusseinheit (12), die in dem hohlen Kanal (112) angeordnet ist und mit dem Isoliergehäuse (11) in Eingriff steht;
eine Schaltungsplatine (13), die direkt mit der leitenden Anschlusseinheit (12) verbunden ist;
gekennzeichnet durch:

mindestens eine erste Stromleitung (16), wobei ein Ende der ersten Stromleitung (16) mit der Schaltungsplatine (13) verbunden ist und das andere Ende der ersten Stromleitung (16) mit dem Eingangsteil (173) des Schalters (17) verbunden ist; und
mindestens eine zweite Stromleitung (18), wobei ein Ende der zweiten Stromleitung (18) mit dem Ausgangsteil (174) des Schalters (17) verbunden ist und das andere Ende der zweiten Stromleitung (18) mit der Hauptschaltungsplatine (2) verbunden ist.

2. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der hohle Kanal (112) durch zwei Enden des Hauptkörpers (111) verläuft und einen ersten Kanalabschnitt (113) sowie einen zweiten Kanalabschnitt (114) aufweist, und der erste Kanalabschnitt (113) eine Öffnung hat, die größer ist als die des zweiten Kanalabschnitts (114) und die als ein erster Aufnahmeraum dient, wobei der Hauptkörper (111) ferner umfasst:

eine Innenfläche (111a);
eine Außenfläche (111b);
mindestens eine erste Nut (115), die an der Innenfläche (111a) des Hauptkörpers (111) ausgebildet ist und sich an dem zweiten Kanalabschnitt (114) befindet;
mindestens einen ersten Vorsprung (116), der an der Innenfläche (111a) des Hauptkörpers (111) benachbart zu der ersten Nut (115) ausgebildet ist und sich an dem zweiten Kanalabschnitt (114) befindet; und
mindestens ein Eingriffselement (117), das an der Außenfläche (111b) des Hauptkörpers (111) ausgebildet ist,
wobei das Isoliergehäuse (11) durch ein erstes Loch (313) der ersten Wand (31) hindurchgeführt und in dieses eingepasst ist, und das mindestens eine Eingriffselement (117) des Isoliergehäuses (11) mit einer Kante des ersten Lochs (313) der ersten Wand (31) in Eingriff steht, so

dass das Isoliergehäuse (11) an der ersten Wand (31) befestigt ist und ein Bereich des Isoliergehäuses (11) bezüglich einer Außenseite (311) der ersten Wand (31) freiliegend ist.

3. Eingangsanschlussvorrichtung (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** mindestens ein Bereich der leitenden Anschlusseinheit (12) in dem zweiten Kanalabschnitt (114) des hohlen Kanals (112) des Hauptkörpers (111) angeordnet ist, wobei die leitende Anschlusseinheit (12) umfasst:

ein erstes Ende (121);
ein zweites Ende (122), das dem ersten Ende (121) gegenüberliegt;
mindestens eine zweite Nut (123), die an einem Umfang der leitenden Anschlusseinheit (12) ausgebildet ist und dem mindestens einen ersten Vorsprung (116) des Hauptkörpers (111) entspricht;
mindestens einen zweiten Vorsprung (124), der an dem Umfang der leitenden Anschlusseinheit (12) ausgebildet ist und der mindestens einen ersten Nut (115) des Hauptkörpers (111) entspricht,
wobei die zweite Nut (123) der leitenden Anschlusseinheit (12) mit dem ersten Vorsprung (116) des Hauptkörpers (111) in Eingriff steht und der zweite Vorsprung (124) der leitenden Anschlusseinheit (12) mit der ersten Nut (115) des Hauptkörpers (111) in Eingriff steht, so dass die leitende Anschlusseinheit (12) sicher in dem Isoliergehäuse (11) befestigt ist und das zweite Ende (122) der leitenden Anschlusseinheit (12) bezüglich einer Innenseite (312) der ersten Wand (31) freiliegend ist, wobei die leitende Anschlusseinheit (12) aus Metallmaterial hergestellt ist.

4. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingangsanschlussvorrichtung (1) außerdem mindestens ein Befestigungselement (14) ausweist, wobei die Schaltungsplatine (13) mit einem zweiten Ende (122) der leitenden Anschlusseinheit (12) durch das Befestigungselement (14) verbunden ist, wobei die leitende Anschlusseinheit (12) außerdem einen zweiten Aufnahmeraum (125) umfasst, der an dem zweiten Ende (122) davon ausgebildet ist, wobei das Befestigungselement (14) ein erstes Ende (141) und ein zweites Ende (142) hat, ein Teil des ersten Endes (141) des Befestigungselements (14) in einem Loch (133) der Schaltungsplatine (13) angeordnet ist, und der andere Teil des ersten Endes (141) des Befestigungselements (14) mit dem zweiten Ende (122) der leitenden Anschlusseinheit (12) in Eingriff steht, so dass der andere Teil des ersten Endes (141) des Befestigungselements (14) in den zweiten Aufnahmeraum (125) eingepasst ist und die Schaltungsplatine (13) durch das Befestigungselement (14) an dem zweiten Ende (122) der leitenden Anschlusseinheit (12) befestigt ist.

5. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Schaltungsplatine (13) senkrecht zu der leitenden Anschlusseinheit (12) und dem Isoliergehäuse (11) verläuft, wobei die Schaltungsplatine (13) eine erste Seite (131) und eine zweite Seite (132) hat, die einander gegenüberliegen, die leitende Anschlusseinheit (12) elektrisch mit einem Kontaktfeld an der ersten Seite (131) der Schaltungsplatine (13) verbunden ist und das Ende der ersten Stromleitung (16) mit der zweiten Seite (132) der Schaltungsplatine (13) verbunden ist.

6. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingangsanschlussvorrichtung (1) außerdem mindestens eine elektronische Komponente (15) umfasst, die an der Schaltungsplatine (13) angeordnet und durch die Schaltungsplatine (13) mit der leitenden Anschlusseinheit (12) elektrisch verbunden ist, wobei die elektronische Komponente (15) ein EMI-Unterdrückungselement ist.

7. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schalter (17) ein erstes Ende (171) und ein zweites Ende (172) hat, die miteinander verbunden sind, wobei das erste Ende (171) des Schalters (17) bezüglich einer Innenseite (312) der ersten Wand (31) freiliegend ist, ein Teil des zweiten Endes (172) des Schalters (17) durch ein zweites Loch (314) der ersten Wand (31) hindurchgeführt ist, das andere Teil des zweiten Endes (172) des Schalters (17) bezüglich einer Außenseite (331) der ersten Wand freiliegend ist und als ein Selektor dient, und der Eingangsteil (173) und der Ausgangsteil (174) an dem ersten Ende (171) angeordnet sind, wobei der Schalter (17) ein- oder ausgeschaltet wird, um selektiv zu ermöglichen, dass elektrischer Strom oder Signalinformationen von der leitenden Anschlusseinheit (12) über die Schaltungsplatine (13) und die erste Stromleitung (16) zur Hauptschaltungsplatine (2) übertragen werden.

8. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingangsanschlussvorrichtung (1) außerdem ein erstes Anschlusselement (19) aufweist, das mit dem anderen Ende der zweiten Stromleitung (18) verbunden ist, wobei die zweite Stromleitung (18) durch das erste Anschlusselement (19) mit der Hauptschaltungsplatine (2) verbunden ist.

9. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingangsanschlussvorrichtung (1) außerdem mindestens einen Stromsensor (21) umfasst, der auf der Schaltungsplatine (13) angeordnet ist, um den durch die Schaltungsplatine (13) fließenden Strom zu erfassen.

10. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** ein zweites Ende (122) der leitenden Anschlusseinheit (12) durch einen leitenden Klebstoff mit der Schaltungsplatine (13) verbunden ist oder ein zweites Ende (122) der leitenden Anschlusseinheit (12) auf der Schaltungsplatine (13) verlötet ist.

11. Eingangsanschlussvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingangsanschlussvorrichtung (1) außerdem ein zweites Anschlusselement (22) aufweist, das mit dem Ende der ersten Stromleitung (16) verbunden ist, wobei die erste Stromleitung (16) durch das zweite Anschlusselement (22) mit der Schaltungsplatine (13) verbunden ist.

Revendications

1. Dispositif de connexion d'entrée (1) pour un dispositif électronique (4), dans lequel le dispositif électronique (4) inclut une carte de circuit mère (2) et un boîtier (3) comportant une première paroi (31), le dispositif de connexion d'entrée (1) comprend:

un logement isolant (11) disposé sur la première paroi (31) et comprenant un corps principal (111) comprenant un canal creux (112);
un interrupteur (17) comportant une partie d'entrée (173) et une partie de sortie (174);
une unité de connexion conductrice (12) disposée dans le canal creux (112) et en prise avec le logement isolant (11);
une carte de circuit (13) connectée directement à l'unité de connexion conductrice (12);
caractérisé par
au moins un premier câble d'alimentation (16), dans lequel une extrémité du premier câble d'alimentation (16) est connectée à la carte de circuit (13), et l'autre extrémité du premier câble d'alimentation (16) est connectée à la partie d'entrée (173) de l'interrupteur (17); et
au moins un second câble d'alimentation (18), dans lequel une extrémité du second câble d'alimentation (18) est connectée à la partie de sortie (174) de l'interrupteur (17), et l'autre extrémité du second câble d'alimentation (18) est connectée à la carte de circuit mère (2).

2. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le canal creux (112) passe à travers deux extrémités du corps principal (111) et inclut une première section de canal (113) et une seconde section de canal (114), et la première section de canal (113) comporte une ouverture plus grande que celle de la seconde section de canal (114) et est utilisée comme un premier espace d'accueil, dans lequel le corps principal (111) comprend en outre:

une surface intérieure (111a);
une surface extérieure (111b);
au moins une première rainure (115) formée sur la surface intérieure (111a) du corps principal (111) et située au niveau de la seconde section de canal (114);
au moins une première saillie (116) formée sur la surface intérieure (111a) du corps principal (111), adjacente à la première rainure (115) et située au niveau de la seconde section de canal (114); et
au moins un élément de prise (117) formé sur la surface extérieure (111b) du corps principal (111),
dans lequel le logement isolant (11) pénètre et est ajusté dans un premier trou (313) de la première paroi (31), et l'au moins un élément de prise (117) du logement isolant (11) est en prise avec un bord du premier trou (313) de la première paroi (31), de telle manière que le logement isolant (11) est fixé sur la première paroi (31) et une partie du logement isolant (11) est exposée d'un côté extérieur (311) de la première paroi (31).

3. Dispositif de connexion d'entrée (1) selon la revendication 2, **caractérisé en ce qu'**au moins une partie de l'unité de connexion conductrice (12) est disposée dans la seconde section de canal (114) du canal creux (112) du corps principal (111), dans lequel l'unité de connexion conductrice (12) comprend:

une première extrémité (121);
une seconde extrémité (122) opposée à la première extrémité (121);
au moins une seconde rainure (123) formée sur une périphérie de l'unité de connexion conductrice (12) et correspondant à l'au moins une première saillie (116) du corps principal (111);
au moins une seconde saillie (124) formée sur la périphérie de l'unité de connexion conductrice (12) et correspondant à l'au moins une première rainure (115) du corps principal (111),
dans lequel la seconde rainure (123) de l'unité de connexion conductrice (12) est en prise avec la première saillie (116) du corps principal (111) et la seconde saillie (124) de l'unité de con-

nexion conductrice (12) est en prise avec la première rainure (115) du corps principal (111), de telle manière que l'unité de connexion conductrice (12) est fixée fermement dans le logement isolant (11) et la seconde extrémité (122) de l'unité de connexion conductrice (12) est exposée d'un côté intérieur (312) de la première paroi (31), dans lequel l'unité de connexion conductrice (12) est faite d'un matériau métallique.

4. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le dispositif de connexion d'entrée (1) comprend en outre au moins un élément de fixation (14), dans lequel la carte de circuit (13) est connectée à une seconde extrémité (122) de l'unité de connexion conductrice (12) par l'intermédiaire de l'élément de fixation (14), dans lequel l'unité de connexion conductrice (12) comprend en outre un second espace d'accueil (125) formé au niveau de la seconde extrémité (122) de celle-ci, dans lequel l'élément de fixation (14) comprend une première extrémité (141) et une seconde extrémité (142), une partie de la première extrémité (141) de l'élément de fixation (14) est disposée dans un trou (133) de la carte de circuit (13), et l'autre partie de la première extrémité (141) de l'élément de fixation (14) est en prise avec la seconde extrémité (122) de l'unité de connexion conductrice (12) de telle manière que l'autre partie de la première extrémité (141) de l'élément de fixation (14) est ajustée dans le second espace d'accueil (125) et la carte de circuit (13) est fixée sur la seconde extrémité (122) de l'unité de connexion conductrice (12) par l'intermédiaire de l'élément de fixation (14).

5. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** la carte de circuit (13) est perpendiculaire à l'unité de connexion conductrice (12) et au logement isolant (11), dans lequel la carte de circuit (13) a un premier côté (131) et un second côté (132) opposés l'un à l'autre, l'unité de connexion conductrice (12) est connectée électriquement à une patte de contact sur le premier côté (131) de la carte de circuit (13), et l'extrémité du premier câble d'alimentation (16) est connectée au second côté (132) de la carte de circuit (13).

6. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le dispositif de connexion d'entrée (1) comprend en outre au moins un composant électronique (15) disposé sur la carte de circuit (13) et connecté électriquement à l'unité de connexion conductrice (12) par l'intermédiaire de la carte de circuit (13), dans lequel le composant électronique (15) est un élément de suppression d'lEM.

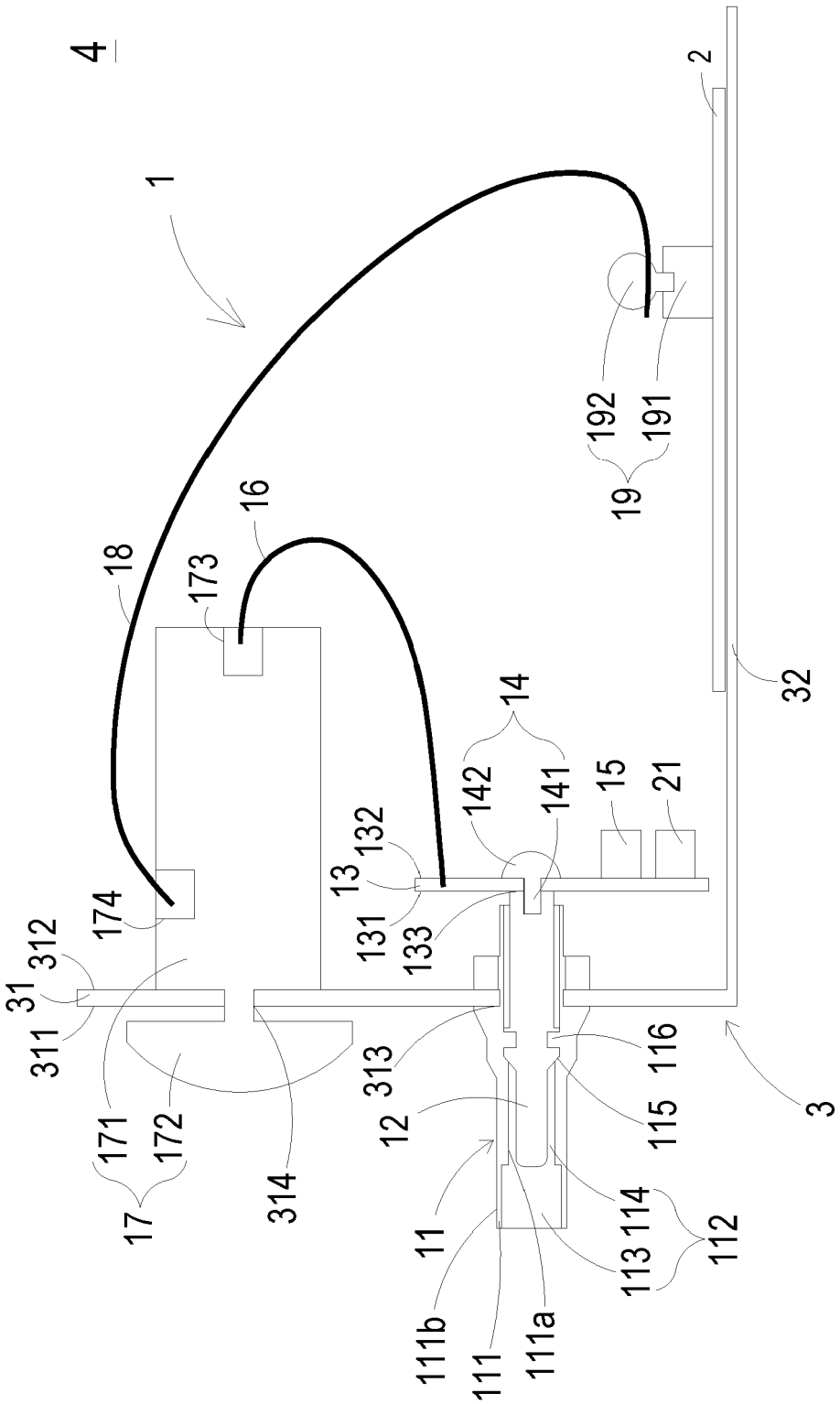
7. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** l'interrupteur (17) inclut une première extrémité (171) et une seconde extrémité (172) connectées ensemble, la première extrémité (171) de l'interrupteur (17) est exposée d'un côté intérieur (312) de la première paroi (31), une partie de la seconde extrémité (172) de l'interrupteur (17) pénètre à travers un second trou (314) de la première paroi (31), l'autre partie de la seconde extrémité (172) de l'interrupteur (17) est exposée d'un côté extérieur (311) de la première paroi (31) et utilisée comme un sélecteur, et la partie d'entrée (173) et la partie de sortie (174) sont situées au niveau de la première extrémité (171), dans lequel l'interrupteur (17) est fermé ou ouvert pour permettre sélectivement à un courant électrique ou une information de signal d'être transmis depuis l'unité de connexion conductrice (12) vers la carte de circuit mère (2) par l'intermédiaire de la carte de circuit (13) et du premier câble d'alimentation (16).

8. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le dispositif de connexion d'entrée (1) comprend en outre un premier élément de connexion (19) connecté à l'autre extrémité du second câble d'alimentation (18), dans lequel le second câble d'alimentation (18) est connecté à la carte de circuit mère (2) par l'intermédiaire du premier élément de connexion (19).

9. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le dispositif de connexion d'entrée (1) comprend en outre au moins un capteur de courant (21) disposé sur la carte de circuit (13) pour détecter un courant s'écoulant à travers la carte de circuit (13).

10. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce qu'**une seconde extrémité (122) de l'unité de connexion conductrice (12) est connectée à la carte de circuit (13) par l'intermédiaire d'une colle conductrice ou une seconde extrémité (122) de l'unité de connexion conductrice (12) est soudée sur la carte de circuit (13).

11. Dispositif de connexion d'entrée (1) selon la revendication 1, **caractérisé en ce que** le dispositif de connexion d'entrée (1) comprend en outre un second élément de connexion (22) connecté à l'extrémité du premier câble d'alimentation (16), dans lequel le premier câble d'alimentation (16) est connecté à la carte de circuit (13) par l'intermédiaire du second élément de connexion (22).


4
1
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192
191
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16
18
173
14
142
141
15
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32
132
13
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133
174
312
31
311
313
116
115
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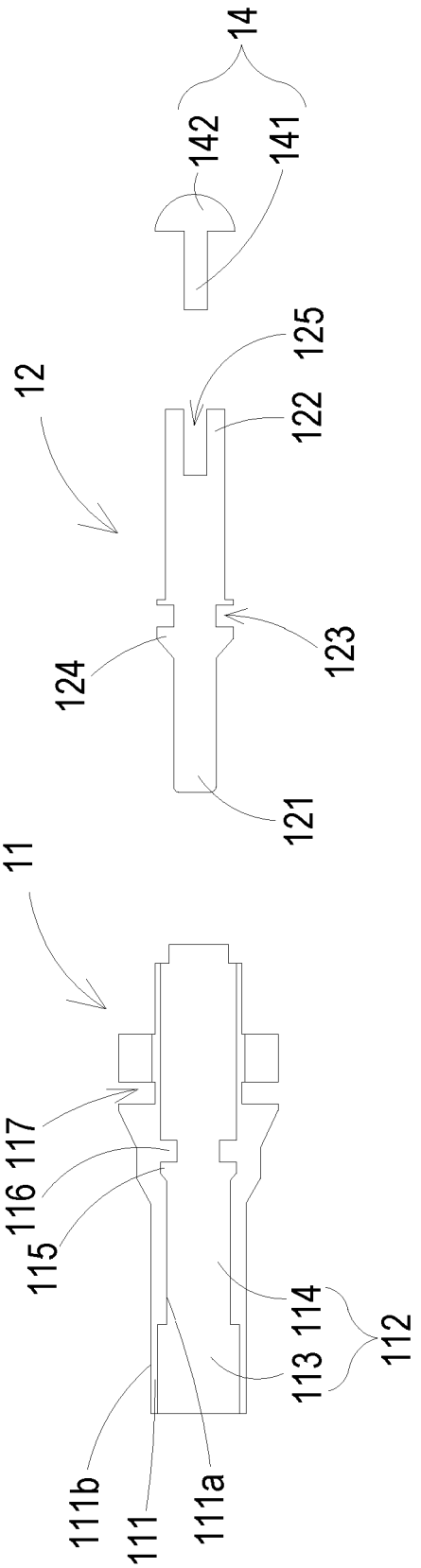
12
171
172
17
314
11
114
113
112
111b
111
111a

FIG. 1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121
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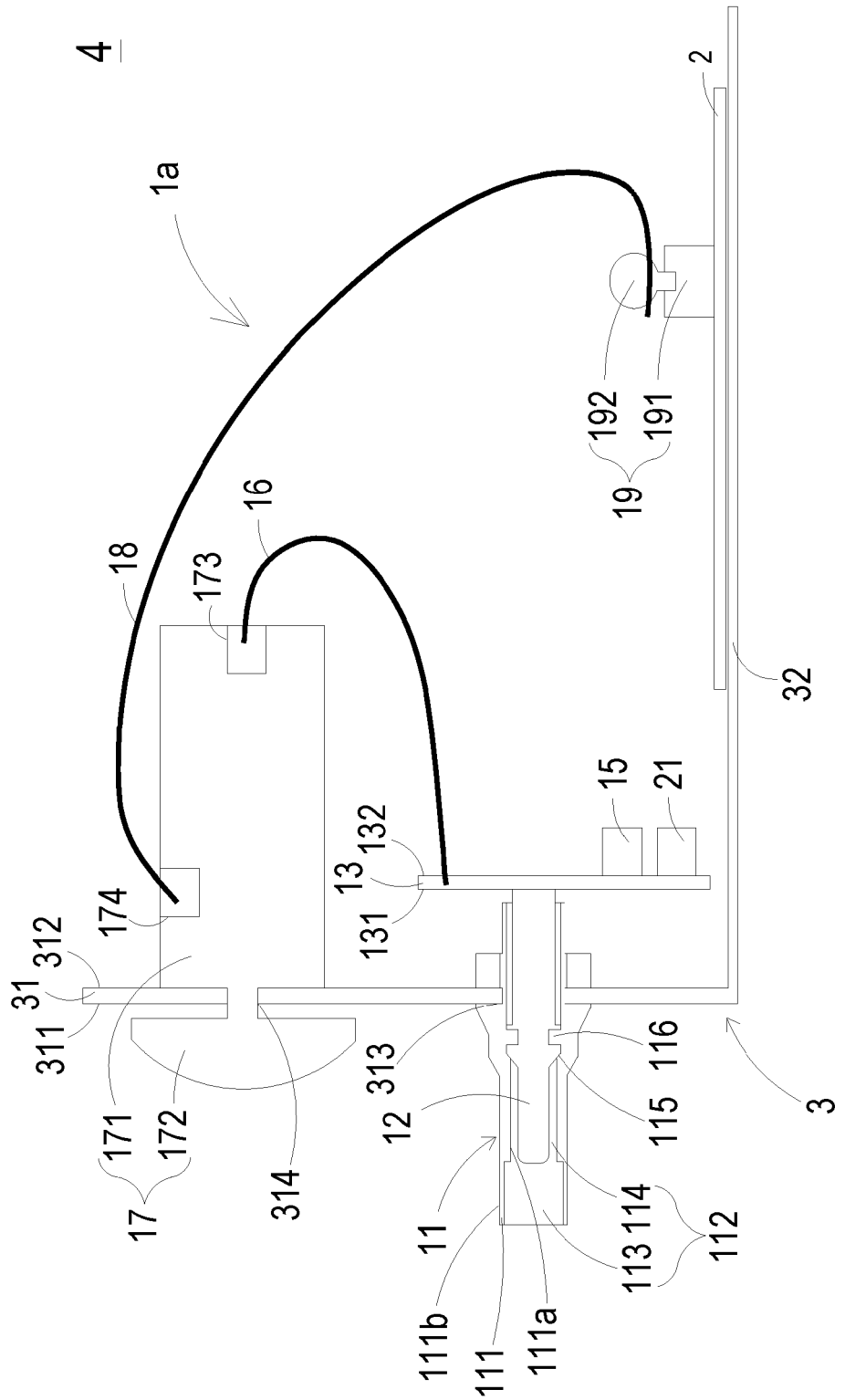
111
111a

FIG. 2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174
312
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171
172
17
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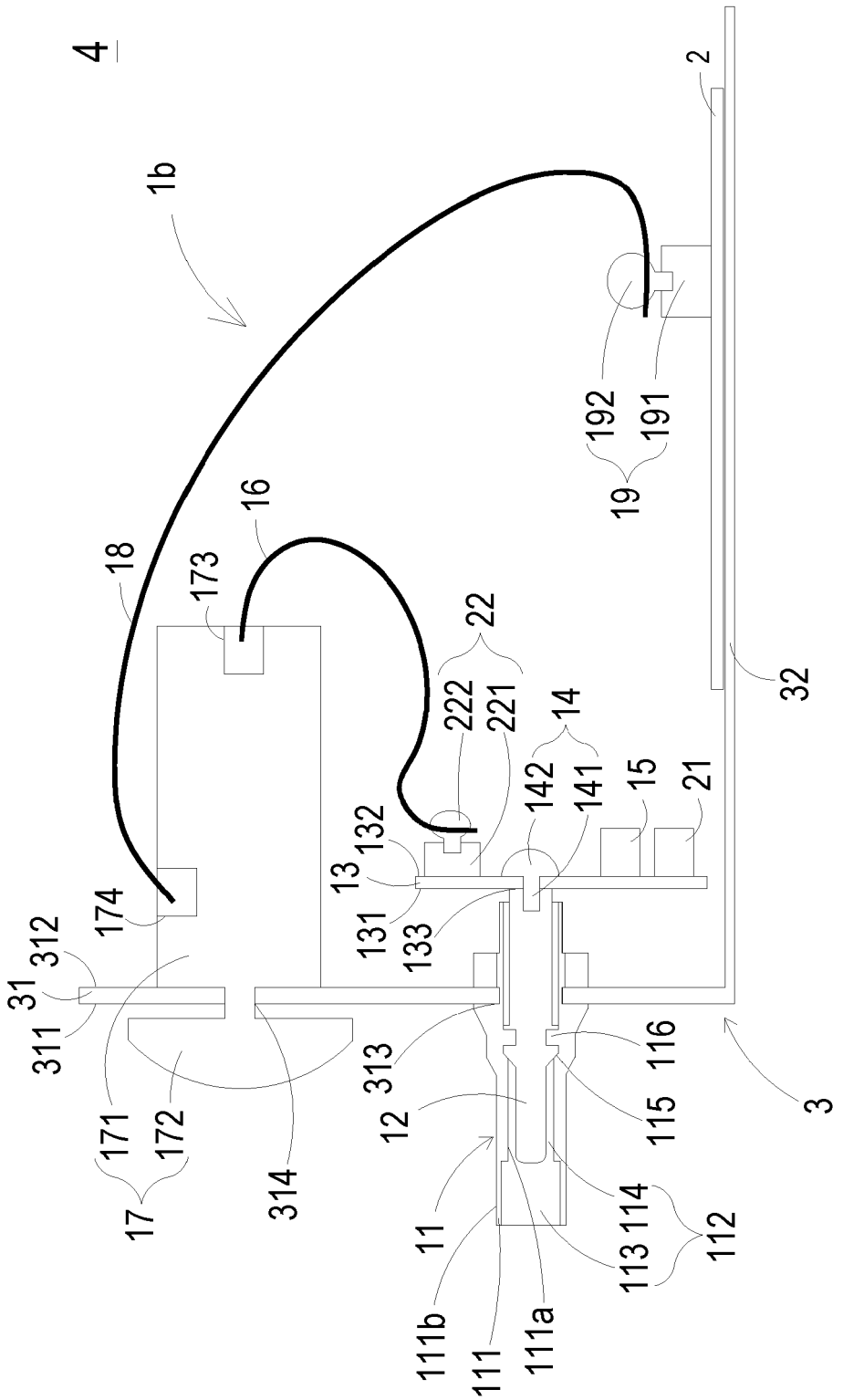
113
112
111b
111
111a

FIG. 3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133
174
312
31
311
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115
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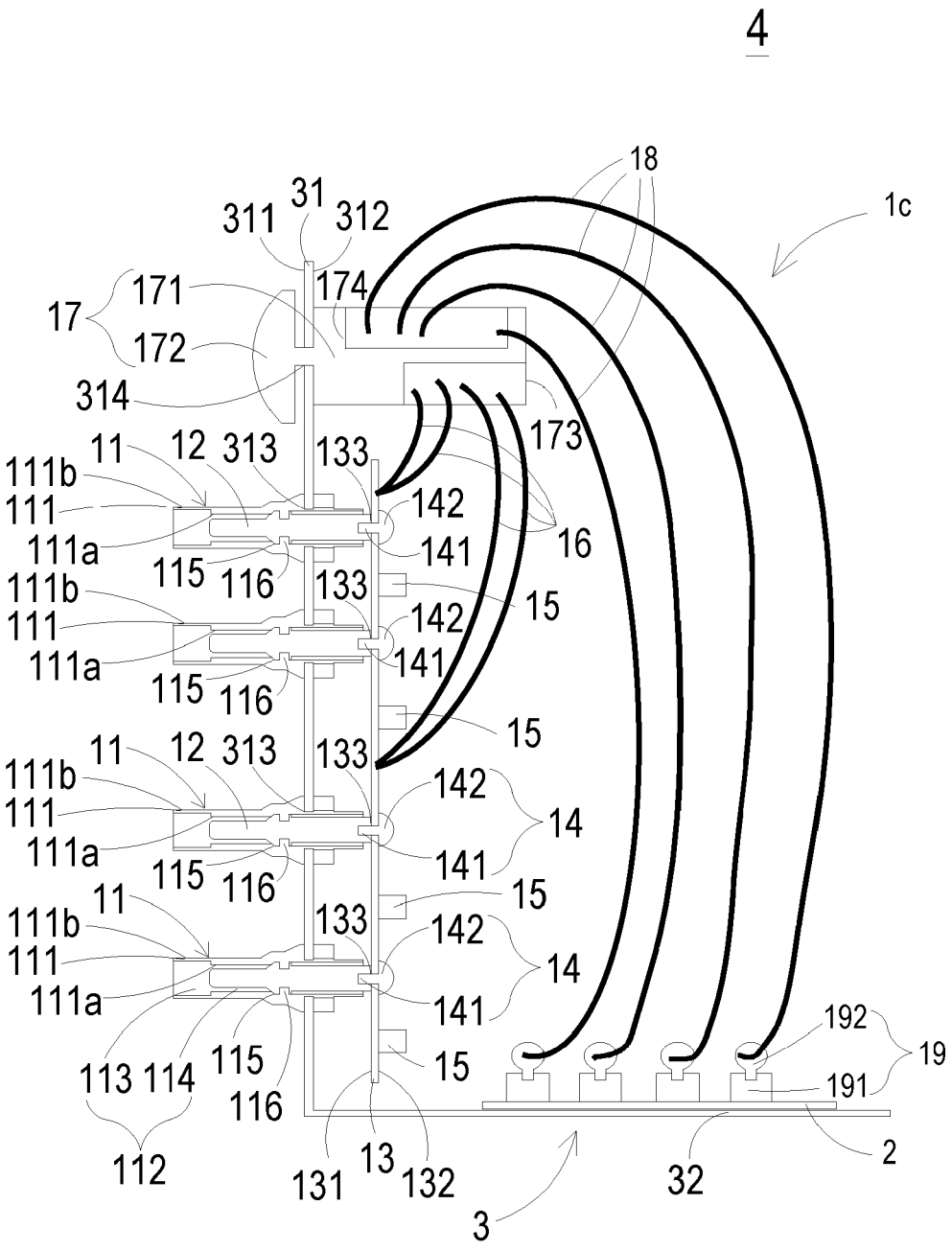
172
17
314
11
114
113
112
111b
111
111a

FIG. 4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314
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111a
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112
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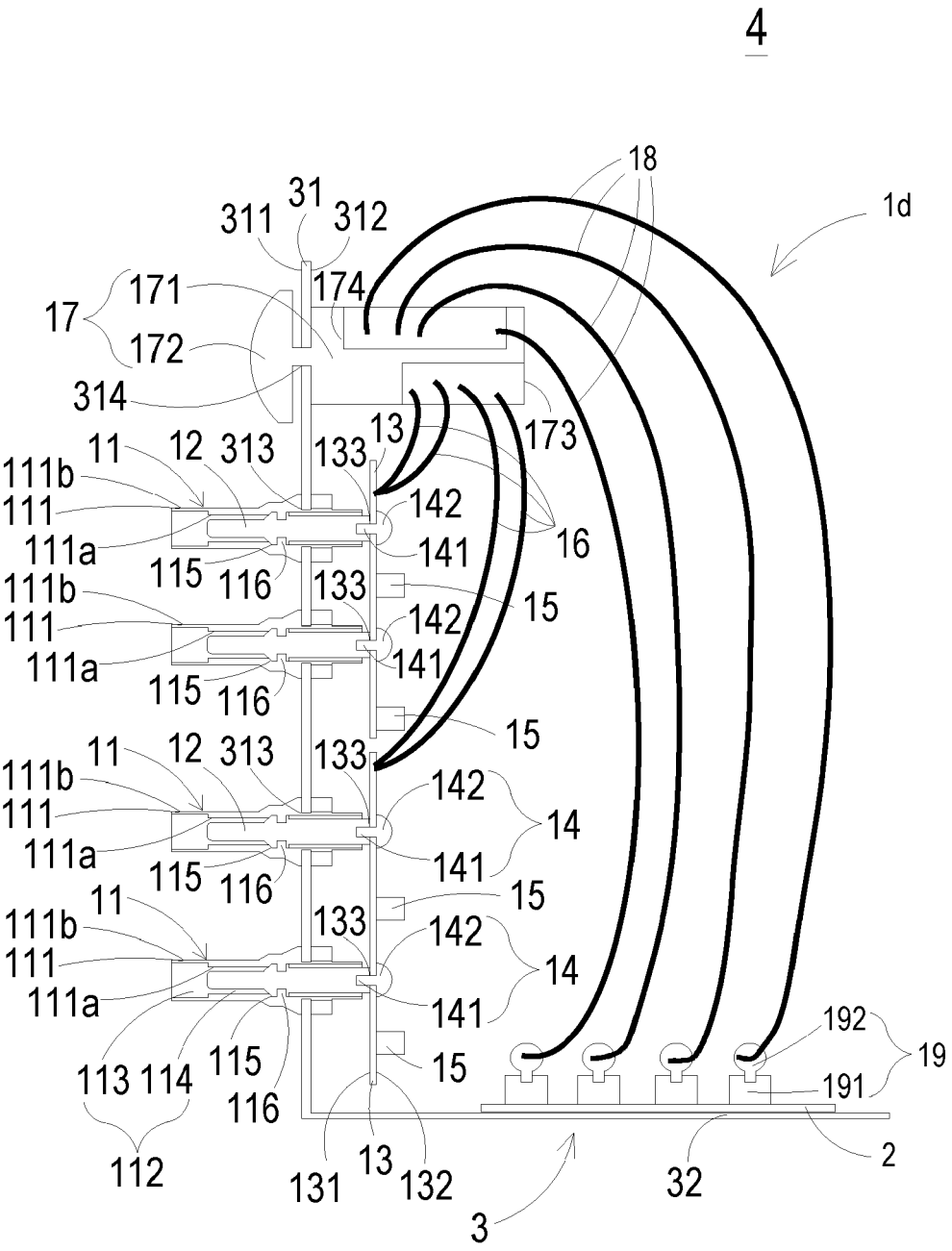
19

FIG. 5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174
172
314
173
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111b
111
111a
142
141
16
115
116
15
14
192
19
191
113
114
112
131
132
3
32
2

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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- EP 0094823 A2 **[0006]**
- US 2005213300 A1 **[0007]**