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EP 0131105 A
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(58) Field of Search:
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(54) Abstract Title: **Swivel electrical connector**

(57) A swivel connector 1 includes a ground pin 11, two insulating parts 12, 14, two annular conductive metal parts 13, 15 and two conductive rings. The ground pin 11 is provided with a ground wire contact portion 111 at an end thereof. The first insulating part 12 has a disc 121 with a central bore 125, two apertures 123, 124, a protrusion 126 at its lower part and a ground wire contact portion receiving support 122 at its upper part. The ground pin 11 is passed through the bore 125. The first annular conductive metal part 13 engages over the protrusion 126 of the first insulating part 12 and has a tongue 131 that is inserted through a first aperture 123 in the first insulating part 12. The first conductive ring engages over the first annular conductive metal part 13. The second insulating part 14 has a disc 145 with a central bore 143, an aperture 141, an annular groove 142 and a protrusion 144 at its lower part. The groove 142 engages over the protrusion 126 of the first insulating part 12. The second annular conductive metal part 15 engages over the protrusion 144 of the second insulating part 14 and has a tongue 151 that is inserted through the aperture 141 in the second insulating part 14 and through the second aperture 124 in the first insulating part 12. The second conductive ring engages over the second annular conductive metal part 15.

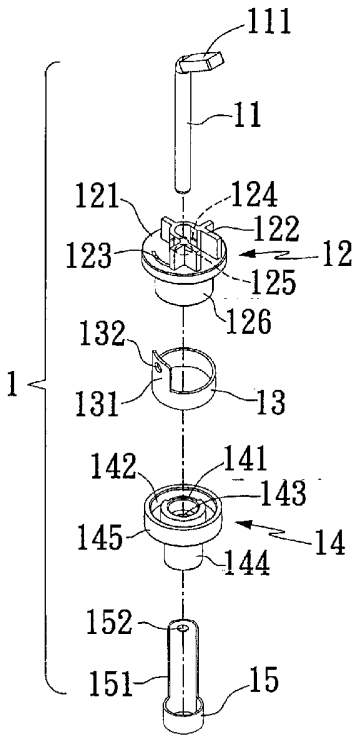

Fig. 1

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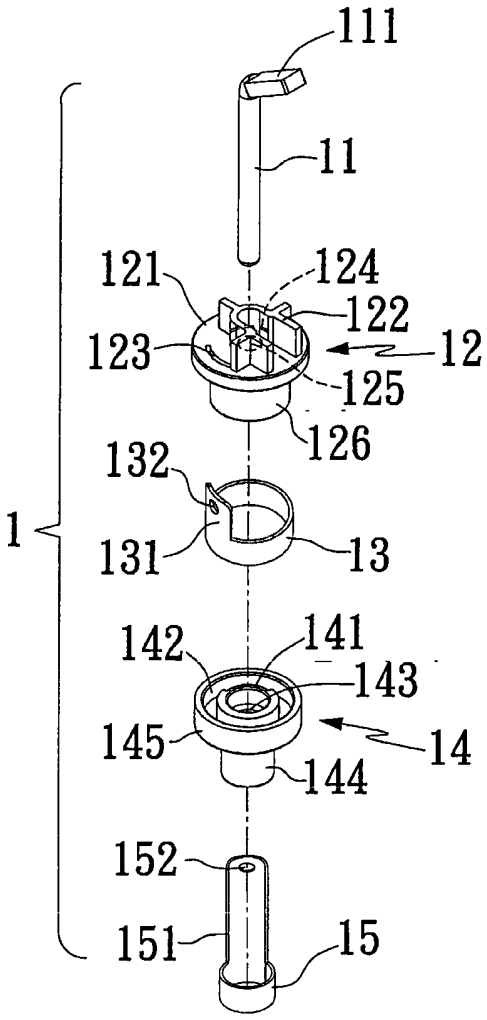
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Fig. 1

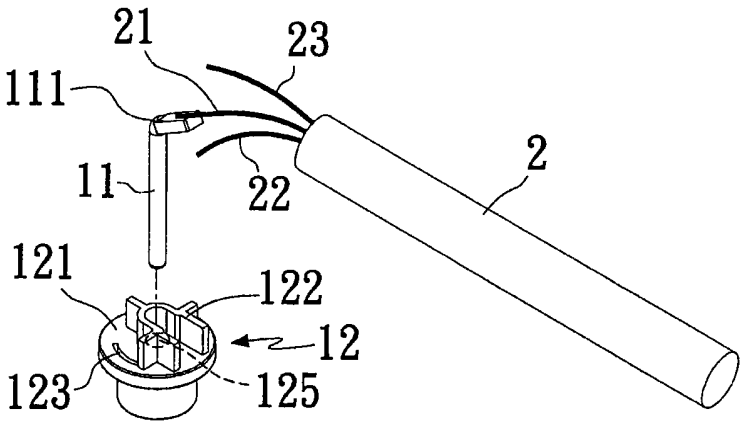

Fig. 2

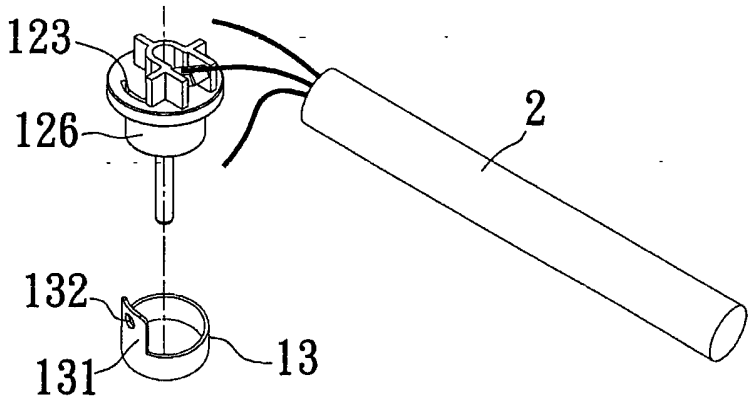

Fig. 3

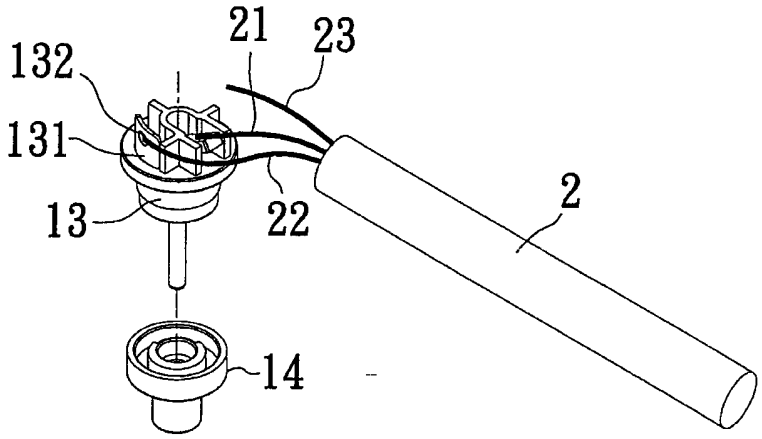

Fig. 4

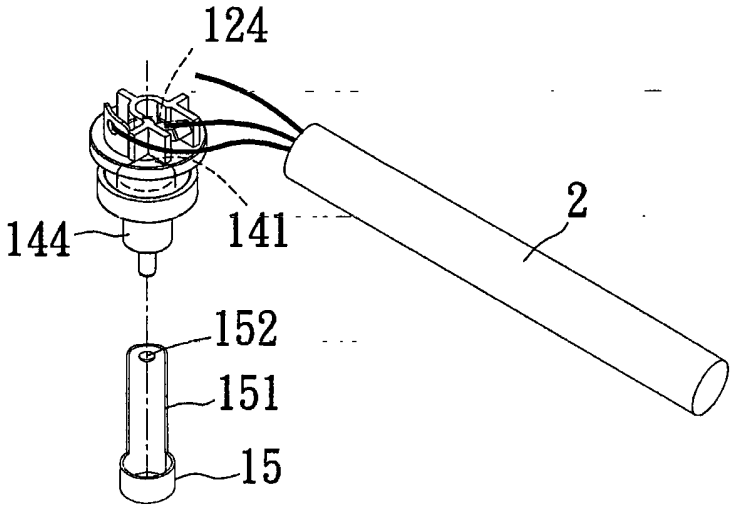

Fig. 5

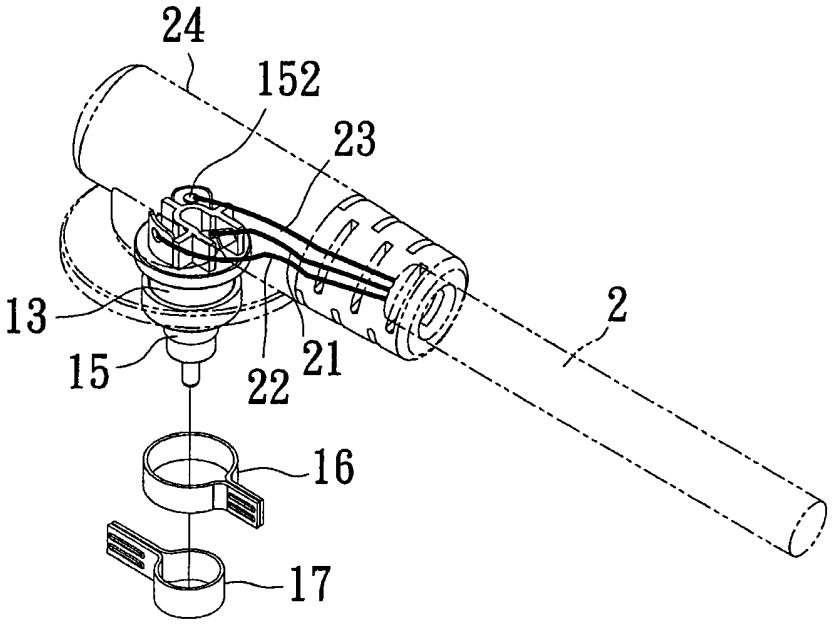

Fig. 6

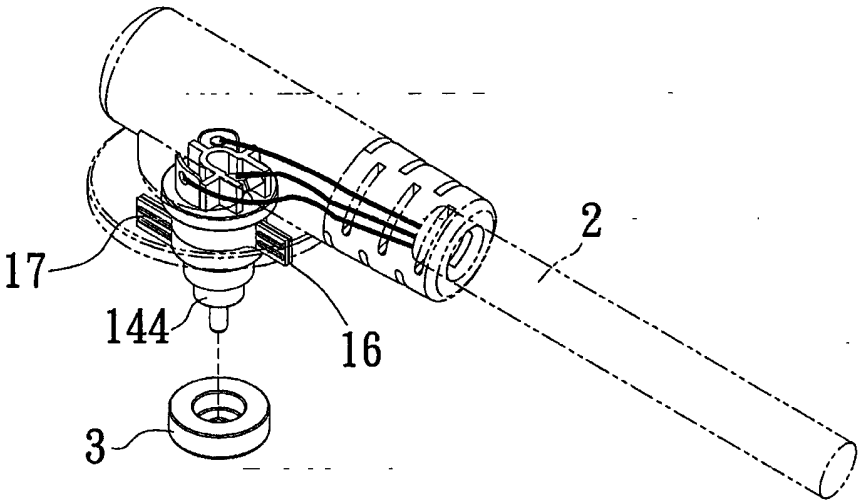

Fig. 7

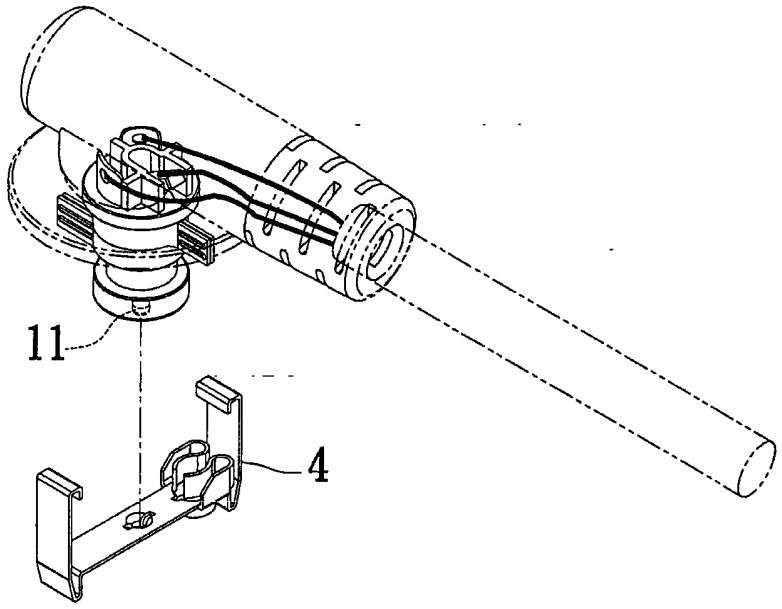

Fig. 8

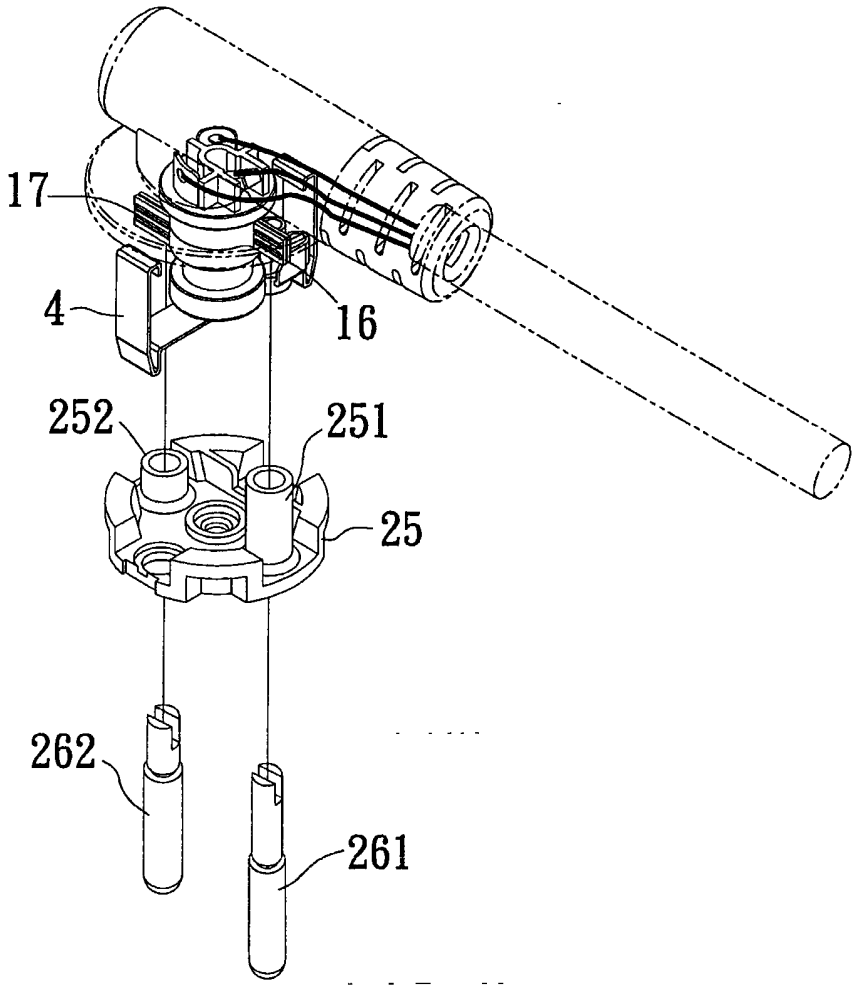

Fig. 9

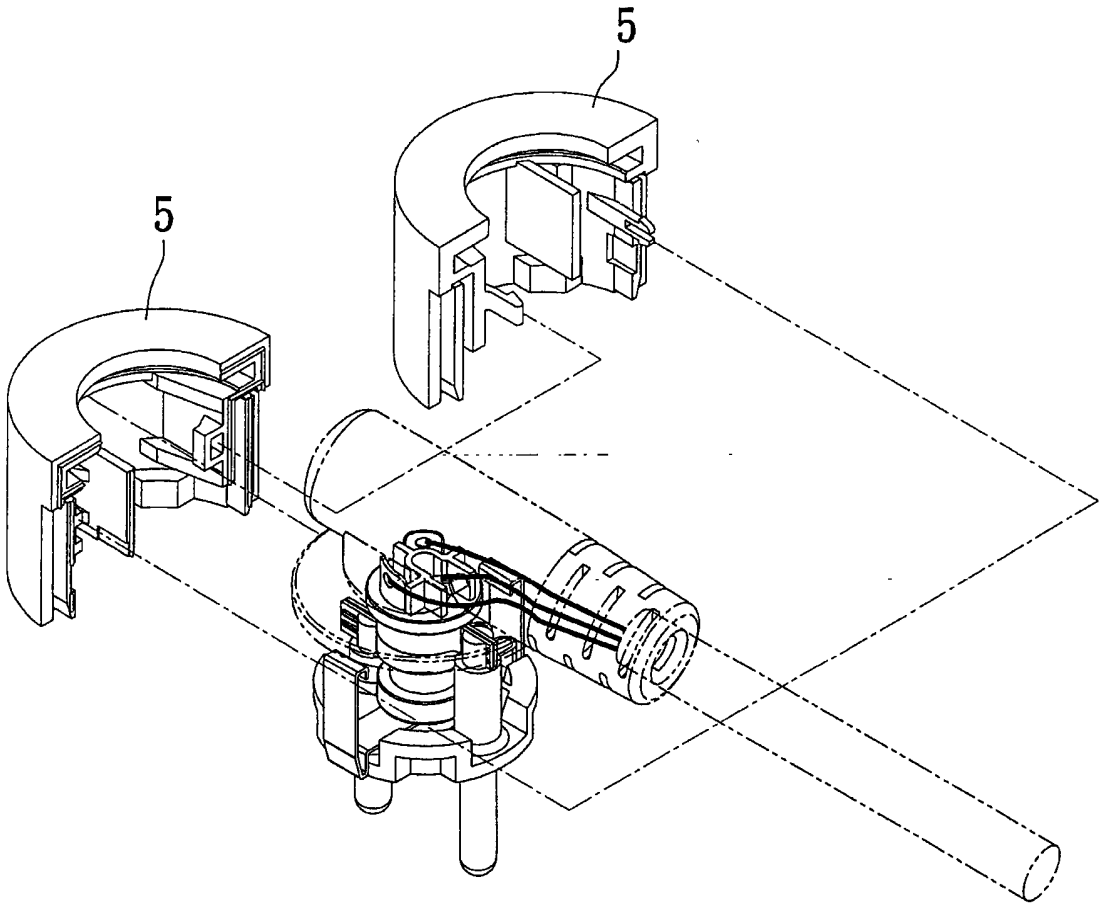

Fig. 10

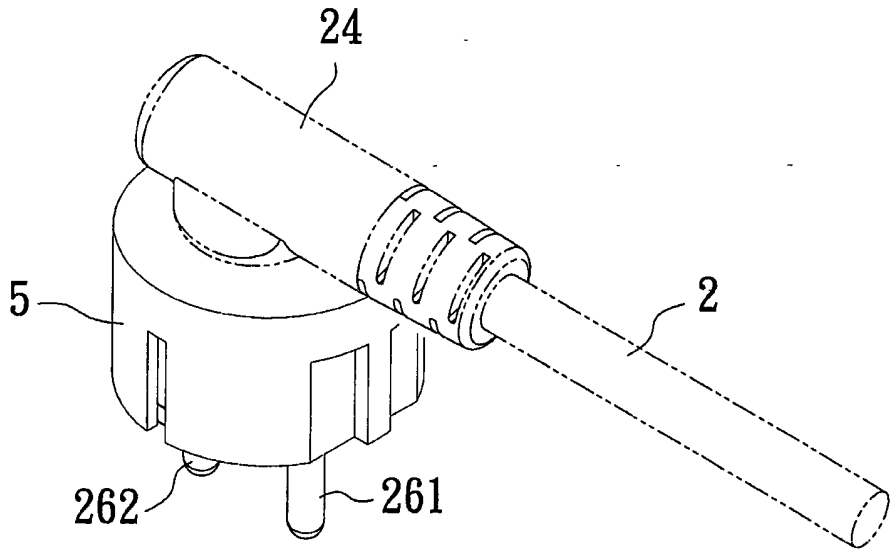

Fig. 11

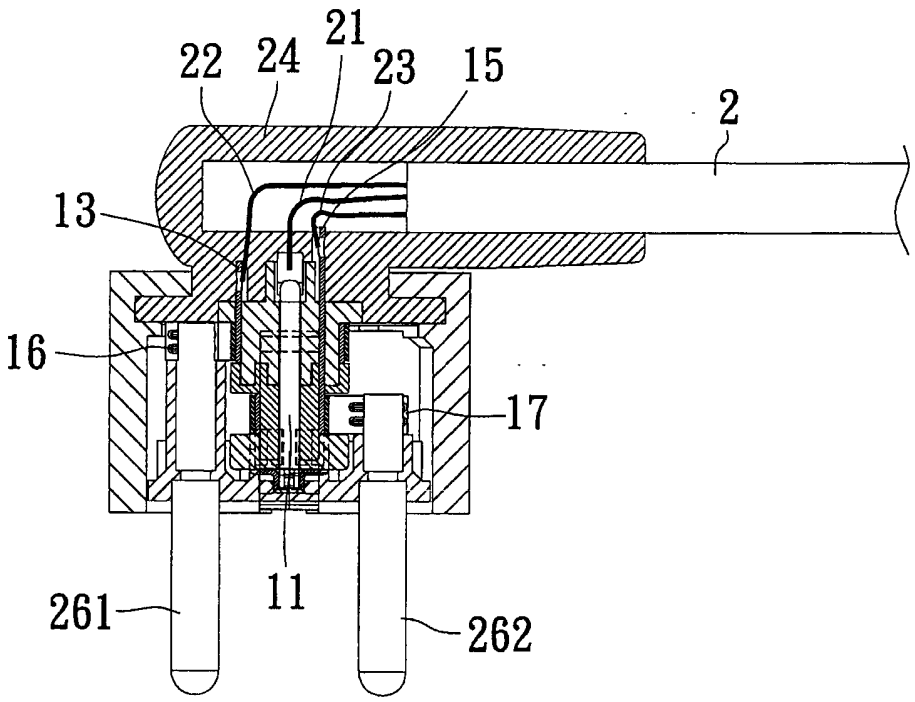

Fig. 12

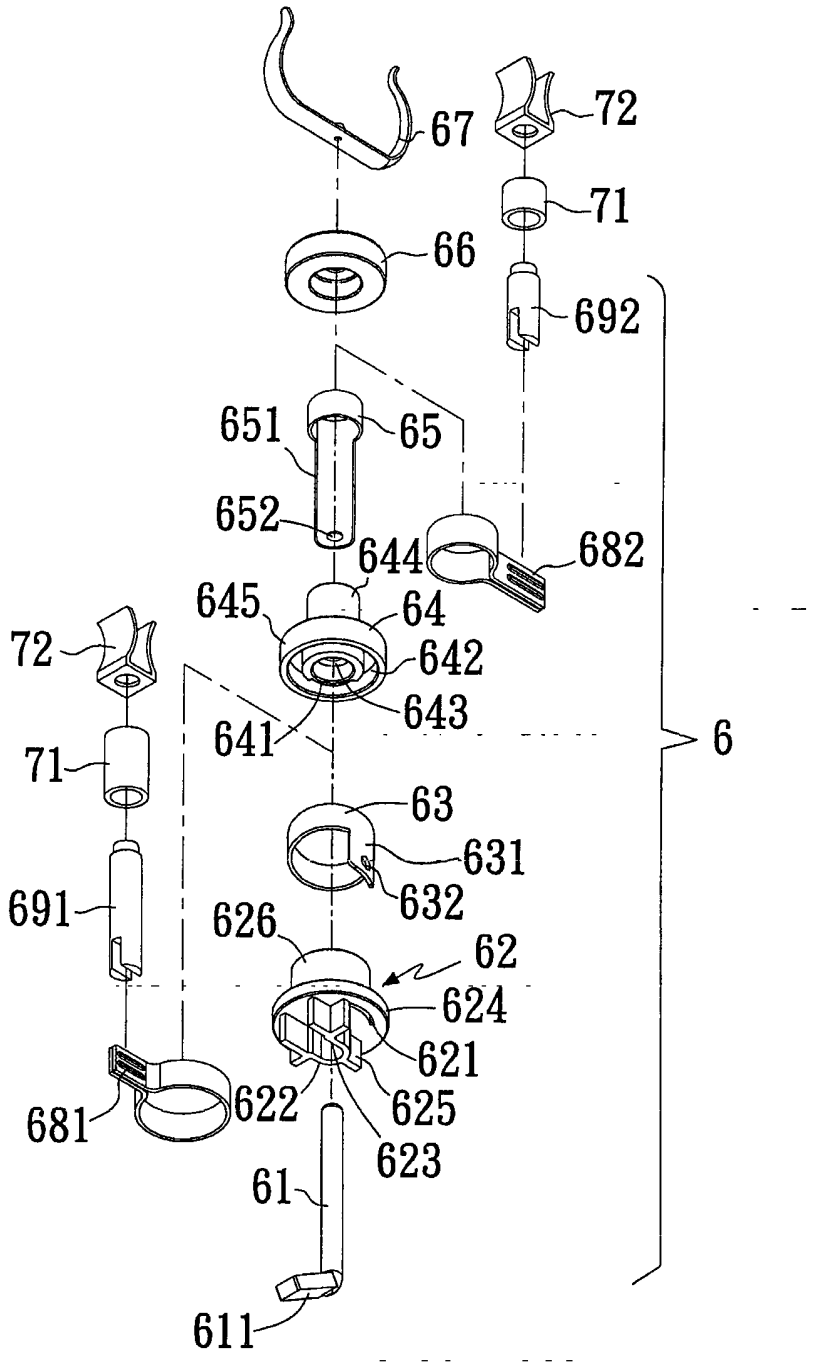
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Fig. 13

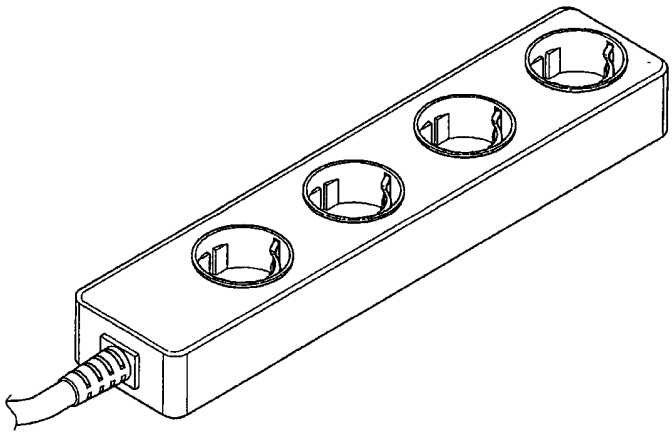

Fig. 14

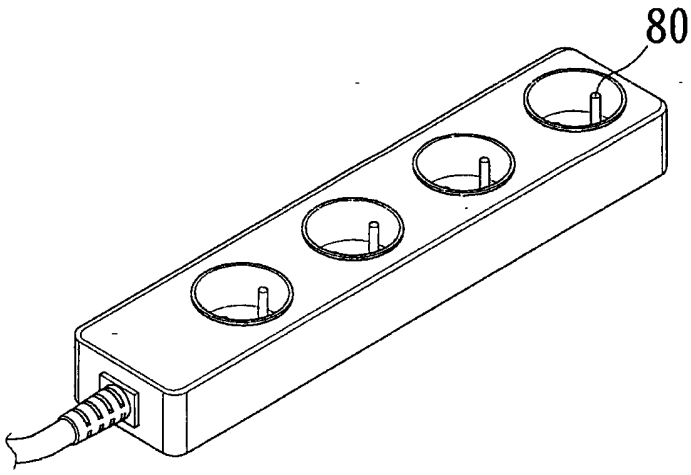

Fig. 15

Swivel Conductive Device

This invention relates to a structural design for a conductive construction, particularly to a freely rotatable swivel conductive device.

The conventional electronic appliance or equipment is connected to a power cord for supplying power that is plugged into a socket supplying power by a plug provided at an end thereof. The conventional power cords and plugs are mostly affixed to each other. Due to the rigid material for making the plug and the pliable material for making the power cord, after the plug is plugged into the socket, the power cord may be bent or twisted along with the movement of the electronic equipment (such as vacuumed cleaners, hair blowers and electronic hand tools). Prolong exposures to such twisting may cause fracturing or damages of the power cords, or failure of the electronic equipment, and occurrences of electrical hazards.

For better appearance, safety and full utilisation of space, a plug with a flat plug housing (where the prongs are normal to the plug) such that the power cord is situated to be parallel to the socket panel (such as the wall surface). However, such plugs can only be implemented in sockets of two units in series but not three or more units in parallel (because the power cords may interfere with each other). Furthermore, on the sockets having three units in parallel (such as an extension cord), the conventional design would affect the other units such as adapters and chargers thereby resulting in inconvenience.

To eliminate the hazards, damages or inconvenience caused by the conventional power cords or sockets, modified plugs and sockets are thus needed.

It is a primary object of this invention to provide a swivel conductive plug or a swivel conductive socket capable of preventing power cords from bending or twisting due to movement of electronic equipment, where prolong exposures to such twisting may cause fracturing or damages to the power cords.

To achieve the above object, this invention provides a swivel conductive device, comprising: a swivel conductive device including a ground wire swivel pin provided at an end thereof with a ground wire contact portion; a first insulator stand a having swivel disc, a swivel disc having a central bore, a first conductive metal notch and second conductive metal notch, a ground wire contact portion receiving support provided at an upper part thereof, a first protrusion provided at a lower part thereof, a ground wire swivel pin passing through the bore, a ground wire contact portion leaning against the ground wire contact portion receiving support; a first conductive metal having a first annular flange and engaging over the first protrusion, a first flange inserting through the first conductive metal notch; a second insulator stand having a swivel disc, a swivel disc having a central bore, wherein the bore perimeter is formed with a third conductive metal notch, and an annular groove formed between the bore and the swivel disc periphery, a second protrusion provided at a lower part thereof, the annular groove engaging over the first protrusion of the first insulator stand; a second conductive metal having a second annular flange engaging over the second protrusion, a second flange inserting through a third conductive metal notch and a second conductive metal notch .

These and other modifications and advantages will become even more apparent from the following detailed description of a preferred embodiment of the invention by way of example and from the drawings in which:

Fig. 1 is an exploded view illustrating the structure of the first embodiment of this invention;

Figs. 2 to 11 are schematic views illustrating the assembly of the first embodiment of this invention;

Fig. 12 is a schematic view illustrating the first embodiment of this invention;

Fig. 13 is an exploded view of the second embodiment of this invention;

Fig. 14 is an assembled, perspective view of the second embodiment of this invention; and

Fig. 15 is an assembled, perspective view of the third embodiment of this invention.

Fig. 1 is an exploded view illustrating the structure of the first embodiment of this invention. As shown, the swivel conductive device 1 of this invention includes:

A ground wire swivel pin 11 is provided at an end thereof with a ground wire contact portion 111.

A first insulator stand 12 includes a swivel disc 121. The swivel disc 121 includes a bore 125, a first conductive metal notch 123 and a second conductive metal notch 124. The swivel disc 121 is provided at an upper part thereof with a ground wire contact portion receiving support 122 and a first protrusion 126 at a lower part thereof. A ground wire swivel pin 11 passes through the bore 125. A ground wire contact portion 111 leans against the ground wire contact portion receiving support 122.

A first conductive metal 13 of an annular shape, includes a first flange 131 and an annular bore 132 and engages over the first protrusion 126. The first flange 131 inserts through the first conductive metal notch 123.

A second insulator stand 14 includes a swivel disc 145, a swivel disc 145 having a central bore 143, the bore 143 perimeter being formed with a third conductive metal notch 141 and an annular groove 142 located between the bore 143 and the swivel disc 145 periphery. The swivel disc 145 is provided at a lower part thereof with a second protrusion 144. The annular groove 142 engaging over the first protrusion 126 of the first insulator stand 12.

A second conductive metal 15 of an annular shape includes a second flange 151 and bore 152 and engaging over the second protrusion 144. The second flange 151 inserts through the third conductive metal notch 141 and the second conductive metal notch 124, such that the first flange 131 of the first conductive metal 13, the second flange 151 of the second conductive metal 15, and ground wire contact portion 111 are exposed out of the first insulator stand 12.

Figs. 2 to 11 are schematic views illustrating the assembly of the first embodiment of this invention. As shown, the ground wire 21 of the power cord 2 is connected to the ground wire contact portion 111. The ground wire swivel pin 11 is placed in the bore 125 of the first insulator stand 12 (see Fig. 2). The first conductive metal 13 then engages over the first protrusion 126 and the first conductive metal notch 123 (see Fig. 3). The neutral wire 22 is electrically connected to the bore 132. The second insulator stand 14 engages over the first protrusion 126 of the first insulator stand 12 (see Fig. 4). The second conductive metal 15 engages over the second protrusion 144. The second flange 151 inserts through the third conductive metal notch 141 and the second conductive metal notch 124 (see Fig. 5). The live wire 23 is electrically connected to the bore 152. A first conductive ring 16 engages over the first conductive metal 13. A second conductive ring 17 engages over the second conductive metal 15. A top lid 24 the covers the power cord (see Fig. 6). The third insulator stand 3 engages over the second protrusion 144 (see Fig. 7). The ground wire conductive copper 4 engages over a tail end of the ground wire swivel pin 11 (see Fig. 8)

A bottom lid 25 then covers the ground wire conductive copper 4. A long prong 261 passes through a long insulating hollow column 251 to engage the first conductive ring 16. A short prong 262 passes through a short insulating hollow column 252 to engage the second conductive ring 17 (see Fig. 9). A lateral cover 5 then covers the swivel conductive device, which is then fused by ultrasonic waves (see Fig. 10), where the final product is as shown in Fig. 11.

Fig. 12 is a schematic view illustrating the first embodiment of this invention. As shown, during rotation of the power cord 2, the ground wire 21, neutral wire 22 and live wire 23 would be rotated coaxially with the first conductive metal 13, second conductive metal 15 and ground wire swivel pin 11 driven by the top lid 24. The first conductive ring 16 and second conductive ring 17 can be electrically connected to the first conductive metal 13 and second conductive metal 15, respectively, via their perimeters. Accordingly, even if the power cord 2 is rotated to any orientation, the power cord 2 would not be twisted or fractured due the affixation of the long prong 261 and short prong 262 to the socket.

Fig. 13 is an exploded view of the second embodiment of this invention. As shown, the swivel conductive device 6 includes:

A ground wire swivel pin 61 provided at an end thereof with a ground wire contact portion 611.

A fourth insulator stand 62 includes a swivel disc 624. The swivel disc 624 includes a central bore 623, a fourth conductive metal notch 621 and a fifth conductive metal notch 622, a ground wire contact portion receiving support 625 provided at a lower part thereof of, and a third protrusion 626 provided at an upper part thereof. The ground wire swivel pin 61 passes through the bore 623. A ground wire contact portion 611 leans against the ground wire contact portion receiving support.

A third conductive metal 63 of an annular shape includes a third flange 631 and a bore 632, and engages over the third protrusion 626. The third flange 631 inserts through the fourth conductive metal notch 621.

A third conductive ring 681 engages over the third conductive metal 63.

A port clamp 72 engages to the third conductive ring 681 via a long conductive prong 691, where an insulator collar 71 engages over the long conductive prong 691.

A fifth insulator stand 64 includes a swivel disc 645. The swivel disc 645 includes a central bore 643. The bore 643 perimeter is formed with a sixth conductive metal notch 641 and an annular groove 642 located between the bore 643 and the swivel disc 645 periphery. The swivel disc 645 is provided at an upper part thereof with a fourth protrusion 644. The annular groove 642 engages over the third protrusion 626 of the fourth insulator stand 62.

A fourth conductive metal 65 of an annular shape includes a fourth flange 651 and a bore 652, and engages over the fourth protrusion 644. The fourth flange 651 inserts through the sixth conductive metal notch 641 and the fifth conductive metal notch 622.

A fourth conductive ring 682 engages over the fourth conductive metal 65.

The port clamp 72 engages over the fourth conductive ring 682 via the short conductive prong 692. An insulator collar 71 engages over the short conductive prong 692.

The sixth insulator stand 66 engages over the fourth protrusion 644. The ground wire conductive copper 67 engages over a tail end of the ground wire swivel pin 61 and is then received in a corresponding socket. Fig. 14 is an assembled, perspective view of the second embodiment of this invention. Fig. 15 illustrates an embodiment where the horn-like ground wire conductive copper 67 is replaced with a cylindrical conductive copper 80 to become a swivel conductive socket in compliance with French specifications.

Accordingly, the special features of the swivel conductive device of this invention modifies the conventional plugs or sockets that cannot move along with the electronic equipment, thereby resulting in bending or twisting, into swivel sockets or swivel plugs.

This invention is related to a novel creation that makes a breakthrough in the art. Aforementioned explanations, however, are directed to the description of preferred embodiments according to this invention. Since this invention is not limited to the specific details described in connection with the preferred embodiments, changes and implementations to certain features of the preferred embodiments without altering the overall basic function of the invention are contemplated within the scope of the appended claims.

Claims

1. A swivel conductive device, comprising:

a ground wire swivel pin, provided at an end thereof with a ground wire contact portion;

a first insulator stand having a swivel disc, the swivel disc having a central bore, a first aperture and a second aperture, a ground wire contact portion receiving support provided at an upper part thereof, a first protrusion provided at a lower part thereof, and a ground wire swivel pin passing through the bore, the ground wire contact portion leaning against the ground wire contact portion receiving support;

a first conductive metal part having a first annular flange and engaging over the first protrusion, the first flange inserting through the first aperture;

a first conductive ring engaging over the first conductive metal part;

a second insulator stand having a swivel disc, the swivel disc having a central bore, the bore perimeter being formed with a third aperture, and an annular groove located between the bore and the swivel disc periphery, the swivel disc being provided at a lower part thereof with a second protrusion, the annular groove engaging over the first flange;

a second conductive metal part having a second annular flange and engaging over the second protrusion, the second flange inserting through the third aperture and the second aperture; and

a second conductive ring engaging over the second conductive metal part.

2. The swivel conductive device of Claim 1, wherein the first flange and the second flange are each formed with a bore and electrically connected to a power cord.

3. The swivel conductive device of claim 1 or claim 2, wherein the first conductive metal part, second conductive metal part and third conductive metal part each includes a conductive metal made of a conductive copper.

4. A swivel conductive device substantially as described herein with reference to Figs. 1 to 12 or 13 and 14 or 15 of the accompanying drawings.

INVESTOR IN PEOPLE

Application No: GB0502087.0 **Examiner:** Mrs Saskia Jonkhart

Claims searched: 1-4 **Date of search:** 2 June 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-4	WO 00/72408 A (PURINGTON ET AL), see page 15 and figures 5A-5E
Y	1-4	JP 63143766 A (SHINKO SEISAKUSHO), see all figures
Y	1-4	JP 2001185315 A (FUJITSU TAKAMISAWA COMPONENT), see figures and PAJ abstract
Y	1-4	US 1743118 A (COUTURE ET AL), see whole document
A	1-4	EP 0254157 A (BRAUN), see whole document
A	1-4	EP 0131105 A (BRAUN), see whole document

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X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

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Worldwide search of patent documents classified in the following areas of the IPC[07]

H01R

The following online and other databases have been used in the preparation of this search report

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