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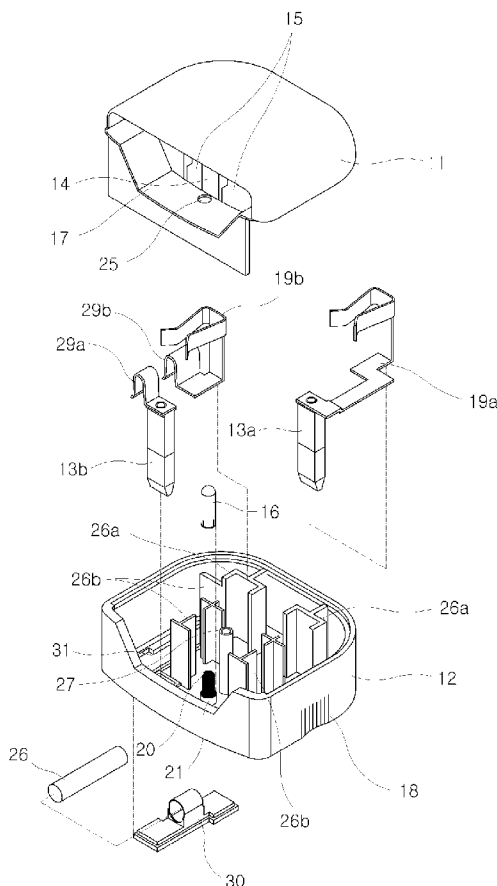
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(54) Title: ADAPTOR FOR CONNECTING PLUG TO DIFFERENT TYPE OF POWER OUTLET



(57) Abstract: An adaptor for connecting a plug of an electrical device to a different type of power outlet is disclosed. The adaptor of the present invention includes a main body, which has an upper casing (11), having a receiving space (14), and a lower casing (12). The adaptor further includes two connection terminals (13a) and (13b), which are provided in the lower casing and have shapes corresponding to the power outlet, and two terminal plates (19a) and (19b), which are provided in the main body and are connected to the respective connection terminals. The adaptor further includes a locking means, which has a holder (21) provided in the lower casing, a locking protrusion (16) that is movably coupled to the holder, and a spring (20) interposed between the holder and the locking protrusion, so that, when the plug of the electrical device is inserted into the receiving space, the locking protrusion is locked to a locking hole of the plug.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## **Description**

### **ADAPTOR FOR CONNECTING PLUG TO DIFFERENT TYPE OF POWER OUTLET**

#### **Technical Field**

- [1] The present invention relates, in general, to adaptors for connecting plugs to different types of power outlets, and, more particularly, to an adaptor which has an improved structure such that a plug of an electrical device, which is manufactured and sold in a particular country or area, can be connected to different types of power outlets in other countries or areas, and such that the plug of the electrical device can be easily coupled to and removed from the adaptor.

#### **Background Art**

- [2] Generally, in every country, electricity is supplied to consumers in a manner suitable for the conditions in the corresponding country. Therefore, the voltage of the supplied electricity is different depending on the country, and the shapes of power outlets, which are provided as the final stage in the supply of electricity, are different depending on the country.
- [3] In detail, the electrical devices that are manufactured and sold in almost all nations in the world are designed such that they can be operated using 110V or 220V power. However, typically, plugs that connect the electrical devices to power supplies, that is, to the power outlets, are designed according to the standard of the corresponding country to correspond to the power outlets in that country.
- [4] Therefore, a foreign tourist must carry a separate adaptor, which can connect plugs of electrical devices to different types of power outlets, in order to use the electrical devices, which have been used in his/her own country, in a destination country in which the voltage or power outlet that are used does not correspond to the electrical devices of the tourist.
- [5] For this, conventional techniques related to adaptors, each of which has a socket in a first side thereof and has on a second side thereof several plugs corresponding to power outlets of various nations, were proposed in US Patent No. 6,749,451, PCT International Publication No. WO 87/04570 and Japanese Laid-open Publication No. Heisei. 04-033280. Furthermore, a plug device, which includes a plug that is removably provided in a casing, and a locking means that separably engages with the plug, was proposed in Korean Patent Registration No. 229,692.
- [6] The plug-in adaptor of US Patent No. 6,749,451 can be selectively connected to plug-in systems of several countries. The electric adaptor of WO 87/04570 includes five kinds of plug systems and a socket having a rotatable body, so that it can be used

with various international standard plug systems by rotating the body. Furthermore, the plug of Japanese Laid-open Publication No. Heisei. 04-033280 has a main body, one surface of which is planar. Several types of plugs and terminals are provided on the sidewall of the main body. A socket is rotatably provided through the central portion of the main body, which has a triangular shape. The compatible plug device of Korean Patent Registration No. 229,692 includes the electric plug, which is removably coupled to the casing and is movable between a mounting position and an operating position, a mounting means, and the locking means, which is provided in the casing and holds the plug to maintain the operating position of the plug.

[7] Each conventional technique in which the above-mentioned construction is used includes the socket, which is mechanically and electrically connected to a plug of a desired electrical device, and the plugs, which are connectable to various types of power outlets of several countries or areas, thus making it possible to connect the desired electrical device, which is manufactured to correspond to the power outlet of the corresponding country, to various types of power outlets of several countries or areas.

[8] However, the adaptors according to the conventional techniques are problematic in that, because several plugs are provided for a single socket, a relatively large space is required. Furthermore, because the plug of the adaptor must be plugged into the power outlet and then the plug of the electrical device must be plugged into the socket of the adaptor, the coupling force therebetween is reduced. Therefore, there is a problem in that the adaptor may be undesirably separated from the power outlet, or the plug of the electrical device may be undesirably separated from the adaptor.

## **Disclosure of Invention**

### **Technical Problem**

[9] Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide an adaptor which has an improved structure such that a plug of an electrical device, which is manufactured and sold in a particular country or area, can be connected to different types of power outlets in other countries or areas.

[10] Another object of the present invention is to provide an adaptor which is constructed such that the plug of the electrical device can be easily removed when coupled to the adaptor, and, even if outside impact is applied to the adaptor, the plug of the electrical device is prevented from being undesirably removed from the adaptor.

### **Technical Solution**

[11] In order to accomplish the above objects, the present invention provides an adaptor for connecting a plug of an electrical device to a different type of power outlet,

including: a main body having a shape corresponding to the power outlet and including an upper casing and a lower casing, with a receiving space defined in a front end of an upper part of the upper casing so that the plug of the electrical device is removably inserted into the receiving space, and a plurality of connection holes formed in the upper casing so that terminals of the plug are removably inserted into the connection holes; two connection terminals provided in the lower casing and having shapes corresponding to the power outlet, so that the connection terminals are removably, mechanically and electrically connected to the power outlet; two terminal plates provided in the main body and electrically connected at first ends thereof to upper ends of the respective connection terminals, the two terminal plates being mechanically and electrically connected at second ends thereof to the plug of the electrical device; and a locking means, including a holder provided in the lower casing, a locking protrusion coupled to the holder so as to be movable in a direction perpendicular to a direction in which the plug is removably inserted into the receiving space of the main body, and a spring interposed between the holder and the locking protrusion, wherein an upper end of the locking protrusion extends outside a guide surface of the main body through a through hole formed through the guide surface, such that the upper end of the locking protrusion is locked to a locking groove formed in the plug of the electrical device when the plug is removably inserted into the receiving space of the main body.

[12] Preferably, at least one of the two terminal plates may be mechanically and electrically divided into two parts, two holding parts are provided on the two respective parts of the divided terminal plate, and a fuse may be removably coupled between the holding parts and mechanically and electrically connects the two parts of the divided terminal plate to each other, so that a safety hazard resulting from overcurrent or malfunction of the electrical device is prevented.

[13] Furthermore, the guide surface may be provided in the front end of the upper casing to guide removable insertion of the plug of the electrical device into the receiving space, and the through hole may be formed through a central portion of the guide surface, so that the locking protrusion is inserted into the through hole.

[14] In addition, the upper casing, the lower casing and the two connection terminals may be designed such that plan cross-sections of the upper casing and the lower casing and shapes and arrangement of the two connection terminals correspond to a standard of the power outlet in an associated country or area.

### **Advantageous Effects**

[15] The adaptor according to the present invention has an improved structure such that a plug of an electrical device, which is manufactured and sold in a particular country or area, can be connected to different types of power outlets in other countries or areas.

Furthermore, in the present invention, the plug of the electrical device can be easily removed when coupled to the adaptor. In addition, even if outside impact is applied to the adaptor, the plug of the electrical device is prevented from being undesirably removed from the adaptor.

### **Brief Description of the Drawings**

- [16] FIGS. 1 and 2 are perspective views of an adaptor, according to an embodiment of the present invention;
- [17] FIG. 3 is an exploded perspective view of the adaptor according to the present invention;
- [18] FIG. 4 is an exploded perspective view of an adaptor according to another embodiment of the present invention;
- [19] FIG. 5 is a perspective view of an open state of an upper casing of the adaptor according to the present invention;
- [20] FIG. 6 is a sectional view showing an enlargement of a critical part of the adaptor according to the present invention;
- [21] FIG. 7 is a perspective view showing the adaptor, into which a plug of an electrical device is plugged;
- [22] FIG. 8 is a sectional view showing the adaptor, into which the plug of the electrical device is plugged; and
- [23] FIGS. 9 through 12 are views showing several examples of adaptors for plugs to be plugged into electric outlets having various standards according to the present invention.

### **Best Mode for Carrying Out the Invention**

- [24] Hereinafter, the present invention will be described in detail with reference to the attached drawings.
- [25] As shown in FIGS. 1 and 2, an adaptor according to an embodiment of the present invention includes an upper casing 11 and a lower casing 12, which are separably coupled to each other. A receiving space 14 for removable insertion of a plug of various types of electrical devices (not shown) into the adaptor is defined in a front end of an upper part of the adaptor when the upper casing 11 is coupled to the lower casing 12. Furthermore, connection holes 15, into which respective connection terminals of the plug of the electrical device are inserted, are horizontally formed in the receiving space 14, that is, in the upper casing 11.
- [26] In other words, the receiving space 14 is open in a sideways direction of the adaptor, such that the direction in which the plug of the electrical device is removably inserted into the receiving space 14 of the adaptor is perpendicular to the direction in which the adaptor is connected to a power outlet. Therefore, when the adaptor is connected to the

power outlet after the plug of the electrical device has been connected to the adaptor, the plug of the electrical device is prevented from interfering with the hand of a user, so that the connection operation can be easily conducted.

- [27] Particularly, because a guide surface 17, a central portion of which is lower than opposite ends thereof, is provided ahead of the receiving space 14, the plug of the electrical device can be removably inserted into the receiving space 14 more easily. Furthermore, a through hole 25 is formed through a central portion of the guide surface 17. A locking protrusion 16, to be locked to a locking groove of the plug of the electrical device, protrudes to a position higher than the guide surface 17 through the through hole 25 of the guide surface 17. The locking protrusion 16 serves to hold the plug of the electrical device, which is inserted into the receiving space 14 and the connection holes 15, such that the plug is prevented from being undesirably removed from the adaptor.
- [28] In addition, two connection terminals 13a and 13b for mechanically and electrically connecting the adaptor and the power outlet extend downwards from the lower casing 12. Here, depending on the standard of the particular country or area, a ground terminal may be provided under the lower surface of the lower casing 12. Of course, the shapes and positions of the connection terminals 13a and 13b and a plan cross-section of the lower casing 12 for mechanically and electrically connecting the adaptor and the power outlet must correspond to the characteristics of the country or area.
- [29] Preferably, an uneven surface 18 is formed on each of opposite sidewalls of the adaptor, that is, on each of opposite sidewalls of the lower casing 12, in order to increase frictional force between the adaptor and the hand of the user when removing or connecting the plug of the electrical device from or to the adaptor.
- [30] Although the upper casing 11, the lower casing 12 and the two connection terminals 13a and 13b have been illustratively described on the supposition that they are used in a country having that specific standard, their shapes and coupling structures, for example, the shapes and arrangement of the plan cross-section of the adaptor and the connection terminals 13a and 13b, may be variously changed depending on the standard of the power outlet in another country or area, as shown in FIGS. 9 through 12.
- [31] FIG. 3 illustrates the adaptor of the present invention. The adaptor of the present invention serves to mechanically and electrically connect a plug of each of various types of electrical devices, which are manufactured and sold in Korea, to power outlets in respective nations having different standards.
- [32] The upper and lower casing 11 and 12 of the adaptor are made of insulation material. After the upper casing 11 and the lower casing 12 have been manufactured through separate processes, they are integrally assembled with each other. Here, a structure for

mechanically and electrically connecting the adaptor and the power outlet is provided in the lower casing 12, and a structure for mechanically and electrically connecting the adaptor and the plug of the electrical device is provided in the upper and lower casing 11 and 12.

[33] The lower casing 12 is integrally provided with the connection terminals 13a and 13b and terminal plates 19a and 19b, which are mechanically and electrically connected to the power outlet.

[34] The connection terminals 13a and 13b may have the shape of FIGS. 1 through 8 or one of the shapes of FIGS. 9 through 12, depending on the standard in the corresponding country or area. It is preferable that the connection terminals 13a and 13b and the lower casing 12 be integrally formed to simplify the manufacturing process and increase the coupling force therebetween. Of course, the connection terminals 13a and 13b may be manufactured through a separate process and then integrally assembled with the lower casing 12.

[35] Furthermore, the connection terminals 13a and 13b are electrically connected to first ends of respective terminal plates 19a and 19b, which are installed in the lower casing 12. In addition, second ends of the terminal plates 19a and 19b have shapes appropriate to be mechanically and electrically connected to the plug of the electrical device. Of course, the connection terminals 13a and 13b and the terminal plates 19a and 19b, which electrically connect the plug of the electrical device to the power outlet, are made of conductive substances having superior conductivity.

[36] As shown in FIG. 5, a plurality of supports 26a and 26b, which maintain the terminal plates 19a and 19b at predetermined positions at which the plug of the electrical device is connected to the terminal plates 19a and 19b, and a screw coupling rod 27, which is used to fasten the upper casing 12 to the lower casing 12 using a screw, are provided in the lower casing 12.

[37] Furthermore, a predetermined portion of a front end of the lower casing 12 is cut to a position lower than the other portion to have the same height as that of the guide surface 17 of the upper casing 11, onto which the plug of the electronic product is removably seated. As shown in FIG. 6, the locking protrusion 16 and a holder 21, which is open at an upper end thereof to receive a spring 20 therein, are provided in the lower casing 12 at a position behind the cut front end of the lower casing 12 and between the two connection terminals 13a and 13b.

[38] A stopper 22 is provided on an upper end of the inner surface of the holder 21 to prevent the locking protrusion 16, which has been inserted into the holder 21, from being undesirably removed from the holder 21. In addition, hooks 23 corresponding to the stopper 22 of the holder 21 are provided on the lower end of the locking protrusion 16 at positions spaced apart from each other at regular intervals.

- [39] Therefore, to couple the locking protrusion 16 to the holder 21, after the spring 20 is interposed between the holder 21 and the locking protrusion 16, outside force is applied to the upper end of the locking protrusion 16 in a downward direction. Then, the hooks 23 of the lower end of the locking protrusion 16 are compressed inwards by the stopper 22 of the holder 21 and cross over the stopper 22 of the holder 21, thereby being inserted into the holder 21. The locking protrusion 16, which is coupled to the holder 21 through the above-mentioned process, is moved by outside pressure applied to the upper end of the locking protrusion 16 or by the spring 20 in a vertical direction within a range defined by the stopper 22 and the hooks 23.
- [40] As shown in FIGS. 6 through 8, when a plug 24 of an electrical device is inserted into the receiving space 14 of the adaptor, the locking protrusion 16 is moved into the holder 21 and pushes the spring 20 downwards. Thereafter, when the plug 24 of the electrical device is completely inserted into the receiving space 14, the locking protrusion 16 is moved upwards by the elasticity of the spring 20 and is inserted into a locking groove 28 of the plug 24. Therefore, the plug 24 of the electrical device is prevented from being undesirably removed from the receiving space 14 of the adaptor. Of course, in the stationary state of the adaptor, when the plug 24 of the electrical device is pulled by force greater than a predetermined magnitude, the locking protrusion 16 is removed from the locking groove 28 of the plug 24, and the plug 24 is then removed from the receiving space 14 of the adaptor.
- [41] Meanwhile, as shown in FIG. 4, the adaptor of the present invention may be provided with a safety unit to interrupt the supply of power into the electrical device when overcurrent is supplied to at least one terminal plate 19a or 19b or when the electrical device connected to the plug 24 malfunctions.
- [42] To achieve the above-mentioned purpose, in the embodiment of FIG. 4, reversed U-shaped holding parts 29a and 29b, which are mechanically and electrically connected to a safety fuse 26, are provided on two respective parts of an end of the terminal plate 19b, which are mechanically and electrically divided. Furthermore, a fuse holder 30 for holding the fuse 26 is inserted into a coupling slot 31, which is formed in the lower casing 12 at a predetermined position adjacent to the terminal plate 19b. Here, the coupling slot 31 is formed at the predetermined position in the lower casing 12 such that the fuse holder 30 provided with the fuse 26 can be removably coupled to the adaptor without disassembly of the adaptor. Therefore, a safety hazard due to overcurrent or malfunction of the electrical device is prevented from occurring, and the fuse 26 can be easily replaced with a new one without disassembling the adaptor.
- [43] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of

the invention as disclosed in the accompanying claims.

### **Industrial Applicability**

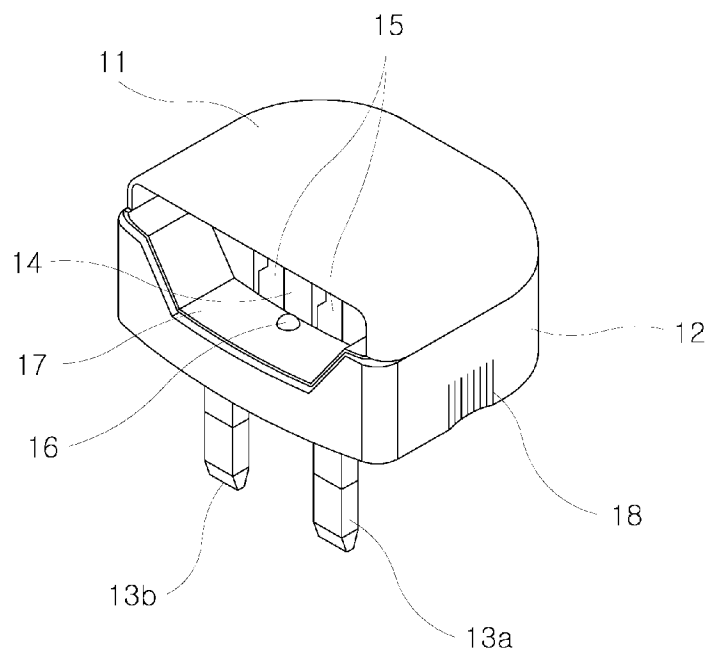
- [44] As described above, the adaptor of the present invention makes it possible to connect a plug of an electrical device, which is manufactured to have a structure corresponding to an associated country or area, to various kinds of power outlet of different countries or areas. Furthermore, the adaptor of the present invention is constructed such that the plug of the electrical device can be easily removed when coupled to the adaptor. In addition, even if outside impact is applied to the adaptor, the plug of the electrical device is prevented from being undesirably removed from the adaptor.

## Claims

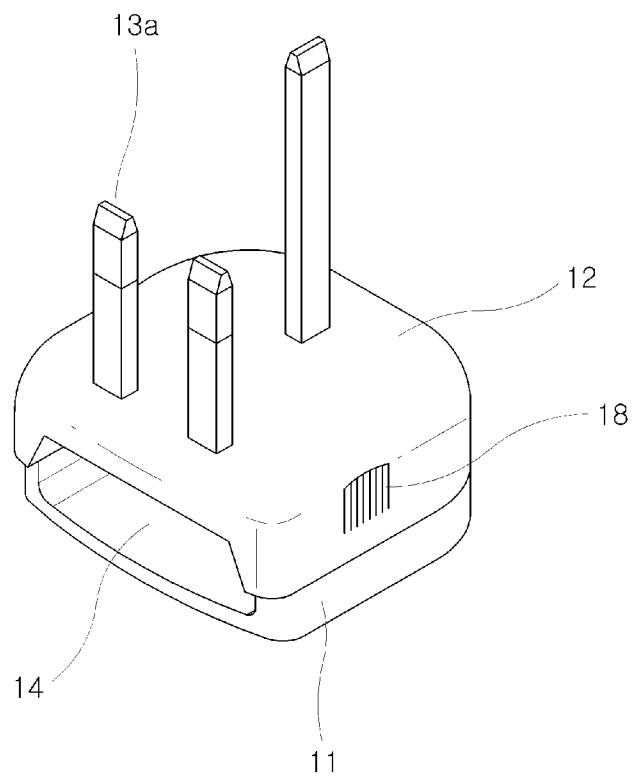
- [1] An adaptor for connecting a plug of an electrical device to a different type of power outlet, comprising:  
a main body having a shape corresponding to the power outlet and including an upper casing and a lower casing, with a receiving space defined in a front end of an upper part of the upper casing so that the plug of the electrical device is removably inserted into the receiving space, and a plurality of connection holes formed in the upper casing so that terminals of the plug are removably inserted into the connection holes;  
two connection terminals provided in the lower casing and having shapes corresponding to the power outlet, so that the connection terminals are removably, mechanically and electrically connected to the power outlet;  
two terminal plates provided in the main body and electrically connected at first ends thereof to upper ends of the respective connection terminals, the two terminal plates being mechanically and electrically connected at second ends thereof to the plug of the electrical device; and  
locking means, comprising a holder provided in the lower casing, a locking protrusion coupled to the holder so as to be movable in a direction perpendicular to a direction in which the plug is removably inserted into the receiving space of the main body, and a spring interposed between the holder and the locking protrusion, wherein an upper end of the locking protrusion extends outside a guide surface of the main body through a through hole formed through the guide surface, such that the upper end of the locking protrusion is locked to a locking groove formed in the plug of the electrical device when the plug is removably inserted into the receiving space of the main body.
- [2] The adaptor according to claim 1, wherein at least one of the two terminal plates is mechanically and electrically divided into two parts, two holding parts are provided on the two respective parts of the divided terminal plate, and a fuse is removably coupled between the holding parts and mechanically and electrically connects the two parts of the divided terminal plate to each other, so that a safety hazard resulting from overcurrent or malfunction of the electrical device is prevented.
- [3] The adaptor according to claim 1, wherein the guide surface is provided in the front end of the upper casing to guide removable insertion of the plug of the electrical device into the receiving space, and the through hole is formed through a central portion of the guide surface, so that the locking protrusion is inserted into the through hole.

- [4] The adaptor according to claim 1, wherein the upper casing, the lower casing and the two connection terminals are designed such that plan cross-sections of the upper casing and the lower casing and shapes and arrangement of the two connection terminals correspond to a standard of the power outlet in an associated country or area.

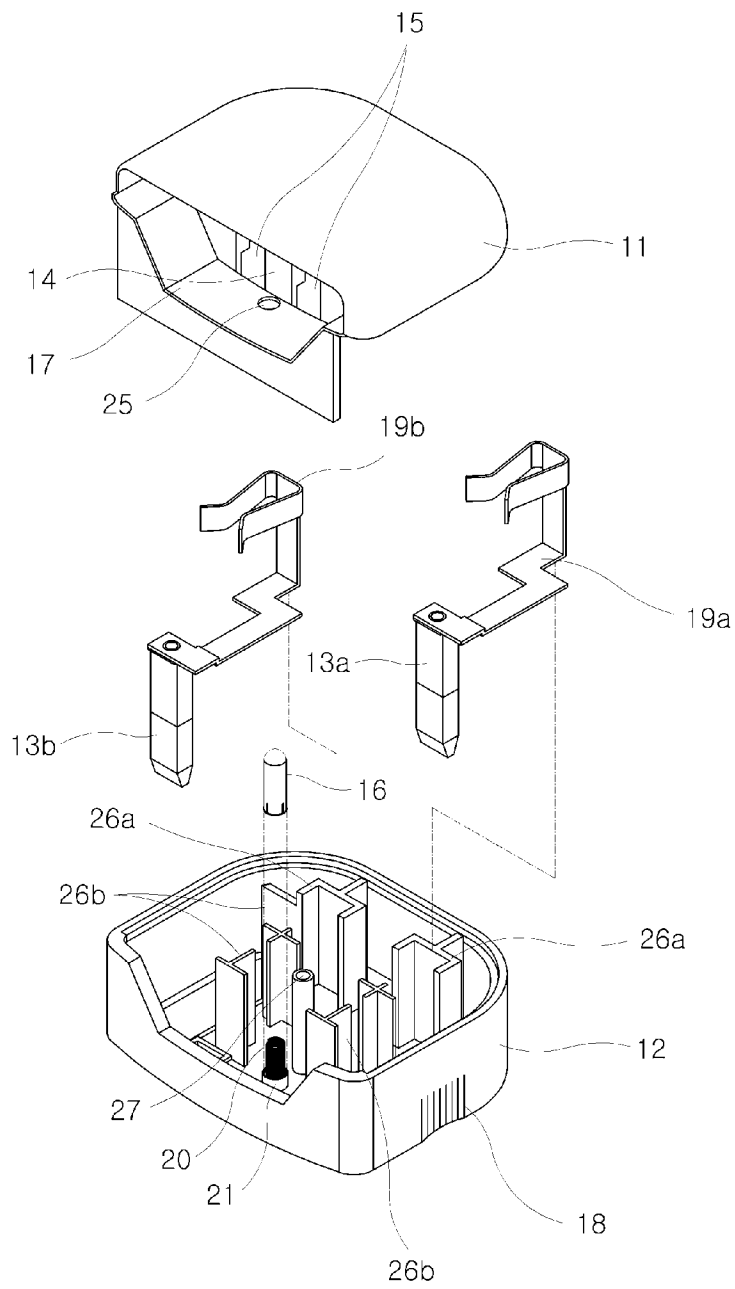
[Fig. 1]



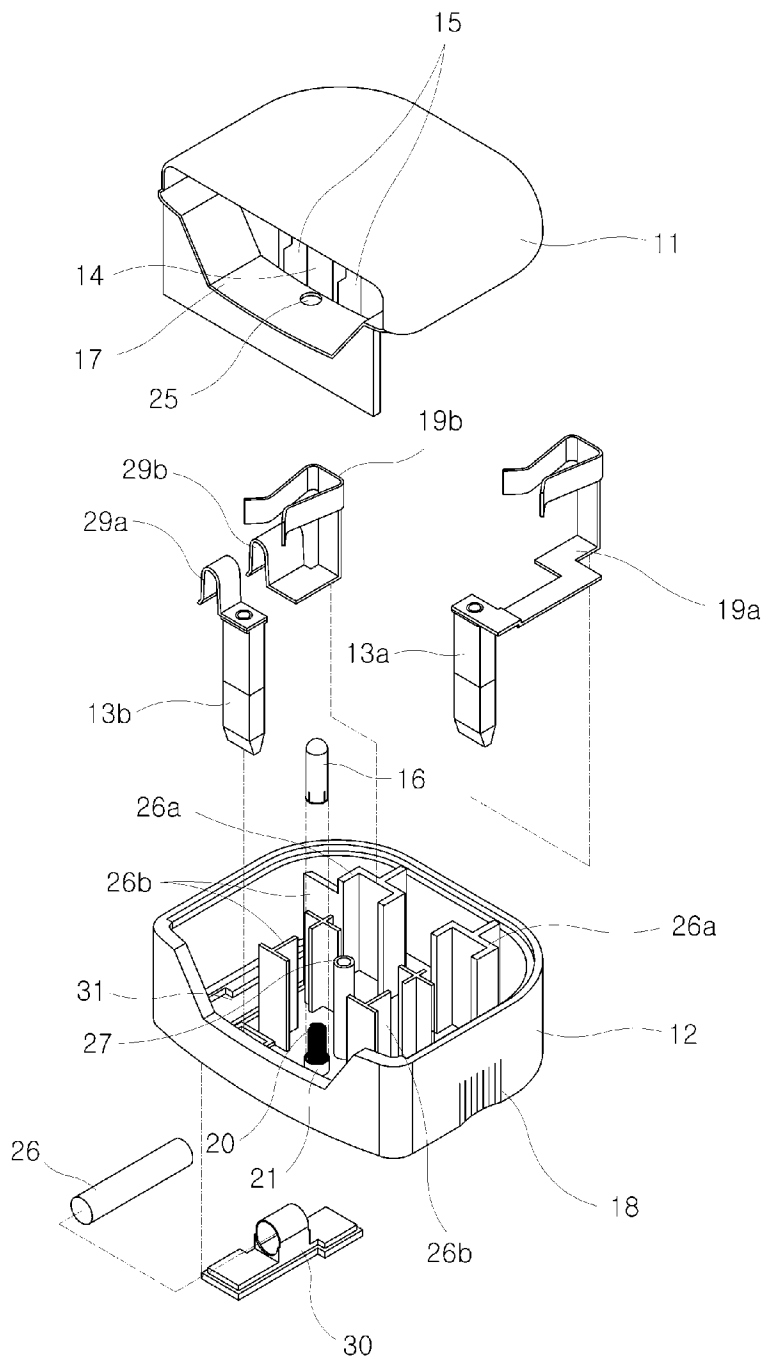
[Fig. 2]



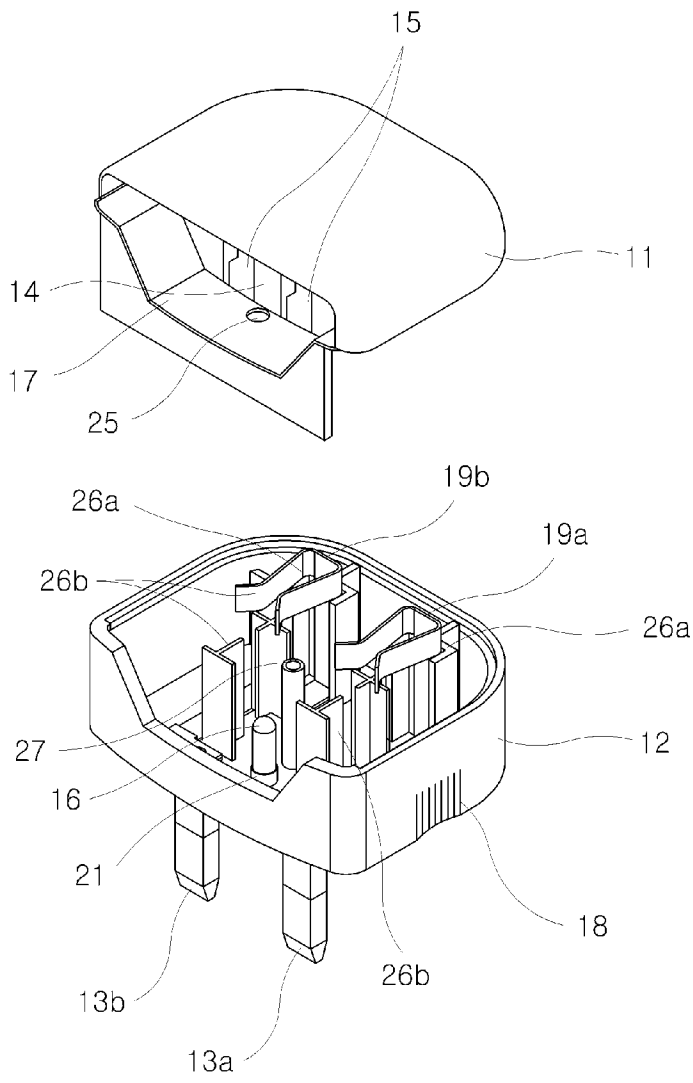
[Fig. 3]



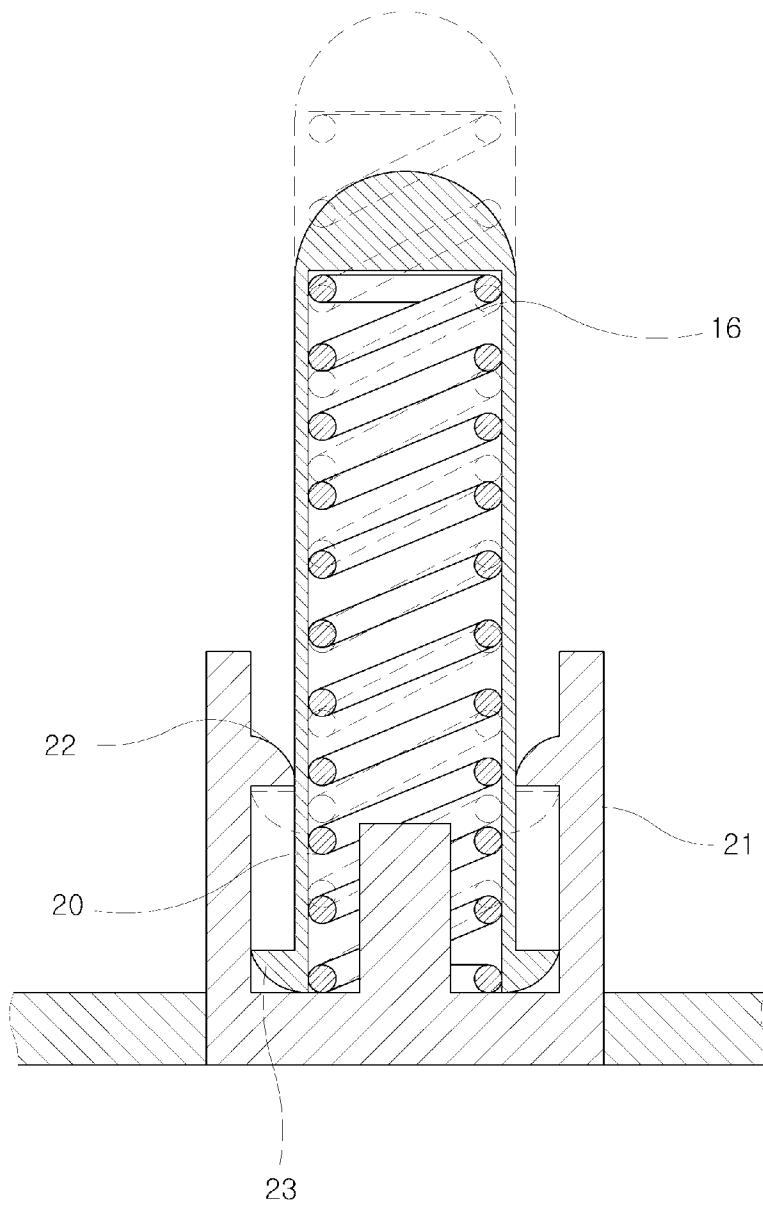
[Fig. 4]



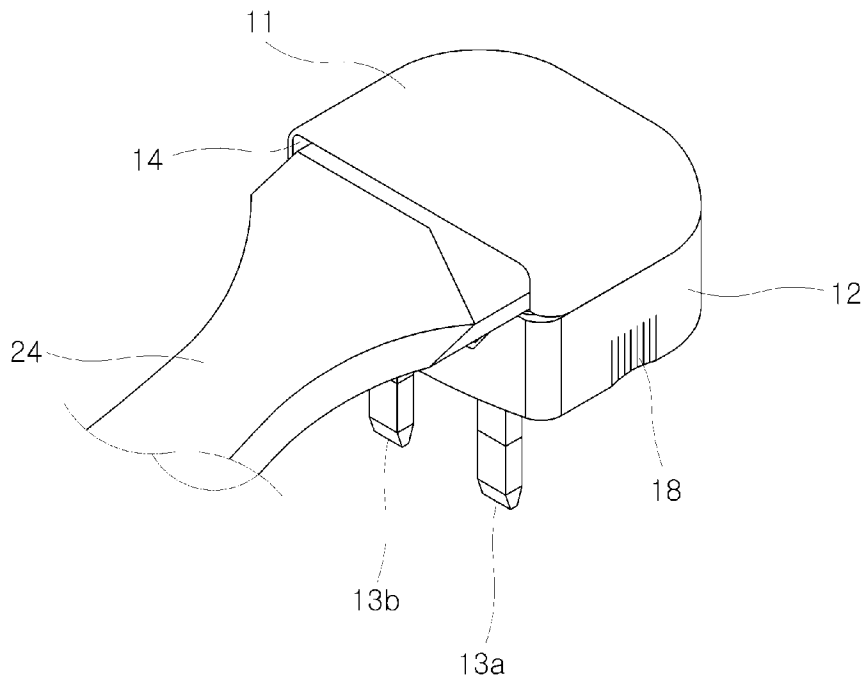
[Fig. 5]



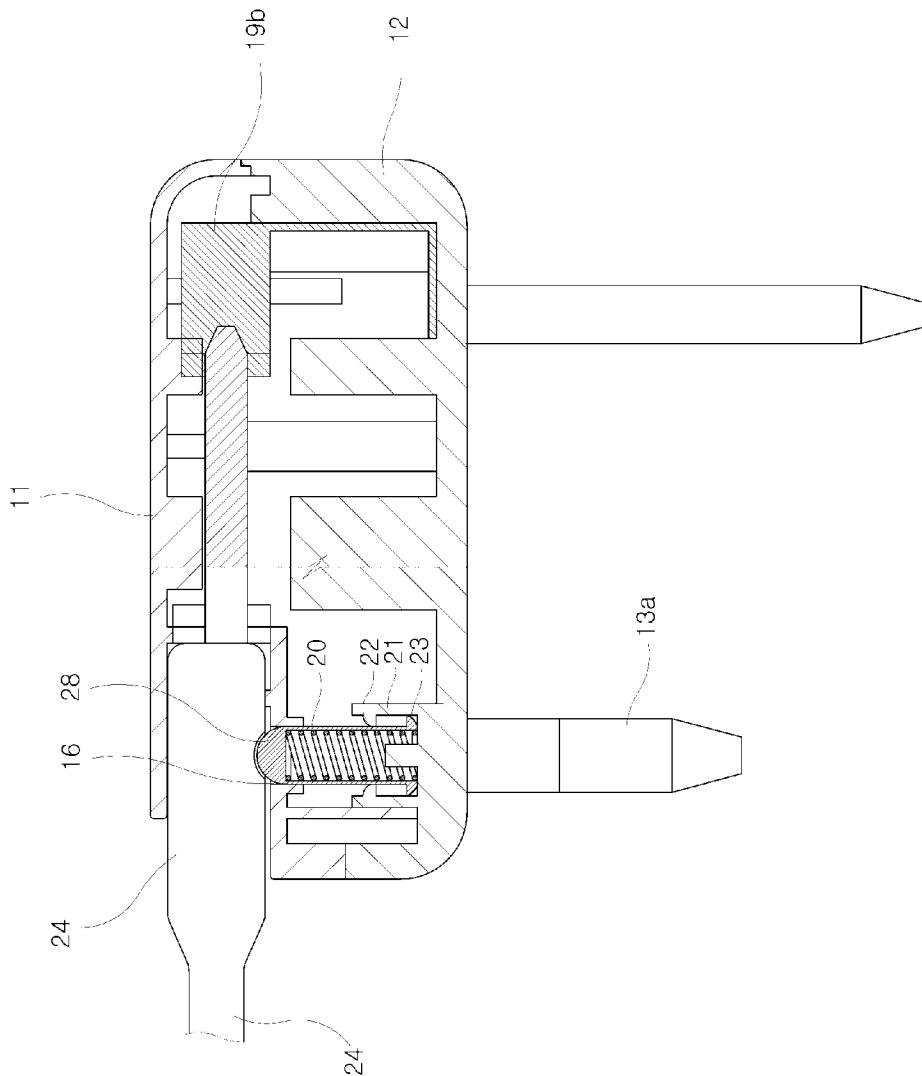
[Fig. 6]



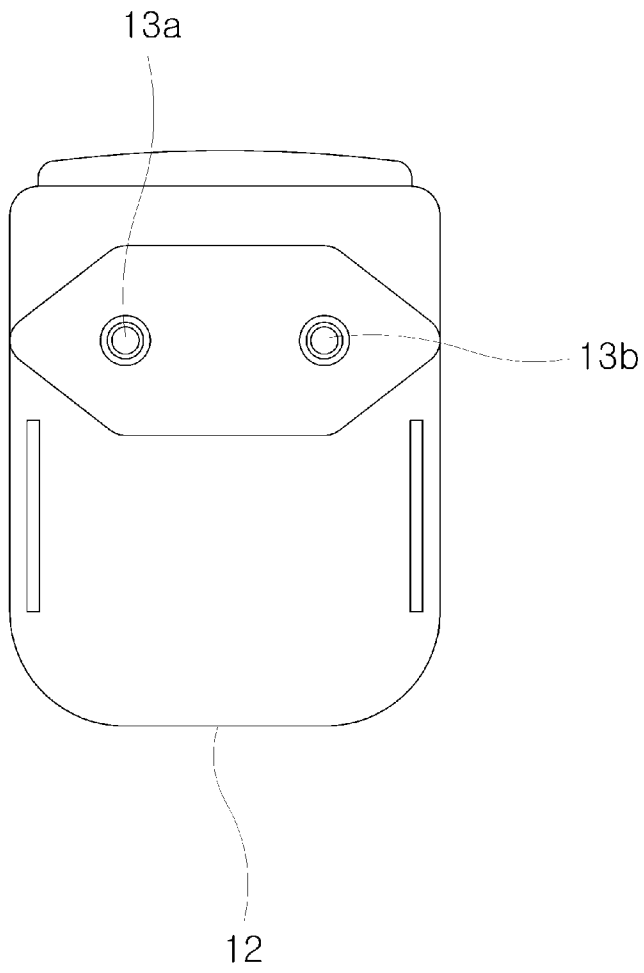
[Fig. 7]



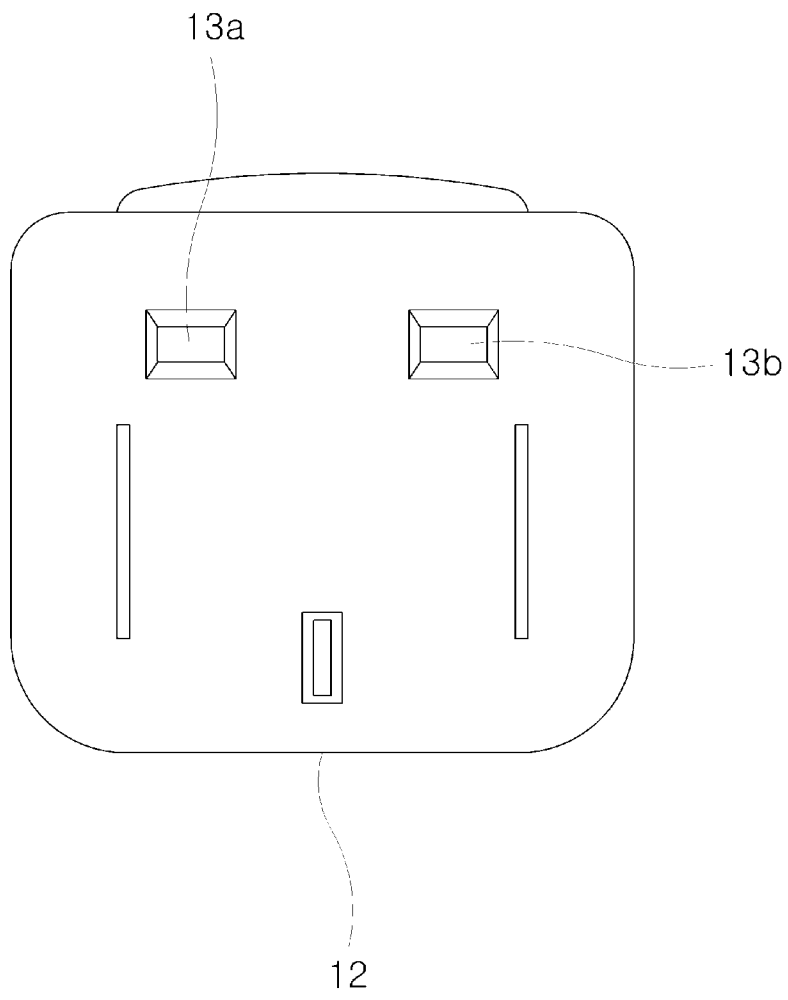
[Fig. 8]



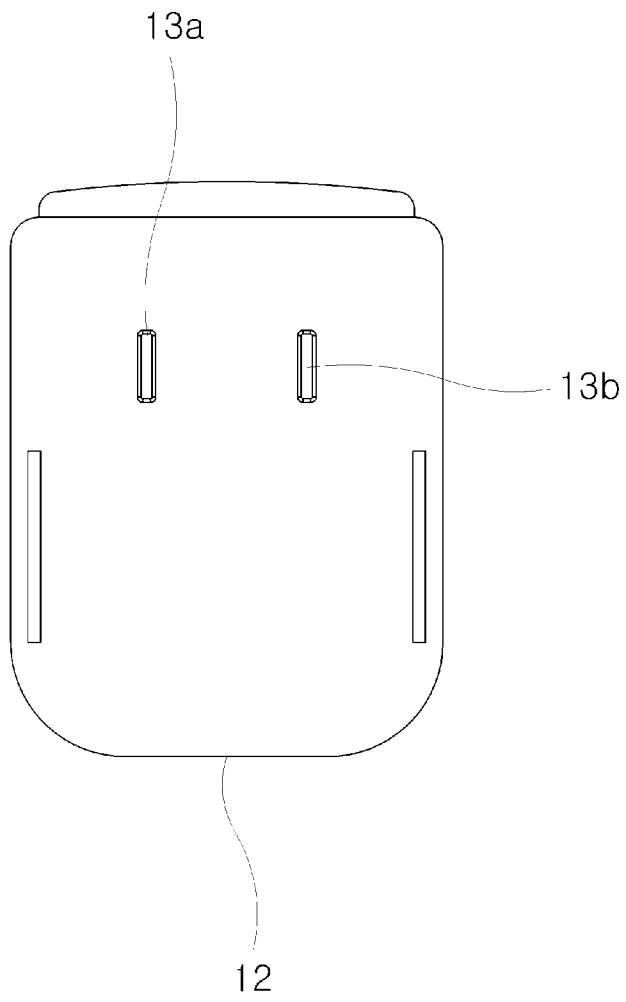
[Fig. 9]



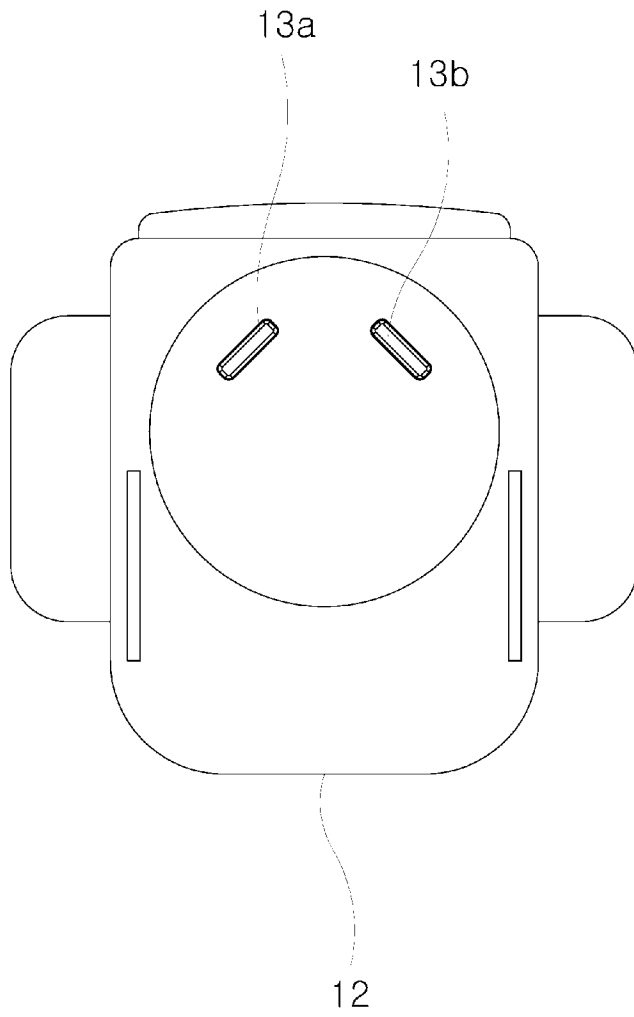
[Fig. 10]



[Fig. 11]



[Fig. 12]



**A. CLASSIFICATION OF SUBJECT MATTER****H01R 31/06(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H01R 31/06 H01R 25/00 H01R 3/00 H01R 13/514

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KOREAN UTILITY MODELS AND APPLICATIONS FOR INVENTIONS SINCE 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KIPASS (KIPO internal) "ADAPTOR" , "PLUG"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP07176354A (HOKURIKU ELECTRIC IND CO LTD) 14 JULY 1995 see the abstract, Fig. 1 and related description	1
A	JP13307848A (ANDO NORIAKI) 02 NOVEMBER 2001 see the abstract, Figs. 1-5 and related description	1
A	US05007857 (Duane E. Wright) 16 APRIL 1991 see the abstract, Figs. 1-2, Col. 2 Line 50 ~ Col.4 Line43	1
A	EP01003246B1 (Rantzsch, Manfred) 09 FEBRARY 2005 see the abstract, Figs. 1-2, Col. No. 9-19	1

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family


Date of the actual completion of the international search

22 MAY 2007 (22.05.2007)

Date of mailing of the international search report

**22 MAY 2007 (22.05.2007)**

Name and mailing address of the ISA/KR


 Korean Intellectual Property Office  
 920 Dunsan-dong, Seo-gu, Daejeon 302-701,  
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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/KR2007/001467**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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