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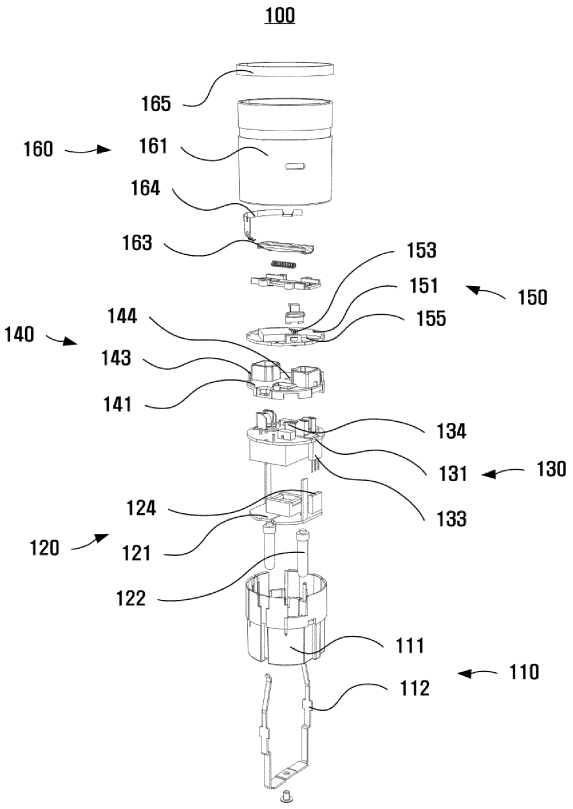
## (54) SMART PLUG SOCKET DEVICE

(57) Disclosed is a smart plug socket device comprising a lower housing (110) that has a pair of through-holes (155) on a bottom surface thereof, an AC/DC conversion board unit (120) comprising a pair of plug pins (122) that pass through the pair of through-holes (155) of the lower housing (110), a transformer (123) that receives AC power through the pair of plug pins (122) and converts the AC power to DC power, a power connector for delivery of the DC power, and a pair of power lines (125) that receive the AC power through the pair of plug pins (122), a relay board unit (130) that is stacked on the AC/DC conversion board unit (120) comprising a relay module (132) that receives the AC power through the pair of power lines (125) and supply or interrupt the AC power to or from a pair of connection terminals (135) in response to a control command from a controller module (152), a power connector that is electrically and mechanically connected to the power connector of the AC/DC conversion board unit (120), a power/signal connector for delivering the DC power and exchanging signals with a controller module (152), and the pair of connection terminals (135) into which plug pins (122) of an electronic device are inserted, a controller board unit (150) that is stacked on the relay board unit (130) comprising a controller board (150, 151) that has through-holes (155), through which the pair of connection terminals (135) pass, the controller module (152) that is coupled to the controller board (150, 151) and control an operation of the smart plug socket device and wirelessly communicate with an external device, and a power/signal connector that is coupled to the controller board (150, 151) and is electrically and mechanically connected with the power/signal connector of the relay board unit (130), and an upper housing (160) that is coupled to the lower housing (110) to define a space between the upper housing (160) and the lower housing (110) and has a pair of insertion holes (155), through which the plug pins (122) of the electronic device are inserted, on a bottom surface thereof.

FIG. 2

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## Description

### BACKGROUND

**[0001]** Embodiments of the inventive concept described herein relate to a smart plug socket device, and more particularly to a coupling structure for components of a smart plug socket device.

**[0002]** A smart plug socket device refers to a device that is connected to a receptacle and a plug of an electronic device between the receptacle and the plug of the electronic device to monitor a power use state of the electronic device or supply or interrupt electric power to or from the electronic device in response to a control command from a user device. The smart plug socket device according to the related art has a tablet shape having a rectangular cross-section and has a large volume, and interferes with a plug of an electronic device, which is inserted into a plug insertion hole adjacent to a receptacle, or another smart plug socket device. Further, as the smart plug socket device according to the related art is configured such that the internal components thereof are integrally formed, the defects of the components cannot be easily tested individually in an assembly process thereof.

### SUMMARY

**[0003]** Embodiments of the inventive concept provide a smart plug socket device that is small-sized and lightweight.

**[0004]** Embodiments of the inventive concept also provide a smart plug socket device that may be easily assembled and tested.

**[0005]** The technical objects of the inventive concept are not limited to the above-mentioned ones, and the other unmentioned technical objects will become apparent to those skilled in the art from the following description.

**[0006]** In accordance with an aspect of the inventive concept, there is provided a smart plug socket device comprising a lower housing that has a pair of through-holes on a bottom surface thereof, an AC/DC conversion board unit comprising a pair of plug pins that pass through the pair of through-holes of the lower housing, a transformer that receives AC power through the pair of plug pins and converts the AC power to DC power, a power connector for delivery of the DC power, and a pair of power lines that receive the AC power through the pair of plug pins, a relay board unit that is stacked on the AC/DC conversion board unit comprising a relay module that receives the AC power through the pair of power lines and supply or interrupt the AC power to or from a pair of connection terminals in response to a control command from a controller module, a power connector that is electrically and mechanically connected to the power connector of the AC/DC conversion board unit, a power/signal connector for delivering the DC power and exchanging signals with a controller module, and the pair of connection terminals into which plug pins of an electronic device are inserted, a controller board unit that is stacked on the relay board unit comprising a controller board that has through-holes, through which the pair of connection terminals pass, the controller module that is coupled to the controller board and control an operation of the smart plug socket device and wirelessly communicate with an external device, and a power/signal connector that is coupled to the controller board and is electrically and mechanically connected with the power/signal connector of the relay board unit, and an upper housing that is coupled to the lower housing to define a space between the upper housing and the lower housing and has a pair of insertion holes, through which the plug pins of the electronic device are inserted, on a bottom surface thereof.

**[0007]** The lower housing may comprise a ground that is coupled to the bottom surface of the lower housing, wherein a central portion of the ground is attached on and supported by the bottom surface of the lower housing to be exposed, and, sides of the ground are attached on and supported by a side surface of the lower housing to be exposed, and a pair of through-holes, through which the sides of the ground pass, are formed on the bottom surface of the upper housing.

**[0008]** Convexo-concave portions may be formed around the pair of through-holes of the lower housing, and wherein convexo-concave portions coupled to the convexo-concave portions of the lower housing are formed at ends of the pair of plug pins of the AC/CD conversion board unit.

**[0009]** The smart plug socked may further comprising a board cover unit that is stacked on the relay board unit between the relay board unit and the controller board unit comprising a board cover has a hole for exposing the power/signal connector of the relay board unit, and a pair of terminal covers that is formed on the board cover and expose the pair of connection terminals of the relay board unit and surround a circumference of the pair of connection terminals.

**[0010]** The board cover unit may further comprise one or more latches that is formed on the board cover and fix the controller board unit onto the board cover unit.

**[0011]** The pair of terminal covers of the board cover unit may pass through the through-holes of the controller board.

**[0012]** The controller board unit may further comprise an inner button that delivers a command signal to the controller module, and wherein the upper housing further comprises an outer button that protrudes through a hole formed on a side surface of the upper housing to be exposed and interworks with the inner button.

**[0013]** The upper housing may comprise a safety assembly comprising a safety bar that has a pair of through-holes corresponding to the pair of insertion holes, and a safety cover that is coupled to the safety bar to close the pair of through-holes of the safety bar and to, if the plug

pins of the electronic device are inserted through the pair of insertion holes of the upper housing, be rotated to one side so as to open the pair of through-holes of the safety bar.

**[0014]** The upper housing may comprise an antenna that is bent along an inner circumference of the upper housing to be coupled to the upper housing and is connected to the controller board unit.

**[0015]** The upper housing may comprise a band that is coupled to a groove formed on an outer peripheral surface of the upper housing.

**[0016]** The other detailed items of the inventive concept are included in the detailed description of the inventive concept and the drawings.

## BRIEF DESCRIPTION OF THE FIGURES

**[0017]** The above and other objects and features will become apparent from the following description with reference to the following figures, wherein like reference numerals refer to like parts throughout the various figures unless otherwise specified, and wherein:

FIG. 1 is a perspective view of a smart plug socket device according to an embodiment of the inventive concept;
FIG. 2 is an exploded perspective view of the smart plug socket device of FIG. 1;
FIG. 3 is a view illustrating a coupling structure of a lower housing of FIG. 2;
FIG. 4 is a view illustrating a coupling structure of an AC/DC conversion board unit of FIG. 2;
FIG. 5 is a view illustrating a coupling structure of a relay board unit of FIG. 2;
FIG. 6 is a view illustrating a coupling structure of a board cover unit of FIG. 2;
FIG. 7 is a view illustrating that a component assembly of FIG. 6 is coupled to the lower housing;
FIG. 8 is a view illustrating a coupling structure of a controller board unit of FIG. 2;
FIG. 9 is a view illustrating a coupling structure of an upper housing of FIG. 2; and
FIG. 10 is a view illustrating that a component assembly of FIG. 8 is coupled to the upper housing.

## DETAILED DESCRIPTION

**[0018]** The above and other aspects, features and advantages of the inventive concept will become apparent from the following description of the following embodiments given in conjunction with the accompanying drawings. However, the inventive concept is not limited to the embodiments disclosed below, but may be implemented in various forms. The embodiments of the inventive concept is provided to make the disclosure of the inventive concept complete and fully inform those skilled in the art to which the inventive concept pertains of the scope of the inventive concept.

**[0019]** The terms used herein are provided to describe the embodiments but not to limit the inventive concept. In the specification, the singular forms include plural forms unless particularly mentioned. The terms "comprises" and/or "comprising" used herein does not exclude presence or addition of one or more other elements, in addition to the aforementioned elements. Throughout the specification, the same reference numerals dente the same elements, and "and/or" includes the respective elements and all combinations of the elements. Although "first", "second" and the like are used to describe various elements, the elements are not limited by the terms. The terms are used simply to distinguish one element from other elements. Accordingly, it is apparent that a first element mentioned in the following may be a second element without departing from the spirit of the inventive concept.

**[0020]** Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by those skilled in the art to which the inventive concept pertains. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the specification and relevant art and should not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

**[0021]** The terms, such as "below", "beneath", "lower", "above", and "upper", which are spatially relative may be used to easily describe a correlation between one element and other elements as illustrated in the drawings. The spatially relative terms have to be understood as terms including different directions of the elements during use or an operation, in addition to the direction illustrated in the drawings. For example, the elements illustrated in the drawings are overturned, the elements "below" or "beneath" another element may be positioned "above" the other element. Accordingly, the term "below", or "beneath" may include "below" or "beneath", and "above". The element may be oriented in different directions, and accordingly, the spatially relative terms may be construed according to the orientation.

**[0022]** Hereinafter, exemplary embodiments of the inventive concept will be described in detail with reference to the accompanying drawings.

**[0023]** Referring to FIGS. 1 to 10, the smart plug socket device 100 according to an embodiment of the inventive concept includes a housing 110 and 160, an AC/DC conversion board unit 120, a relay board unit 130, a board cover unit 140, and a controller board unit 150 that are coupled within the housing 110 and 160.

**[0024]** The housing 110 and 160 defines an overall external appearance of the smart plug socket device 100. The housing 110 and 160 has a cylindrical shape, and is formed of a nonconductive material. The housing 110 and 160 includes a lower housing 110 and an upper housing 160. The lower housing 110 and the upper housing 160 are coupled to each other to define a space there-

between. The lower housing 110 has a diameter that is smaller than that of the upper housing 160, and an upper side of the lower housing 110 is inserted into a lower side of the upper housing 160.

**[0025]** The lower housing 110 includes a cylindrical lower housing body 111 having a circular cross-section, one side of which is opened. An outer diameter of the lower housing body 111 has a size corresponding to a plug insertion hole of a receptacle. Although not clearly illustrated, a pair of through-holes, through which a pair of plug pins 122, which will be described below, pass, are formed on a bottom surface of the lower housing body 111. Although not clearly illustrated, convexo-concave portions are formed around the pair of through-holes on the bottom surface of the lower housing body 111 to be coupled to convexo-concave portions at ends of the pair of plug pins 122, which will be described below. Accordingly, rotation of the pair of plug pins 122 is prevented, and thus may be firmly fixed. A ground 112 for grounding is coupled to the bottom surface of the lower housing body 111. The ground 112 has a band shape of a specific length and has a substantially U-shaped section. A central portion of the ground 112 may be coupled to the bottom surface of the lower housing body 111 by a rivet 113. The central portion of the ground 112 is attached on and supported by the bottom surface of the lower housing body 111 to be exposed, and the sides of the ground 112 are attached on and supported by the bottom surface of the lower housing body 111 to be exposed. Further, as will be described below, the sides of the ground 112 pass through opposite sides of a bottom surface of the upper housing body 161 to be exposed on the bottom surface of the upper housing body 161.

**[0026]** The AC/DC conversion board unit 120 includes a plate-shaped AC/DC conversion board 121. The pair of plug pins 122 are coupled to the bottom surface of the AC/DC conversion board 121. Ends 122a of the pair of plug pins 122 may be coupled to the bottom surface of the AC/DC conversion board 121 through soldering. Each of the pair of plug pins 122 has a rod shape of a specific length, and is formed of a conductive material. Convexo-concave portions 122a are formed at ends of the pair of plug pins 122, and may be coupled to the convexo-concave portions 122a of the bottom surface of the above-described lower housing body 111. As will be described below, the pair of plug pins 122 pass through the bottom surface of the lower housing body 111 and are exposed on the bottom surface of the lower housing body 111. A transformer 123, a pin type power connector 124, and a pair of power line 125 are coupled to the upper surface of the AC/DC conversion board 121. The transformer 123 converts AC power supplied (from the receptacle) through the pair of plug pins 122 to DC power to generates internal power for the internal elements of the smart plug socket device 100. For example a relay module 132 and a controller module 152, which will be described below, may be operated by using the internal power generated by the transformer 123. The pin type power connector 124 is adapted to receive internal DC power from the transformer 123 and deliver the internal DC power to the relay board unit 130, which will be described below. The pair of power lines 125 is adapted to deliver the AC power supplied through the pair of plug pins 122 to the relay board unit 130, which will be described below. The pair of power lines 125 includes a conductive metal and may be formed through pressing. The pair of power lines 125 support the relay board unit 130 to prevent movement of the AC/DC conversion board 121 by an external force applied to the pair of plug pins 122.

**[0027]** The relay board unit 130 is stacked on and coupled to the AC/DC conversion board unit 120. The relay board unit 130 includes a plate-shaped relay board 131. A relay module 132 and a pin type power connector 133 are coupled to the bottom surface of the relay board 131. The relay module 132 receives AC power through the pair of power lines 125, and may supply or interrupt AC power to or from a pair of connection terminals 135 in response to a control command from the controller module 152. The pin type power connector 133 is electrically and mechanically connected with the pin type power connector 124 of the AC/DC conversion board unit 120 to receive internal DC power. The pin type power connector 133 delivers the internal DC power to the relay module 132. A pin type power/signal connector 134 and a pair of connection terminals 135 are coupled to an upper surface of the relay board 131. The pin type power/signal connector 134 is adapted to deliver the internal DC power to the controller board unit 150, which will be described below, and exchange signals with the controller board unit 150. Plug pins of an electronic device may be inserted into and coupled to the pair of connection terminals 135. The pair of connection terminals 135 are formed of a conductive material, and may supply the AC power supplied from the pair of power lines 125 to the plug pins of the electronic device.

**[0028]** The board cover unit 140 is stacked on and coupled to the relay board unit 130. The board cover unit 140 functions to electrically isolate the relay board unit 130 and the controller board unit 150, which will be described below, and fix the controller board 150, which will be described below, on the relay board unit 130. The board cover unit 140 includes a plate-shaped board cover 141. The board cover 141 has a hole 144 for exposing the pin type power/signal connector 134 of the relay board unit 130. A pair of terminal covers 142 and one or more latches 13 are formed on an upper surface of the board cover 141. The pair of terminal covers 142 expose the pair of connection terminals 135, and surrounds a periphery peripheries of the pair of connection terminals 135. The pair of terminal covers 142 is formed to be higher than the pair of connection terminals 135 to prevent sparks generated by the pair of connection terminals 135 from causing an electrical problem to the controller board unit 150. The one or more latches 13 functions to fix the controller board unit 150, which will be described below,

onto the board cover unit 140.

**[0029]** In a process of assembling the smart plug socket device 100, the component assembly in which the AC/DC conversion board unit 120, the relay board unit 130, and the board cover unit 140 are coupled to each other may be inserted into the lower housing 110. Further, the component assembly may be inserted into and fixed to the lower housing 110 by using thermal fusion or a bolt coupling manner.

**[0030]** The controller board unit 150 is stacked on and coupled to the board cover unit 140. The controller board unit 150 includes a plate-shaped controller board 151. Through-holes 155, through which the pair of terminal covers 142 of the board cover unit 140 pass, are formed in the controller board 151. A pin type power/signal connector 153 is coupled to a bottom surface of the controller board 151. The pin type power/signal connector 153 is electrically and mechanically connected with the pin type power/signal connector 134 of the relay board unit 130 to receive internal DC power and exchange signals. The pin type power/signal connector 153 supplies the internal DC power to the controller module 152. The pin type power/signal connectors 134 and 153 of the relay board unit 130 and the controller board unit 150 exchange signals between the controller module 152 and the relay module 132. The controller module 152 and an inner button 154 are coupled to an upper surface of the controller board 151. The controller module 152 controls an overall operation of the smart plug socket device 100. For example, the controller module 152 may include a processor that calculates and processes data, a memory that stores data, and a communication unit that performs wireless communication with an external device, but the inventive concept is not limited thereto. The controller module 152 may measure and calculate power consumption, a power factor, an amount of accumulated power, an amount of discharged carbon dioxide, and a power rate of the electronic device, and may turn on or off supply of electric power to the electronic device in response to a control command received from the user device. The inner button 154 may deliver a command signal to the controller module 152 based on a pressing operation. Based on the command signal, the controller module 152 may perform an operation of turning on and off the smart plug socket device 100, an operation of supplying and interrupting AC power to and from the plug pins of the electronic device, and an operating of being paired with the user device, but the inventive concept is not limited thereto.

**[0031]** The upper housing 160 includes a cylindrical upper housing body 161 having a circular cross-section, opposite sides of which are opened. An inner diameter of the upper housing body 161 has a size corresponding to the plug of the electronic device. The bottom surface of the upper housing body 161 is formed at an intermediate portion that is formed at a depth from an upper side of the upper housing body 161. Although not clearly illustrated, a pair of insertion holes, into which the plug pins of the electronic device may be inserted, are formed on the bottom surface of the upper housing body 161. Further, a pair of through-holes, through which the sides of the ground 112 of the lower housing 110 pass, are formed on opposite sides of the bottom surface of the upper housing body 161. A hole 166 is formed on a side surface of the upper housing body 161, and a portion of an outer button 162 is coupled to an inner surface of the upper housing body 161 to protrude from the side surface of the upper housing body 161 through the hole 166 so as to be exposed. The outer button 162 interworks with the inner button 154 of the controller board unit 150. A safety assembly 163 is coupled to the bottom surface of the upper housing body 161 at a location corresponding to the pair of insertion holes of the bottom surface of the upper housing body 161. The safety assembly 163 includes a safety cover 163a, a spring 163b, and a safety bar 163c. Although not clearly illustrated, the safety bar 163c has a pair of through-holes corresponding to the pair of insertion holes. The safety cover 163a is rotatably coupled to the safety bar 163c. The spring 163b provides a resilient force such that the safety cover 163a closes the pair of through-holes of the safety bar 163c. If the plug pins of the electronic device are inserted through the pair of insertion holes of the upper housing body 161, the safety cover 163a is rotated to one side while compressing a spring 163b to open the pair of through-holes of the safety bar 163c. Accordingly, the mechanisms of the electronic device, other than the plug, may be prevented from being inserted into the smart plug socket device 100. An antenna 164 for wireless communication is bent along an inner circumference of the upper housing body 161 to be coupled to an inner surface of the upper housing body 161. The antenna 164 may have a form of a plate antenna. Although not clearly illustrated, one end of the antenna 164 may be connected to the controller board unit 150. A band 165 is coupled to the upper side of the upper housing body 161. A groove is formed on an outer peripheral surface of an upper portion of the upper housing body 161, and the band 165 may be coupled to the groove. The band 165 has a specific color and is formed of silicon to provide an aesthetic feeling and convenience of user to the smart plug socket device 100.

**[0032]** In a process of assembling the smart plug socket device 100, the component assembly in which the lower housing 110, the AC/DC conversion board unit 120, the relay board unit 130, the board cover unit 140, and the controller board unit 150 are coupled to each other may be inserted into the upper housing 160. Further, the component assembly may be inserted into and fixed to the upper housing 160 by using ultrasonic fusion.

**[0033]** The smart plug socket device 100 may or may not supply the AC power supplied from the pair of plug pins 122 to the pair of connection terminals 135 through the relay module 132 under the control of the controller module 152. Further, the smart plug socket device 100 may wirelessly transmit information, such as power con-

sumption measured based on a current/a voltage supplied to the pair of connection terminals 135 to the user device, under the control of the controller module 152.

**[0034]** As the plate-shaped board units 120, 130, and 150 are sequentially stacked along a vertical axis in the above-described smart plug socket device 100, the smart plug socket device 100 may be easily made small-sized.

**[0035]** Further, as the board units 120, 130, and 150 of the smart plug socket device 100 has the terminals/connectors for receiving electric power, the defects of the board units may be easily tested in a process of assembling the smart plug socket device 100.

**[0036]** The steps of a method or an algorithm that have been described in relation to the embodiments of the inventive concept may be directly implemented by hardware, may be implemented by a software module executed by hardware, or may be implemented by a combination thereof. The software module may reside in a random access memory (RAM), a read only memory (ROM), an erasable programmable ROM (EPROM), an electrically erasable programmable ROM (EEPROM), a flash memory, a hard disk, a detachable disk, a CD-ROM, or a computer readable recording medium in an arbitrary form, which is well known in the art to which the inventive concept pertains.

**[0037]** Although the exemplary embodiments of the inventive concept have been described with reference to the accompanying drawings, it will be understood by those skilled in the art to which the inventive concept pertains that the inventive concept can be carried out in other detailed forms without changing the technical spirits and essential features thereof. Therefore, the above-described embodiments are exemplary in all aspects, and should be construed not to be restrictive.

**[0038]** According to the embodiments, because the driver may propagate the fact that a traffic accident has occurred to a following vehicle without risking a danger of directly installing a tripod, a secondary accident may be prevented.

**[0039]** Further, even when the driver is wounded or unconscious due to a traffic accident, a danger signal may be propagated to neighboring vehicles and a request for a rescue may be transmitted to the outside, so that a secondary accident may be prevented and the scene of the traffic accident may be rapidly settled.

**[0040]** Further, by collecting information on a request for a rescue that is transmitted when a traffic accident occurs, information on the traffic accident may be rapidly provided.

**[0041]** The aspect of the inventive concept is not limited thereto, and other unmentioned aspects of the inventive concept may be clearly appreciated by those skilled in the art from the following descriptions.

## Claims

**1.** A smart plug socket device comprising:

a lower housing that has a pair of through-holes on a bottom surface thereof;

an AC/DC conversion board unit comprising a pair of plug pins that pass through the pair of through-holes of the lower housing, a transformer that receives AC power through the pair of plug pins and converts the AC power to DC power, a power connector for delivery of the DC power, and a pair of power lines that receive the AC power through the pair of plug pins;

a relay board unit that is stacked on the AC/DC conversion board unit comprising a relay module that receives the AC power through the pair of power lines and supply or interrupt the AC power to or from a pair of connection terminals in response to a control command from a controller module, a power connector that is electrically and mechanically connected to the power connector of the AC/DC conversion board unit, a power/signal connector for delivering the DC power and exchanging signals with a controller module, and the pair of connection terminals into which plug pins of an electronic device are inserted;

a controller board unit that is stacked on the relay board unit comprising a controller board that has through-holes, through which the pair of connection terminals pass, the controller module that is coupled to the controller board and control an operation of the smart plug socket device and wirelessly communicate with an external device, and a power/signal connector that is coupled to the controller board and is electrically and mechanically connected with the power/signal connector of the relay board unit; and

an upper housing that is coupled to the lower housing to define a space between the upper housing and the lower housing and has a pair of insertion holes, through which the plug pins of the electronic device are inserted, on a bottom surface thereof.

**2.** The smart plug socket device of claim 1, wherein the lower housing comprises a ground that is coupled to the bottom surface of the lower housing, wherein a central portion of the ground is attached on and supported by the bottom surface of the lower housing to be exposed, and, sides of the ground are attached on and supported by a side surface of the lower housing to be exposed, and a pair of through-holes, through which the sides of the ground pass, are formed on the bottom surface of the upper housing.

**3.** The smart plug socket device of claim 1, wherein convexo-concave portions are formed around the pair of through-holes of the lower housing, and wherein convexo-concave portions coupled to the convexo-concave portions of the lower housing are

formed at ends of the pair of plug pins of the AC/CD conversion board unit.

**4.** The smart plug socket device of claim 1, further comprising
a board cover unit that is stacked on the relay board unit between the relay board unit and the controller board unit comprising a board cover has a hole for exposing the power/signal connector of the relay board unit, and a pair of terminal covers that is formed on the board cover and expose the pair of connection terminals of the relay board unit and surround a circumference of the pair of connection terminals.

**5.** The smart plug socket device of claim 4, wherein the board cover unit further comprises one or more latches that is formed on the board cover and fix the controller board unit onto the board cover unit.

**6.** The smart plug socket device of claim 4, wherein the pair of terminal covers of the board cover unit pass through the through-holes of the controller board.

**7.** The smart plug socket device of claim 1, wherein the controller board unit further comprises an inner button that delivers a command signal to the controller module, and wherein the upper housing further comprises an outer button that protrudes through a hole formed on a side surface of the upper housing to be exposed and interworks with the inner button.

**8.** The smart plug socket device of claim 1, wherein the upper housing comprises a safety assembly comprising a safety bar that has a pair of through-holes corresponding to the pair of insertion holes, and a safety cover that is coupled to the safety bar to close the pair of through-holes of the safety bar and to, if the plug pins of the electronic device are inserted through the pair of insertion holes of the upper housing, be rotated to one side so as to open the pair of through-holes of the safety bar.

**9.** The smart plug socket device of claim 1, wherein the upper housing comprises an antenna that is bent along an inner circumference of the upper housing to be coupled to the upper housing and is connected to the controller board unit.

**10.** The smart plug socket device of claim 1, wherein the upper housing comprises a band that is coupled to a groove formed on an outer peripheral surface of the upper housing.

FIG. 1

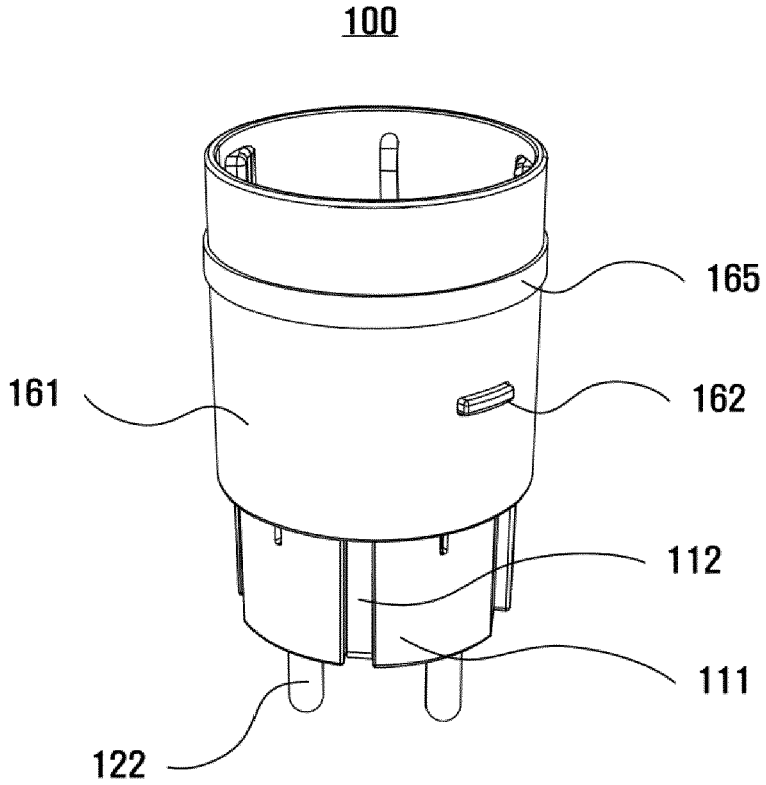

FIG. 2

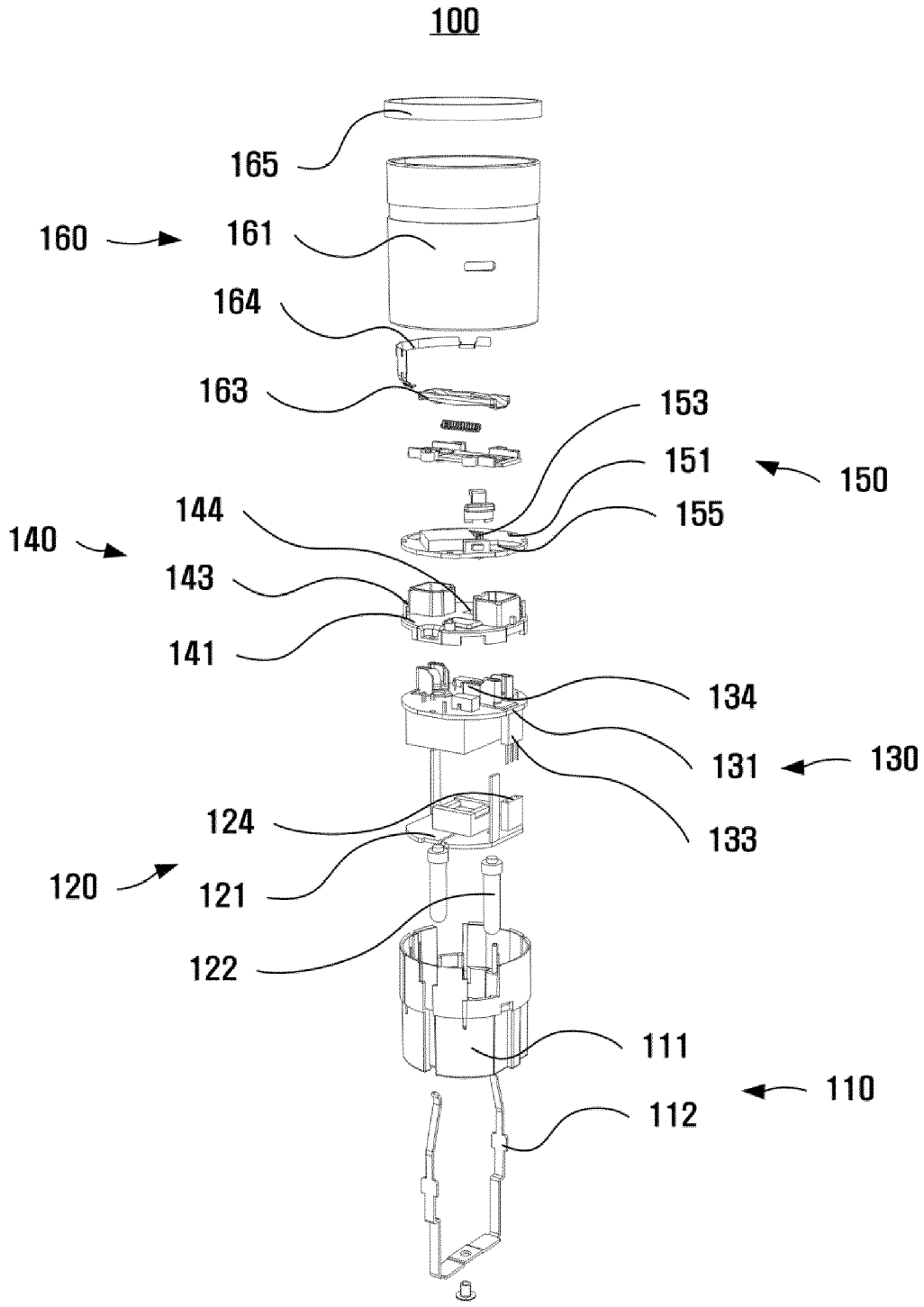
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FIG. 3

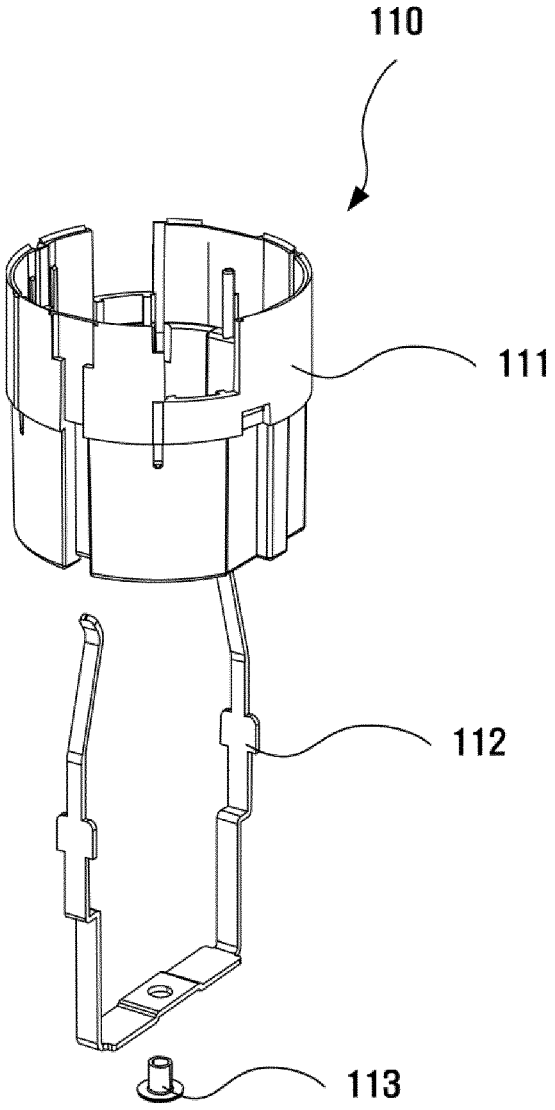


FIG. 4

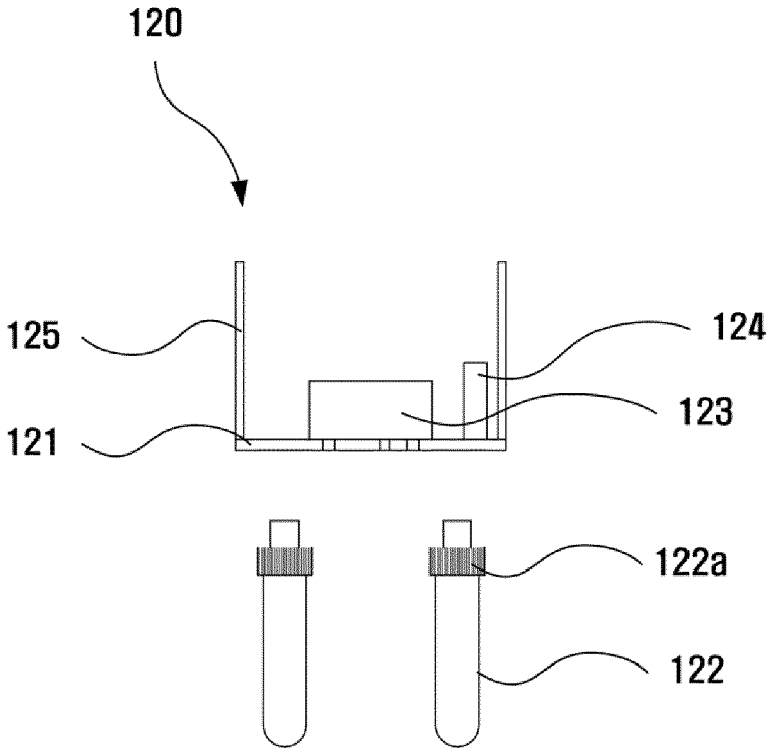


FIG. 5

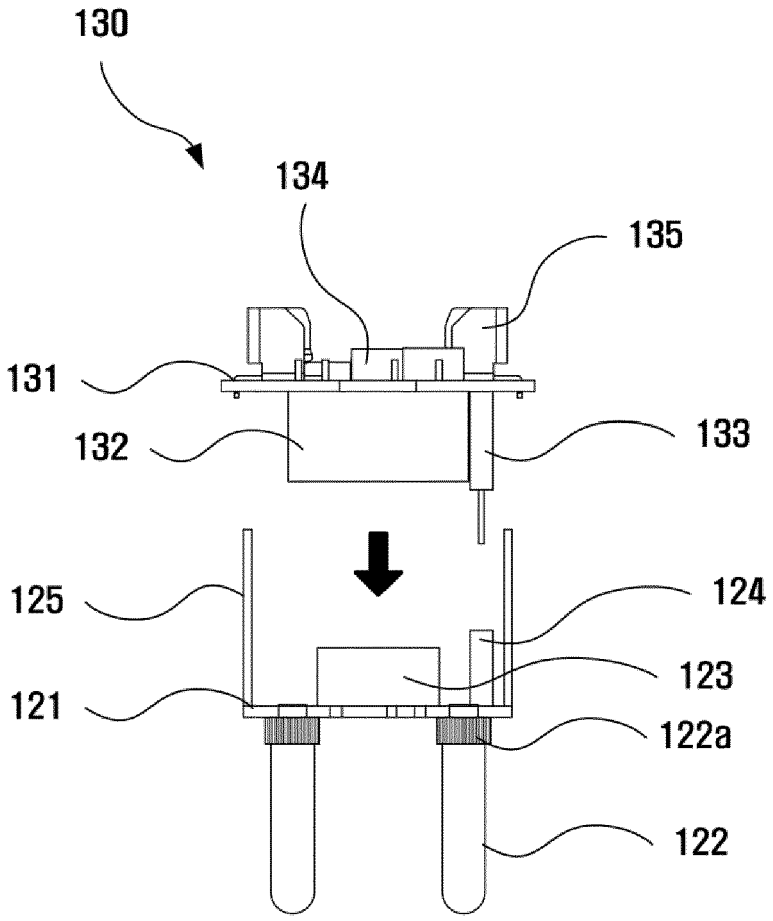


FIG. 6

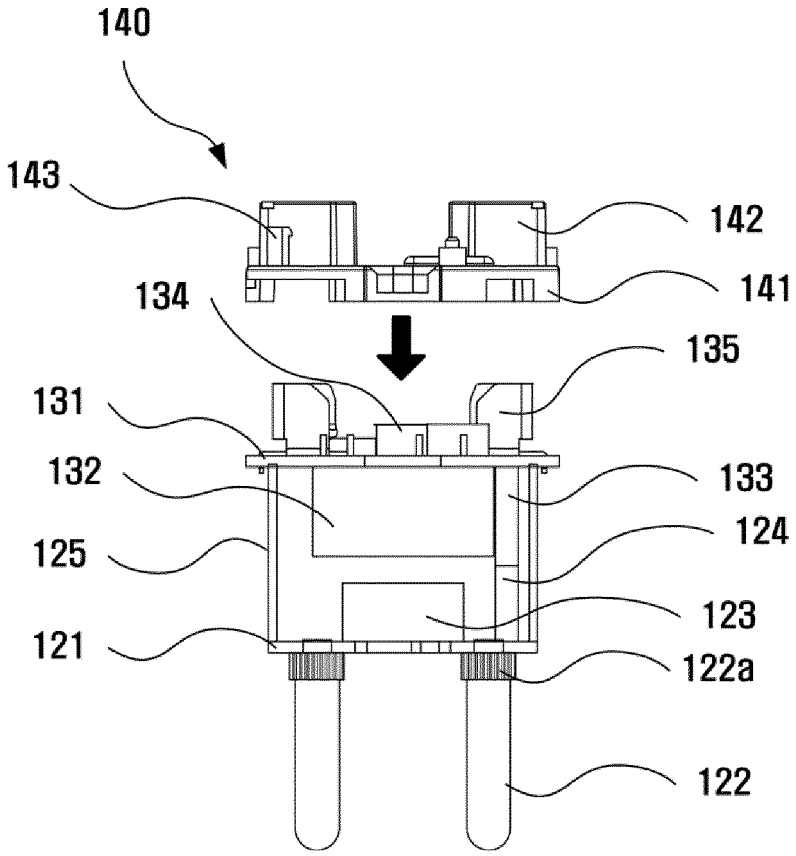


FIG. 7

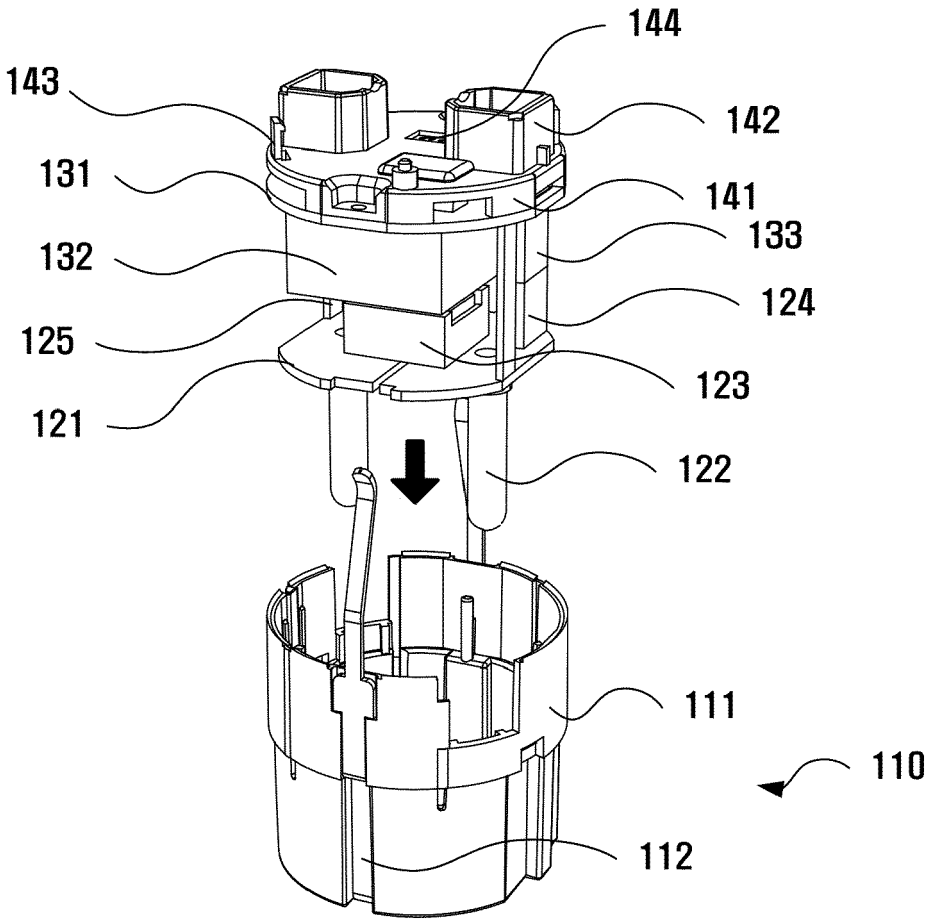


FIG. 8

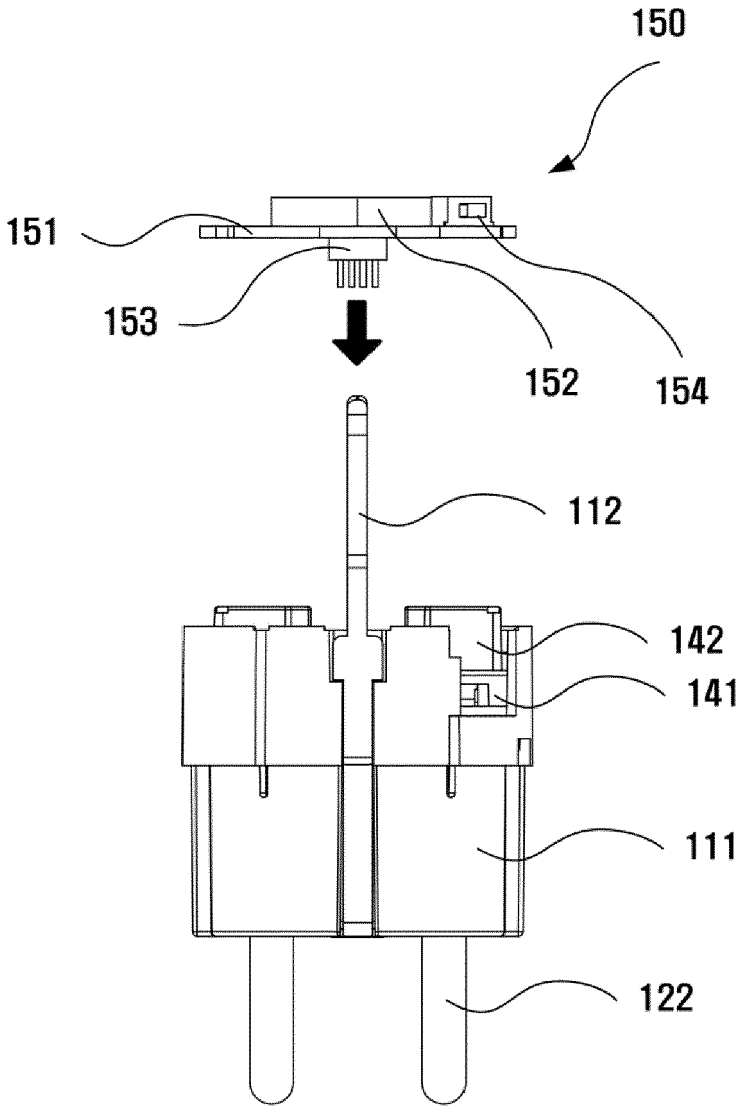


FIG. 9

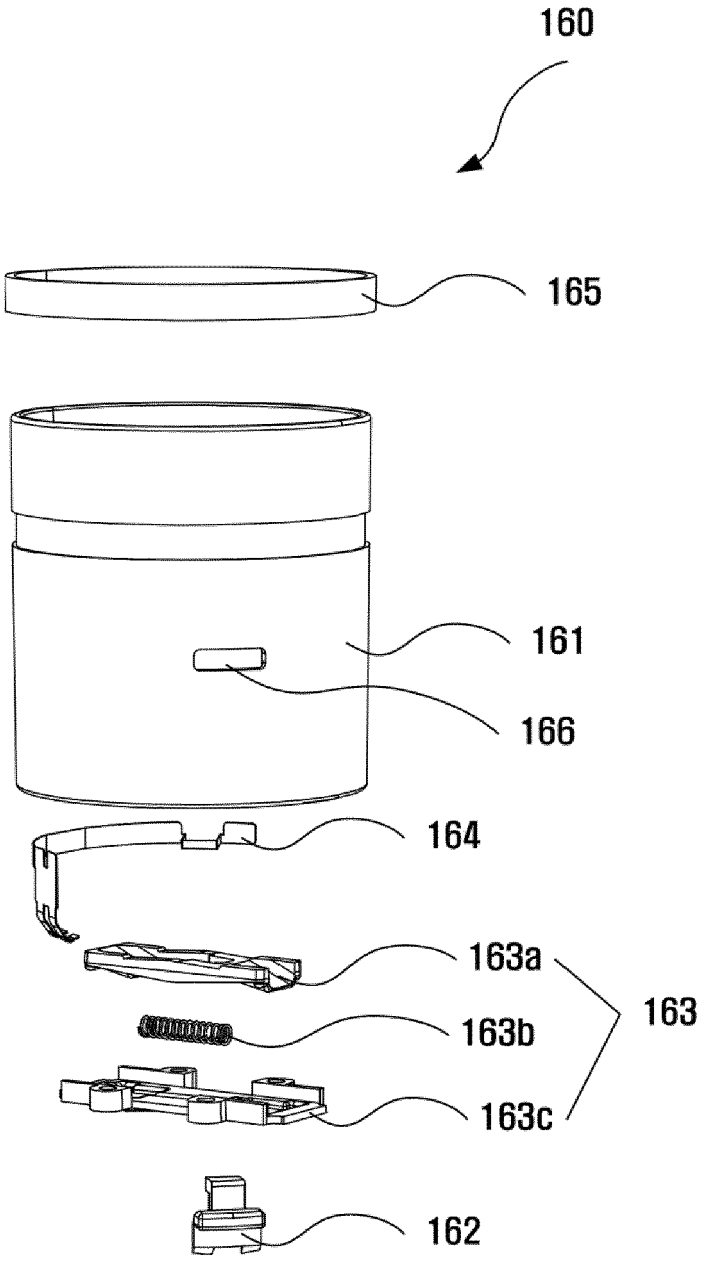
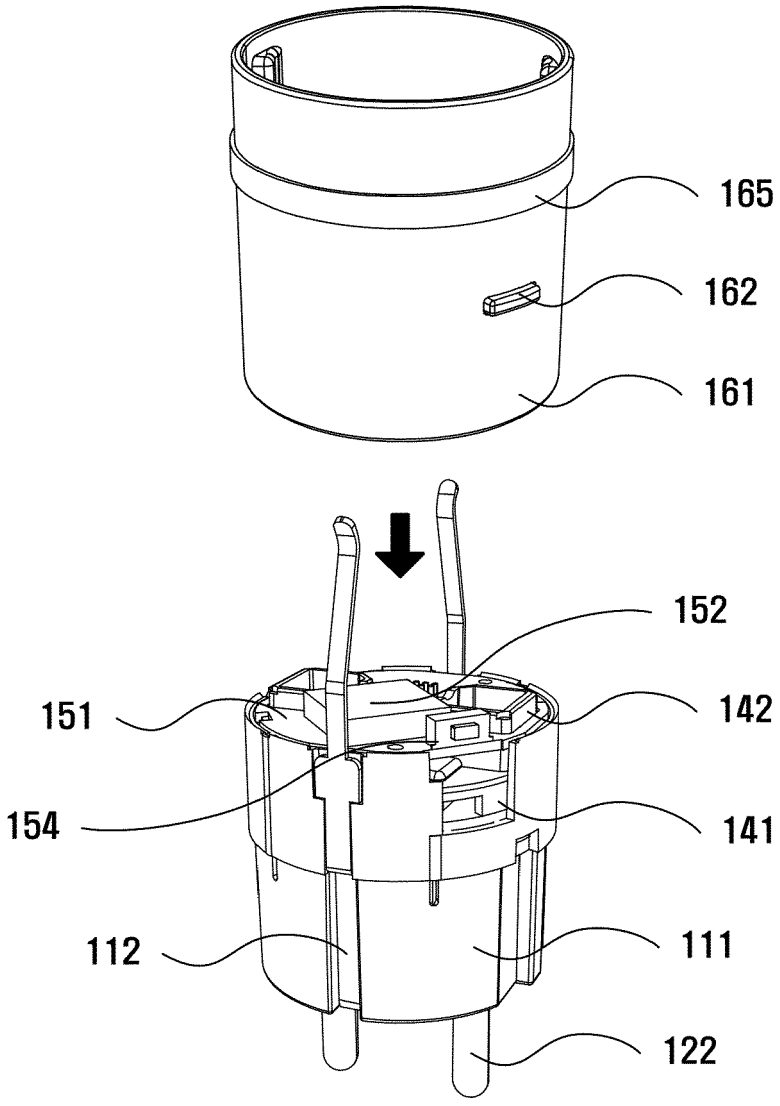


FIG. 10



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Application Number
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