US 20230031256A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2023/0031256 A1**

(43) **Pub. Date: Feb. 2, 2023**

KIM et al.

(54) **SELF-POWER WIRELESS SWITCH**

(71) Applicant: **Sun Young KIM**, Gyeonggi-do (KR)

(72) Inventors: **Sun Young KIM**, Gyeonggi-do (KR); **Hyung Jin CHOI**, Incheon (KR)

(21) Appl. No.: **17/791,780**

(22) PCT Filed: **Jan. 6, 2021**

(86) PCT No.: **PCT/KR2021/000125**

§ 371 (c)(1),
(2) Date: **Jul. 8, 2022**

(30) **Foreign Application Priority Data**

Jan. 9, 2020 (KR) 10-2020-0003079
Sep. 28, 2020 (KR) 10-2020-0126307

Publication Classification

(51) **Int. Cl.**
H01H 13/14 (2006.01)
H01L 41/113 (2006.01)
H01H 13/20 (2006.01)

(52) **U.S. Cl.**
CPC ***H01H 13/14*** (2013.01); ***H01L 41/113*** (2013.01); ***H01H 13/20*** (2013.01)

(57) **ABSTRACT**

A self-power wireless switch according to an embodiment of the present disclosure includes a lower body, an upper body rotatably coupled to one side of the lower body through a rotating shaft, a printed circuit board (PCB) comprising a contact unit which is coupled to the upper body and is in contact with a switch member pressed by a user, and a generator disposed on a bottom surface of the PCB and supplying power to the PCB. When the user presses the switch member, while the upper body rotates, a pressure is applied to a generator bar disposed on the generator to generate power.

10

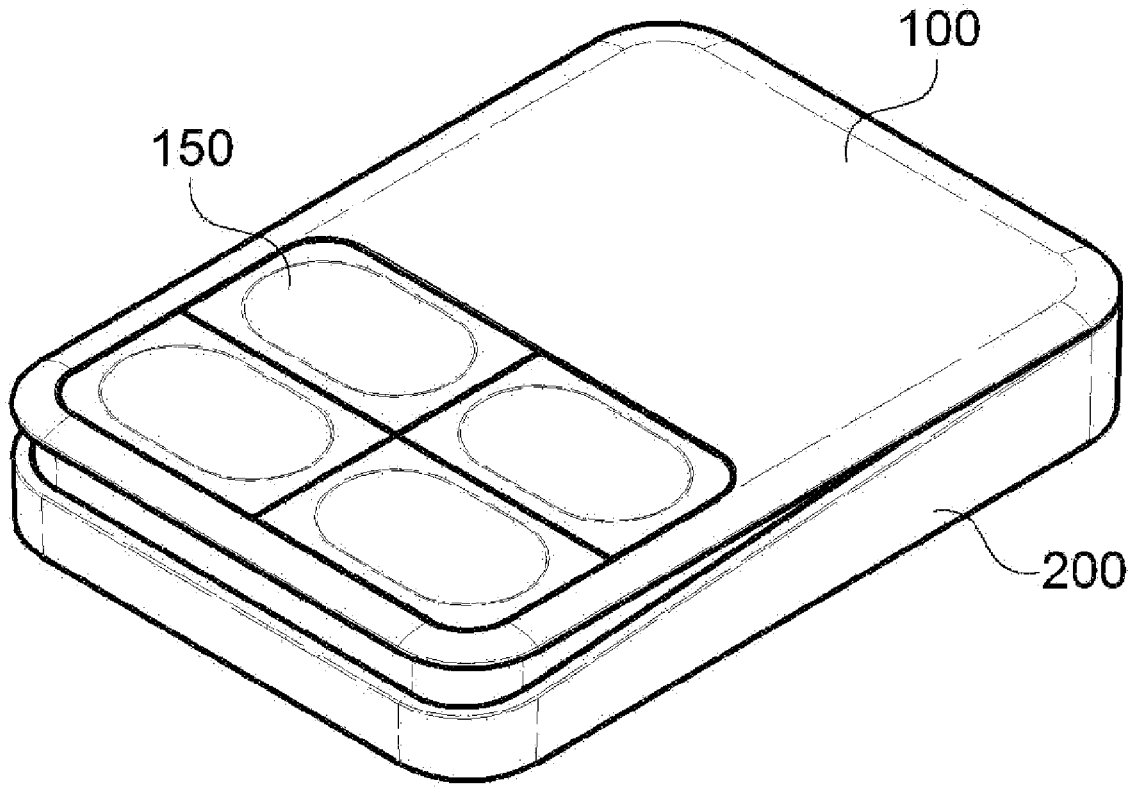


FIG. 1

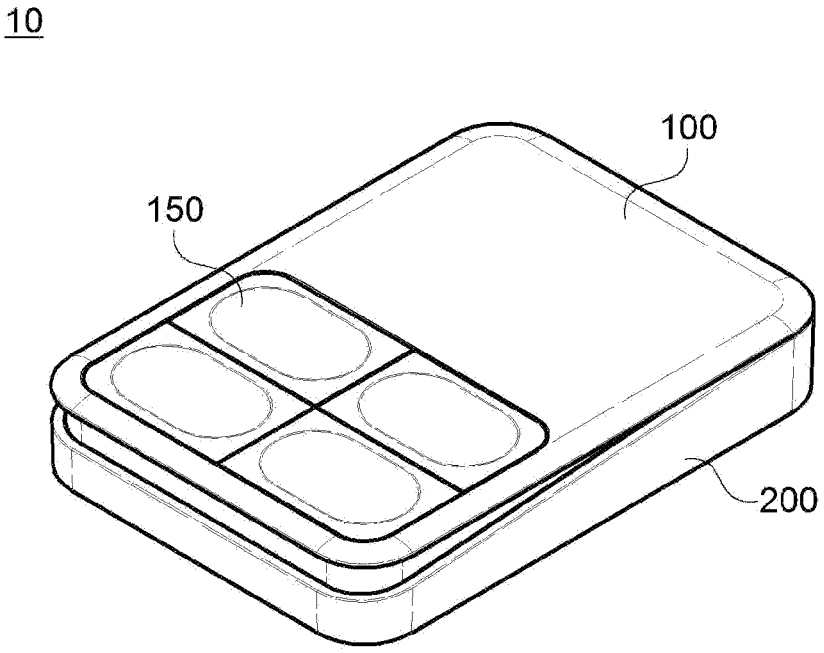


FIG. 2A

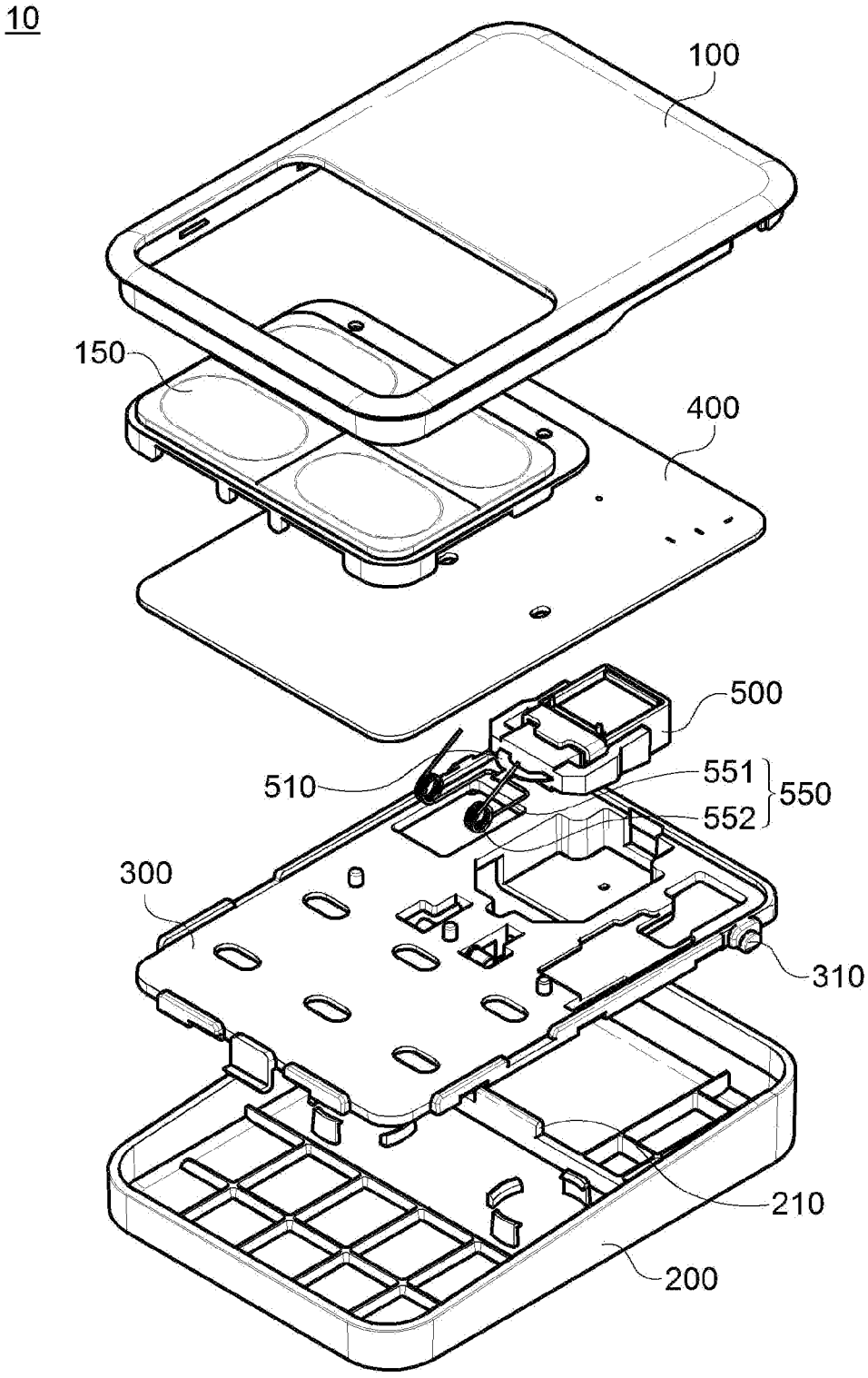


FIG. 2B

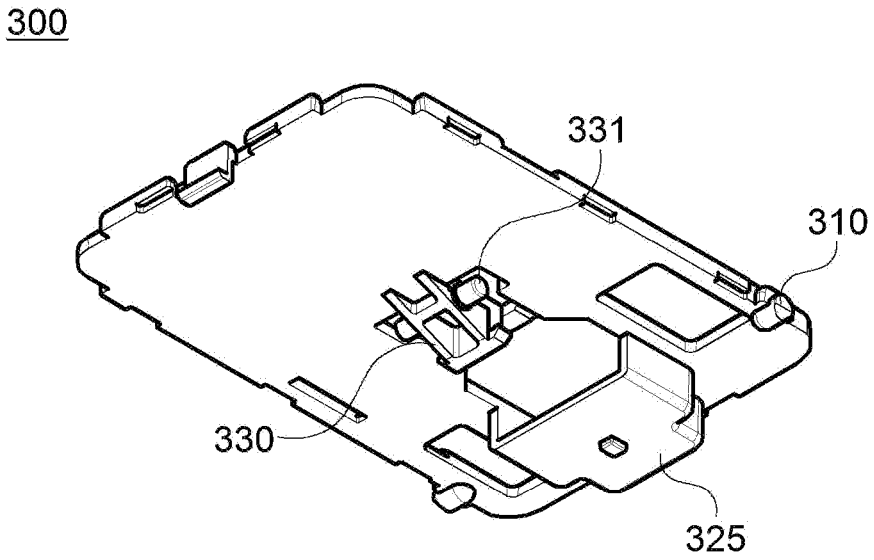


FIG. 2C

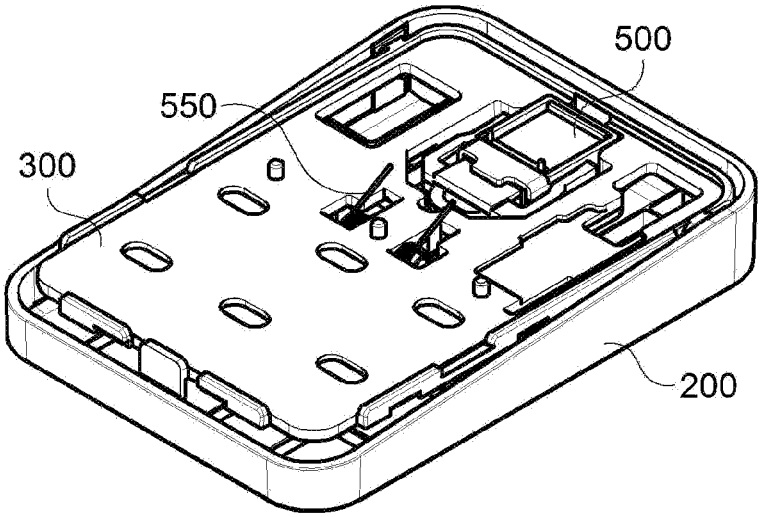


FIG. 3A

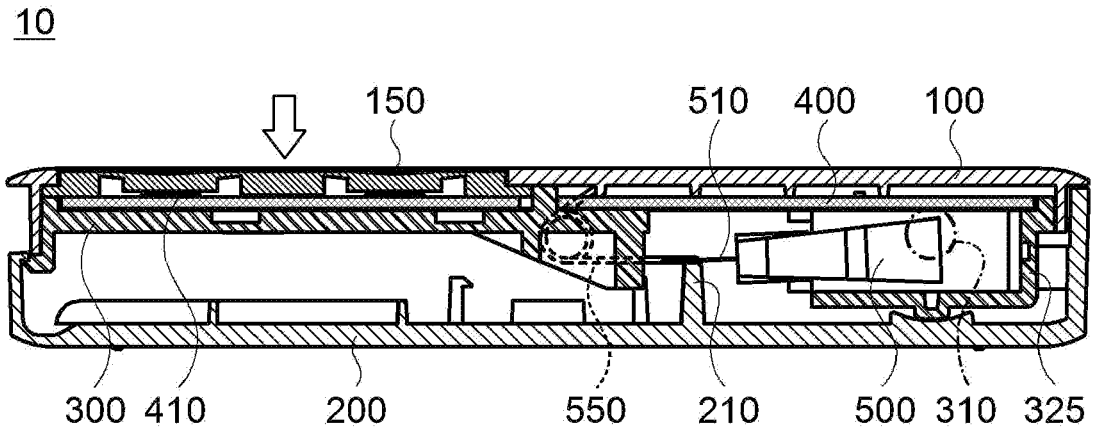


FIG. 3B

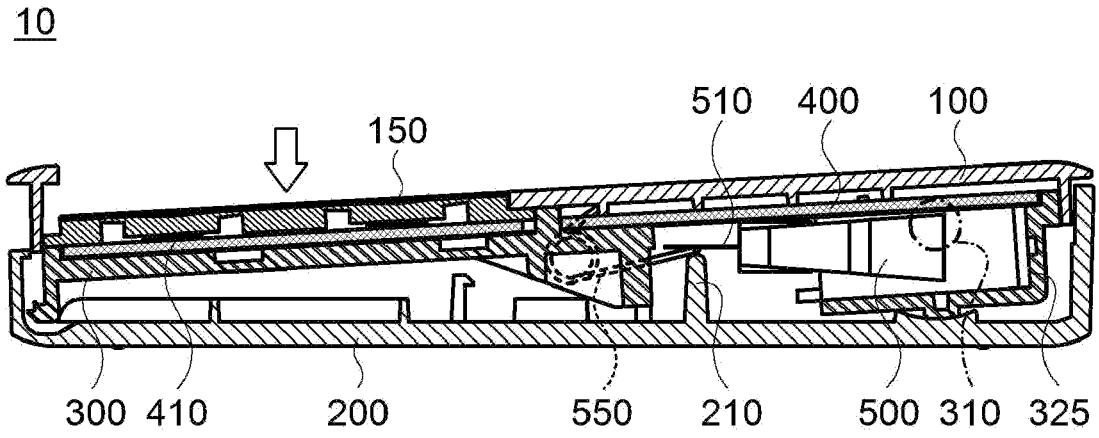
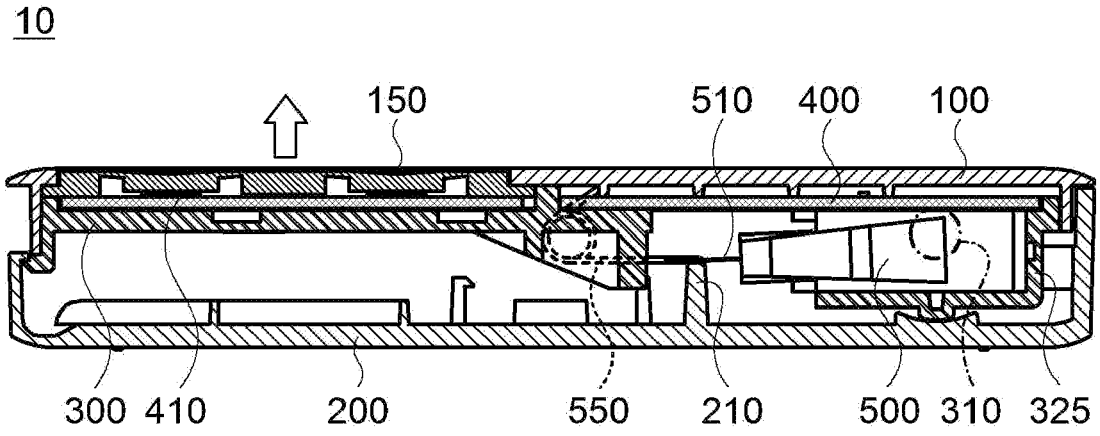


FIG. 3C



SELF-POWER WIRELESS SWITCH

CROSS REFERENCE TO RELATED APPLICATIONS AND CLAIM OF PRIORITY

[0001] This application claims benefit under 35 U.S.C. 119, 120, 121, or 365(c), and is a National Stage entry from International Application No. PCT/KR2021/000125, filed Jan. 6, 2021, which claims priority to the benefit of Korean Patent Application Nos. 10-2020-0003079 filed in the Korean Intellectual Property Office on Jan. 9, 2020 and 10-2020-0126307 filed in the Korean Intellectual Property Office on Sep. 28, 2020, the entire contents of which are incorporated herein by reference.

BACKGROUND

1. Technical Field

[0002] Embodiments of the present invention relate to a self-power wireless switch.

2. Background Art

[0003] In general, a wiring switch is a mechanism for connecting or blocking electricity to electric device such as lightings or home appliances in indoor wirings, and a button type is being widely used.

[0004] Such a wiring switch is installed on a wall or the like in a manner, in which one button is connected to an electric circuit to control turn-on/off of one electric appliance, or is installed in a manner, in which a plurality of buttons are connected in parallel to one electric circuit to selectively control turn-on/off of a plurality of electric appliance.

[0005] However, a self-power wireless switch that generates power for a switch operation through self-power generation without an external power supply in order to solve inconvenience of burying and installing a push button in the wall or inconvenience of replacing a battery therein.

[0006] However, in the case of the self-power wireless switch according to the related art, noise is generated during a switch push operation, and the operation is not smooth when the switch is pressed, and thus, excessive force is required when a user presses the button.

[0007] In addition, the self-power wireless switch according to the related art requires a plurality of components for constituting the self-power wireless switch and complicated in shape to increase in manufacturing cost.

SUMMARY

[0008] Embodiments of the present invention are to provide a self-power wireless switch in which feeling of a button operation is softened to be pressed by a user such as the weak and the elderly with little force when the switch is pressed.

[0009] In addition, embodiments of the present invention are to provide a self-power wireless switch that is simplified in components constituting the switch and is formed with even a simple structure.

[0010] In addition, embodiments of the present invention are to provide a self-power wireless switch in which a switch member for controlling a plurality of electric appliances is easily expanded.

[0011] According to an embodiment of the present invention, a self-power wireless switch includes: a lower body; an upper body rotatably coupled to one side of the lower body through a rotating shaft; a printed circuit board (PCB) including a contact unit which is coupled to the upper body and is in contact with a switch member pressed by a user; and a generator disposed on a bottom surface of the PCB and supplying power to the PCB, wherein, when the user presses the switch member, while the upper body rotates, a pressure is applied to a generator bar disposed on the generator to generate power.

[0012] A pressing member may be disposed inside the lower body, and when the upper body rotates, the pressing member may apply the pressure to the generator bar.

[0013] The pressing member may have a shape that protrudes upward from the lower body.

[0014] An elastic member may be disposed between the generator bar and the upper body.

[0015] The elastic member may include a torsion spring.

[0016] The switch member may include a plurality of pressing positions, and the contact unit of the printed circuit board may be formed in number corresponding to the plurality of pressing positions.

[0017] The self-power wireless switch may further include an upper cover configured to cover the upper body and the printed circuit board.

[0018] The upper cover may be rotatably coupled together with the upper body.

[0019] A distance between the switch member and the rotating shaft may be greater than that between the generator bar and the rotating shaft.

[0020] According to the embodiments of the present invention, when the self-power wireless switch is pressed, the operation feeling is softened by using the lever principle based on the rotating shaft formed at one side of the lower body so that the user may press the self-power wireless switch with the little force.

[0021] In addition, according to the embodiments of the present invention, since the switch member, the printed circuit board, and the self-power generator are disposed on the upper body, the self-power wireless switch, in which the button constituting the switch and the ancillary components of the button are simplified and formed with the simple structure.

[0022] In addition, according to the embodiments of the present invention, since the self-power wireless switch and the printed circuit board are in direct contact with each other, the self-power wireless switch, in which the pressing position is capable of being freely expanded on the switch member, may be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. **1** is a view illustrating an outer appearance of a self-power wireless switch according to an embodiment of the present invention.

[0024] FIG. **2**A is an exploded perspective view illustrating the self-power wireless switch of FIG. **1**.

[0025] FIG. **2**B is a view illustrating a lower side of an upper body of the self-power wireless switch.

[0026] FIG. **2**C is a view illustrating a state in which an upper cover of the self-power wireless switch is separated.

[0027] FIGS. **3**A to **3**C are views for explaining an operation of the self-power wireless switch according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0028] Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings. The following detailed descriptions are provided to help comprehensive understanding of a method, an apparatus, and/or a system described in this specification. However, this is merely an example, and the present invention is not limited thereto.

[0029] In descriptions of embodiments of the present invention, detailed descriptions related to the well-known technologies will be ruled out in order not to unnecessarily obscure subject matters of the present invention. Also, terms used in the present specification are terms defined in consideration of functions according to embodiments, and thus the terms may be changed according to the intension or usage of a user or operator. Therefore, the terms should be defined on the basis of the overall contents of this specification. The terms used in the present specification are merely used to describe particular embodiments, and are not intended to limit the present invention. An expression used in the singular encompasses the expression in the plural, unless it has a clearly different meaning in the context. In the present specification, it is to be understood that terms such as "including" or "having", etc., are intended to indicate the existence of the features, numbers, steps, actions, components, parts, or combinations thereof disclosed in the specification, and are not intended to preclude the possibility that one or more other features, numbers, steps, actions, components, parts, or combinations thereof may exist or may be added.

[0030] FIG. **1** is a view illustrating an outer appearance of a self-power wireless switch **10** according to an embodiment of the present invention, FIG. **2**A is an exploded perspective view illustrating the self-power wireless switch **10** of FIG. **1**, FIG. **2**B is a view illustrating a lower side of an upper body **300** of the self-power wireless switch **10**, and FIG. **2**C is a view illustrating a state in which an upper cover **100** of the self-power wireless switch **10** is separated.

[0031] Referring to FIGS. **1** and **2**A to **2**C, the self-power wireless switch **10** may include an upper cover **100** and a lower body **200** and is provided with a switch member **150** at a side of the upper cover **100**. Each of the upper cover **100** and the lower body **200** may be made of a material having rigidity, and the switch member **150** may be made of a material having elasticity so that a user feels pressing feeling when pressed. The switch member **150** may have conductivity while having elasticity, and thus, when the switch member **150** is in contact with a contact unit **410** of a printed circuit board **400**, the switch member **150** is electrically conducted. For this, a side of the switch member **150**, which is in contact with at least the contact unit **410**, may be made of carbon or other materials. The upper cover **100** may rotate based on a rotating shaft **310** formed at one side of the lower body **200**. Thus, when the user presses the switch member **150**, the entire upper body **300** and upper cover **100** may rotate to move.

[0032] The switch member **150** may have a plurality of pressing positions so that the user turns on/off a desired mechanism. For example, the switch member **150** may have a plurality of pressing positions that correspond to a plurality of lighting devices, respectively. Thus, a specific lighting fixture among a plurality of lighting devices may be turned on and off according to which one of the plurality of pressing positions is pressed. However, the self-power wireless switch **10** may be connected to various electric appliances as well as lighting devices to turn on and off the corresponding electric appliance (e.g., air conditioners, televisions, home appliances such as set-top boxes).

[0033] A printed circuit board (PCB) **400** capable of transmitting an on/off signal to a desired electronic appliance and a generator **500** that supplies power to the printed circuit board **400** to perform an on/off operation may be disposed between the upper cover **100** and the upper body **300**. The printed circuit board **400** may be coupled to one side of an inner side of the upper cover **100**, and the generator **500** may be disposed at the other side rather than a portion to which the printed circuit board **400** is coupled. The generator **500** may include a piezoelectric element to generate power when a pressure is applied to a generator bar **510**. In the case of the self-power wireless switch **10** according to an embodiment of the present invention, when the upper body **300** and the upper body **300** rotate together based on the rotating shaft **310** by the user's pressing force, the generator bar **510** may be pressed to generate the power in the generator **500**.

[0034] A contact unit **410** that is in contact with the switch member **150** may be disposed on the printed circuit board **400** when the switch member **150** is pressed. When the switch member **150** is in contact with the contact unit **410**, the on/off signal may be transmitted to the electric appliance corresponding to the corresponding position. When a plurality of pressing positions are formed on the switch member **150**, a plurality of contact units **410** corresponding to the plurality of pressing positions may also be formed on the printed circuit board **400**. Thus, when the user presses a specific pressing position, the on/off signal may be transmitted to an appropriate electric appliance according to the corresponding contact unit **410**. The contact unit **410** may be made of carbon or other materials to have durability and corrosion resistance in spite of the multiple contact of the switch member **150**. According to an embodiment of the present invention, since the contact unit **410** of the printed circuit board **400** is in direct contact with the switch member **150**, it may be easy to expand the pressing position between the contact unit **410** and the switch member **150**. That is, a pattern for forming the contact unit **410** on the printed circuit board **400** may be freely formed, and also, the pressing position of the switch member **150** may be formed at each corresponding position to freely expand the number of electronic appliances that are capable of being controlled in one self-power wireless switch **10**.

[0035] In order to fix the printed circuit board **400**, the upper body **300** may be disposed at an opposite side of the upper cover **100** with the printed circuit board **400** therebetween. That is, the printed circuit board **400** may be disposed in the middle between the upper cover **100** and the upper body **300** to prevent the printed circuit board **400** from being separated from its original position.

[0036] When the user presses the switch member **150**, and the upper cover **100** and the upper body **300** rotate with respect to the lower body **200** and then releases the user's hand, an elastic member **550** may be disposed so that the upper cover **100** returns to its original state. The elastic member **550** may be disposed between the upper body **300** (or the printed circuit board **400**) and the generator bar **510** to allow a distance between the generator bar **510** and the upper cover **100** to return to its original state when the user releases the user's hand. Thus, the upper cover **100** may

return to its original position. The elastic member **550** may be a torsion spring in which elasticity is generated by torsion. The elastic member **550** may include a spring bar **551** supported to a side of the upper body and a side of the generator bar **510** and a torsion part **552** fitted into a connection bar **331** of an elastic member connection member **330** of the upper body **300** while generating torsional electricity therebetween.

[0037] The pressing member **210** corresponding to the generator bar **510** disposed on the printed circuit board **400** may be disposed inside the lower body **200**. The pressing member **210** may have a shape protruding upward from the lower body **200**. The pressing member **210** may apply a pressure to the generator bar **510** by pressing the generator bar **510** when the upper body **300** is pressed. As the pressing member **210** applies the pressure to the generator bar **510**, the generator **500** may generate power.

[0038] FIGS. **3**A to **3**C are views for explaining an operation of the self-power wireless switch **10** according to an embodiment of the present invention.

[0039] Referring to FIGS. **3**A to **3**C, the user may press the switch member **150** formed on the upper cover **100**. When a plurality of pressing positions are formed on the switch member **150**, the user may press the pressing position corresponding to the desired electric appliance. As the switch member **150** is pressed, the contact unit **410** disposed at a position corresponding to the switch member **150** on the printed circuit board **400** may be in contact with the switch member **150**. If the plurality of pressing positions are formed on the switch member **150**, the contact units **410** may also be formed in a corresponding number, and the contact units **410** corresponding to the pressing positions pressed by the user may be in contact with the switch member **150**.

[0040] The upper cover **100** and the upper body **300** may rotate about the rotating shaft **310** by user's pressing force and thus may be inclined toward the lower body **200**. Since the printed circuit board **400** and the generator **500** are coupled between the upper cover **100** and the upper body **300**, the printed circuit board **400** and the generator **500** may also be inclined together with the upper cover **100** and the upper body **300**.

[0041] When the upper cover **100** and the upper body **300** are inclined toward the lower body **200**, the generator bar **510** of the generator **500** may be pressed by the pressing member **210** disposed on the lower body **200**. When the generator bar **510** is deformed by being pressed by the pressing member **210**, power may be generated in the generator **500**. The generated power may be used to transmit the on/off signal from the printed circuit board **400** to the corresponding electric appliance.

[0042] When the user stops the pressing with respect to the switch member **150**, the elastic member **510** may function of allowing the generator bar **510**, the upper cover **100**, and the upper body **300** to return to their original states. As the elastic member **510** pushes the upper cover **100** and the upper body **300** upward while allowing the generator bar **510** to turn to its original position, the upper cover **100** and the upper body **300** may return to their original positions.

[0043] In the self-powering switch **10** according to an embodiment of the present invention, it is possible to provide the self-power wireless switch **10** with smooth operation feeling by the structure described above. Particularly, since a distance between the switch member **150** and the rotating shaft **310**, which corresponds to a position, at which the user presses, is greater than a distance between the generator bar **510** generating power and the rotating shaft **310**, the user may operate the generator **500** with little force through a lever principle, and thus, the smooth operation feeling may be obtained.

[0044] In addition, the printed circuit board **400** and the generator **500** are disposed below the upper cover **100**, a configuration for operating the generator **500** may be minimized, and the self-power wireless switch **10** may be configured with a simple configuration. Also, since the switch member **150** and the printed circuit board **400** are in direct contact with each other, the desired number of contact units **410** may be provided on the printed circuit board **400** to easily expand an electronic appliance capable of being controlled through one self-power wireless switch **10**.

[0045] Although the present invention has been described in detail through representative examples above, those of ordinary skill in the art to which the present invention pertains will understand that various modifications can be made to the above-described embodiments without departing from the scope of the present invention. Therefore, the scope of this disclosure is defined not by the detailed description of the invention but by the appended claims, and all differences within the scope will be construed as being included in the present invention.

1. A self-power wireless switch comprising:

a lower body;

an upper body rotatably coupled to one side of the lower body through a rotating shaft;

a printed circuit board (PCB) comprising a contact unit which is coupled to the upper body;

a switch member with which the PCB is to be in contact when a user presses the switch member;

a generator disposed on a bottom surface of the PCB and configured for supplying power to the PCB; and

a generator bar disposed on the generator,

wherein, when the user presses the switch member, while the upper body rotates, a pressure is applied to the generator bar to generate power.

2. The self-power wireless switch of claim **1**, further comprising a pressing member is-disposed inside the lower body,

wherein, when the upper body rotates, the pressing member is configured to apply the pressure to the generator bar.

3. The self-power wireless switch of claim **2**, wherein the pressing member has a shape that protrudes upward from the lower body.

4. The self-power wireless switch of claim **1**, further comprising an elastic member disposed between the generator bar and the upper body.

5. The self-power wireless switch of claim **4**, wherein the elastic member comprises a torsion spring.

6. The self-power wireless switch of claim **1**, wherein the switch member comprises a plurality of pressing positions, and

the contact unit of the printed circuit board is formed in the number corresponding to the plurality of pressing positions.

7. The self-power wireless switch of claim **1**, further comprising an upper cover configured to cover the upper body and the printed circuit board.

8. The self-power wireless switch of claim **7**, wherein the upper cover is rotatably coupled together with the upper body.

9. The self-power wireless switch of claim **1**, wherein a distance between the switch member and the rotating shaft is greater than that between the generator bar and the rotating shaft.

* * * * *