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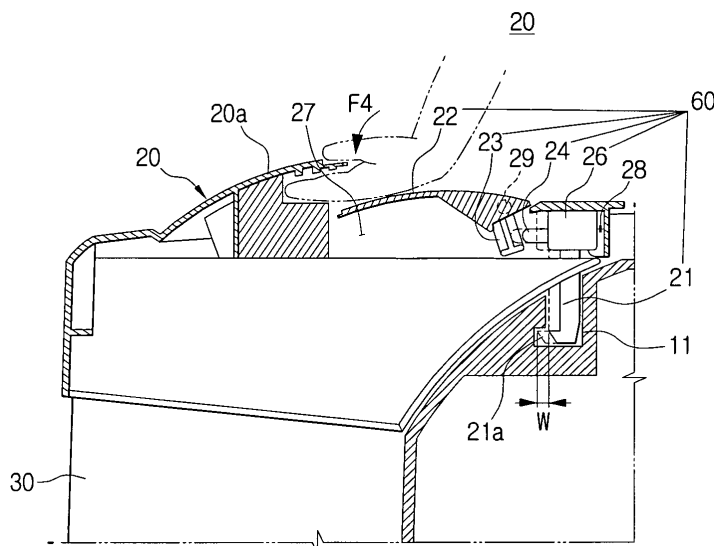
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(54) **Vacuum cleaner**

(57) A vacuum cleaner is provided that comprises a dust collection unit (40) mounted to a mounting portion (15) of a cleaner body (10). The dust collection unit (40) separates dust from outside air being drawn in. The dust collection unit (40) has a handle (20a) and a locking unit (60) for detachably fixing the dust collection unit (40) to the cleaner body (10). Here, the locking unit (60) com-

prises a locking member (21) moving between a connecting position and a releasing position, the connecting position for being engaged with a connection recess (11) formed on the cleaner body (10) and the releasing position for being released from the connection recess (11); and a button member (22) formed on an outer surface of the dust collection unit (40) for pressing operation.

FIG. 5



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit under 35 U.S.C. § 119(a) of Korean Patent Application No. 2005-102617, filed October 28, 2005, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the invention

[0002] The present invention relates to a vacuum cleaner for cleaning a surface to be cleaned. More particularly, the present invention relates to a vacuum cleaner having a locking unit so that a dust collection unit can be selectively attached and separated with respect to a cleaner body.

2. Description of the Related Art

[0003] Generally, a vacuum cleaner draws in dust-laden air using a vacuum force generated by a vacuum motor mounted in a cleaner body, and separates and collects dust from the air in the cleaner body to finally dump the collected dust. The vacuum cleaner adopts the principle of cyclone in order to separate and collect dust. In such a vacuum cleaner, a dust collection unit is separably mounted to a cleaner body. Korean Patent Publication No. 2005-13693 (filed by LG Electronics Co., Ltd.) discloses the vacuum cleaner in which a handle is exposed on an upper part of a dust collection unit and a locking/unlocking device is provided for connection between the dust collection unit and a cleaner body. In this vacuum cleaner, a user can detach the dust collection unit from the cleaner body by inserting his/her fingers in a grab space formed at the handle mounted to the upper part of the dust collection unit with one hand and pressing a button formed on the cleaner body with the other hand so that the dust collection unit is released from the cleaner body, and pulling up the dust collection unit.

[0004] However, in the conventional vacuum cleaner, the user has to use both hands as described above to hold the dust collection unit and the cleaner body, respectively. In other words, separation of the dust collection unit from the cleaner body is inconvenient.

SUMMARY OF THE INVENTION

[0005] An aspect of the present invention is to solve at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present invention is to provide a vacuum cleaner improved in user's convenience by enabling a user to mount and separate a dust collection unit with respect to a cleaner body with one hand.

[0006] In order to achieve the above-described as-

pects of the present invention, there is provided a vacuum cleaner comprising a cleaner body having a mounting portion a dust collection unit for separating dust from outside air, the dust collection unit being mounted to the mounting portion, the dust collection unit having a handle and a locking unit for detachably fixing the dust collection unit mounted in the mounting portion with respect to the cleaner body, wherein the locking unit comprises a locking member for movement between a connecting position and a releasing position, the connecting position for being engaged with a connection recess formed on the cleaner body and the releasing position for being released from the connection recess; and a button member formed on an outer surface of the dust collection unit for pressing operation, and wherein when a user grabs the handle of the dust collection unit, the button member is pressed from an initial position so that the locking member is moved from the connecting position to the releasing position, thereby releasing the dust collection unit and the cleaner body.

[0007] The locking unit further comprises a releasing member moved in association with the locking member, and a gear member operating the releasing member and the button member in association with each other.

[0008] The gear member converts a rotational motion of the button member to a linear motion and transmits the linear motion to the releasing member. The gear member, the locking member, and the releasing member are integrally formed.

[0009] The button member comprises a partition protruded from one side thereof to press the gear member during the rotational movement of the button member

[0010] The vacuum cleaner further comprises a cover part mounted to an upper part of the dust collection part to cover the upper part of the dust collection part. The button member and the handle are disposed on the cover part to face each other, and the button member is hinged on the cover part.

[0011] The locking unit further comprises a spring for restoring the button member to the initial position when the user releases the handle.

[0012] The dust collection unit comprises a dust collection part for drawing in the outside air, centrifugally separating dust from the outside air, and collecting the separated dust, and a cover part mounted to an upper part thereof to cover the dust collection unit, the cover part comprises the button member on a top side and the releasing member therein, and the locking member is integrally formed with either side of the releasing member.

[0013] The vacuum cleaner further comprises a grab space for inserting user's fingers is formed inside the cover part so that when the user inserts fingers in the grab space, the button member is pressed, thereby releasing connection between the dust collection unit and the cleaner body.

[0014] According to another embodiment of the present invention, there is provided a vacuum cleaner

comprising a dust collection unit having a handle, a cleaner body and a vacuum source mounted to the cleaner body and generating a suction force, wherein when the handle is grabbed, the dust collection unit is separated from the cleaner body and when the handle is released, the dust collection unit is locked to the cleaner body.

[0015] The dust collection unit comprises a locking unit, and the locking unit comprises a button member that rotates, and at least one locking member that is linearly moved by rotation of the button member.

[0016] The locking unit further comprises a gear member converting rotational motion of the button member to linear motion.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0017] The above aspect and other features of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawing figures, wherein;

[0018] FIG. 1 is a perspective view of a vacuum cleaner according to an embodiment of the present invention;

[0019] FIG. 2 is a bottom view of a dust collection unit cover of FIG. 1 with a button member thereof not pressed yet, in a state where a handle is not grabbed by a user ;

[0020] FIG. 3 is a sectional view of FIG. 2 cut along a line III-III;

[0021] FIG. 4 is a bottom view of the dust collection unit cover of FIG. 1 with the button member thereof pressed, in a state where the handle is grabbed by the user ; and

[0022] FIG. 5 is a sectional view of FIG. 4 cut along a line V-V.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0023] Hereinafter, certain embodiments of the present invention will be described in detail with reference to the accompanying drawing figures.

[0024] In the following description, the matters defined in the description such as a detailed construction and elements are nothing but the ones provided to assist in a comprehensive understanding of the invention. Thus, it is apparent that the present invention can be carried out without those defined matters. Also, well-known functions or constructions are not described in detail since they would obscure the invention in unnecessary detail.

[0025] FIG. 1 is a perspective view of a vacuum cleaner, separately showing a dust collection unit and a cleaner body. FIG. 2 is a bottom view of a cover part separated from a dust collection unit of FIG. 1. FIG. 3 is a side-sectional view of FIG. 2 cut along a line III-III.

[0026] Referring to FIGS. 1 through 3, the vacuum cleaner comprises a cleaner body 10, a dust collection unit 40, and a locking unit 60.

[0027] In the cleaner body 10, a suction source (not shown) for drawing in outside air is mounted at the rear

portion, and wheels 14 are mounted on both sides of the rear portion to help the cleaner body 10 travel. Front and upper portions of the cleaner body 10 are opened, thereby forming a mounting portion 15 for receiving the dust collection unit 40 that will be explained hereinafter. The dust collection unit 40 is detachably mounted to the mounting portion 15 and for this, a connection recess 11 is formed on either side of an upper part of the mounting portion 15 for connection and separation with respect to a locking member 21 formed at the dust collection unit 40. In addition, a guide recess 13 having a substantially square form is formed at a lower part of the front of the cleaner body 10 for engagement with a protrusion 25 of the dust collection unit 40. The guide recess 13 helps the dust collection unit 40 be mounted at a correct position of the cleaner body 10 and firmly fixes the dust collection unit 40 as mounted in the mounting portion 15 to prevent the dust collection unit 40 from shaking or separating from the cleaner body 10 during carrying and operation of the vacuum cleaner.

[0028] Being connected with the cleaner body 10, the dust collection unit 40 draws in the outside air, and separates and collects dust from the outside air using a centrifugal force. To this end, the dust collection unit 40 comprises a dust collection part 30 and a cover part 20.

[0029] Inside the dust collection part 30 are provided a cyclone (not shown) for centrifugally separating the dust from the outside air and a dust receptacle (not shown) for storing the dust separated by the cyclone. Although a cyclone-type dust collection part is taken as an example in this embodiment, the present invention is applicable to other types of dust collection units. A protrusion 25 for engagement with the guide recess 13 of the cleaner body 10 is formed at a lower part of the dust collection part 30.

[0030] The cover part 20 is mounted to an upper part of the dust collection part 30 to cover the upper part of the dust collection part 30. A handle 20a and a button member 22 of the locking unit 60 are formed on a top side of the cover part 20. The handle 20a is fixed to the cover part 20, and the button member 22 is disposed to face the handle 20a as shown in FIG. 5, so that a user can grab the handle 20a only when the button member 22 is pressed. Also, the button member 22 is mounted to pivot on a hinge 29. The locking unit 60 is mounted to the cover part 20.

[0031] Referring to FIGS. 1 through 3, the locking unit 60 comprises the button member 22, a releasing member 26, a partition 23, a locking member 21, a gear member 24, and a spring 28. The button member 22 is disposed on the top side of the cover part 20 while the others 26, 23, 21, 24, and 28 are disposed on a bottom side 20-2 of the cover part 20.

[0032] The button member 22 comprises the hinge 29 disposed at either side thereof to pivot by a predetermined angle. The button member 22 seals a grab space 27 formed between the cover part 20 and the dust collection part 30, together with the handle 20a. In order to

insert his/her fingers in the grab space 27 to grab the handle 20a, the user needs to press one side of the button member 22, thereby pivoting the button member 22 and opening the grab space 27 (see FIG. 5).

[0033] The releasing member 26 is mounted to the bottom side of the cover part 20 to be movable in directions shown by arrows F1 and F2 in FIG. 4. The releasing member 26 is spaced by a predetermined distance from the button member 22. The locking member 21 is integrally formed with either side of the releasing member 26 in this embodiment. However, the locking member 21 may be detachably mounted to the releasing member 26. As the releasing member 26 moves in the directions F1 and F2 of FIG. 4, the locking member 21 accordingly moves in the same directions. Since being mounted to the bottom side 20-2 of the cover part 20, the releasing member 26 is not shown from the outside. A slit 51 is formed on either side of the releasing member 26, and a screw 50 formed on the releasing member 26 is inserted in the slit 51 so as to fix the releasing member 26 and the cover part 20 in a semi-restricted state.

[0034] The partition 23 is protruded downward from either side of the bottom side 20-2 of the cover part 20. Therefore, the partition 23 is rotated as the button member 22 pivots on the hinge 29, thereby pressing the gear member 24. Additionally, the partition 23 has an inversed T-shape for enhancing hardness to endure an external force during rotation of the button member 22 and may be integrally formed with the button member 22.

[0035] The locking member 21 comprises a hook part 21a at the lower part and is protruded from either side of the releasing member 26. The locking member 21 is integrally formed with the releasing member 26 and therefore moves together with the releasing member 26. In order to mount the dust collection unit 40, the locking member 21 is inserted in the connection recess 11 formed on the cleaner body 10, and the hook part 21a formed at the lower part of the locking member 21 is locked in the connection recess 11 having a flattened U-shape. When separating the dust collection unit 40 from the cleaner body 10, the locking member 21 is moved in the direction F1 of FIG. 3, thereby releasing connection between the dust collection unit 40 and the cleaner body 10.

[0036] Referring to FIGS. 2 and 3, the gear member 24 is disposed between the partition 23 and the releasing member 26 inside the cover part 20. According to the present embodiment, the gear member 24 is integrally formed with the releasing member 26. As the button member 22 is pivoted, the partition 23 is rotated thereby pressing one side of the gear member 24. Consequently, the gear member 24 moves the releasing member 26 in the direction F1.

[0037] Referring to FIG. 2, the spring 28 biases the releasing member 26 with one end thereof at the bottom side of the cover part 20. The other end of the spring 28 is fixed to one side of the bottom side 20-2 of the cover part 20. When a force is applied to the button member

22 in an arrowed direction F4, the releasing member 26 is moved in the direction F1 of FIG. 3, and the spring 28 is compressed. When the force applied in the direction F4 is removed, the releasing member 26 is restored by a recovery force of the spring 28 and accordingly, the button member 22 is restored to its initial position.

[0038] When the user grabs the handle 20a to hold the dust collection unit 40 and presses one side of the button member 22, the button member 22 is pivoted by a predetermined angle in the direction F4. As a result, the partition 23 protruded on the button member 22 moves the gear member 24 to the rear side by a predetermined distance W. When the gear member 24 is moved, the locking member 21 in connection with the releasing member 26 is moved to a releasing position P2, as being engaged with the connection recess 11 of the cleaner body 10. Here, the hook part 21a formed at the locking member 21 has length preferably equal to or greater than the predetermined distance W for engagement with the connection recess 11 of the cleaner body 10. Thus, the dust collection unit 40 can be separated from the cleaner body 10 by the operation of the locking unit 60. Here, rotation of the button 22 induces linear motion of the releasing member 24 because the releasing member 24 fixed in the semi-restricted state by the cover part 20 and the screw 50 moves along the slit 51 formed at the releasing member 24.

[0039] Meanwhile, as the button member 22 is pressed to separate the dust collection unit 40 from the cleaner body 10, the grab space 27 is formed between the cover part 20 and the button member 22 and exposed to the outside, so that the user is able to hold and lift the dust collection unit 40 by inserting his/her fingers in the grab space 27. It is preferred that the grab space 27 is formed near the user's side for convenient use.

[0040] When the force pressing the button member 22 is removed to release connection between the dust collection unit 40 and the cleaner body 10, the spring 28 mounted to one side of the releasing member 26 and the rear side of the cover 20 restores the button member 22 to the initial position. In other words, when the button member 22 is pressed, the releasing member 26 is moved to the rear side thereby compressing the spring 28. When the external force is removed from the button member 22, on the contrary, the button member 22 is restored to the initial position by the recovery force of the compressed spring 28. Also, the locking member 21 is moved to a connecting position P1, thereby locking the dust collection unit 40 to the cleaner body 10.

[0041] Hereinafter, the operation of mounting and separating the dust collection unit 40 with respect to the cleaner body 10 will be described with reference to FIGS. 1 through 5.

[0042] When the user mounts the dust collection unit 40 of the cleaner body 10, the user presses the button member 22. Simultaneously, the user grabs the dust collection unit 40 by inserting his/her fingers in the grab space 27 and inserts the dust collection unit 40 in the

mounting portion 15 formed on the cleaner body 10 in an arrowed direction F. In order to guide the dust collection unit 40 to the correct position of the cleaner body 10, the protrusion 25 is set to the guide recess 13 formed on the cleaner body 10.

[0043] More specifically, when the user presses the button member 22, the partition 23 integrally formed with the button member 22 is pivoted on the hinge 29 by the predetermined angle in the direction F4. Therefore, the releasing member 26 contacted with the partition 23 is moved in the direction F1. At this time, the releasing member 26 connected with the cleaner body 10 through the screw 50 inserted in the slit 51 is linearly moved in the direction F1 along the slit 51.

[0044] According to this, the locking member 21 fixed to both ends of the releasing member 26 is moved in the direction F1. To summarize, as the user presses the button member 22, the locking member 21 is moved to the releasing position P2. When the user inserts the dust collection unit 40 in the cleaner body 10 with the button member 22 pressed and removes the force for pressing the button member 22, the releasing member 26 is moved to the connecting position P1 by the recovery force of the spring 28 and accordingly, the locking member 21 mounted to the releasing member 26 is also moved to the connecting position P1. Simultaneously, the gear member 24 protruded on the releasing member 26 is moved in the direction F1, thereby pushing the partition 23 in the direction 23 so that the button member 22 is restored to the initial position.

[0045] Separation of the dust collection unit 40 from the cleaner body 10 can be achieved by performing the above processes in the reverse order.

[0046] According to the embodiment of the present invention, the user can grab the dust collection unit 40, and mount and separate the dust collection unit 40 with respect to the cleaner body 10 with one hand simultaneously. Therefore, mounting and separation of the dust collection unit 40 can be more facilitated than when using a conventional dust collection unit mounting/separating device.

[0047] As can be appreciated from the above description of the vacuum cleaner according to the embodiment of the present invention, the grab space 27 is formed as the button member 22 formed on the cover part 20 is pressed so that the dust collection unit 40 can be lifted and separated from the cleaner body 10. As a consequence, the dust collection unit 40 can be separated with only one hand.

[0048] Furthermore, since the grab space 27 is formed only when the user intends to mount and separate the dust collection unit 40, appearance of the vacuum cleaner can be improved.

[0049] While the invention has been shown and described with reference to certain embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as

defined by the appended claims.

Claims

1. A vacuum cleaner comprising:

a cleaner body having a mounting portion;
a dust collection unit for separating dust from outside air, the dust collection unit being mounted to the mounting portion, the dust collection unit having a handle and a locking unit for detachably fixing the dust collection unit mounted in the mounting portion with respect to the cleaner body, wherein the locking unit comprises:

a locking member for movement between a connecting position and a releasing position, the connecting position for being engaged with a connection recess formed on the cleaner body and the releasing position for being released from the connection recess; and

a button member formed on an outer surface of the dust collection unit for pressing operation, and

wherein when a user grabs the handle of the dust collection unit, the button member is pressed from an initial position so that the locking member is moved from the connecting position to the releasing position, thereby releasing the dust collection unit from the cleaner body.

2. The vacuum cleaner of claim 1, wherein the locking unit further comprises a releasing member moved in association with the locking member, and a gear member operating the releasing member and the button member in association with each other.

3. The vacuum cleaner of claim 2, wherein the gear member converts a rotational motion of the button member to a linear motion and transmits the linear motion to the releasing member.

4. The vacuum cleaner of any of claims 2 and 3, wherein the gear member, the locking member, and the releasing member are integrally formed.

5. The vacuum cleaner of any of claims 3 and 4, wherein the button member comprises a partition protruded from one side thereof to press the gear member during the rotational movement of the button member.

6. The vacuum cleaner of any of claims 1 to 5, further comprising a cover part mounted to an upper part of the dust collection part to cover the upper part of the dust collection part, wherein the button member and

the handle are disposed on the cover part to face each other, and the button member is hinged on the cover part.

7. The vacuum cleaner of any of claims 1 to 6, wherein the locking unit further comprises a spring for restoring the button member to the initial position when the user releases the handle. 5

8. The vacuum cleaner of any of claims 1 to 7, wherein the dust collection unit comprises a dust collection part for drawing in the outside air, centrifugally separating dust from the outside air, and collecting the separated dust, and a cover part mounted to an upper part thereof to cover the dust collection unit, the cover part comprises the button member on a top side and the releasing member therein, and the locking member is integrally formed with either side of the releasing member. 10
15
20

9. The vacuum cleaner of claim 8, further comprising a grab space for inserting user's fingers formed inside the cover part so that when the user inserts fingers in the grab space, the button member is pressed, thereby releasing connection between the dust collection unit and the cleaner body. 25

10. A vacuum cleaner comprising
a dust collection unit having a handle;
a cleaner body; and 30
a vacuum source mounted to the cleaner body and generating a suction force,
wherein when the handle is grabbed, the dust collection unit is separated from the cleaner body and
when the handle is released, the dust collection unit is locked to the cleaner body. 35

11. The vacuum cleaner of claim 10, wherein the dust collection unit comprises a locking unit, and the locking unit comprises a button member that rotates and at least one locking member that is linearly moved by rotation of the button member. 40

12. The vacuum cleaner of claim 11, wherein the locking unit further comprises a gear member converting rotational motion of the button member to linear motion. 45

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FIG. 1

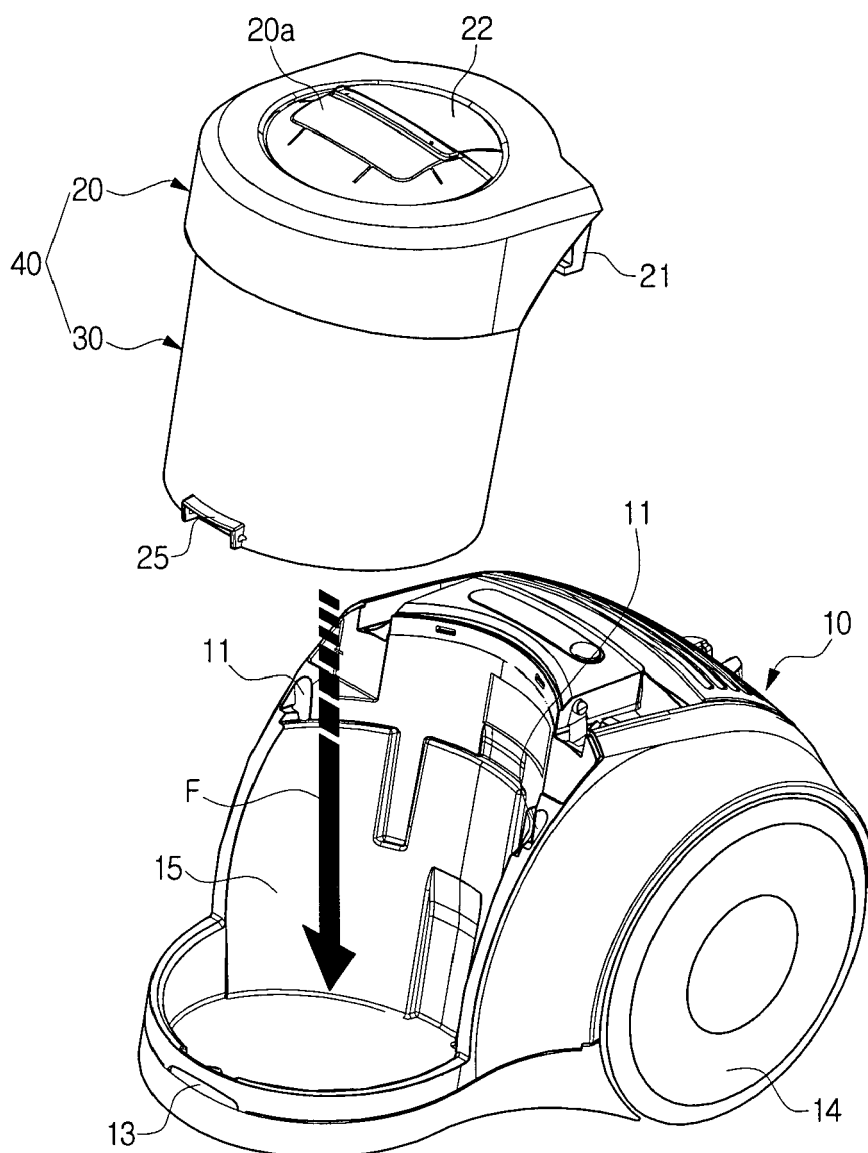


FIG. 2

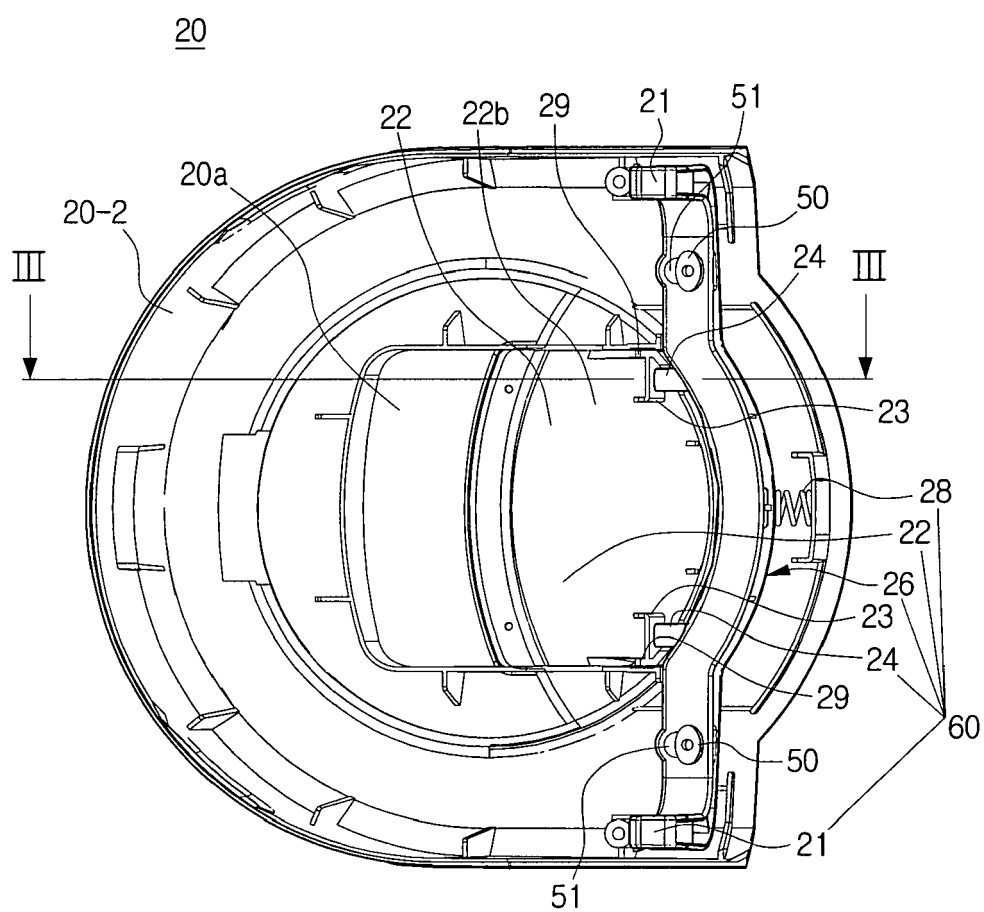


FIG. 3

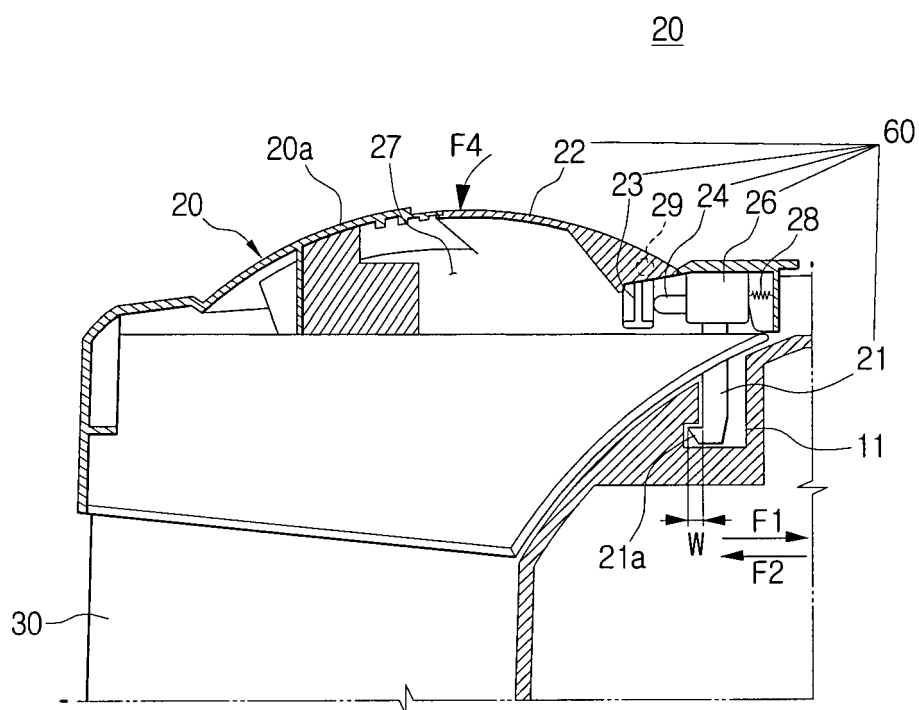


FIG. 4

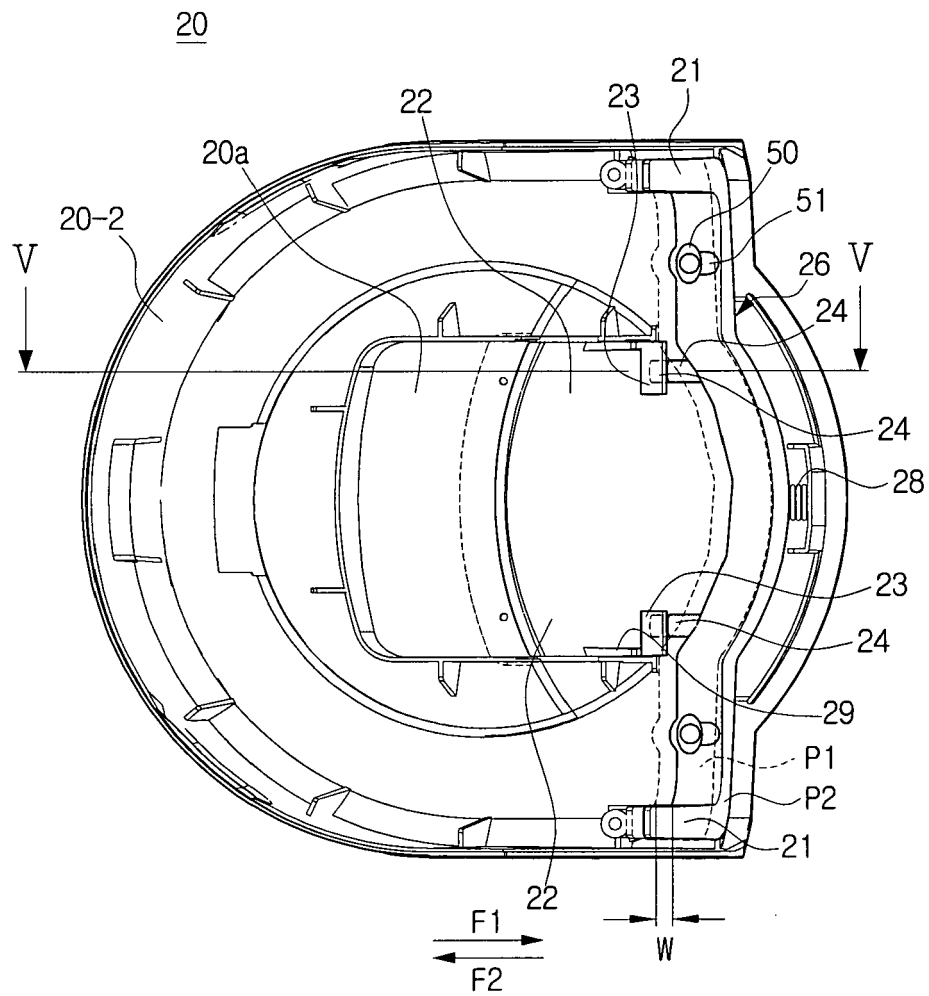
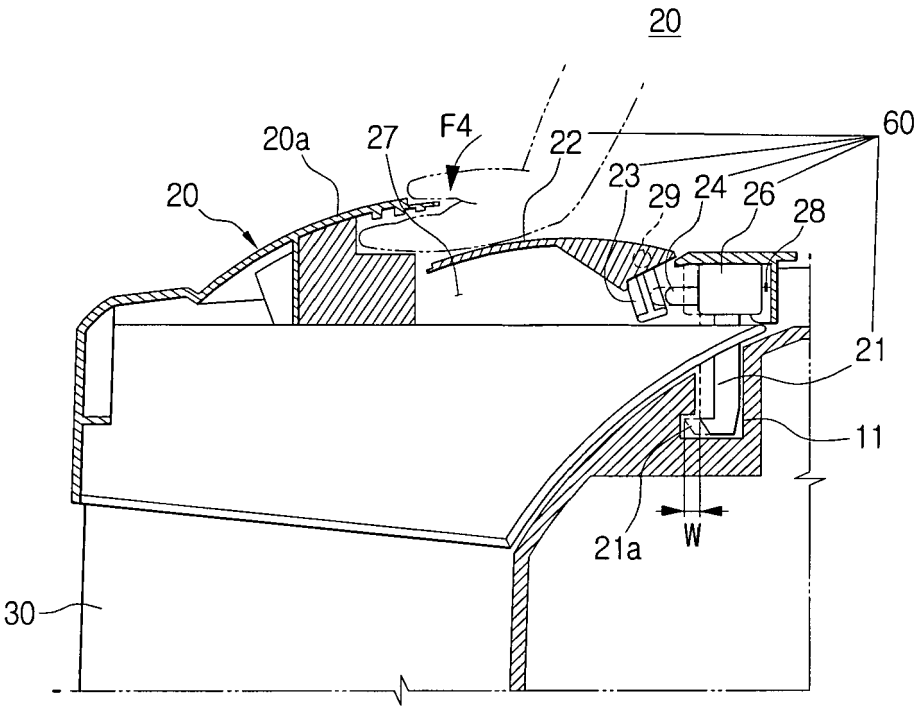


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 2005102617 [0001]
- KR 200513693 [0003]