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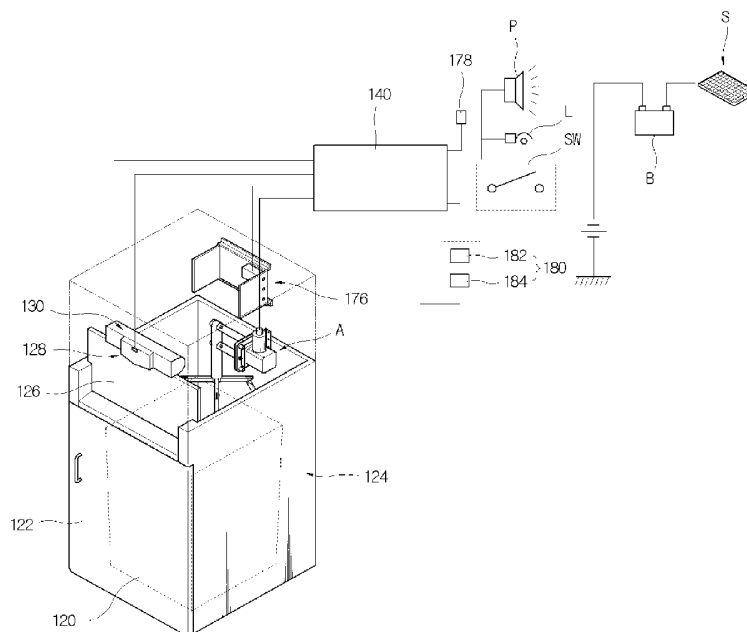
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(54) Title: WASTE BASKET WITH AUTOMATIC OPENING AND CLOSING DOOR



(57) Abstract: Provided is a waste basket with an automatic opening and closing door including an outer case having upper and lower doors for opening and closing upper and lower inner portions, an inner case included in the lower inner portion of the outer case, a detection unit detecting an approaching object, an upper door drive unit driving the upper door to open and close in response to a signal input from the detection unit, and a control unit controlling the driving of the upper door drive unit in response to the signal input from the detection unit.

Description

WASTE BASKET WITH AUTOMATIC OPENING AND CLOSING DOOR

Technical Field

- [1] The present invention relates to a waste basket with an automatic opening and closing door, and more particularly, to a waste basket with an automatic opening and closing door in which the door for putting waste in is automatically opened and closed when necessary with no need to manually open and close the door.

Background Art

- [2] For a generally used waste basket, since various waste in the waste basket are exposed as they are, the waste basket not only gives an unpleasant feeling to users but also is messy and insanitary. To overcome this problem, a waste basket having an opening and closing lid or door has been widely used. However, a user needs to manually open and close the lid or door to put waste in the waste basket. Thus, it is inconvenient for the user to use the waste basket by manually opening and closing the lid or door. Further, there is a high possibility of the users being infected by germs or viruses remaining on the waste or foreign materials that adheres to the door so that the user must wash his or her hands after using the waste basket.
- [3] In order to improve the waste basket, a waste basket having a foot pedal for opening and closing a lid or door has been developed. However, it is inconvenient for the user to step the foot pedal to open and close the lid or door and the foot pedal is easily broken. Also, it is difficult for handicapped persons to use this type of manually opening and closing waste basket.
- [4] To solve the above problem, Korean Patent Publication No. 2001-0084902 discloses an automatic opening and closing waste basket as shown in FIG. 1. Referring to FIG. 1, a detection sensor 2 such as an infrared sensor or ultrasonic sensor detects whether a user puts waste in a waste basket 1. A proximity sensor 3 in engagement with the detection sensor 2 detects whether a door 4 is open or closed. Such operation is controlled by a control panel 12 and power is supplied through a solar cell 5. A shaft pin 8 is provided at a side of the door 4 and is gear-connected via a deceleration gear 11 to a motor 10 installed at the side for automatic opening and closing of the door 4. Thus, as the shaft pin 8 rotates in a predetermined decelerated rotation ratio, the door 4 is open or closed so that waste can be put through an entrance 9.
- [5] However, in the above automatic opening and closing waste basket, the waste fully put in the waste basket may spring out of the waste basket as the door 4 is open or the door 4 is not completely open or may be damaged due to the waste in the waste basket.

- [6] As an example of the above conventional automatic opening and closing waste basket, Korean Patent Publication No. 2003-0061944 discloses an apparatus and method for automatically opening and closing a door of a waste basket, as shown in FIG. 2. Referring to FIG. 2, a lid 27 is automatically opened or closed according to a detection signal of proximity detection sensors 21 and 22 so that convenience in use is maximized. When power is supplied, an input signal is detected. As a result of the detection, when a door open switch is on, a motor (not shown) is driven in a forward direction to open the lid 27 and a light emitting diode (LED; not shown) indicating the opening of the lid 27 is lit up. When a door close switch is on, the motor is driven in a backward direction to close the lid 27 and a light emitting diode (LED; not shown) indicating the closing of the lid 27 is lit up.
- [7] Also, when the input signal is searched for and determined to be an object detection signal, the motor is driven in the forward direction to automatically open the lid 27 and the LED indicating the opening of the lid 27 is lit. When an object is detected and then the input signal is searched for and determined to be a signal detecting no object, whether a set time has been passed is checked. If the set time has passed, the motor is rotated in the backward direction to close the lid 27 that is open and the LED indicating the closing of the lid 27 is lit. Consequently, the lid 27 of the waste basket is automatically open and closed.
- [8] The above-described conventional waste baskets have drawbacks in that the door cannot be easily and conveniently open or closed because the switch for opening and closing the door using power needs to be directly operated. Also, the conventional waste baskets lack a function of preventing the door from automatically being open when waste in the waste basket approaches a particular level (height). Accordingly, the waste in the waste basket may overflow out of the waste basket, making the surroundings messy.
- [9] Also, it cannot be prevented that the door is pressed by the waste overflowing the waste basket and a resistant force is applied to the door as the door is forcibly open in this state so that other parts may be damaged or the waste basket become out of order. Furthermore, when the power supply is cut off in the conventional waste basket with a door opened and closed using power, the door for putting waste in is closed and cannot be manually and easily opened and closed. Thus, as the door is opened or closed by applying an excessive force, the parts may be damaged.

Disclosure of Invention

Technical Problem

- [10] To solve the above and/or other problems, the present invention provides a waste basket with an automatic opening and closing door in which the door is easily and con-

veniently opened and closed without directly manipulating a switch for opening the door using power.

Technical Solution

- [11] The present invention also provides a waste basket with an automatic opening and closing door in which the door for putting waste in is not automatically open when the waste reaches a predetermined level so that a possibility that the waste overflowing the waste basket comes out of the waste basket to make the surrounding messy is completely prevented.
- [12] The present invention also provides a waste basket with an automatic opening and closing door in which it is prevented that the door is pressed by the waste overflowing the waste basket and a resistant force is applied to the door as the door is forcibly open in this state so that other parts may be damaged or the waste basket become out of order.
- [13] The present invention also provides a waste basket with an automatic opening and closing door in which a sudden door closing due to the power off can be prevented so that, when the supply of power is cut off, the door for putting waste in can be easily and manually opened and closed.
- [14] According to an aspect of the present invention, a waste basket with an automatic opening and closing door comprises an outer case having upper and lower doors for opening and closing upper and lower inner portions, an inner case included in the lower inner portion of the outer case, a detection unit detecting an approaching object, an upper door drive unit driving the upper door to open and close in response to a signal input from the detection unit, and a control unit controlling the driving of the upper door drive unit in response to the signal input from the detection unit.
- [15] The waste basket further comprises a photo interrupter detecting whether the upper door is open or closed, and an ozone generation unit generating ozone only when the upper door is closed in response to a detection signal from the photo interrupter.
- [16] The waste basket further comprises a level sensor detecting a level of waste filling the inner case, and a warning lamp unit lighting a warning lamp and a speaker outputting a guide voice when the inner case is filled with waste in response to a detection signal of the level sensor.
- [17] The waste basket further comprises a pressing unit pressing and compressing waste filling the inner case.
- [18] The pressing unit comprises an installation plate bent to substantially have a shape of "
□
" and fixed to an inner wall of the outer case to have two surface bodies facing each

other, a pair of pivot link, each having one end hinge-coupled to two surfaces of the installation plate facing each other, an elevation link moving up and down by being hinge-coupled to the other end of each of the pivot links, a cross fingers fixed to a lower end of the elevation link, and a drive motor pivoting the pivot link.

[19] A folding member which pivots with a limit to a horizontal state by a force acting from a lower portion to an upper portion is hinge-coupled to an end portion of each of the cross fingers.

[20] The detection unit is a far infrared sensor installed above the upper door and emitting a far infrared ray in a forward downward direction and left and right directions.

[21] The upper door drive unit comprises a bracket installed on an inner wall of the outer case, to which a hinge shaft coupled to an upper end of the upper door is hinge coupled, a power generation unit fixed to the bracket and generation power, and a clutch sporadically transferring power generated from the power generation unit to the hinge shaft.

[22] The waste basket further comprises a gear train provided between the power generation unit and the clutch and decelerating to allow the hinge shaft to rotate at a predetermined rotation speed.

Brief Description of the Drawings

[23] FIG. 1 is a perspective view of an example of a conventional waste basket;

[24] FIG. 2 is a perspective view of another example of the conventional waste basket;

[25] FIG. 3 is a perspective view of a waste basket with an automatic opening and closing door according to an embodiment of the present invention;

[26] FIG. 4 is a view illustrating the configuration of the waste basket with an automatic opening and closing door of FIG. 3;

[27] FIG. 5 is a partially exploded perspective view illustrating the configuration of a pressing unit shown in FIG. 4;

[28] FIGS. 6 and 7 are views illustrating the operational states of the pressing unit shown in FIGS. 4 and 5;

[29] FIG. 8 is a partially exploded perspective view of an upper door drive unit of FIG. 4; and

[30] FIG. 9 is a cross-sectional view of part of the upper door drive unit of FIG. 4.

[31]

Best Mode for Carrying Out the Invention

[32] While this invention has been particularly shown and described with reference to preferred 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. The preferred embodiments should be considered in descriptive sense only and not for purposes of limitation. Therefore, the scope of the invention 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.

[33] Referring to FIGS. 3 and 4, a waste basket with an automatic opening and closing door according to an embodiment of the present invention includes an outer case 124, an inner case 120, a detection unit 128, an upper door drive unit 130, and a control unit 140. The outer case 124 includes upper and lower doors 126 and 122 for opening and closing upper and lower portions of the waste basket. The inner case 120 is included in the lower portion of the outer case 124. The detection unit 128 detects an approaching object. The upper door drive unit 130 drives the upper door 126 to open and close in response to a signal input from the detection unit 128. The control unit 140 controls driving of the upper door drive unit 130 in response to a signal input from the detection unit 128.

[34] The waste basket with an automatic opening and closing door may further include a photo interrupter 178 detecting whether the upper door 126 is open or closed and an ozone generating portion 176 operating in response to a signal of the photo interrupter 178. Also, the waste basket may further include a level sensor 180 detecting the level of waste filling the inner case 120, and a warning lamp unit L lighting a warning lamp and a speaker P outputting a guide voice when the inner case 120 is filled with waste in response to a detection signal of the level sensor 180,. The level sensor 180 may be an ultrasonic sensor consisting of a transmitter 182 and a receiver 184 exchanging ultrasonic waves. Thus, the waste can be always maintained at an appropriate level, overfilling or the waste can be restricted, and excessive opening and closing of the upper door 126 and a side effect according thereto can be fundamentally excluded.

[35] The waste basket with an automatic opening and closing door may further include a pressing unit A pressing and compressing the waste filling the inner case 120. The pressing unit A, as shown in FIGS. 5 through 7, includes an installation plate A44, a pair of pivot links A46 and A48, an elevation link A50, a cross fingers A50a-A50d, a link gear A61, a motor gear A63, and a drive motor A64.

[36] The installation plate A44 of the pressing unit A is bent to substantially have a shape of "

□

" and arranged to have two surface bodies facing each other. The installation plate A44 is fixed to a corresponding inner wall of the outer case 124. Ends of the pivot links A46 and A48 are hinge-coupled at positions where the two surface bodies of the installation plate A44 are separated from each other.

- [37] The elevation link A50 is a position where the other ends of the pivot links A46 and A48 are hinge-coupled. The cross fingers A50a-A50d are fixed to a lower end of the elevation link A50. The cross fingers A50a-A50d may have folding members A52a-A52d which are hinge-coupled to end portions of the cross fingers A50a-A50d and pivot with a limit to a horizontal state by a force acting from the lower portion to the upper portion.
- [38] The pressing unit A includes another installation plate A62 which is separated parallel to each other by space members A60a, A60b, and A60c. The link gear A61 which is fixed to the lower end of one of the pivot links A46 and A48 is engaged with the motor gear A63 between the installation plates A44 and A46. The motor gear A63 is installed on an output shaft of the drive motor A64. In FIG. 5, reference numerals A70a, A70b, and A70c denote bolt members coupled to nut members A72a, A72b, and A72c by inserting screw end portions thereof in the space members A60a, A60b, and A60c.
- [39] The detection unit 128 of FIG. 4 is installed above the upper door 126 and may be a far infrared sensor for emitting a far infrared ray in a forward downward direction and left and right directions. The upper door drive unit 130, as shown in FIGS. 8 and 9, is hinge-coupled to a hinge shaft coupled to an upper end of the upper door 126 (the reference numeral of the hinge shaft is omitted herein). In this state, a bracket 132a is installed on an inner wall of the outer case 124 at a corresponding portion.
- [40] The upper door drive unit 130 includes a power generation unit 134 installed on a vertical partition wall 132b provided in the bracket 132a and a gear train consisting of a drive gear 136a installed on a rotation shaft of the power generation unit 134 that penetrates the vertical partition wall 132b and a driven gear 136b engaged with the drive gear 136a. Also, the upper door drive unit 130 includes a clutch 138 having an input shaft coaxially coupled to the rotation shaft of the driven gear 136b and an output shaft, as the hinge shaft, coupled to the upper end portion of the upper door 126 to be capable of transferring power. That is, the upper door drive unit 130 has the gear train provided between the clutch 138 and the power generation unit 134 so that rotational power transferred from the power generation unit 134 to the input shaft of the clutch 138 can be decelerated.
- [41] In FIG. 8, reference numeral 136c denotes a cover for covering the bracket 132a and a portion connected thereto. The waste basket with an automatic opening and closing door, as shown in FIG. 4, further includes a battery B connected to a power in parallel and a solar cell S electrically connected to the battery B.
- [42] In the operation of the waste basket with an automatic opening and closing door configured as above, when the detection sensor detects whether there is an object approaching to put waste, information obtained from the detection is input to the control

unit 140. The control unit 140 controls the operation of the upper door drive unit 130 according to a calculation value so that the upper door 126 is automatically open and closed.

- [43] The amount of waste filling the inner case 120 is frequently checked and warning sound and light can be generated according to a degree of filling. In particular, the waste filling the inner case 120 can be compressed by the pressing unit A. in addition, sterilization by ozone is performed and the upper door 126 can be firmly closed. The opening and closing of the upper door 126 is controlled according to the level of the waste filling the inner case 120. Also, the inner case 120 can be detached out of the outer case 124. The internal state of the waste basket or the opening and closing state of the upper door 126 is indicated by the warning lamp unit L or the speaker P. Electric energy generated by the solar cell S using sunlight can be used. In particular, when the supply of current is cut off due to the power-off, the clutch 138 is in an idle state so that the upper door 126 for putting the waste in can be easily open and closed with hands.

Industrial Applicability

- [44] As described above, the waste basket with an automatic opening and closing door according to the present invention has the following effects.
- [45] First, since a user does not need to directly open the door of the waste basket using hands, infection of germs or viruses due to contamination by waste so that sanitary use of the waste basket is possible.
- [46] Second, since the level detection sensor detecting the amount of waste filling a waste container in the waste basket is attached, when the waste reaches a pre-determined level, the level detection sensor automatically detects the filling of the waste and prevents the door of the waste basket from being open. Thus, making the surrounding of the waste basket messy as the waste overflows due to the excessive putting of the waste can be prevented.
- [47] Third, when the user cannot use hands to put a heavy or big waste, he/she inconveniently needs to put the waste on the ground, opens the door, puts the waste in the waste basket, and closes the door. However, according to the present invention, since the user does not need to use hands to put the waste, such inconvenience is solved so that convenience of the user is maximized.
- [48] Fourth, since the case of the waste basket and the waste container can be separated, when the waste is put in a waste bag, the waste container can be easily separated from the case of the waste basket to be disposed.
- [49] Fifth, since an LED or indication lamp is installed on the outer surface of the waste basket, the opening and closing of the waste basket can be easily noticed. In particular,

the opening and closing of the waste basket can be easily noticed at night so that the convenience in use is enhanced.

[50] Sixth, the solar cell for charging the battery which supplies power to automatically open and close the door of the waste basket is adopted. Thus, the contamination of environment is reduced by using the above clean energy and natural resources can be economized.

[51] In addition, when the supply of current is cut off, the clutch is in an idle state so that the door for putting the waste in can be easily open and closed with hands. Thus, sudden door closing when the power is off can be prevented. Furthermore, a possibility of damaging other parts due to the forcible opening and closing of the door can be removed.

[52] While this invention has been particularly shown and described with reference to preferred 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.

[53]

[54]

Claims

- [1] A waste basket with an automatic opening and closing door comprising:
 an outer case having upper and lower doors for opening and closing upper and lower inner portions;
 an inner case included in the lower inner portion of the outer case;
 a detection unit detecting an approaching object;
 an upper door drive unit driving the upper door to open and close in response to a signal input from the detection unit; and
 a control unit controlling the driving of the upper door drive unit in response to the signal input from the detection unit.
- [2] The waste basket of claim 1, further comprising:
 a photo interrupter detecting whether the upper door is open or closed; and
 an ozone generation unit generating ozone only when the upper door is closed in response to a detection signal from the photo interrupter.
- [3] The waste basket of claim 1, further comprising:
 a level sensor detecting a level of waste filling the inner case; and
 □
 a warning lamp unit lighting a warning lamp and a speaker outputting a guide voice when the inner case is filled with waste in response to a detection signal of the level sensor.
- [4] The waste basket of claim 1, further comprising a pressing unit pressing and compressing waste filling the inner case.
- [5] The waste basket of claim 4, wherein the pressing unit comprises:
 an installatio
 □
 n plate bent to substantially have a shape of "
 □
 " and fixed to an inner wall of the outer case to have two surface bodies facing each other;
 a pair of pivot link, each having one end hinge-coupled to two surfaces of the installation plate facing each other;
 an elevation link moving up and down by being hinge-coupled to the other end of each of the pivot links;
 a cross fingers fixed to a lower end of the elevation link; and
 a drive motor pivoting the pivot link.
- [6] The waste basket of claim 5, wherein a folding member which pivots with a limit to a horizontal state by a force acting from a lower portion to an upper portion is

- hinge-coupled to an end portion of each of the cross fingers.
- [7] The waste basket of claims 6, wherein the detection unit is a far infrared sensor installed above the upper door and emitting a far infrared ray in a forward downward direction and left and right directions.
- [8] The waste basket of claims 6, wherein the upper door drive unit comprises: a bracket installed on an inner wall of the outer case, to which a hinge shaft coupled to an upper end of the upper door is hinge coupled; a power generation unit fixed to the bracket and generating power; and a clutch sporadically transferring power generated from the power generation unit to the hinge shaft.
- [9] The waste basket of claim 8, further comprising a gear train provided between the power generation unit and the clutch and decelerating to allow the hinge shaft to rotate at a predetermined rotation speed.

AMENDED CLAIMS

Received by the International Bureau on 01 November 2005 (01.11.05).

Claims 1 amended. Claims 2 deleted. Other claims are unchanged.

(2 pages)

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Statement

What is claimed is:

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1. A waste basket with an automatic opening and closing door comprising:

an outer case having upper and lower doors for opening and closing upper and lower inner portions;

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an inner case included in the lower inner portion of the outer case;

a detection unit detecting an approaching object;

an upper door drive unit driving the upper door to open and close in response to a signal input from the detection unit;

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a control unit controlling the driving of the upper door drive unit in response to the signal input from the detection unit;

a photo interrupter detecting whether the upper door is open or closed; and

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an ozone generation unit generating ozone only when the upper door is closed in response to a detection signal from the photo interrupter.

3. The waste basket of claim 1, further comprising:

a level sensor detecting a level of waste filling the inner case;

25 and

a warning lamp unit lighting a warning lamp and a speaker outputting a guide voice when the inner case is filled with waste in response to a detection signal of the level sensor.

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4. The waste basket of claim 1, further comprising a pressing unit pressing and compressing waste filling the inner case.

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5. The waste basket of claim 4, wherein the pressing unit comprises:

an installation plate bent to substantially have a shape of "U" and fixed to an inner wall of the outer case to have two surface bodies facing each other;

a pair of pivot link, each having one end hinge-coupled to two surfaces of the installation plate facing each other;

an elevation link moving up and down by being hinge-coupled to the other end of each of the pivot links;

a cross fingers fixed to a lower end of the elevation link; and
a drive motor pivoting the pivot link.

6. The waste basket of claim 5, wherein a folding member which pivots with a limit to a horizontal state by a force acting from a lower portion to an upper portion is hinge-coupled to an end portion of each of the cross fingers.

7. The waste basket of claims 6, wherein the detection unit is a far infrared sensor installed above the upper door and emitting a far infrared ray in a forward downward direction and left and right directions.

8. The waste basket of claims 6, wherein the upper door drive unit comprises:

a bracket installed on an inner wall of the outer case, to which a hinge shaft coupled to an upper end of the upper door is hinge coupled;

a power generation unit fixed to the bracket and generating power;
and

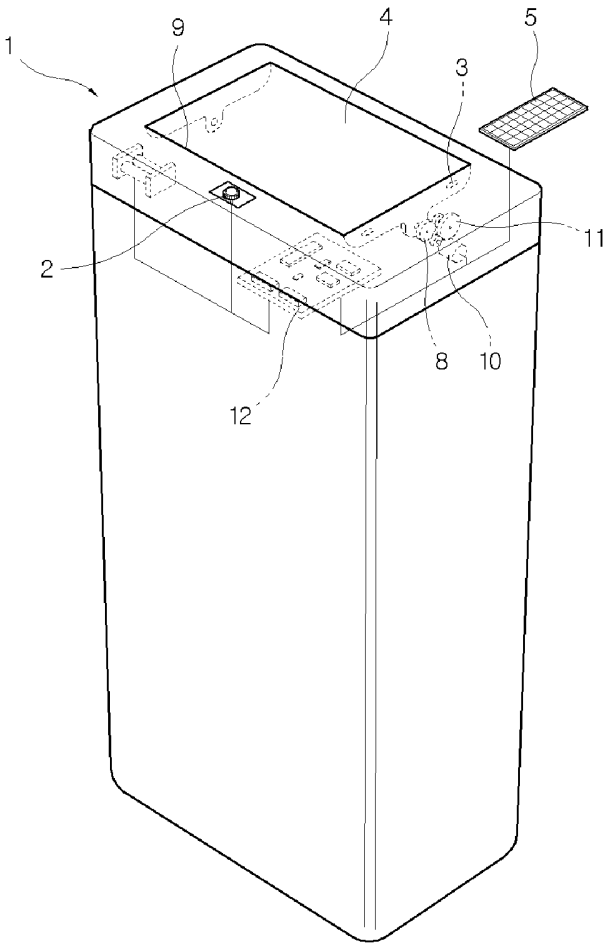
a clutch sporadically transferring power generated from the power generation unit to the hinge shaft.

9. The waste basket of claim 8, further comprising a gear train provided between the power generation unit and the clutch and decelerating to allow the hinge shaft to rotate at a predetermined rotation speed.

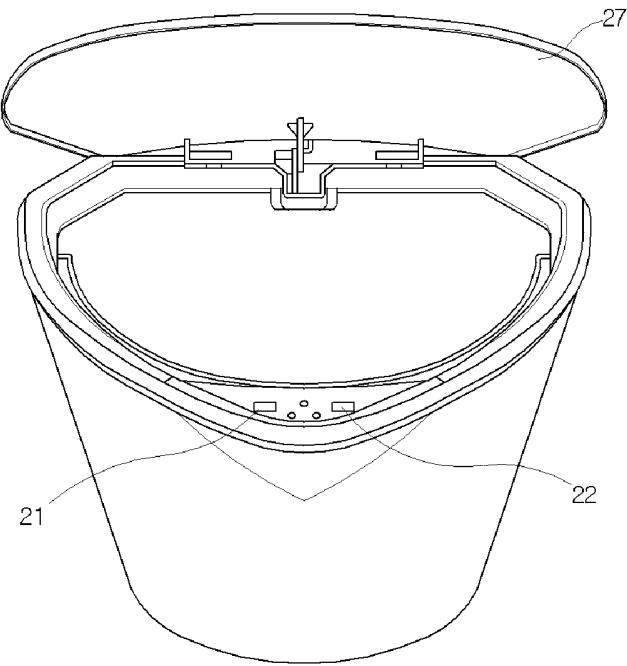
Statement under Article 19

In the amendment, the original claim 1 of PCT International Patent Application No. PCT/KR2005/001706 has been amended into claim 1 by adding the features of the original claim 2 to the original claim 1. Accordingly, the original claim 2 has been deleted and the amended claim 1 is supported by the original claims 1 and 2.

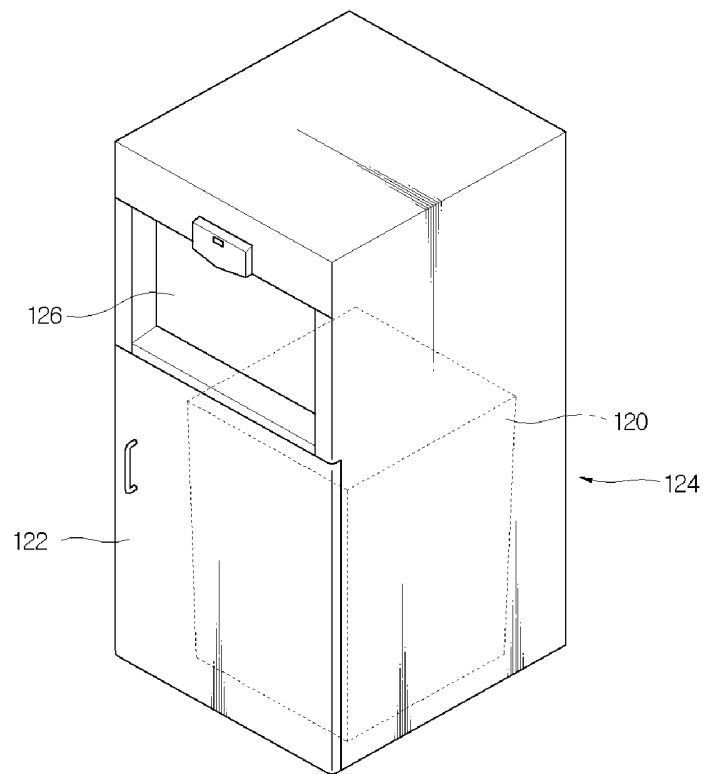
[Fig. 1]



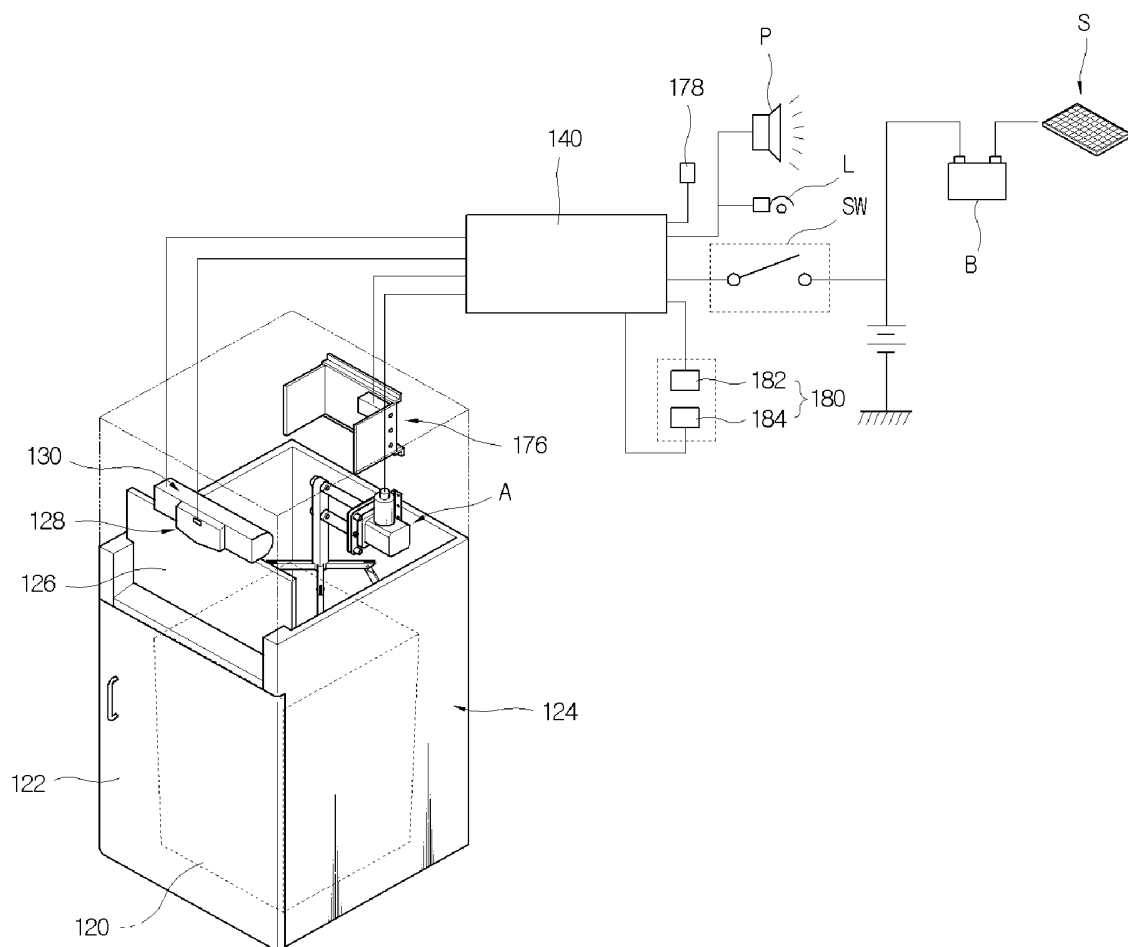
[Fig. 2]



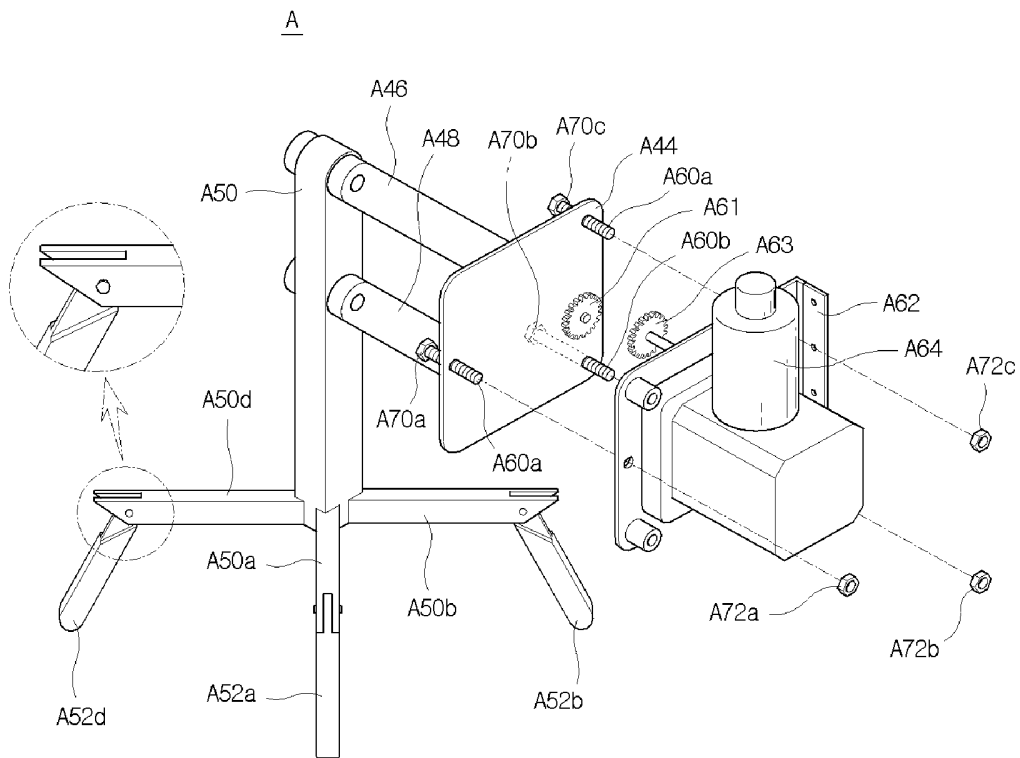
[Fig. 3]



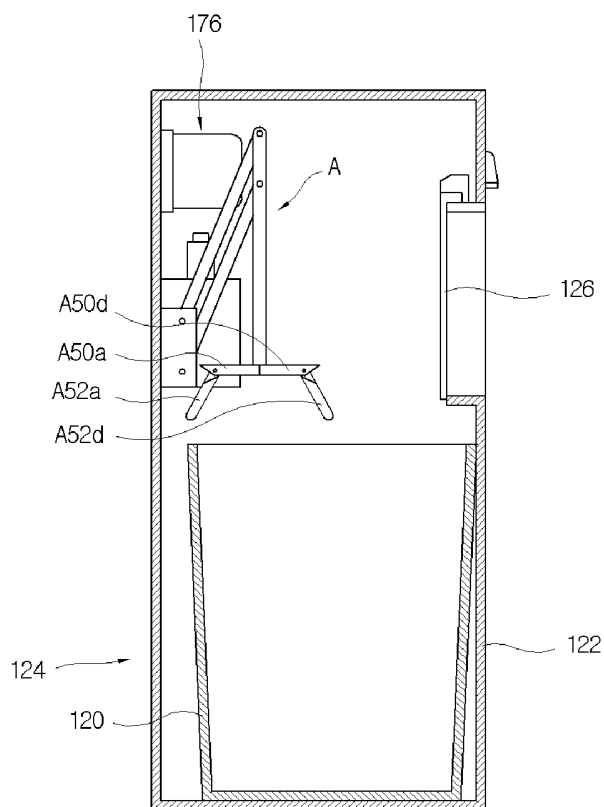
[Fig. 4]



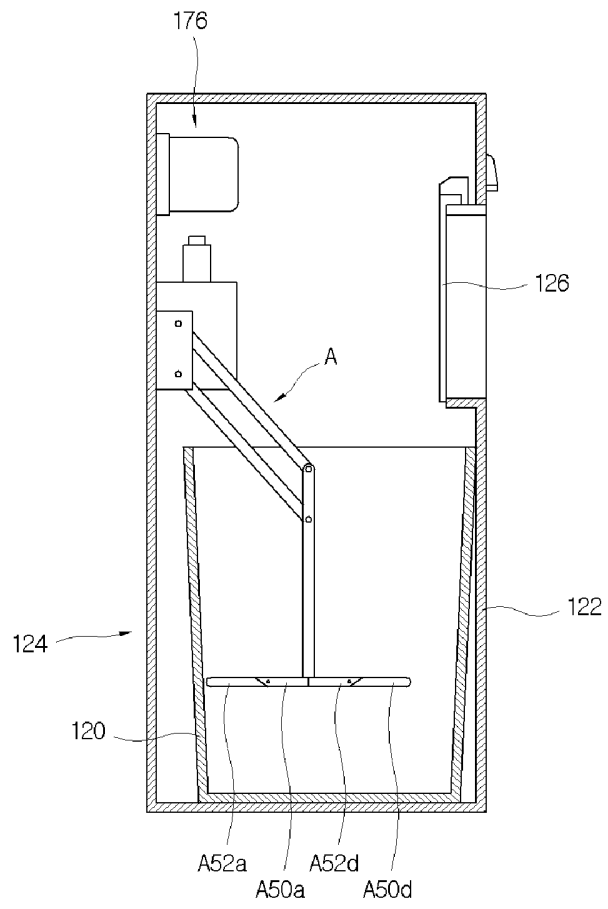
[Fig. 5]



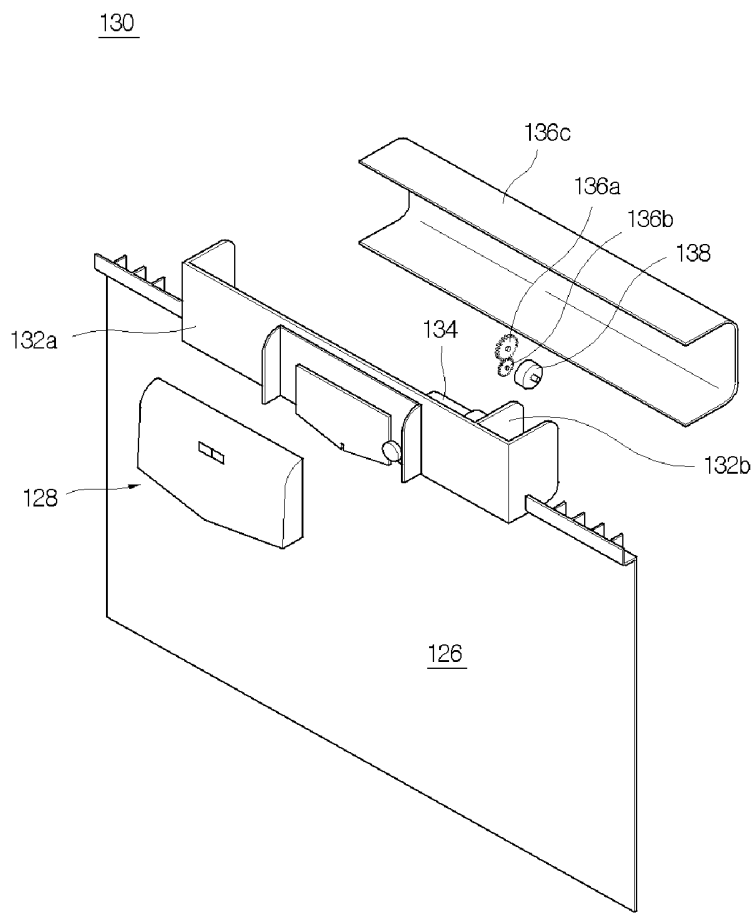
[Fig. 6]



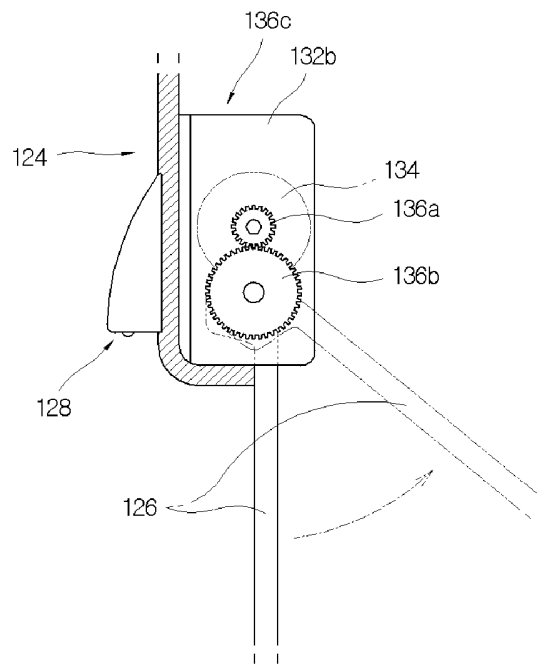
[Fig. 7]



[Fig. 8]



[Fig. 9]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/001706

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65F 1/16

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)

IPC7 B65F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KR, JP : IPC as above

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

KIPO NPS system : "door", "detection"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,150,939 A (LIN) 21 NOVEMBER 2000. (abstract, Fig. 2-9)	1, 3
A	US2002-0056377 A1 (GAWLEY et al.) 16 MAY 2002 (abstract, Fig. 1,4)	1-9
A	US2004-174268 A1 (BRYAN SCOTT et al.) 09 SEPTEMBER 2004 (abstract, Fig.1-10)	1-9

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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