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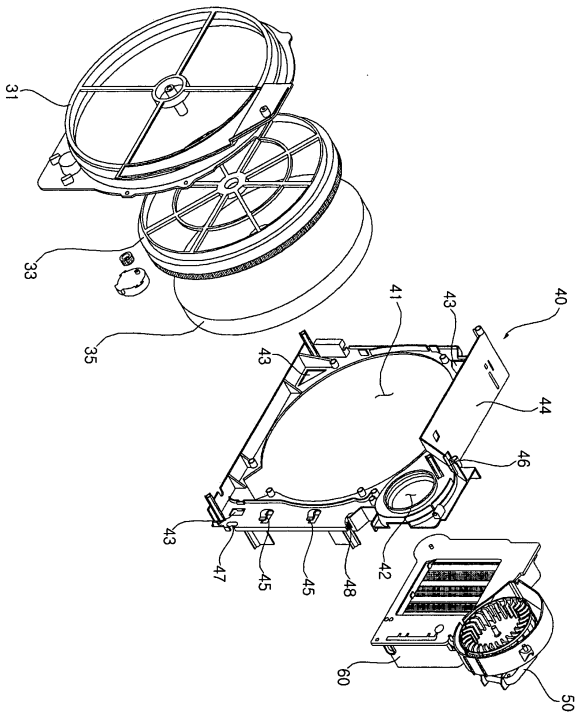
(54) **Dehumidifier**

(57) The present invention relates to a dehumidifier. The dehumidifier includes a main body, comprising a dehumidification duct in which indoor air is sucked in and the sucked-in indoor air is dehumidified and a reconditioning duct in which reconditioning air circulates, a dehumidification rotor configured to dehumidify the sucked-in indoor air and reconditioned by the reconditioning air, a rotor supporter (31) configured to rotatably support the dehumidification rotor, and a rotor frame (40) configured to fix the rotor supporter and to comprise a first aperture unit (41) through which the indoor air and the reconditioning air passing through the dehumidification rotor pass and a second aperture unit (42) through which the reconditioning air passes. Accordingly, the dehumidification rotor can be easily replaced, and elements can be densely placed within the main body.

FIG. 3

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## Description

### Field of the Invention

**[0001]** The present invention relates to a dehumidifier and, more particularly, to an air conditioner including a rotor supporter capable of easily connecting a dehumidification rotor and a rotor frame capable of fixing the rotor supporter and the elements of the dehumidifier.

### Background of the Invention

**[0002]** In general, dehumidifiers can be classified according to their operation method as dehumidifiers using a cooling cycle and dehumidifiers using a desiccant rotor.

**[0003]** Dehumidifiers using a cooling cycle are problematic in that a compressor must be provided, and the compressor generates noise and occupies space. Accordingly, dehumidifiers using a desiccant rotor are more common nowadays.

**[0004]** The desiccant rotor has the property of absorbing moisture in the air and dehumidifies while transmitting indoor air therethrough. The desiccant which has absorbed the moisture is reconditioned using hot air.

**[0005]** The air that has been used to recondition the desiccant rotor has high temperature and high humidity and is discharged to the outside. Here a problem arises because the dehumidifier must be placed outside a building or, if placed indoors, an additional exhaust duct must be provided.

**[0006]** In the case where the hot, moist air that has reconditioned the desiccant is circulated within the dehumidifier, there is no need to provide the additional exhaust duct. There is another advantage in that the dehumidifier may be placed at a position desired by a user.

**[0007]** In order to circulate the hot, moist air, the moisture needs to be removed.

Accordingly, a condensing heat exchanger for removing the moisture from the hot, moist air is generally provided in a space between an indoor air intake port and the desiccant rotor. That is, the humidity is lowered based on the principle that moisture within the hot, moist air is condensed through heat exchange between the hot, moist air and normal-temperature air.

**[0008]** Meanwhile, the desiccant is partitioned into a dehumidification area into which moisture is absorbed while indoor air passes through the dehumidification area and a reconditioning area from which moisture is evaporated while reconditioning air passes through the reconditioning area. The respective areas are alternately changed when the desiccant is rotated, so moisture is absorbed and evaporated. Accordingly, there is a need for a structure capable of rotatably supporting the desiccant within the main body.

### Summary of the Invention

**[0009]** It would therefore be desirable to provide a dehumidifier in which a rotor supporter and a rotor frame are placed within a main body, thereby rotatably supporting a desiccant and also making easy to replace the desiccant.

**[0010]** It would also be desirable to provide a dehumidifier in which elements within the main body can be densely arranged by fixing the elements within the main body to the rotor frame to which the rotor supporter is fixed.

**[0011]** It would also be desirable to provide a dehumidifier in which bypass holes are formed in the rotor frame, thereby being capable of improving the flow of indoor air introduced into the main body and improving the dehumidification performance of the dehumidifier.

**[0012]** A dehumidifier according to an exemplary embodiment of the present invention includes a main body, comprising a dehumidification duct in which indoor air is sucked in and the sucked-in indoor air is dehumidified and a reconditioning duct in which reconditioning air circulates, a dehumidification rotor configured to dehumidify the sucked-in indoor air and reconditioned by the reconditioning air, a rotor supporter configured to rotatably support the dehumidification rotor, and a rotor frame configured to fix the rotor supporter and to comprise a first aperture unit through which the indoor air and the reconditioning air passing through the dehumidification rotor pass and a second aperture unit through which the reconditioning air passes.

**[0013]** Bypass holes through which indoor air that has not passed through the dehumidification rotor is bypassed may be formed in the rotor frame. The example dehumidifier may further include a control box for accommodating a control unit for controlling the dehumidifier. A control box fixing unit on which the control box is mounted may be placed over the rotor frame.

**[0014]** The dehumidifier may further include a power code having one end connected to the control box and the other end connected to an outside through a rear face of the main body. Fixing units for fixing the power code to the rotor frame may be formed in the rotor frame. A power code groove for connecting the power code to the control box may be further formed in the control box fixing unit.

**[0015]** The example dehumidifier may further include a reconditioning air heating member coupled to a rear face of the first aperture unit and configured to heat the reconditioning air passed through the first aperture unit, and a reconditioning fan coupled to a rear face of the second aperture unit and configured to suck in the reconditioning air passed through the second aperture unit. The dehumidifier may further include a condensing heat exchanger placed in front of the dehumidification rotor and configured to condense the reconditioning air that has reconditioned the dehumidification rotor and to include a discharge unit for discharging the reconditioning air after the condensation to an outside being formed in the condensing heat exchanger.

**[0016]** The discharge unit may communicate with the

second aperture unit. The dehumidifier may further include an exhaust duct through which the discharge unit and the second aperture unit communicate with each other. The discharge unit may be formed on a lower side of the condensing heat exchanger, and the second aperture unit is formed on an upper side of the rotor supporter.

**[0017]** The dehumidifier discussed above has the following advantages.

**[0018]** First, a user can replace the desiccant by detaching the rotor supporter from the rotor frame. Accordingly, a user can easily replace the desiccant.

**[0019]** Second, a variety of elements within the main body are connected to the rotor frame. Accordingly, an additional member for fixing the elements within the main body at proper positions is not required, and the elements within the main body can be densely placed.

**[0020]** Third, the bypass holes are formed in the rotor frame, thereby making smooth the flow of indoor air circulating within the main body. Accordingly, the dehumidification performance can be improved, and noise generated by the flow of indoor air can be reduced.

**[0021]** Fourth, various electric wires and a power code formed within the main body can be fixed to the rotor frame. Accordingly, the electric wires and the power code can be protected from moisture within the main body, and the electric wires within the main body can be arranged densely.

## Brief Description of the Drawings

**[0022]** The above and other objects, features and advantages of the present invention will become more apparent from the following description of some exemplary embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of a dehumidifier according to an exemplary embodiment of the present invention;

Fig. 2 is an exploded perspective view showing major elements of the dehumidifier shown in Fig. 1;

Fig. 3 is an exploded perspective view of a dehumidification rotor, a rotor supporter, a rotor frame, a reconditioning fan, and a reconditioning air heating member according to the present exemplary embodiment; and

Fig. 4 is a front view of the rotor frame according to the present exemplary embodiment.

## Detailed Description of Exemplary Embodiments

**[0023]** Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings so that they can be readily implemented by those skilled in the art. In describing the exemplary embodiments of the present invention, the same reference numbers are used throughout the drawings to refer to the same parts, and redundant descriptions thereof are omitted.

**[0024]** Fig. 1 is a perspective view of a dehumidifier according to an exemplary embodiment of the present invention, and Fig. 2 is an exploded perspective view showing major elements of the dehumidifier shown in Fig. 1.

**[0025]** The overall structure of the dehumidifier according to the exemplary embodiment of the present invention will be described with reference to Figs. 1 and 2.

**[0026]** The dehumidifier according to the exemplary embodiment of the present invention is configured to suck in indoor air, adsorb moisture from the indoor air, and discharge the dehumidified indoor air. To this end, a main body 1 includes air intake units for sucking in air and an air discharge unit for dehumidifying and discharging the sucked-in indoor air. In the present exemplary embodiment, the air intake units are placed on the left and right sides of the main body 1 and over the air discharge unit.

**[0027]** A front panel 2, the front surface of a bucket 10, left and right panels 4 and 5, an upper panel 3, a base 8, an upper rear panel 7, and a lower rear panel 6 constitute the external appearance of the main body.

**[0028]** The front panel 2 forms the external appearance of the upper front portion of the main body. A groove on which a filter can be slidingly mounted is formed in the rear surface of the front panel 2. The filter for purifying the indoor air passed through the air intake units is also placed in the front panel 2.

**[0029]** The left and right panels 4 and 5 form the side faces of the main body and include handles for enabling a user to manually move the dehumidifier. A hole is formed at a position where the bucket 10 to be described later is placed, which belongs to the bottom of the side panels 4 and 5, so that an additional horse for discharging water, accommodated in the bucket 10, to the outside can be coupled to the hole.

**[0030]** The upper panel 3 forms the upper part of the main body. An air discharge unit, and a display unit and a manipulation unit for enabling a user to check the operation state of the dehumidifier and to input the operation of the dehumidifier are placed in the upper panel 3.

**[0031]** The rear panels 6 and 7 form the rear part of the main body. In particular, the lower rear panel 6 is detachably coupled to the main body. A power code fixing unit (not shown) for fixing a power code, supplying electric power to the main body, is placed within the lower rear panel 6.

**[0032]** The base 8 forms the bottom of the main body. A wheel assembly is placed within the base 8. The wheel assembly includes a wheel for helping the movement of the dehumidifier and a wheel support to which the wheel is rotatably coupled. The top surface of the base 8 is open, and a drain fan 20 is placed on the top surface of the base 8. The bucket 10 is slidingly and detachably coupled to the base 8.

**[0033]** A condensing heat exchanger 100, a rotor frame 40, a ventilator 9, and so on are placed over the

drain fan 20. One or more holes through which condensed water, condensed in the condensing heat exchanger 100 and discharged therefrom, is discharged to the bucket 10 under the drain fan 20 are formed in the drain fan 20.

**[0034]** The bucket 10 forms a space for collecting the condensed water introduced via the drain fan 20. In the case where the bucket 10 is slidingly coupled to the base 8 and condensed water is collected in the bucket 10, a user detaches the bucket 10 from the base 8 and empties it outside.

**[0035]** A ventilator 9, a dehumidification rotor 30, a reconditioning fan 50, a reconditioning air heating member 60, and the condensing heat exchanger 100 are placed within the main body.

**[0036]** The ventilator 9 sucks in indoor air through the air intake units and discharges the indoor air to the air discharge unit via the main body. A fan motor and a fan coupled to the rotation shaft of the fan motor are included within the ventilator 9. An outlet grill may be placed in the outlet unit.

**[0037]** The dehumidification rotor 30 functions to adsorb moisture in the indoor air sucked in by the ventilator 9 and to recycle the adsorbed moisture at low temperature. The dehumidification rotor 30 is placed between the ventilator 9 and the condensing heat exchanger 100.

**[0038]** The dehumidification rotor 30 includes a desiccant 35 and a desiccant wheel 33 to which the desiccant 35 is fixed. The desiccant 35 adsorbs moisture within the indoor air while the indoor air passes through the dehumidification rotor 30 and recycles the adsorbed moisture. The desiccant wheel 33 surrounds the circumference of the desiccant 35.

**[0039]** The desiccant 35 is generally configured to have a circular plate and is surrounded by the desiccant wheel 33. A fixing hole for fixing the desiccant 35 to the center of the dehumidification rotor 30 is formed in the desiccant 35.

**[0040]** The desiccant 35 may have a variety of shapes and materials. The desiccant 35 according to the present exemplary embodiment may have a shape in which paperboard and corrugated paper, made of ceramics fiber, are alternately wound up in a cylindrical shape. The desiccant 35 may also be made of meso-silica ($SiO_2$), such as nano-carbon balls (NCBs). NCBs have excellent hygroscopic properties owing to well-developed pores and surface area, and are capable of being reconditioned at a low temperature of about 60°C or less.

**[0041]** NCBs have a spherical carbon structure 200nm to 500nm in diameter that includes a spherical hollow core unit and a mesoporous carbon cell unit. NCBs include fine pores each having a diameter of 2nm to 50nm. The pores of typical activated carbon have a wide surface area (BET), a wide mesoporous area, and do not clog.

**[0042]** The desiccant 35 is partitioned into an area into which moisture within indoor air is absorbed while the indoor air passes through the desiccant 35 (hereinafter referred to as a 'dehumidification area'), and an area from which moisture evaporates into reconditioning air while the reconditioning air passes through the desiccant 35 (hereinafter referred to as a 'reconditioning area'). The respective areas alternate by rotation of the desiccant 35 so that moisture is absorbed and evaporated. The reconditioning area generally has a fan shape.

**[0043]** The desiccant wheel 33 includes an edge unit configured to have a ring shape and to surround the circumference of the desiccant 35, a fixing unit configured to fix the desiccant 35, and a connection unit configured to connect the edge unit and the fixing unit and radially formed between the edge unit and the fixing unit.

**[0044]** Fig. 3 is an exploded perspective view of the dehumidification rotor, a rotor supporter, the rotor frame, the reconditioning fan, and the reconditioning air heating member according to the present exemplary embodiment, and Fig. 4 is a front view of the rotor frame according to the present exemplary embodiment.

**[0045]** Referring to Figs. 3 and 4, the rotor supporter 31 for rotatably supporting the dehumidification rotor 30 and the rotor frame 40 on which the rotor supporter 31 is mounted are placed within the main body.

**[0046]** A reconditioning air distribution member 90 to be described later is coupled to the front surface of the rotor supporter 31. The rear surface of the reconditioning air distribution member 90 is opened. An intake unit through which reconditioning air is such in into the reconditioning air distribution member 90 is formed in the rear surface of the reconditioning air distribution member 90 while the rear surface of the reconditioning air distribution member 90 is coupled to the rotor supporter 31.

**[0047]** The rotor frame 40 functions as a kind of barrier for partitioning the inside of the main body into a rear-side space where the ventilator 20 is placed and a front-side space where the condensing heat exchanger 100 is placed.

**[0048]** A first aperture unit 41 through which indoor air and reconditioning air passed through the dehumidification rotor 30 pass and a second aperture unit 42 through which reconditioning air passes are formed in the rotor frame 40. In more detail, the indoor air passed through the first aperture unit 41 passes through the dehumidification area of the desiccant 35 and then passes through the first aperture unit 41. The reconditioning air passed through the first aperture unit 41 passes through the reconditioning air heating member 60 to be described later and then sequentially passes through the first aperture unit 41 and the reconditioning area of the desiccant 35. The reconditioning air passed through the exhaust duct 80 passes through the second aperture unit 42 and then enters the reconditioning fan 50.

**[0049]** Bypass holes 43 are perforated in the rotor frame 40. Accordingly, a part of indoor air that has condensed reconditioning air, while passing through the condensing heat exchanger 100, does not pass through the dehumidification rotor 30, but passes through the bypass holes 43. Accordingly, the amount of indoor air, which is greater than the amount of indoor air that can be dehu-

midified by the dehumidification rotor 30, can be sucked in and used to condense the reconditioning air within the condensing heat exchanger 100, thereby increasing condensing efficiency. Further, a part of the indoor air passed through the condensing heat exchanger 100 is bypassed through the bypass holes 43, thereby being capable of making smooth the flow of the indoor air and reducing noise generated by the flow of the indoor air.

**[0050]** A control box fixing unit 44 on which a control box 22 for controlling the dehumidifier is mounted is formed at the top of the rotor frame 40. Since the control box 22 is placed over the rotor frame 40, electronic components within the control box 22 can be protected from moisture within the main body 1. The control box 22 for controlling the dehumidifier is placed over the rotor frame 40, so that the manipulation unit and the display unit placed in the upper panel 3 can be easily connected to the control box 22.

**[0051]** The second aperture unit 42 is preferably formed on the upper portion of the rotor frame 40, as will be described later. Accordingly, in the case where the second aperture unit 42 is formed in part of the upper portion of the rotor frame 40 and the control box 22 is placed in the remaining portions of the rotor frame 40, space within the main body 1 can be efficiently used.

**[0052]** Meanwhile, the dehumidifier is equipped with a power code (not shown) for transferring external power source. The power code connects the control box 22 to power source outside the main body 1. The power code is generally connected to external power source through the rear side of the main body 1 owing to a feeling of beauty.

**[0053]** In the present exemplary embodiment, the control box 22 is placed over the rotor frame 40, and fixing units 45 for fixing the power code to the rotor frame 40 are formed in the rotor frame 40. Each of the fixing units 45 has a clip shape and closely adheres and fixes the power code to the rotor frame 40. In the present exemplary embodiment, the fixing units 45 are formed on the front surface of the rotor frame 40.

**[0054]** A groove 47 is formed on one side of the lower portion of the rotor frame 40.

The groove 47 leads the power code connected to the rear side of the main body 1 so that the power code can be fixed to the fixing units 45 formed on the front surface of the rotor frame 40. Accordingly, when the elements are assembled in the dehumidifier, the power code can be easily led from the rear side of the main body 1 to the front surface of the rotor frame 40 and can be then fixed to the fixing units 45.

**[0055]** The control box 22 is placed over the control box fixing unit 44. Thus, in order to connect the power code, fixed to the fixing units 45, to the control box 22, a power code groove 46 is also formed in the control box fixing unit 44. Consequently, the power code is connected to external power source through the rear side of the main body 1 via the control box 22, the power code groove 46, the fixing units 45, and the groove 47. Accordingly, the elements do not interfere with one another because the power code is effectively installed within the main body.

**[0056]** An electric wire groove 48 is further formed in the rotor frame 40. An electric wire connecting the ventilator 9 and the reconditioning fan 50, placed on the rear side of the control box 22 and the rotor frame 40, passes through the electric wire groove 48. Accordingly, the electric wire connecting the ventilator 9 and the reconditioning fan 50 does not interfere with other elements.

**[0057]** The reconditioning fan 50 is coupled to the rear face of the second aperture unit 42. The reconditioning fan 50 assigns circulation power to reconditioning air so that the reconditioning air can flow through the main body while circulating through the main body. That is, the reconditioning fan 50 sucks in the air passed through the second aperture unit 42 and discharges the sucked-in air to the reconditioning air heating member 60.

**[0058]** The reconditioning air heating member 60 is coupled to the rear face of an area through which the reconditioning air of the first aperture unit 41 passes. The reconditioning air heating member 60 heats the reconditioning air discharged from the reconditioning fan 90 and supplies the reconditioning air of a high temperature to the dehumidification rotor 30. The reconditioning air heating member 60 includes heaters 63, a first heater cover 65, and a second heater cover 61. The first heater cover 65 covers the heaters 63 and communicates with the reconditioning fan 50. The second heater cover 61 is placed between the first heater cover 65 and the dehumidification rotor 30 and is coupled to the first heater cover 65.

**[0059]** The second heater cover 61 functions as a kind of air guide for preventing the air, heated by the heaters 63, from leaking to the surroundings between the heaters 63 and the dehumidification rotor 30 so that the heated air moves toward the dehumidification rotor 30. In other words, reconditioning air heated by the reconditioning air heating member 60 passes through the first aperture unit 41 of the rotor frame 40 and then enters the reconditioning area of the desiccant 35.

**[0060]** As described above, the rotor frame 40 functions to fix the rotor supporter 31, the control box 22, the reconditioning air heating member 60, and the reconditioning fan 50. Accordingly, the elements can be compactly fixed within the main body 1.

**[0061]** The reconditioning air heated while passing through the reconditioning heater 60 sequentially passes through the first aperture unit 41 and the reconditioning area of the desiccant 35 and then enters the reconditioning air distribution member 90.

**[0062]** The reconditioning air distribution member 90 is placed between the condensing heat exchanger 100 and the reconditioning area of the desiccant 35. Accordingly, the reconditioning air discharged from the reconditioning area of the desiccant 35 enters the reconditioning air distribution member 90. The reconditioning air distribution member 90 distributes the reconditioning air and

supplies the distributed reconditioning air to the condensing heat exchanger 100. In other words, the reconditioning air distribution member 90 functions to distribute the reconditioning air, which has passed through the reconditioning area of the desiccant 35, into a plurality of heat exchange plates to be described later.

**[0063]** The condensing heat exchanger 100 performs heat exchange of the reconditioning air, passed through the reconditioning air distribution member 90, with indoor air. In other words, the condensing heat exchanger 100 condenses the reconditioning air into which moisture has been absorbed, while the reconditioning air passes through the reconditioning area of the dehumidification rotor 30, using the indoor air and discharges the reconditioning air from which moisture has been removed to the reconditioning fan 50 via the exhaust duct 80. Condensing water is introduced into the bucket 10 via the drain fan 20.

**[0064]** In the present exemplary embodiment, the condensing heat exchanger 100 can maximize the area in which reconditioning air and indoor air are subject to heat exchange because it includes a plurality of heat exchange plates. The condensing heat exchanger 100 is placed in front of the dehumidification rotor 30 and is configured to condense reconditioning air that has reconditioned the dehumidification rotor 30. A discharge unit 110 for discharging the reconditioning air after the condensation is further formed in the condensing heat exchanger 100.

**[0065]** The discharge unit 110 is configured to communicate with the second aperture unit 42. The reconditioning air condensed by the condensing heat exchanger 100 is sucked in by the reconditioning fan 50 via the second aperture unit 42 and is then heated by the reconditioning air heating member 60.

**[0066]** Alternatively, the discharge unit 110 may be formed at the bottom of the condensing heat exchanger 100, and the second aperture unit 42 may be formed on the upper portion of the rotor frame 40. In this case, there is an advantage in that moisture, included in reconditioning air, can drop while condensed reconditioning air flows from the bottom to the top.

**[0067]** In the present exemplary embodiment, the dehumidifier further includes the exhaust duct 80 connecting the discharge unit 110, formed on the lower side of the condensing heat exchanger 100, and the second aperture unit 42 formed on the upper side of the rotor frame 40. In other words, the reconditioning air from which moisture has been removed, while passing through the condensing heat exchanger 100, is again sucked in by the reconditioning fan 50 via the exhaust duct 80, formed to communicate with the discharge unit 110, and the second aperture unit 42.

**[0068]** A process of condensing reconditioning air, a process of dehumidifying indoor air, and a process of discharging condensed water and moisture within the main body 1 in the above-constructed dehumidifier according to the present invention are described below.

**[0069]** First, reconditioning air circulates through a reconditioning duct when the reconditioning fan 50 rotates. That is, the reconditioning air passing through the reconditioning fan 50 is heated in the reconditioning air heating member 60 making its temperature rise. The heated reconditioning air is introduced into the dehumidification rotor 30 via the first aperture unit 41 of the rotor frame 40. The hot reconditioning air reconditions the reconditioning area of the desiccant 44. The reconditioning air is then introduced into the condensing heat exchanger 100 via the reconditioning air distribution member 90.

**[0070]** The reconditioning air introduced into the condensing heat exchanger 100 undergoes heat exchange with indoor air while flowing up and down through a plurality of heat exchange plates. During this heat exchange process, moisture within the reconditioning air is condensed. The condensed reconditioning air sequentially passes through the discharge unit 110, the exhaust duct 80, and the second aperture unit 42 of the rotor frame 40 and then enters the reconditioning fan 50 again. That is, the reconditioning air circulates within the main body according to the above cycle.

**[0071]** Meanwhile, the indoor air is sucked through the air intake units of the main body and undergoes heat exchange with the reconditioning air flowing through the reconditioning air duct while passing through an indoor air duct of the condensing heat exchanger 100. The moisture of the indoor air passing through the condensing heat exchanger 100 is absorbed by the desiccant 44 while the indoor air passes through the dehumidification area of the desiccant 44. The dehumidified indoor air is then discharged to the interior of a room through the first aperture unit 41 of the rotor frame 40 and the blower fan 9.

**[0072]** Meanwhile, water condensed in the condensing heat exchanger 100 is collected in the bucket 10 via the drain fan 20. The user detaches the bucket 10 from the base 8 and empties it outside.

**[0073]** While the present invention has been shown and described in connection with the exemplary embodiments thereof, those skilled in the art will appreciate that the present invention may be changed and modified in various ways without departing from the spirit and scope of the present invention as defined in the following claims.

## Claims

**1.** A dehumidifier, comprising:

a main body, comprising a dehumidification duct in which indoor air is sucked in and the sucked-in indoor air is dehumidified and a reconditioning duct in which reconditioning air circulates;

a dehumidification rotor configured to dehumidify the sucked-in indoor air and reconditioned by the reconditioning air;

a rotor supporter configured to rotatably support the dehumidification rotor; and

a rotor frame configured to fix the rotor supporter and to comprise a first aperture unit through which the indoor air and the reconditioning air passing through the dehumidification rotor pass and a second aperture unit through which the reconditioning air passes.

**2.** The dehumidifier of claim 1, wherein bypass holes through which indoor air that has not passed through the dehumidification rotor is bypassed are formed in the rotor frame.

**3.** The dehumidifier of claim 1 or 2, further comprising a control box for accommodating a control unit for controlling the dehumidifier,
wherein a control box fixing unit on which the control box is mounted is placed over the rotor frame.

**4.** The dehumidifier of claim 3, further comprising a power cord having one end connected to the control box and the other end connected to an outside through a rear face of the main body, and
wherein fixing units for fixing the power cord to the rotor frame are formed in the rotor frame.

**5.** The dehumidifier of claim 3, further comprising a power cord having one end connected to the control box and the other end connected to an outside through a rear face of the main body, and
wherein a power cord groove for connecting the power cord to the control box is formed in the control box fixing unit.

**6.** The dehumidifier of any preceding claim, further comprising a reconditioning air heating member coupled to a rear face of the first aperture unit and configured to heat the reconditioning air passed through the first aperture unit.

**7.** The dehumidifier of any preceding claim, further comprising a reconditioning fan coupled to a rear face of the second aperture unit and configured to suck in the reconditioning air passed through the second aperture unit.

**8.** The dehumidifier of any preceding claim, further comprising

a condensing heat exchanger placed in front of the dehumidification rotor and configured to condense the reconditioning air that has reconditioned the dehumidification rotor, a discharge unit for discharging the reconditioning air after the condensation to an outside being formed in the condensing heat exchanger,
wherein the discharge unit communicates with the second aperture unit.

**9.** The dehumidifier of claim 8, further comprising an exhaust duct through which the discharge unit and the second aperture unit communicate with each other,
wherein the discharge unit is formed on a lower side of the condensing heat exchanger, and the second aperture unit is formed on an upper side of the rotor supporter.

**10.** The dehumidifier of claim 8, wherein:

the condensing heat exchanger comprises a plurality of heat exchange plates, and
the dehumidifier further comprises a reconditioning air distribution member placed between the dehumidification rotor and the condensing heat exchanger and configured to distribute and introduce the reconditioning air which has reconditioned the dehumidification rotor into the plurality of heat exchange plates.

FIG. 1

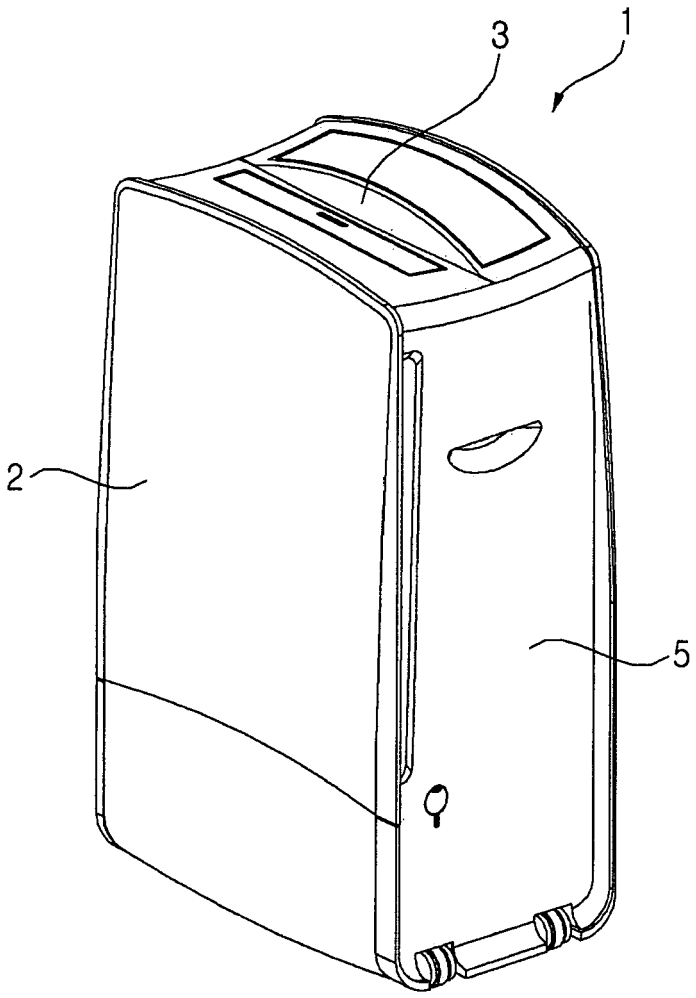


FIG. 2

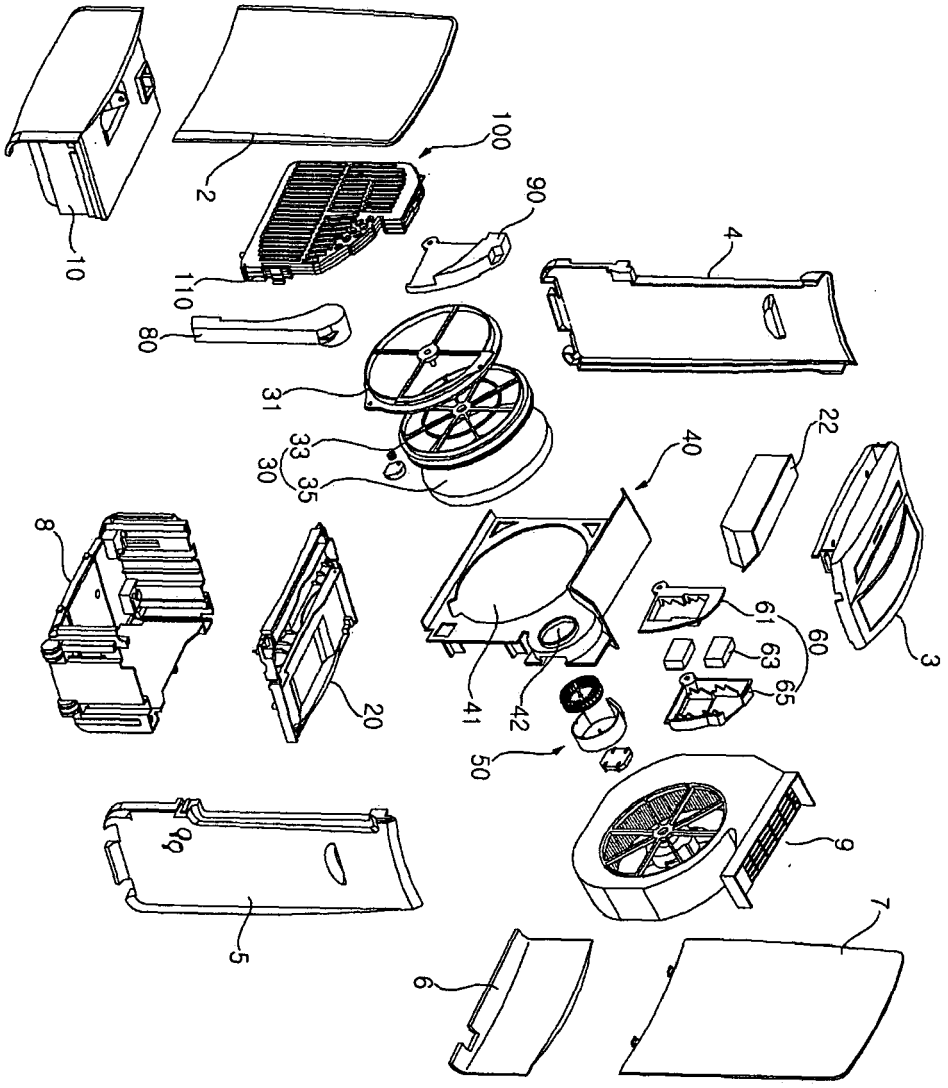


FIG. 3

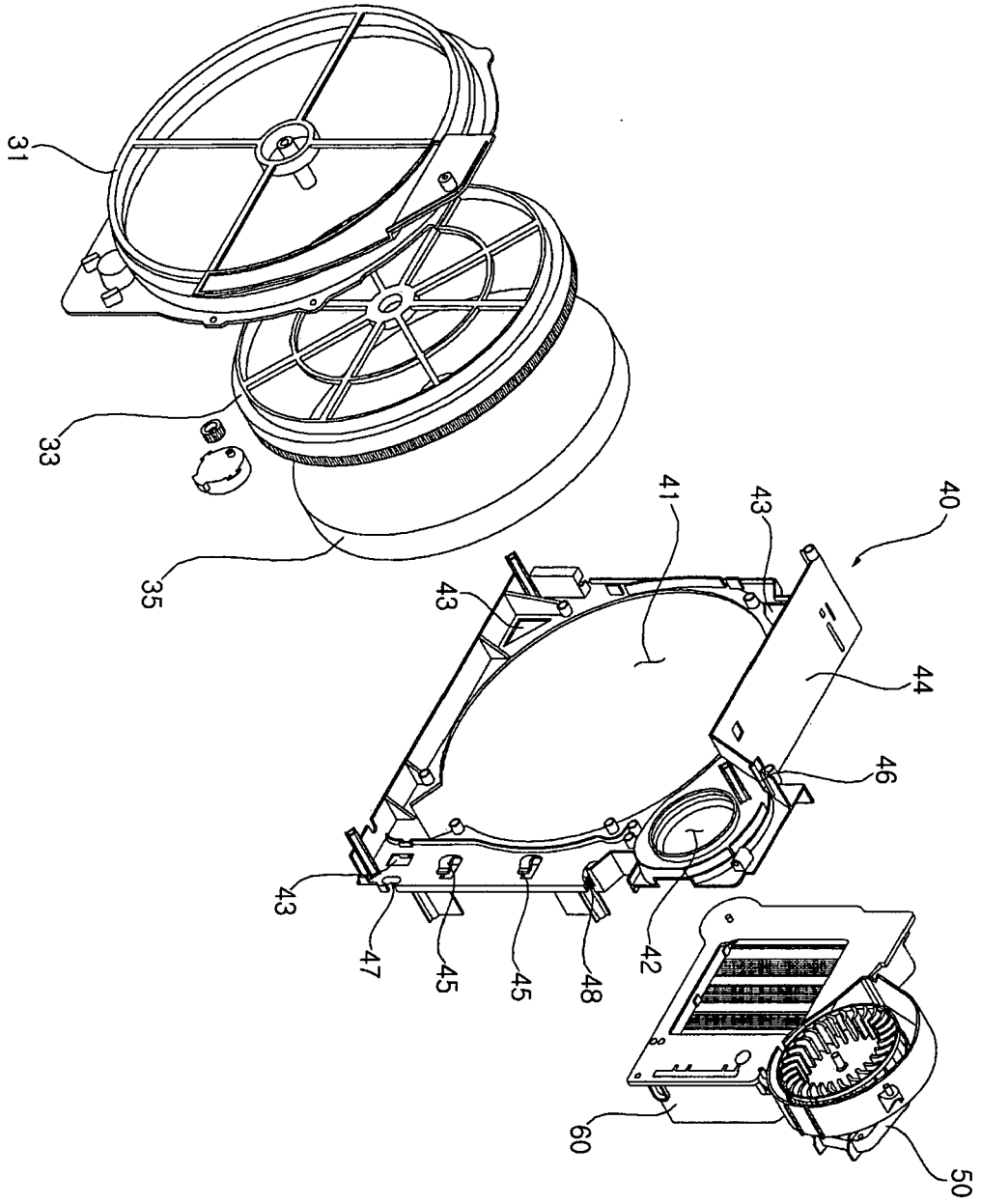
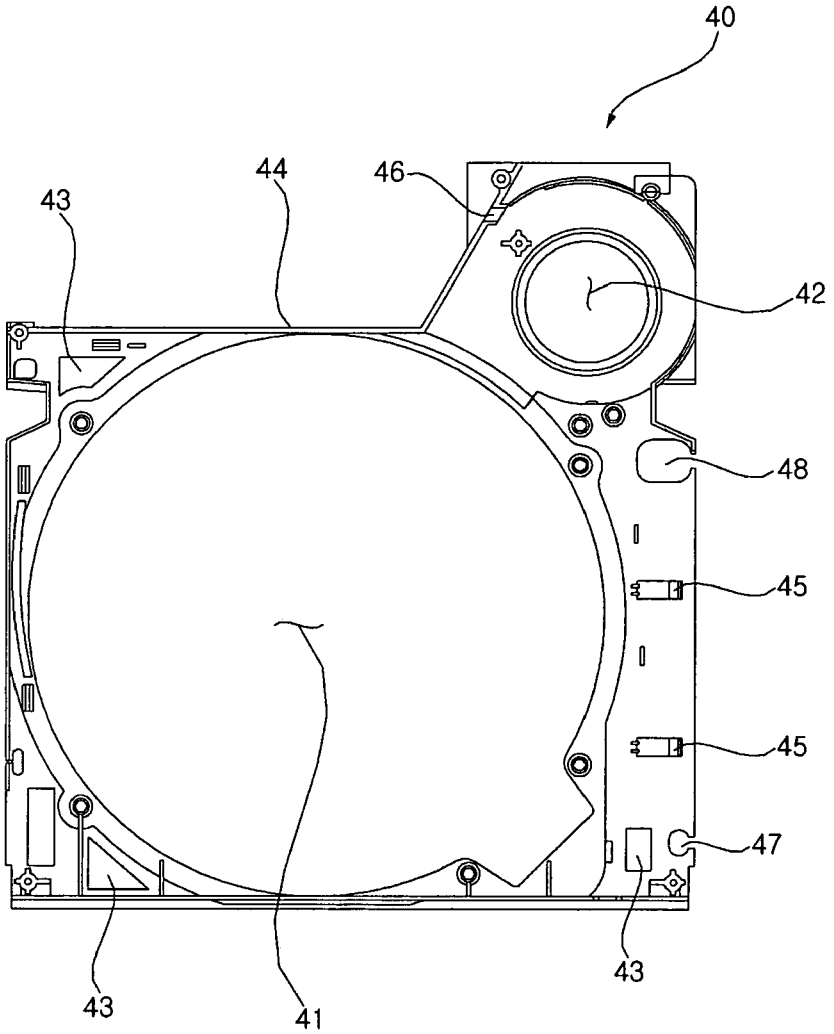


FIG. 4



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# EUROPEAN SEARCH REPORT

Application Number
EP 09 25 0623

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