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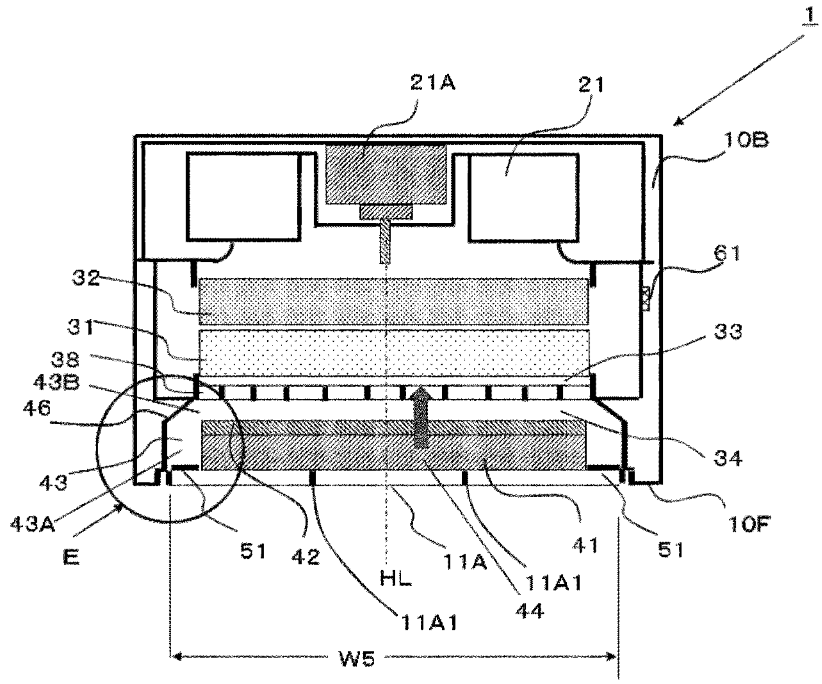

(57) **Abstract:** Provided is an invention (1) with which it is possible to efficiently select between air purity operation and dehumidification operation. This dehumidifier (1) has: a first air passage that is formed inside a housing (3), the first air passage being such that an airflow passes through an air purification means to reach a dehumidification means; a second air passage that is formed inside the housing (3), the second air passage being such that the airflow reaches the dehumidification means without passing through the air purification means; an airflow restriction means (51) for restricting

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the flow of the airflow in the second air passage; a compressor (6) for supplying a refrigerant to the dehumidification means; and a control device (18) for controlling a ventilation means, the airflow restriction means (51), and the compressor (6). The control device (18) controls the airflow restriction means (51) in accordance with environmental information and/or surroundings information.

(57) 要約：空気清浄運転と除湿運転とを効率よく選択できる（１）を提供する。除湿機（１）は、筐体（３）の内部に形成され、気流が空気清浄化手段を通過して除湿手段に至る第一の風路と、筐体（３）の内部に形成され、気流が空気清浄化手段を通過せずに除湿手段に至る第二の風路と、第二の風路の気流の流れを制限する気流制限手段（５１）と、除湿手段に冷媒を供給する圧縮機（６）と、送風手段、気流制限手段（５１）及び圧縮機（６）を制御する制御装置（１８）と、を有する。制御装置（１８）は、環境情報及び周囲情報の少なくとも一つに応じて気流制限手段（５１）を制御する。

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DEHUMIDIFIER

Field

[0001]

The present disclosure relates to a dehumidifier.

Background

[0002]

A dehumidifier is disclosed in PTL 1. This dehumidifier has an air-cleaning function, and a user can select one of operation focused on an air-cleaning effect and operation focused on a dehumidification effect.

[0003]

This dehumidifier disclosed in PTL 1 dehumidifies, through a heat exchanger, air taken in from an air intake port. A filter is positioned not to cover a part of a ventilation path between the air intake port and the heat exchanger, the part being on the front surface side of the heat exchanger, in other words, in the upper course of air flow when viewed from the heat exchanger. A shutter that can block air flow is provided at the part where the filter does not cover the front surface side of the heat exchanger. The shutter is provided to be able to select a position where the shutter covers part of a path to the heat exchanger and a position where the shutter does not cover the path.

Citation List

Patent Literature

[0004]

[PTL 1] JP 2004-211913A

Summary

Technical Problem

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[0005]

The above-described PTL 1 discloses, in addition to a configuration in which the shutter is manually opened and closed, a configuration in which a humidity sensor is provided and the shutter is opened and closed in accordance with humidity, but dehumidification operation and air-cleaning operation cannot be efficiently selectively performed only by opening and closing the shutter.

[0006]

The present disclosure is made to solve the problem as described above. The present disclosure is intended to provide a dehumidifier that can efficiently selectively operate dehumidification operation and air-cleaning operation.

Solution to Problem

[0007]

A dehumidifier according to the present disclosure is a dehumidifier including:

a housing including a suction port and a blowout port formed in the housing;

an air-sending unit configured to generate airflow from the suction port to the blowout port;

an air-cleaning means positioned inside the housing; and

a dehumidification means positioned inside the housing and configured to remove water in the airflow,

the dehumidifier further including:

a first air path that is formed inside the housing and along which the airflow reaches the dehumidification means through the air-cleaning means;

a second air path that is formed inside the housing and along which the airflow reaches the dehumidification means not through the air-cleaning means,

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an airflow restriction means configured to restrict flow of the airflow along the second air path,

a compressor configured to supply a refrigerant to the dehumidification means, and

a control device configured to control the air-sending unit, the airflow restriction means, and the compressor,

in which the control device controls the airflow restriction means in accordance with at least one of environment information and surroundings information.

[0007a]

A dehumidifier according to the present disclosure is a dehumidifier including:

a housing including a suction port and a blowout port formed in the housing;

an air-sending unit configured to generate airflow from the suction port to the blowout port;

an air-cleaning means positioned inside the housing; and

a dehumidification means positioned inside the housing and configured to remove water in the airflow,

the dehumidifier further including:

a first air path that is formed inside the housing and along which the airflow reaches the dehumidification means through the air-cleaning means;

a second air path that is formed inside the housing and along which the airflow reaches the dehumidification means not through the air-cleaning means,

an airflow restriction means configured to restrict the airflow along the second air path,

a compressor configured to supply a refrigerant to the dehumidification means, and

a control device configured to control the air-sending unit, the airflow restriction means, and the compressor,

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wherein the control device controls the airflow restriction means in accordance with environment information including first information indicating humidity and second information indicating air cleanness and in accordance with surroundings information, and drives the air-sending unit and the airflow restriction means to cause the airflow to flow along the second air path when a first threshold set for the first information and a second threshold set for the second information are both satisfied.

Advantageous Effects of Invention

[0008]

According to the present disclosure, a second air path that does not pass through an air-cleaning means is provided, and thus it is possible to perform dehumidification operation by guiding air to be dehumidified to the second air path. Thus, it is possible to reduce a pressure loss and operation noise as compared to a case in which dehumidification operation is performed by using only a first air path. Moreover, a control device controls airflow along the second air path in accordance with at least one of environment information and surroundings information, and thus it is possible to efficiently perform the dehumidification operation and air-cleaning operation.

Brief Description of Drawings

[0009]

[Fig. 1]

Fig. 1 is a front view of a dehumidifier of Embodiment 1.

[Fig. 2]

Fig. 2 is a longitudinal sectional view of the dehumidifier of Embodiment 1.

[Fig. 3]

Fig. 3 is a horizontal sectional view of the dehumidifier of Embodiment 1.

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[Fig. 4]

Fig. 4 is an enlarged cross-sectional view illustrating part of Fig. 3.

[Fig. 5]

Fig. 5 is a diagram additionally including dimensions in the same transverse sectional view as in Fig. 3.

[Fig. 6]

Fig. 6 is a transverse sectional view at the same position as in Fig. 5 and is a diagram in which main components are virtually separated to clearly indicate dimensions of each part.

[Fig. 7]

Fig. 7 is a simplified perspective view of an evaporator.

[Fig. 8]

Fig. 8 is a perspective view for description of the sizes of an HEPA filter and an activated charcoal filter constituting an air-cleaning means.

[Fig. 9]

Fig. 9 is a dimension explanatory diagram of a part corresponding to a suction port when the dehumidifier of Embodiment 1 is viewed from a front surface side.

[Fig. 10]

Fig. 10 is a schematic diagram for description of operation of an airflow restriction means of Embodiment 1.

[Fig. 11]

Fig. 11 is a block diagram illustrating main control-related components of the dehumidifier of Embodiment 1.

[Fig. 12]

Fig. 12 is a flowchart illustrating operation steps in dehumidification operation of the dehumidifier of Embodiment 1.

[Fig. 13]

Fig. 13 is a flowchart illustrating operation steps in air-cleaning operation of the dehumidifier of Embodiment 1.

[Fig. 14]

Fig. 14 is a flowchart illustrating operation steps in dehumidification air-cleaning operation of the dehumidifier of Embodiment 1.

[Fig. 15]

Fig. 15 is a flowchart illustrating basic operation steps of a main control device at operation start of the dehumidifier of Embodiment 1.

[Fig. 16]

Fig. 16 is a longitudinal sectional view illustrating air flow in the dehumidifier of Embodiment 1.

[Fig. 17]

Fig. 17 is a horizontal sectional view illustrating air flow in dehumidification operation of the dehumidifier of Embodiment 1.

[Fig. 18]

Fig. 18 is a horizontal sectional view illustrating air flow in air-cleaning operation of the dehumidifier of Embodiment 1.

[Fig. 19]

Fig. 19 is a longitudinal sectional view illustrating air flow in dehumidification operation of a dehumidifier of Embodiment 2.

[Fig. 20]

Fig. 20 is a longitudinal sectional view illustrating air flow in air-cleaning operation of the dehumidifier of Embodiment 2.

[Fig. 21]

Fig. 21 is a partially simplified perspective view of a dehumidifier of Embodiment 3.

[Fig. 22]

Fig. 22 is an exploded transverse sectional view of a front case part of the dehumidifier in Fig. 21 when taken along line C-C.

[Fig. 23]

Fig. 23 is a front view of a suction port frame used in the dehumidifier in Fig. 21.

[Fig. 24]

Fig. 24 is a longitudinal (vertical) sectional view of a right-left central part of the dehumidifier illustrated in Fig. 21.

[Fig. 25]

Fig. 25 is a block diagram illustrating main control-related components of the dehumidifier illustrated in Fig. 21.

[Fig. 26]

Fig. 26 is a longitudinal (vertical) sectional view of a right-left central part of a dehumidifier of Embodiment 4.

Description of Embodiments

[0010]

Embodiments will be described below with reference to the accompanying drawings. Identical reference signs in the drawings denote identical parts or equivalent parts. In the present disclosure, duplicate description is simplified or omitted as appropriate. Note that the present disclosure includes every possible combination of configurations described in the embodiments below.

[0011]

Embodiment 1.

Figs. 1 to 20 illustrate a dehumidifier of Embodiment 1. Note that the sizes and positions of structural objects in the dehumidifier may be different between examples illustrated in the drawings and those in reality.

For sake of simplicity of description, illustrations in each drawing are omitted as appropriate in some cases.

[0012]

Fig. 1 is a front view of a dehumidifier 1 of Embodiment 1. Fig. 2 is a longitudinal sectional view of the dehumidifier 1 of Embodiment 1. Fig. 2 is a cross-sectional view taken along line A-A illustrated in Fig. 1. Fig. 3 is a horizontal sectional view of the dehumidifier 1 of Embodiment 1.

Fig. 3 is a horizontal sectional view taken along line B-B illustrated in Fig. 1. Fig. 4 is an enlarged cross-sectional view illustrating part of Fig. 3.

[0013]

In the present disclosure, the dehumidifier 1 will be described below with, as a reference, a state in which the dehumidifier 1 is placed on a horizontal surface such as a floor surface, in principle. Note that the following description is made based on a premise that a surface at which a suction port 11 exists is a front surface. However, the surface at which the suction port 11 is formed is a back surface when the dehumidifier 1 is actually used.

[0014]

Fig. 1 will be described first.

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The dehumidifier 1 includes a case 10. The case 10 constitutes part of a housing 3 forming an outer shell of the dehumidifier 1. The housing 3 includes a bottom plate 4 to which a plurality of wheels 20 to be described later are attached. The hollow box-shaped housing 3 is formed by the case 10 and the bottom plate 4.

[0015]

The wheels (casters) 20 for moving the dehumidifier 1 may be positioned at front, back, right, and left positions, respectively, separated from one another on the bottom plate 4. A heavy weight object such as an electric compressor 6 to be described later is placed on the bottom plate 4. Thus, the bottom plate 4 is made of a metal plate having a strength (stiffness) higher than that of the case 10.

[0016]

The case 10 is assembled in an one-box shape by connecting end parts of a plurality of metal thin plates through connecting members (not illustrated) such as screws. Alternatively, the case 10 is assembled in an one-box shape by connecting, through connecting members (not illustrated) such as screws, a plurality of members formed by casting using a thermoplastic resin (plastic) material.

[0017]

In Embodiment 1, the case 10 includes a back case 10B and a front case 10F. The back case 10B is a member forming a back surface part of the case 10. The front case 10F is a member forming a front surface part of the case 10. The front case 10F is fixed to the back case 10B through connecting members (not illustrated) such as screws.

[0018]

An upper case 10U of a flat plate shape is coupled to upper end parts of the back case 10B and the front case 10F. The upper case 10U is constituted by two parts of a front part

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10UF and a back part 10UB. The front part 10UF and the back part 10UB face and contact from front and back and constitute one flat surface. This surface is a ceiling surface of the case 10.

[0019]

The suction port 11 and a blowout port 12 are formed at the case 10. The suction port 11 is an opening for taking air from the outside of the case 10 to the inside. The blowout port 12 is an opening for sending air from the inside of the case 10 to the outside.

[0020]

In Embodiment 1, the suction port 11 is formed in a square window shape at a central part of the front case 10F. The blowout port 12 is formed at a ceiling surface part of the case 10. The blowout port 12 is opened when the entire back part 10UB of the upper case 10U is opened upward to a certain angle with a front end part at a pivot as illustrated in Fig. 16.

[0021]

The suction port 11 has a square shape as illustrated in Fig. 1 when the housing 3 is viewed from a front side. The suction port 11 may have a rectangular shape or a circular shape. The square window formed at the front case 10F of the housing 3 may be used as the suction port 11, or a picture frame-like frame may be fitted inside the window and the inside of the frame may be used as the suction port 11.

[0022]

The dehumidifier 1 is provided with a suction port cover 11A that covers the suction port 11. The suction port cover 11A is formed in, for example, a lattice shape. Alternatively, the suction port cover 11A may entirely have a minute louver shape. The suction port cover 11A prevents a foreign object from entering inside the case 10 through the

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suction port 11. The suction port cover 11A detachably fixed to, for example, the back case 10B through fixation members such as screws.

[0023]

A net for preventing a foreign object from entering is attached to the entire surface of the suction port cover 11A. Alternatively, the suction port cover 11A may be formed of a plastic material by casting. The suction port cover 11A can prevent large foreign objects (such as paper dust and fiber dust of clothes or the like) flying in air from entering inside the housing 3. However, the suction port cover 11A has a small pressure loss and a poor air-cleaning effect for fine particles and the like and is not a kind of an air-cleaning means to be described later. The "air-cleaning means" in the present embodiment is an activated charcoal filter 42 and an HEPA filter 41.

[0024]

In Fig. 1, reference sign 11A1 denotes a vertical bar constituting the suction port cover 11A. In Fig. 1, reference sign 11A2 denotes a horizontal bar constituting the suction port cover 11A. A large number of ventilation windows 5 are partitioned and formed in the suction port cover 11A by the vertical bars 11A1 and horizontal bars 11A2.

[0025]

In Fig. 1, reference sign 6 denotes an electric compressor. The electric compressor 6 may be of any scheme such as a reciprocating or rotary scheme. The electric compressor 6 includes a motor (not illustrated) and forcibly circulates a refrigerant in a refrigerant pipe (also referred to as a "refrigerant circuit") 22 connected to an evaporator 31 and a condenser 32 to be described later. Specifically, the electric compressor 6 compresses the refrigerant and supplies the compressed refrigerant to a refrigeration cycle formed by connecting the evaporator 31, the condenser 32, and the like through the refrigerant pipe 22.

[0026]

The motor (not illustrated) of the electric compressor 6 can change rotation speed per unit time in accordance with electric power supplied from a drive circuit 27 to be described later. By changing the rotation speed, it is possible to change refrigerant supply capacity and increase and decrease (adjust) cooling capacity. A main control device 18 controls the rotation speed of the motor (not illustrated) of the electric compressor 6 by designating a drive frequency to the drive circuit 27.

[0027]

In Fig. 1, reference sign 7 denotes a water storage tank. Drain water generated on the external surface of the evaporator 31 along with dehumidification operation is directly dropped and guided to the water storage tank 7. Alternatively, the drain water is guided into the water storage tank 7 by a guide plate such as a gutter pipe. Note that the water storage tank 7 may be taken out of the housing 3 through a take-out port (not illustrated) formed at a side surface of the back case 10B or the case 10. Note that the take-out port is covered by a door (not illustrated), which is freely openable and closable, except when the water storage tank 7 is taken out.

[0028]

Fig. 2 will be described next.

The dehumidifier 1 includes a louver 13.

In Embodiment 1, the louver 13 is constituted by only one back part 10UB of the upper case 10U as described above. Note that the louver 13 may be constituted by several plate-shaped members. The louver 13 is used to adjust a direction in which air is sent out from the blowout port 12. The louver 13 is positioned near the blowout port 12 in a freely openable and closable manner.

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[0029]

The posture of the louver 13 is changed by a coupled louver drive motor (not illustrated). The tilt angle of the louver 13 relative to the blowout port 12 is changed at several stages or more by the louver drive motor (not illustrated). Accordingly, the direction of air (airflow AF) blown out from the blowout port 12 can be adjusted. Note that operation of the louver drive motor (not illustrated) is controlled by a drive signal from a control board (not illustrated). The control board (not illustrated) is housed in a board box 16 formed of metal plates or a non-flammable heat-resistant plastic case.

[0030]

The dehumidifier 1 includes an operation notification unit 15. The operation notification unit 15 is constituted by an input operation unit 17 (refer to Fig. 11) for a user to operate the dehumidifier 1 and by a notification unit 23 (refer to Fig. 11). The notification unit 23 displays, to the user, the state of the dehumidifier 1 and the like as visible information such as text. The notification unit 23 can provide notification by sound. An operation display board 8 configured to control the operation notification unit 15 is arranged inside the case 10 facing the operation notification unit 15. An operation switch configured to start and stop operation of the dehumidifier 1 is arranged on the operation display board 8. Note that the operation display board 8 may be constituted by two or more boards, namely an operation board 8A on which any circuit member of the input operation unit 17 to be described later is mounted, and a display board 8B on which any circuit member related to a display unit 23D is mounted.

[0031]

The operation display board 8 includes an operation mode switching switch 17S (refer to Fig. 11) for switching an operation mode to any one of three kinds of operation modes,

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namely a "dehumidification operation mode", an "air-cleaning operation mode", and a "dehumidification air-cleaning operation mode".

[0032]

The operation display board 8 includes the notification unit 23 (refer to Fig. 11) and the input operation unit 17. In the notification unit 23, the liquid-crystal display unit 23D capable of displaying information is arranged below the front part 10UF (upper wall surface) of the upper case 10U in the operation notification unit 15. The information displayed on the display unit 23D transmits through the front part 10UF and is displayed above the upper case 10U. An operating condition, an operation state, and the like of the dehumidifier 1 are displayed outside the housing 3 through the display unit 23D of the operation notification unit 15. The operation display board 8 is horizontally arranged near an inside ceiling part of the front case 10F.

[0033]

A power source board (not illustrated) and the board box 16 in which one or several control boards are housed are arranged in a space below the operation display board 8. A drive circuit 28 for a fan 21 to be described later and a drive circuit (inverter circuit) 27 for the electric compressor 6 are mounted on each control board.

[0034]

The fan 21 (rotation vane) is provided as an air-sending means at a back part inside the case 10. The fan 21 is a device configured to take air into the case 10 and send the intake air out of the case 10. The fan 21 rotates to generate, in an air path from the suction port 11 to the blowout port 12, the airflow AF from the suction port 11 to the blowout port 12.

[0035]

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A motor 21A is housed inside the case 10. The motor 21A is a device configured to rotate the fan 21. In Embodiment 1, the fan 21 and the motor 21A are positioned at a back part of the housing 3. In other words, the fan 21 and the motor 21A are positioned on the back surface side of the dehumidifier 1. The motor 21A is connected to a rotational center part of the fan 21 through a rotational shaft 21B extending in the horizontal direction. Rotational operation of the motor 21A is controlled by the drive circuit 28 (refer to Fig. 11) to be described later. Accordingly, start, stop, and speed of rotation of the motor 21A are each controlled by the drive circuit 28.

[0036]

The fan 21 is a sirocco fan (multiblade fan) and the rotational center part thereof is fixed by the rotational shaft 21b. The fan 21 sucks air from the front side into a fan case 36 to be described later and blows the air out of the blowout port 12.

[0037]

The fan case 36 surrounds the fan 21 and the motor 21A. A bell mouth part 37 is formed on a front wall surface of the fan case 36 at a position corresponding to the fan 21. The bell mouth part 37 is a large circular opening, and a port edge part thereof is largely curved on the leeward side. The bell mouth part 37 smoothly sucks airflow having passed through the condenser 32.

[0038]

The dehumidifier 1 includes the evaporator 31, the condenser 32, the electric compressor 6, and a decompression device (not illustrated) as examples of a dehumidification means that removes water in air. The evaporator 31 and the condenser 32 form a refrigerant circuit together with the electric compressor 6 and the decompression device (not illustrated).

[0039]

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The evaporator 31, the condenser 32, the electric compressor 6, and the decompression device (not illustrated) are housed inside the case 10. The evaporator 31 and the condenser 32 are each vertically installed to block the front side of the bell mouth part 37 as illustrated in Fig. 2. The electric compressor 6 is installed at a bottom part of the case 10 as illustrated with dashed lines in Fig. 1.

[0040]

In Fig. 2, reference sign 38 denotes a rectification member having a flat plate shape and entirely formed of, for example, a thermoplastic plastic material. Frames 38B intersecting in the longitudinal direction and the lateral direction are formed in the rectification member 38 as illustrated in Fig. 4, and a large number of ventilation windows 38A are formed between the frames 38B. Accordingly, the ventilation windows 38A are opening parts independent from one another. The ventilation windows 38A are regularly arranged in the horizontal direction and the vertical direction across the entire rectification member 38.

[0041]

Front, back, right, and left surfaces of the frames 38B are flat guide surfaces having a certain length D5 (refer to Fig. 4) to cause the airflow AF to linearly flow. Note that the length D5 is set to a dimension (for example, 12 mm) in the range of 10 mm to 15 mm, for example. The diameter (opening area) of the ventilation windows 38A is equally set across the entire rectification member 38.

[0042]

The rectification member 38 faces the front surface of the evaporator 31 as part of a heat exchanger to be described later with a first space 33 interposed therebetween.

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Specifically, the rectification member 38 faces the evaporator 31 at a predetermined distance D3 (Figs. 5 and 6 refer to).

[0043]

The rectification member 38 also faces the back surface of the activated charcoal filter 42 as part of an air-cleaning filter (air-cleaning means) to be described later with a second space 34 interposed therebetween. Specifically, the rectification member 38 faces the back surface of the activated charcoal filter 42 at a predetermined distance D4.

[0044]

The evaporator 31, the electric compressor 6, the condenser 32, and the decompression device (not illustrated) are sequentially connected to each other through a refrigerant pipe (not illustrated) or the like. The refrigerant from the electric compressor 6 flows to the refrigerant circuit formed by the evaporator 31, the electric compressor, the condenser 32, and the decompression device (not illustrated).

[0045]

The evaporator 31 and the condenser 32 are a heat exchanger for performing heat exchange between the refrigerant and air. The electric compressor 6 described with reference to Fig. 1 is a device configured to compress the refrigerant. The decompression device (not illustrated) is a device configured to decompress the refrigerant. The decompression device (not illustrated) is, for example, an expansion valve or a capillary tube.

[0046]

The dehumidifier 1 includes, as examples of an air-cleaning means that removes dust and odor in air, the HEPA filter 41 and the activated charcoal filter 42 that are air-cleaning filters for cleaning air. The HEPA filter 41 and the activated charcoal filter 42 are housed inside the case 10. In Embodiment 1, the HEPA filter 41 and the activated charcoal filter 42

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are housed between the suction port 11 and the rectification member 38 inside the front case 10F.

[0047]

The HEPA filter 41 is a filter that captures minute dust in air. The activated charcoal filter 42 is a filter that captures odor in air. The activated charcoal filter 42 is separated from the front surface of the rectification member 38 with the space ("second space 34" to be described later) of the predetermined distance D4 interposed therebetween as described above.

[0048]

The HEPA filter 41 and the activated charcoal filter 42 can be inserted to a position on the front side of the rectification member 38 through the suction port 11 in a state in which the suction port cover 11A is removed from the front case 10F. The HEPA filter 41 and the activated charcoal filter 42 can be detachably installed inside the case 10.

[0049]

The rectification member 38 also serves a protection member for preventing the user from touching the evaporator 31 in a state in which the HEPA filter 41 and the activated charcoal filter 42 is removed from the back case 10B. Thus, the evaporator 31 is not touched by a finger of the user or the like in a case of pressing from the front side by the finger or the like.

[0050]

In Embodiment 1, the air path from the suction port 11 to the blowout port 12 is formed inside the case 10. The airflow AF flowing inside the air path flows from the suction port 11 to the suction port cover 11A, the HEPA filter 41, the activated charcoal filter 42, the evaporator 31, the condenser 32, and the fan 21 in order. A series of air paths along which

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air having entered from the suction port 11 flows from the heat exchanger (such as the evaporator 31) toward the fan 21 through the air-cleaning filter (the HEPA filter 41 and the activated charcoal filter 42) are formed.

[0051]

An upper course and a lower course are determined by using the airflow AF flowing through the air path from the suction port 11 to the blowout port 12. For example, the upper course is defined to be a side on which the suction port 11 is positioned relative to the heat exchanger (such as the evaporator 31). The lower course is defined to be a side on which the blowout port 12 is positioned relative to the heat exchanger (such as the evaporator 31).

[0052]

In Fig. 2, reference sign 62 denotes a dust sensor. The dust sensor 62 is positioned at an uppermost part inside the case 10. A small-diameter opening 62A (not illustrated) for communication between the dust sensor 62 and the outside of the case 10 is provided in the vicinity of the dust sensor 62 in the case 10. Dust detection information is acquired by the dust sensor 62 and the main control device 18 to be described later, and thus the amount and concentration of dust in an indoor space in which the dehumidifier 1 is installed can be measured. The dust sensor 62 has, for example, performance of detecting particles of 0.1 μm. A result of the sensing by the dust sensor 62 is acquired by the main control device 18, and this acquired dust detection information may be displayed on the display unit 23D provided on the operation display board 8.

[0053]

In Fig. 2, reference sign 63 denotes a gas sensor 63. The gas sensor 63 is positioned inside the case 10 at a position lower than the suction port 11. A small-diameter opening 63A (not illustrated) for communication between the outside of the case 10 and the gas sensor

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63 is provided at a wall surface of the case 10 in the vicinity of the gas sensor 63. Gas detection information is acquired by the gas sensor 63 and the main control device 18, and thus odor of indoor air can be measured. A result of the measurement by the gas sensor 63 is acquired by the main control device 18, and this acquired gas detection information may be displayed on the display unit 23D provided on the operation display board 8.

[0054]

In Fig. 2, reference sign 26 denotes a wireless communication unit (wireless communication module) housed near a ceiling part inside the case 10. The wireless communication unit 26 can perform wireless communication with a local network facility such as a wireless router (not illustrated) installed in a house or an office in which the dehumidifier 1 is installed. The wireless communication unit 26 is connected to the Internet (not illustrated) through the local network facility in some cases.

[0055]

Thus, the wireless communication unit 26 can communicate information through the Internet with an information processing terminal device (not illustrated) such as a smartphone at a remote place or with any other communication instrument. Note that the local network facility may be a command device configured to control total electric power consumption inside the house or the office, an integrated management device configured to collect information of a plurality of electric instruments and cooperate the electric instruments, or the like, and is also referred to as an "access point" in some cases.

[0056]

As illustrated in Fig. 2, the rotational shaft 21b of the motor 21A extends in the horizontal direction. A central line HL is a horizontal central line penetrating through the center of the rotational shaft 21b. The central line HL is positioned at a central part of the

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suction port 11 in the up-down direction. In other words, the rotational shaft 21b exists at a position of a height corresponding to half of the suction port 11 having a height dimension H1.

[0057]

Fig. 3 will be described next.

In Fig. 3, a bypass air path 43 adjacently exists on the right and left sides of the HEPA filter 41 and the activated charcoal filter 42. The bypass air path 43 is a space provided across the entire range in the height direction of the suction port 11 inside the front case 10F.

[0058]

The bypass air path 43 is an air path extending from the suction port 11 to the back side as illustrated in Fig. 3. In other words, the bypass air path 43 is a narrow-width path extending from the front side to the back side. In Fig. 3, reference sign 46 denotes an air channel extending from a port edge part of the suction port 11 to the back side. The air channel 46 is entirely formed of a thin plate metal member or a thermoplastic plastic member.

[0059]

A void space between a front end part of the air channel 46 and each of right and left side surfaces of the HEPA filter 41 is an entrance 43A of the bypass air path 43. A back end part of the air channel 46 contacts an outer peripheral end part of the rectification member 38 to prevent external leakage of the airflow AF halfway through the air path. A void space between the back end part of the air channel 46 and each of right and left side surfaces of the activated charcoal filter 42 is an exit 43B of the bypass air path 43.

[0060]

As is clear from the above description, the air path from the suction port 11 to the blowout port 12 is constituted by two air paths, namely a main air path 44 and the bypass air

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path 43. The main air path (also referred to as a "first air path") 44 is an air path from the suction port 11 to the rectification member 38 through the HEPA filter 41 and the activated charcoal filter 42. The bypass air path (also referred to as a "second air path") 43 is an air path from the suction port 11 to the rectification member 38 not through the HEPA filter 41 and the activated charcoal filter 42.

[0061]

The main air path 44 and the bypass air path 43 join in front of the rectification member 38. In Fig. 3, W5 denotes the clearance dimension of the suction port 11. In other words, W5 denotes a lateral width dimension thereof. In Embodiment 1, W5 is 315 mm. In Fig. 3, HL denotes a central line penetrating through the center of the rotational shaft 21b of the motor 21A as illustrated in Fig. 2.

[0062]

In Fig. 3, reference sign 51 denotes an airflow restriction means configured to open and close to restrict flow of bypass airflow AF2 by opening and closing the corresponding entrance 43A of the bypass air path 43 in effect. The airflow restriction means 51, which is provided on each of the right and left sides of the suction port 11, will be described in detail with reference to Fig. 4.

[0063]

Fig. 4 will be described next. Fig. 4 is an enlarged transverse sectional view of part E in Fig. 3.

As illustrated in Fig. 4, the bypass air path 43 is an air path along which the airflow AF flows to the lower course not through the HEPA filter 41 and the activated charcoal filter 42. Unlike the bypass air path 43, the main air path 44 is an air path along which the airflow AF passes through the HEPA filter 41 and the activated charcoal filter 42.

[0064]

The bypass air path 43 is formed on each of the right and left sides of the HEPA filter 41 and the activated charcoal filter 42 interposed therebetween. Accordingly, the bypass air path 43 and the main air path 44 are positioned adjacent and in parallel to each other in the front-back direction.

[0065]

A fixed wall of the air channel 46 exists outside the bypass air path 43, but no wall exists inside where the HEPA filter 41 and the activated charcoal filter 42 exist. Accordingly, no fixed object exists at a boundary between the bypass air path 43 and the main air path 44. However, airflow (hereinafter referred to as "bypass airflow" and denoted by reference sign AF2) passing through the bypass air path 43 and airflow (hereinafter referred to as "main airflow" and denoted by reference sign AF1) passing through the main air path 44 do not join inside the HEPA filter 41 and the activated charcoal filter 42.

[0066]

As illustrated in Fig. 4, since the bypass air path 43 that is an air path that does not pass through the air-cleaning filter and the main air path 44 that is an air path passing through the air-cleaning filter are positioned adjacent to each other, it is possible to achieve a compact configuration of air paths in the dehumidifier 1 and size reduction of the dehumidifier 1. Note that the height dimension of the bypass air path 43 in the longitudinal direction (up-down direction) is desirably set to be approximately equal to the length of the HEPA filter 41 in the longitudinal direction (up-down direction) when the dehumidifier 1 is viewed from the front surface. Such a dimension relation will be described later in detail in Figs. 5 and 6.

[0067]

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The bypass airflow AF2 flowing along the bypass air path 43 and the main airflow AF1 flowing along the main air path 44 join in a space in the lower course relative to the activated charcoal filter 42, that is, in the first space 33 separated by the distance D3 from the rectification member 38 and in the second space 34 having an interval of the distance D4 from the rectification member 38.

[0068]

Specifically, the bypass airflow AF2 and the main airflow AF1 join before the evaporator 31 positioned in the lower course relative to the activated charcoal filter 42 and thereafter flow through one air path inside the case 10. Note that, among the main airflow AF1 flowing along the main air path 44, the main airflow AF1 having passed through parts near right and left end parts of the activated charcoal filter 42 joins the bypass airflow AF2 when passing through right and left end parts of the rectification member 38 right after having passed through the activated charcoal filter 42.

[0069]

Although the first space 33 and the second space 34 are provided in the above-described configuration, the airflows flowing along the bypass air path 43 and the main air path 44 only need to merge before the evaporator 31. Thus, it suffices to provide at least the first space 33. The second space 34 may be provided when the first space 33 cannot be provided in a sufficient size. The second space 34 may be provided, for example, when it is assumed that the HEPA filter 41 and the activated charcoal filter 42 move or curve toward the lower course and contact the rectification member 38 by receiving air resistance when the main airflow AF1 passes.

[0070]

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An air guiding surface 46A is formed in the lower course relative to the bypass airflow AF2 in the air channel 46. The air channel 46 is provided with a pair of right and left air guiding surfaces 46A at positions of coupling to the rectification member 38. The air guiding surfaces 46A are symmetrically (at the same angle) tilted toward the HEPA filter 41 and the activated charcoal filter 42 when two-dimensionally viewed as illustrated in Fig. 4.

[0071]

The air guiding surfaces 46A are provided to guide, toward the center of the front surface of the heat exchanger (such as the evaporator 31) on the windward side, the bypass airflow AF2 having passed through the bypass air path 43. In other words, the air guiding surfaces 46A have a function to slightly change the traveling direction of the bypass airflow AF2 toward the central line HL penetrating through the center of the rotational shaft 21b of the motor 21A.

[0072]

The air guiding surface 46A illustrated in Fig. 4 is entirely formed as one flat tilted surface. The direction in which the bypass airflow AF2 is guided can be adjusted by adjusting the normal direction (tilt angle) of the tilted surface. Note that the air guiding surface 46A, which is formed as one surface with no irregularities in the middle, has a small resistance and generates no unnecessary turbulence when the bypass airflow AF2 flows.

[0073]

Each air guiding surface 46A may be formed as a curved surface. Spread of the bypass airflow AF2 guided by the air guiding surface 46A can be adjusted by adjusting the curvature of the curved surface. In this manner, the air guiding surface 46A that guides the bypass airflow AF2 in a predetermined direction (in Fig. 3, toward the central line HL) is provided at part of the second air path (bypass air path 43) on the windward side of the heat

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exchanger (such as the evaporator 31), and thus the bypass airflow AF2 passing through the bypass air path 43 can efficiently flow into the heat exchanger, which improves dehumidification efficiency.

[0074]

Fig. 4 will be described below.

Each airflow restriction means 51 is provided on the bypass air path 43. As illustrated in detail in Fig. 10, the airflow restriction means 51 includes a plate-shaped flap or partition plate that opens and closes the corresponding entrance 43A of the bypass air path 43. The flap or the partition plate is collectively referred to as a shutter 51S.

[0075]

The shutter 51S is positioned in the lower course relative to the suction port cover 11A. The shutter 51S has one end part pivotally supported by a rotational shaft 51E (refer to Fig. 10). The shutter 51S is fixed at an opened position and a closed position by a drive motor 51B (refer to Fig. 10) as an opening-closing means and driven to maintain a stopped state at a particular position between the opened position and the closed position. The airflow restriction means 51 has a function to determine whether the bypass airflow AF2 flows to the bypass air path 43, and an adjustment function to increase and decrease the amount of the bypass airflow AF2 flowing along the bypass air path 43.

[0076]

Fig. 5 will be described next. Fig. 5 is a diagram additionally including dimensions in the same transverse sectional view as in Fig. 3.

Reference sign D1 denotes the thickness (depth dimension) of the condenser 32 in the front-back direction and is 51 mm. Reference sign D2 denotes the thickness (depth dimension) of the evaporator 31 in the front-back direction and is 38 mm. The evaporator

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31 is provided with two lines (two layers) of refrigerant pipes 22 in the front-back direction. Since the two layers of refrigerant pipes 22 are provided, cooling capacity is higher than in a case of one layer. Note that, for simplification of illustration in each diagram, the evaporator 31 and the condenser 32 are not illustrated in sizes proportional to their actual thicknesses but are illustrated in equivalent sizes in the diagram.

[0077]

Reference sign D4 denotes the opposite interval (distance) between the activated charcoal filter 42 and the rectification member 38 and is 15 mm. Note that the opposite interval D4 does not need to be uniformly completely the same across the entire rectification member 38. When the activated charcoal filter 42 partially curves toward the lower course due to passing of the airflow AF, the opposite interval D4 slightly decreases at a curved part in some cases.

[0078]

Reference sign D3 denotes the opposite interval (distance) between the rectification member 38 and the evaporator 31 and is 10 mm. Note that, in the evaporator 31, a large number of thin metal heat exchange plates 31F called plate fins are arranged at a minute interval (pitch) of 1 mm or smaller as illustrated in Fig. 7, and the refrigerant pipes 22 are positioned through the plates 31F. The opposite interval D3 is the interval between each thin plate 31F and the rectification member 38.

[0079]

Reference sign W1 denotes an effective lateral width dimension of the main air path 44, which is the lateral width dimension (clearance dimension) of the suction port 11 except for a part closed by the airflow restriction means 51, and is set to 255 mm. Reference sign

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W5 denotes the lateral width dimension (clearance dimension) of the suction port 11 and is set to 315 mm.

[0080]

Fig. 6 will be described next. Fig. 6 is a transverse sectional view at the same position as in Fig. 5 and is a diagram in which main components are virtually separated to clearly indicate dimensions of each part.

Reference sign W2 denotes the lateral width dimension of the evaporator 31 and is set to 270 mm. Reference sign W3 denotes the lateral width dimension of the condenser 32 and is set to 270 mm.

[0081]

Reference sign W4 denotes the opening diameter (diameter) of the bell mouth part 37 and is set to 230 mm. Reference sign BL denotes a horizontal reference line extending in the front-back direction and penetrating through the central point of the opening of the bell mouth part 37 (in the up-down and right-left directions).

[0082]

Reference sign W6 denotes the lateral width dimension of a window 47A of a back air channel 47 (refer to Fig. 4) surrounding the right and left sides of the rectification member 38 and is set to 270 mm. The rectification member 38 is fitted in the window 47A. Reference sign H2 denotes the height dimension of the window 47A of the back air channel 47. The height dimension H2 is 252 mm, which is the same as the height dimension H3 of the evaporator 31.

[0083]

The lateral width dimension of each of the condenser 32 and the evaporator 31 is 270 mm. The condenser 32 and the evaporator 31 are positioned in proximity to each other in

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the front-back direction and overlap each other at the same position when viewed from the front side. The lateral width dimension W6A of the rectification member 38 is close to the dimension W6 of 270 mm because of fitting to the window 47A. The three components of the rectification member 38, the evaporator 31, and the condenser 32 are arranged in line in the front-back direction in accordance with the position of the window 47A of the back air channel 47.

[0084]

The three components of the rectification member 38, the evaporator 31, and the condenser 32 are also arranged in line in the front-back direction in accordance with the reference line BL. When viewed from the suction port 11, the four components of the rectification member 38, the evaporator 31, the condenser 32, and the bell mouth part 37 are arranged over one another on one straight line (the reference line BL).

[0085]

In addition, the HEPA filter 41 and the activated charcoal filter 42 have such a positional relation that the filters overlap one another on one straight line on the reference line BL. Accordingly, airflow AF sucked through the suction port 11 and passing through any of the bypass air path 43 and the main air path 44 linearly flows from the front side to the back side in a range centered at the reference line BL, and thus air path resistance is low and operation efficiency can be improved.

[0086]

As is clear from the above description, the horizontal reference line BL is a straight line penetrating through the central point of the opening of the bell mouth part 37 and is also a straight line penetrating through the central point of each of the HEPA filter 41 and the

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activated charcoal filter 42. Thus, the reference line BL is also referred to as a central line of the air-cleaning means (the HEPA filter 41 and the activated charcoal filter 42).

[0087]

The reference line BL is positioned at a position matching the central line HL penetrating through the center of the rotational shaft 21b. The rectification member 38, the evaporator 31, the condenser 32, the HEPA filter 41, and the activated charcoal filter 42 each have a central part on the reference line BL. In other words, the HEPA filter 41 and the activated charcoal filter 42 are positioned such that the filters are symmetric with respect to the reference line BL in the right and left directions.

[0088]

Fig. 7 will be described next. Fig. 7 is a simplified perspective view of the evaporator 31. Fig. 7 illustrates the relation between the evaporator 31 and the lateral width dimension W6 of the rectification member 38 or the like.

In Fig. 7, reference sign W2 denotes the lateral width dimension of the evaporator 31 and is set to 270 mm as described above. The refrigerant pipes 22 penetrate at two stages (two layers) in the front-back direction in the evaporator 31. The refrigerant pipes 22 penetrate from a first predetermined position to a second predetermined position in the evaporator 31 while meandering. Intermediate parts of the refrigerant pipes 22 protrude in bending shapes as illustrated in Fig. 7.

[0089]

A protrusion amount L2 of the refrigerant pipes 22 illustrated in Fig. 7 is 14 mm on the right side of the evaporator 31 but is 26 mm on the left side. The height dimension H3 of the evaporator 31 is 252 mm.

[0090]

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The lateral width dimension W6 of the window 47A of the back air channel 47 surrounding the right and left sides of the rectification member 38 is set to 270 mm as described above. Reference sign OB denotes the central point (second central point) of the evaporator 31 in the right-left and front-back directions when viewed from the front side. Reference sign CL1 denotes a horizontal central line horizontally passing through the second central point OB of the evaporator 31. Reference sign CV1 denotes a vertical central line vertically passing through the second central point OB of the evaporator 31. Note that reference sign D2 denotes the depth dimension of the evaporator 31 and is 38 mm as described above.

[0091]

Fig. 8 will be described next. Fig. 8 is a perspective view for description of the sizes of the HEPA filter 41 and the activated charcoal filter 42 constituting the air-cleaning means.

[0092]

Fig. 8(A) will be described below.

The activated charcoal filter 42 is constituted by a filter body 42A having a function to capture dust and adsorb an aromatic constituent and a frame body 42B protecting the entire periphery of the filter body 42A. The filter body 42A, which is flexible, is provided with certain stiffness when integrated with the frame body 42B and thus can be easily handled when the user performs replacement work.

[0093]

Reference sign W8 denotes the lateral width dimension of the frame body 42B and is set to 255 mm. Accordingly, the lateral width dimension W8 of the frame body 42B is set to the same size as the effective lateral width dimension W1 (255 mm) of the main air path 44 as described with reference to Figs. 5 and 6.

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[0094]

Reference sign H4 denotes the height dimension of the frame body 42B and is set to 252 mm. Accordingly, the height dimension H4 is the same size as the (inner) height dimension H2 of the window 47A of the back air channel 47 described with reference to Fig. 7. The height dimension H4 is also the same size as the height dimension H3 of the evaporator 31.

[0095]

Reference sign D6 denotes the depth dimension of the frame body 42B. In other words, the depth dimension D6 is a "thickness" when viewed in the right-left direction and is set to a dimension (for example, 10 mm) in the range of 5 mm to 15 mm. Note that the filter body 42A has a depth dimension equivalent to that of the frame body 42B. The depth dimension of the activated charcoal filter 42 is determined by the depth dimension D6 of the frame body 42B. Note that the thickness of only the frame body 42B when viewed from the front side is several mm approximately.

[0096]

Fig. 8(B) will be described next.

The HEPA filter 41 is constituted by a filter body 41A having a function to capture dust and a frame body 41B protecting the entire periphery of the filter body 41A. The filter body 41A, which is flexible, is provided with certain stiffness when integrated with the frame body 41B and thus can be easily handled when the user performs replacement work.

[0097]

Reference sign W9 denotes the lateral width dimension of the frame body 41B and is set to 255 mm. Accordingly, the lateral width dimension W9 of the frame body 41B is set to

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the same size as the effective lateral width dimension W1 (255 mm) of the main air path 44 as described with reference to Figs. 5 and 6.

[0098]

Reference sign H5 denotes the height dimension of the frame body 41B and is set to 252 mm. Accordingly, the height dimension H5 is the same size as the (inner) height dimension H2 of the window 47A of the back air channel 47 described with reference to Fig. 7. The height dimension H5 is the same size as the height dimension H3 of the evaporator 31.

Reference sign D7 denotes the depth dimension of the frame body 41B. In other words, the depth dimension D7 is a "thickness" when viewed in the right-left direction and is set to a dimension (for example, 30 mm) in the range of 20 mm to 40 mm. Note that the filter body 41A has a depth dimension equivalent to that of the frame body 41B. The depth dimension of the HEPA filter 41 is determined by the depth dimension D7 of the frame body 41B. Note that the thickness of the frame body 41B when the frame body 41B is viewed from the front side is several mm approximately.

[0099]

Fig. 9 will be described next. Fig. 9 is a dimension explanatory diagram of a part corresponding to the suction port 11 when the dehumidifier 1 of Embodiment 1 is viewed from the front surface side. Fig. 9 is a front view at the same position as in Fig. 1, and the size of the suction port 11 or the like is illustrated as a frame with dashed lines to indicate a dimension relation.

[0100]

In Fig. 9, reference sign CL1 denotes a horizontal central line passing through a central point (first central point) OA of the suction port 11 when the case 10 is viewed from the front side. Reference sign CV2 denotes a vertical central line penetrating through the central point (first central point) OA of the suction port 11.

[0101]

Reference sign H1 denotes the effective maximum dimension of the suction port 11 in the height direction as described above with reference to Fig. 2 and is 270 mm. Reference sign W1 denotes the effective lateral width dimension of main air path 44 as described with reference to Figs. 5 and 6 and is set to 255 mm. Reference sign W5 denotes the lateral width dimension (clearance dimension) of the suction port 11 and is set to 315 mm. Reference sign W7 denotes the lateral width dimension of the entrance part of the bypass air path 43, which is provided on each of the right and left sides of the suction port 11, and is set to 30 mm.

[0102]

The position of the first central point OA in Fig. 9 and the position of the second central point OB in Fig. 7 are identical positions completely overlapping when viewed from the front side. In other words, the second central point OB is positioned on a horizontal straight line penetrating the first central point OA from the front side.

[0103]

Fig. 10 will be described next. Fig. 10 is a schematic diagram for description of operation of the airflow restriction means 51 of Embodiment 1.

The shutter 51S in a flap shape or a flat plate shape has one end part supported to the rotational shaft 51E of the motor 51B (for example, a stepping motor). In Fig. 10, the shutter 51S is positioned at an "opened position" OP retracted from the bypass air path 43 in the lateral direction as illustrated with dashed lines. When driven by the motor 51B, the shutter 51S is moved to a position (closed position CL) where the shutter 51S closes the

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bypass air path 43 with the height dimension H1 (270 mm) and the lateral width dimension W7 (30 mm) of the entrance 43A. In other words, the shutter 51S maintains the closed state at the closed position CL when moved to maximum.

[0104]

Note that the shutter 51S does not necessarily need to close, to a completely sealed state, the entrance 43A of the bypass air path 43 at the closed position CL. Any minute gap around the shutter 51S at the closed position CL causes no problem for basic performance of the dehumidifier 1. Note that a sealing member formed of, for example, a silicon rubber material having elasticity may be provided to the entrance 43A so that the shutter 51S closely contacts the sealing member to improve air-tightness in the closed state.

[0105]

In Fig. 10, reference signs 51C and 51D denote sensors configured to electrically sense that the shutter 51S is positioned at the opened position OP and the closed position CL. The sensors 51C and 51D are each, for example, an optical sensor such as an infrared sensor, or a magnetic sensing sensor. Sensing signals from the sensors 51C and 51D are input to an opening-closing sensing unit 53 and finally input as opening-closing sensing signals to the main control device 18 to be described later (refer to Fig. 11).

[0106]

Fig. 11 will be described next. Fig. 11 is a block diagram illustrating main control-related components of the dehumidifier 1 of Embodiment 1. Note that illustrations of the sensors 51C and 51D, which are described above with reference to Fig. 10, are omitted.

[0107]

The main control device 18 has a function to control the entire dehumidifier 1. The main control device 18 includes an electronic circuit board on which electronic components

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such as a drive circuit, a power circuit, and a sensor for controlling operation of each component constituting the dehumidifier 1 are mounted, and a central processing unit (CPU) 24 such as a microcomputer and a storage device such as a ROM or a RAM that are mounted on the electronic circuit board. The CPU 24 includes a timer unit 24T for exerting a function to measure a time such as an operation time.

[0108]

The main control device 18 receives an input command signal in accordance with operation of the input operation unit 17 and emits a command signal to a drive circuit (inverter circuit) 27 of the electric compressor 6. The main control device 18 also emits a command signal to the drive circuit 28 and controls operation of the motor 21A of the fan 21. In addition, the main control device 18 emits a command signal to a drive circuit 29 for control of the airflow restriction means 51.

[0109]

The main control device 18 emits, to the wireless communication unit 26, command signals for transmission and reception of information. When the wireless communication unit 26 is not constantly used, the main control device 18 emits a command signal for stopping supply of power source to the wireless communication unit 26 and a command signal for starting supply of the power source.

[0110]

When having received a command from the user through the input operation unit 17, the main control device 18 emits a command for connecting the Internet (not illustrated) through the local network facility to be described later and acquires necessary "control data" and "notification data" (to be described later) from the outside in some cases.

[0111]

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In addition, the main control device 18 controls the drive circuit (inverter circuit) 27 and the drive circuit 29 of the airflow restriction means 51 based on detection signals from the opening-closing sensing unit 53, a room temperature sensor 35, the dust sensor 62, a humidity sensor 61, and the gas sensor 63. The airflow restriction means 51 that receives a drive command from the drive circuit 29 is, for example, the shutter 51S (refer to Fig. 10) and the motor 51B.

[0112]

The input operation unit 17 includes the operation mode switching switch 17S. The notification unit 23 includes the display unit 23D and a sound notification unit 23V.

[0113]

The main control device 18 includes a storage means 25 that stores data such as various "operation programs" and parameters (hereinafter collectively referred to as "control data") used for control of the dehumidifier 1, and display-screen display data and sound notification data (hereinafter collectively referred to as "notification data") used by the display unit 23D and the sound notification unit 23V. Note that the above-described "operation programs" are also referred to as control programs but are collectively referred to as "programs".

[0114]

The main control device 18 serves as a host computer (main computer) that performs integrated control of the entire dehumidifier 1. One or a plurality of microcomputers (also referred to as "auxiliary control devices" or "slave microcomputers") subordinated to the main control device 18 may be further provided for control of the input operation unit 17, the notification unit 23, the drive circuit 27 of the electric compressor 6, or the like. Such an

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auxiliary control device may be dedicated to information processing of an input operation, notification, and drive control of the electric compressor 6.

[0115]

Constituent components such as circuits, components, and devices illustrated in Fig. 11 are functionally conceptual and not necessarily need to be physically configured as illustrated in the drawings. Functions of these circuits may be distributed and integrated, and specific forms thereof are not limited to those illustrated in the drawings. The entire or part of each function may be functionally or physically distributed and integrated in arbitrary units in accordance with the function, the operation situation, and the like.

[0116]

Each function of the timer unit 24T, the drive circuit 29, and the opening-closing sensing unit 53 are implemented by a processing circuit. The processing circuit that implements each function may be dedicated hardware or may be one or a plurality of processors that execute a program stored in the storage means 25.

[0117]

A dedicated processing unit may be provided that collects, in a centralized manner, detection data from various sensors such as the room temperature sensor 35, the dust sensor 62, a temperature sensor for monitoring the temperature of any important part (for example, the electric compressor 6) of the dehumidifier 1, and the gas sensor 63 and determines whether an operation state is appropriate, whether anomaly exists, or the like, and a determination signal from the processing unit may be input to the main control device 18. Note that, in this case, the processing unit may be dedicated hardware or may be configured as a processor that executes a program stored in the storage means 25.

[0118]

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Each function of the main control device 18 is implemented by software, firmware, or combination thereof. The software and the firmware are written as programs and stored in the storage means 25 as a memory. The CPU (processor) 24 implements each function of the main control device 18 by reading and executing the programs stored in the storage means 25.

[0119]

Note that the storage means 25 is typically a non-transitory or transitory semiconductor memory such as a RAM, a ROM, a flash memory, an EPROM, or an EEPROM.

[0120]

Some of data and programs in the storage means 25 may be held in an external recording medium (such as a storage server) instead of being held in the dehumidifier 1. In this case, the dehumidifier 1 accesses the external recording medium (storage server) by wireless or wired communication through the wireless communication unit 26 and acquires information of necessary data and programs.

[0121]

Operation programs for the main control device 18, the input operation unit 17, the notification unit 23, and the like may be able to be updated to those improved as appropriate as desired by the user, the manufacturer of the dehumidifier 1, or the like. In this case, the dehumidifier 1 may obtain corrected programs through the wireless communication unit 26, for example.

[0122]

As illustrated in Fig. 11, in Embodiment 1, the dehumidifier 1 includes the humidity sensor 61 (refer to Fig. 3). The humidity sensor 61 is positioned inside the case 10. An opening (not illustrated) for the humidity sensor 61 to communicate with the outside of the

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case 10 is provided near the humidity sensor 61 in the case 10. Humidity detection information is acquired by the humidity sensor 61 and the main control device 18, and indoor humidity can be measured. A result of the measurement by the humidity sensor 61 is displayed by the display unit 23D having received a display command from the main control device 18.

[0123]

In Fig. 11, reference sign 19 denotes a power source unit that receives alternating-current power from a commercial power source 40 and supplies electric power of predetermined voltage to each part. For example, the power source unit 19 receives electric power of 200 V or 220 V and 50 Hz or 60 Hz from the commercial power source 40, converts the electric power into alternating-current power or direct-current power of a plurality of voltages such as 5 V, 15 V, and 220 V, and supplies the alternating-current power or the direct-current power to the main control device 18, the drive circuit 27, the notification unit 23, the drive circuit 29, and the like.

[0124]

The input operation unit 17 is provided with a power switch operation button (not illustrated) with which the user can perform an opening-closing (ON-OFF) operation of a main power switch (not illustrated) between the power source unit 19 and the commercial power source 40.

[0125]

In Fig. 11, reference sign 13A denotes a drive circuit for opening and closing the louver 13 provided at a ceiling part of the case 10, and reference sign 13M denotes a motor that receives electric power from the drive circuit 13A and performs opening-closing operation of the louver 13.

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[0126]

Operation of the dehumidifier 1 of Embodiment 1 will be described next. In Embodiment 1, "operation modes" set in advance are stored in the storage means 25 of the main control device 18.

[0127]

Examples of the "operation modes" are a "dehumidification operation mode", an "air-cleaning operation mode", and a "dehumidification air-cleaning automated driving mode". Fig. 12 is a flowchart illustrating operation steps in dehumidification operation of the dehumidifier 1 of Embodiment 1. Fig. 13 is a flowchart illustrating operation steps in air-cleaning operation of the dehumidifier 1 of Embodiment 1. Fig. 14 is a flowchart illustrating operation steps in dehumidification air-cleaning operation of the dehumidifier 1 of Embodiment 1.

[0128]

While operation of the dehumidifier 1 is stopped, a motor (not illustrated) for drive of the compressor 6, the motor 13M for drive of the louver 13, and the motor 21A are all controlled to stop by the main control device 18. Accordingly, no electric power is supplied to the motor (not illustrated) for drive of the compressor 6, the motor 13M, and the motor 21A.

[0129]

Thus, the louver 13 and the shutter 51S maintain the blowout port 12 and the entrance 43A of the bypass air path 43 in closed states, respectively.

[0130]

A case in which the "dehumidification operation mode" is started will be described next with reference to Fig. 12.

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The "dehumidification operation mode" is an operation mode for dehumidifying the indoor space. For example, operation of the dehumidifier 1 can be started when the user turns on the operation switch (main power switch) of the input operation unit 17 to activate the main control device 18.

[0131]

When the dehumidification operation mode is selected with the operation mode switching switch 17S, the dehumidifier 1 starts the dehumidification operation at steps as described below.

[0132]

First, the main control device 18 starts energization of the louver-drive motor 13M and controls the opened position of the louver 13 so that the louver 13 opens the blowout port 12 (step S001).

[0133]

The motor 13M is, for example, a stepping motor and thus rotates in a predetermined direction by a constant angle in response to a drive signal from the drive circuit 13A. Such a mechanical structure inside the motor 13M enables highly accurate positioning in open-loop control. The motor 13M moves at a step angle in accordance with the number of pulses from the drive circuit 13A. Accordingly, the louver 13 can be maintained in a state of being opened to a designated angle (for example, 45°, 60°, or 75°).

[0134]

Subsequently, the main control device 18 emits a command signal to the drive circuit 29, provides drive electric power to the motor 51B, and controls the opened position so that the shutter 51S is opened to the opened position OP (refer to Fig. 10).

[0135]

The motor 51B is, for example, a stepping motor, and thus the shutter 51S rotates in a predetermined direction by a constant angle in response to a drive signal from the drive circuit 29. Through the rotation, the entrance 43A of the bypass air path 43 is opened (step S002).

[0136]

Emission of a drive command from the main control device 18 to the drive circuit 29 is transferred by a signal to the opening-closing sensing unit 53 as illustrated with a dashed-line arrow in Fig. 11. The sensors 51C and 51D are activated at a time point when the opening-closing sensing unit 53 receives the signal.

[0137]

When the bypass air path 43 is closed, one of the sensors corresponding to the closed position CL senses change of the shutter 51S from a "state of existing" at a predetermined position to a "state of not existing".

[0138]

The other sensor corresponding to the opened position OP senses change of the shutter 51S from a "state of not existing" at a predetermined position to a "state of existing". Accordingly, the main control device 18 can determine that the shutter 51S has certainly opened the bypass air path 43.

[0139]

As described above, since the motor 51B is a stepping motor, the shutter 51S rotates in a predetermined direction by a constant angle in response to a drive signal from the drive circuit 29. Thus, the opening-closing sensing unit 53 and the sensors 51C and 51D may be omitted.

[0140]

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In Embodiment 1, importance is placed on opening-closing operation of the shutter 51S related to a basic function of the dehumidifier 1, and the opening-closing sensing unit 53 and the sensors 51C and 51D are provided so that secure operation can be performed even when failure has occurred to the opening-closing operation.

[0141]

Subsequently, after having determined that the shutter 51S is opened at step S002, the main control device 18 performs rotational drive of the motor 21A and controls the fan 21 to rotate at a rotation speed of high-speed rotation set in advance (step S003).
The main control device 18 also performs control to drive the electric motor (not illustrated) for drive of the compressor 6. Accordingly, the electric compressor 6 starts operation to compress the refrigerant (step S004).

[0142]

The main control device 18 determines humidity by using the humidity sensor 61.
The humidity sensor 61 starts operation to sense the humidity of air around the humidity sensor 61 and transmits sensing data to the main control device 18. Accordingly, the main control device 18 determines whether the humidity is equal to or higher than 50% (step S005).
When the humidity is equal to or higher than 50%, the main control device 18 performs the dehumidification operation by continuing drive operation of the motor for drive of the electric compressor 6 (S006) and returns to step S005 after a certain time.

[0143]

When the humidity is equal to or lower than 50% the determination at step S005, the main control device 18 performs control to stop drive of the motor for drive of the electric compressor 6, and accordingly, the refrigerant compression operation of the electric compressor 6 stops (step S007). In this case, the main control device 18 performs control to continue the rotational drive operation of the motor 21A of the fan 21 and returns to step S005 after a certain time.

In the above description, the threshold of humidity sensing by the humidity sensor 61 is 50% as an example of determination (determination reference) of whether to perform operation in the dehumidification operation mode, but the threshold may be any other value.

[0144]

A case of the "air-cleaning operation mode" will be described next with reference to Fig. 13.

The "air-cleaning operation mode" is an operation mode for cleaning indoor air. For example, when the user turns on the main power switch of the input operation unit 17 and selects the air-cleaning operation mode with the operation mode switching switch 17S, the dehumidifier 1 starts the air-cleaning operation at steps as described below.

[0145]

First, the main control device 18 starts operation of the louver-drive motor 13M by transmitting an activation signal to the drive circuit 13A so that the louver 13 opens the blowout port 12. Accordingly, the louver 13 is opened to a predetermined position (step S101).

[0146]

Subsequently, the main control device 18 performs rotational drive of the motor 21A and controls the fan 21 to rotate at the rotation speed of high-speed rotation set in advance (step S102). The main control device 18 emits measurement commands to the dust sensor 62 and the gas sensor 63. The dust sensor 62 and the gas sensor 63 start operation to sense dust and gas, respectively, in air around the sensors and transmit data to the main control

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device 18. The main control device 18 determines the degree of dirtiness of the air based on the acquired data (step 103).

[0147]

When having determined that the degree of dirtiness of the air is small at the determination at step S103, the main control device 18 emits a rotation speed change command to the drive circuit 28 so that the fan 21 operating in the high-speed rotation set in advance rotates at a rotation speed of low-speed rotation set in advance. The drive circuit 28 performs control to lower the rotation speed of the motor 21A per unit time (step S104), performs air-cleaning operation (low) (step S105), and returns to step S103 after a certain time.

[0148]

When having determined that the degree of dirtiness of the air is large at step S103, the main control device 18 performs air-cleaning operation (high) that continues the operation of high-speed rotation because the fan 21 has been operated at the rotation speed of high-speed rotation since the timing of step S102 (step S106). Thus, the main control device 18 emits no rotation speed change command to the drive circuit 28 and returns to step S103 after a certain time.

[0149]

A case of the "dehumidification air-cleaning operation mode" will be described next with reference to Fig. 14.

In the dehumidification air-cleaning operation mode, the operation mode of the dehumidifier 1 is switched to, for example, the dehumidification operation mode or the air-cleaning operation mode in accordance with the state of humidity and air dirtiness in the indoor space. For example, when the user turns on the main power switch of the input

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operation unit 17 and selects the dehumidification air-cleaning operation mode with the operation mode switching switch 17S, the dehumidifier 1 starts the dehumidification air-cleaning operation as described below.

[0150]

First, the main control device 18 emits a drive command to the drive circuit 28 and controls the louver-drive motor 13M so that the louver 13 opens the blowout port 12 (step S201). Subsequently, the main control device 18 emits a drive command to the drive circuit 29 and controls the motor 51B for opening and closing of the shutter 51S so that the shutter 51S is opened. Accordingly, the entrance 43A of the bypass air path 43 is opened (step S202).

[0151]

When having determined that the shutter 51S is opened to a predetermined position, the main control device 18 emits a predetermined drive command to the drive circuit 28 to perform rotational drive of the motor 21A. The drive circuit 28 controls the rotation speed of the motor 21A so that the fan 21 rotates at the rotation speed of high-speed rotation set in advance (step S203).

[0152]

In addition, the main control device 18 starts operation of a motor 6M (not illustrated) for drive of the electric compressor 6 and controls the motor 6M to drive at a predetermined rotation speed. Accordingly, the electric compressor 6 starts operation to compress the refrigerant (step S204).

[0153]

The humidity sensor 61 starts operation to sense the humidity of air around the humidity sensor 61 and transmits humidity sensing data to the main control device 18. The main control device 18 determines whether the humidity is equal to or higher than 50% (step S205).

[0154]

When the humidity is equal to or higher than 50%, the main control device 18 continues the drive operation of the motor 6M (not illustrated) for drive of the electric compressor 6. The dust sensor 62 and the gas sensor 63 start operation to sense dust and gas in air around the respective sensors and determine the degree of dirtiness of the air (step S206). When the degree of dirtiness of the air is small, the main control device 18 continues the operation at steps S202, S203, and S204 to perform the dehumidification operation (step S207). Then, the main control device 18 returns to step S205 after a certain time elapses since step S206.

[0155]

When the degree of dirtiness of the air is large, the main control device 18 controls the motor 51B for drive of the airflow restriction means 51 to close the shutter 51S. Then, the main control device 18 closes the entrance 43A of the bypass air path 43 (step S208), performs dehumidification air-cleaning operation "high" (step S209), and returns to step S205 after a certain time elapses since step S206.

[0156]

When the humidity is equal to or lower than 50% at step S205, the main control device 18 performs control to stop drive of the motor 6M for drive of the electric compressor 6, and accordingly, the refrigerant compression operation of the electric compressor 6 stops (step S210).

[0157]

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In this state, the main control device 18 controls the dust sensor 62 and the gas sensor 63 to start operation to sense dust and gas in air around the respective sensors and determines the degree of dirtiness of the air (step S211).

[0158]

When the degree of dirtiness of the air is small, the main control device 18 controls the motor 21A so that the fan 21 rotates at the rotation speed of low-speed rotation set in advance (step S212), performs circulation operation that performs air-sending but does not perform dehumidification (step S213), and returns to step S205 after a certain time.

[0159]

When the degree of dirtiness of the air is large, the main control device 18 emits a close command signal to the drive circuit 29 to close the shutter 51S. The drive circuit 29 starts operation of the motor 51B for drive and moves the shutter 51S to the closed position CL.

[0160]

Through the above-described operation, the entrance 43A of the bypass air path 43 is closed (step S214). The fan 21 is maintained in the "high-speed operation" mode at step S203 and performs the air-cleaning operation "high" (step S215). After a certain time elapses since the timing of step 214 or S215, the main control device 18 returns to step S205 in the dehumidification operation mode in Fig. 12. Note that the threshold of the humidity measured by the humidity sensor 61 at step S205 is 50% as a determination reference for switching to, for example, the dehumidification operation mode or the air-cleaning operation mode, but the threshold may be any other value.

[0161]

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In this manner, since the airflow restriction means 51 that opens and closes the entrance 43A of the bypass air path 43 is provided, an air path appropriate for performing the dehumidification operation and the air-cleaning operation can be easily selected from among the bypass air path 43 and the main air path 44, and thus the dehumidifier 1 having high usability is obtained.

[0162]

Fig. 15 will be described next. Fig. 15 is a flowchart illustrating basic operation steps of the main control device 18 at operation start of the dehumidifier 1 of Embodiment 1.

First, the main power switch (not illustrated) is turned on through the input operation unit 17 and the operation mode switching switch 17S is operated. In this manner, the operation mode of the "dehumidification operation", the "air-cleaning operation", or the like is selected.

[0163]

Accordingly, supply of electric power as a power source from the power source unit 19 to the main control device 18 is started. The main control device 18 checks whether its internal configuration has anomaly.

Then, when no anomaly is found by initial anomaly determination, a command signal for opening the louver 13 is emitted to the drive circuit 13A (step S300).

[0164]

Through step S300, the louver 13 is immediately rotated to a predetermined opened position by the motor 13M. In addition, the main control device 18 emits an open command signal for the shutter 51S to the drive circuit 29. Then, measurement of an elapsed time since this time point is started by the timer unit 24T (step S301).

[0165]

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Drive of the motor 51B of the airflow restriction means 51 is started by the drive circuit 29. The shutter 51S is rotated to the opened position OP by 90° approximately about the shaft 51E by the motor 51B. Accordingly, the entrance 43A of the bypass air path 43 is opened.

[0166]

Subsequently, upon arrival of an open sensing signal from the opening-closing sensing unit 53, the main control device 18 determines whether the entrance 43A of the bypass air path 43 is opened (step S302). When the result of the determination at step S302 is "Yes", a command signal for air-sending start is emitted to the drive circuit 28. A command for air-sending strength in this case is "high", and operation of the fan 21 is started in a "high" operation mode determined based on rated air-sending capacity (step S303).

[0167]

When the result of the determination at step S302 is "No", the operation proceeds to step S304. At step S304, when an elapsed time since step S301 does not exceed a "reference response time" (for example, 10 seconds) determined in advance, the operation returns to step S302 again and performs opening-closing determination based on an open sensing signal from the opening-closing sensing unit 53.

[0168]

When the elapsed time since step S301 exceeds the "reference response time" (for example, 10 seconds) in the processing at step S304, it is determined that anomaly has occurred to the airflow restriction means 51 due to some factor, and it is notified by the notification unit 23 that the shutter 51S is not opened. For example, the notification is made by text or diagram on the display unit 23D. In addition, notification such as "the bypass air path is not appropriately opened" is performed by sound by the sound notification unit 23V.

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Then, after a certain time (for example, 30 seconds) elapses since the time point of these notifications, the main power switch is automatically turned off and the operation is automatically ended (step S305).

[0169]

Note that, instead of step S305, it may be notified by the notification unit 23 that only operation not using the bypass air path 43 is performed, and thereafter, the power source may be automatically cut off as in step S305 when no inputting is performed through the input operation unit 17.

[0170]

Air flow in the dehumidifier 1 of Embodiment 1 when the dehumidification operation and the air-cleaning operation described above are performed will be described next. Fig. 16 is a longitudinal sectional view illustrating air flow in the dehumidifier 1. Fig. 17 is a horizontal sectional view illustrating air flow in the dehumidification operation of the dehumidifier 1. Fig. 18 is a horizontal sectional view illustrating air flow in the air-cleaning operation of the dehumidifier 1. Arrows in Figs. 17 and 18 illustrate air flow (airflow AF) when the dehumidifier 1 operates.

[0171]

In a case of the dehumidification operation, after the louver 13 and the shutter 51S are opened, the motor 21A is driven and the fan 21 starts rotation. Thereafter, the electric compressor 6 starts operation. As the fan 21 rotates, the airflow AF flowing from the suction port 11 to the blowout port 12 is generated inside the case 10. In this case, since the shutter 51S is opened, the entrance 43A of the bypass air path 43 is opened. Air having passed through the suction port cover 11A bifurcates into the bypass air path 43 and the main air path 44.

[0172]

Among the bypass air path 43 and the main air path 44, the main air path 44 has a larger air path area when the dehumidifier 1 is viewed from the front side. As described above with reference to Fig. 9, the projected area of the main air path 44 when the dehumidifier 1 is viewed from the front side is determined by the height dimension H1 and the lateral width W1. Since H1 is 270 mm and W1 is 255 mm as described above, the product thereof is the projected area.

[0173]

The lateral width W7 of the bypass air path 43 is 30 mm (refer to Fig. 9). The height dimension H1 of the bypass air path 43 is 270 mm. Thus, the projected area of each bypass air path 43 is determined by the product of the height dimension H1 and the lateral width W7 (30 mm).

[0174]

Since the HEPA filter 41 and the activated charcoal filter 42 having thicknesses equal to or larger than a certain thickness are positioned in the main air path 44, a pressure drop is larger when the airflow AF passes through the main air path 44. Thus, the amount of bypass airflow AF2 passing through the bypass air path 43 is larger than the amount of main airflow AF1 passing through the main air path 44.

[0175]

In the main air path 44, the airflow (main airflow AF1) having passed through the HEPA filter 41 and the activated charcoal filter 42 joins the bypass airflow AF2 having passed through the bypass air path 43 near the rectification member 38.

[0176]

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The bypass airflow AF2 is airflow having arrived at the vicinity of the rectification member 38 not through the HEPA filter 41 and the activated charcoal filter 42. The bypass air path 43 includes, in the air channel 46 constituting part thereof, the air guiding surface 46A guiding air toward the center of the evaporator 31. Accordingly, the airflow AF1 traveling straight through the bypass air path 43 from the front side changes, on the windward side of the evaporator 31 as part of the heat exchanger, its traveling path toward the central line HL (refer to Figs. 2 and 3) penetrating through the center of the rotational shaft 21B.

[0177]

In other words, the airflow AF1 changes its traveling path toward the horizontal reference line BL extending in the front-back direction and penetrating through the central point of the opening of the bell mouth part 37 (refer to Fig. 4).

Accordingly, the bypass airflow AF2 having passed through the bypass air path 43 and the main airflow AF1 having passed through right and left peripheral parts of the main air path 44 are mixed near the rectification member 38 and flow into the evaporator 31.

[0178]

The bypass airflow AF2 has a larger air volume per unit time than that of the main airflow AF1 passing through the main air path 44. In addition, the bypass airflow AF2 has a faster wind speed than that of the main airflow AF1. Thus, in a case in which the air guiding surface 46A guiding air toward the center of the heat exchanger is not provided in the bypass air path 43, a pressure drop is large, and furthermore, wind speed balance flowing into the heat exchanger is poor, and thus heat exchange efficiency degrades.

[0179]

In a space in the lower course relative to the activated charcoal filter 42, the evaporator 31 as part of the heat exchanger and the rectification member 38 are positioned facing each

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other with the first space 33 (having the interval D3 of 10 mm) interposed therebetween. In addition, the activated charcoal filter 42 as part of the air-cleaning filter and the rectification member 38 are positioned facing each other through the first space 33 (having the interval D3 of 10 mm). Accordingly, the bypass airflow AF2 having passed through the bypass air path 43 and the main airflow AF1 having passed through the main air path 44 are mixed in the second space 34 and the first space 33. Accordingly, the airflow AF flowing into the evaporator 31 can be distributed in a balanced manner and supplied to the evaporator 31, which leads to improvement of heat exchange efficiency.

[0180]

Note that the interval D3 of the first space 33 is 10 mm to 15 mm in practical use. The size of the housing 3 in the depth direction increases as the interval D3 increases. The interval D4 of the second space 34 is 15 mm to 20 mm in practical use. The size of the housing 3 in the depth direction increases as the interval D4 increases.

[0181]

Since the bypass air paths 43 are provided in parallel on the right and left sides of the main air path 44, imbalance of the volume of airflow into the evaporator 31 as part of the heat exchanger can be reduced as compared to a case in which a bypass air path 43 is provided only on one side of the main air path 44, and thus heat exchange efficiency can be improved.

[0182]

Air (airflow AF) passing through the evaporator 31 is subjected to heat exchange with the refrigerant flowing through the evaporator 31. As described above, the refrigerant decompressed by the decompression device (not illustrated) installed halfway through the refrigerant circuit (not illustrated), into which the refrigerant flows from the compressor 6, flows into the evaporator 31. Thus, the refrigerant having a temperature lower than that of

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air taken into the case 10 flows into the evaporator 31. The refrigerant flowing through the evaporator 31 absorbs heat from the air passing through the evaporator 31.

[0183]

As described above, heat of the airflow AF passing through the evaporator 31 is absorbed by the refrigerant flowing through the evaporator 31. In other words, the airflow AF passing through the evaporator 31 is cooled by the refrigerant flowing through the evaporator 31. Accordingly, water in the airflow AF passing through the evaporator 31 condenses and dew condensation occurs. The condensed water in the air is removed as liquid water from the air. The removed water is stored in, for example, the water storage tank 7 (refer to Fig. 1) provided inside the case 10. The water storage tank 7 can be taken out of the case 10.

[0184]

The air having passed through the evaporator 31 is transferred to the condenser 32. Heat exchange is performed between the air passing through the condenser 32 and the refrigerant flowing through the refrigerant pipes of the condenser 32. The refrigerant flowing through the condenser 32 is cooled by the air passing through the condenser 32. The air passing through the condenser 32 is heated by the refrigerant flowing through the condenser 32.

[0185]

The air having passed through the condenser 32 is drier than air outside the dehumidifier 1. The drier air passes through the fan 21. The air having passed through the fan 21 is sent upward from the case 10 through the blowout port 12. In this manner, the dehumidifier 1 dehumidifies introduced air. The dehumidifier 1 can supply the dried air to the outside of the housing 3.

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[0186]

In a case of the air-cleaning operation, after the louver 13 is opened, the motor 21A is driven and the fan 21 starts rotation while the shutter 51S is closed. As the fan 21 rotates, the airflow AF flowing from the suction port 11 to the blowout port 12 is generated inside the case 10. In this case, the entrance 43A of the bypass air path 43 is closed since the shutter 51S is closed. Since the bypass air path 43 is closed, air having passed through the suction port cover 11A passes through only the main air path 44 (only the main airflow AF1 is supplied to the lower course).

[0187]

As the fan 21 operates, pressure inside the case 10 becomes negative, and accordingly, air is introduced into the main air path 44. Since the HEPA filter 41 and the activated charcoal filter 42 are provided in the main air path 44, a pressure drop is larger than in the dehumidification operation. Thus, the rotation speed of the fan 21 when the same volume of air as in the dehumidification operation flows is larger and a load on the motor 21A is larger as well, and as a result, operation noise (such as wind noise of the fan 21) is larger. However, since the airflow AF1 passes through only the main air path 44, air blown out of the blowout port 12 of the dehumidifier 1 is cleaner than in the dehumidification operation. Moreover, the aromatic constituent is removed due to the effect of the activated charcoal filter 42.

[0188]

Air having passed through the main air path 44 flows into the evaporator 31. Air flow after the flow into the evaporator 31 is the same as in the case of the dehumidification operation.

[0189]

Summary of Embodiment 1.

The dehumidifier 1 according to one example of the present disclosure includes:

the housing 3 (case 10) at which the suction port 11 and the blowout port 12 are formed;

an air-sending unit (the fan 21) configured to generate the airflow AF from the suction port 11 to the blowout port 12;

the two filters 41 and 42 as the air-cleaning means positioned inside the housing 3 (case 10); and

the evaporator 31 as a dehumidification means positioned inside the housing 3 (case 10) and configured to remove water in the airflow AF.

The housing 3 includes:

the first air path (main air path 44) along which the airflow AF reaches the evaporator 31 through the filters 41 and 42;

the second air path (bypass air path 43) along which the airflow AF reaches the evaporator 31 not through the filters 41 and 42; and

the airflow restriction means 51 configured to control the volume of the bypass airflow AF2 by changing the opening degree (air path cross-sectional area) of the entrance 43A of the second air path (bypass air path 43) between a fully opened state and a fully closed state.

The second air path (bypass air path 43) has an entrance 43A positioned on the outer periphery side of the filters 41 and 42, and

the second air path (bypass air path 43) has an exit 43B positioned further on the center side (side closer to the central line BL) of the filters 41 and 42 than the entrance 43A.

The dehumidifier 1 further includes

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a control device (the main control device 18) configured to control the air-sending unit 21, the airflow restriction means 51, and the electric compressor 6, and

the control device (main control device 18) controls the airflow restriction means 51 in accordance with environment information.

[0190]

According to the one example, in the dehumidification operation, since air flows along the second air path (bypass air path 43) not extending through the filters 41 and 42, it is possible to lower the rotation speed of the fan 21 and reduce noise generation as compared to a case of performing operation with all air flowing to the filters 41 and 42.

[0191]

Moreover, since the control device (main control device) 18 controls the airflow restriction means 51 in accordance with the environment information, it is possible to automatically perform selection between the dehumidification operation and the air-cleaning operation. In other words, selection of an air path appropriate for performing the dehumidification operation or the air-cleaning operation can be automatically performed by the control device 18, and thus special work for air path selection is not requested for the user, and the dehumidifier having high usability is obtained.

[0192]

Moreover, in the first example, the environment information acquired by the control device (main control device 18) includes at least one of first information indicating humidity and second information indicating air cleanness. Accordingly, the dehumidification operation using the second air path 43, the air-cleaning operation using the main air path 44, or the like can be automatically selected in accordance with the humidity and the degree of

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dirtiness (determined by dust, the aromatic constituent, and the like) of air in a space such as a house or an office in which the dehumidifier 1 is installed.

[0193]

Moreover, in the first example, the control device (main control device 18) drives the air-sending unit and the airflow restriction means 51 to cause the bypass airflow AF2 to flow along the second air path 43 when a first threshold (for example, the humidity is 50%) set for the first information and a second threshold (the degree of dirtiness of air is "small") set for the second information are both satisfied. Accordingly, the dehumidification operation using the second air path 43, the air-cleaning operation using the main air path 44, or the like can be automatically selected in accordance with a certain reference (threshold) and in accordance with the humidity and the degree of dirtiness of air in the space in which the dehumidifier 1 is installed.

[0194]

Moreover, in the first example, the dehumidifier 1 further includes the input operation unit 17 configured to receive an input operation by the user, and the notification unit 23 configured to provide notification of an input result received by the input operation unit. An operation unit for a power switch is provided at the input operation unit 17, and the main control device 18 drives the air-sending unit to generate the airflow AF inside the housing 3 when the power switch is turned on. The main control device 18 acquires the environment information (the humidity and the contamination degree of air) during operation of the air-sending unit and drives the airflow restriction means 51 to cause the airflow to flow along the second air path 43 when the first threshold (for example, the humidity is 50%) set for the first information and the second threshold (the degree of dirtiness of air is "small") set for the second information (the degree of dirtiness of air) are both satisfied (steps S205 and S206 in

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Fig. 14). Accordingly, the dehumidification operation using the second air path 43, the air-cleaning operation using the main air path 44, or the like can be automatically selected in accordance with a certain reference (threshold) and in accordance with the "environment information" such as the humidity in the space and the degree of dirtiness of air, and since the environment information is acquired during operation of the air-sending unit 21, the environment information can be accurately acquired in the situation of surrounding air, and an appropriate operation mode can be selected in accordance with the surrounding environment.

[0195]

Moreover, in the first example, the compressor 6 is an electric compressor configured to perform refrigerant compression operation with power of a motor, the control device (main control device 18) emits command signals for the electric compressor 6, the air-sending unit 21, and the airflow restriction means 51, respectively, and the control device 18 includes an operation program configured to acquire the environment information and determine whether to emit the command signals. Accordingly, the electric compressor 6, the air-sending unit 21, and the airflow restriction means 51 can be each controlled in accordance with the humidity and the degree of dirtiness of air in the space in which the dehumidifier 1 is installed, and an appropriate operation mode can be selected in accordance with the surrounding environment based on a condition defined in the operation program.

[0196]

Moreover, in the first example, the air-sending unit has air-sending capacity that is changeable by the drive circuit 28 upon reception of one of the command signals. Accordingly, operation with appropriate air-sending strength in accordance with the surrounding environment can be performed in accordance with the "environment information" based on a condition defined in the operation program.

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[0197]

Moreover, in the first example, since the humidity sensor 61 is provided to sense "humidity" as a kind of the environment information, the control device 18 can control the volume of airflow by the airflow restriction means 51 in accordance with a result of sensing by the humidity sensor 61, and the dehumidification operation can be efficiently performed in accordance with the humidity in the space.

[0198]

Moreover, in the first example, since the dust sensor 62 and the gas sensor 63 that sense dirtiness of air are provided for "air quality" as a kind of the environment information, the control device 18 can control the volume of airflow by the airflow restriction means 51 in accordance with results of sensing by such air-quality sensors. Thus, the air-cleaning operation can be efficiently performed in accordance with the dirtiness situation of air in the space.

[0199]

Furthermore, the control device 18 can control the volume of airflow by the airflow restriction means 51 in accordance with results of sensing by the humidity sensor 61, the dust sensor 62, and the gas sensor 63, and also controls the air-sending unit 21 or the electric compressor 6 in accordance with theses detection results. Accordingly, the dehumidification operation and the air-cleaning operation can be automatically selected and efficiently performed.

[0200]

Moreover, in the first example, the entrance 43A of the second air path is positioned on the outer periphery side of the air-cleaning means (filters 41 and 42), and the exit 43B of the second air path 43 is positioned further on the center side (side closer to the central line

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BL) of the air-cleaning means than the entrance 43A. With this configuration, in the dehumidification operation, since air flows along the second air path (bypass air path 43) not extending through the filters 41 and 42, it is possible to lower the rotation speed of the fan 21 and reduce noise generation as compared to a case of performing operation with all air flowing to the filters 41 and 42. Furthermore, air from the bypass air path 43 can be guided to the evaporator 31 in the lower course and can be subjected to heat exchange.

[0201]

Moreover, in the first example, the air-cleaning means (filter) is the dust-capture filter 41 having a flat plate shape and installed the first air path 44, and the lateral width dimension W2 (for example, 270 mm) of the evaporator 31 of the dehumidification means is set to be larger than the maximum lateral width dimension W9 (for example, 255 mm) of the filter 41. With this configuration, in the dehumidification operation and the air-cleaning operation, the airflow AF (AF1 and AF2) having passed through the main air path 44 and the second air path (bypass air path 43) not extending through the filters 41 and 42 can be subjected to heat exchange in the evaporator 31 in the lower course.

[0202]

Moreover, in the first example,

The air-cleaning means includes a first filter 41 configured to capture dust from the airflow AF and a second filter 42 (such as an activated charcoal filter) configured to capture an aromatic constituent from the airflow AF. With this configuration, the dehumidifier 1 capable of removing dust and odor can be provided.

[0203]

Moreover, in the first example, the first filter 41 is positioned in the upper course of the airflow AF, and the second filter 42 is positioned in the lower course of the airflow AF in

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contact with or in proximity to the first filter 41. With this configuration, the depth dimension of an air path in the upper course relative to the evaporator 31 can be minimized to reduce increase in the size of the housing 3 (case 10) of the dehumidifier 1.

[0204]

Moreover, in the first example,

the suction port 11 exists at the front surface of the housing 3, and

a projection plane including the suction port 11 and the entrance 43A of the second air path (bypass air path 43) is larger than a projection plane of the first filter 41 and the second filter 42 when the suction port 11 is viewed from the front side of the housing 3. Specifically, as described with reference to Figs. 6 and 9, the second air path (bypass air path 43) ranges by the lateral width dimension W7 (30 mm) of the second air path (bypass air path 43) in the right-left direction from each of right and left end faces of the first filter 41 and the second filter 42. Accordingly, in the dehumidification operation, air can be directly supplied from the second air path (bypass air path 43) to the evaporator 31 not through the filters 41 and 42. In addition, with this configuration, the areas of the first filter 41 and the second filter 42 are not sacrificed, and thus the air-cleaning effect is not impaired.

[0205]

Moreover, in the first example, the entrances 43A of the second air path exist at positions outside right and left edges of the suction port 11 when the suction port 11 is viewed from the front side of the housing 3. Specifically, the entrances 43A of the second air path are positioned on the right side of the right edge of the suction port 11 and on the left side of the left edge thereof, respectively, when the suction port 11 is viewed from the front side of the housing 3. Accordingly, in the dehumidification operation, air can be directly supplied from the second air path (bypass air path 43) to the evaporator 31 not through the filters 41

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and 42. In addition, with this configuration, the areas of the first filter 41 and the second filter 42 are not sacrificed, and thus the air-cleaning effect is not impaired.

[0206]

Moreover, in the first example, each entrance 43A of the second air path is linearly connected to the exit 43B. Specifically, as described above with reference to Fig. 4, the second air path (bypass air path 43) linearly extends from the entrance 43A to the exit 43B, and thus in the dehumidification operation, a large volume of air can be directly supplied from the second air path (bypass air path 43) to the evaporator 31.

[0207]

Moreover, in the first example, the first filter as the HEPA filter 41 has a structure that maintains a predetermined thickness whether or not air to be dehumidified passes through the first filter from the first air path.

Specifically, with a configuration including the frame body 41B to maintain the shape of the filter body 41A as described above with reference to Fig. 8, the first air path (main air path 44) does not largely deform and ventilation performance can be maintained.

[0208]

Moreover, in the first example, outer peripheral surfaces of the first filter 41 and the second filter 42 overlapping each other constitute an inner wall surface of the second air path (bypass air path 43). Accordingly, a dedicated wall that provides partition between the first filter 41 and the second filter 42 is not needed to constitute the second air path (bypass air path 43), and thus the configuration can be simplified, which is advantageous in cost.

[0209]

Moreover, in the first example, the rectification member 38 is a structural object having a flat plate shape and including a large number of ventilation windows 38A (refer to

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Figs. 3 and 4). Accordingly, the main airflow AF1 and the bypass airflow AF2 from the first filter 41 and the second filter 42 can be further averaged at an upper-course stage reaching the evaporator 31. Note that, as described above with reference to Fig. 4, it is further preferable that inner side surfaces of the large number of ventilation windows 38A independent from one another are guide surfaces that are flat over a certain length (D5).

[0210]

Moreover, in the first example, the rectification member 38 having an opposite interval maintained at a certain dimension (the distance D4) or larger from the filters 41 and 42 is provided on a side opposite the suction port 11 with the first filter 41 and the second filter 42 interposed therebetween. Accordingly, the main airflow AF1 and the bypass airflow AF2 from the first filter 41 and the second filter 42 can be further averaged at an upper-course stage reaching the evaporator 31.

[0211]

Moreover, in the first example, the rectification member 38 is provided for preventing the first filter 41 and the second filter 42 from being moved toward the evaporator 31 by the main airflow AF1 passing therethrough. Specifically, the rectification member 38 is a structure having stiffness and installed across the entire upper course relative to the evaporator 31 and thus can prevent the first filter 41 and the second filter 42 from being moved or deformed toward the lower course by the main airflow AF1 penetrating therethrough.

Accordingly, performance degradation due to deformation and movement can be prevented.

[0212]

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Moreover, in the first example, the opposite interval (the distance D3 of the first space 33) between the rectification member 38 and the evaporator 31 is set to 10 mm to 15 mm. Accordingly, the main airflow AF1 and the bypass airflow AF2 can be averaged at an upper-course stage reaching the evaporator 31.

[0213]

Moreover, in the first example, the suction port 11 exists at the front surface of the housing 3 (case 10), and the entrances 43A of the second air path are positioned on the right and left sides, respectively, of the suction port 11 when the suction port 11 is viewed from the front side of the housing 3. With this configuration, in the dehumidification operation, air can be directly supplied from the second air path (bypass air path 43) to the evaporator 31 not through the filters 41 and 42. Thus, imbalance of airflow flowing into the evaporator 31 from the bypass air path 43 can be reduced as compared to a case in which the bypass air path 43 is provided on one side of the main air path 44, and the airflow can flow into the evaporator 31 in a balanced manner. In addition, with this configuration, the areas of the first filter 41 and the second filter 42 are not sacrificed, and thus the air-cleaning effect is not impaired.

[0214]

Moreover, in the first example, the airflow restriction means 51 is an opening-closing means capable of selecting any of a state in which the bypass airflow AF2 passes along the second air path (bypass air path 43) and a state in which the bypass airflow AF2 is blocked along the second air path (bypass air path 43). With this configuration, as described above with reference to Fig. 10, the airflow restriction means 51 can be constituted by the shutter 51S that moves between the opened position OP and the closed position CL, and the motor 51B or the like as a drive source for performing opening-closing operation of the shutter 51S.

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Thus, the airflow restriction means 51 can be easily installed inside the case 10 in which the size of an installation space is restricted.

[0215]

Moreover, in the first example, the airflow restriction means 51 includes the shutter 51S capable of selecting passing or blocking of the bypass airflow AF2 in the second air path 43. Accordingly, the airflow restriction means 51 can be easily installed inside the case 10 in which the size of an installation space is restricted.

[0216]

Moreover, in the first example, the airflow restriction means 51 performs opening-closing operation of the shutter 51S upon reception of an electric signal. Accordingly, the user does not need to manually perform opening-closing operation of the shutter 51S, and a load on the user along with the dehumidification operation can be reduced.

[0217]

Moreover, in the first example, the dehumidifier 1 includes a control unit (the drive circuit 28) configured to control operation of the fan 21 of the air-sending unit, a refrigerant supply means (the compressor 6) configured to supply the refrigerant to the dehumidification means (such as the evaporator 31), a drive unit (the motor 51B) configured to change the position of a shutter 51A, and the control device (main control device 18) configured to control the control unit (drive circuit 28) upon reception of a command from the user. The control device (main control device 18) opens the shutter 51S by emitting a command to the drive unit (motor 51B). Accordingly, the user does not need to manually perform opening-closing operation the shutter 51S, and a load on the user along with the dehumidification operation can be reduced.

[0218]

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During operation of the fan 21, when having received a command from the user or when having sensed that a predetermined "environment condition" is satisfied, the control device (main control device 18) opens the shutter 51S by controlling a second drive unit (motor 51B).

[0219]

Note that the above-described "environment condition" is, for example, "the humidity in a room (space) in which the dehumidifier 1 is installed exceeds 50%" as described in Embodiment 1. Alternatively, the "environment condition" may be, for example, "the humidity exceeds 50% and the degree of dirtiness of air is small" as described above with reference to Fig. 14.

[0220]

With such a configuration, the user does not need to manually perform opening-closing operation the shutter 51S, but the shutter 51S can be automatically opened by performing predetermined inputting through the input operation unit 17. Accordingly, a load on the user along with the dehumidification operation can be reduced.

[0221]

Moreover, in Embodiment 1, the dehumidifier 1 according to a second example below is disclosed.

The dehumidifier 1 according to the second example includes:

the housing 3 (case 10) at which the suction port 11 and the blowout port 12 are formed;

the air-sending unit (fan 21) configured to generate the airflow AF from the suction port 11 to the blowout port 12;

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the two filters 41 and 42 as the air-cleaning means positioned inside the housing 3 (case 10); and

the evaporator 31 as a dehumidification means positioned inside the housing 3 (case 10) and configured to remove water in the airflow AF.

The housing 3 includes:

the first air path (main air path 44) along which the airflow AF reaches the evaporator 31 through the filters 41 and 42;

the second air path (bypass air path 43) along which the airflow AF reaches the evaporator 31 not through the filters 41 and 42; and

the airflow restriction means 51 configured to control the volume of the bypass airflow AF2 by changing the opening degree (air path cross-sectional area) of each entrance 43A of the second air path (bypass air path 43) between a fully opened state and a fully closed state.

The suction port 11 exists at the front surface of the housing 3,

a projection shape of the suction port 11 when viewed from the front side of the housing 3 is square or rectangular,

the entrances 43A of the second air path are formed continuously adjacent outside right and left edge parts of the suction port 11 and symmetric in the right-left direction, and

the evaporator 31 is positioned inside an outer edge of the projection shape of the suction port 11 in effect when viewed from the front side of the housing 3.

The dehumidifier 1 further includes the control device (main control device 18 configured to control the air-sending unit, the airflow restriction means 51, and the electric compressor 6, and

the control device 18 controls the airflow restriction means 51 in accordance with the environment information.

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[0222]

With this configuration, the control device (main control device 18) can control the airflow restriction means 51 in accordance with the environment information and can automatically perform selection between the dehumidification operation and the air-cleaning operation. In other words, selection of an air path appropriate for performing the dehumidification operation or the air-cleaning operation can be automatically performed by the control device 18, and thus special work is not requested for the user, and the dehumidifier having high usability is obtained.

[0223]

Furthermore, with this configuration, in the dehumidification operation, air flows along the second air path (bypass air path 43) not extending through the air-cleaning means having a large pressure drop, and thus it is possible to lower the rotation speed of the fan 21 and reduce noise generation as compared to a case of performing operation with all air flowing to the air-cleaning means.

[0224]

Moreover, when the suction port 11 is viewed from the front side of the housing 3, the second air path (bypass air path 43) symmetrically protrudes outward from right and left end faces of the suction port 11. Accordingly, the bypass airflow AF2 can be supplied to the evaporator 31 from both sides in a balanced manner without sacrificing the air filtration (cleaning) area of the air-cleaning means (filters 41 and 42).

[0225]

Moreover, in the second example, a projection shape of the evaporator 31 when viewed from the front side of the housing 3 is square or rectangular, and a large number of heat-exchange fins having minute void spaces through which the airflow AF passes are

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provided. Accordingly, the bypass airflow AF2 can be supplied in a balanced manner from the bypass air path 43 to heat-exchange fin parts at right and left end parts when the evaporator 31 is viewed from the front side.

[0226]

Moreover, in the second example, when the evaporator 31 is viewed from the front side of the housing 3, the lateral width dimension W2 (270 mm; refer to Fig. 7) is larger than the lateral width dimensions W8 and W9 (255 mm; refer to Fig. 8) of the air-cleaning means (filters 41 and 42) and smaller than the lateral width dimension (clearance dimension) W1 (315 mm; refer to Fig. 6) of the suction port 11. Accordingly, the bypass airflow AF2 and the main airflow AF1 can be efficiently supplied from the bypass air path 43 and the main air path 44 to heat-exchange plate fin 31F parts at right and left end parts when the evaporator 31 is viewed from the front side.

[0227]

Moreover, in Embodiment 1, the dehumidifier 1 according to a third example below is disclosed.

The dehumidifier 1 according to the third example includes:

the housing 3 (case 10) at which the suction port 11 and the blowout port 12 are formed;

the air-sending unit (fan 21) configured to generate the airflow AF from the suction port 11 to the blowout port 12;

the two filters 41 and 42 as the air-cleaning means positioned inside the housing 3 (case 10); and

the evaporator 31 as a dehumidification means positioned inside the housing 3 (case 10) and configured to remove water in the airflow AF.

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The housing 3 includes:

the first air path (main air path 44) along which the airflow AF reaches the evaporator 31 through the filters 41 and 42;

the second air path (bypass air path 43) along which the airflow AF reaches the evaporator 31 not through the filters 41 and 42; and

the airflow restriction means 51 configured to control the bypass airflow AF2.

In addition, the rectification member 38 provided with a large number of the ventilation windows 38A partitioned by the frames 38B is positioned transversely in front of the evaporator 31 at a position where the main airflow AF1 having passed through the first air path and the bypass airflow AF2 having passed through the second air path join.

The dehumidifier 1 further includes the control device (main control device 18) configured to control the air-sending unit 21, the airflow restriction means 51, and the electric compressor 6, and the control device controls the airflow restriction means 51 in accordance with the environment information.

[0228]

With this configuration, the control device (main control device 18) controls the airflow restriction means 51 in accordance with the environment information and can automatically perform selection between the dehumidification operation and the air-cleaning operation. In other words, selection of an air path appropriate for performing the dehumidification operation or the air-cleaning operation can be automatically performed by the control device 18, and thus special work is not requested for the user, and the dehumidifier having high usability is obtained.

[0229]

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Moreover, with existence of the rectification member 38, it is possible to prevent distribution of the airflow AF at an upper-course stage reaching the evaporator 31 from concentrating on a local part of the evaporator 31. Thus, airflow in each of the first air path and the second air path can efficiently pass toward the evaporator 31 in the lower course, and dehumidification efficiency can be improved.

[0230]

Embodiment 2.

Figs. 19 and 20 illustrate the dehumidifier 2 of Embodiment 2.

Fig. 19 is a longitudinal sectional view illustrating air flow in the dehumidification operation of a dehumidifier 2 of Embodiment 2. Fig. 20 is a longitudinal sectional view illustrating air flow in the air-cleaning operation of the dehumidifier 2 of Embodiment 2. Note that any part identical or equivalent to a component in Embodiment 1 described above with reference to Figs. 1 to 18 is denoted by the same reference sign.

[0231]

In Embodiment 2, the position of the bypass air path 43 described in Embodiment 1 is changed and the bypass air path 43 is provided below the suction port 11.

[0232]

In Embodiment 1, the bypass air path 43 is provided on the right and left sides of the HEPA filter 41 and the activated charcoal filter 42, and the bypass air path 43 and the main air path 44 are provided in parallel to each other on the left and right sides of the suction port 11.

[0233]

However in Embodiment 2, a bypass air path 45 is provided below the HEPA filter 41 and the activated charcoal filter 42, and the bypass air path 45 and the main air path 44 are

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provided in parallel to each other at a lower part of the suction port 11. In Embodiment 2, no bypass air path is provided on the right and left sides of the HEPA filter 41 and the activated charcoal filter 42.

[0234]

In Embodiment 2, the bypass air path 45 having a lateral width dimension (W1) corresponding to the lateral width dimensions of the HEPA filter 41 and the activated charcoal filter 42 is provided below the HEPA filter 41 and the activated charcoal filter 42. The bypass air path 45 is part of an air path from the suction port 11 to the blowout port 12 in a space provided inside the front case 10F.

[0235]

With this configuration, for example, when the lateral width dimensions of the HEPA filter 41 and the activated charcoal filter 42 are 255 mm, the lateral width dimension W7 of the bypass air path 43 is not 30 mm as in Embodiment 1 but is 255 mm approximately in Embodiment 2. Instead, the dimension of the entrance 43A in the up-down direction is set to 30 mm approximately.

[0236]

The bypass air path 43 is an air path along which the bypass airflow AF2 flows to the lower course not through the HEPA filter 41 and the activated charcoal filter 42. The main air path 44 is an air path provided with the HEPA filter 41 and the activated charcoal filter 42.

[0237]

The bypass air path 43 and the main air path 44 have a vertical positional relation and are positioned in the front-back direction. In this manner, the bypass air path 43 is adjacently positioned below the main air path 44, and thus the dimension of the dehumidifier 2 in the right-left direction can be reduced.

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[0238]

When the dehumidifier 2 is viewed from the front surface, the length of the bypass air path 45 in the lateral direction (right-left direction) is preferably set to be approximately equal to the length of the bypass air path 45 of the HEPA filter 41 in the lateral direction (right-left direction). Note that "the front surface of the dehumidifier 2" is defined for the purpose of description of Embodiment 2 and different from that in a case in which the dehumidifier 2 is actually used.

[0239]

The bypass air path 43 and the main air path 44 communicate with the outside of the case 10 through the space in the lower course relative to the activated charcoal filter 42, in other words, through the second space 34, the rectification member 38, the first space 33, and the blowout port 12.

[0240]

Specifically, similarly to the configuration described in Embodiment 1, the rectification member 38 faces the front surface of the evaporator 31 as part of the heat exchanger with the first space 33 interposed therebetween. In other words, the rectification member 38 faces the evaporator 31 at the predetermined distance D3 (refer to Figs. 5 and 6).

[0241]

The rectification member 38 also faces the back surface of the activated charcoal filter 42 with the second space 34 interposed therebetween. In other words, the rectification member 38 faces the back surface of the activated charcoal filter 42 at the predetermined distance D4.

[0242]

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The main airflow AF1 having penetrated through the main air path 44 and the bypass airflow AF2 having passed through the bypass air path 43 join and become one air path before the rectification member 38 positioned in the lower course relative to the activated charcoal filter 42.

[0243]

The air channel 46 extending from the port edge part of the suction port 11 to the back side is installed to cover lower end faces of the HEPA filter 41 and the activated charcoal filter 42 at an interval.

[0244]

A void space between the front end part of the air channel 46 and the lower end face of the HEPA filter 41 serves as the entrance 43A of the bypass air path 43. One air guiding surface 46A is provided at the back end part of the air channel 46. The air guiding surface 46A is provided to change the direction of the bypass airflow AF2 traveling inside the bypass air path 43 to the upward direction (elevation direction) and guide the bypass airflow AF2 toward the center of the evaporator 31 (the second central point OB illustrated in Fig. 7).

[0245]

The air guiding surface 46A is formed as, for example, a flat surface. The direction in which the bypass airflow AF2 is guided can be adjusted by adjusting the normal direction of the flat surface. Alternatively, the air guiding surface 46A may be formed as a curved surface. Spread of the guided bypass airflow AF2 can be adjusted by adjusting the curvature of the curved surface.

[0246]

The bypass air path 43 is provided with the shutter 51S for opening and closing the air path. The shutter 51S is formed of a plate member. The shutter 51S is positioned in the

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lower course relative to the suction port cover 11A. For example, the shutter 51S is pivotally supported by a shaft (not illustrated) on a side opposite the HEPA filter 41, that is, on the lower end side of the shutter 51S having a plate shape, and is driven by the motor 51B (not illustrated) for drive of the opening-closing means. The rotation angle of the motor 51B is controlled by the main control device 18 (not illustrated). Thus, it is preferable to use a stepping motor as the motor 51B.

[0247]

The shutter 51S opens and closes the entrance 43A of the bypass air path 43. The shutter 51S is driven by the motor 51B (not illustrated) for drive about the rotational shaft 51E (not illustrated) in the lower course of the bypass airflow AF2 between a position at which the bypass air path 43 is closed and a position at which the bypass air path 43 is opened. Since the shutter 51S is formed of one plate member and one rotational shaft 51E is driven by the motor 51B for drive of the opening-closing means, the dehumidifier 1 having a simple configuration and capable of easily performing opening-closing control is obtained.

[0248]

In Embodiment 2 as well, the gas sensor 63 is installed although not illustrated. The gas sensor 63 is positioned inside the case 10 on the right or left side of the suction port 11 at a position on the lower side of the suction port 11 or in the vicinity of the suction port 11. In addition, an opening (not illustrated) for communication with the outside of the case 10 is provided at the wall surface of the case 10 in the vicinity of the gas sensor 63. The opening allows the gas sensor 63 to easily sense indoor air around the dehumidifier 2.

[0249]

As described in Embodiment 1, the gas sensor 63 transmits gas detection data to the main control device 18, and the odor degree of indoor air can be determined based on the gas

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detection data by the main control device 18. Similarly to Embodiment 1, a result of measurement by the gas sensor 63 can be displayed on the display unit 23D by the main control device 18.

[0250]

Similarly to the operation of the dehumidifier 1 of Embodiment 1, the operation of the dehumidifier 2 of Embodiment 2 has the dehumidification operation mode, the air-cleaning operation mode, and the dehumidification air-cleaning operation mode. Opening-closing control and open-degree control of the shutter 51S in the dehumidification operation mode, the air-cleaning operation mode, and the dehumidification air-cleaning operation mode are the same as opening-closing control of the shutter 51S in the dehumidifier 1 of Embodiment 1. Note that the open degree is a ratio in which the flow rate of the bypass airflow AF2 flowing through the bypass air path 43 is expressed in the range of 100% to 0% (closed state), and is an open ratio such as 80%, 70%, 50%, or 30% at an intermediate stage.

[0251]

Summary of Embodiment 2.

In Embodiment 2, the dehumidifier 2 below is disclosed. The dehumidifier 2 exemplarily described in Embodiment 2 includes:

the housing 3 (case 10) at which the suction port 11 and the blowout port 12 are formed;

the air-sending unit (fan 21) configured to generate the airflow AF from the suction port 11 to the blowout port 12;

the two filters 41 and 42 as the air-cleaning means positioned inside the housing 3 (case 10); and

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the evaporator 31 as a dehumidification means positioned inside the housing 3 (case 10) and configured to remove water in the airflow AF.

The housing 3 includes:

the first air path (main air path 44) along which the airflow AF reaches the evaporator 31 through the filters 41 and 42;

the second air path (bypass air path 43) along which the airflow AF reaches the evaporator 31 not through the filters 41 and 42; and

the airflow restriction means 51 configured to control the volume of the bypass airflow AF2 along the second air path (bypass air path 43).

The entrance 43A of the second air path is positioned on the lower side and the outer periphery side of the filters 41 and 42, and

the exit 43B of the second air path 43 is positioned further on the center side (side closer to the central line BL) of the filters 41 and 42 than the entrance 43A.

The dehumidifier 2 further includes the control device (main control device 18) configured to control the air-sending unit, the airflow restriction means 51, and the electric compressor 6, and

The main control device 18 controls the airflow restriction means 51 in accordance with the environment information.

[0252]

With this configuration, in the dehumidification operation, since air flows along the second air path (bypass air path 43) not extending through the filters 41 and 42, it is possible to lower the rotation speed of the fan and reduce noise generation as compared to a case of performing operation with all air flowing to the filters 41 and 42.

[0253]

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Moreover, since the control device (main control device 18) controls the airflow restriction means 51 in accordance with the environment information, it is possible to automatically perform selection between the dehumidification operation and the air-cleaning operation. In other words, selection of an air path appropriate for performing the dehumidification operation or the air-cleaning operation can be automatically performed by the control device 18, and thus special work for air path selection is not requested for the user, and the dehumidifier having high usability is obtained. Note that the same effect as described in Embodiment 1 is obtained for any other feature having the same configuration as in Embodiment 1.

[0254]

Furthermore, in Embodiment 2, the second air path (bypass air path 43) is positioned below the HEPA filter 41 and the activated charcoal filter 42, and the second air path (bypass air path 43) and the main air path 44 are positioned in parallel in a vertical positional relation, and thus the dimension (lateral width) of the dehumidifier 2 in the right-left direction can be reduced.

[0255]

Note that, in Embodiment 2, the bypass air path 43 is adjacently positioned below the main air path 44. The air guiding surface 46A provided in the bypass air path 43 changes the direction of airflow passing through the bypass air path 43 from the horizontal direction to the upward direction (elevation direction) and guides the airflow toward the center of the evaporator 31. The bypass air path 43 may be adjacently positioned above the main air path 44. In this case, the air guiding surface 46A provided in the bypass air path 43 may change the direction of airflow passing through the bypass air path 43 from the horizontal direction to

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the downward direction (depression direction) and guide the airflow toward a central part of the evaporator 31.

[0256]

Embodiment 3.

Figs. 21 to 26 illustrate the dehumidifier 1 of Embodiment 3. Figs. 21 to 23 illustrate the dehumidifier 1 of Embodiment 3. Fig. 21 is a partially simplified perspective view of the dehumidifier. Fig. 22 is an exploded transverse sectional view of a front case part of the dehumidifier 1 in Fig. 21 when taken along line C-C. Fig. 23 is a front view of a suction port frame used in the dehumidifier 1 in Fig. 21. Fig. 24 is a longitudinal (vertical) sectional view of a right-left central part of the dehumidifier 1 illustrated in Fig. 21. Fig. 25 is a block diagram illustrating main control-related components of the dehumidifier 1 illustrated in Fig. 21. Note that any part identical or equivalent to a component in the embodiments described above with reference to Figs. 1 to 20 is denoted by the same reference sign.

[0257]

In Embodiment 3, the configuration of components constituting the bypass air path 43 described in Embodiment 1 is changed. As for other characteristics, a person sensing unit 64 as an example of a surroundings information acquisition unit configured to sense whether a person such as a user exists is provided in a space in which the dehumidifier 1 is installed, and an infrared sensor 64S configured to sense existence of a person is installed in the housing 3.

[0258]

As illustrated in Fig. 21, a suction port frame 50 that is square when viewed from the front side is fitted in the front case 10F at which the suction port 11 is formed. The suction port frame 50 is entirely formed of a thermoplastic plastic material by integral molding.

[0259]

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When the suction port frame 50 is viewed from the front side, a right peripheral wall 50R and a left peripheral wall 50L are coupled through an upper wall part 50T and a lower wall part 50U as illustrated in Fig. 23. A right bypass air path 43 is formed inside the upper wall part 50T, the lower wall part 50U, and the right peripheral wall 50R.

[0260]

Fig. 22(A) illustrates a state in which the suction port frame 50 is incorporated in the front case 10F, but the suction port cover 11A is not mounted as illustrated with dashed lines.

[0261]

Fig. 22(B) illustrates a state before the suction port frame 50 is incorporated in the front case 10F. Thus, sectional shapes of the suction port frame 50 and the front case 10F are clearly understood. Note that, in Fig. 22(B) as well, the suction port cover 11A is not mounted as illustrated with dashed lines.

[0262]

A left bypass air path 43 is formed inside the upper wall part 50T, the lower wall part 50U, and the left peripheral wall 50L. The sizes of the entrances 43A and exits 43B of the right and left bypass air paths 43 are set to the same dimensions (diameters).

[0263]

Reference sign 50B denotes stepped parts (recesses) formed at front end parts of the peripheral walls 50L and 50R and provided for fitting with the suction port cover 11A. Thus, with the stepped parts 50B, the suction port cover 11A can be detachably installed on the case 10 and prevented from being protruded on the front side of the front surface of the front case 10F.

[0264]

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As described above, in one characteristic configuration of Embodiment 3, right peripheral walls 50R1 and 50R2 and left peripheral walls 50L1 and 50L2 are formed as partition walls that are continuous from the port edge of the suction port 11 to the lower course of the airflow AF, and a space between the entrance 43A and exit 43B of each bypass air path 43 is partitioned into two spaces by the partition walls (peripheral walls 50R1 and 50R2 or 50L1 and 50L2).

[0265]

One of the two spaces serves as the first air path, and the other space serves as the second air path (bypass air path 43). Specifically, instead of the bypass air path 43 formed by using outer peripheral end faces of the two filters 41 and 42 as described in Embodiments 1 and 2, the bypass air path 43 of a predetermined size is partitioned and formed inside the suction port frame 50.

[0266]

Fig. 24 will be described next. In the dehumidifier 1 in Fig. 24, similarly to Embodiment 1, the bypass air path 43 and the main air path 44 are adjacently formed in the right-left direction.

[0267]

The infrared sensor 64S configured to sense heat is provided on the back surface side of the housing 3 of the dehumidifier 1. The infrared sensor 64S is a sensor configured to detect the surface temperature of a target region in a non-contact state. The infrared sensor 64S is connected to the person sensing unit 64 (refer to Fig. 25).

[0268]

Presence of a person in a space is determined based on a result of sensing by the infrared sensor 64S. For example, when a large change has occurred to the result of sensing by the infrared sensor 64S, it is estimated that a heat source has moved and it is determined that a person exists. The infrared sensor 64S only needs to be able to sense presence of a person and may be any other person sensing sensor such as an ultrasonic wave sensor.

[0269]

The infrared sensor 64S has a sensing range (target region) set on the back surface side of the housing 3 of the dehumidifier 1, in other words, on the back side of the back case 10B. In actual use of the dehumidifier 1, the back case 10B is a side from which a person such as a user approaches. Thus, it is preferable to install the dehumidifier 1 such that the back case 10B side faces, for example, a central part of a room.

[0270]

Opening and closing of the shutter 51S may be controlled by determining existence (presence) of a person with the infrared sensor 64S. For example, when the person sensing unit 64 senses that a person exists in the room based on a sensing signal from the infrared sensor 64S, the main control device 18 may emit a command signal to the airflow restriction means 51 to close the shutter 51S based on an assumption that dust flies along with movement of the person. Accordingly, operation of the drive motor 51B is controlled and performed in a state in which the shutter 51S is closed. Thus, the air-cleaning operation is automatically performed without a special inputting operation from a user.

[0271]

Fig. 25 will be described next. Reference sign 64 denotes a person sensing unit configured to receive a sensing signal from the infrared sensor 64S and determine existence of a person. The person sensing unit 64 does not need to be provided as dedicated hardware but may be implemented as part of a program that implements functions of the main control

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device 18. Alternatively, a processing circuit shared with other sensors (for example, the dust sensor 62) may be provided to have a person sensing function.

[0272]

Reference sign 64M denotes a drive mechanism for enlarging the sensing range of the infrared sensor 64S. When having received a command signal from the main control device 18, the drive mechanism 64M drives a drive source such as an actuator including an electric or mechanical constituent component such as an electric motor.

[0273]

The infrared sensor 64S is fixed to the drive mechanism 64M. When the drive mechanism 64M is driven, a temperature sensing surface of the infrared sensor 64S is directed in a constant range (for example, 45° in the right-left direction and 15° in the up-down direction) in the up-down direction and the horizontal direction as illustrated with a dashed line in Fig. 24. Thus, the sensing range is enlarged through operation of the drive mechanism 64M. Note that the drive mechanism 64M changes the direction of the sensing surface of the infrared sensor 64M at a constant time interval. This drive pattern is determined by the main control device 18. Note that it is not essential to provide the drive mechanism 64M.

[0274]

The infrared sensor 64S of the person sensing unit 64 may allow the range of person sensing to be selected by a user. For example, the sensing range may be input from the user by using the input operation unit 17 and the display unit 23D. The sensing range may be displayed as a figure or the like on the display unit 23D and determined by using the input operation unit 17 while viewing the display.

[0275]

Summary of Embodiment 3.

As described above, in Embodiment 3, the suction port frame 50 is incorporated in the front case 10F to form the bypass air paths 43.

Specifically, the embodiment has a configuration in which the bypass air paths 43 are not formed by using the outer peripheral end faces of the two filters 41 and 42 as described in Embodiments 1 and 2.

Thus, the bypass air paths 43 having ventilation performance not affected by the positions, shapes, and the like of the outer peripheral end faces of the filters 41 and 42 are formed. Specifically, ventilation performance of the bypass air paths 43 potentially degrades when the installation positions of the filters 41 and 42 are changed after the filters 41 and 42 are temporarily removed for replacement or inspection and then installed again for operation.

[0276]

However, according to the configuration of Embodiment 3, ventilation performance of the bypass air paths 43 is not directly affected even when the installation positions of the filters 41 and 42 are changed. Thus, desired ventilation performance can be ensured in use for a long duration. Accordingly, stable dehumidification performance can be maintained.

[0277]

Moreover, according to the dehumidifier 1 of Embodiment 3, the infrared sensor 64S configured to sense heat emitted from a person such as a user is installed in a space in which the dehumidifier 1 is installed, and the person sensing unit 64 configured to sense existence of a person based on sense data from the infrared sensor 64S is provided.

The main control device 18 controls opening-closing operation of the shutter 51S of the airflow restriction means 51 in accordance with a person sensing result from the person sensing unit 64.

With this configuration, according to Embodiment 3, it is possible to appropriately and automatically select the air-cleaning operation or the dehumidification operation in accordance with existence of a person such as a user in the room.

[0278]

Moreover in Embodiment 3, the main control device 18 acquires information (person sensing information) related to existence of a person such as a user based on sensing information from the infrared sensor 64S as a kind of surroundings information, and performs one of operations below when a third threshold (for example, a person exists for a certain time or longer) set for the person sensing information (third information) is satisfied.

(1) In a case of an "air-cleaning prioritized mode", the state of each second air path 43 is changed by the airflow restriction means 51 from a state in which the bypass airflow AF2 flows to a state in which the bypass airflow AF2 does not flow, or the closed state of the second air path 43 (state in which the bypass airflow AF2 does not flow) is maintained by the airflow restriction means 51.

(2) In a case of an "operation-noise reducing mode", the state of each second air path 43 is changed by the airflow restriction means 51 from a state in which the bypass airflow AF2 does not flow to a state in which the bypass airflow AF2 flows, or the opened state of the second air path 43 (state in which the bypass airflow AF2 flows) is maintained by the airflow restriction means 51.

[0279]

The "air-cleaning prioritized mode" is an operation mode that can be selected through the operation mode switching switch 17S of the input operation unit 17. Specifically, the "air-cleaning prioritized mode" is a useful operation mode in which, when it is sensed (by the dehumidifier 1) that a person exists in a living space or the like, a situation in which dust or

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the like is generated with movement of the person or the like is assumed and handled. The "operation-noise reducing mode" is an operation mode that can be selected through the operation mode switching switch 17S of the input operation unit 17. Specifically, the "operation-noise reducing mode" is an operation mode in which, when it is sensed (by the dehumidifier 1) that a person exists a living space or the like, it is intended to maintain a desirable space by reducing operation noise of the dehumidifier 1 as much as possible, and this mode is a useful operation mode, as well. Note that any other advantage in Embodiment 3 is equivalent to that described in Embodiments 1 and 2.

[0280]

Embodiment 4.

Embodiment 4 will be described next. Fig. 26 illustrates the configuration of the dehumidifier 1 of Embodiment 4. Fig. 26 is a longitudinal (vertical) sectional view of a right-left central part of the dehumidifier of Embodiment 4. Note that any part identical or equivalent to a component in the embodiments described above with reference to Figs. 1 to 25 is denoted by the same reference sign, and duplicate description thereof is omitted.

[0281]

In Embodiment 4, information related to the brightness in a space in which the dehumidifier 1 is installed is acquired as a kind of the surroundings information. Thus, as a characteristic, an illuminance determination unit 65 (not illustrated) for surroundings information acquisition is provided and an illuminance sensor 65S configured to sense illuminance is installed in the housing 3.

[0282]

As illustrated in Fig. 26, the illuminance sensor 65S is positioned on an upper surface 10UF of the case 10 (front case 10F) of the dehumidifier 1. The illuminance sensor 65S is a

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sensor configured to detect the brightness in the space. The illuminance sensor 65S is connected to the main control device 18 through the illuminance determination unit 65 (not illustrated).

[0283]

The illuminance determination unit 65 does not need to be provided as dedicated hardware but may be implemented as part of a program that implements functions of the main control device 18. Alternatively, a processing circuit shared with other sensors (for example, the dust sensor 62) may be provided to have an illuminance determination function.

[0284]

The main control device 18 may detect the brightness in the space by using the illuminance sensor 65S and control opening-closing operation (adjustment of the opening degree) of the shutter 51S by driving the motor 51B of the airflow restriction means 51. For example, when the space is dark, the main control device 18 assumes that it is night, and performs operation in a state in which the shutter 51S is opened to a fully opened state to reduce operation noise.

[0285]

Summary of Embodiment 4.

As described above, the dehumidifier 1 disclosed in Embodiment 4 includes the illuminance determination unit 65 and the illuminance sensor 65S for sensing brightness in addition to components in Embodiment 1. The illuminance determination unit 65 determines illuminance by using illuminance measurement data from the illuminance sensor 65S. Then, the main control device 18 determines the opening-closing degree of the bypass air path 43 by using the airflow restriction means 51 in accordance with a result of the illuminance determination. In this manner, the main control device 18 automatically

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controls opening and closing of the bypass air path 43 in accordance with the brightness in a room, and thus the air-cleaning operation or the dehumidification operation can be appropriately selected.

[0286]

Note that, in Embodiment 4, the person sensing unit 64 described in Embodiment 3 is provided as well, and thus control based on sensing of person existence can be performed as described in Embodiment 4.

[0287]

Various sensors (the humidity sensor 61, the dust sensor 62, and the gas sensor 63) configured to acquire the "environment information" and various sensors (the infrared sensor 64S, the illuminance sensor 65S) configured to acquire the "surroundings information" described in Embodiments 1 to 4 may be used alone or in combination as appropriate.

Industrial Applicability

[0288]

A dehumidifier according to the present disclosure can be used to dehumidify indoor air, for example.

[0289]

In the claims which follow and in the preceding description of the disclosure, except where the context requires otherwise due to express language or necessary implication, the word “comprise” or variations such as “comprises” or “comprising” is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the disclosure.

[0290]

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

[0291]

It will be understood to persons skilled in the art of the disclosure that many modifications may be made without departing from the spirit and scope of the disclosure.

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Reference Signs List

[0289]

1 dehumidifier

2 dehumidifier

3 housing

5 window

6 electric compressor

7 water storage tank

8 operation display board

10 case

10F front case

10B back case

11 suction port

11A suction port cover

11A1 vertical bar

11A2 horizontal bar

12 blowout port

13 louver

15 operation notification unit

16 board box

17 input operation unit

17S operation mode switching switch

18 main control device

19 power source unit

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20 wheel

21 fan

21A motor

22 refrigerant pipe

23 notification unit

23D display unit

23V sound notification unit

24 CPU

24T timer unit

25 storage means

26 wireless communication unit

27 drive circuit

28 drive circuit

29 drive circuit

31 evaporator

32 condenser

33 first space

34 second space

35 room temperature sensor

36 fan case

37 bell mouth part

38 rectification member

41 HEPA filter

42 activated charcoal filter

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43 bypass air path

44 main air path

46 air channel

46A air guiding surface

50 suction port frame

50B stepped part

50R1 peripheral wall (partition wall)

50R2 peripheral wall (partition wall)

50L1 peripheral wall (partition wall)

50L2 peripheral wall (partition wall)

51 airflow restriction means

51B motor

51C sensor

51D sensor

51S shutter

53 opening-closing sensing unit

61 humidity sensor

62 dust sensor

63 gas sensor

64 person sensing unit (surroundings information acquisition unit)

64S infrared sensor

65 illuminance determination unit (surroundings information acquisition unit)

65S illuminance sensor

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CLAIMS

1. A dehumidifier comprising:

a housing including a suction port and a blowout port formed in the housing;

an air-sending unit configured to generate airflow from the suction port to the blowout port;

an air-cleaning means positioned inside the housing; and

a dehumidification means positioned inside the housing and configured to remove water in the airflow,

the dehumidifier further comprising:

a first air path that is formed inside the housing and along which the airflow reaches the dehumidification means through the air-cleaning means;

a second air path that is formed inside the housing and along which the airflow reaches the dehumidification means not through the air-cleaning means;

an airflow restriction means configured to restrict the airflow along the second air path;

a compressor configured to supply a refrigerant to the dehumidification means; and

a control device configured to control the air-sending unit, the airflow restriction means, and the compressor,

wherein the control device controls the airflow restriction means in accordance with environment information including first information indicating humidity and second information indicating air cleanness and in accordance with surroundings information, and drives the air-sending unit and the airflow restriction means to cause the airflow to flow along the second air path when a first threshold set for the first information and a second threshold set for the second information are both satisfied.

2. The dehumidifier according to claim 1, further comprising:

an input operation unit configured to receive an input operation by a user; and

a notification unit configured to provide notification of an input result received by the input operation unit, wherein

an operation unit for a power switch is provided at the input operation unit,

the control device drives the air-sending unit to generate the airflow inside the housing when the power switch is turned on, and

the control device acquires the environment information during operation of the air-sending unit and drives the airflow restriction means to cause the airflow to flow along the second air path when a first threshold that is set for the first information and a second threshold that is set for the second information are both satisfied.

3. The dehumidifier according to claim 1 or 2, wherein:

the compressor is an electric compressor configured to perform refrigerant compression operation with power of a motor,

the control device emits command signals for the electric compressor, the air-sending unit, and the airflow restriction means, respectively, and

the control device includes an operation program configured to acquire at least one of the environment information and the surroundings information and determine whether to emit the command signals.

4. The dehumidifier according to claim 3, wherein the air-sending unit has air-sending capacity that is changeable upon reception of one of the command signals.

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5. The dehumidifier according to any one of the preceding claims, wherein the surroundings information includes at least one of third information indicating existence of a person and fourth information indicating brightness in a dehumidification target space.

6. The dehumidifier according to claim 5, wherein the control device:

acquires the third information based on sensing information from an infrared sensor, and

performs one of first operation and second operation when a third threshold that is set for the third information is satisfied,

and wherein:

the first operation in an air-cleaning prioritized mode is operation of changing, by the airflow restriction means, a state of the second air path from a state in which the airflow flows to a state in which the airflow does not flow, or operation of maintaining a state in which the second air path is closed by the airflow restriction means, and

the second operation in an operation-noise reducing mode is operation of changing, by the airflow restriction means, the state of the second air path from the state in which the airflow does not flow to the state in which the airflow flows, or operation of maintaining a state in which the second air path is opened by the airflow restriction means.

7. The dehumidifier according to claim 5 or 6, wherein the control device:

acquires the fourth information based on sensing information from an illuminance sensor, and

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drives the airflow restriction means to cause the airflow to flow along the second air path when a fourth threshold that is set for the fourth information is satisfied.

8. The dehumidifier according to any one of the preceding claims, wherein:

the second air path has an entrance positioned on an outer periphery side of the air-cleaning means, and

the second air path has an exit positioned further on a center side of the air-cleaning means than the entrance.

9. The dehumidifier according to any one of the preceding claims, wherein:

the air-cleaning means is a filter having a flat plate shape and installed on the first air path, and

a lateral width dimension of an evaporator of the dehumidification means is set to be larger than a maximum lateral width dimension of the filter.

10. The dehumidifier according to any one of claims 1 to 8, wherein the air-cleaning means includes a first filter configured to capture dust from the airflow and a second filter configured to capture an aromatic constituent from the airflow.

11. The dehumidifier according to claim 10, wherein:

the first filter is positioned further in an upper course of the airflow than the second filter, and

the second filter is positioned in contact with or in proximity to the first filter.

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12. The dehumidifier according to claim 10 or 11, wherein:

the suction port exists at a front surface of the housing, and

a projection plane including the suction port and an entrance of the second air path is larger than a projection plane of the first filter and the second filter when the suction port is viewed from a front side of the housing.

13. The dehumidifier according to any one of the preceding claims, wherein:

the suction port exists at a front surface of the housing, and

entrances of the second air path exist at positions outside right and left edges of the suction port when the suction port is viewed from a front side of the housing.

14. The dehumidifier according to claim 13, wherein an opening area of the entrance is equivalent to or larger than an opening area of an exit of the second air path.

15. The dehumidifier according to claim 13 or 14, wherein the second air path is linearly formed from the entrance to an exit of the second air path.

16. The dehumidifier according to any one of the preceding claims, wherein:

a partition wall that is continuous from a port edge of the suction port to a lower course of the airflow is formed, and

a space from the entrance to an exit of the second air path is partitioned into two spaces by the partition wall,

one of the two spaces is the first air path, and

another of the two spaces is the second air path.

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17. The dehumidifier according to any one of claims 10 to 16, wherein:

the first filter is an HEPA filter, and

the first filter has a structure that maintains a predetermined thickness whether or not air to be dehumidified passes through the first filter from the first air path.

18. The dehumidifier according to any one of claims 10 to 17, wherein outer peripheral surfaces of the first filter and the second filter overlapping each other constitute an inner wall surface of the second air path.

19. The dehumidifier according to any one of claims 10 to 18, wherein:

each of the first filter and the second filter includes a filter body and a frame body covering an outer peripheral part of the filter body, and

an outer peripheral surface of the frame body constitutes an inner wall surface of the second air path.

20. The dehumidifier according to any one of the preceding claims, wherein a rectification member provided with a large number of ventilation windows is positioned transversely in front of an evaporator included in the dehumidification means at a position where the airflow having passed through the first air path and the airflow having passed through the second air path join.

21. The dehumidifier according to claim 20, wherein an interval by which the rectification member is opposite the evaporator is set to a constant range.

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22. The dehumidifier according to claim 20 or 21, wherein the rectification member is a structural object having a flat plate shape and provided with a large number of ventilation windows.

23. The dehumidifier according to any one of claims 20 to 22, wherein each of the ventilation windows is surrounded by a frame having a flat guide surface of a length equal to or larger than a predetermined dimension in a direction in which the airflow flows.

24. The dehumidifier according to any one of claims 20 to 23, wherein an interval by which the rectification member is opposite the air-cleaning means is set to a constant range.

25. The dehumidifier according to claim 21, wherein the constant range is 10 mm to 15 mm.

26. The dehumidifier according to claim 24, wherein the constant range is 15 mm to 20 mm.

27. The dehumidifier according to any one of claims 1 to 12, wherein:

the suction port exists at a front surface of the housing, and

entrances of the second air path are positioned on right and left sides, respectively, of the suction port when the suction port is viewed from a front side of the housing.

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28. The dehumidifier according to any one of the preceding claims, wherein the airflow restriction means is an opening-closing means capable of selecting any of a state in which the airflow passes along the second air path and a state in which the airflow is blocked along the second air path.

29. The dehumidifier according to any one of the preceding claims, wherein the airflow restriction means is a means capable of controlling an amount in which the airflow passes along the second air path to a plurality of stages.

30. The dehumidifier according to any one of the preceding claims, wherein the airflow restriction means includes a shutter capable of controlling an amount in which the airflow passes along the second air path.

31. The dehumidifier according to claim 30, wherein the airflow restriction means includes a motor having a position control function to change a position of the shutter upon reception of an electric signal.

FIG.1

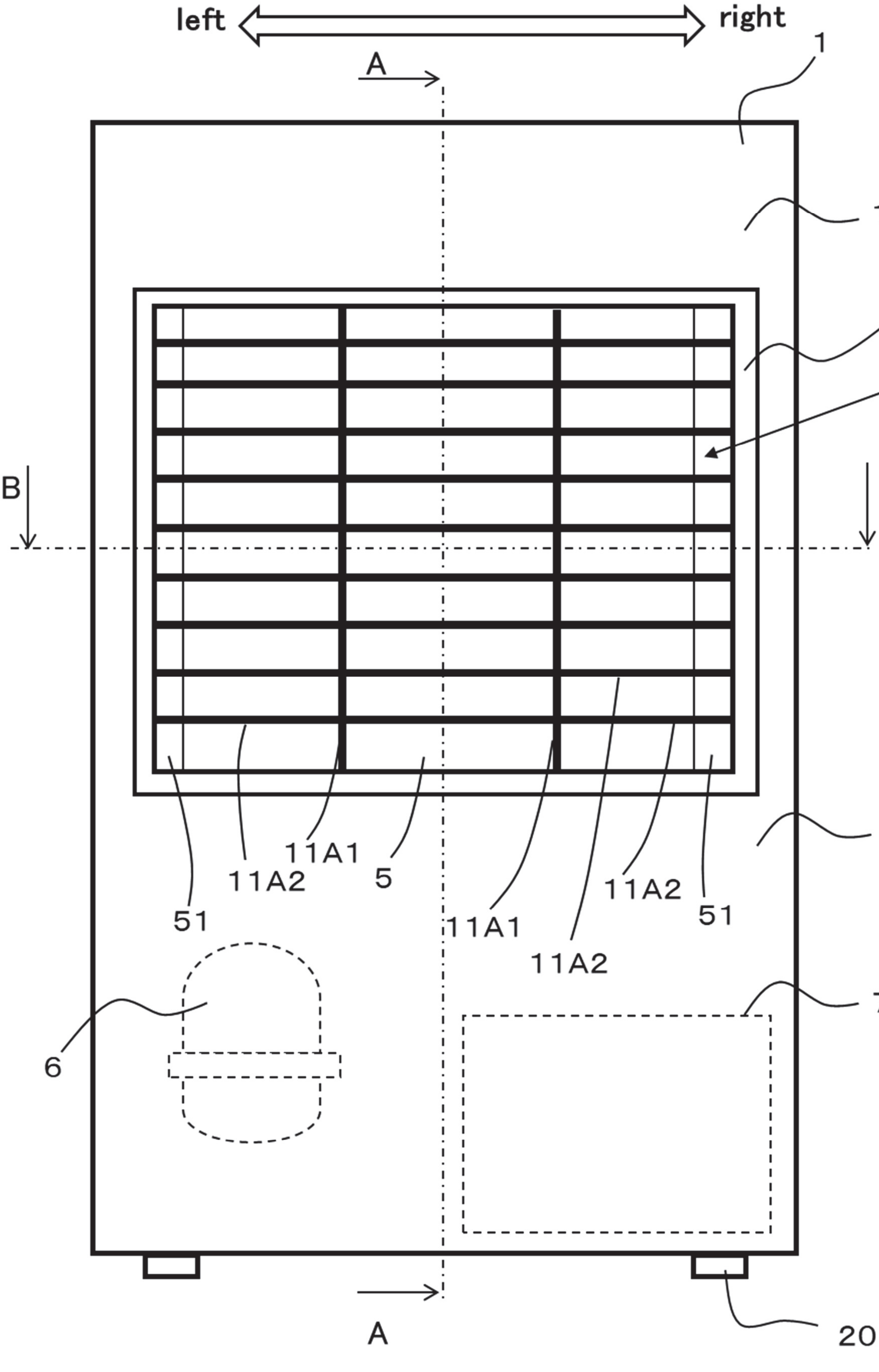

left
right
A
1
10F
11A
11
B
B
11A1
11A2
5
51
11A1
11A2
11A2
51
10
6
7
A
20

FIG.2

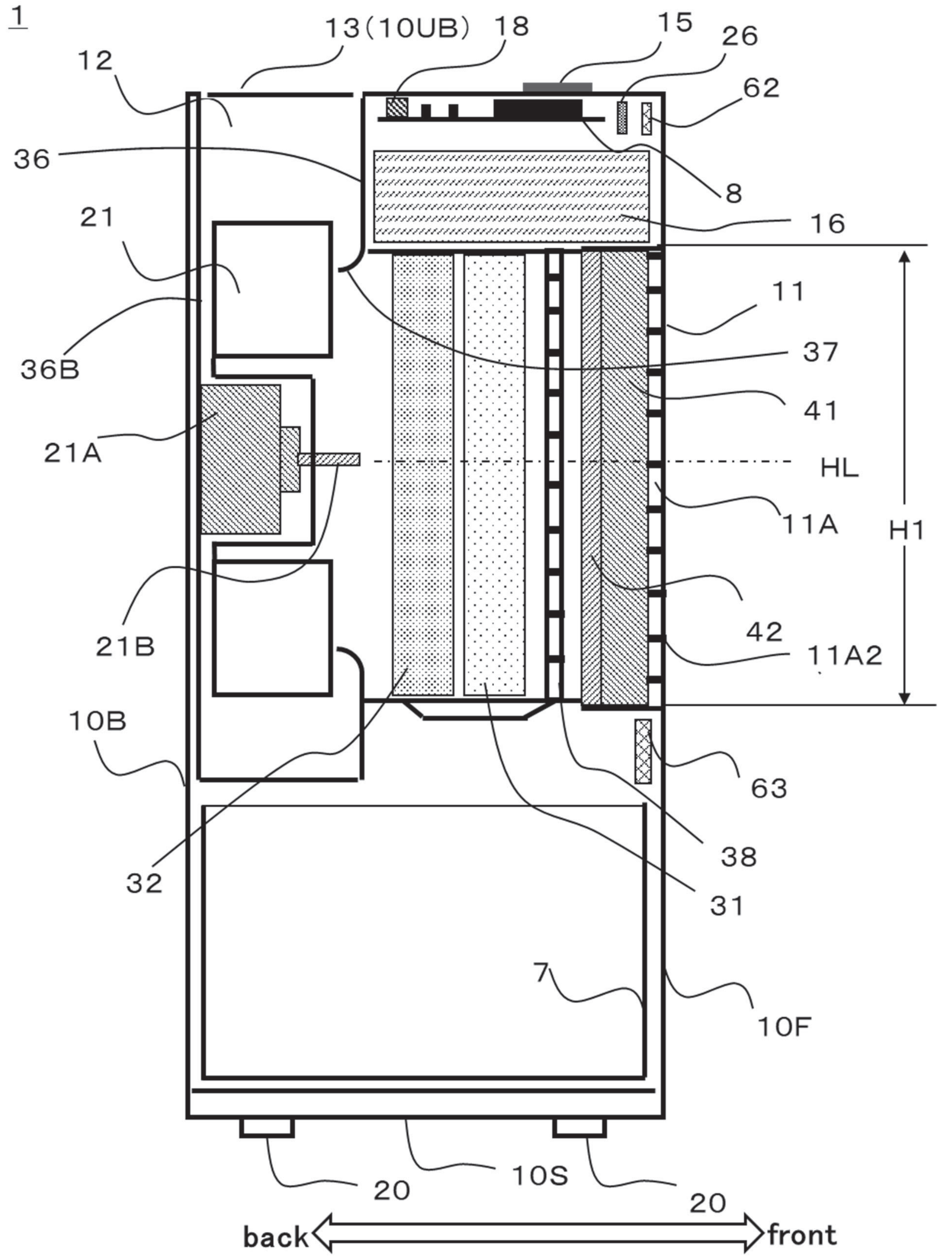

1
13(10UB)
18
15
26
62
12
36
8
16
21
11
36B
37
41
21A
HL
11A
H1
42
21B
11A2
10B
63
38
32
31
7
10F
10S
20
20
back
front

FIG.3

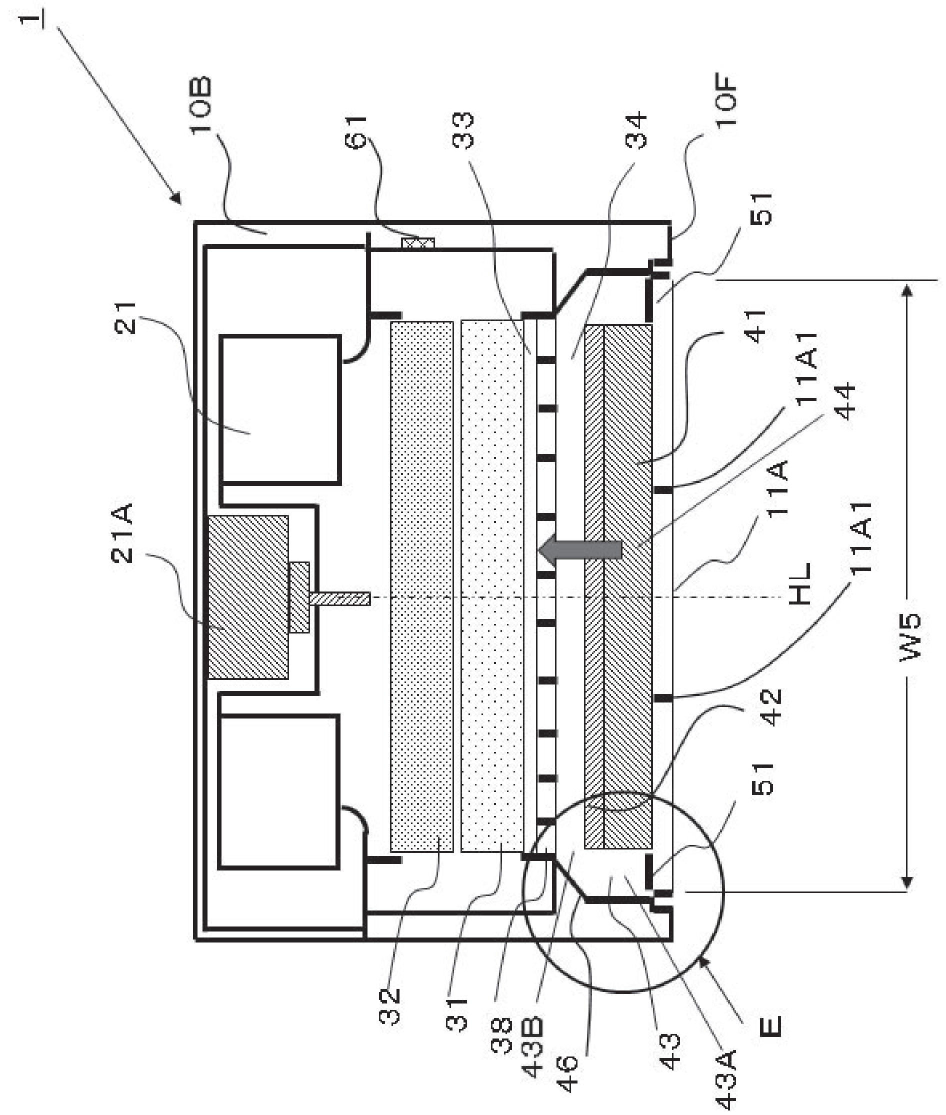

1
10B
61
33
34
10F
51
21
41
11A1
44
11A
21A
HL
11A1
W5
42
51
32
31
38
43B
46
43
43A
E

FIG.4

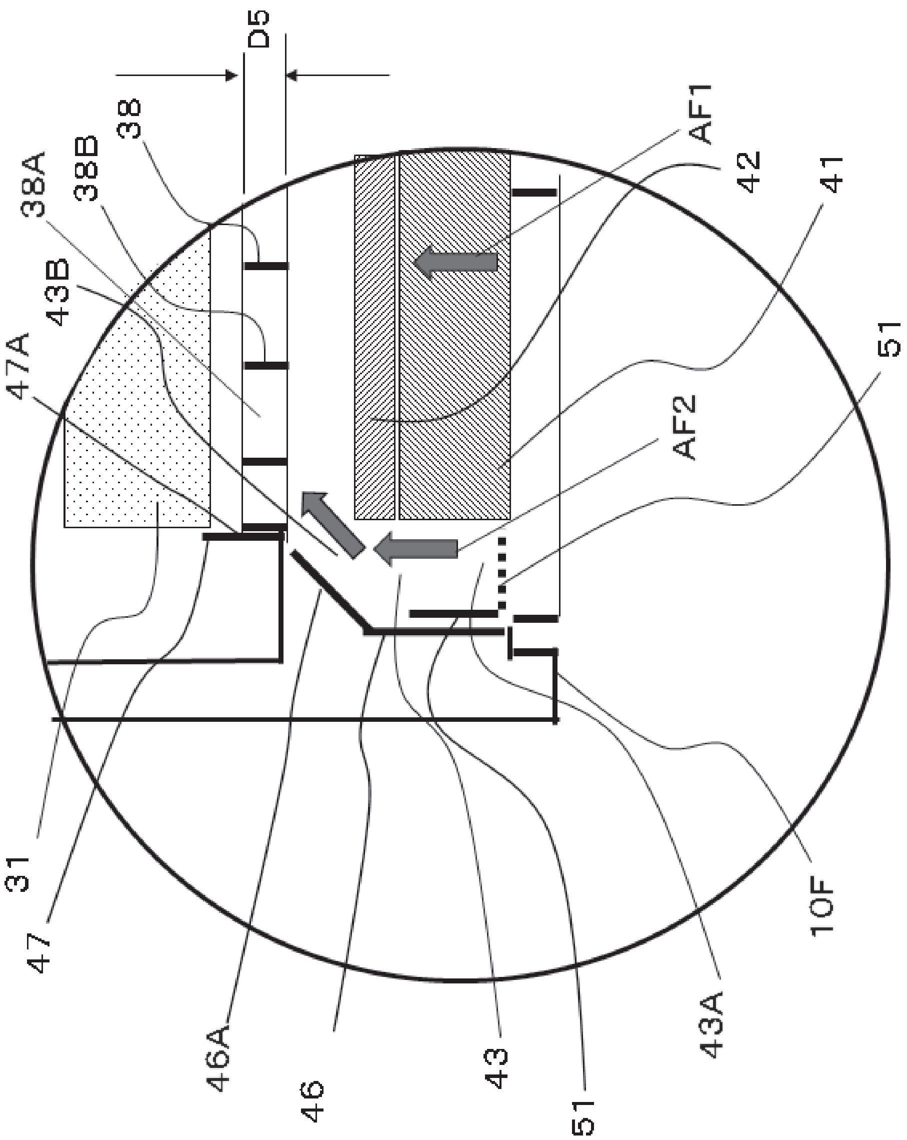


FIG.5

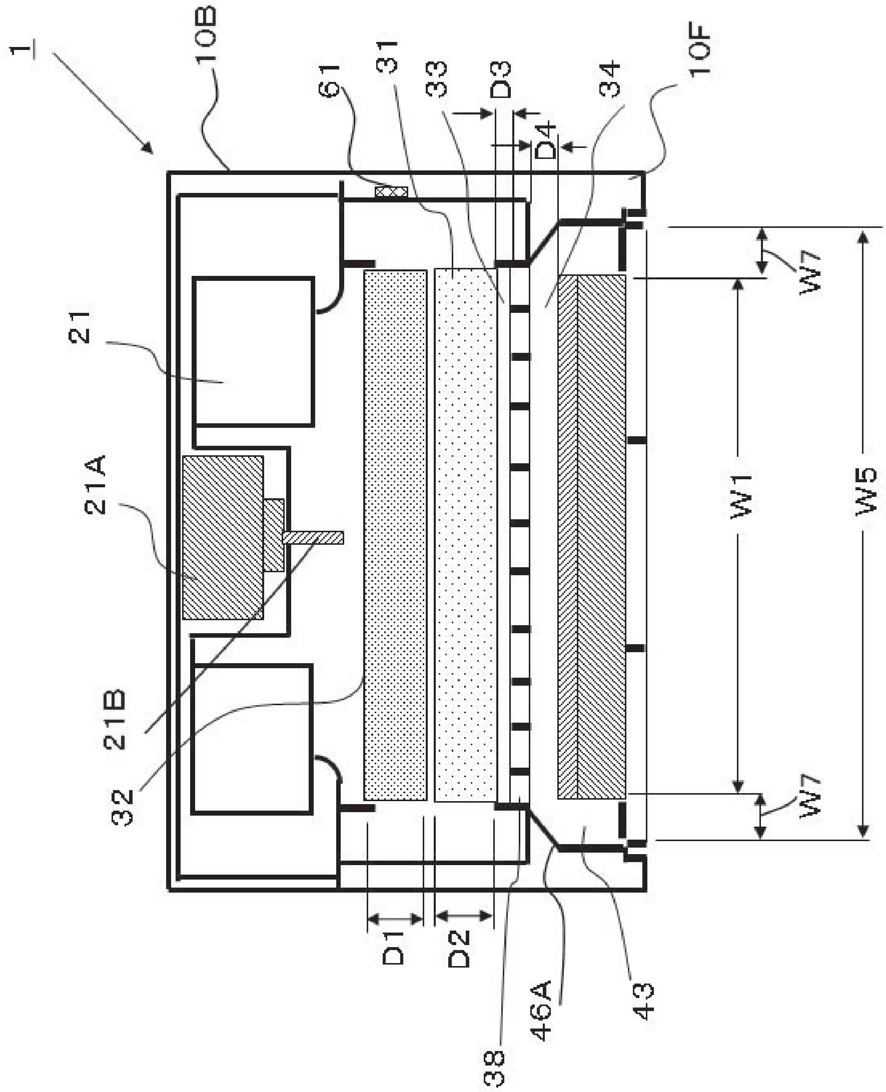


FIG.6

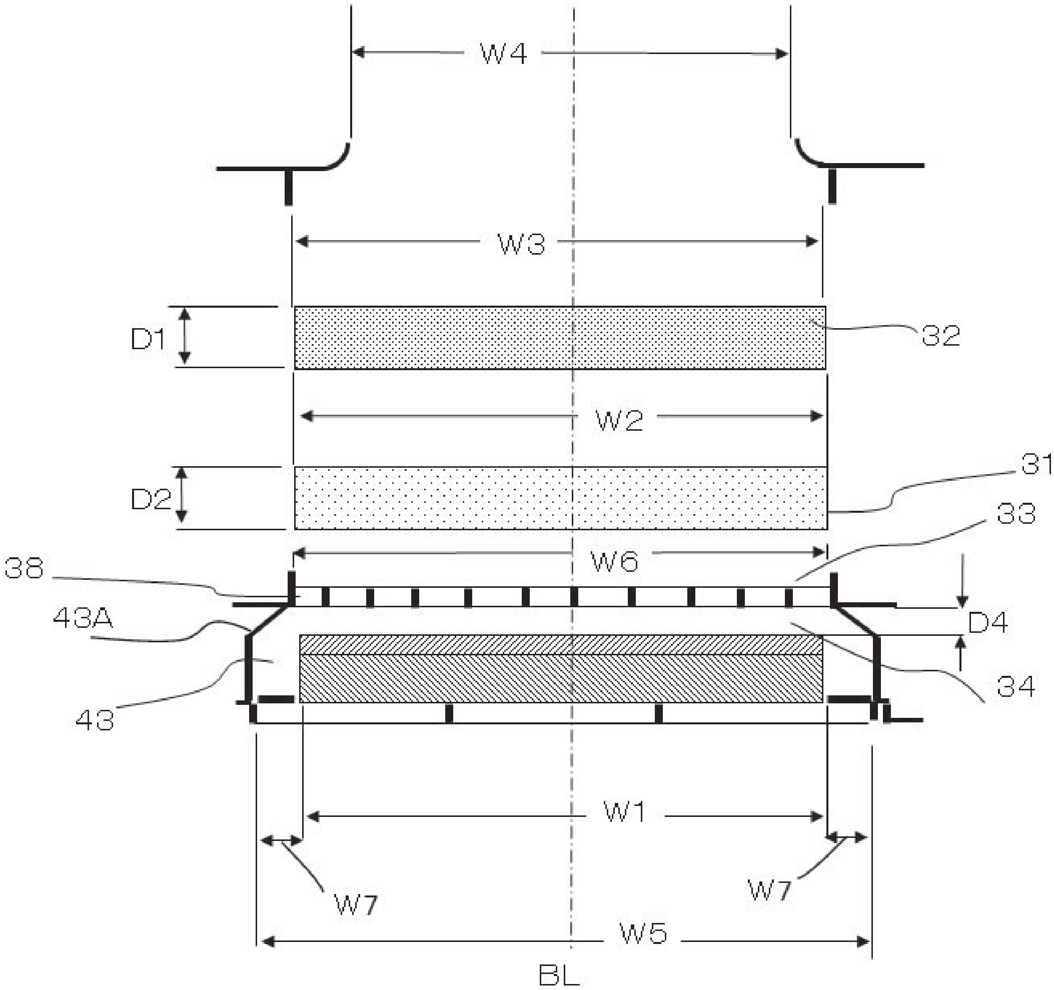


FIG.7

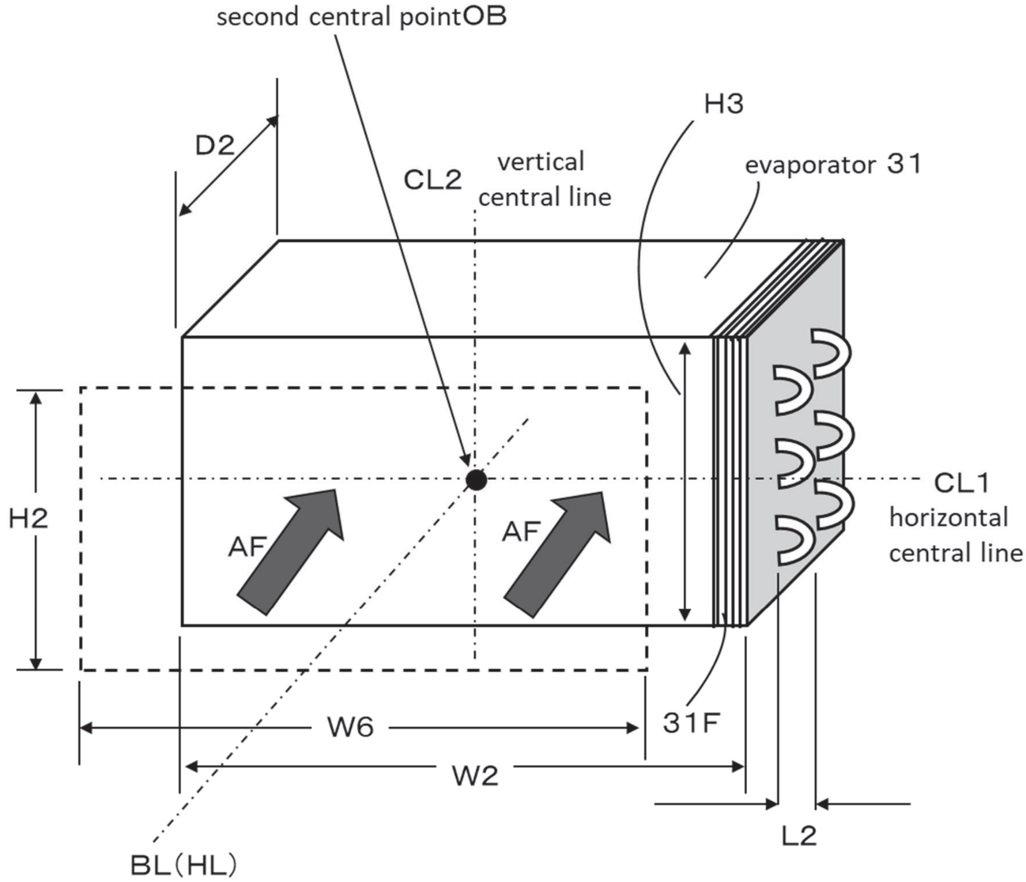

second central pointOB
D2
CL2
vertical
central line
H3
evaporator 31
H2
AF
AF
CL1
horizontal
central line
31F
W6
W2
L2
BL(HL)

FIG.8

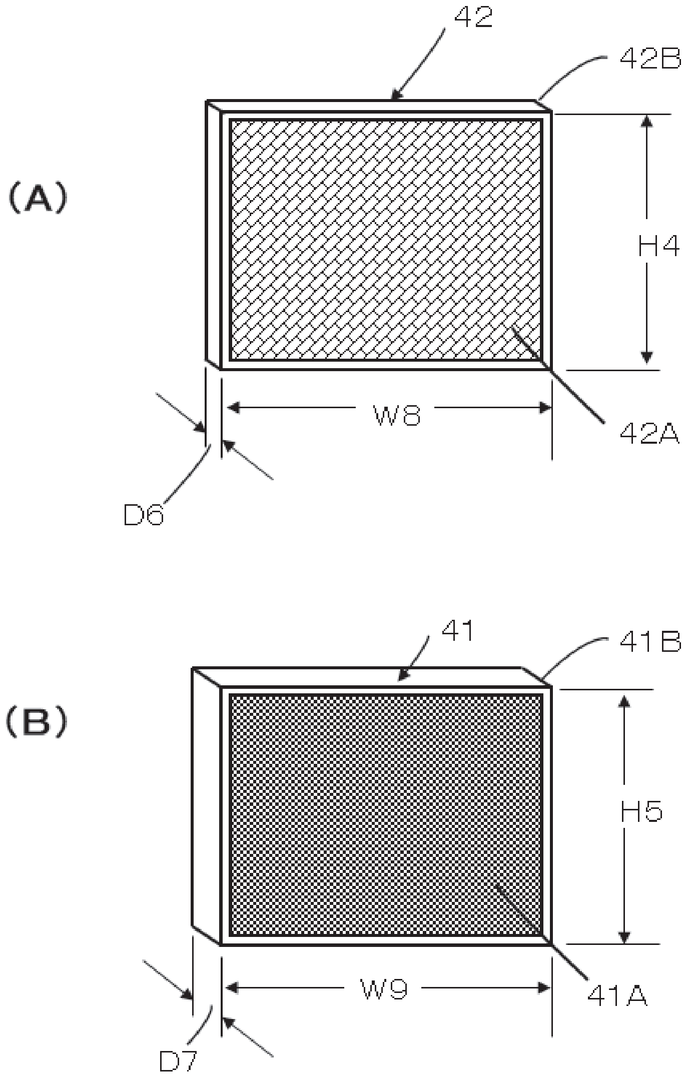


FIG.9

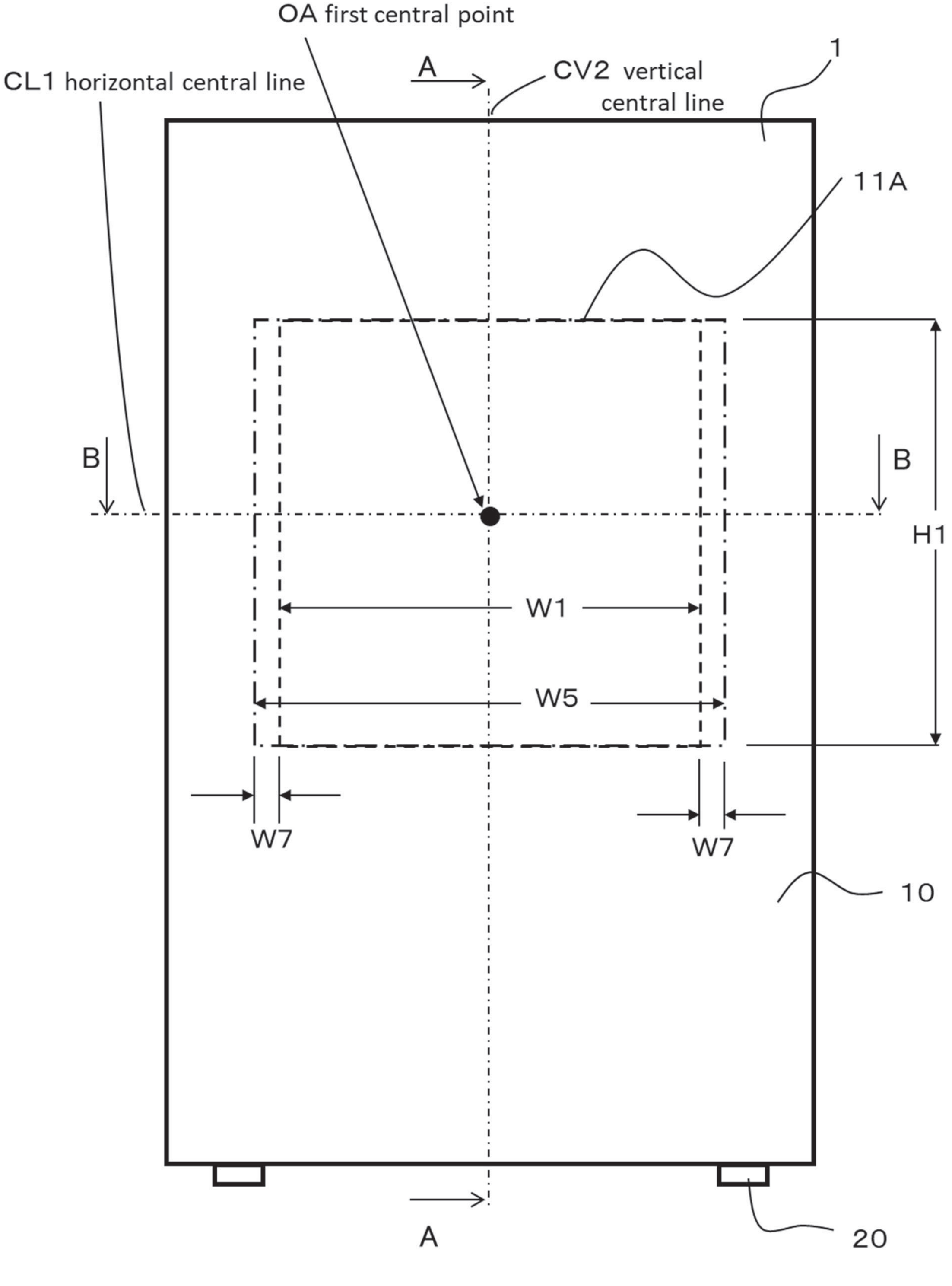

OA first central point
CL1 horizontal central line
A
CV2 vertical central line
1
11A
B
B
H1
W1
W5
W7
W7
10
A
20

FIG.10

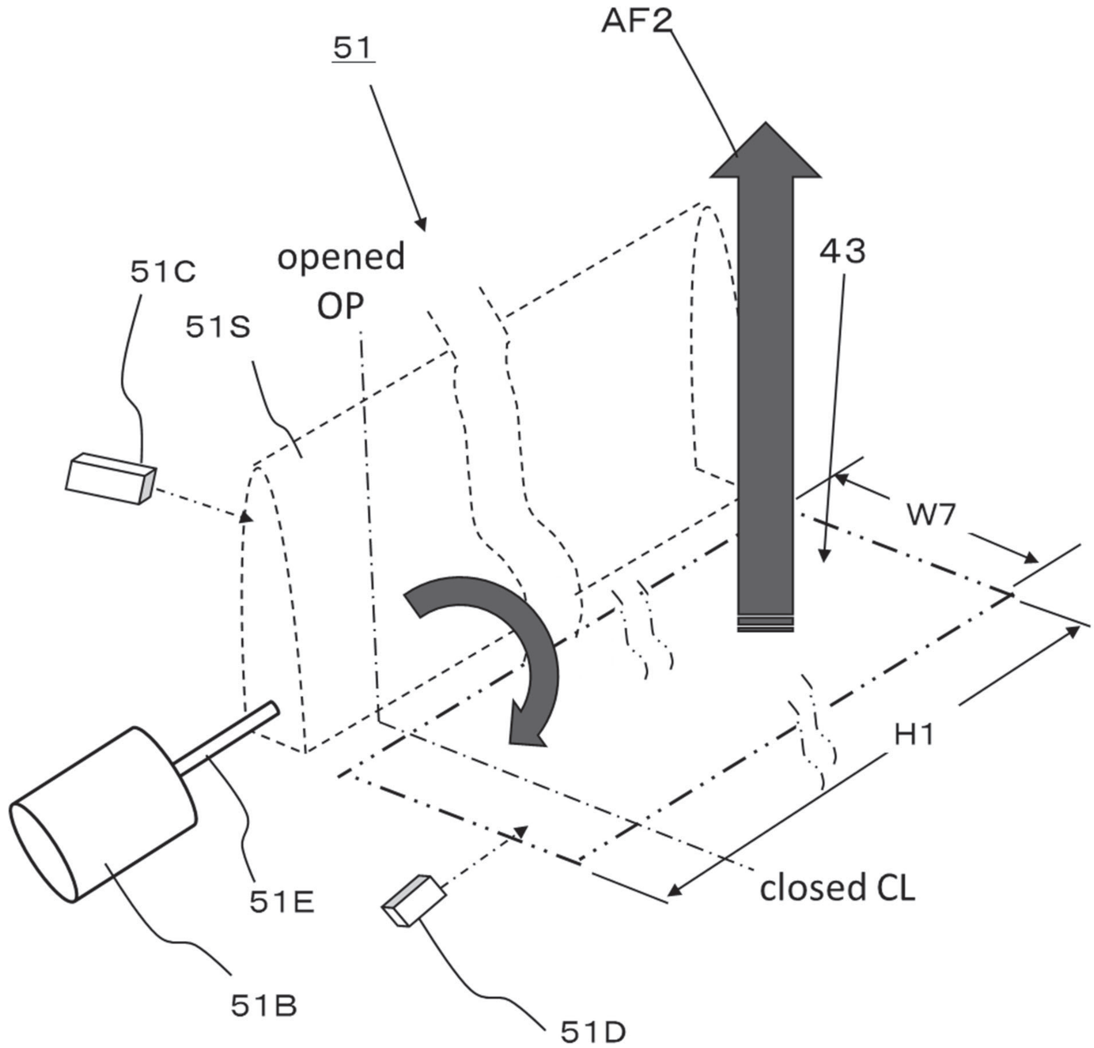
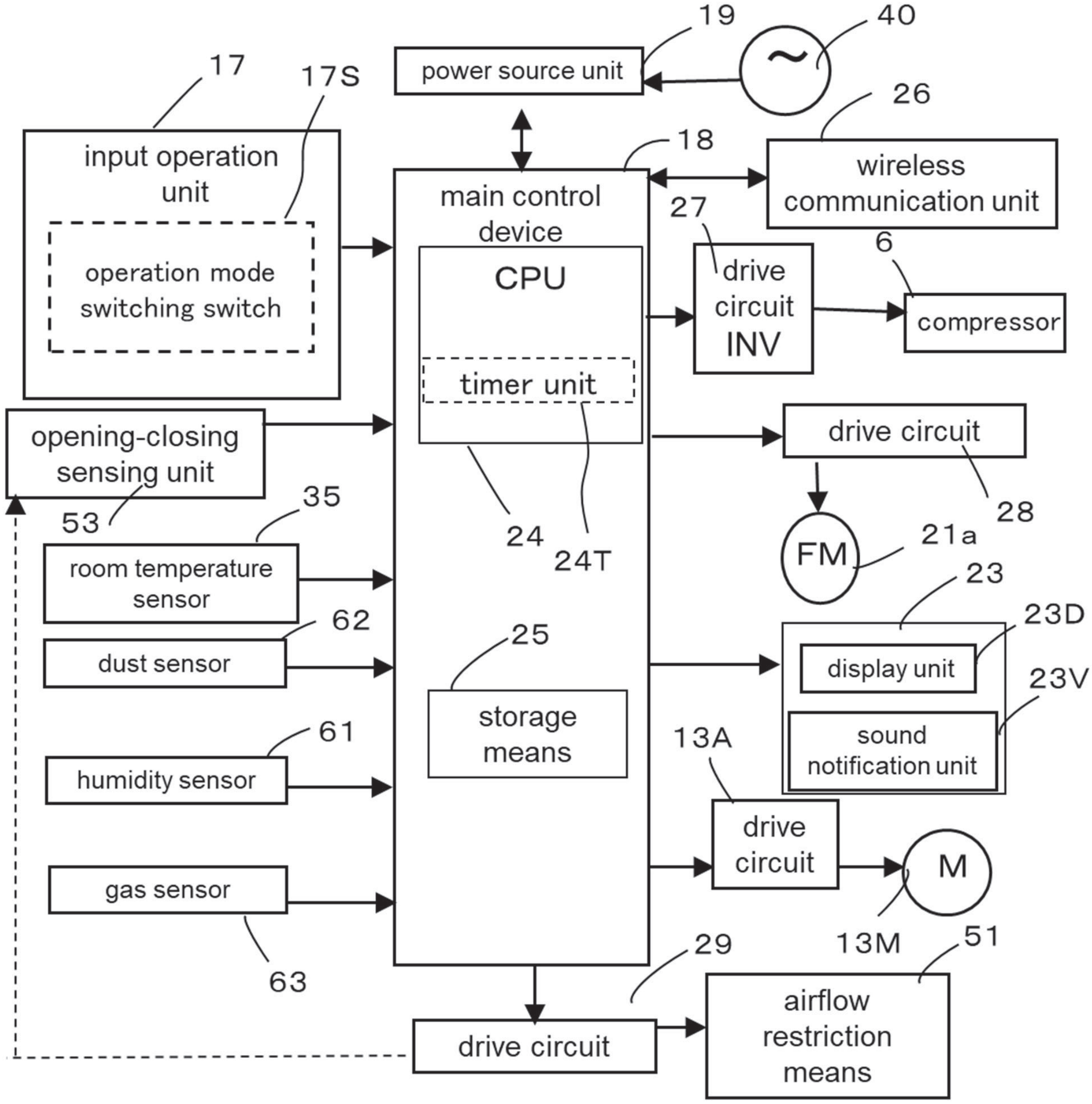


FIG.11



19
40
power source unit
17
17S
26
input operation unit
18
wireless communication unit
main control device
27
operation mode switching switch
CPU
drive circuit INV
6
compressor
timer unit
opening-closing sensing unit
drive circuit
53
35
28
24
24T
21a
FM
room temperature sensor
23
62
23D
dust sensor
25
display unit
storage means
23V
61
13A
sound notification unit
humidity sensor
drive circuit
M
gas sensor
29
13M
51
63
airflow restriction means
drive circuit

FIG.12

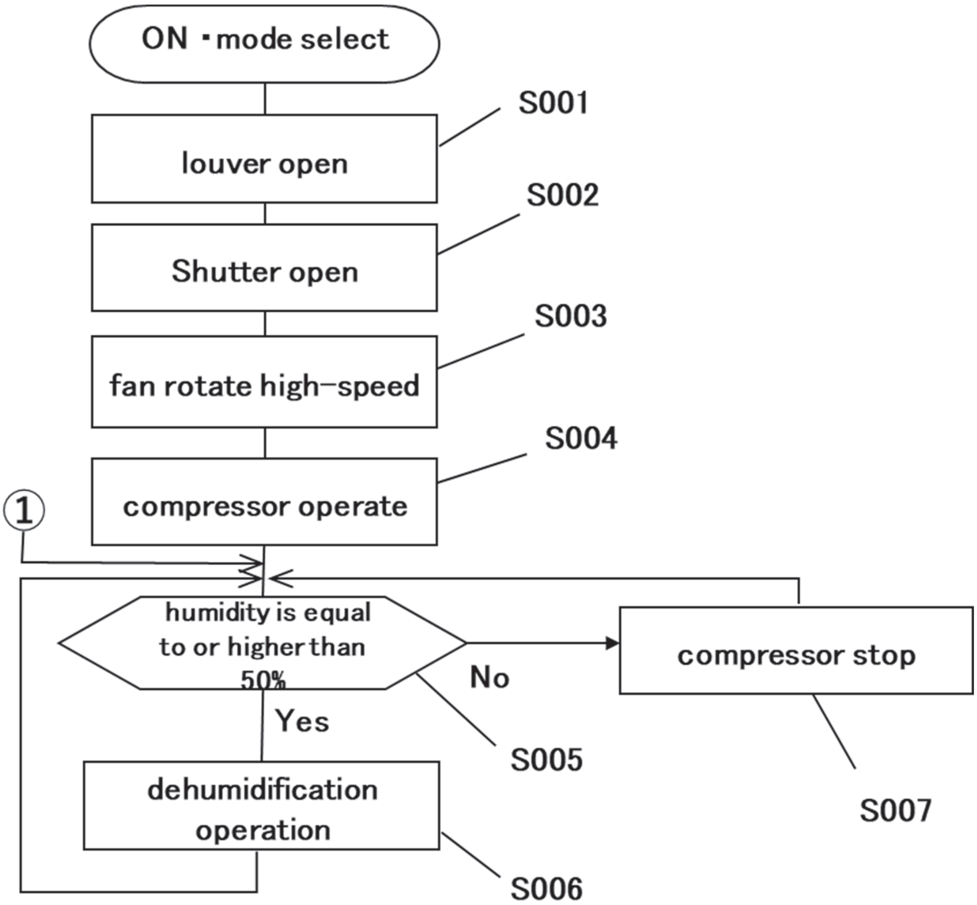

ON ・mode select
louver open
S001
Shutter open
S002
fan rotate high−speed
S003
compressor operate
S004
①
humidity is equal to or higher than 50%
No
compressor stop
Yes
S005
S007
dehumidification operation
S006

FIG.13

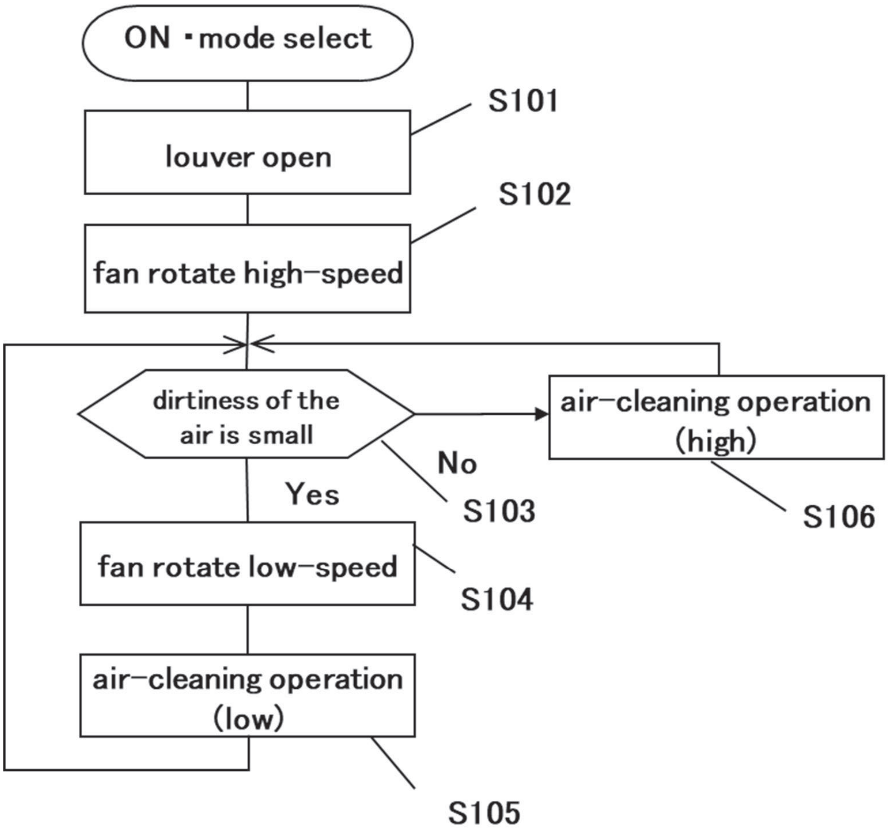

ON ・mode select
S101
louver open
S102
fan rotate high-speed
dirtiness of the
air is small
air-cleaning operation
(high)
No
Yes
S103
S106
fan rotate low-speed
S104
air-cleaning operation
(low)
S105

FIG.14

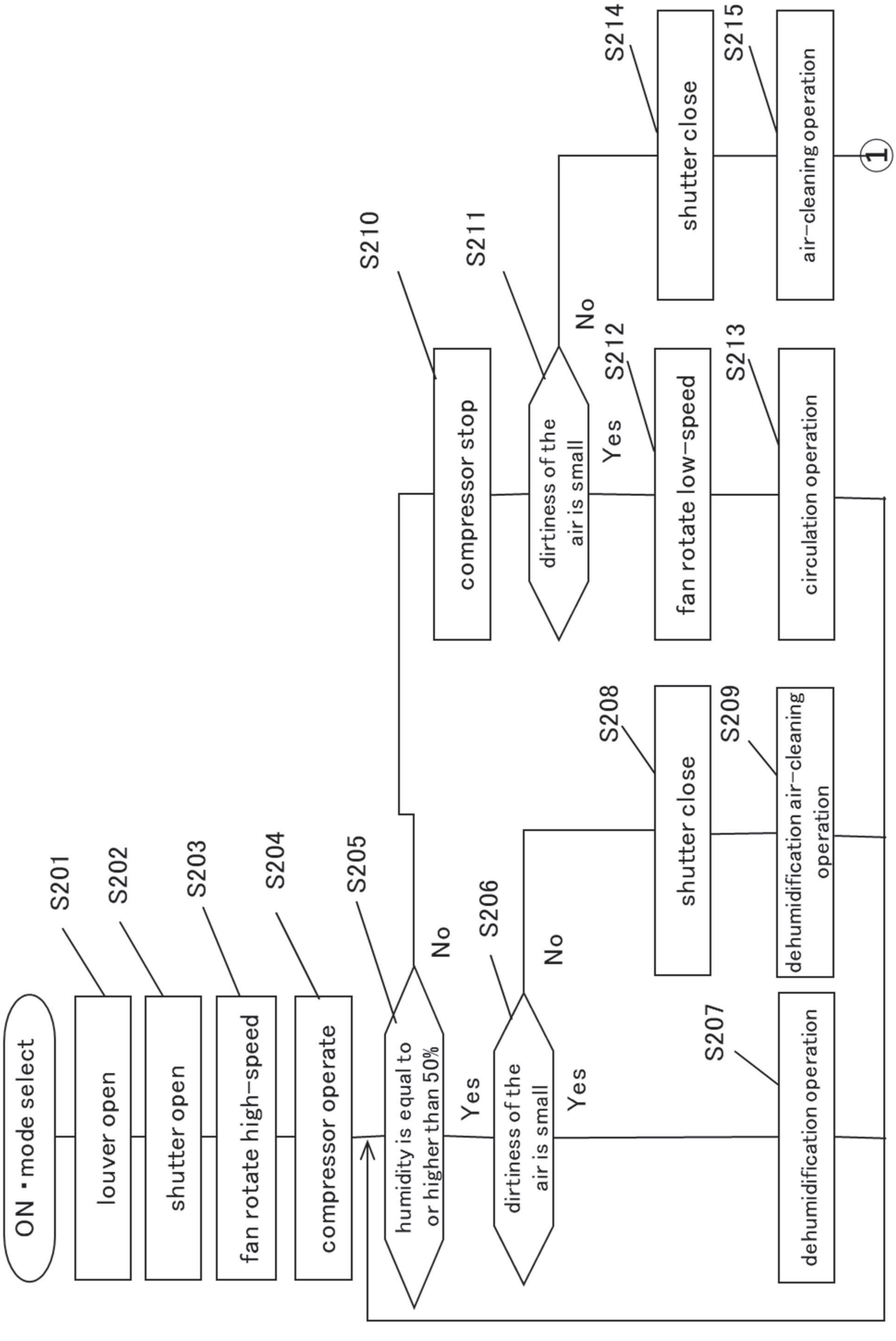

ON・mode select
louver open
S201
shutter open
S202
fan rotate high-speed
S203
compressor operate
S204
humidity is equal to or higher than 50%
S205
Yes
No
dirtiness of the air is small
S206
Yes
No
dehumidification operation
S207
shutter close
S208
dehumidification air-cleaning operation
S209
compressor stop
S210
dirtiness of the air is small
S211
Yes
No
fan rotate low-speed
S212
circulation operation
S213
shutter close
S214
air-cleaning operation
S215
1

FIG.15

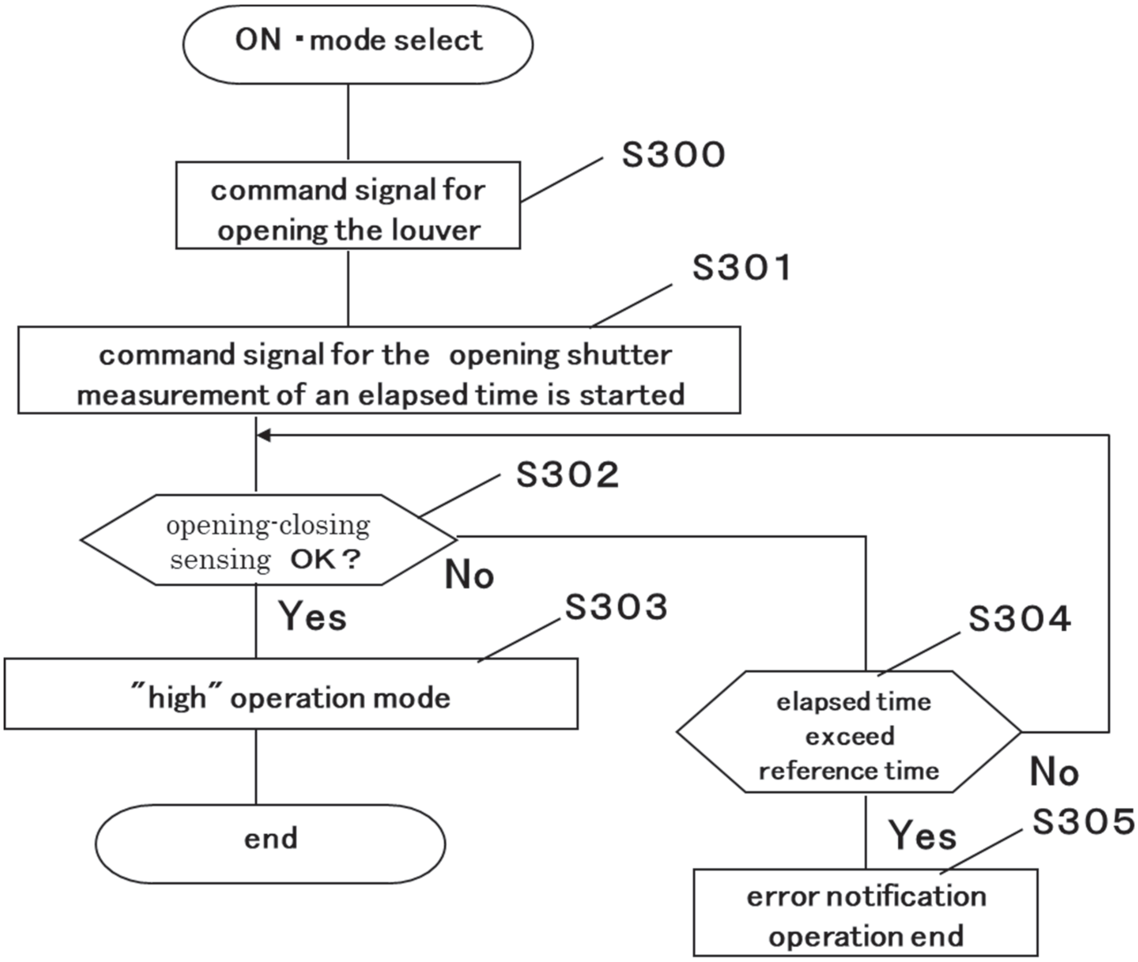

ON ・mode select
S300
command signal for opening the louver
S301
command signal for the opening shutter measurement of an elapsed time is started
S302
opening-closing sensing OK ?
No
Yes
S303
"high" operation mode
end
S304
elapsed time exceed reference time
No
Yes
S305
error notification operation end

FIG.16

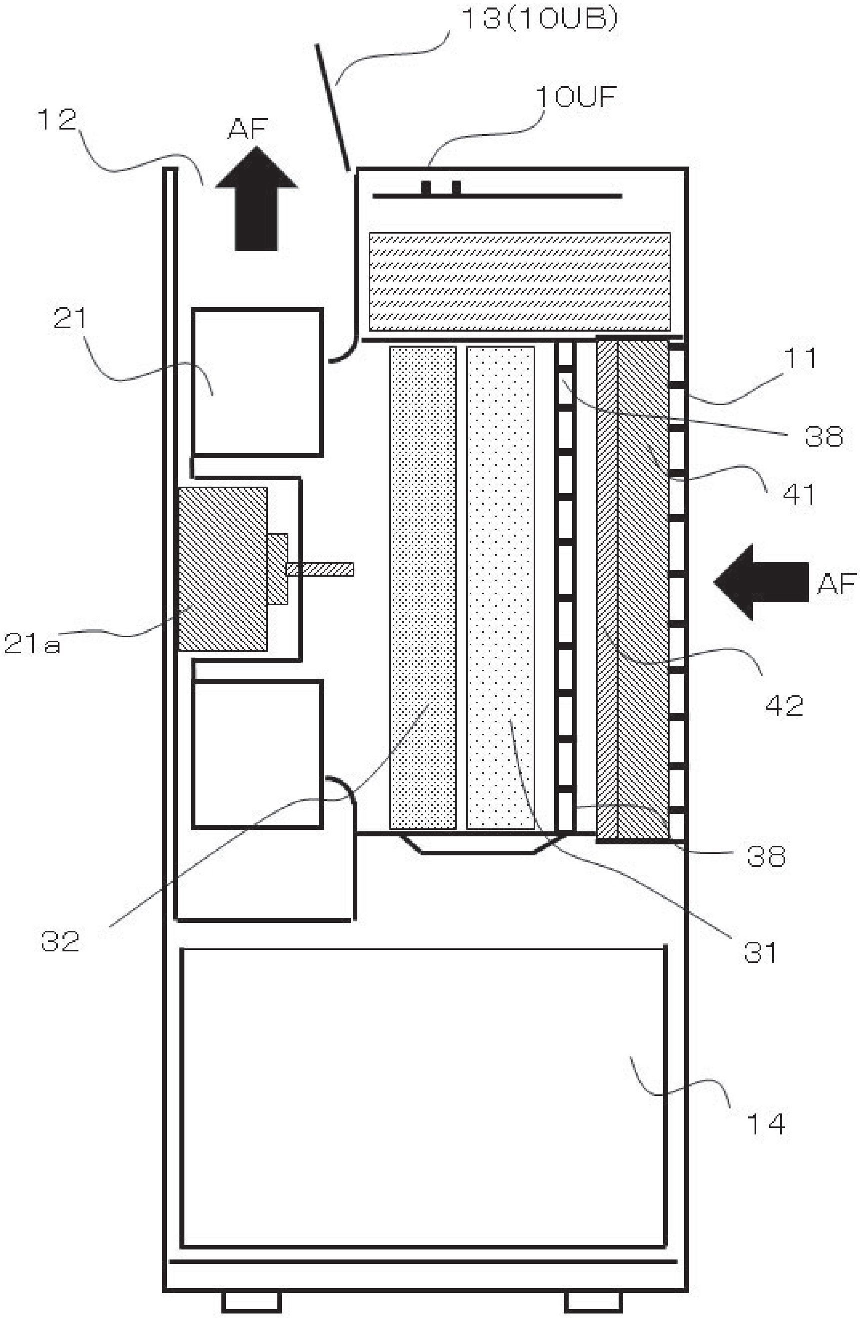


FIG.17

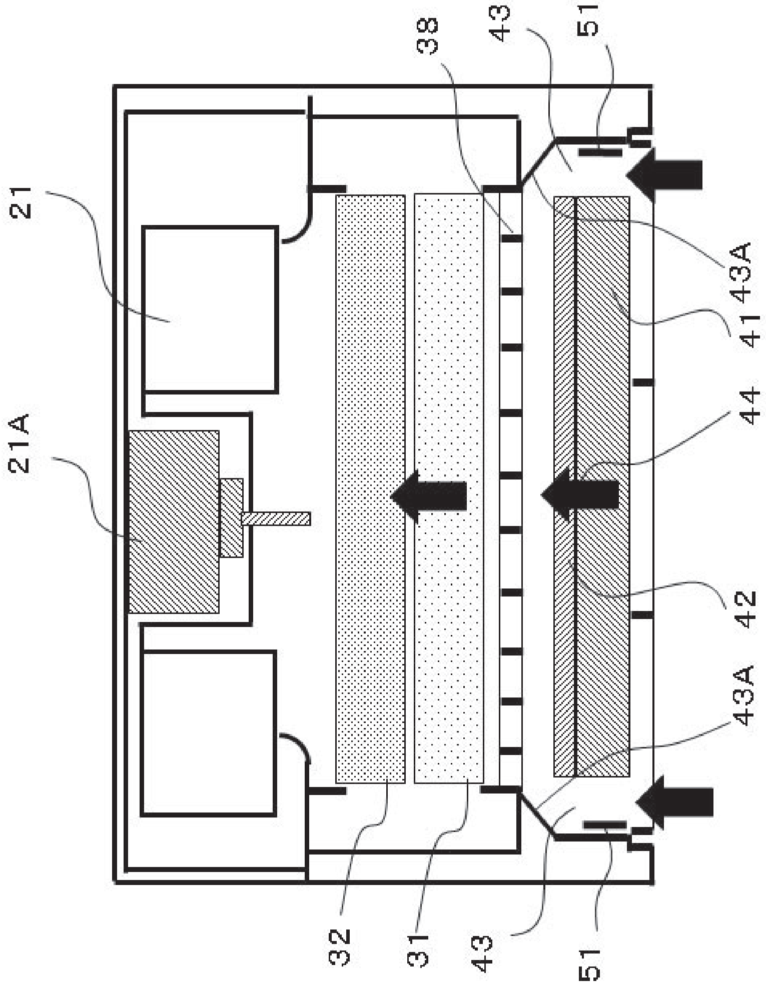


FIG.18

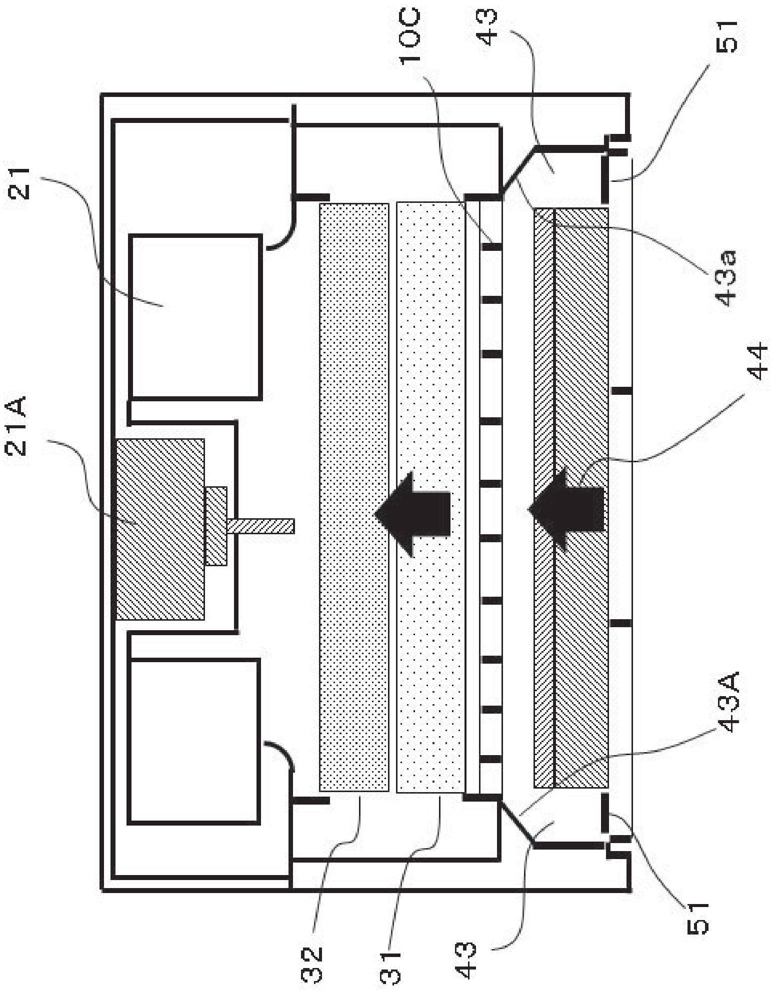


FIG.19

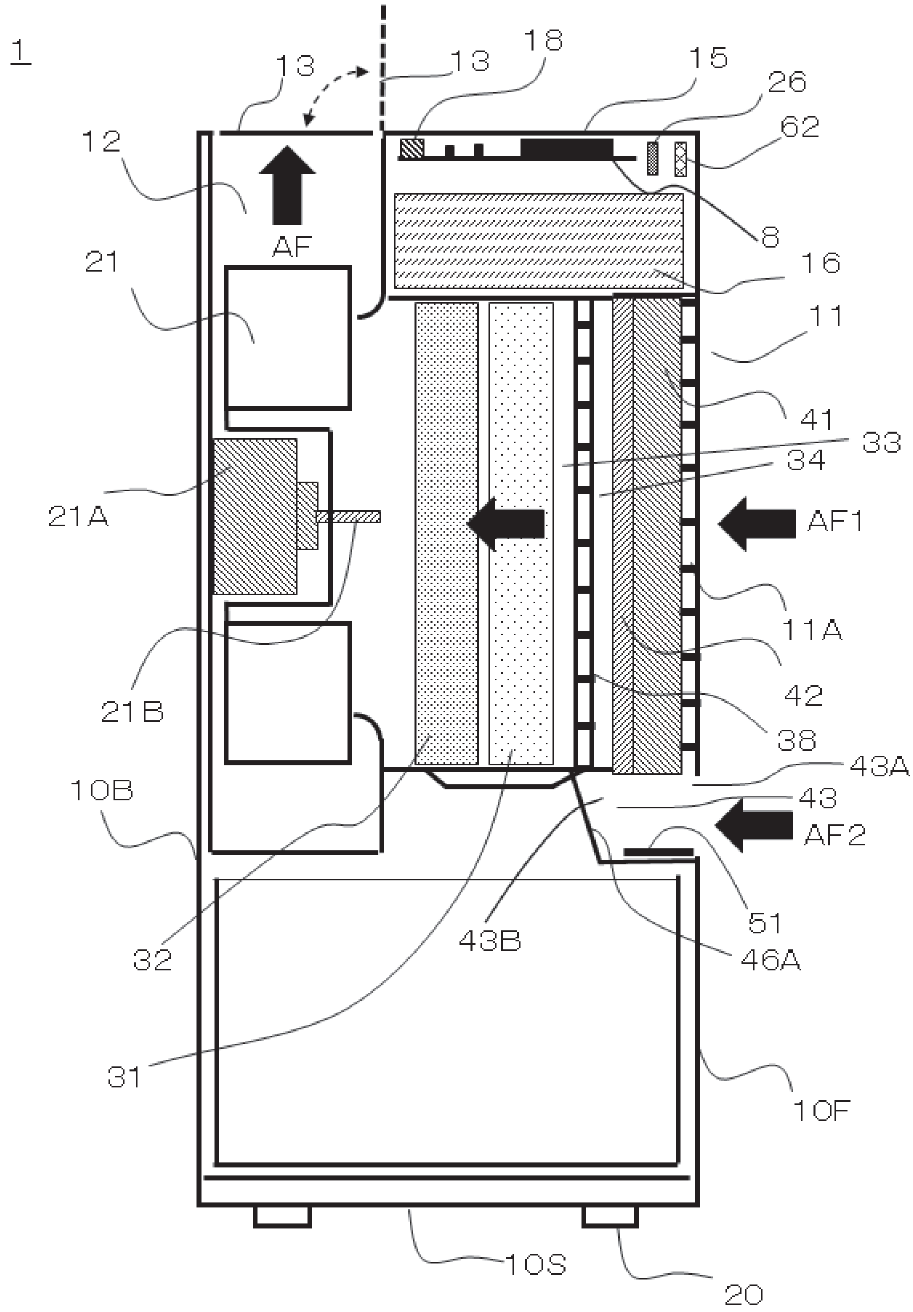
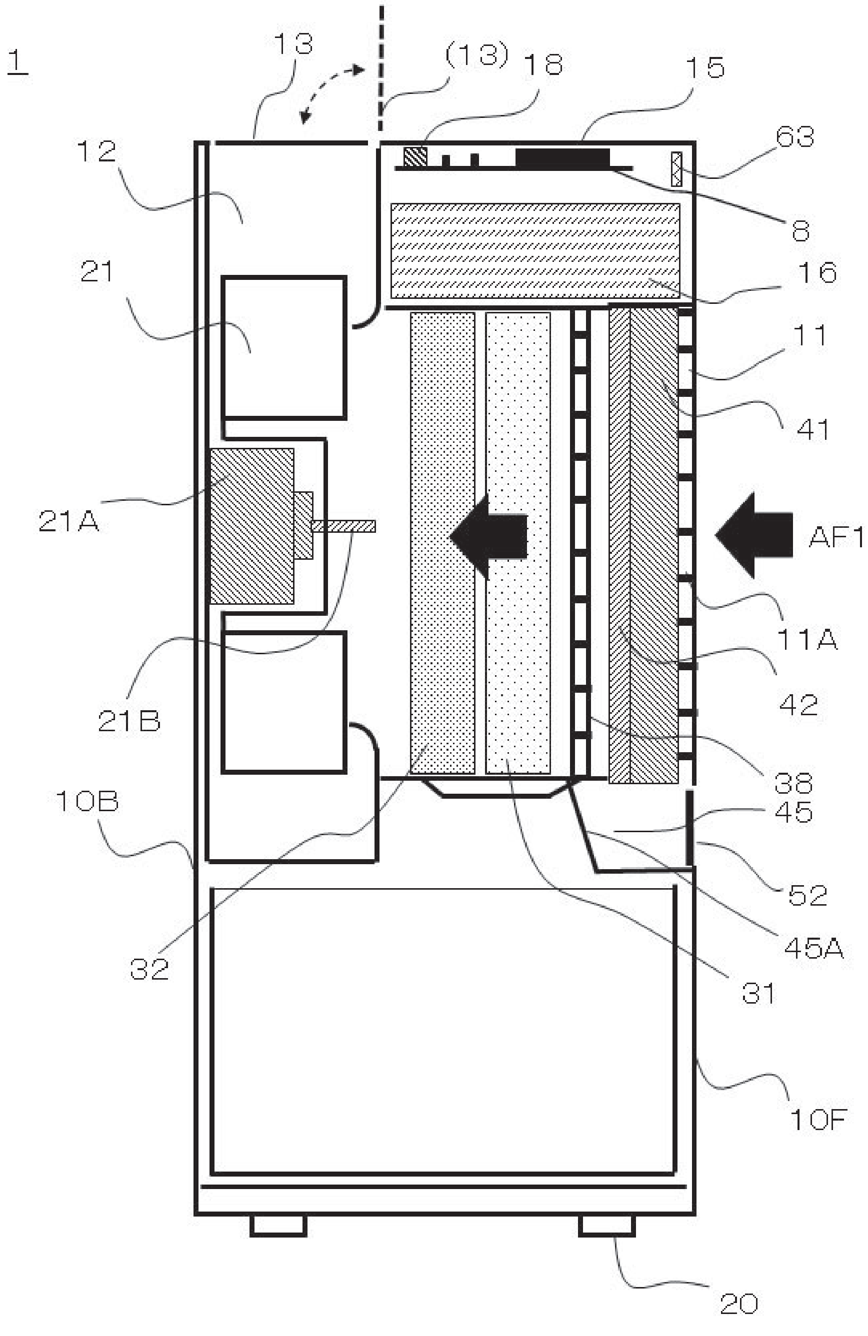

1
13
13
18
15
26
62
12
AF
8
16
21
11
41
33
34
21A
AF1
11A
42
21B
38
43A
10B
43
AF2
51
32
43B
46A
31
10F
10S
20

FIG.20



1
13
(13)
18
15
63
12
8
16
21
11
41
21A
AF1
11A
42
21B
38
45
10B
52
45A
32
31
10F
20

FIG.21

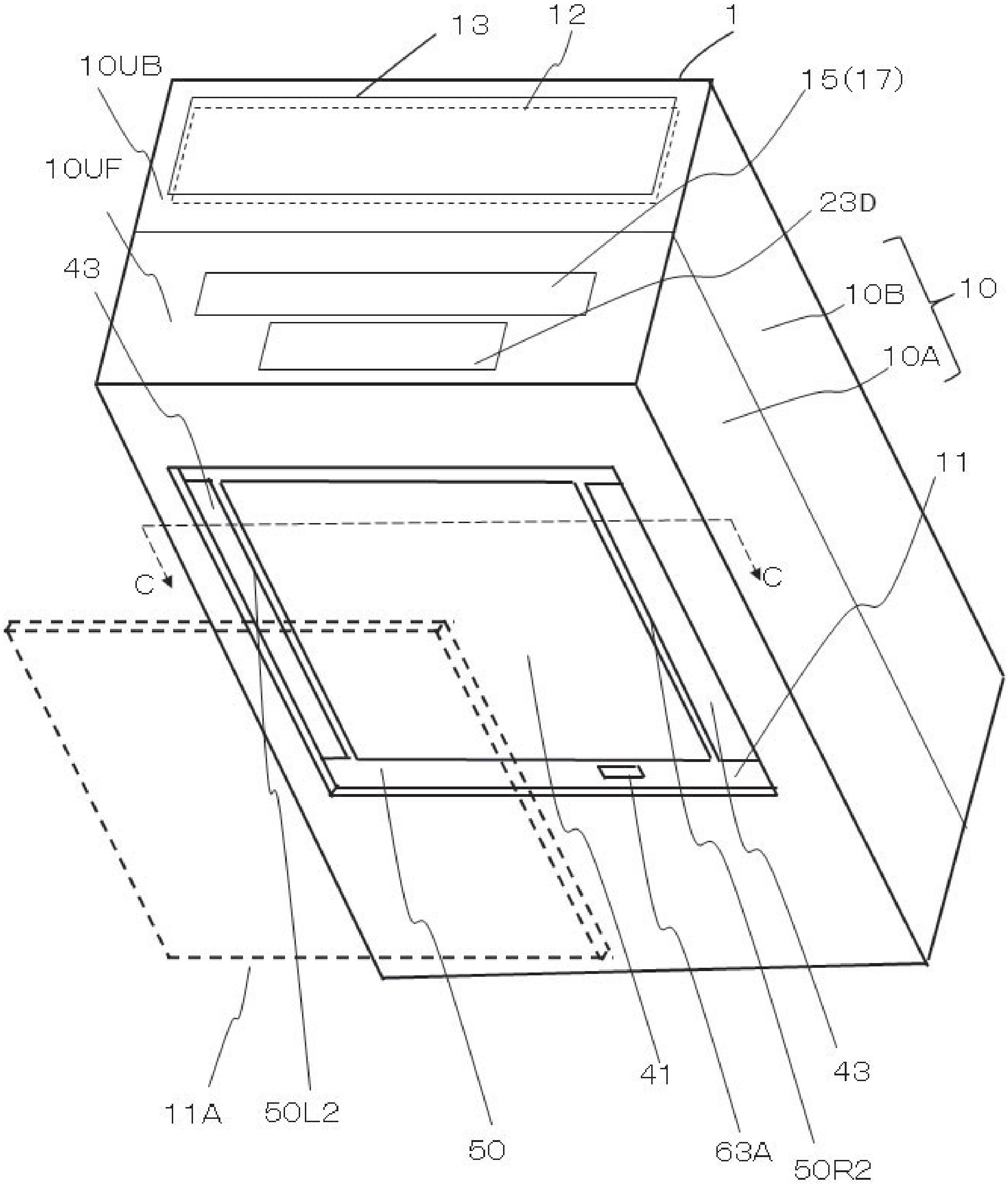
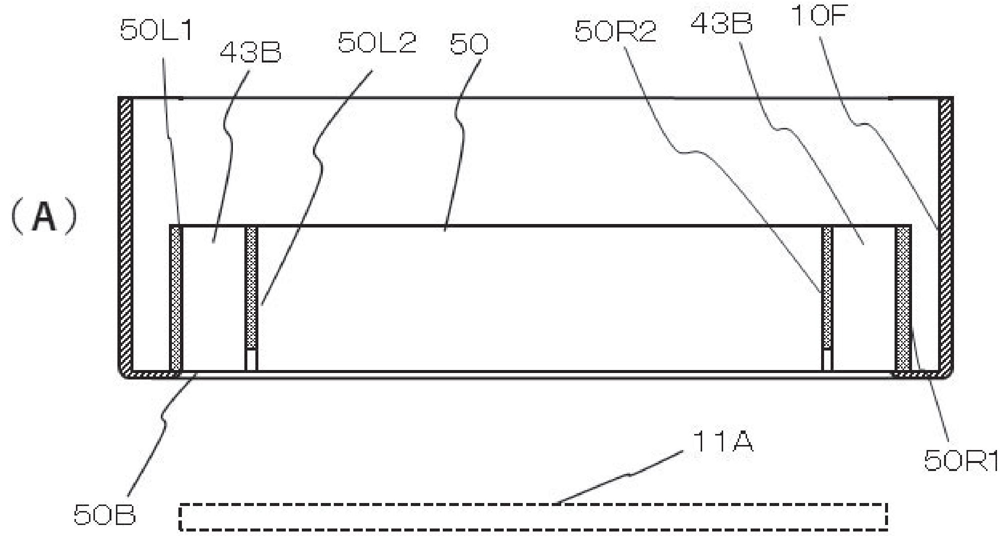

13
12
1
10UB
15(17)
10UF
23D
43
10B
10
10A
11
C
C
11A
50L2
50
41
63A
43
50R2

FIG.22


(A)
50L1
43B
50L2
50
50R2
43B
10F
50B
11A
50R1

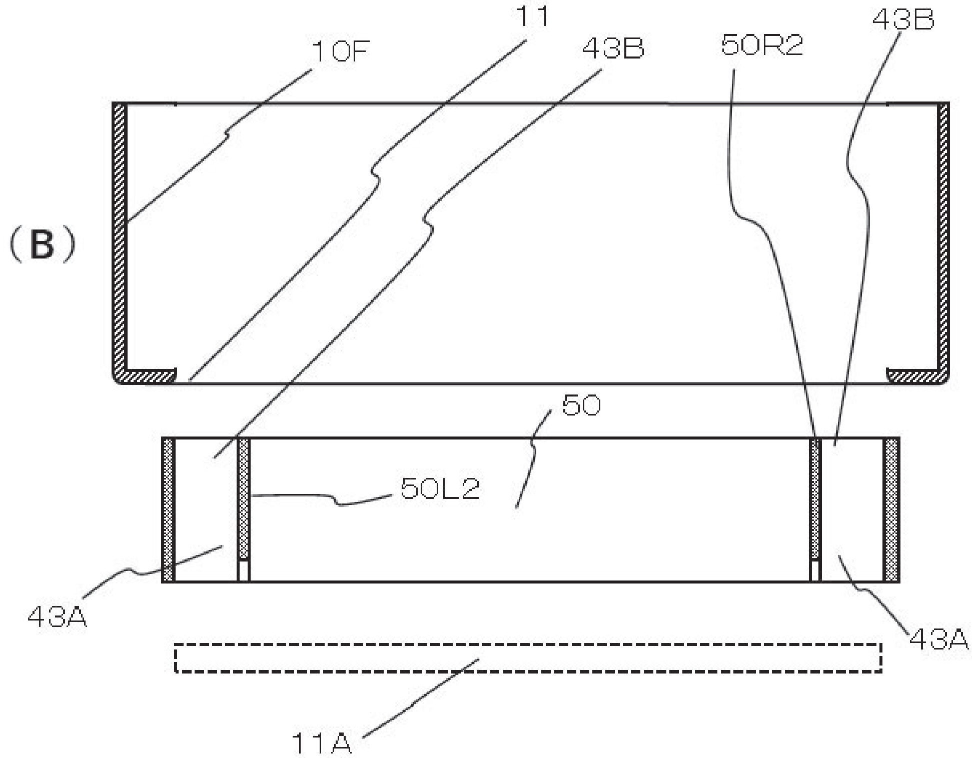

(B)
10F
11
43B
50R2
43B
50
50L2
43A
43A
11A

FIG.23

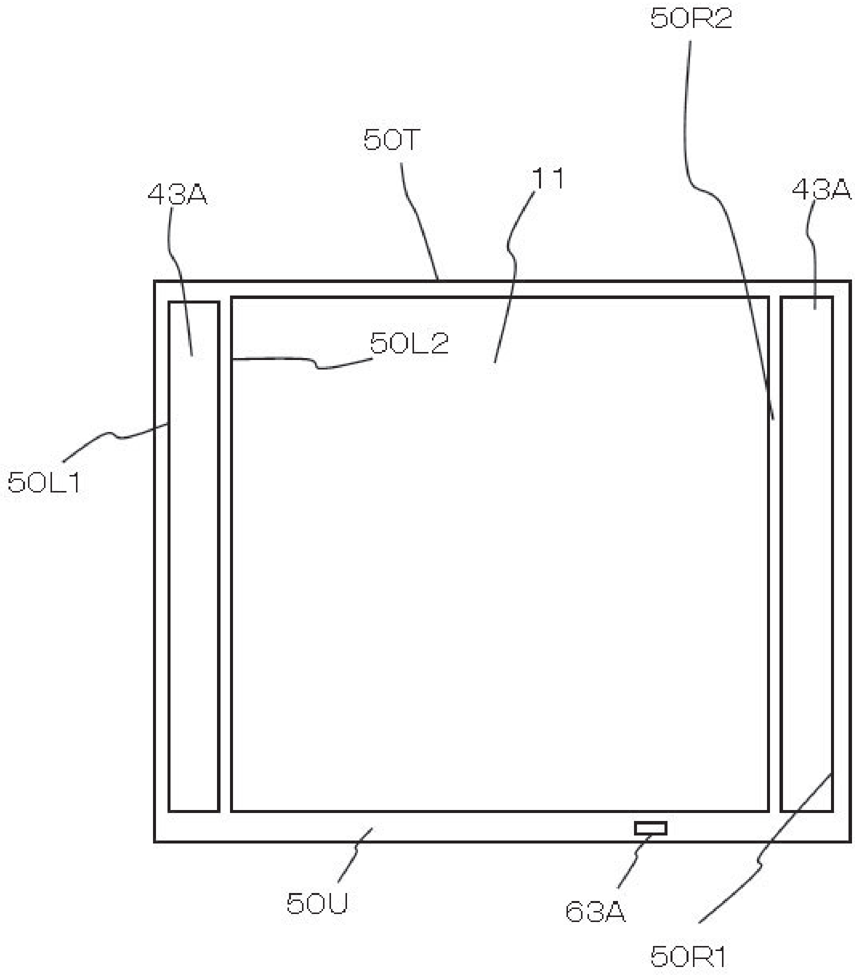


FIG.24

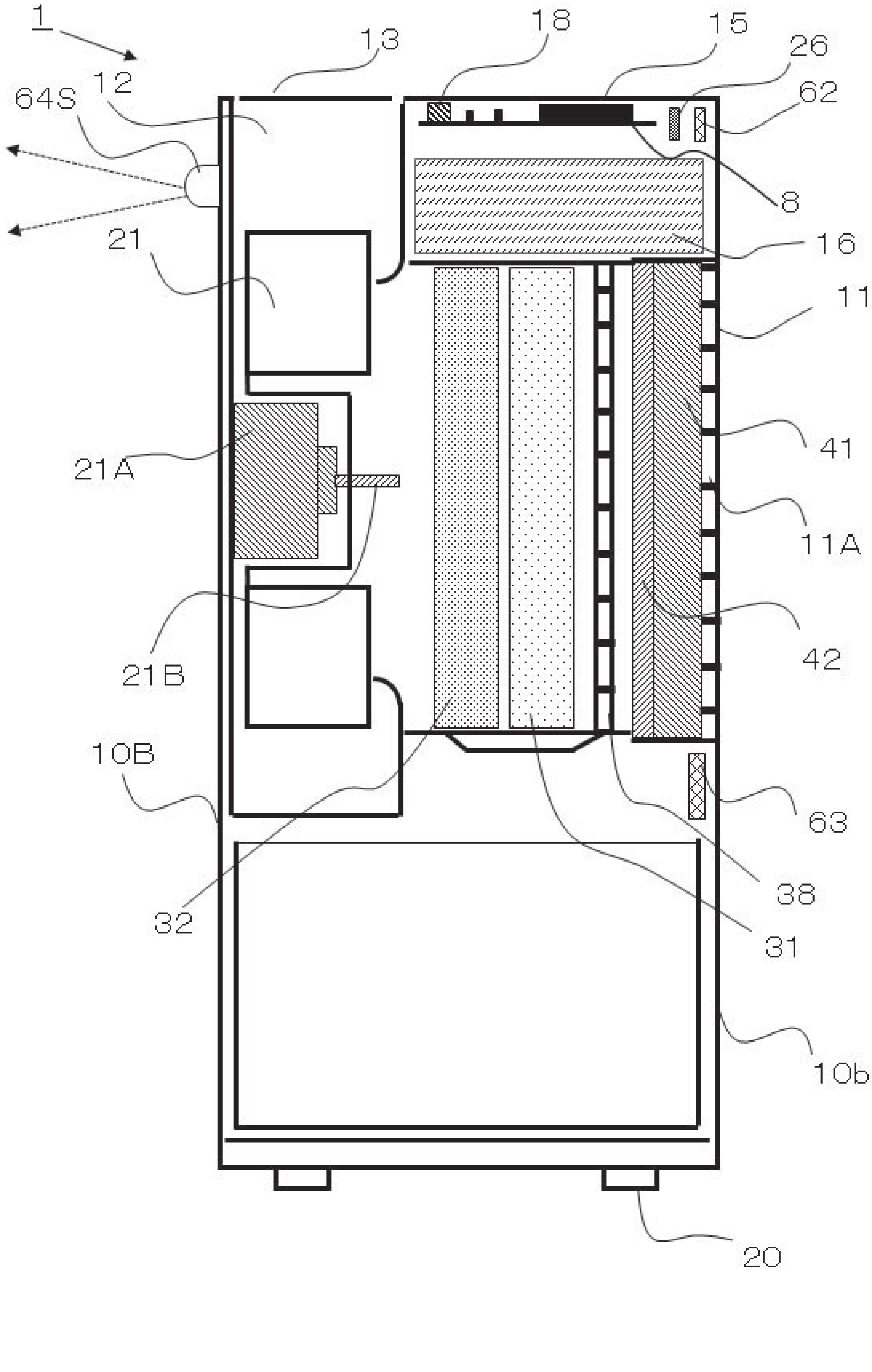
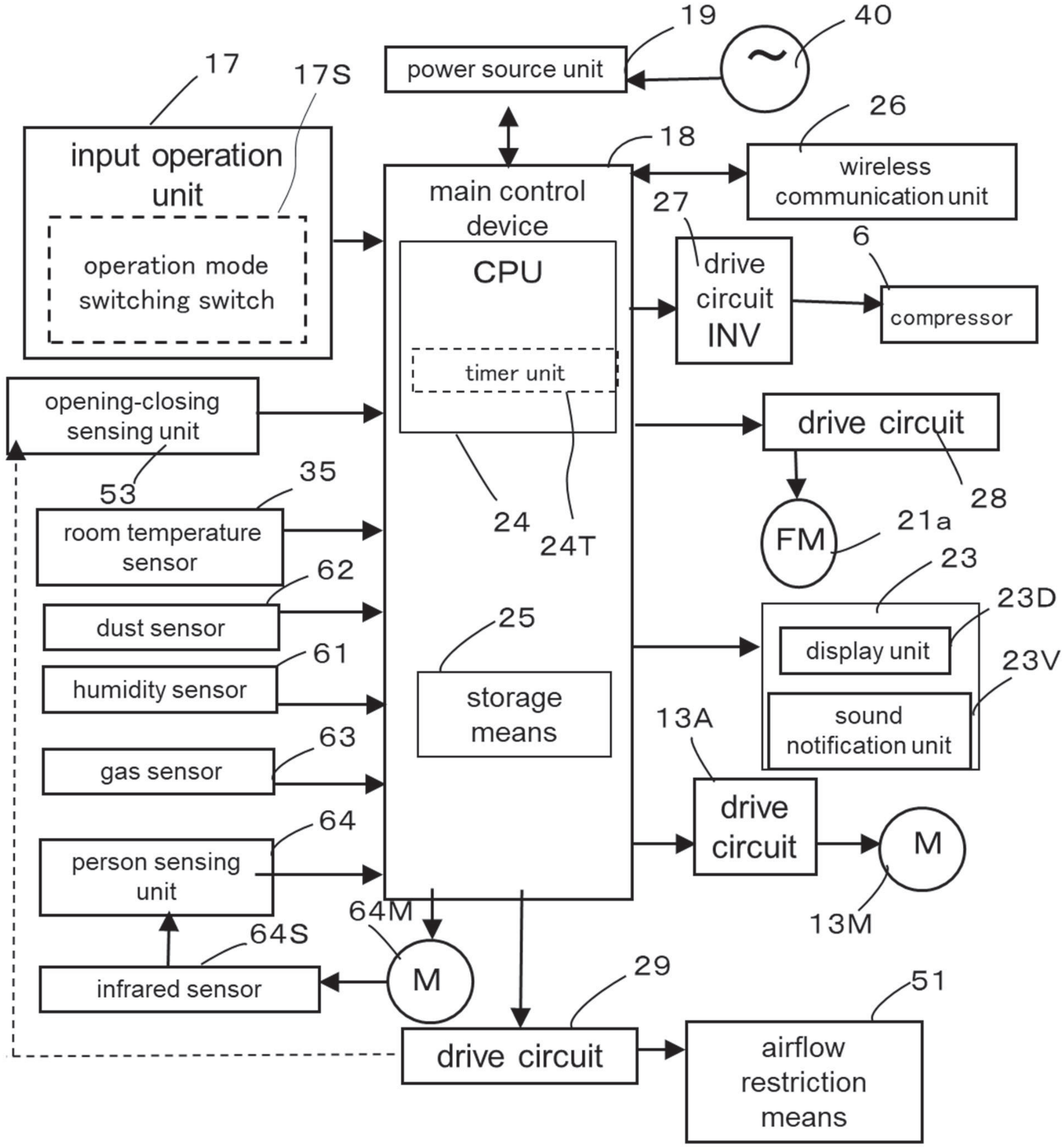
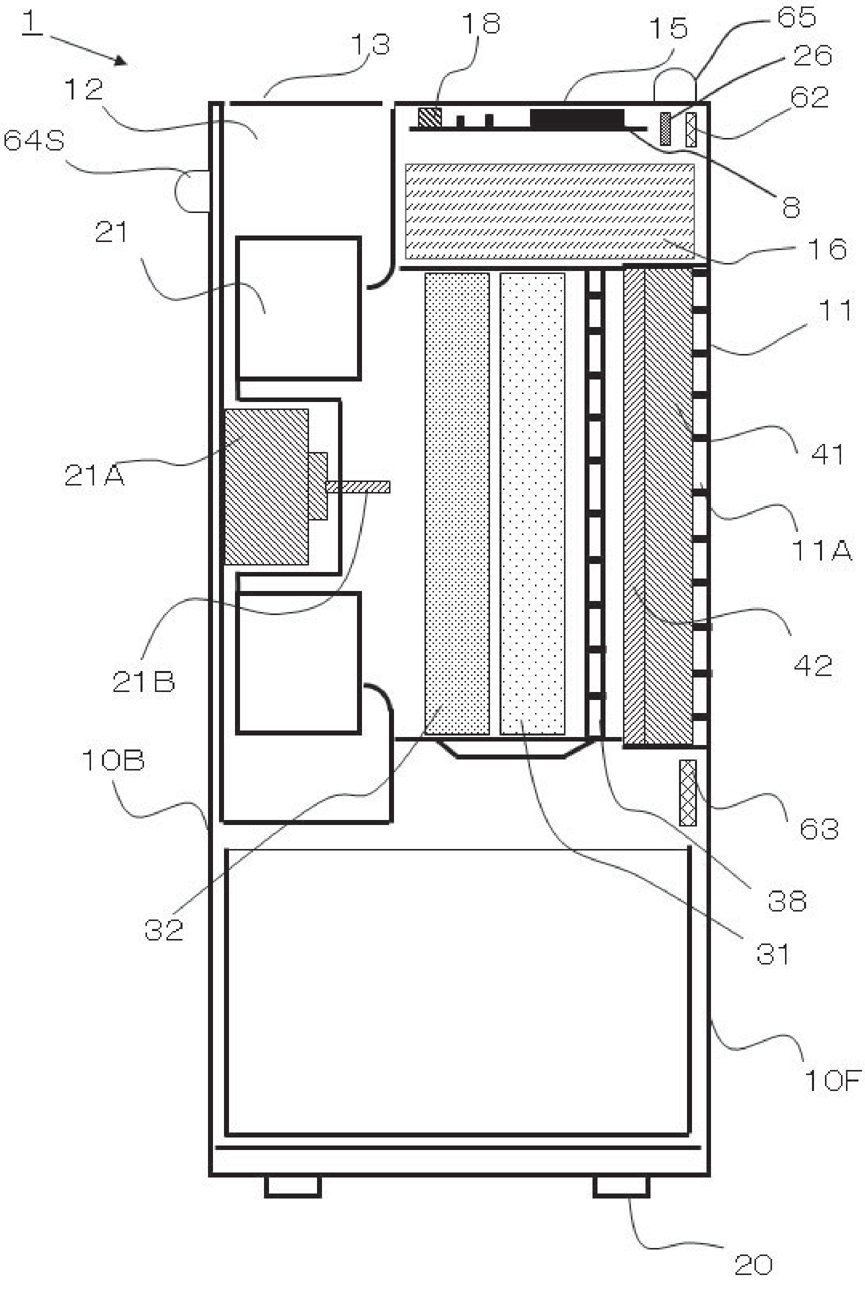

1
13
18
15
26
62
64S
12
8
21
16
11
21A
41
11A
42
21B
10B
63
38
32
31
10b
20

FIG.25



17
17S
input operation unit
operation mode switching switch
19
40
power source unit
~
18
26
main control device
wireless communication unit
27
6
CPU
drive circuit INV
compressor
timer unit
opening-closing sensing unit
drive circuit
53
35
24
24T
28
room temperature sensor
FM
21a
62
23
dust sensor
25
23D
61
display unit
humidity sensor
storage means
23V
63
13A
sound notification unit
gas sensor
64
drive circuit
M
person sensing unit
64M
13M
64S
infrared sensor
M
29
51
drive circuit
airflow restriction means

FIG.26


1
13
18
15
65
26
62
12
64S
8
16
21
11
41
21A
11A
42
21B
10B
63
38
32
31
10F
20