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(54) **OPERATING SYSTEM AND OPERATING METHOD FOR AIR-CONDITIONING DEVICE**

(57) An operation system for an air conditioning device capable of easily identifying an air outlet provided with an adjustment portion serving as an object to be operated and adjusting the blowing direction of air and the like is provided. An operation system for an air conditioning device for operating an indoor unit (12) including a plurality of air outlets (50), and adjustment portions (51) that adjust the blowing direction of the air from the air outlets (50) and existence/non-existence of blowout, the operation system includes an imaging device (61) that takes an image of an air conditioning region (A) by the indoor unit (12), and an operation device (60) that receives an instruction of an operation of the adjustment portions (51), wherein the operation device (60) includes a display unit (64), an image generating part (66) that generates an operation image (S1) by overlapping the image (G1) of the air conditioning region (A) taken by the imaging device (61) with an image (G2) of the plurality of air outlets (50), a display control part (68) that lets the display unit (64) display the operation image (S1), and a selection receiving part (67) that receives selection of the air outlet (50) on the operation image (S1) displayed on the display unit (64) in order to identify the air outlet (50) provided with the adjustment portion (51) serving as an object to be operated.

FIG. 5

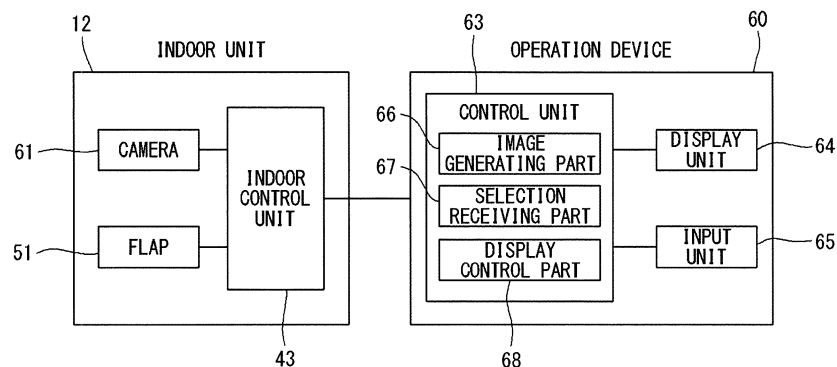
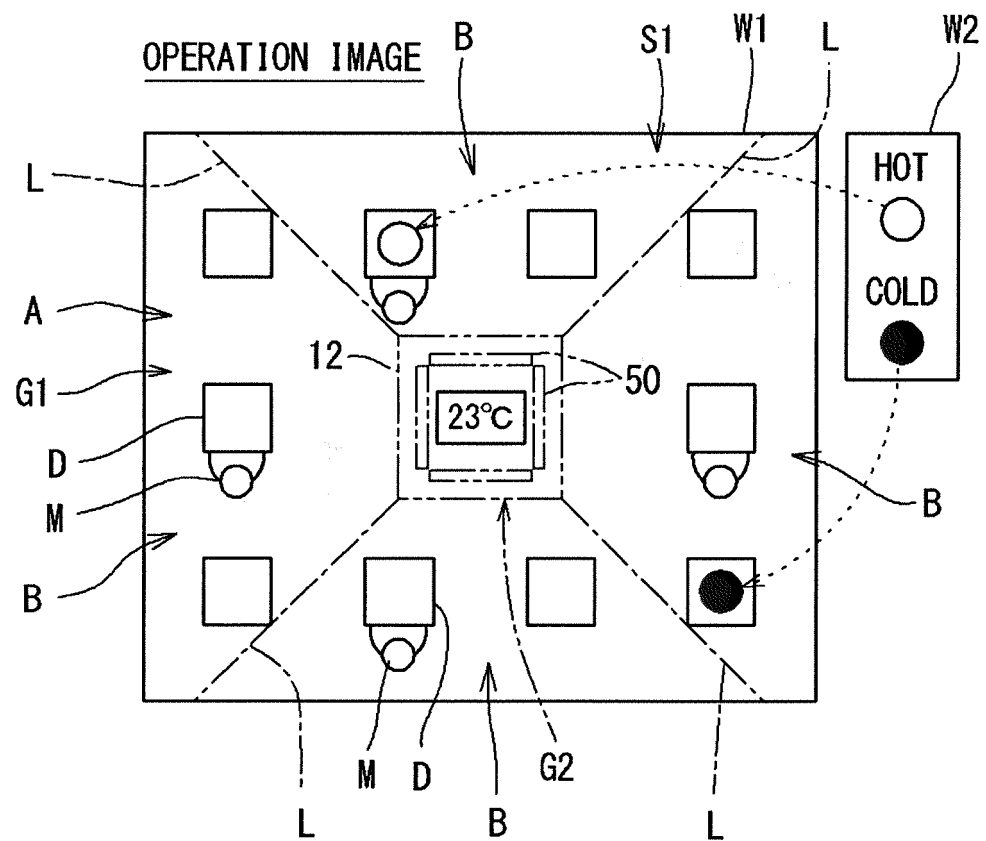


FIG. 6



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to an operation system and an operation method for an air conditioning device.

BACKGROUND ART

10 **[0002]** Patent Literature 1 below discloses an indoor unit attached to a ceiling, the indoor unit including four air outlets that blow out air to four sides. In this indoor unit, the air whose temperature is adjusted is fed to a wide range of an interior by blowing out the air respectively from the air outlets, so that a temperature in the interior can be efficiently adjusted.

15 **[0003]** A flap (adjustment portion) that adjusts the blowing direction of the air in the up and down direction is provided in each of the four air outlets of this indoor unit, and the flaps can be independently actuated. In this indoor unit, a remote controller that receives an operation for individually actuating the flaps is provided.

20 **[0004]** Sign portions different from each other are provided in the vicinity of the respective air outlets in the indoor unit of Patent Literature 1, and a display portion that displays in correspondence with the sign portions of the air outlets is provided in the remote controller. Specifically, the sign portions respectively indicating "□," "□□," "□□□," and "□□□□" are provided in the vicinity of the four air outlets, and indications of "□," "□□," "□□□," and "□□□□" corresponding to these are displayed on the display portion of the remote controller. By selecting the indication of the remote controller corresponding to the sign portion of the air outlet, a user can operate the flap provided in the air outlet.

CITATION LIST

25 [PATENT LITERATURE]

[0005]

30 Patent Literature 1: Japanese Unexamined Patent Publication No. 2011-94924

SUMMARY OF INVENTION

TECHNICAL PROBLEM

35 **[0006]** In the technique described in Patent Literature 1, for example, in a case where the flaps are actuated in such a manner that wind blows (or does not blow) directly onto the user himself/herself, the user is firstly required to identify the air outlet blowing out the air toward him/her, and go nearby the indoor unit to confirm the sign portion attached to the air outlet. After that, the user has to move to a position of the remote controller, select the indication corresponding to the sign portion, and then operate the flap. Therefore, an operation for adjusting the blowing direction of the air is highly troublesome.

40 **[0007]** An object of the present invention is to provide an operation system and an operation method for an air conditioning device capable of easily identifying an air outlet provided with an adjustment portion serving as an object to be operated and promptly adjusting the blowing direction of air and the like.

45 SOLUTION TO PROBLEM

[0008] The present invention is an operation system for an air conditioning device for operating an indoor unit including a plurality of air outlets that blows out air whose temperature is adjusted to an air conditioning region, and adjustment portions each of which is provided to correspond to each of the air outlets, with the adjustment portions that adjust at least one of the blowing direction of the air from the air outlets and existence/non-existence of blowout, the operation system including an imaging device that takes an image of the air conditioning region, and an operation device that receives an operation for actuating the adjustment portions, wherein the operation device includes a display unit, an image generating part that generates an operation image by overlapping the image of the air conditioning region taken by the imaging device with an image of the plurality of air outlets, a display control part that lets the display unit display the operation image, and a selection receiving part that receives selection of an air outlet on the operation image displayed on the display unit in order to identify the air outlet provided with the adjustment portion serving as an object to be operated.

55 **[0009]** According to the above configuration, when the image of the air conditioning region is taken by the imaging device, a user located in the air conditioning region is included in the image. Thus, on the operation image generated

by overlapping the image with the image of the air outlets, a positional relationship between the user and the air outlets is obvious at a glance. Therefore, the user can easily distinguish the air outlet blowing out the air to him/her on the operation image and select the air outlet on the operation image. Thus, there is no need for a task of confirming sign portions attached to an indoor unit as in the conventional technique, so that an operation of the adjustment portion can

be promptly performed.

[0010] In the above configuration, preferably, the indoor unit is attached to a ceiling, and the imaging device takes an image of the air conditioning region from the side of the indoor unit toward the lower side.

[0011] With such a configuration, the image of the entire air conditioning region can be favorably taken.

[0012] Preferably, the display control part lets the display unit display the image of the air conditioning region while partitioning into divided regions corresponding to the respective air outlets.

[0013] With such a configuration, the user can more easily distinguish the air outlet blowing out the air to him/her and more easily select the air outlet.

[0014] The selection receiving part may receive an input of an identified position in the air conditioning region corresponding to the air outlet, and sensible temperature information at the identified position.

[0015] When the identified position in the air conditioning region (such as a location of the user) and the sensible temperature information at the location (temperature information that the user physically feels such as "hot" or "cold") are obtained, in which direction the air has to be blown out from the air outlet to the identified location can be judged. For example, when the user feels "hot" at the time of a cooling operation, the blowing direction of the air may be adjusted in such a manner that cool wind blows directly onto the position of the user (identified position). As in the above configuration, by inputting the identified position in the air conditioning region and the sensible temperature information at the identified position to the operation device, even when the user does not directly instruct the blowing direction of the air, the proper blowing direction can be automatically determined on the side of the indoor unit.

[0016] Preferably, in a case where the plurality of indoor units is provided in one room, the image generating part synthesizes the plurality of operation images in accordance with actual arrangement of the plurality of indoor units and generates one entire operation image, and the display control part lets the display unit display the entire operation image on one screen.

[0017] In a case where the plurality of indoor units is provided in one room, there is sometimes a case where the air is blown out to the user from the air outlets of two or more indoor units. In this case, the adjustment portions not only in one air outlet but also in two or more air outlets may have to be actuated. In the above configuration, in a state in accordance with actual arrangement of the indoor units, one entire operation image is generated by synthesizing the plurality of operation images, and this entire operation image is displayed on one screen of the display unit. Thus, the air outlets of the plurality of indoor units can be selected on one screen.

[0018] The present invention is an operation method for an air conditioning device for operating an indoor unit including a plurality of air outlets that blows out air whose temperature is adjusted to an air conditioning region, and adjustment portions each of which is provided to correspond to each of the air outlets, with the adjustment portions that adjust at least one of the blowing direction of the air from the air outlets and existence/non-existence of blowout, the operation method including an imaging step of taking an image of the air conditioning region, an image generating step of generating an operation image by overlapping the image of the air conditioning region taken in the imaging step with an image of the plurality of air outlets, a display step of displaying the operation image generated in the image generating step on a display unit of an operation device, and a selection receiving step of receiving selection of an air outlet on the operation image displayed on the display unit in order to identify the air outlet provided with the adjustment portion serving as an object to be operated.

[0019] By such an operation method, as well as the above description, the user can easily distinguish the air outlet blowing out the air to him/her on the operation image and select the air outlet on the operation image. Therefore, there is no need for a task of confirming sign portions attached to an indoor unit as in the conventional technique, so that an operation of the adjustment portion can be promptly performed.

ADVANTAGEOUS EFFECTS OF INVENTION

[0020] According to the present invention, the air outlet provided with the adjustment portion serving as the object to be operated can be easily identified and the blowing direction of the air and the like can be promptly adjusted.

BRIEF DESCRIPTION OF DRAWINGS

[0021]

[FIG. 1] FIG. 1 is a schematic configuration diagram of an air conditioning device in which an operation system according to a first embodiment of the present invention is adopted.

[FIG. 2] FIG. 2 is a schematic side sectional view of an indoor unit.

[FIG. 3] FIG. 3 is a plan view in which a decoration panel of the indoor unit is seen from the indoor side (side of an air conditioning region).

[FIG. 4] FIG. 4 is a sectional view of a part of an air outlet of air.

[FIG. 5] FIG. 5 is a block diagram showing a configuration of the operation system for the air conditioning device.

[FIG. 6] FIG. 6 is a schematic view showing a display content on a display unit.

[FIG. 7] FIG. 7 is a schematic view showing a display content on a display unit in a second embodiment of the present invention.

[FIG. 8] FIG. 8 is a schematic view showing a display content on a display unit in a third embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0022] Hereinafter, embodiments of the present invention will be described with reference to the drawings.

[First Embodiment]

[0023] FIG. 1 is a schematic configuration diagram of an air conditioning device in which an operation system according to a first embodiment of the present invention is adopted.

[0024] An air conditioning device 10 is a split type air conditioning device, and mainly has an outdoor unit 11, an indoor unit 12, and a liquid side communication pipe 13 and a gas side communication pipe 14 connecting the outdoor unit 11 and the indoor unit 12, and these form a vapor compression type refrigerant circuit 15.

[0025] The outdoor unit 11 is installed in an exterior or the like, and mainly includes a compressor 21, a four-way selector valve 22, an outdoor heat exchanger 23, an expansion valve 24, a liquid side stop valve 25, and a gas side stop valve 26.

[0026] The compressor 21 is a mechanism that suctions and compresses a low-pressure gaseous refrigerant to make a high-pressure gaseous refrigerant, and then discharges the gaseous refrigerant. As this compressor 21, a closed type compressor in which a compression element of a rotary type, a scroll type, or the like accommodated in a casing is driven by a compressor motor 21a can be adopted. In the compressor motor 21a, the rotation number thereof (that is, the operation frequency) can be changed by inverter control. Thereby, capacity control of the compressor 21 can be performed.

[0027] The four-way selector valve 22 is a valve for switching the direction of a flow of the refrigerant at the time of switching a cooling operation and a heating operation. The four-way selector valve 22 connects a discharge side of the compressor 21 and a gas side end of the outdoor heat exchanger 23 and connects the gas side stop valve 26 and a suction side of the compressor 21 at the time of the cooling operation (refer to solid lines of the four-way selector valve 22 in FIG. 1). The four-way selector valve 22 connects the discharge side of the compressor 21 and the gas side stop valve 26 and connects the gas side end of the outdoor heat exchanger 23 and the suction side of the compressor 21 at the time of the heating operation (refer to broken lines of the four-way selector valve 22 in FIG. 1).

[0028] The outdoor heat exchanger 23 is a heat exchanger functioning as a heat radiator (condenser) of the refrigerant at the time of the cooling operation and functioning as an evaporator of the refrigerant at the time of the heating operation. A liquid side end of the outdoor heat exchanger 23 is connected to the expansion valve 24 and the gas side end is connected to the four-way selector valve 22.

[0029] The expansion valve 24 of the present embodiment is an electric expansion valve by which a high-pressure liquid refrigerant whose heat is already released in the outdoor heat exchanger 23 can be decompressed before feeding to an indoor heat exchanger 42 (to be described later) at the time of the cooling operation, and a high-pressure liquid refrigerant whose heat is already released in the indoor heat exchanger 42 can be decompressed before feeding to the outdoor heat exchanger 23 at the time of heating operation.

[0030] The liquid side stop valve 25 and the gas side stop valve 26 are valves provided in connection ports to external devices and pipes (specifically, the liquid side communication pipe 13 and the gas side communication pipe 14). The liquid side stop valve 25 is connected to the expansion valve 24. The gas side stop valve 26 is connected to the four-way selector valve 22.

[0031] The outdoor unit 11 is provided with an outdoor fan 27 for suctioning outdoor air into the casing, supplying the outdoor air to the outdoor heat exchanger 23, and then discharging the air to an exterior of the casing.

[0032] The outdoor heat exchanger 23 is a heat exchanger that releases heat of or evaporates the refrigerant with the outdoor air serving as a cooling source or a heat source. As the outdoor fan 27, a propeller fan to be driven by an outdoor fan motor 27a can be adopted. In the outdoor fan motor 27a, the rotation number thereof (that is, the operation frequency) can be changed by an inverter device. Thereby, an air volume of the outdoor fan 27 can be controlled.

[0033] The outdoor unit 11 has an outdoor control unit 28 that controls actions of parts forming the outdoor unit 11.

The outdoor control unit 28 has a microcomputer, a memory, and the like for controlling the outdoor unit 11, and sends and receives a control signal and the like to and from an indoor control unit 43 (to be described later) of the indoor unit 12.

[0034] The liquid side communication pipe 13 is connected to the liquid side stop valve 25, and used for guiding the refrigerant out to an exterior of the outdoor unit 11 from an outlet of the outdoor heat exchanger 23 functioning as the heat radiator (condenser) of the refrigerant at the time of the cooling operation, and used for introducing the refrigerant into an inlet of the outdoor heat exchanger 23 functioning as the evaporator of the refrigerant from the exterior of the outdoor unit 11 at the time of the heating operation.

[0035] The gas side communication pipe 14 is connected to the gas side stop valve 26, and used for introducing the refrigerant into the suction side of the compressor 21 from the exterior of the outdoor unit 11 at the time of the cooling operation, and used for guiding the refrigerant out to the exterior of the outdoor unit 11 from the discharge side of the compressor 21 at the time of the heating operation.

[0036] The indoor unit 12 is installed on an indoor ceiling, a wall, or the like, and mainly has an indoor fan 41 and the indoor heat exchanger 42. The indoor fan 41 is formed to suction indoor air serving as an object to be conditioned, let the air pass through the indoor heat exchanger 42, and then blow out the air to an exterior of the indoor unit 12. The indoor fan 41 has an indoor fan motor 41a and a bladed wheel 41b coupled to the indoor fan motor 41a to be driven and rotated. The bladed wheel 41b is a bladed wheel having turbo blades. In the indoor fan motor 41a, the rotation number thereof (that is, the operation frequency) can be changed by inverter control. Thereby, an air volume of the indoor fan 41 can be controlled.

[0037] The indoor heat exchanger 42 is a heat exchanger functioning as an evaporator of the refrigerant at the time of the cooling operation and functioning as a heat radiator (condenser) of the refrigerant at the time of the heating operation. The indoor heat exchanger 42 is connected to the liquid side communication pipe 13 and the gas side communication pipe 14 via a refrigerant pipe.

[0038] The indoor unit 12 has the indoor control unit 43 that controls actions of parts forming the indoor unit 12. This indoor control unit 43 has a microcomputer, a memory, and the like for controlling the indoor unit 12, and can send and receive a control signal and the like to and from the outdoor control unit 28 of the outdoor unit 11. A control unit that performs operation control and the like of the air conditioning device 10 is formed by the indoor control unit 43 and the outdoor control unit 28.

[0039] The air conditioning device 10 includes an operation device 60 for performing operations such as start/stop of an operation, and adjustment of a temperature, an air volume, and the wind direction. This operation device 60 is connected so as to be in communication with the indoor control unit 43 via communication means. The operation device 60 forms the operation system for the air conditioning device 10 together with an imaging device 61 to be described later. The operation device 60 of the present embodiment is formed by a general personal computer (hereinafter, also referred to as the "PC") including a CPU, a memory, and the like. It should be noted that communication between the operation device 60 and the indoor control unit 43 by the communication means may be wire communication using a LAN cable or the like or may be wireless communication using a wireless LAN or the like.

[0040] FIG. 2 is a schematic side sectional view of the indoor unit. FIG. 3 is a plan view in which a decoration panel of the indoor unit is seen from the indoor side (side of an air conditioning region). FIG. 4 is a sectional view of a part of an air outlet of the air.

[0041] The indoor unit 12 of the present embodiment is of a ceiling embedded type which is installed inside a ceiling. This indoor unit 12 has a casing 44 accommodating various constituent members inside as shown in FIG. 2. The casing 44 is formed by a casing main body 45 arranged inside the ceiling, and a decoration panel 46 arranged on the lower side of the casing main body 45 and arranged along a lower surface of a ceiling 54.

[0042] The casing main body 45 is formed into a box shape whose lower surface is opened, and the indoor heat exchanger 42 and the indoor fan 41 are arranged inside thereof. The decoration panel 46 is a square plate shape body made of synthetic resin or metal, fixed to a lower end portion of the casing main body 45. A suction port 47 that suctions the air is formed in the center of the decoration panel 46, and a plurality of air outlets 50 that blows out the air is formed about the suction port 47. As shown in FIG. 3, the suction port 47 is formed into a square shape in a plan view, and the suction port 47 is provided with a suction grille 48 and a suction filter 49.

[0043] As shown in FIG. 2, the indoor fan 41 is arranged above the suction port 47, and the indoor fan motor 41a thereof is attached and fixed to a top plate 45a of the casing main body 45. The indoor heat exchanger 42 is arranged so as to surround the indoor fan 41. A drain pan 52 is provided on the lower side of the indoor heat exchanger 42, and a bell mouth 53 that guides a flow of the air from the suction port 47 to the indoor fan 41 is provided in the center of the drain pan 52.

[0044] When the indoor fan 41 is activated, the air is suctioned from the suction port 47, and in a process of passing through the indoor heat exchanger 42 on an outer periphery of the suction port, heat exchange is performed between the air and the refrigerant. The air after heat exchange flows downward along an inside surface 45b of the casing main body 45, and is blown out from the air outlets 50. Dew condensation water generated in the indoor heat exchanger 42 is received by the drain pan 52 on the lower side thereof, and discharged to the exterior via a water discharge route (not

shown).

[0045] As shown in FIG. 3, the air outlets 50 are provided at four points, and formed to be thin and long along outer sides of side parts of the suction port 47 formed in a square shape. A flap (adjustment portion; adjustment blade) 51 that adjusts the blowing direction of the air and existence/non-existence of blowout is provided in each of the air outlets 50. The flap 51 is a plate shape member formed to be thin and long substantially along an inner edge of the air outlet 50, and is supported by a substantially horizontal support shaft 51b (refer to FIG. 4) arranged along the longitudinal direction thereof so as to be swingable in the up and down direction. The flap 51 is driven and swung in the up and down direction by a flap motor 51a (refer to FIG. 3) and adjusts the blowing direction of the air in accordance with an oscillation angle thereof.

[0046] As shown in FIG. 4(a), the flap 51 can bring the air outlet 50 into a substantially closed state at a substantially horizontal posture (P5), so as to stop blowout of the air from the air outlet 50 as far as possible (to suppress a blowout amount in a state where little air leakage is allowed). As shown in FIG. 4(b), the flap 51 can adjust the blowing direction of the air by changing the posture about the support shaft 51b. In the flap 51 of the present embodiment, the posture can be changed by five steps of P0 to P4. Together with the substantially horizontal posture P5 shown in FIG. 4(a), the posture can be changed by six steps in total in the flap 51. It should be noted that the posture of the flap 51 may be formed to be adjusted steplessly, or the substantially horizontal posture P5 of the flap 51 at which blowout of the air is stopped may be omitted.

[0047] As shown in FIG. 4(b), in the present embodiment, when the posture of the flap 51 is set to be P0, the air is blown out in the substantially horizontal direction along the lower surface of the ceiling 54 from the air outlet 50. When the posture of the flap 51 is set to be P4, the air is blown out in the substantially directly downward direction. When the posture of the flap 51 is set to be P1 to P3, the air is blown out in the oblique direction which is between the substantially horizontal direction and the substantially directly downward direction.

[0048] Next, the operation system for operating the flap 51 in accordance with a request of the user will be described in detail.

[0049] FIG. 5 is a block diagram showing a configuration of the operation system for the air conditioning device.

[0050] The operation system of the present embodiment includes the operation device 60 connected to the indoor unit 12 and the camera (imaging device) 61 provided in the indoor unit 12. This camera 61 includes for example imaging elements mounted on a substrate such as a CMOS and a CCD, and is provided in an outer peripheral part of the decoration panel 46, the suction grille 48, or the like. An imaging range of the camera 61 is set in such a manner that an image of the entire air conditioning region of an interior centering on the indoor unit 12 is taken. The image taken by the camera 61 is sent to the operation device 60 from the indoor control unit 43 via a communication wire.

[0051] The operation device 60 is to provide an operation instruction of the flap 51, and includes a control unit 63, a display unit 64, and an input unit 65. The control unit 63 includes an arithmetic unit such as a CPU and a storing unit such as a memory. By the arithmetic unit executing a program recorded in the storing unit, various functions can be exerted. The control unit 63 of the present embodiment includes an image generating part 66, a selection receiving part 67, and a display control part 68 as functioning parts thereof.

[0052] The image generating part 66 has a function of generating a predetermined operation image by utilizing an image of the air conditioning region taken by the camera 61. The display control part 68 controls and lets the display unit 64 display the operation image generated by the image generating part 66. The display unit 64 can be formed for example by a liquid crystal monitor or a CRT monitor, and is connected to the control unit 63 via an output interface (not shown).

[0053] FIG. 6 is a schematic view showing a display content on the display unit.

[0054] An operation image S1 is formed by overlapping a photographed image G1 of an air conditioning region A taken by the camera 61 with an image G2 of the indoor unit 12 including the air outlets 50. That is, the operation image S1 is an image expressing the entire air conditioning region A in a form of including the indoor unit 12 as well. The photographed image G1 of the air conditioning region A includes desks D arranged in the air conditioning region A and users M at the desks D. The image G2 can be an imaginary image such as an illustration expressing the indoor unit 12 and the air outlets 50. However, the image G2 may be a photographed image in which an image of the decoration panel 46 is separately taken from the lower surface side. In any case, the image G2 is an image that the camera 61 is incapable of taking. In the present embodiment, an indication of a numeric value of a set temperature ("23°C" in the example shown in the figure) is also included in the image G2.

[0055] In the operation image S1, partition lines L partitioning the air conditioning region A for regions (divided regions) B respectively corresponding to the air outlets 50 are provided. By the partition lines L, in which region B in the air conditioning region A a temperature or the like is mainly adjusted by the air blown out from the air outlet 50 can be grasped. Therefore, by seeing the operation image S1, a position of the user M and the desk D and a relationship between the position and the air outlet 50 blowing out the air toward the position are obvious at a glance.

[0056] The selection receiving part 67 has a function of receiving selection (designation) of the air outlet 50 on the operation image S1 displayed on the display unit 64 in order to identify the air outlet 50 provided with the flap 51 serving

as an object to be operated. The air outlet 50 can be selected by using the input unit 65. The input unit 65 can be formed by a mouse, a keyboard, or the like connected to the control unit 63.

[0057] Hereinafter, a specific method of selecting the air outlet 50 will be described.

[0058] As shown in FIG. 6, in the display unit 64, a display region W1 for displaying the operation image S1 as well as a display region W2 for displaying a sensible temperature icon (sensible temperature designation image) are provided. This sensible temperature icon includes an icon of "○" indicating a sensible temperature "hot" of the user, and an icon of "●" indicating a sensible temperature "cold" of the user. In order to input the sensible temperature of the user to the operation device 60, in a case where the user feels cold, the user drags and drops (hereinafter, simply referred to as "drags") the "●" icon to his/her position (for example, onto the desk D), and in a case where the user feels hot, the user drags the "○" icon to his/her position.

[0059] By this operation, firstly, the air outlet 50 corresponding to the divided region B to which the sensible temperature icon is dragged is identified as the air outlet 50 provided with the flap 51 serving as an object to be operated, and received by the selection receiving part 67 of the control unit 63. Further, information on a position in the divided region B to which the sensible temperature icon is dragged and a type of the sensible temperature icon (● or ○) is received by the selection receiving part 67 of the control unit 63.

[0060] By the position to which the sensible temperature icon is dragged, an indoor location at which the temperature actually has to be adjusted can be identified. By the type of the sensible temperature icon (● or ○), in what way the blowing direction of the air to the location has to be adjusted can be judged. The selection receiving part 67 sends the information on the received air outlet 50 and the information on the position to which the sensible temperature icon is dragged and the type thereof to the indoor control unit 43, and the indoor control unit 43 controls and actuates the flap motor 51a based on these information.

[0061] For example, during the cooling operation, in a case where the user located at a position the most distant from the indoor unit 12 in one of the divided regions B on the operation image S1 drags the "cold" icon to his/her position, the selection receiving part 67 of the control unit 63 receives selection of the air outlet 50 corresponding to the divided region B and also receives and sends the dragged position of the sensible temperature icon and the type thereof to the indoor control unit 43. The indoor control unit 43 adjusts the flap 51 at a nearly horizontal posture such as the postures P3 to P5 in FIG. 4 and the like based on the information received from the selection receiving part 67. Thereby, the air can be blown out in such a manner that cold wind is not directly delivered to the user located at the position distant from the indoor unit 12, so that a peripheral part of the user can be adjusted to have a proper temperature. The indoor control unit 43 may adjust not only the blowing direction of the air from the air outlet 50 but also a blowing temperature and an air volume in accordance with the type of the sensible temperature icon.

[0062] It should be noted that in a case where plural users drag different sensible temperature icons in one of the divided regions B in the operation image S1, the wind direction can be adjusted by a majority decision. For example, when the number of the user who drags the "cold" icon in one of the divided regions B is more than the number of the user who drags the "hot" icon, with the "cold" icon taking priority, the posture of the flap 51 may be adjusted for the position of the user who drags the "cold" icon. In a case where plural users drag different sensible temperature icons by plural times, the posture of the flap 51 may be adjusted with the sensible temperature icon which is most frequently dragged taking priority.

[0063] The operation device 60 may be formed by a particular PC installed in the interior or may be formed by a PC that the user is using at the desk. In the latter case, the user can operate the indoor unit 12 from the PC that he/she is using. Thus, the user is not required to stand up out of a seat and move for the operation.

[0064] The operation device 60 may be installed not in the interior which is the air conditioning region but in other outdoor locations such as a control room for controlling air conditioning and the like. In this case, the indoor unit 12 can be remotely operated by the outdoor operation device 60. An indoor state can be monitored from the control room or the like by the photographed image G1 taken by the camera 61. That is, the camera 61 can be utilized as a monitoring camera.

[0065] Not only two types of icons "hot" and "cold" but also various types of icons may be prepared as the sensible temperature icon. For example, by adding a sensible temperature icon such as "slightly hot," "slightly cold," or the like, finer adjustment of the temperature (adjustment of the blowing direction) may be enabled. By clicking (selecting) the indication of the set temperature in the operation image S1 by the mouse or the like, a change in the set temperature may be enabled.

[0066] The photographed image G1 taken by the camera 61 may be a still image or a moving image. In a case of the still image, the operation image S1 is preferably appropriately updated by taking the photographed image G1 at predetermined time intervals (such as several-minute intervals or several-hour intervals). In a case where the photographed image is the moving image, the indoor state can be grasped in real time.

[Second Embodiment]

[0067] FIG. 7 is a schematic view showing a display content on a display unit in a second embodiment of the present invention.

[0068] In the present embodiment, in a case where a plurality of indoor units 12 is provided in one room, operations of flaps 51 of the plurality of indoor units 12 can be received by one operation image S2.

[0069] Specifically, as well as the first embodiment, an image generating part 66 of a control unit 63 firstly generates an operation image S1 by synthesizing a photographed image G1 taken by a camera 61 for each of the indoor units 12 and an image G2 of the indoor unit 12. The image generating part 66 synthesizes the plurality of operation images S1 in accordance with actual arrangement of the plurality of indoor units 12 and generates one operation image (entire operation image) S2. A display control part 68 of the control unit 63 displays the entire operation image S2 generated by the image generating part 66 on a display region W1 of a display unit 64.

[0070] Therefore, as well as the first embodiment, when the user drags a sensible temperature icon on the entire operation image S2, a selection receiving part 67 receives selection of an air outlet 50 corresponding to a dragged position or the like, so that the blowing direction of the air from this air outlet 50 can be adjusted. In the present embodiment, adjacent divided regions B of the operation images S1 are not clearly partitioned from each other, and the divided regions substantially overlap in the vicinity of a border between both the divided regions B. Therefore, in a case where the user is located at a position in the middle of the plurality of indoor units 12, and when the sensible temperature icon is dragged to a position of the user on the entire operation image S2, the selection receiving part 67 receives selection of the air outlets 50 of the plurality of indoor units 12. Thereby, the plurality of flaps 51 of the air outlets 50 can be adjusted at the same time, so that more optimal air conditioning can be performed.

[Third Embodiment]

[0071] FIG. 8 is a schematic view showing a display content on a display unit in a third embodiment of the present invention.

[0072] In the above first and second embodiments (refer to FIGS. 6 and 7), the sensible temperature icon is displayed on a display region W2 in the display unit 64. However, in the present embodiment, posture designation images G30 to G35 for directly designating postures of flaps 51 are displayed in place of the sensible temperature icon. Specifically, six posture designation images G30 to G35 indicating the postures P0 to P5 of the flap 51 shown in FIG. 4 are displayed on a display region W2.

[0073] A selection receiving part 67 of the present embodiment receives selection of an air outlet 50 by designating the air outlet 50 on an operation image S1 or a divided region B corresponding to the air outlet 50 by the user using a mouse or the like. The user himself/herself can determine the posture of the flap 51 provided in the air outlet 50 by designating any of the posture designation images G30 to G35 in the display region W2. That is, although the blowing direction of the air (posture of the flap 51) is automatically determined on the side of the indoor control unit 43 by inputting the information on the position of the user and the sensible temperature in the first and second embodiments, the blowing direction of the air can be adjusted in accordance with preference of the user in the present embodiment. Thus, a freedom degree of the operation can be increased.

[0074] The present invention is not limited to the above embodiments but can be appropriately modified within the scope of the invention described in the claims.

[0075] For example, although the air is blown out to four sides from the four air outlets 50 in the indoor unit 12 of the above embodiments, the air may be blown out in two directions from two air outlets 50. Alternatively, the air may be blown out from three or five or more air outlets 50. Although the indoor unit 12 of the above embodiments is of a ceiling embedded type, the indoor unit may be of a ceiling suspended type or a wall attached type.

[0076] The adjustment portions of the above embodiments are formed by the flaps 51 that adjust the blowing direction of the air from the air outlets 50 in the up and down direction. However, the adjustment portions may be formed by louvers (adjustment slats) that adjust the blowing direction in the left and right direction or the like.

[0077] The indoor heat exchanger 42 of the indoor unit 12 may be able to adjust the temperatures of the air blown out from the air outlets 50 individually. The indoor fan 41 may be able to adjust the air volumes of the air blown out from the air outlets 50 individually.

[0078] The operation device 60 may include a touch panel type display unit. In this case, the display unit is also used as an input unit. The operation device 60 may be formed by a tablet terminal, or as well as the conventional example, may include a display panel (display unit) and an operation button (input unit) or may be formed by a remote controller.

REFERENCE SIGNS LIST

[0079]

12: INDOOR UNIT
 50: AIR OUTLET
 51: FLAP (ADJUSTMENT PORTION)
 60: OPERATION DEVICE
 5 61: CAMERA (IMAGING DEVICE)
 64: DISPLAY UNIT
 66: IMAGE GENERATING PART
 67: SELECTION RECEIVING PART
 A: AIR CONDITIONING REGION
 10 B: DIVIDED REGION
 G1: IMAGE OF AIR CONDITIONING REGION
 G2: IMAGE OF AIR OUTLET
 S1: OPERATION IMAGE
 S2: ENTIRE OPERATION IMAGE

Claims

1. An operation system for an air conditioning device for operating an indoor unit (12) including a plurality of air outlets (50) that blows out air whose temperature is adjusted to an air conditioning region (A), and adjustment portions (51) each of which is provided to correspond to each of the air outlets (50), with the adjustment portions that adjust at least one of a blowing direction of the air from the air outlets (50) and existence/non-existence of blowout, the operation system comprising:

an imaging device (61) that takes an image of the air conditioning region (A); and
 an operation device (60) that receives an instruction of an operation of the adjustment portions (51), wherein the operation device (60) includes:

a display unit (64);

an image generating part (66) that generates an operation image (S1) by overlapping the image (G1) of the air conditioning region (A) taken by the imaging device (61) with an image (G2) of the plurality of air outlets (50);

a display control part (68) that lets the display unit (64) display the operation image (S1); and

a selection receiving part (67) that receives selection of an air outlet (50) on the operation image (S1) displayed on the display unit (64) in order to identify the air outlet (50) provided with the adjustment portion (51) serving as an object to be operated.

2. The operation system for an air conditioning device according to claim 1, wherein the indoor unit (12) is attached to a ceiling, and the imaging device (61) takes an image of the air conditioning region (A) from a side of the indoor unit (12) toward a lower side.

3. The operation system for an air conditioning device according to claim 1 or 2, wherein the display control part (68) lets the display unit (64) display the image (G1) of the air conditioning region (A) while partitioning into divided regions (B) respectively corresponding to the air outlets (50).

4. The operation system for an air conditioning device according to any one of claims 1 to 3, wherein the selection receiving part (67) receives an input of an identified position in the air conditioning region (A) corresponding to the air outlet (50), and sensible temperature information at the identified position.

5. The operation system for an air conditioning device according to any one of claims 1 to 4, wherein in a case where the plurality of indoor units (12) is provided in one room, the image generating part (66) synthesizes the plurality of operation images (S1) in accordance with actual arrangement of the plurality of indoor units (12) and generates one entire operation image (S2), and the display control part (68) lets the display unit (64) display the entire operation image (S2) on one screen.

6. An operation method for an air conditioning device for operating an indoor unit (12) including a plurality of air outlets (50) that blows out air whose temperature is adjusted to an air conditioning region (A), and adjustment portions (51) each of which is provided to correspond to each of the air outlets (50), with the adjustment portions that adjust at

least one of a blowing direction of the air from the air outlets (50) and existence/non-existence of blowout, the operation method comprising:

an imaging step of taking an image of the air conditioning region (A);

an image generating step of generating an operation image (S1) by overlapping the image (G1) of the air conditioning region (A) taken in the imaging step with an image (G2) of the plurality of air outlets (50);

a display step of letting a display unit (64) of an operation device (60) display the operation image (S1) generated in the image generating step; and

a selection receiving step of receiving selection of an air outlet (50) on the operation image (S1) displayed on the display unit (64) in order to identify the air outlet (50) provided with the adjustment portion (51) serving as an object to be operated.

FIG. 1

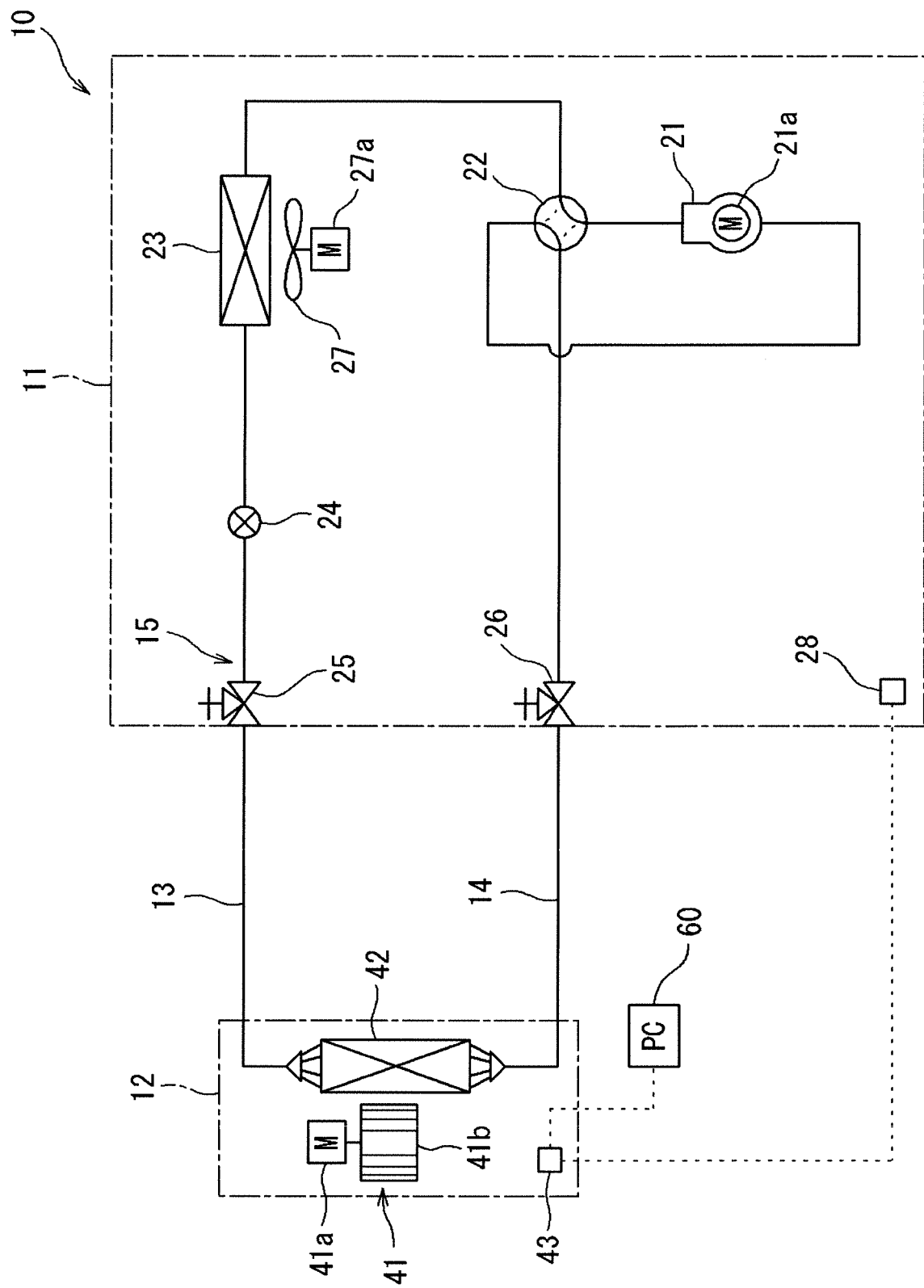


FIG. 2

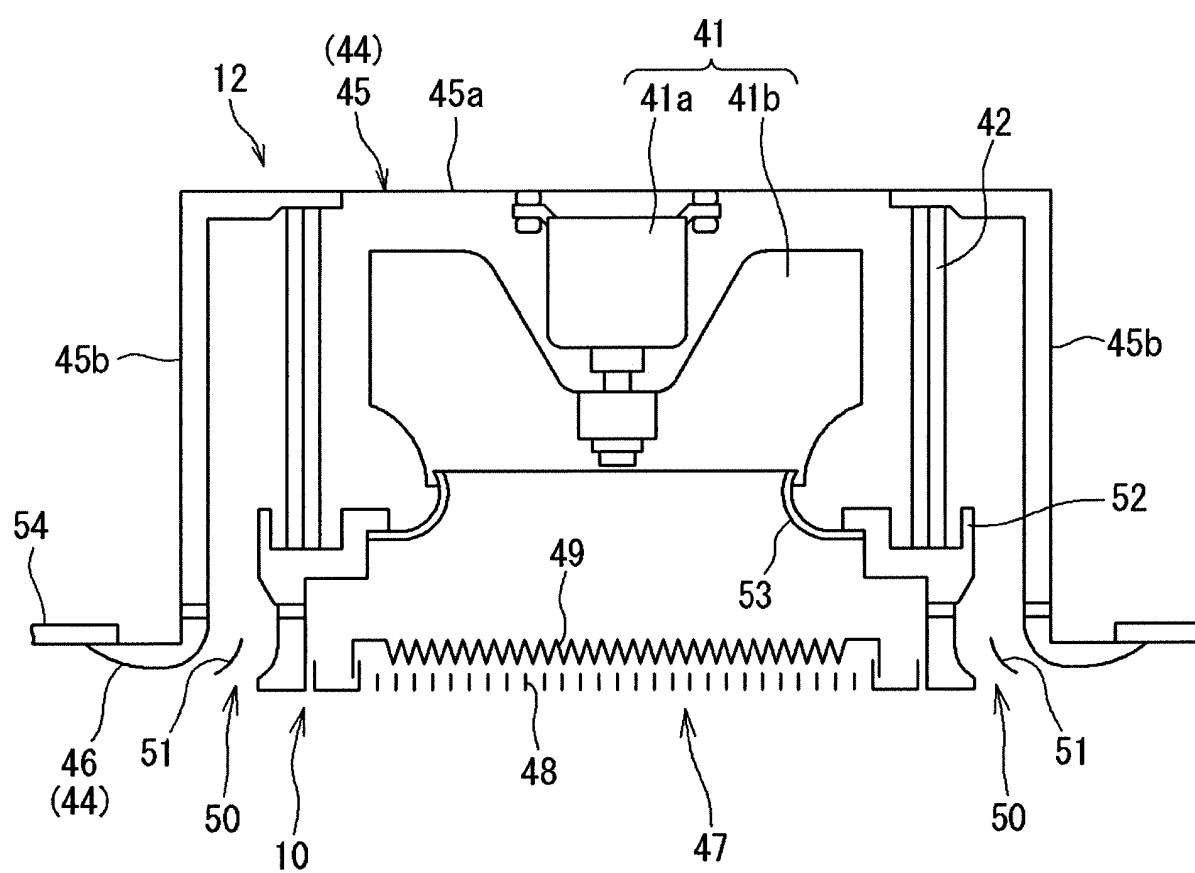


FIG. 3

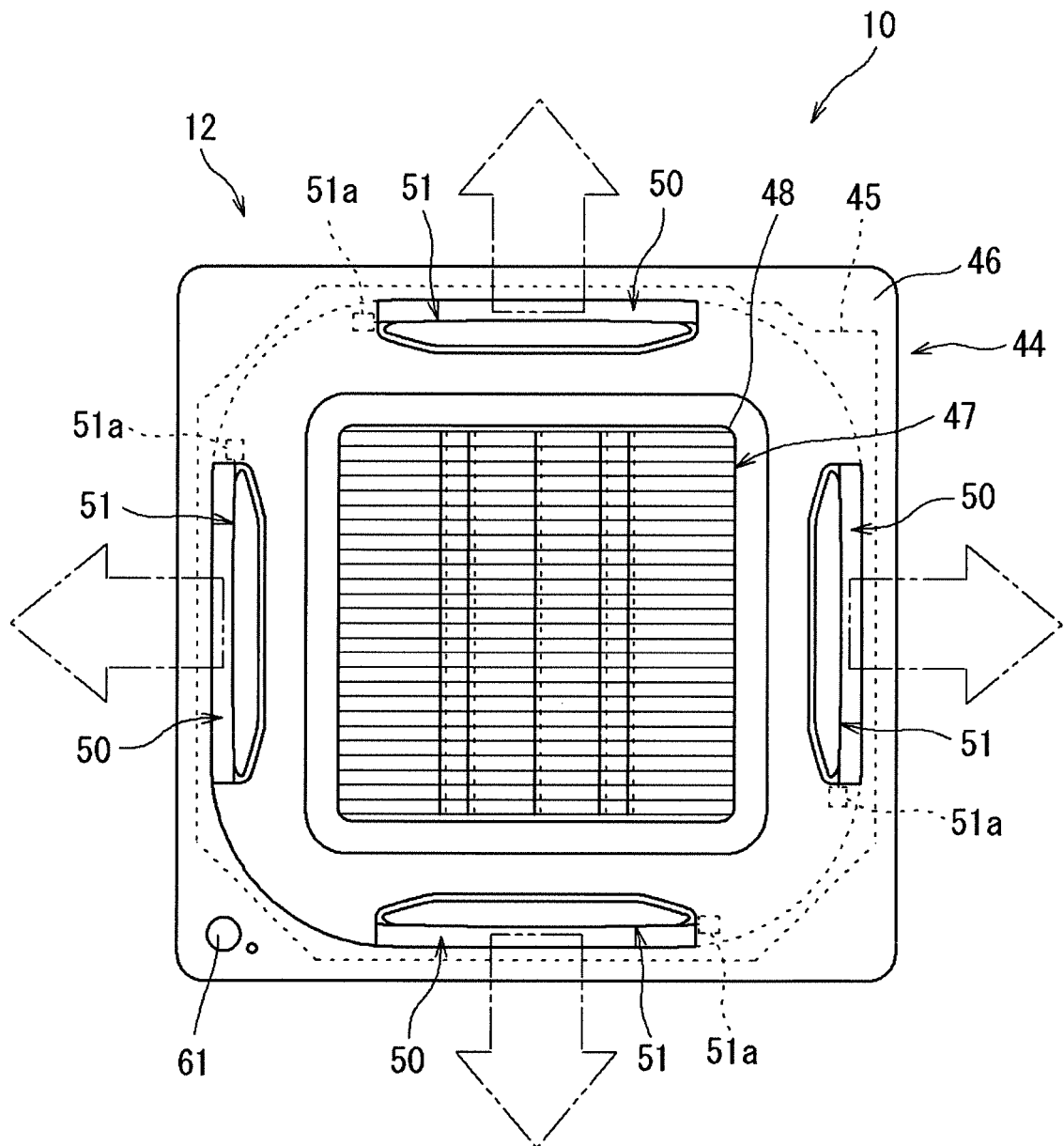
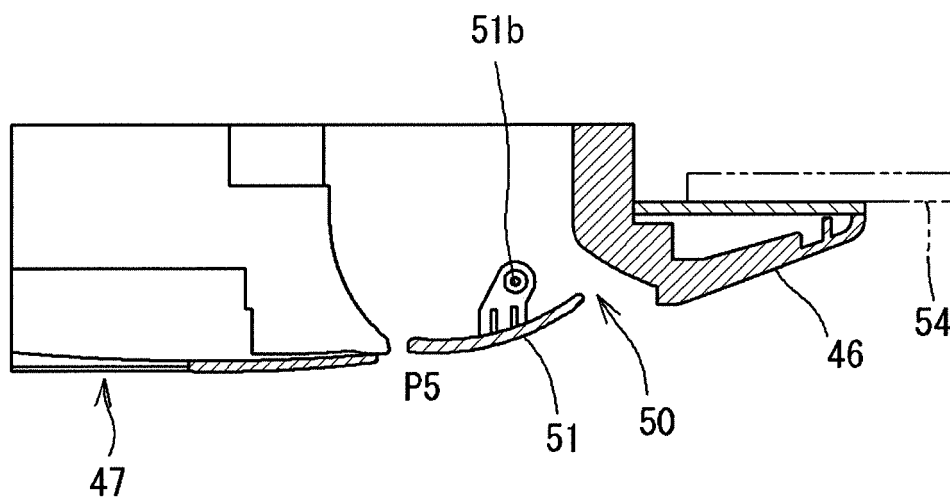


FIG. 4

(a)



(b)

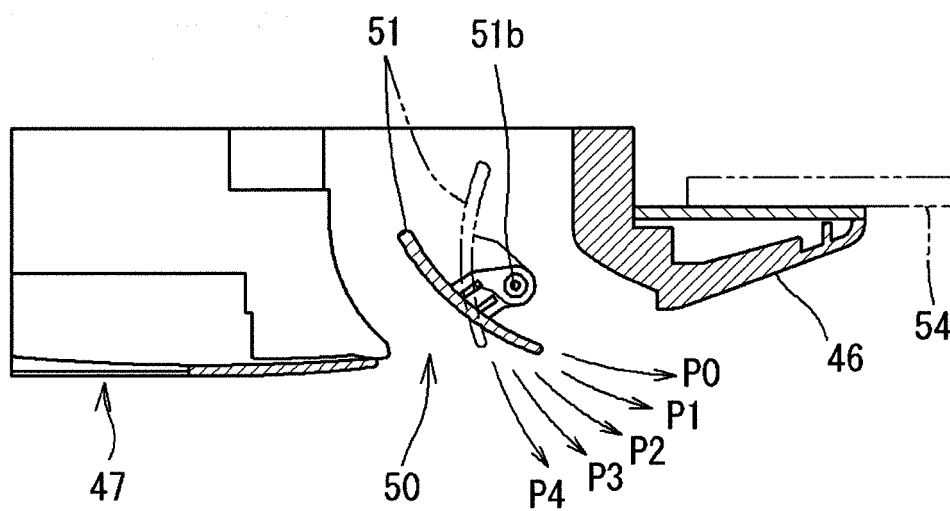


FIG. 5

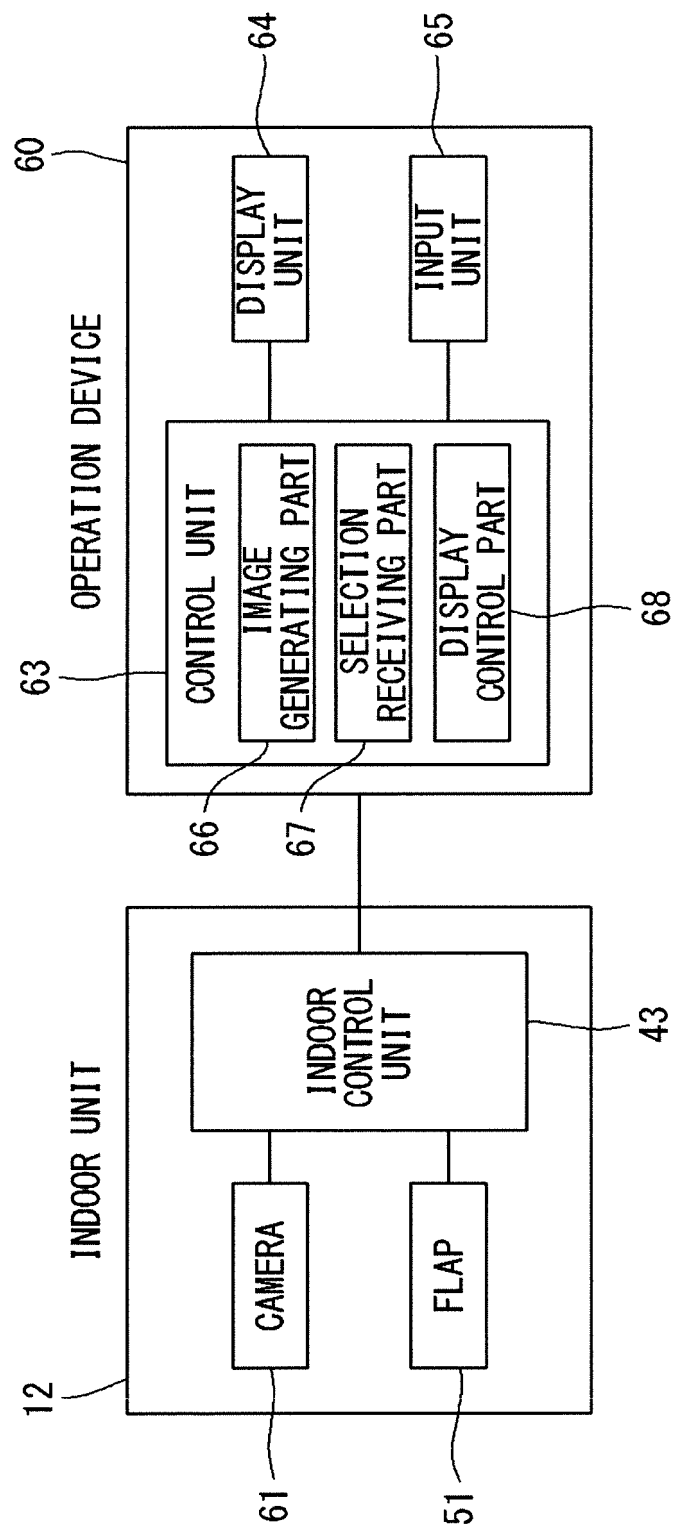
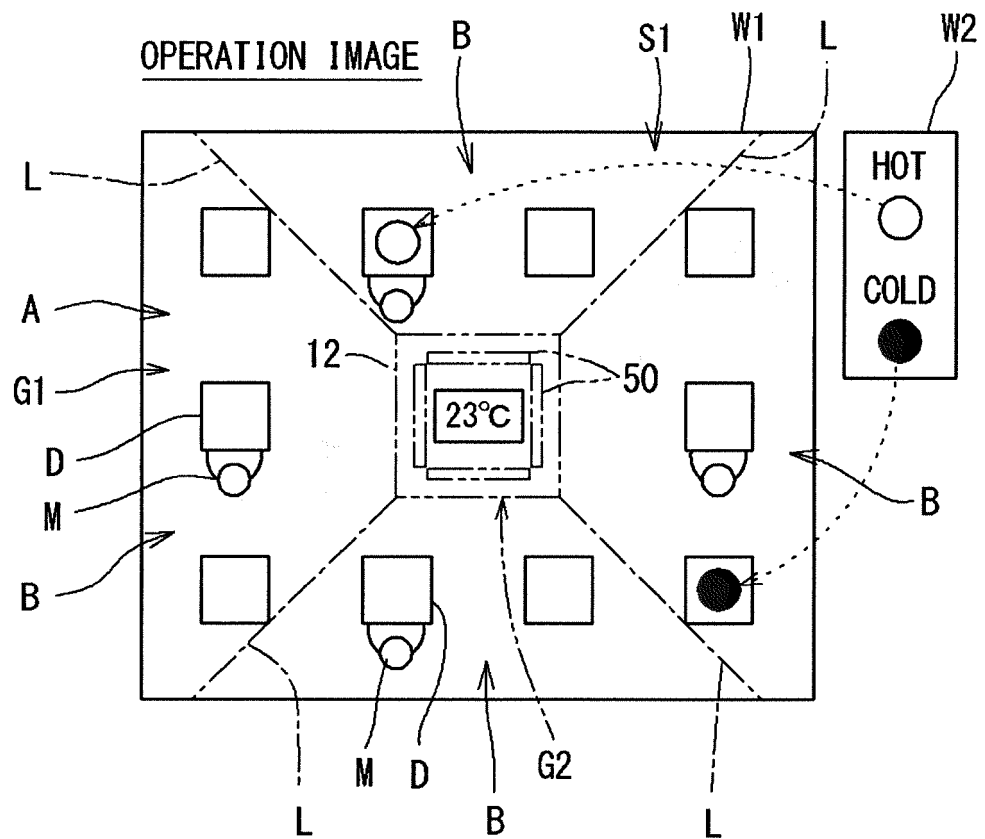


FIG. 6



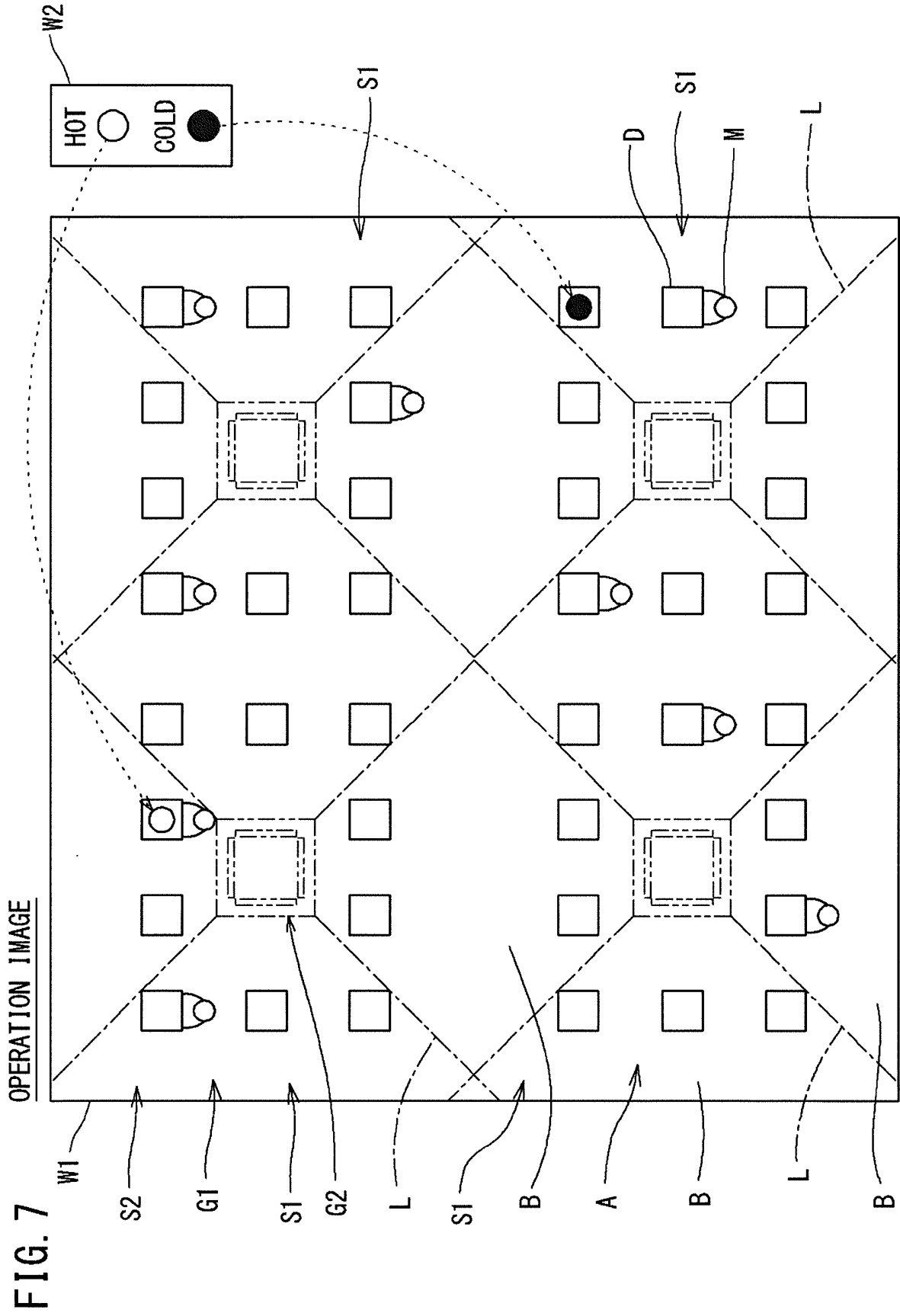
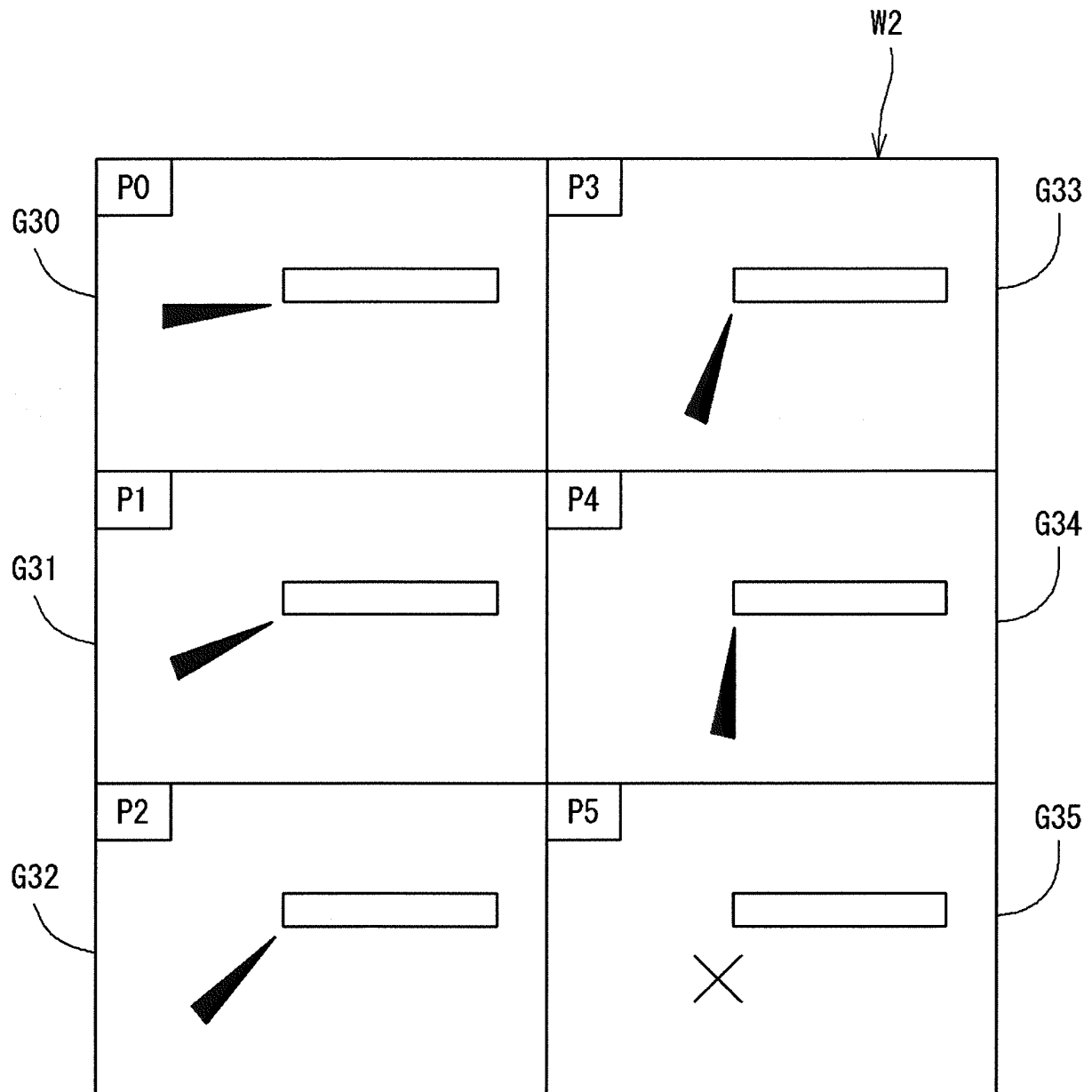


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/058855

A. CLASSIFICATION OF SUBJECT MATTER

F24F11/02(2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F11/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2014
 Kokai Jitsuyo Shinan Koho 1971-2014 Toroku Jitsuyo Shinan Koho 1994-2014

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2011-94924 A (Daikin Industries, Ltd.), 12 May 2011 (12.05.2011), entire text; all drawings & US 2012/0214399 A1 & EP 2495506 A1 & WO 2011/052742 A1 & AU 2010312444 A & CN 102667357 A & KR 10-2012-0087975 A	1-2, 4, 6 3, 5
Y	JP 2012-172910 A (Panasonic Corp.), 10 September 2012 (10.09.2012), paragraphs [0011] to [0030]; fig. 1 to 8 (Family: none)	1-2, 4, 6
Y	JP 2001-350515 A (Energy Support Co., Ltd.), 21 December 2001 (21.12.2001), paragraphs [0039] to [0041] (Family: none)	1-2, 4, 6

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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Date of the actual completion of the international search
11 June, 2014 (11.06.14)Date of mailing of the international search report
24 June, 2014 (24.06.14)Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/058855

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99/34151 A1 (Mitsubishi Electric Corp.), 08 July 1999 (08.07.1999), entire text; all drawings & EP 972996 A1	1-6
A	JP 2011-52958 A (Daikin Industries, Ltd.), 17 March 2011 (17.03.2011), paragraphs [0005] to [0006] (Family: none)	1-6

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Patent documents cited in the description

- JP 2011094924 A [0005]