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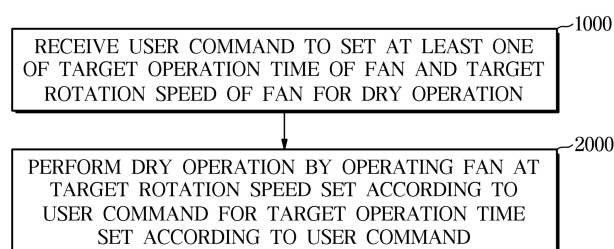
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(54) **METHOD OF MANAGING AIR CONDITIONER AND AIR CONDITIONER**

(57) A method of managing an air conditioner for performing a cooling operation and a dry operation includes receiving a user command to set at least one of a target operation time of a fan of the air conditioner and a target rotation speed of the fan to control the dry operation;

and performing the dry operation by operating the fan at the set target rotation speed of the fan according to the user command for the set target operation time of the fan according to the user command.

FIG. 10



Description

[Technical Field]

[0001] The disclosure relates to a method of managing an air conditioner and the air conditioner.

[Background Art]

[0002] The air conditioner is a device for conditioning air in indoor space by using transfer of heat produced in evaporation and condensation procedures of a refrigerant to cool or heat the air and releasing the cooled or heated air.

[0003] The air conditioner may circulate the refrigerant and draw in indoor air by rotating a fan arranged around an indoor heat exchanger in the cooling operation or heating operation. The air conditioner may have the air drawn in exchange heat in the indoor heat exchanger and release the heat-exchanged air into the indoor space.

[0004] Furthermore, the air conditioner performs a dry operation after the end of the cooling operation to get rid of water condensed in the indoor heat exchanger during the cooling operation. The air conditioner may stop circulating the refrigerant during the dry operation, and drop or evaporate the water condensed on the heat exchanger by rotating the fan arranged around the indoor heat exchanger.

[0005] The traditional air conditioner rotates the fan at a predetermined rotation speed during a predetermined dry time for the dry operation, thereby causing a loud noise.

[Disclosure]

[Technical Problem]

[0006] The disclosure provides a method of managing an air conditioner and the air conditioner, allowing the user to change settings of a dry operation of the air conditioner according to the demand of the user.

[0007] The disclosure provides a method of managing an air conditioner and the air conditioner, allowing the user to change settings of a dry operation of the air conditioner according to the demand of the user while maintaining the efficiency of the dry operation.

[0008] Technological objectives of the disclosure are not limited to what are mentioned above, and throughout the specification, it will be clearly appreciated by those of ordinary skill in the art that there may be other technological objectives unmentioned.

[Technical Solution]

[0009] According to an embodiment of the disclosure, a method of managing an air conditioner may include receiving a user command to set at least one of a target operation time of a fan of the air conditioner and a target

rotation speed of the fan to control a dry operation; and performing the dry operation by operating the fan at the set target rotation speed of the fan set according to the user command for the set target operation time of the fan set according to the user command.

[0010] According to an embodiment of the disclosure, an air conditioner may include a main body including an outlet; a heat exchanger; a compressor configured to compress a refrigerant supplied from the heat exchanger; a fan configured to blow air which has exchanged heat in the heat exchanger to the outlet; and a controller configured to control the compressor and the fan to perform a cooling operation and a dry operation, wherein the controller is configured to receive a user command to set at least one of a target operation time of the fan and a target rotation speed of the fan for the dry operation; and perform the dry operation by operating the fan at the target rotation speed of the fan set according to the user command for the target operation time of the fan set according to the user command.

[Description of Drawings]

[0011]

FIG. 1 illustrates an air conditioner management system including an air conditioner, according to an embodiment.

FIG. 2 illustrates a refrigerant circulation circuit of an air conditioning system, according to an embodiment.

FIG. 3 is an exterior view of an air conditioner, according to an embodiment.

FIG. 4 is an exploded view of an air conditioner, according to an embodiment.

FIG. 5 illustrates an air conditioner with an outlet open, according to an embodiment.

FIG. 6 is a cross-sectional view along A-A' of FIG. 4.

FIG. 7 illustrates an air conditioner with an outlet closed, according to an embodiment.

FIG. 8 is a cross-sectional view along line B-B' of FIG. 6.

FIG. 9 is a control block diagram illustrating components of an air conditioning system, according to an embodiment.

FIG. 10 is a flowchart illustrating an example of a management method for air conditioner, according to an embodiment.

FIG. 11 is a flowchart for describing an example of a procedure for determining a target operation time based on a target rotation speed set by a user, according to an embodiment.

FIG. 12 is a flowchart for describing an example of a procedure for determining a minimum operation time based on a target rotation speed set by a user, according to an embodiment.

FIG. 13 illustrates an example of an interface for changing the settings of a dry operation, according

to an embodiment.

FIG. 14 illustrates another example of an interface for changing the settings of a dry operation, according to an embodiment.

FIG. 15 illustrates an example of a visual element indicating a minimum operation time, according to an embodiment.

FIG. 16 illustrates an example of a visual element provided when a user is going to set a target operation time to be shorter than a minimum operation time, according to an embodiment.

FIG. 17 is a flowchart for describing an example of a procedure for determining a target operation speed based on a target operation time set by a user, according to an embodiment.

FIG. 18 is a flowchart for describing an example of a procedure for determining a minimum rotation speed based on a target operation time set by a user, according to an embodiment.

FIG. 19 illustrates an example of a visual element indicating a minimum rotation speed, according to an embodiment.

FIG. 20 illustrates an example of a visual element provided when a user is going to set a target rotation speed to be lower than a minimum rotation speed, according to an embodiment.

FIG. 21 illustrates an example of an interface provided to select a user setting mode or an automatic mode for a mode of a dry operation of an air conditioner, according to an embodiment.

FIG. 22 is a flowchart for describing how an air conditioner performs a dry operation according to a user setting mode or an automatic mode, according to an embodiment.

[Modes of the Invention]

[0012] Embodiments and features as described and illustrated in the disclosure are merely examples, and there may be various modifications replacing the embodiments and drawings at the time of filing this application.

[0013] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the disclosure.

[0014] As used herein, the expression "A or B", "at least one of A and/or B" or "one or more of A and/or B" includes any possible combination of the listed items. For example, "A or B", "at least one of A and B" or "at least one of A or B" may refer to any case of 1) including only A, 2) including only B, or 3) including both A and B.

[0015] For example, the singular forms "a", "an" and "the" as herein used are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0016] The terms "comprises" and/or "comprising," when used in this specification, represent the presence of stated features, integers, steps, operations, elements, components or combinations thereof, but do not preclude

the presence or addition of one or more other features, integers, steps, operations, elements, components, or combinations thereof.

[0017] When an element is mentioned as being "connected to", "coupled to", "supported on" or "contacting" another element, it includes not only a case that the elements are directly connected to, coupled to, supported on or contact each other but also a case that the elements are connected to, coupled to, supported on or contact each other through a third element.

[0018] Throughout the specification, when an element is mentioned as being located "on" another element, it implies not only that the element is abut on the other element but also that a third element exists between the two elements.

[0019] When it is mentioned that a component (e.g., a first component) is (operatively or communicatively) coupled with/to or connected to another component (e.g., a second component), it should be understood that the first component is coupled to the second component directly or through another component (e.g., a third component).

[0020] In the disclosure, the expression "configured to" as herein used may be interchangeably used with "suitable for", "having the capacity to", "designed to", "adapted to", "made to", or "capable of" according to the given situation. The expression "configured to" may not necessarily mean "specifically designed to" in terms of hardware.

[0021] In some situations, an expression "a device configured to do something" may refer to "the device able to do something in cooperation with another device or parts". For example, "a processor configured to perform A, B and C functions" may refer to a dedicated processor, e.g., an embedded processor for performing A, B and C functions, or a general purpose processor, e.g., a central processing unit (CPU) or an application processor that may perform A, B and C functions by executing at least one software program stored in a memory.

[0022] The term including an ordinal number such as "first", "second", or the like is used to distinguish one component from another and does not restrict the former component.

[0023] Furthermore, the terms, such as "~ part", "~ block", "~ member", "~ module", etc., may refer to a unit of handling at least one function or operation. For example, the terms may refer to at least one process handled by hardware such as a field-programmable gate array (FPGA)/application specific integrated circuit (ASIC), etc., software stored in a memory, or at least one processor.

[0024] An embodiment of the disclosure will now be described in detail with reference to accompanying drawings. Throughout the drawings, like reference numerals or symbols refer to like parts or components.

[0025] A working principle and embodiments of the disclosure will now be described with reference to accompanying drawings.

[0026] FIG. 1 illustrates an air conditioner management system including an air conditioner, according to an embodiment.

[0027] Referring to FIG. 1, the air conditioner management system may include an air conditioner 1, a user device 6 and/or a computing device 7.

[0028] The air conditioner 1 may include a communication interface for communicating with the user device 6 and/or the computing device 7, a user interface device for receiving a user input or outputting various information, at least one processor for controlling operation of the air conditioner 1 and at least one memory for storing a program for controlling the operation of the air conditioner 1.

[0029] The computing device 7 may include a server device.

[0030] The computing device 7 may include a communication interface for communicating with the air conditioner 1 and/or the user device 6. The computing device 7 may include at least one processor for processing data received from the air conditioner 1, another computing device (or another server device) and/or the user device 6, and at least one memory for storing a program for processing data or the processed data. The computing device 7 may be implemented with various computing devices such as a workstation, a cloud, a data drive, a data station, etc. The computing device 7 may be implemented with one or more servers physically or logically classified based on function, sub-configuration of the function or data, and may transmit or receive data through inter-server communication and process the data.

[0031] The computing device 7 may perform functions of storing and/or managing a user account, registering the air conditioner 1 and/or the user device 6 by associating them with the user account, and managing or controlling the registered air conditioner 1 and/or the user device 6. For example, the user may access the computing device 7 through the user device 6 to create a user account. The user account may be identified by an identity (ID) and a password created by the user. The user may access the computing device 7 through the user device 6 to manage the user account. The computing device 7 may register the air conditioner 1 and/or the user device 6 with the user account according to a set procedure. For example, the computing device 7 may connect identification information (e.g., a serial number, a media access control (MAC) address, etc.) of the air conditioner 1 to the user account to register, manage and control the air conditioner 1. Likewise, the computing device 7 may register the user device 6 with the user account and control the user device 6.

[0032] In various embodiments, the computing device 7 may include a plurality of servers.

[0033] For example, the computing device 7 may include a first server device and a second server device. The first server device may create and/or manage user account information, and register and/or manage information of the air conditioner 1 and/or the user device 6

with the user account information. The second server device may receive registration information of the air conditioner 1 and/or the user device 6 from the first server to control the air conditioner 1 and/or the user device 6.

[0034] In another example, the second server device may perform a function of managing the air conditioner 1 and/or the user device 6 registered in the first server device for the first server device.

[0035] The number of the computing devices 7 is not limited thereto, and the computing device 7 may include a plurality of servers for performing the same and/or different operations.

[0036] The user device 6 may include a communication interface for communicating with the air conditioner 1 and/or the computing user device 7. The user device 6 may include a user interface device for receiving user inputs or outputting information for the user. The user device 6 may include at least one processor for controlling operation of the user device 6 and at least one memory for storing a program for controlling the operation of the user device 6.

[0037] The user device 6 may be carried by the user or placed at the user's home or office. The user device 6 may include a personal computer, a terminal, a mobile phone, a smart phone, a handheld device, a wearable device, a display device, etc., without being limited thereto.

[0038] In an embodiment, the user device 6 may include a remote control device for remotely controlling the air conditioner 1. The remote control device may include various interfaces for controlling the air conditioner 1 or setting the air conditioner 1. In an embodiment, when the user device 6 corresponds to the remote control device configured to remotely control the air conditioner 1, the air conditioner 1 and the user device 6 may perform direct communication.

[0039] In the memory of the user device 6, a program for controlling the air conditioner 1 and/or the computing device 7, i.e., an application, may be stored. The application may be sold in a state of being installed in the user device 6, or may be downloaded and installed from an external server.

[0040] The user may access the computing device 7 and create a user account by running the application installed in the user device 6, and register the air conditioner 1 in the computing device 7 by communicating with the computing device 7 based on the login user account.

[0041] For example, when the air conditioner 1 is operated to access the computing device 7 according to a procedure guided in the application installed in the user device 6, the computing device 7 may register the air conditioner 1 with the user account by registering the identification information (e.g., a serial number or a MAC address) of the air conditioner 1 with the user account. It is obvious that other information than the serial number or MAC address of the device to identify the device may be used for the information required to register the device

such as the air conditioner 1 with the user account.

[0042] The user may use the application installed in the user device 6 to control the air conditioner 1. For example, when the user signs up with the user account in the application installed in the user device 6, a visual indicator that indicates the air conditioner 1 registered with the user account may appear. When a control command for the air conditioner 1 is input to the user device 6, the user device 6 may forward the control command to the air conditioner 1 through the computing device 7.

[0043] The user device 6 may receive various information from the air conditioner 1 registered with the user account directly or through the computing device 7.

[0044] A network may include both a wired network and a wireless network. The wired network may include a cable network or a telephone network, and the wireless network may include any network that transmits or receives signals in radio waves. The wired network and the wireless network may be connected to each other.

[0045] The network may include a wide area network (WAN) such as the Internet, a local area network (LAN) formed around an access point (AP), and a short-range wireless network without an AP. The short-range wireless network may include bluetooth (IEEE 802.15.1), Zigbee (IEEE 802.15.4), wireless fidelity (Wi-Fi) direct, near field communication (NFC), Z-wave, etc., without being limited thereto.

[0046] The AP may connect the air conditioner 1 and/or the user device 6 to the WAN connected to the computing device 7. The air conditioner 1 and/or the user device 6 may be connected to the computing device 7 through the WAN.

[0047] The AP may use wireless communication such as Wi-Fi (IEEE 802.11), Bluetooth (IEEE 802.15.1), Zigbee (IEEE 802.15.4), etc., to communicate with the air conditioner 1 and/or the user device 6, and use wired communication to access the WAN, but the wireless communication scheme of the AP is not limited thereto.

[0048] In various embodiments, the air conditioner 1 may be directly connected to the user device 6 and/or the computing device 7 without passing through the AP.

[0049] The air conditioner 1 may be connected to the user device 6 and/or the computing device 7 over a long-range wireless network or a short-range wireless network.

[0050] For example, the air conditioner 1 may be connected to the user device 6 over a short-range wireless network (e.g., Wi-Fi direct, Bluetooth). In another example, the air conditioner 1 may use the long-range wireless network (e.g., a cellular communication module) to be connected to the user device 6 and/or the computing device 7 through the WAN.

[0051] The air conditioner 1 may transmit information about an operation or status of the air conditioner 1 to the user device 6 and/or the computing device 7 over the network. For example, the air conditioner 1 may transmit the information about the operation or the status to the user device 6 and/or the computing device 7 when re-

ceiving a request from the user device 6 and/or the computing device 7, when a particular event occurs in the air conditioner 1, periodically or in real time.

[0052] On receiving the information about the operation or status from the air conditioner 1, the computing device 7 may update information about the operation or status of the air conditioner 1 that has been stored, and transmit the updated information about the operation and status of the air conditioner 1 to the user device 6 over the network. The updating of the information may include various operations to change the existing information such as adding new information to the existing information, replacing the existing information with new information, etc.

[0053] The information about the operation and/or status of the air conditioner 1 may include information relating to an operation of the air conditioner 1.

[0054] For example, the information relating to an operation of the air conditioner 1 may include information about an operation point and an end point of operation of the air conditioner 1.

[0055] The information about the operation and/or status of the air conditioner 1 may include information collected by at least one sensor equipped in the air conditioner 1.

[0056] For example, the information about the operation and/or status of the air conditioner 1 may include humidity information and/or temperature information of surrounding air.

[0057] The air conditioner 1 may obtain various information from the user device 6 and/or the computing device 7, and provide the obtained information to the user. For example, the air conditioner 1 may obtain information relating to a function of the air conditioner 1 or various environmental information (e.g., weather, temperature, humidity, etc.) from the computing device 7 and output the obtained information through the user interface device.

[0058] The air conditioner 1 may receive electric signals corresponding to various notifications from the user device 6 and/or the computing device 7, and provide the notification corresponding to the electric signal to the user.

[0059] The user device 6 may receive electric signals corresponding to various notifications from the air conditioner 1 and/or the computing device 7, and provide the notification corresponding to the electric signal to the user.

[0060] The air conditioner 1 may operate according to a control command received from the user device 6 and/or the computing device 7. For example, when the air conditioner 1 has won prior approval of the user to operate according to a control command of the computing device 7 even without a user input through the user device 6, the air conditioner 1 may operate according to the control command received from the computing device 7. The control command received from the computing device 7 may include a control command input by the user through

the user device 6, a control command based on a preset condition or the like, without being limited thereto.

[0061] The user device 6 may transmit information about the user to the air conditioner 1 and/or the computing device 7 through the communication interface. For example, the user device 6 may transmit information about a location of the user, a health condition of the user, a preference of the user, a schedule of the user, etc., to the computing device 7. The user device 6 may transmit the information about the user to the computing device 7 according to the prior approval of the user.

[0062] In an embodiment, the user device 6 may transmit the settings related to the air conditioner 1 (e.g., the settings of the dry operation) to the air conditioner 1 and/or the computing device 7 through the communication interface.

[0063] The air conditioner 1, the user device 6 and/or the computing device 7 may determine a control command by using an artificial intelligence (AI) technology. For example, the computing device 7 may process the information about the operation or status of the air conditioner 1 and the information about the user of the user device 6 by using the AI technology, and transmit a result of the processing or a control command to the air conditioner 1 and/or the user device 6 based on the result of the processing.

[0064] FIG. 1 is a diagram for describing an example of an air conditioning management system according to an embodiment, in which the air conditioner 1, the user device 6 and/or the computing device 7 exchanges information and/or control commands with each other, but the communication method of the air conditioner 1, the user device 6 and/or the computing device 7 or the example of information transmitted from the air conditioner 1, the user device 6 and/or the computing device 7 is not limited to what are described above.

[0065] FIG. 2 illustrates a refrigerant circulation circuit of an air conditioning system, according to an embodiment.

[0066] Referring to FIG. 2, the air conditioning system includes the air conditioner 1 and an outdoor unit 2. The air conditioner 1 may also be referred to as an indoor unit in that the air conditioner 1 is located in indoor space in need of air conditioning. The air conditioner 1 may be arranged in a space separated by a wall or a shield from outside such as e.g., inside of a house or inside of an office.

[0067] The outdoor unit 2 may be located outside the air conditioning space. The outdoor unit 2 may be arranged e.g., outdoors.

[0068] The air conditioning system includes a refrigerant flow path for circulating the refrigerant between indoors and outdoors. The refrigerant may be circulated between indoors and outdoors along the refrigerant flow path, and may absorb heat or emit latent heat during a change in state (e.g., a change in state from gas to liquid or liquid to gas).

[0069] To induce the change in state of the refrigerant,

the refrigerant circulator may include a compressor 3, an outdoor heat exchanger 4, an expansion valve 5 and an indoor heat exchanger 20.

[0070] The compressor 3 may compress the gaseous refrigerant, causing the refrigerant to be heated. The high temperature/high pressure gaseous refrigerant may be delivered by the compressor 3 to the outdoor heat exchanger 4. The high temperature/high pressure gaseous refrigerant is converted from the gas state to the liquid state and also emits heat. The refrigerant in the liquid state may be delivered to the expansion valve 5. The expansion valve 5 may decompress the refrigerant in the liquid state, causing the refrigerant to be cooled. The low temperature/low pressure refrigerant liquid may be delivered to the indoor heat exchanger 20. The low temperature/low pressure refrigerant liquid is converted into the gas state from the liquid state and also absorbs heat in the indoor heat exchanger 20.

[0071] As such, the refrigerant may emit heat in the outdoor heat exchanger 4 and absorb heat in the indoor heat exchanger 20. The indoor heat exchanger 20 may be installed in the air conditioner 1 along with the expansion valve 5, and the outdoor heat exchanger 4 may be installed in the outdoor unit 2 along with the compressor 3. Accordingly, the indoor heat exchanger 20 may cool the air in the air conditioning space (indoors).

[0072] In the following description, for convenience of explanation, the indoor heat exchanger 20 will be referred to as a heat exchanger 20. Furthermore, components equipped in the outdoor unit 2 may also be the components of the air conditioner 1, and the air conditioner 1 may be a concept including both the indoor unit 1 and the outdoor unit 2.

[0073] FIG. 3 is an exterior view of an air conditioner, according to an embodiment. FIG. 4 is an exploded view of an air conditioner, according to an embodiment. FIG. 5 illustrates an air conditioner with an outlet open, according to an embodiment. FIG. 6 is a cross-sectional view along A-A' of FIG. 5. FIG. 7 illustrates an air conditioner with an outlet closed, according to an embodiment. FIG. 8 is a cross-sectional view along line B-B' of FIG. 7.

[0074] Referring to FIGS. 3, 4, 5, 6, 7 and 8, the air conditioner 1 includes a main body 10 having at least one outlet 41, the heat exchanger 2 for exchanging heat with the air brought into the main body 10, an air blower 30 for circulating air into or out of the main body 10, and a discharger 40 for discharging the air blown from the air blower 30 out of the main body 10.

[0075] The main body 10 may include a front panel 10a on which the at least one outlet 41 is formed, a rear panel 10b arranged behind the front panel 10a, a side panel 10c arranged between the front panel 10a and the rear panel 10b, and upper and lower panels 10d arranged on top and bottom of the side panel 10c. The at least one outlet 41 is shaped like a circle, and at least two of them may be spaced from each other in an up/down direction of the front panel 10a. For example, the outlet 41 may include a first outlet 41a, a second outlet 41b and a third outlet 41c.

[0076] An inlet 19 through which to draw outside air into the main body 10 may be formed on the rear panel 10b.

[0077] The inlet 19 may be formed on the rear panel 10b placed behind the heat exchanger 20 to guide the air outside the main body 10 to flow into the main body 10. The air brought into the main body 10 through the inlet 19 absorbs or loses heat while going through the heat exchanger 20. The air that has exchanged heat while going through the heat exchanger 20 may be discharged by the air blower 30 out of the main body 10 through the discharger 40.

[0078] The air blower 30 may include a fan 32 and a grill 34.

[0079] The grill 34 may be arranged in a discharging direction of the fan 32. In an embodiment, the fan 32 employs a mixed flow fan, but the type of the fan 32 is not limited thereto and the fan 32 may have any structure that moves the air brought in from outside of the main body 10 to be discharged back to the outside of the main body 10. For example, the fan 32 may be a cross fan, a turbo fan, or a sirocco fan. There are no limitations on the number of fans 32, and in an embodiment, there may be at least one fan 32 arranged to correspond to the at least one outlet 41. For example, the fan 32 may include a first fan 32a, a second fan 32b and a third fan 32c.

[0080] The air blower 30 may be equipped with a fan motor 33 arranged in the middle of the fan 32 to drive the fan 32. For example, the fan motor 33 may include a first fan motor 33a for driving the first fan 32a, a second fan motor 33b for driving the second fan 32b and a third fan motor 33c for driving the third fan 32c. The fan motor 33 may include a motor whose rotation speed may be controlled. For example, the fan motor 33 may be a brushless direct current (BLDC) motor.

[0081] In the disclosure, controlling the fan 32 may include controlling the fan motor 33.

[0082] The grill 34 may be arranged in front of the fan 32 to guide the air flow. The grill 34 is arranged between the fan 32 and the outlet 41 to minimize external influences on the fan 32.

[0083] The grill 34 may include a plurality of wings 35. By controlling the number, shape and arrangement angle of the plurality of wings 35, the direction or volume of the air blown from the fan 32 to the outlet 41 may be controlled.

[0084] A door actuator 66, which will be described later, may be located in the middle of the grill 34. The door actuator 66 and the fan motor 33 may be arranged on the same line in the front-back direction. With this structure, the plurality of wings 35 of the grill 34 may be located in front of the fan 32.

[0085] The air blower 30 may include a duct 36. The duct 36 is shaped like a circle that encloses the fan 32 to guide the air flow to the fan 32.

[0086] The heat exchanger 20 may be arranged between the fan 32 and the inlet 19 to absorb heat from the air brought in through the inlet 19 or deliver heat to the air brought in through the inlet 19. The heat exchanger 20

may include a tube 21, and headers 22 coupled to the upper and lower sides of the tube 21. However, there are no limitations on the type of the heat exchanger 20.

[0087] There may be at least one heat exchanger 20 arranged in the main body 10 to correspond to the number of outlets 41. For example, the outlet 41 may include the first outlet 41a, the second outlet 41b and the third outlet 41c.

[0088] The air conditioner 1 may perform multiple operations. The multiple operations may include a cooling operation that discharges, through the outlet 41, air that has exchanged heat, and a dry operation that discharges, through the outlet 41, air that has not exchanged heat. The dry operation may also be referred to as an air blow operation in that the dry operation discharges air that has not exchanged heat. In various embodiments, the dry operation may include an air blow operation that operates only the fan 32 without operation of the compressor 3 and/or a heating operation that operates the fan 32 along with operation of the compressor 3.

[0089] The dry operation may also be called a cleaning operation in that the dry operation inhibits mold growth by dehumidifying the inside of the air conditioner 1 (e.g., around the heat exchanger 20).

[0090] In the heating operation, the flow of the refrigerant to be compressed by the compressor 3 may be controlled for the indoor air to exchange heat with the hot refrigerant of the heat exchanger 20.

[0091] The flow of the refrigerant to be compressed by the compressor 3 may be changed according to an operation of at least one valve (not shown) to change the flow of the refrigerant. For example, a controller 160 may perform the heating operation or the cooling operation by controlling the at least one valve to control the flow of the refrigerant to be compressed by the compressor 3.

[0092] In the cooling operation, the fan 32 may be rotated with operation of the compressor 3. In the cooling operation, the flow of the refrigerant to be compressed by the compressor 3 may be controlled for the indoor air to exchange heat with the cold refrigerant of the heat exchanger 20. In the dry operation, only the fan 32 may be rotated without operation of the compressor 3. In an embodiment, even in the dry operation, the fan 32 may be rotated with operation of the compressor 3. In the dry operation, the flow of the refrigerant to be compressed by the compressor 3 may be controlled for the indoor air to exchange heat with the hot refrigerant of the heat exchanger 20. In various embodiments, the dry operation may include the heating operation.

[0093] The cooling operation may include a first cooling operation that discharges, through the at least one outlet 41, air that has exchanged heat, and a second cooling operation that discharges, through discharge holes 42 formed at a porous discharge plate 14, air that has exchanged heat. The size of the outlet 41 may be larger than the size of the discharge hole 42. Furthermore, the number of the discharge holes 42 is bigger than the number of outlets 41, and the discharge holes 42 may

be substantially uniformly distributed across the discharge plate 14.

[0094] Specifically, in the first cooling operation, the air that has exchanged heat may be discharged out of the air conditioner 1 through the first, second or third outlet 41a, 41b or 41c, which is open. In this case, the air conditioner 1 may perform the first cooling operation by selectively opening the first, second or third outlet 41a, 41b or 41c depending on the detected room temperature.

[0095] In the second cooling operation, all the first, second and third outlets 41a, 41b and 41c are closed, and the air that has exchanged heat may be discharged through the discharge holes 42 formed at the discharge plate 14.

[0096] In other words, the air that has exchanged heat in the heat exchanger 20 may be discharged, by the fan 32, out of the air conditioner through the at least one outlet 41 and the discharge holes 42.

[0097] In the first cooling operation, the air that has exchanged heat is discharged through the outlet 41, in which case a portion of the air may also be discharged through the discharge holes 42. That is, most of the air that has exchanged heat may be discharged through the outlet 41 in the first cooling operation. As in the first cooling operation, in the second cooling operation, most of the air that has exchanged heat may be discharged through the discharge holes 42.

[0098] The air that has passed the air blower 30 may be discharged out of the main body 10 through the outlet 41.

[0099] When the air conditioner 1 performs the first cooling operation, the air that has exchanged heat may be discharged out of the main body 10 through the outlet 41. The outlet 41 is arranged for the air that has exchanged heat to be discharged directly to the outside. The outlet 41 may be arranged to be exposed to the outside of the main body 10. The outlet 41 may be arranged in the air blowing direction of the fan 32 so that the air that has exchanged heat may be discharged directly to the outside. The air blown by the fan 32 may be moved through a first discharge path 41d formed between the fan 32 and the outlet 41. The first discharge path 41d may be formed by a discharge guide 45.

[0100] The first discharge path 41d may be formed by a discharge guide 45. An end 43 of the discharge guide 45 may be connected to the outlet 41, and the first discharge path 41d may be formed along the inner circumferential plane of the discharge guide 45. The end 43 of the discharge guide 45 may be exposed to the outside through the outlet 41 of the main body 10, and a door 60, which will be described below, may be settled at the end 43 of the discharge guide 45.

[0101] The outlet 41 may be opened or closed by the door 60.

[0102] The door 60 may open or close the outlet 41, and the air that has exchanged heat may be selectively discharged out of the main body 10 through the outlet 41. For example, the door 60 may include a first door 60a to open or close the first outlet 41a, a second door 60b to

open or close the second outlet 41b and a third door 60c to open or close the third outlet 41c.

[0103] The door 60 may be moved between an open position P1 to open the outlet 41 and a closed position P2 to close the outlet 41. The door 60 may be moved between the open position P1 and the closed position P2 in the front-back direction.

[0104] Specifically, the door 60 may include a door blade 62 and a door actuator 66 to operate the door blade 62.

[0105] The door blade 62 may be shaped like a circle to correspond to the shape of the outlet 41. The door blade 62 may be separated from the end 43 of the discharge guide 45 when the door 60 is in the open position P1, and the door blade 62 may close the outlet 41 by contacting the end 43 of the discharge guide 45 when the door 60 is in the closed position P2. For example, the door blade 62 may include a first door blade 62a to open or close the first outlet 41a, a second door blade 62b to open or close the first outlet 41a and a third door blade 62c to open or close the first outlet 41a.

[0106] The door blade 62 may include a blade body 63 shaped like a circle to correspond to the outlet 41, and a blade coupler 64 extending from the blade body 63 to be coupled to the door actuator 66.

[0107] The blade body 63 may be shaped substantially like a circular plate. Furthermore, the blade body 63 may be formed to have one side facing the outside of the man body 10 and the other side facing the outlet 41.

[0108] A display is arranged on the one side of the blade body 63, and the display may be configured to display an operation state of the air conditioner or to allow the air conditioner to be manipulated.

[0109] The door actuator 66 may move the door blade 62. The door actuator 66 may include a motor (not shown). The door actuator 66 may be coupled to the blade coupler 64 of the door blade 62 to move the door blade 62.

[0110] For example, the door actuator 66 may include a first door actuator 66a to move the first door blade 62a, a second door actuator 66b to move the second door blade 62b and a third door actuator 66c to move the third door blade 62c.

[0111] The grill 34 as described above may be arranged around the door actuator 66. The air blown from the fan 32 arranged on the rear surface of the grill 34 may be discharged forward past the grill 34.

[0112] When the air conditioner 1 performs the second cooling operation, the air that has exchanged heat may be discharged out of the main body 10 through the discharge holes 42. With this structure, the air that has exchanged heat may be discharged to the outside at a reduced wind speed. The discharge holes 42 may include a plurality of discharge holes 42 formed on the porous discharge plate 14.

[0113] When the air that has exchanged heat is discharged out of the main body 10 through the discharge holes 42, the air blown by the fan 32 may be moved along

a second discharge path 42a formed between the fan 32 and the discharge holes 42. The second discharge path 42a may be formed by the discharge guide 45 and a discharge panel 12 as will be described below.

[0114] The discharge panel 12 may form the second discharge path 42a. The air that has exchanged heat is allowed to be discharged out of the air conditioner at low speed through the second discharge path 42a formed by the discharge panel 12 and the discharge plate 14 as will be described later.

[0115] The discharge panel 12 may include a flow path forming frame 13 and the discharge plate 14.

[0116] The flow path forming frame 13 may separate the inside of the main body 10 from the second discharge path 42a. The flow path forming frame 13 may prevent the air that has exchanged heat from flowing back into the main body 10. In an embodiment of the disclosure, the flow path forming frame 13 may be formed by extending from the grill 34 and connected to an exterior panel 11.

[0117] The discharge hole 42 may be formed on the discharge plate 14. There are no limitations on the form of the discharge hole 42, but in an embodiment of the disclosure, the discharge hole 42 may be formed in the plural. The discharge hole 42 may run through the front and rear surfaces of the discharge plate 14.

[0118] The discharge holes 42 may form a discharge area. The plurality of discharge holes 42 may be evenly distributed in the discharge area or may be concentrated in at least a portion of the discharge area. In the embodiment, the plurality of discharge holes 42 may be evenly distributed in the discharge area.

[0119] The discharge area may be formed in at least a portion of the discharge plate 14. It is not, however, limited thereto, and discharging is made through the front surface of the discharge plate 14.

[0120] The discharger 40 may include the first discharge path 41d and the second discharge path 42a.

[0121] The air blown by the fan 32 may be moved through at least one of the first discharge path 41d and the second discharge path 42a.

[0122] In the first cooling operation, the air blown by the fan 32 may be moved along the first discharge path 41d formed between the fan 32 and the outlet 41. In the second cooling operation, the air blown by the fan 32 may be moved along the second discharge path 42a formed between the fan 32 and the discharge holes 42.

[0123] The discharger 40 may include the discharge guide 45. The air blown by the fan 32 may be controlled by the discharge guide 45. The discharge guide 45 is arranged in front of the air blower 30 so that the air moving from the air blower 30 may be moved along at least one of the first discharge path 41d and the second discharge path 42a.

[0124] The discharge guide 45 may include a guide body 46 and a guide groove 47.

[0125] The guide body 46 may form the first discharge path 41d inside. The guide body 46 may be formed in a cylindrical form with a cavity. Specifically, the guide body

46 is shaped like a tube with one end facing the air blower 30 and the other end facing the outlet 41.

[0126] The guide groove 47 is formed for the second discharge path 42a to pass through. The guide groove 47 may be formed on the guide body 46. There are no limitations on the shape of the guide groove 47, and the guide groove 47 may have any form arranged on the guide body 46 to allow the air to be moved out of the guide body 46. In an embodiment, the guide groove 47 may have the form of a plurality of holes along the edge of the guide body 46.

[0127] In the first cooling operation, the door 60 opens the outlet 41. In this case, the air blown from the air blower 30 passes the first discharge path 41d formed within the guide body 46 and is discharged through the outlet 41.

[0128] In the second cooling operation, the door 60 closes the outlet 41. In this case, one side of the guide body 46 is blocked by the door 60, so that the air blown from the air blower 30 is discharged through the discharge holes 42 past the guide groove 47 formed within the guide body 46.

[0129] An example of operation of the air conditioner 1 according to the disclosure will now be described.

[0130] The air brought into the main body 10 from outside exchanges heat with the heat exchanger 20. The air heated or cooled by the heat exchanger 20 is discharged by the air blower 30 out of the main body 10.

[0131] The air conditioner 1 discharges the air that has passed the heat exchanger 20 to the outside through at least one of the outlet 41 and the discharge holes 42. Specifically, discharging is made through the outlet 41, making the heating or the cooling performed quickly as in the first cooling operation, and discharging is made through the discharge holes 42, making the heating or the cooling performed slowly throughout the room as in the second cooling operation.

[0132] The outlet 41 may be opened or closed by the operation of the door 60. The air that has exchanged heat may be discharged through the outlet 41 when the outlet 41 is opened, and the air that has exchanged heat may be discharged through the discharge holes 42 when the outlet 41 is closed.

[0133] In the first cooling operation, the air that has exchanged heat is discharged through the outlet 41. In the first cooling operation, the door blade 62 is located in the open position P1 and separated from the end 43 of the discharge guide 45 to open the outlet 41.

[0134] In this case, the air blown from the air blower 30 is moved to the outlet 41 through the first discharge path 41d formed by the guide body 46 of the discharge guide 45.

[0135] When the air is discharged out of the main body 10 through the outlet 41, the air is discharged to the outside at a constant wind speed set by the air blower 30.

[0136] In the second cooling operation, the air that has exchanged heat is discharged through the discharge holes 42. In the second cooling operation, the door blade 62 is located in the closed position P2 and contacts the

end 43 of the discharge guide 45, thereby closing the outlet 41.

[0137] In this case, the air moving from the air blower 30 passes the guide groove 47 formed within the guide body 46 of the discharge guide 45 because the outlet 41 is blocked by the door blade 62. This makes the air moving from the air blower 30 flow along the second discharge path 42a to the discharge holes 42.

[0138] When the air is discharged out of the main body 10 through the discharge holes 42, the air slows down while passing the plurality of discharge holes on the discharge plate 14 and is discharged to the outside at low speed.

[0139] With this structure, the room may be cooled or heated at a wind velocity that gives the user a pleasant feeling.

[0140] In the dry operation, the air may be discharged out of the air conditioner 1 through the first, second or third outlet 41a, 41b or 41c which is open, or may be discharged through the discharge holes 42 formed on the discharge plate 14 while the first, second and third outlets 41a, 41b and 41c are closed.

[0141] In the disclosure, the outlet formed on the main body 10 may be a concept including at least one of the outlet 41 and the discharge holes 42.

[0142] FIG. 9 is a control block diagram illustrating components of an air conditioning system, according to an embodiment.

[0143] Referring to FIG. 9, the air conditioner 1 may include a user interface device 110, an environmental sensor 120, the compressor 3, the fan 32, a communication interface 140 and/or a controller 160.

[0144] The user interface device 110 may allow the user to interact with the air conditioner 1.

[0145] The user interface device 110 may include an output interface 112 and an input interface 111.

[0146] The at least one output interface 112 may deliver various information relating to operation of the air conditioner to the user by generating sensory information.

[0147] For example, the at least one output interface 112 may deliver information relating to the settings of the air conditioner 1 and an operation time of the air conditioner 1 to the user. The information relating to the operation of the air conditioner 1 may be output through a display, an indicator and/or voice. The at least one output interface 112 may include, for example, a liquid crystal display (LCD) panel, an indicator, a light emitting diode (LED) panel, a speaker, etc.

[0148] The at least one input interface 111 may convert sensory information received from the user into an electric signal.

[0149] The at least one input interface 111 may include a power button for powering on the air conditioner 1, a setting button for setting an operation mode of the air conditioner 1, a control button for controlling rotation speed of the compressor 3 and/or the fan 32, a timer button, etc.

[0150] Each button may include a visual indicator (e.g., text, an icon, etc.) that may indicate the function.

[0151] The at least one input interface 111 may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial and/or a microphone.

[0152] In the disclosure, the term 'button' may be replaced by a user interface (UI) element, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial and/or a microphone.

[0153] The power button is to power on or off the air conditioner 1.

[0154] The setting button is to change an operation mode of the air conditioner 1. The operation mode of the air conditioner may include a cooling operation, a heating operation, a dry operation, etc.

[0155] Each operation mode may have a different operating frequency of the compressor 3 and rotation speed of the fan 32.

[0156] The control button is to control the operating frequency of the compressor 3 of the air conditioner 1 and/or the rotation speed of the fan 32. The operating frequency of the compressor 3 and/or rotation speed of the fan 32 may be controlled by operation of the control button.

[0157] The timer button is to set an operation time of the air conditioner 1. The air conditioner 1 may perform an operation according to the operation mode selected by the user as long as the operation time set by the timer button, and finish the operation after the lapse of the operation time set by the timer button.

[0158] The air conditioner 1 may process the user input received through the input interface 111 or output information relating to the air conditioner 1 through the output interface 112.

[0159] For example, the user input received through the input interface 111 may be forwarded to the controller 160. In another example, the controller 160 may control the output interface 112 to output the information relating to the air conditioner 1.

[0160] The environmental sensor 120 may measure temperature and humidity of the surrounding air of the air conditioner 1.

[0161] The environmental sensor 120 may include at least one temperature sensor 121 and at least one humidity sensor 122.

[0162] Sensor data collected from the environmental sensor 120 may include temperature data and humidity data. The temperature data may include temperature data of air that has not passed the heat exchanger 20 (hereinafter, air drawn in) and temperature data of air that has passed the heat exchanger 20 (hereinafter, discharged air). The humidity data may include humidity data of the air drawn in and humidity data of the discharged air.

[0163] The at least one temperature sensor 121 may measure the temperature of the surrounding air of the air

conditioner. The at least one temperature sensor 121 may transmit the temperature data of the surrounding air of the air conditioner to the controller 160.

[0164] In various embodiments, the at least one temperature sensor 121 may include a first temperature sensor for measuring temperature of the air drawn into the main body 10 from outside of the main body 10 and/or a second temperature sensor for measuring temperature of the air discharged out of the main body 10 from inside of the main body 10.

[0165] The first temperature sensor may be arranged around the inlet 19. The first temperature sensor may measure the temperature of the air drawn in. The first temperature sensor may send the temperature data of the air drawn in to the controller 160.

[0166] The second temperature sensor may be arranged around the discharge plate 14. The second temperature sensor may measure the temperature of the discharged air. The second temperature sensor may send the temperature data of the discharged air to the controller 160.

[0167] In various embodiments, the at least one temperature sensor 121 may further include a temperature sensor for measuring temperature of the surrounding air of the outdoor unit 2.

[0168] The temperature of the surrounding air of the air conditioner 1 may be called the temperature of indoor air, and the temperature of the surrounding air of the outdoor unit 2 may be called the temperature of outside air.

[0169] The at least one humidity sensor 122 may measure the humidity of the surrounding air of the air conditioner. The at least one humidity sensor 122 may transmit the humidity data of the surrounding air of the air conditioner to the controller 160.

[0170] The at least one humidity sensor 122 may include a first humidity sensor for measuring humidity of the air drawn into the main body 10 from outside of the main body 10 and/or a second humidity sensor for measuring humidity of the air discharged out of the main body 10 from inside of the main body 10.

[0171] The first humidity sensor may be arranged around the inlet 19. The first humidity sensor may measure the humidity of the air drawn in. The first humidity sensor may send the humidity data of the air drawn in to the controller 160.

[0172] The second humidity sensor may be arranged around the discharge plate 14. The second humidity sensor may measure the humidity of the discharged air. The second humidity sensor may send the humidity data of the discharged air to the controller 160.

[0173] In various embodiments, the at least one humidity sensor 122 may further include a humidity sensor for measuring humidity of the surrounding air of the outdoor unit 2.

[0174] The humidity of the air around the air conditioner 1 may be called the humidity of indoor air, and the humidity of the air around the outdoor unit 2 may be called the humidity of outside air.

[0175] The fan 32 may be rotated by driving force provided by the fan motor 33.

[0176] The controller 160 controlling the fan 32 may include the controller 160 controlling the fan motor 33.

5 The controller 160 may control the rotation speed of the fan 32 by controlling the fan motor 33.

[0177] The compressor 3 may operate based on a control signal from the controller 160.

10 **[0178]** The controller 160 may operate the compressor 3 based on a cooling operation of the air conditioner 1 being started.

[0179] The door actuator 66 may operate based on a control signal from the controller 160.

15 **[0180]** As described above, the controller 160 may control the door actuator 66 to open the outlet 41 during the first cooling operation. Furthermore, the controller 160 may control the door actuator 66 to close the outlet 41 during the second cooling operation.

20 **[0181]** The air conditioner 1 may include the communication interface 140 for communicating with an external device (e.g., the user device 6 and/or the computing device 7) wirelessly and/or wirelessly.

25 **[0182]** The communication interface 140 may include at least one of a short-range communication module or a long-range communication module.

30 **[0183]** The communication interface 140 may transmit or receive data to or from the external device (e.g., the user device 6 and/or the computing device 7). For example, the communication interface 140 may establish communication with the user device 6 and/or the computing device 7 and transmit and receive various data.

35 **[0184]** For this, the communication interface 140 may support establishment of a direct (e.g., wired) communication channel or a wireless communication channel between external devices, and communication through the established communication channel. In an embodiment, the communication interface 140 may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module or a global navigation satellite system (GNSS) communication module) or a wired communication module (e.g., a local area network (LAN) communication module or a power-line communication module). A corresponding one of the communication modules may
45 communicate with an external device over a first network (e.g., a short-range communication network such as bluetooth, wireless-fidelity (Wi-Fi) direct or infrared data association (IrDA)) or a second network (e.g., a remote communication network such as a legacy cellular network, a fifth generation (5G) network, a next generation communication network, the Internet, or a computer network (e.g., a LAN or wide area network (WAN))). These various types of communication modules may be integrated into a single component (e.g., a single chip) or
50 implemented as a plurality of separate components (e.g., a plurality of chips).

[0185] The short-range communication module may include a bluetooth communication module, a bluetooth

low energy (BLE) communication module, a near field communication (NFC) module, a WLAN, e.g., Wi-Fi, communication module, a Zigbee communication module, an infrared data association (IrDA) communication module, a Wi-Fi direct (WFD) communication module, an ultrawideband (UWB) communication module, an Ant+ communication module, a microwave (uWave) communication module, etc., without being limited thereto.

[0186] The long-range communication module may include a communication module for performing various types of long-range communication and include a mobile communication interface. The mobile communication interface transmits and receives radio frequency (RF) signals to and from at least one of a base station, an external terminal, or a server in a mobile communication network.

[0187] In an embodiment, the communication interface 140 may communicate with an external device such as the user device 6 and/or the computing device 7 through a nearby access point (AP). The AP may connect a LAN connected to the user device 6 to a WAN connected to the computing device 7. The air conditioner may be connected to the computing device 7 through the WAN.

[0188] The controller 160 may process a user command received from the input interface 111.

[0189] The controller 160 may process the data collected from various sensors (e.g., environmental sensor 120).

[0190] The controller 160 may process a user command received through the communication interface 140.

[0191] The controller 160 may control various components of the air conditioner 1 (e.g., the output interface 112, the compressor 3, the fan 32, the door actuator 66 and/or the communication interface 140).

[0192] The controller 160 may include at least one processor 161 for controlling operation of the air conditioner 1, and at least one memory 162 for storing a program and data for controlling the operation of the air conditioner 1.

[0193] The at least one memory 162 may store data required for various embodiments. The memory 162 may be implemented in the form of a memory embedded in or detachable from the air conditioner 1 depending on the data storage use. For example, data for operating the air conditioner 1 may be stored in the memory embedded in the air conditioner 1 and data for an extended function of the air conditioner 1 may be stored in the memory detachable from the air conditioner 1. In the meantime, the memory embedded in the air conditioner 1 may be implemented with at least one of a volatile memory (e.g., a dynamic random access memory (DRAM), a static RAM (SRAM), or a synchronous dynamic RAM (SDRAM), etc.) or a non-volatile memory (e.g., a one time programmable read only memory (OTPROM), a programmable ROM (PROM), an erasable and programmable ROM (EPROM), an electrically erasable and programmable ROM (EEPROM), a mask ROM, a flash ROM, a flash

memory (e.g., NAND flash or NOR flash), a hard drive or a solid state drive (SSD)). The memory detachable from the air conditioner 1 may be implemented in such a format as a memory card (e.g., compact flash (CF), secure digital (SD), micro-SD, mini-SD, extreme digital (xD), multi-media card (MMC), etc.) or an external memory (e.g., USB memory) connectable to a USB port.

[0194] The at least one memory 162 may store an algorithm to perform the cooling operation and the dry operation.

[0195] The at least one processor 161 controls general operation of the air conditioner 1. Specifically, the at least one processor 161 may be connected to the respective components of the air conditioner 1 to control general operation of the air conditioner 1. For example, the at least one processor 161 may be electrically connected to the memory 162 to control general operation of the air conditioner 1. The processor 161 may include one or more processors.

[0196] The at least one processor 161 may execute at least one instruction stored in the memory 162 to perform operation of the air conditioner 1 according to various embodiments.

[0197] The at least one processor 161 may include one or more of a central processing unit (CPU), a graphics processing unit (GPU), an accelerated processing unit (APU), a many integrated core (MIC), a digital signal processor (DSP), a neural processing unit (NPU), a hardware accelerator or a machine learning accelerator. The at least one processor 161 may control one or any combination of the other components of the air conditioner 1, and perform a communication related operation or data processing. The at least one processor 161 may execute at least one program or instruction stored in the memory 162. For example, the at least one processor 161 may execute the at least one instruction stored in the memory 162 to perform a method according to at least one embodiment of the disclosure.

[0198] The at least one memory 162 may store an algorithm for controlling the compressor 3 and/or the fan 32 according to the operation mode of the air conditioner 1.

[0199] The components shown in FIG. 9 are merely an example of the components of the air conditioner 1, and the air conditioner 1 according to an embodiment may further include some other components than the components shown in FIG. 9 or may not include some (e.g., the door actuator 66) of the components shown in FIG. 9.

[0200] In an embodiment, the user device 6 may include a user interface device 610, a communication interface 640 and/or a controller 660.

[0201] The user interface device 610 may allow the user to interact with the user device 6.

[0202] The user interface device 610 may include an output interface 612 and an input interface 611.

[0203] The at least one output interface 612 may deliver various information to the user by generating the sensory information.

[0204] For example, the at least one output interface 612 may deliver information relating to an operation or state of the air conditioner connected to the user device 6 to the user. The various information may be output through a display, an indicator and/or voice. The at least one output interface 612 may include, for example, a liquid crystal display (LCD) panel, an indicator, a light emitting diode (LED) panel, a speaker, etc.

[0205] In an embodiment, the at least one output interface 612 may output sensory information (e.g., visual information, auditory information, etc.) relating to the settings of the air conditioner 1.

[0206] The at least one input interface 611 may convert sensory information received from the user into an electric signal.

[0207] The at least one input interface 611 may receive a user input to manipulate an interface element included in the interface provided by the user device 6.

[0208] Each interface element may include a visual indicator (e.g., text, an icon, etc.) that may indicate the function.

[0209] The at least one input interface 611 may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial and/or a microphone.

[0210] The user device 6 may process the user input received through the input interface 611 or output information relating to the user device 6 through the output interface 612.

[0211] For example, the user input received through the input interface 611 may be sent to the controller 660. In another example, the controller 660 may control the output interface 612 to output various information.

[0212] The controller 660 may process a user input received from the input interface 611.

[0213] The controller 660 may process data received from an external device (e.g., the air conditioner 1 and/or the computing device 7) through the communication interface 640.

[0214] The controller 660 may transmit the user input received through the input interface 611 to the external device (e.g., the air conditioner 1 and/or the computing device 7) through the communication interface 640.

[0215] The controller 660 may control various types of components (e.g., the output interface 612 and the communication interface 640) of the user device 6.

[0216] The controller 660 may include at least one processor 661 for controlling operation of the user device 6, and at least one memory 662 for storing a program and data for controlling the operation of the user device 6.

[0217] The at least one memory 662 may store data required for various embodiments. The memory 662 may be implemented in the form of a memory embedded in or detachable from the user device 6 depending on the data storage use. For example, data for operating the user device 6 may be stored in the memory embedded in the user device 6 and data for an extended function of the user device 6 may be stored in the memory detachable

from the user device 6. In the meantime, the memory embedded in the user device 6 may be implemented with at least one of a volatile memory (e.g., a DRAM, an SRAM, or an SDRAM, etc.) or a non-volatile memory (e.g., an OTPROM, a PROM, an EPROM, an EEPROM, a mask ROM, a flash ROM, a flash memory (e.g., NAND flash or NOR flash), a hard drive or an SSD). The memory detachable from the user device 6 may be implemented in such a format as a memory card (e.g., CF, SD, micro-SD, mini-SD, xD, MMC, etc.) or an external memory (e.g., USB memory) connectable to a USB port.

[0218] The at least one processor 661 controls general operation of the user device 6. Specifically, the at least one processor 661 may be connected to the respective components of the user device 6 to control general operation of the user device 6. For example, the at least one processor 661 may be electrically connected to the memory 662 to control general operation of the user device 6. The processor 661 may include one or more processors.

[0219] The at least one processor 661 may execute at least one instruction stored in the memory 662 to perform operation of the user device 6 according to various embodiments.

[0220] The at least one processor 661 may include one or more of a CPU, a GPU, an APU, an MIC, a DSP, an NPU, a hardware accelerator or a machine learning accelerator. The at least one processor 661 may control one or any combination of other components of the user device 6, and perform a communication related operation or data processing. The at least one processor 661 may execute at least one program or instruction stored in the memory 662. For example, the at least one processor 661 may execute the at least one instruction stored in the memory 662 to perform a method according to at least one embodiment of the disclosure.

[0221] The at least one memory 662 may store an algorithm to provide an interface for changing the settings of the air conditioner 1.

[0222] The communication interface 640 may include at least one of a short-range communication module or a long-range communication module.

[0223] The communication interface 640 may transmit or receive data to or from an external device (e.g., the air conditioner 1 and/or the computing device 7). For example, the communication interface 640 may establish communication with the air conditioner 1 and/or the computing device 7 and transmit and receive various data.

[0224] For this, the communication interface 640 may support establishment of a direct (e.g., wired) communication channel or a wireless communication channel between external devices, and communication through the established communication channel. In an embodiment, the communication interface 640 may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module or a GNSS communication module) or a wired communication module (e.g., a LAN communication

module or a power-line communication module). A corresponding one of the communication modules may communicate with an external device over a first network (e.g., a short-range communication network such as bluetooth, Wi-Fi direct or IrDA) or a second network (e.g., a remote communication network such as a legacy cellular network, a 5G network, a next generation communication network, the Internet, or a computer network (e.g., a LAN or WAN). These various types of communication modules may be integrated into a single component (e.g., a single chip) or implemented as a plurality of separate components (e.g., a plurality of chips).

[0225] The short-range communication module may include a bluetooth communication module, a BLE communication module, an NFC module, a WLAN, e.g., Wi-Fi, communication module, a Zigbee communication module, an IrDA communication module, a WFD communication module, an UWB communication module, an Ant+ communication module, a uWave communication module, etc., without being limited thereto.

[0226] The long-range communication module may include a communication module for performing various types of long-range communication and include a mobile communication interface. The mobile communication interface transmits and receives RF signals to and from at least one of a base station, an external terminal, or a server in a mobile communication network.

[0227] In an embodiment, the computing device 7 may include a processor 761, a memory 762 and/or a communication interface 740.

[0228] The processor 761 may process data received from the communication interface 740.

[0229] For example, the processor 761 may process data collected from an external device (e.g., the air conditioner 1 and/or the user device 6) through the communication interface 740.

[0230] The processor 761 may control general operation of the computing device 7.

[0231] The computing device 7 may include the at least one memory 762 that stores a program and data for controlling the operation of the computing device 7.

[0232] The at least one memory 762 may store data required for various embodiments. The memory 762 may be implemented in the form of a memory embedded in or detachable from the computing device 7 depending on the data storage use. For example, data for operating the computing device 7 may be stored in the memory embedded in the computing device 7 and data for an extended function of the computing device 7 may be stored in the memory detachable from the computing device 7. In the meantime, the memory embedded in the computing device 7 may be implemented with at least one of a volatile memory (e.g., a DRAM, an SRAM, or an SDRAM, etc.) or a non-volatile memory (e.g., an OTPROM, a PROM, an EPROM, an EEPROM, a mask ROM, a flash ROM, a flash memory (e.g., NAND flash or NOR flash), a hard drive or an SSD). The memory detachable from the computing device 7 may be implemented in such a format

as a memory card (e.g., CF, SD, micro-SD, mini-SD, xD, MMC, etc.) or an external memory (e.g., USB memory) connectable to a USB port.

[0233] The at least one processor 761 controls general operation of the computing device 7. Specifically, the at least one processor 761 may be connected to the respective components of the computing device 7 to control general operation of the computing device 7. For example, the at least one processor 761 may be electrically connected to the memory 762 to control general operation of the computing device 7. The processor 761 may include one or more processors.

[0234] The at least one processor 761 may execute at least one instruction stored in the memory 762 to perform operation of the computing device 7 according to various embodiments.

[0235] The at least one processor 761 may include one or more of a CPU, a GPU, an APU, an MIC, a DSP, an NPU, a hardware accelerator or a machine learning accelerator. The at least one processor 761 may control one or any combination of other components of the computing device 7, and perform a communication related operation or data processing. The at least one processor 761 may execute at least one program or instruction stored in the memory 762. For example, the at least one processor 761 may execute the at least one instruction stored in the memory 762 to perform a method according to at least one embodiment of the disclosure.

[0236] The at least one memory 762 may store an algorithm for processing data received from an external device (e.g., the air conditioner 1 and/or the user device 6).

[0237] The communication interface 740 may include at least one of a short-range communication module or a long-range communication module.

[0238] The communication interface 740 may transmit or receive data to or from an external device (e.g., the air conditioner 1 and/or the user device 6). For example, the communication interface 740 may establish communication with the air conditioner 1 and/or the user device 6 and transmit and receive various data.

[0239] For this, the communication interface 740 may support establishment of a direct (e.g., wired) communication channel or a wireless communication channel between external devices, and communication through the established communication channel. In an embodiment, the communication interface 740 may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module or a GNSS communication module) or a wired communication module (e.g., a LAN communication module or a power-line communication module). A corresponding one of the communication modules may communicate with an external device over a first network (e.g., a short-range communication network such as bluetooth, Wi-Fi direct or IrDA) or a second network (e.g., a remote communication network such as a legacy cellular network, a 5G network, a next generation com-

munication network, the Internet, or a computer network (e.g., a LAN or WAN). These various types of communication modules may be integrated into a single component (e.g., a single chip) or implemented as a plurality of separate components (e.g., a plurality of chips).

[0240] The short-range communication module may include a bluetooth communication module, a BLE communication module, an NFC module, a WLAN, e.g., Wi-Fi, communication module, a Zigbee communication module, an IrDA communication module, a WFD communication module, an UWB communication module, an Ant+ communication module, a uWave communication module, etc., without being limited thereto.

[0241] The long-range communication module may include a communication module for performing various types of long-range communication and include a mobile communication interface. The mobile communication interface transmits and receives RF signals to and from at least one of a base station, an external terminal, or a server in a mobile communication network.

[0242] In a case that the method according to the at least one embodiment of the disclosure includes a plurality of operations, the plurality of operations may be performed by one or multiple processors (161, 661 and 761). For example, when a first operation, a second operation and a third operation are performed in a method according to at least one embodiment, all the first operation, the second operation and the third operation may be performed by a first processor, or the first operation and the second operation may be performed by the first processor (e.g., a universal processor) and the third operation may be performed by a second processor (e.g., an AI dedicated processor).

[0243] The at least one processor 161, 661 and 761 may be implemented with a single core processor having a single core, or may be implemented with at least one multicore processor having multiple cores (e.g., homogeneous multi cores or heterogeneous multi cores). When the at least one processor 161, 661 and 761 is implemented with the multicore processor, each of the multiple cores included in the multicore processor may include an internal processor memory such as a cache memory or an on-chip memory, and a common cache shared by the multiple cores may be included in the multicore processor. Furthermore, each (or some) of the multiple cores included in the multicore processor may independently read and execute program instructions to implement a method according to at least one embodiment of the disclosure, or all (or some) of the plurality of cores may be involved to read and execute program instructions to implement the method according to the at least one embodiment of the disclosure.

[0244] In a case that the method according to the at least one embodiment of the disclosure includes a plurality of operations, the plurality of operations may be performed by one or multiple cores included in the multicore processor. For example, when a first operation, a second operation and a third operation are performed in a

method according to at least one embodiment, all the first operation, the second operation and the third operation may be performed by a first core included in the multicore processor, or the first operation and the second operation may be performed by the first core included in the multicore processor and the third operation may be performed by a second core included in the multicore processor.

[0245] In embodiments of the disclosure, the processor 161, 661 or 761 may refer to an SoC in which at least one processor and other electronic parts are integrated, a single core processor, a multicore processor, or a core included in the single core processor or multicore processor, and the core may be implemented with a CPU, a GPU, an APU, an MIC, a DSP, an NPU, a hardware accelerator or a machine learning accelerator, without being limited thereto.

[0246] In various embodiments, the communication interface 140 of the air conditioner 1 may be connected directly (e.g., through a short-range communication module) to the communication interface 640 of the user device 6.

[0247] In various embodiments, the communication interface 140 of the air conditioner 1 may be indirectly connected (e.g., via the communication interface 740 of the computing device 7) to the communication interface 640 of the user device 6.

[0248] FIG. 10 is a flowchart illustrating an example of a management method for air conditioner, according to an embodiment.

[0249] Referring to FIG. 10, a method of managing the air conditioner 1 may include an operation 1000 of receiving a user command to set a target operation time of the fan 32 and/or a target rotation speed of the fan 32 for the dry operation.

[0250] The target operation time of the fan 32 may also be called a target dry time in that the target operation time corresponds to an operation time of the dry operation.

[0251] The target rotation speed of the fan 32 may also be called a target dry flow rate in that the target rotation speed corresponds to a flow rate in the dry operation.

[0252] The user command is a command received from the user, which may be received through the input interface 111 of the air conditioner 1 and/or the input interface 611 of the user device 6.

[0253] The operation of receiving the user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation may be performed by the air conditioner 1.

[0254] In an embodiment, the air conditioner 1 may receive a user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation through the input interface 111 of the air conditioner 1.

[0255] In an embodiment, the user device 6 may receive a user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation through the input interface 611 of the user device 6 and forward them to the air conditioner 1,

and the air conditioner 1 may receive the user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation from the user device 6 through the communication interface 140.

[0256] In the traditional technology, there is no method that allows the user to directly set the target operation time of the fan 32 or the target rotation speed of the fan 32 for the dry operation, so it is difficult to perform the dry operation that takes into account the circumstances of the user.

[0257] In an embodiment, the method of managing the air conditioner 1 may include an operation 2000 of performing, by the air conditioner 1, the dry operation by operating the fan 32 at the target rotation speed set according to the user command for the target operation time set according to the user command.

[0258] In the disclosure, by allowing the user to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation, user convenience may be improved.

[0259] The air conditioner 1 may store the target operation time and the target rotation speed for the dry operation in the memory 162.

[0260] In an embodiment, the air conditioner 1 may store the target rotation speed set according to the user command and the target operation time set according to the user command in the memory 162.

[0261] In an embodiment, the air conditioner 1 may determine a target rotation speed based on the target operation time set according to the user command, and store the target operation time set according to the user command and the target rotation speed determined based on the target operation time set according to the user command in the memory 162.

[0262] In an embodiment, the air conditioner 1 may determine a target operation time based on the target rotation speed set according to the user command, and store the target rotation speed set according to the user command and the target operation time determined based on the target rotation speed set according to the user command in the memory 162.

[0263] In an embodiment, the user device 6 may determine a target operation time based on the target rotation speed set according to the user command and transmit the target rotation speed set according to the user command and the target operation time determined based on the target rotation speed set according to the user command to the air conditioner 1, and the air conditioner 1 may store the target rotation speed and the target operation time received from the user device 6 in the memory 162.

[0264] In an embodiment, the user device 6 may determine a target rotation speed based on the target operation time set according to the user command and transmit the target operation time set according to the user command and the target rotation speed determined based on the target operation time set according to the

user command to the air conditioner 1, and the air conditioner 1 may store the target rotation speed and the target operation time received from the user device 6 in the memory 162.

[0265] In an embodiment, the air conditioner 1 may perform the dry operation by operating the fan 32 at the target rotation speed for the target operation time in response to a start condition of the dry operation being satisfied.

[0266] The start condition of the dry operation may include a termination condition of the cooling operation.

[0267] In an embodiment, the air conditioner 1 may terminate the cooling operation in response to the termination condition of the cooling operation being satisfied, and perform the dry operation by operating the fan 32 at the target rotation speed for the target operation time.

[0268] The termination condition of the cooling operation may include receiving a cooling operation termination command from the user.

[0269] The air conditioner 1 may receive the cooling operation termination command through the input interface 111 or from the user device 6 through the communication interface 140.

[0270] The start condition of the dry operation may include receiving a dry operation command.

[0271] The air conditioner 1 may receive the dry operation start command through the input interface 111 or from the user device 6 through the communication interface 140.

[0272] In an embodiment, when the target operation time and the target rotation speed are changed according to a user command, the air conditioner 1 may update the target operation time and the target rotation speed stored in the memory 162.

[0273] FIG. 11 is a flowchart for describing an example of a procedure for determining a target operation time based on a target rotation speed set by a user, according to an embodiment.

[0274] Referring to FIG. 11, the operation 1000 of receiving a user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation may include operation 1110 of providing an interface for changing the settings of the dry operation.

[0275] The interface for changing the settings of the dry operation may be provided through the output interface 112 of the air conditioner 1 and/or the output interface 612 of the user device 6.

[0276] In an embodiment, the processor 161 of the air conditioner 1 may control the output interface 112 to provide the interface for changing the settings of the dry operation. In an embodiment, the processor 661 of the user interface 6 may control the output interface 612 to provide the interface for changing the settings of the dry operation. In an embodiment, the processor 761 of the computing device 7 may transmit an electric signal to provide the interface for changing the settings of the dry operation to the air conditioner 1 and/or the user device 6.

[0277] In the disclosure, the computing device 7 providing the interface may include the computing device 7 transmitting the control signal to provide the interface to the air conditioner 1 and/or the user device 6.

[0278] In an embodiment, the air conditioner 1 may provide the interface for changing the settings of the dry operation through the output interface 112 according to the user's manipulation.

[0279] In an embodiment, the user device 6 may provide the interface for changing the settings of the dry operation through the output interface 612 according to the user's manipulation.

[0280] The operation 1000 of receiving a user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation may include operation 1120 of receiving a user command to set a target rotation speed.

[0281] The user may input a user command to set the target rotation speed through the input interface 111.

[0282] The user may input the user command to set the target rotation speed through the input interface 611 of the user device 6.

[0283] In an embodiment, the method of managing the air conditioner 1 may include an operation 1130 of determining a target operation time based on the target rotation speed set according to the user command.

[0284] In an embodiment, the air conditioner 1 may determine the target operation time based on the target rotation speed set according to the user command.

[0285] In various embodiments, the memory 162 of the air conditioner 1 may store a lookup table in which a target rotation speed set according to a user command is mapped to a corresponding target operation time. In various embodiments, the memory 162 of the air conditioner 1 may store an algorithm for determining a target operation time corresponding to a target rotation speed set according to the user command.

[0286] In an embodiment, the user device 6 may determine a target operation time based on a target rotation speed set according to a user command.

[0287] In various embodiments, the memory 662 of the user device 6 and the memory 762 of the computing device 7 may store a lookup table in which a target rotation speed set according to a user command is mapped to a corresponding target operation time. In various embodiments, the memory 662 of the user device 6 and the memory 762 of the computing device 7 may store an algorithm for determining a target operation time corresponding to a target rotation speed set according to a user command.

[0288] In an embodiment, the target operation time may be set to be shorter based on the target rotation speed being higher. In other words, the target operation time may be set to be longer based on the target rotation speed being lower.

[0289] The operation 1110 of providing the interface for changing the settings of the dry operation may include an operation of outputting a visual element that indicates a

target operation time determined based on a target rotation speed set according to a user command.

[0290] In the disclosure, the visual element may include characters, figures, text, images, animation, etc., and may be implemented in various forms that may provide visual information.

[0291] When the target operation time is short even though the target rotation speed is low in the dry operation, the efficiency of the dry operation may be significantly reduced.

[0292] In an embodiment of the disclosure, reduction in efficiency of the dry operation may be prevented by automatically setting the target operation time corresponding to the target rotation speed of the fan 32 while leaving the user the discretion to set the target rotation speed of the fan 32 for the dry operation.

[0293] FIG. 12 is a flowchart for describing an example of a procedure for determining a minimum operation time based on a target rotation speed set by a user, according to an embodiment.

[0294] Referring to FIG. 12, in an embodiment, the method of managing the air conditioner 1 may include operation 1121 of determining a minimum operation time based on the target rotation speed set according to the user command.

[0295] In an embodiment, the air conditioner 1 may determine the minimum operation time based on the target rotation speed set according to the user command.

[0296] In various embodiments, the memory 162 of the air conditioner 1 may store a lookup table in which a target rotation speed set according to a user command is mapped to a corresponding minimum operation time. In various embodiments, the memory 162 of the air conditioner 1 may store an algorithm for determining a minimum operation time corresponding to a target rotation speed set according to the user command.

[0297] In an embodiment, the user device 6 may determine a minimum operation time based on a target rotation speed set according to a user command.

[0298] In various embodiments, the memory 662 of the user device 6 and the memory 762 of the computing device 7 may store a lookup table in which a target rotation speed set according to a user command is mapped to a corresponding minimum operation time. In various embodiments, the memory 662 of the user device 6 and the memory 762 of the computing device 7 may store an algorithm for determining a minimum operation time corresponding to a target rotation speed set according to a user command.

[0299] In an embodiment, the minimum operation time may be set to be shorter based on the target rotation speed being higher. In other words, the minimum operation time may be set to be longer based on the target rotation speed being lower.

[0300] The operation 1110 of providing the interface for changing the settings of the dry operation may include an operation 1123 of outputting a visual element that indicates the minimum operation time determined based on

the target rotation speed set according to the user command.

[0301] In an embodiment, the method of managing the air conditioner 1 may include an operation 1125 of limiting the range of settable target operation time to prevent the target operation time from being shorter than the minimum operation time.

[0302] Due to the operation 1125 of limiting the range of settable target operation time to prevent the target operation time from being shorter than the minimum operation time, the user is unable to set the target operation time to be shorter than the minimum operation time through the interface for changing the settings of the dry operation.

[0303] The limiting of the range of settable target operation time may include limiting a settable range of the target operation time.

[0304] In an embodiment, the method of managing the air conditioner 1 may include an operation 1127 of providing a visual element indicating that the range of the target operation time is limited, in response to an intent of the user to reduce the target operation time to be shorter than the minimum operation time being detected.

[0305] The detecting of the intent of the user to reduce the target operation time to be shorter than the minimum operation time may include detecting an input of the user to reduce the target operation time to be shorter than the minimum operation time.

[0306] For example, the operation 1127 of providing the visual element indicating that the range of the target operation time is limited may include outputting a pop-up window indicating that the range of the target operation time is limited.

[0307] In an embodiment of the disclosure, the target operation time corresponding to the target rotation speed of the fan 32 may be prevented from being shorter than the minimum operation time that may drop the efficiency of the dry operation while leaving the user the discretion to set the target rotation speed of the fan 32 and the target operation time of the fan 32 for the dry operation.

[0308] FIG. 13 illustrates an interface for changing the settings of a dry operation, according to an embodiment. FIG. 14 illustrates another example of an interface for changing the settings of a dry operation, according to an embodiment.

[0309] Referring to FIG. 13, an interface U1 for changing the settings of the dry operation may include an interface element U11a for setting the target rotation speed and/or an interface element U12 for setting the target operation time.

[0310] In various embodiments, the interface element U11a for setting the target rotation speed as shown in FIG. 13 may be replaced by an interface element U11b for setting the target rotation speed as shown in FIG. 14.

[0311] In various embodiments, the interface U1 for changing the settings of the dry operation may include both the interface element U11a shown in FIG. 13 and the interface element U11b shown in FIG. 14.

[0312] The interface element U11a for setting the target rotation speed shown in FIG. 13 may include a tool for setting the target rotation speed. The tool for setting the target rotation speed may be implemented in the form of a bar, but the form of the tool for setting the target rotation speed is not limited thereto.

[0313] In the disclosure, receiving a user command to set the target rotation speed may include manipulating, by the user, the tool for setting the target rotation speed.

[0314] The interface element U11a for setting the target rotation speed may include a visual indicator indicating the target rotation speed set according to the user's manipulation.

[0315] The user may intuitively identify the target rotation speed set by himself/herself by checking the visual indicator indicating the target rotation speed. For example, the visual indicator indicating the target rotation speed may include a relative term such as 'first step', 'second step', etc. The example of the visual indicator indicating the target rotation speed is not, however, limited thereto, and may include a numerical value directly indicating the target rotation speed.

[0316] The interface element U11a for setting the target rotation speed may further include an element for automatically setting the target rotation speed.

[0317] When the element for automatically setting the target rotation speed is selected, the target rotation speed may be automatically selected to be a target rotation speed corresponding to the target operation time set according to a user command.

[0318] In an embodiment, the interface element U11b for setting the target rotation speed may include the interface element U11b for setting a noise level of the dry operation.

[0319] The interface element U11b for setting the noise level of the dry operation as shown in FIG. 14 may include a tool for setting the noise level of the dry operation. The tool for setting the noise level of the dry operation may be implemented in the form of a bar, but the form of the tool for setting the target rotation speed is not limited thereto.

[0320] In the disclosure, receiving a user command to set the target rotation speed may include manipulating, by the user, the tool for setting the noise level of the dry operation.

[0321] The interface element U11b for setting the noise level of the dry operation may include a visual indicator indicating the noise level of the dry operation set according to the user's manipulation.

[0322] The user may intuitively identify the noise level set by himself/herself by checking the visual indicator indicating the noise level of the dry operation. For example, the visual indicator indicating the noise level of the dry operation may include a relative term such as 'normal', 'first low noise step', 'second low noise step', etc. The example of the visual indicator indicating the noise level is not, however, limited thereto, and may include a numerical value directly indicating the noise level.

[0323] When the noise level of the dry operation is set

according to a user command, a target rotation speed corresponding to the noise level of the dry operation may be determined.

[0324] For this, the memory 162 of the air conditioner 1, the memory 662 of the user device and/or the memory 762 of the computing device 7 may store a lookup table in which a noise level of the dry operation is mapped to a corresponding target rotation speed.

[0325] For example, when the noise level of the dry operation is set to the first low noise step, the target rotation speed may be determined to be about 700 revolutions per minute (rpm), and when the noise level of the dry operation is set to the second low noise step, the target rotation speed of the fan 32 may be determined to be about 500 rpm.

[0326] The interface element U12 for setting the target operation time may include a visual element indicating a minimum operation time.

[0327] The user may identify a range of the target operation time that is settable by the user through the visual element indicating the minimum operation time.

[0328] The interface element U12 for setting the target operation time may include a tool for setting the target operation time. In the disclosure, receiving a user command to set the target operation time may include manipulating, by the user, the tool for setting the target operation time.

[0329] In an embodiment, the interface U1 for changing the settings of the dry operation may include a visual element U13 indicating a cleaning efficiency of the dry operation based on the target operation time and target rotation speed set according to the user command.

[0330] The visual element U13 indicating the cleaning efficiency of the dry operation may include a visual element indicating a degree of change in dehumidification efficiency and/or mold growth probability in the air conditioner 1 as compared to a default dry operation.

[0331] In an embodiment, the air conditioner 1, the user device 6 and/or the computing device 7 may determine the cleaning efficiency corresponding to the target rotation speed and target operation time set according to a user command.

[0332] For this, the memory 162 of the air conditioner 1, the memory 662 of the user device and/or the memory 762 of the computing device 7 may store a lookup table in which a target rotation speed and target operation time is mapped to corresponding cleaning efficiency.

[0333] In an embodiment, the interface U1 for changing the settings of the dry operation may include a visual element U14 indicating a recommended dry time determined based on average operation time information of the air conditioner 1, temperature information and humidity information of surrounding air of the air conditioner 1.

[0334] In an embodiment, the visual element U14 indicating the recommended dry time may include a visual element indicating information about a recommended dry time.

[0335] The visual element U14 indicating the recommended dry time may include a visual element indicating the average operation time information of the air conditioner 1, temperature information and humidity information of the surrounding air of the air conditioner 1 for a certain period (e.g., three days).

[0336] In an embodiment, the air conditioner 1, the user device 6 and/or the computing device 7 may determine a recommended dry time based on the average operation time information of the air conditioner 1, the temperature information and humidity information of the surrounding air of the air conditioner 1.

[0337] The temperature information and humidity information of the surrounding air of the air conditioner 1 may be obtained by the environmental sensor 120 of the air conditioner 1. The temperature information and humidity information of the surrounding air of the air conditioner 1 may be transmitted to the user device 6 and/or the computing device 7 from the air conditioner 1.

[0338] The temperature information and humidity information of the surrounding air of the air conditioner 1 may include temperature and humidity of indoor air and/or temperature and humidity of outside air.

[0339] The average operation time information of the air conditioner 1 may also be obtained by the air conditioner 1, and transmitted to the user device 6 and/or the computing device 7 from the air conditioner 1.

[0340] The memory 162 of the air conditioner 1, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store an algorithm for calculating the recommended dry time based on the average operation time information of the air conditioner 1, the temperature information and humidity information of the surrounding air of the air conditioner 1.

[0341] In another example, the memory 162 of the air conditioner 1, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store a lookup table for calculating the recommended dry time based on the average operation time information of the air conditioner 1, the temperature information and humidity information of the surrounding air of the air conditioner 1.

[0342] In another example, the memory 162 of the air conditioner 1, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store a trained AI model for calculating the recommended dry time based on the average operation time information of the air conditioner 1, the temperature information and humidity information of the surrounding air of the air conditioner 1.

[0343] In an embodiment, the interface U1 for changing the settings of the dry operation may include a visual element U15 indicating a noise level corresponding to a target rotation speed set according to the user command.

[0344] The user may check the visual element U15 indicating the noise level, and change the noise level by changing the target rotation speed depending on the purpose of the user.

[0345] FIG. 15 illustrates an example of a visual element indicating a minimum operation time, according to an embodiment.

[0346] Referring to FIG. 15, the user may set a target rotation speed of the fan 32 for the dry operation through the interface element U11a or U11b for setting a target rotation speed.

[0347] The air conditioner 1, the user device 6 and/or the computing device 7 may determine a minimum dry time based on the target rotation speed set according to a user command, and output information about the minimum dry time through the output interface 112 of the air conditioner 1 and/or the output interface 612 of the user device 6.

[0348] The user may try to reduce the target operation time of the fan 32 for the dry operation to be shorter than the minimum operation time through the interface element U12 for setting the target operation time.

[0349] For example, when the interface element U12 for setting the target operation time includes a tool shaped like a bar, the user may drag the bar-shaped tool in a direction that reduces the target dry time.

[0350] However, the trying to reduce the target operation time of the fan 32 for the dry operation to be shorter than the minimum operation time is not limited to the dragging, but may be variously changed depending on the form of the tool for setting the target operation time.

[0351] FIG. 16 illustrates an example of a visual element provided when a user is going to set a target operation time to be shorter than a minimum operation time, according to an embodiment.

[0352] Referring to FIG. 16, in response to an intent of the user to reduce the target operation time to be shorter than the minimum operation time being detected, the air conditioner 1, the user device 6 and/or the computing device 7 may provide a visual element UT indicating that a range of the target operation time is limited.

[0353] The visual element UT indicating that a range of the target operation time is limited may include a pop-up window, but the form of the visual element UT is not limited thereto.

[0354] The user may check the visual element UT indicating that a range of the target operation time is limited, and may increase the target rotation speed through the interface element U11a or U11b for setting the target rotation speed to reduce the dry time or give up changing the target operation time.

[0355] In an embodiment of the disclosure, the target operation time corresponding to the target rotation speed of the fan 32 may be prevented from being shorter than the minimum operation time that may drop the efficiency of the dry operation while setting the dry operation is left to the discretion of the user.

[0356] In an embodiment of the disclosure, even when only the target rotation speed is set according to a user command, the target operation time may be set automatically, or the user may be allowed to set the target operation time within the limited range based on the

minimum operation time.

[0357] FIG. 17 is a flowchart for describing an example of a procedure for determining a target operation speed based on a target operation time set by a user, according to an embodiment.

[0358] Referring to FIG. 17, the operation 1000 of receiving a user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation may include operation 1210 of providing an interface for changing the settings of the dry operation.

[0359] The interface for changing the settings of the dry operation may be provided through the output interface 112 of the air conditioner 1 and/or the output interface 612 of the user device 6.

[0360] The operation 1000 of receiving the user command to set the target operation time of the fan 32 and/or the target rotation speed of the fan 32 for the dry operation may include operation 1220 of receiving a user command to set a target operation time.

[0361] The user may input a user command to set the target operation time through the input interface 111.

[0362] The user may input the user command to set the target operation time through the input interface 611 of the user device 6.

[0363] In an embodiment, the method of managing the air conditioner 1 may include operation 1230 of determining a target rotation speed based on the target operation time set according to the user command.

[0364] In an embodiment, the air conditioner 1 may determine the target rotation speed based on the target operation time set according to the user command.

[0365] In various embodiments, the memory 162 of the air conditioner 1 may store a lookup table in which a target operation time set according to a user command is mapped to a corresponding target rotation speed. In various embodiments, the memory 162 of the air conditioner 1 may store an algorithm for determining a target rotation speed corresponding to a target operation time set according to the user command.

[0366] In an embodiment, the user device 6 may determine a target rotation speed based on a target operation time set according to a user command.

[0367] In various embodiments, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store a lookup table in which a target operation time set according to a user command is mapped to a corresponding target rotation speed. In various embodiments, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store an algorithm for determining a target rotation speed corresponding to a target operation time set according to a user command.

[0368] In an embodiment, the target rotation speed may be set to be lower based on the target operation time being longer. In an embodiment, the target rotation speed may be set to be higher based on the target operation time being shorter.

[0369] The operation 1110 of providing the interface for changing the settings of the dry operation may include an operation of outputting a visual element that indicates a target rotation speed determined based on a target operation time set according to a user command.

[0370] The visual element indicating the target rotation speed may include a visual element indicating an expected noise level caused by the dry operation.

[0371] When the target rotation speed is low even though the performance time (target operation time) of the dry operation is short, efficiency of the dry operation may be significantly reduced.

[0372] In an embodiment of the disclosure, reduction in efficiency of the dry operation may be prevented by automatically setting the target rotation speed corresponding to the target operation time of the fan 32 while leaving the user the discretion to set the target operation time of the fan 32 for the dry operation.

[0373] FIG. 18 is a flowchart for describing an example of a procedure for determining a minimum rotation speed based on a target operation time set by a user, according to an embodiment.

[0374] Referring to FIG. 18, in an embodiment, the method of managing the air conditioner 1 may include operation 1221 of determining a minimum rotation speed based on the target operation time set according to the user command.

[0375] In an embodiment, the air conditioner 1 may determine the minimum rotation speed based on the target operation time set according to the user command.

[0376] In various embodiments, the memory 162 of the air conditioner 1 may store a lookup table in which a target operation time set according to a user command is mapped to a corresponding minimum rotation speed. In various embodiments, the memory 162 of the air conditioner 1 may store an algorithm for determining a minimum rotation speed corresponding to a target operation time set according to the user command.

[0377] In an embodiment, the user device 6 may determine a minimum rotation speed based on a target operation time set according to a user command.

[0378] In various embodiments, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store a lookup table in which a target operation time set according to a user command is mapped to a corresponding minimum rotation speed. In various embodiments, the memory 662 of the user device 6 and/or the memory 762 of the computing device 7 may store an algorithm for determining a minimum rotation speed corresponding to a target operation time set according to a user command.

[0379] In an embodiment, the minimum rotation speed may be set to be lower based on the target operation time being longer. In an embodiment, the minimum rotation speed may be set to be higher based on the target operation time being shorter.

[0380] The operation 1210 of providing the interface for changing the settings of the dry operation may include

operation 1223 of outputting a visual element that indicates a minimum rotation speed determined based on a target operation time set according to a user command.

[0381] In an embodiment, the method of managing the air conditioner 1 may include operation 1225 of limiting the range of settable target rotation speed to prevent the target rotation speed from being lower than the minimum rotation speed.

[0382] Due to the operation 1225 of limiting the range of settable target rotation speed to prevent the target rotation speed from being lower than the minimum rotation speed, the user is unable to set the target rotation speed to be lower than the minimum rotation speed through the interface for changing the settings of the dry operation.

[0383] The limiting of the range of settable target rotation speed may include limiting a settable range of the target rotation speed.

[0384] In an embodiment, the method of managing the air conditioner 1 may include operation 1227 of providing a visual element indicating that the range of the target rotation speed is limited in response to an intent of the user to reduce the target rotation speed to be lower than the minimum rotation speed being detected.

[0385] The detecting of the intent of the user to reduce the target rotation speed to be lower than the minimum rotation speed may include detecting an input of the user to reduce the target rotation speed to be lower than the minimum rotation speed.

[0386] The operation 1227 of providing the visual element indicating that the range of the target rotation speed is limited may include outputting a pop-up window indicating that the range of the target rotation speed is limited.

[0387] In an embodiment of the disclosure, the target rotation speed corresponding to the target operation time of the fan 32 may be prevented from being lower than the minimum rotation speed that may drop the efficiency of the dry operation while leaving the user the discretion to set the target operation time of the fan 32 and the target rotation speed of the fan 32 for the dry operation.

[0388] FIG. 19 illustrates an example of a visual element indicating a minimum rotation speed, according to an embodiment.

[0389] Referring to FIG. 19, the interface U2 for changing the settings of the dry operation may include an interface element U21 for setting the target operation time and an interface element U22 for setting the target rotation speed.

[0390] The user may set a target operation time of the fan 32 for the dry operation through the interface element U21 for setting the target operation time.

[0391] The air conditioner 1, the user device 6 and/or the computing device 7 may determine a minimum rotation speed based on the target operation time set according to a user command, and output information about the minimum rotation speed through the output interface 112 of the air conditioner 1 and/or the output interface 612 of

the user device 6.

[0392] The user may try to reduce the target rotation speed of the fan 32 for the dry operation to be lower than the minimum rotation speed through the interface element U22 for setting the target rotation speed.

[0393] For example, when the interface element U22 for setting the target rotation speed includes a tool shaped like a bar, the user may drag the bar-shaped tool in a direction that reduces the target rotation speed.

[0394] However, the trying to reduce the target rotation speed of the fan 32 for the dry operation to be lower than the minimum rotation speed is not limited to the dragging, but may be variously changed depending on the form of the tool for setting the target rotation speed.

[0395] FIG. 20 illustrates an example of a visual element provided when a user is going to set a target rotation speed to be lower than the minimum rotation speed, according to an embodiment.

[0396] Referring to FIG. 20, in response to an intent of the user to reduce the target rotation speed to be lower than the minimum rotation speed being detected, the air conditioner 1, the user device 6 and/or the computing device 7 may provide a visual element US indicating that a range of the target rotation speed is limited.

[0397] The visual element US indicating that a range of the target rotation speed is limited may include a pop-up window, but the form of the visual element US is not limited thereto.

[0398] The user may check the visual element US indicating that the range of the target rotation speed is limited, and may increase the target operation time through the interface element U21 for setting the target operation time to reduce the target rotation speed or give up changing the target rotation speed.

[0399] In an embodiment of the disclosure, the target rotation speed corresponding to the target operation time of the fan 32 may be prevented from being lower than the minimum rotation speed that may drop the efficiency of the dry operation while setting the dry operation is left to the discretion of the user.

[0400] In an embodiment of the disclosure, even when only the target operation time is set according to a user command, the target rotation speed may be set automatically, or the user may be allowed to set the target rotation speed within the limited range based on the minimum rotation speed.

[0401] In an embodiment, the air conditioner 1 may perform the dry operation based on the settings for the dry operation set according to the user command.

[0402] In an embodiment, the air conditioner 1 may receive a user command through the input interface 111. In another example, the air conditioner 1 may receive a user command from an external device (e.g., the user device 6 and/or the computing device 7) through the communication interface 140.

[0403] The receiving of the user command from the external device (e.g., the user device 6 and/or the computing device 7) may include receiving information about

the settings for the dry operation from the external device (e.g., the user device 6 and/or the computing device 7).

[0404] After this, the air conditioner 1 may perform the dry operation based on the settings for the dry operation set by the user, in response to a start condition for the dry operation being satisfied.

[0405] FIG. 21 illustrates an example of an interface provided to select a mode for a dry operation of an air conditioner to be a user setting mode or an automatic mode, according to an embodiment.

[0406] Referring to FIG. 21, a method of managing the air conditioner 1 may include providing an interface U3 (hereinafter, referred to as a mode selection interface) for selecting a mode for a dry operation to be a user setting mode or an automatic mode.

[0407] The mode selection interface U3 may be provided through the output interface 112 of the air conditioner 1 and/or the output interface 612 of the user device 6.

[0408] In an embodiment, the processor 161 of the air conditioner 1 may control the output interface 112 to provide the mode selection interface U3. In an embodiment, the processor 661 of the user interface 6 may control the output interface 612 to provide the mode selection interface U3. In an embodiment, the processor 761 of the computing device 7 may transmit an electric signal to provide the mode selection interface U3 to the air conditioner 1 and/or the user device 6.

[0409] The mode selection interface U3 may include an interface element U31 for selecting a user setting mode and an interface element U32 for selecting an automatic mode.

[0410] The interface element U31 for selecting the user setting mode may include a visual indicator indicating whether to select the user setting mode (or whether to activate the user setting mode). The user setting mode may also be called a manual mode in that the user is able to manually change the settings of the dry operation.

[0411] The interface element U32 for selecting the automatic mode may include a visual indicator indicating whether to select the automatic mode (or whether to activate the automatic mode). The automatic mode may also be called an AI mode in that the air conditioner 1 is able to change the settings of the dry operation depending on the surrounding condition.

[0412] When the user setting mode is selected through the interface element U31 for selecting the user setting mode, the automatic mode may be deactivated. When the automatic mode is selected through the interface element U32 for selecting the automatic mode, the user setting mode may be deactivated.

[0413] Before the user setting mode is selected through the interface element U31 for selecting the user setting mode, the automatic mode may be set by default.

[0414] In an embodiment, the air conditioner 1 may perform the dry operation by operating the fan 32 at the target rotation speed of the fan 32 set according to the user command for the target operation time of the fan 32

set according to the user command only when the user setting mode is selected.

[0415] The mode selection interface U3 may further include an interface element U33 for providing the interface U1 or U2 for changing the settings of the dry operation.

[0416] In response to the interface element U33 for providing the interface U1 or U2 for changing the settings of the dry operation being selected, the interface U1 or U2 for changing the settings of the dry operation may be provided.

[0417] FIG. 22 is a flowchart for describing how the air conditioner 1 performs a dry operation according to a user setting mode or an automatic mode, according to an embodiment.

[0418] Referring to FIG. 22, in an embodiment, a method of managing the air conditioner 1 may include operation 2000 of receiving a selection command to select the user setting mode or the automatic mode for a dry operation mode.

[0419] In an embodiment, the method of managing the air conditioner 1 may include operation 2100 of performing the dry operation by operating the fan 32 at the target rotation speed set according to the user command for the target operation time of the fan 32 set according to the user command, in response to the user setting mode selected for the dry operation mode in 2000.

[0420] In an embodiment, the method of managing the air conditioner 1 may include operations 2200 and 2300 of automatically determining the settings of the dry operation and performing the dry operation based on the determined settings of the dry operation, in response to the automatic mode selected for the dry operation mode in 2000.

[0421] The air conditioner 1, the user device 6 and/or the computing device 7 may determine the target operation time and the target rotation speed of the fan 32 for the dry operation based on an operation time of the air conditioner 1 and temperature and humidity of the surrounding air of the air conditioner 1.

[0422] The operation time of the air conditioner 1 may include a time consumed between start and end points of a cooling operation performed by the air conditioner 1 right before the dry operation is performed. The temperature of the surrounding air of the air conditioner 1 may include a temperature of the surrounding air measured by the environmental sensor 120 at the end of the cooling operation. The humidity of the surrounding air of the air conditioner 1 may include an average value of the humidity of the surrounding air measured by the environmental sensor 120 for a predetermined period of time (e.g., three days) until the end of the cooling operation.

[0423] In an embodiment, the air conditioner 1 may determine the target operation time and the target rotation speed based on the operation time of the air conditioner 1 and the temperature and humidity of the surrounding air of the air conditioner 1. For this, the memory 162 of the air conditioner 1 may store a lookup table, an

algorithm and/or a trained AI model for calculating an optimal target operation time and target rotation speed based on the operation time of the air conditioner 1 and the temperature and humidity of the surrounding air of the air conditioner 1.

[0424] In an embodiment, the user device 6 and/or the computing device 7 may determine the target operation time and the target rotation speed based on an operation time of the air conditioner 1 and temperature and humidity of the surrounding air of the air conditioner 1. For this, the air conditioner 1 may transmit information about the operation time of the air conditioner 1, the temperature and humidity of the surrounding air of the air conditioner 1 to the user device 6 and/or the computing device 7.

[0425] For this, the memory 662 of the user device and/or the memory 762 of the computing device 7 may store a lookup table, an algorithm and/or a trained AI model for calculating an optimal target operation time and target rotation speed based on the operation time of the air conditioner 1 and the temperature and humidity of the surrounding air of the air conditioner 1.

[0426] In an embodiment, the air conditioner 1 may perform the dry operation based on the target operation time and the target rotation speed determined by the processor 161 of the air conditioner 1.

[0427] In an embodiment, the user device 6 and/or the computing device 7 may transmit, to the air conditioner 1, information about the target operation time and the target rotation speed determined based on an operation time of the air conditioner 1 and temperature and humidity of the surrounding air of the air conditioner 1, and the air conditioner 1 may perform the dry operation based on the information about the target operation time and target rotation speed received from the user device 6 and/or the computing device 7.

[0428] In the disclosure, when the user does not want to use the user setting mode, the dry operation is performed based on the optimal target operation time and target rotation speed calculated by the air conditioner 1, the user device 6 and/or the computing device, thereby attaining optimal cleaning efficiency.

[0429] According to an embodiment of the disclosure, a method of managing the air conditioner 1 to perform a cooling operation and a dry operation may include receiving a user command to set at least one of a target operation time of the fan 32 and a target rotation speed of the fan 32 for the dry operation; and performing the dry operation by operating the fan 32 at the target rotation speed of the fan 32 set according to the user command for the target operation time of the fan 32 set according to the user command.

[0430] The method of managing the air conditioner 1 may further include providing an interface for changing settings of the dry operation, and the interface may include an interface element for setting a noise level of the dry operation.

[0431] The receiving of the user command to set the target rotation speed may include receiving the user

command to set a noise level of the dry operation through the interface element; and setting the target rotation speed based on the noise level of the dry operation set according to the user command.

[0432] The method of managing the air conditioner 1 may further include determining a minimum operation time based on the target rotation speed set according to the user command; and limiting a settable range of the target operation time to prevent the target operation time from being shorter than the minimum operation time.

[0433] The method of managing the air conditioner 1 may further include outputting a visual element indicating the minimum operation time.

[0434] The method of managing the air conditioner 1 may further include providing a visual element indicating that the range of the target operation time is limited in response to an intent of the user to reduce the target operation time to be shorter than the minimum operation time being detected.

[0435] The method of managing the air conditioner 1 may further include determining the target rotation speed based on the target operation time set according to the user command; and providing a visual element indicating the determined target rotation speed.

[0436] The providing of the visual element indicating the determined target rotation speed may include providing a visual element indicating a noise level corresponding to the determined target rotation speed.

[0437] The method of managing the air conditioner 1 may further include determining cleaning efficiency of the dry operation based on the target operation time and the target rotation speed set according to the user command; and providing a visual element indicating the cleaning efficiency.

[0438] The method of managing the air conditioner 1 may further include determining a recommended dry time based on average operation time information of the air conditioner 1, and temperature information and humidity information of surrounding air of the air conditioner 1; and providing a visual element indicating the recommended dry time.

[0439] The method of managing the air conditioner 1 may further include receiving a selection command which selects a mode of the dry operation to be a user setting mode or an automatic mode; in response to the user setting mode being selected for the mode of the dry operation, performing the dry operation by operating the fan 32 at the target rotation speed of the fan 32 set according to the user command for the target operation time of the fan 32 set according to the user command; and in response to the automatic mode being selected for the mode of the dry operation, performing the dry operation based on the target operation time and the target rotation speed automatically determined based on an operation time of the air conditioner 1, and temperature and humidity of surrounding air of the air conditioner 1.

[0440] The method of managing the air conditioner 1 may further include performing the dry operation in re-

sponse to the cooling operation being terminated.

[0441] The receiving of the user command may include receiving the user command through the user interface device 110 of the air conditioner 1.

[0442] The receiving of the user command may include receiving, by the user device 6, the user command through the user interface device 610 of the user device 6; transmitting, by the user device 6, the user command to the air conditioner 1; and receiving, by the air conditioner 1, the user command from the user device 6.

[0443] According to an embodiment of the disclosure, the air conditioner 1 may include the main body 10 including the outlet 41 or 42; the heat exchanger 20; the compressor 3 configured to compress a refrigerant supplied from the heat exchanger 20; the fan 32 configured to blow air which has exchanged heat in the heat exchanger 20 to the outlet; and the controller 160 configured to control the compressor 3 and the fan 32 to perform a cooling operation and a dry operation, wherein the controller 160 is configured to receive a user command to set at least one of a target operation time of the fan 32 and a target rotation speed of the fan 32 for the dry operation, and perform the dry operation by operating the fan 32 at the target rotation speed of the fan 32 set according to the user command for the target operation time of the fan 32 set according to the user command.

[0444] The controller 160 may be configured to receive a selection command to select one of a user setting mode or an automatic mode, and perform the dry operation by operating the fan 32 at the target rotation speed of the fan 32 set according to the user command for the target operation time of the fan 32 set according to the user command only in response to the user setting mode being selected.

[0445] The controller 160 may be configured to, in response to the automatic mode being selected, perform the dry operation based on the target operation time and the target rotation speed automatically determined based on an operation time of the air conditioner 1, and temperature and humidity of surrounding air of the air conditioner 1.

[0446] The air conditioner 1 may include the communication interface 140 configured to receive the user command from the external device 6 or 7.

[0447] The air conditioner 1 may include the user interface device 110 configured to receive the user command.

[0448] The controller 160 may be configured to receive the user command to set a noise level of the dry operation through the user interface device 110 and set the target rotation speed based on the noise level of the dry operation set according to the user command.

[0449] Meanwhile, the embodiments of the disclosure may be implemented in the form of a recording medium for storing instructions to be carried out by a computer. The instructions may be stored in the form of program codes, and when executed by a processor, may generate program modules to perform operations in the embodiments of the disclosure. The recording media may cor-

respond to computer-readable recording media.

[0450] The computer-readable recording medium includes any type of recording medium having data stored thereon that may be thereafter read by a computer. For example, it may be a read only memory (ROM), a random access memory (RAM), a magnetic tape, a magnetic disk, a flash memory, an optical data storage device, etc.

[0451] The computer-readable storage medium may be provided in the form of a non-transitory storage medium. The term 'non-transitory storage medium' may mean a tangible device without including a signal, e.g., electromagnetic waves, and may not distinguish between storing data in the storage medium semi-permanently and temporarily. For example, the non-transitory storage medium may include a buffer that temporarily stores data.

[0452] In an embodiment of the disclosure, the aforementioned method according to the various embodiments of the disclosure may be provided in a computer program product. The computer program product may be a commercial product that may be traded between a seller and a buyer. The computer program product may be distributed in the form of a recording medium (e.g., a compact disc read only memory (CD-ROM)), through an application store (e.g., play store™), directly between two user devices (e.g., smart phones), or online (e.g., downloaded or uploaded). In the case of online distribution, at least part of the computer program product (e.g., a downloadable app) may be at least temporarily stored or arbitrarily created in a recording medium that may be readable to a device such as a server of the manufacturer, a server of the application store, or a relay server.

[0453] The embodiments of the disclosure have thus far been described with reference to accompanying drawings. It will be obvious to those of ordinary skill in the art that the disclosure may be practiced in other forms than the embodiments of the disclosure as described above without changing the technical idea or essential features of the disclosure. The above embodiments of the disclosure are only by way of example, and should not be construed in a limited sense.

Claims

1. A method of managing an air conditioner for performing a cooling operation and a dry operation, the method comprising:

receiving a user command to set at least one of a target operation time of a fan of the air conditioner and a target rotation speed of the fan to control the dry operation; and
performing the dry operation by operating the fan at the set target rotation speed of the fan according to the received user command for the set target operation time of the fan according to

the received user command.

2. The method of claim 1, further comprising:

providing an interface for changing settings of the dry operation,
wherein the interface comprises an interface element for setting a noise level of the dry operation.

3. The method of claim 2, wherein the receiving of the user command to set the target rotation speed further comprises

receiving the user command to set the noise level of the dry operation through the interface element; and
setting the target rotation speed based on the noise level of the dry operation set according to the received user command.

4. The method of claim 1, further comprising:

determining a minimum operation time of the fan for the dry operation based on the set target rotation speed according to the received user command; and
limiting a settable range of the target operation time to prevent the target operation time from being shorter than the determined minimum operation time.

5. The method of claim 4, further comprising:

outputting a visual element indicating the minimum operation time.

6. The method of claim 4, further comprising:

providing a visual element indicating that the range of the target operation time is limited, in response to receiving a user command to reduce the target operation time to be shorter than the determined minimum operation time.

7. The method of claim 1, further comprising:

determining the target rotation speed based on the set target operation time according to the received user command; and
providing a visual element indicating the determined target rotation speed.

8. The method of claim 7, wherein the providing of the visual element indicating the determined target rotation speed comprises

providing a visual element indicating a noise level corresponding to the determined target rotation speed.

9. The method of claim 1, further comprising:

determining cleaning efficiency of the dry operation based on the set target operation time and the set target rotation speed according to the received user command; and
providing a visual element indicating the cleaning efficiency.

10. The method of claim 1, further comprising:

determining a recommended dry time for the dry operation based on average operation time information of the air conditioner, and temperature information and humidity information of surrounding air of the air conditioner; and
providing a visual element indicating the determined recommended dry time.

11. The method of claim 1, further comprising:

receiving a selection command which selects a mode of the dry operation to be a user setting mode or an automatic mode;
in response to the user setting mode being selected for the mode of the dry operation, performing the dry operation by operating the fan at the set target rotation speed of the fan according to the user command for the set target operation time of the fan according to the user command; and
in response to the automatic mode being selected for the mode of the dry operation, performing the dry operation based on the target operation time and the target rotation speed automatically determined based on an operation time of the air conditioner, and temperature and humidity of surrounding air of the air conditioner.

12. The method of claim 1, further comprising:

performing the dry operation in response to the cooling operation being terminated.

13. The method of claim 1, wherein the receiving of the user command comprises

receiving, by the air conditioner, the user command through a user interface device of the air conditioner.

14. The method of claim 1, wherein the receiving of the user command comprises

receiving, by a user device, the user command through a user interface device of the user device;
transmitting, by the user device, the user command to the air conditioner; and
receiving, by the air conditioner, the user com-

mand from the user device.

15. An air conditioner comprising:

a main body including an outlet;
a heat exchanger;
a compressor configured to compress a refrigerant supplied from the heat exchanger;
a fan configured to blow air which has exchanged heat in the heat exchanger to the outlet; and
a controller configured to control the compressor and the fan to perform a cooling operation and a dry operation,
wherein the controller is configured to

receive a user command to set at least one of a target operation time of the fan and a target rotation speed of the fan to control the dry operation; and
perform the dry operation by operating the fan at the set target rotation speed of the fan according to the received user command for the set target operation time of the fan according to the received user command.

FIG. 1

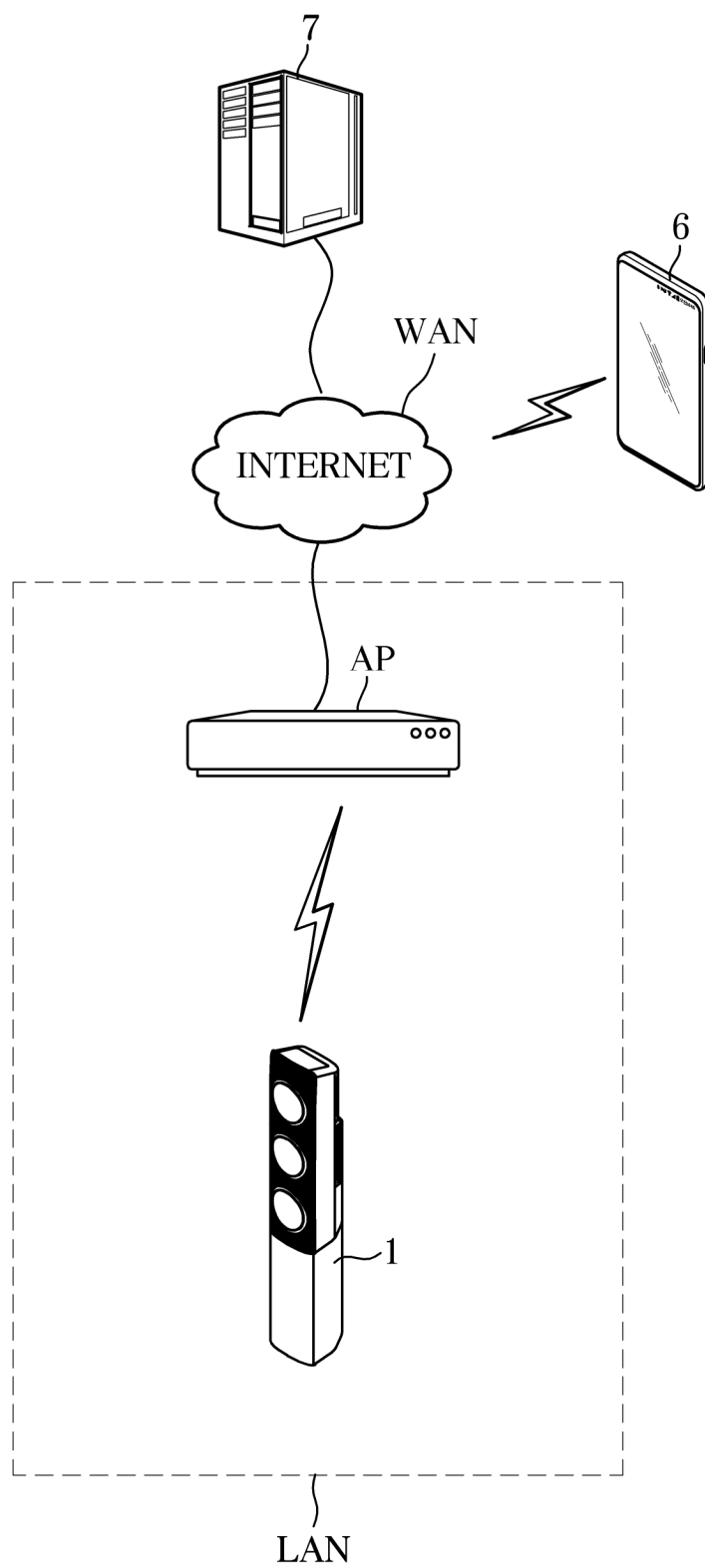


FIG. 2

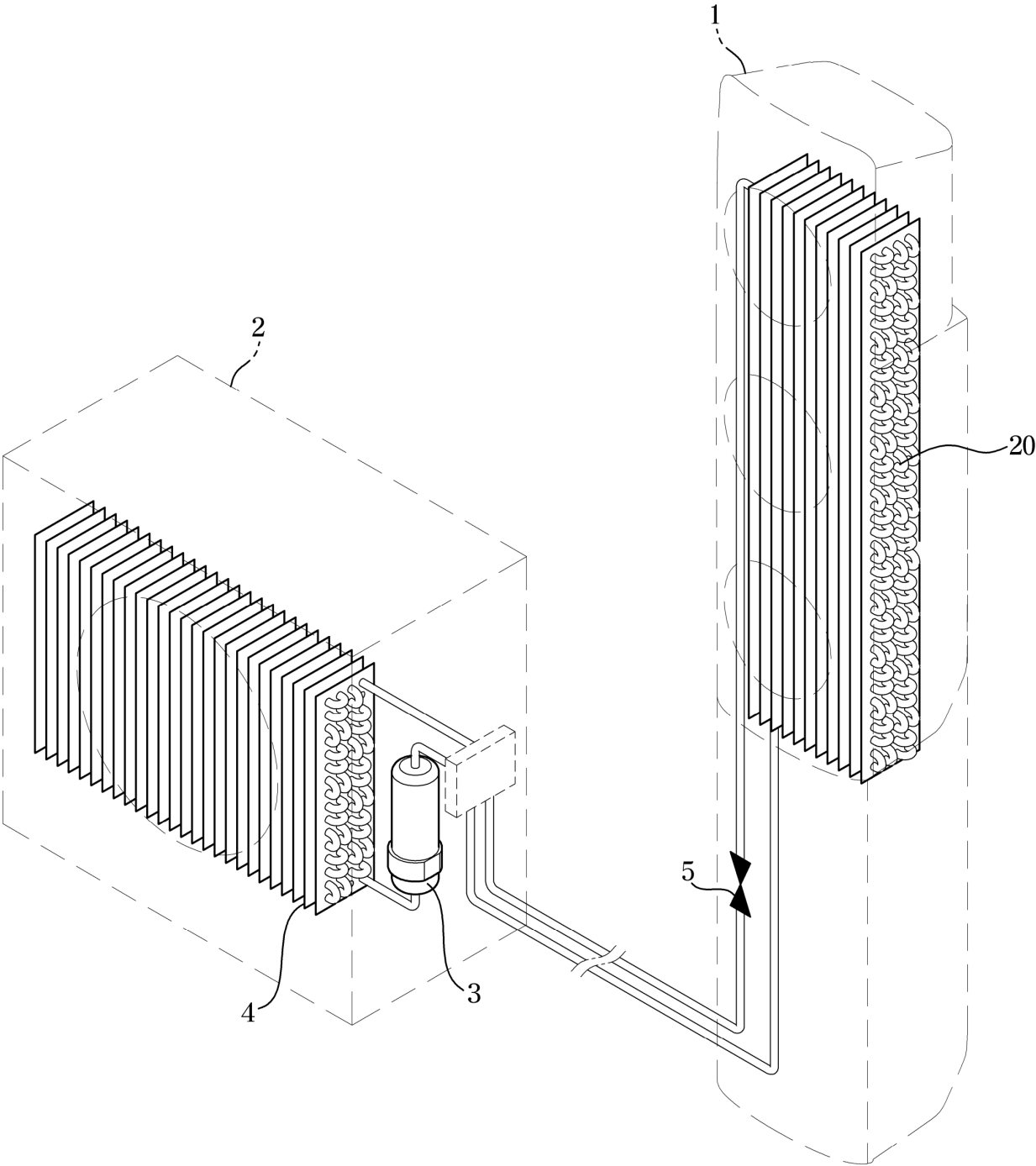
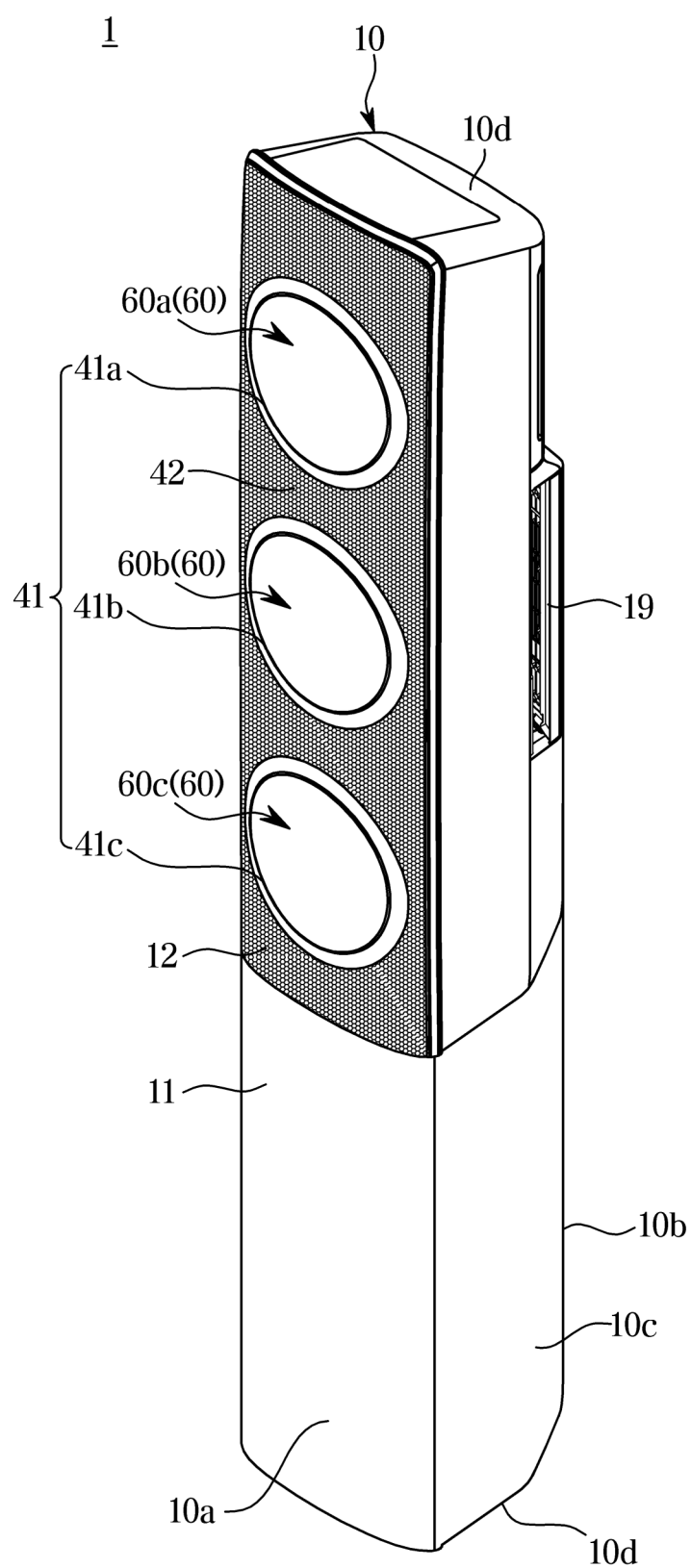


FIG. 3

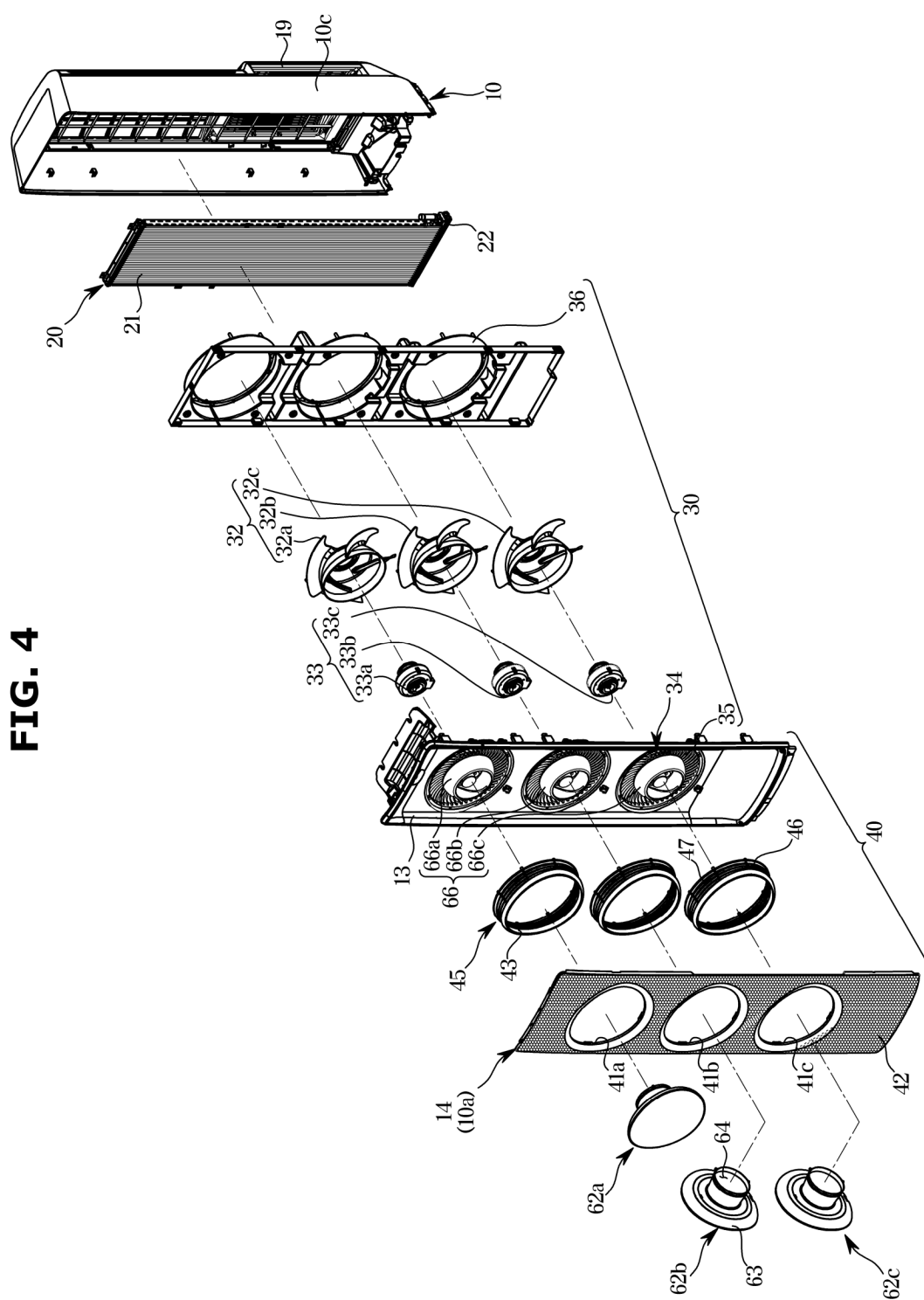


FIG. 4

FIG. 5

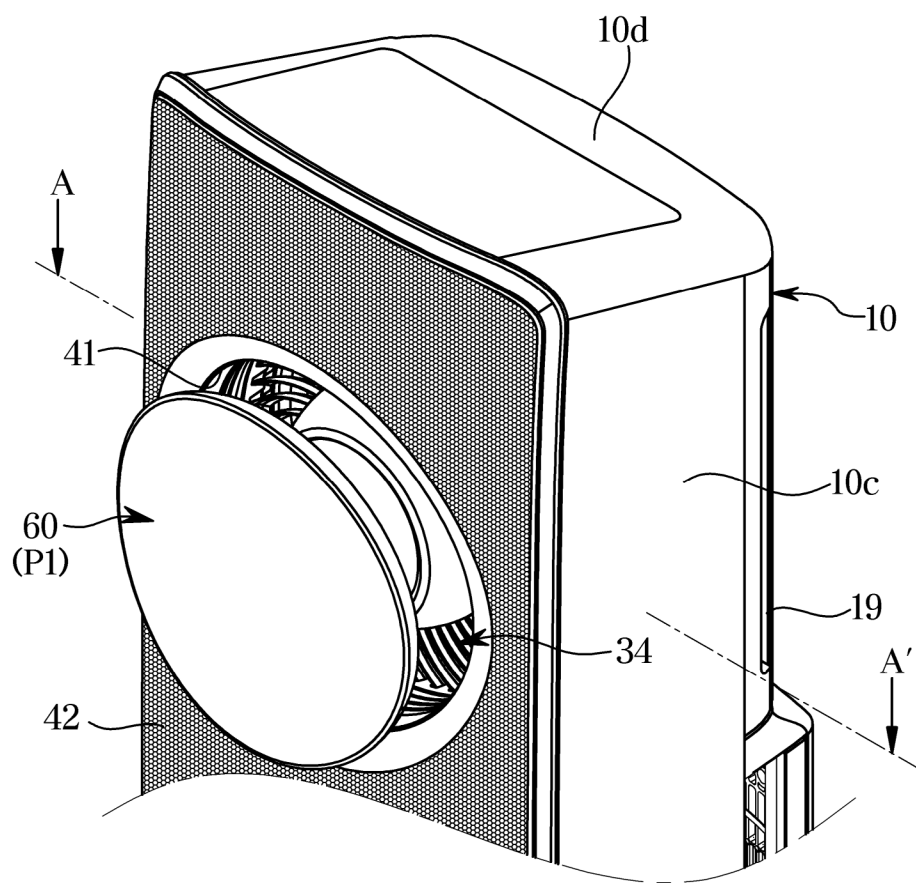


FIG. 6

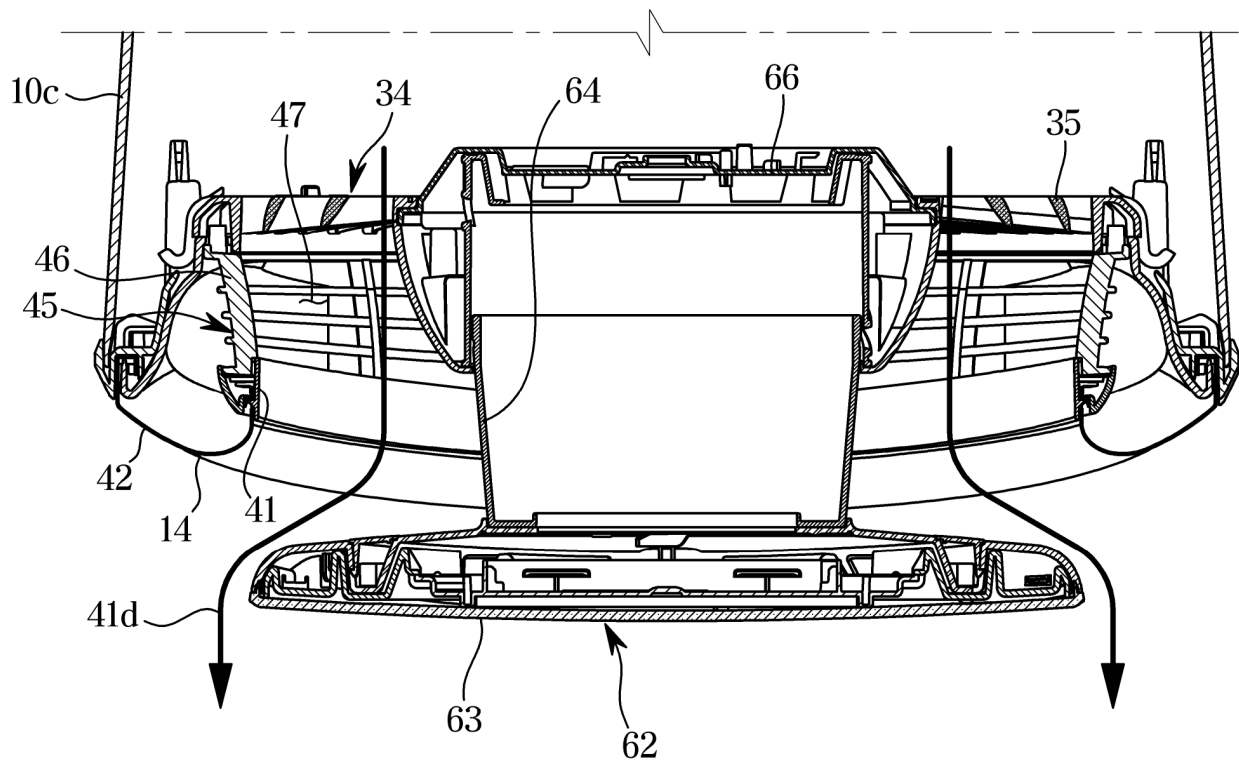


FIG. 7

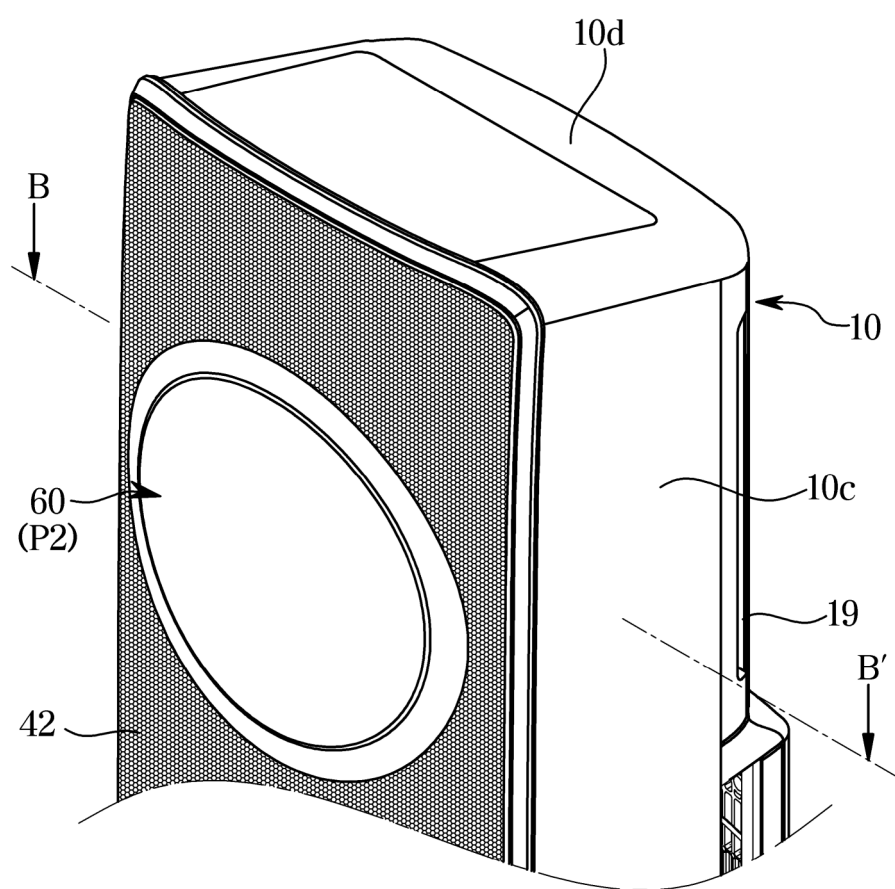


FIG. 8

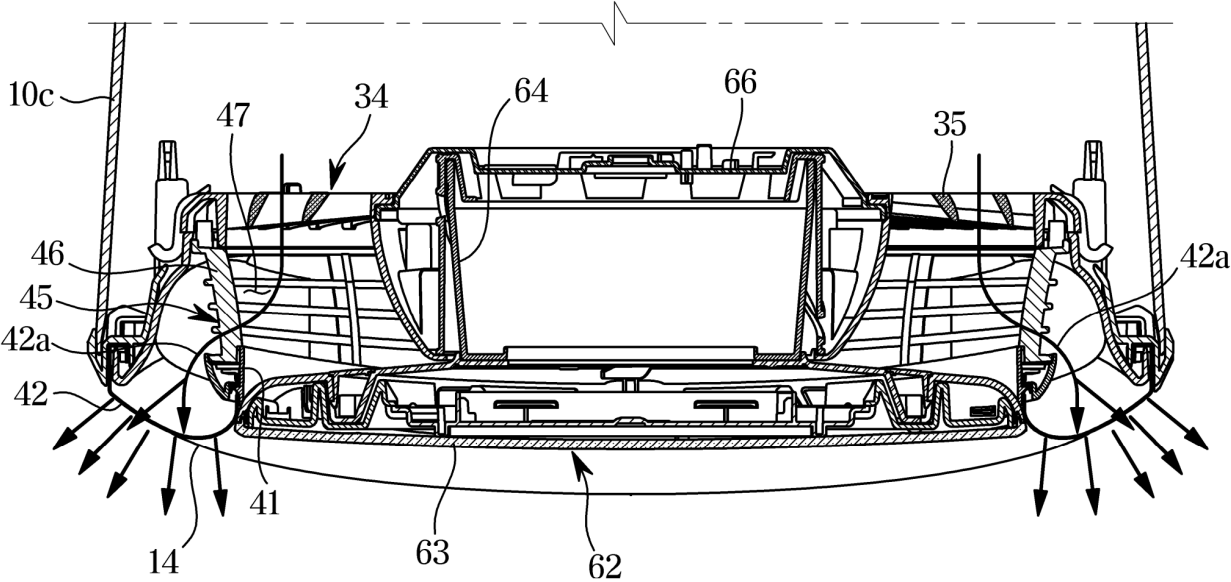


FIG. 9

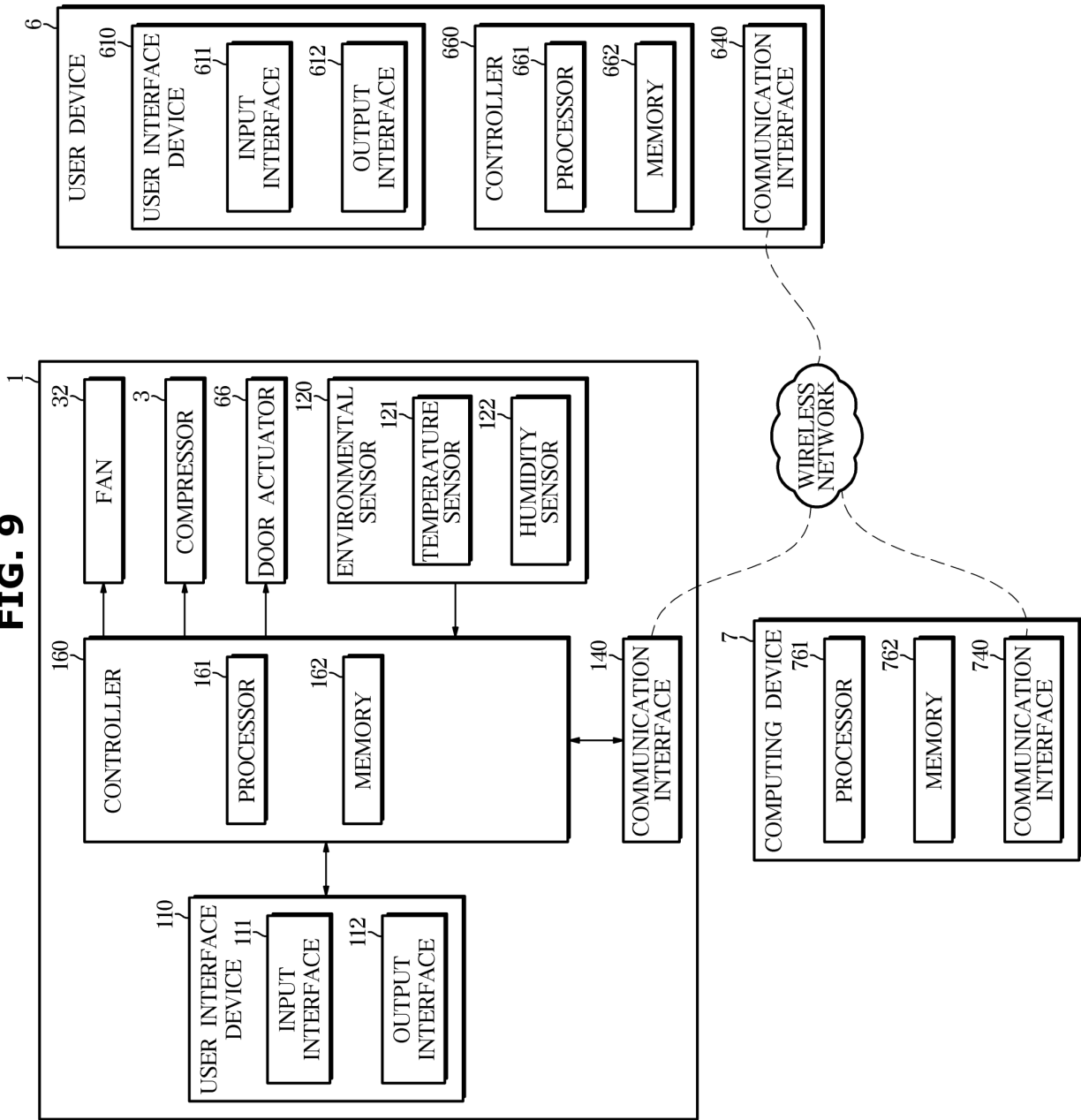


FIG. 10

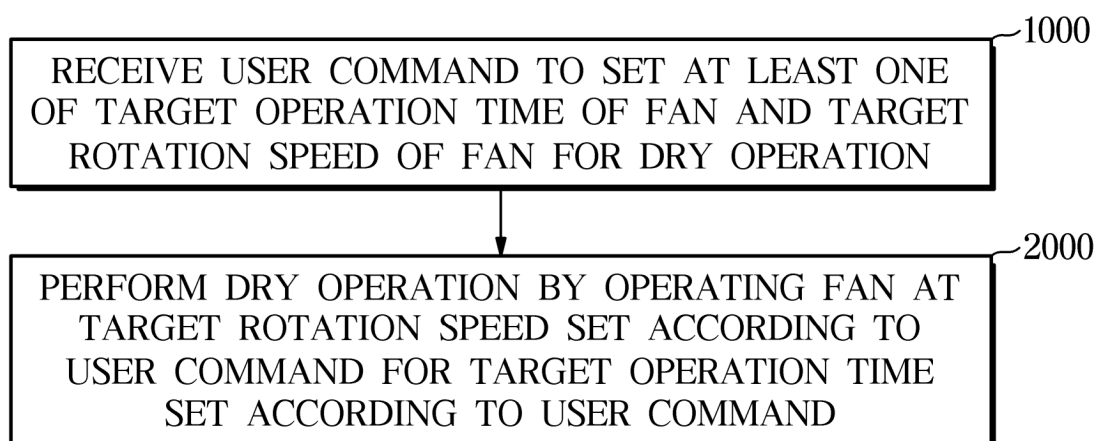


FIG. 11

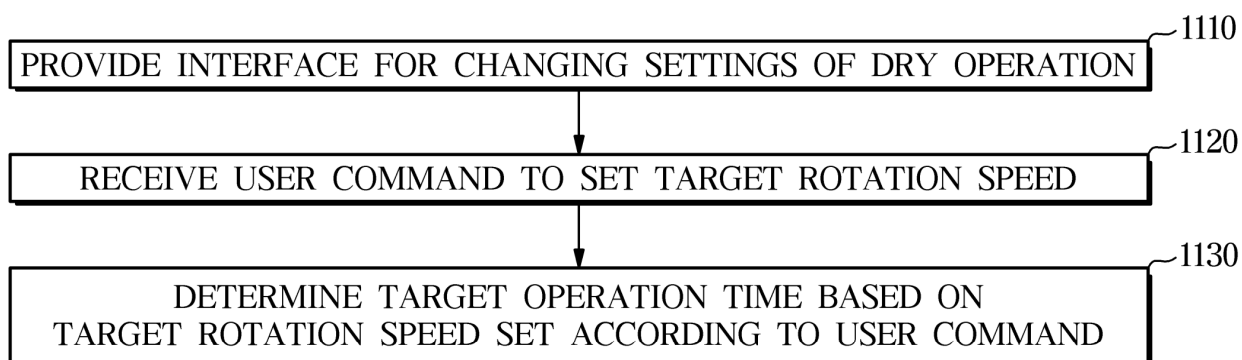


FIG. 12

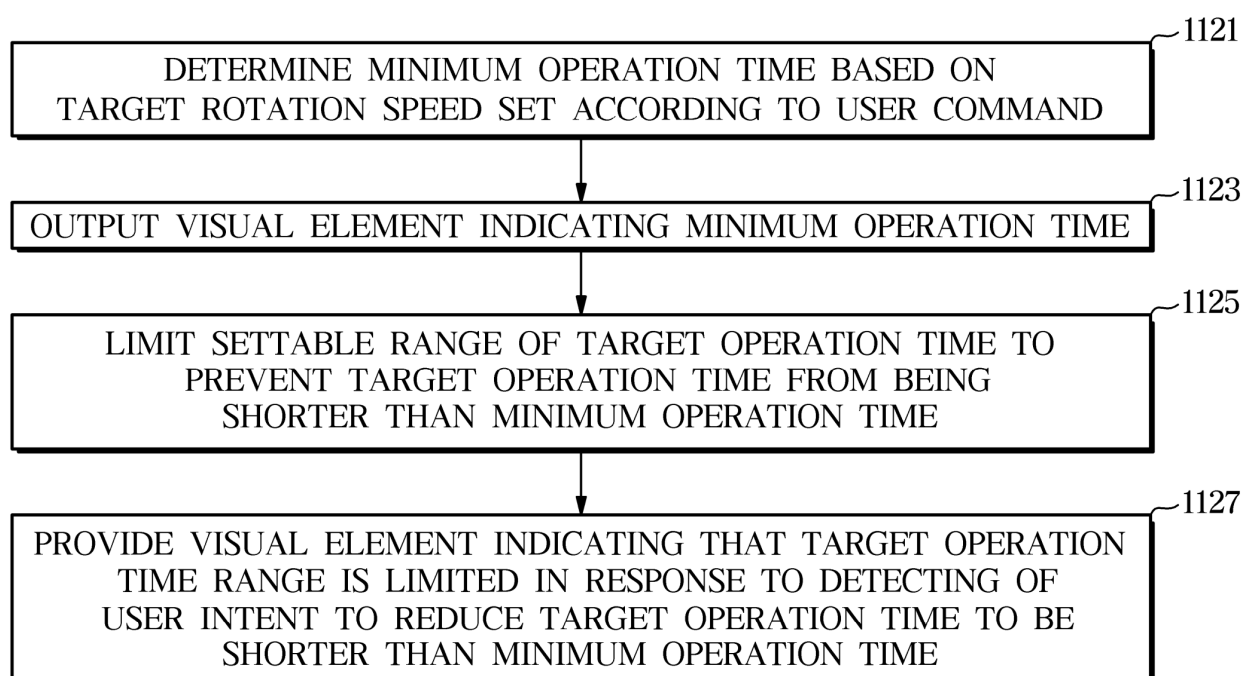


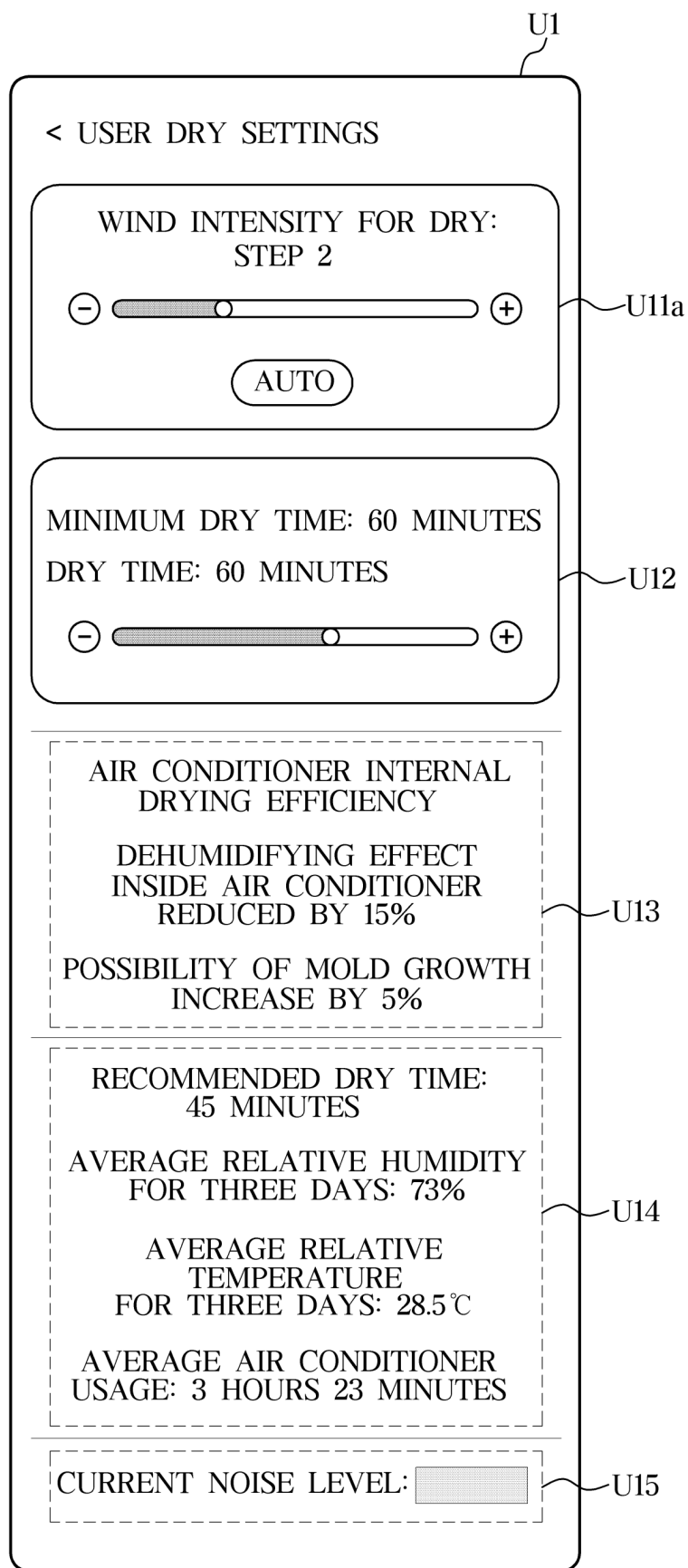
FIG. 13

FIG. 14

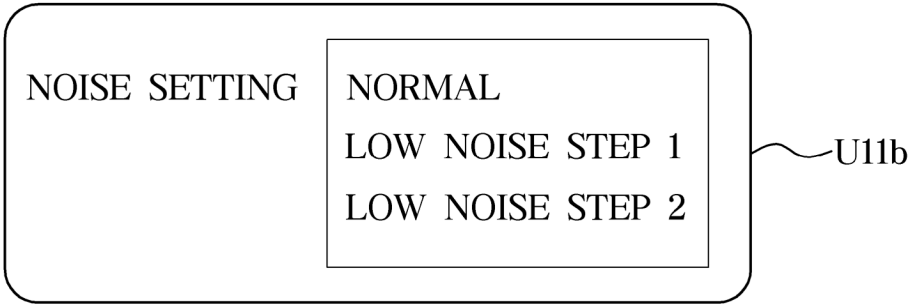


FIG. 15

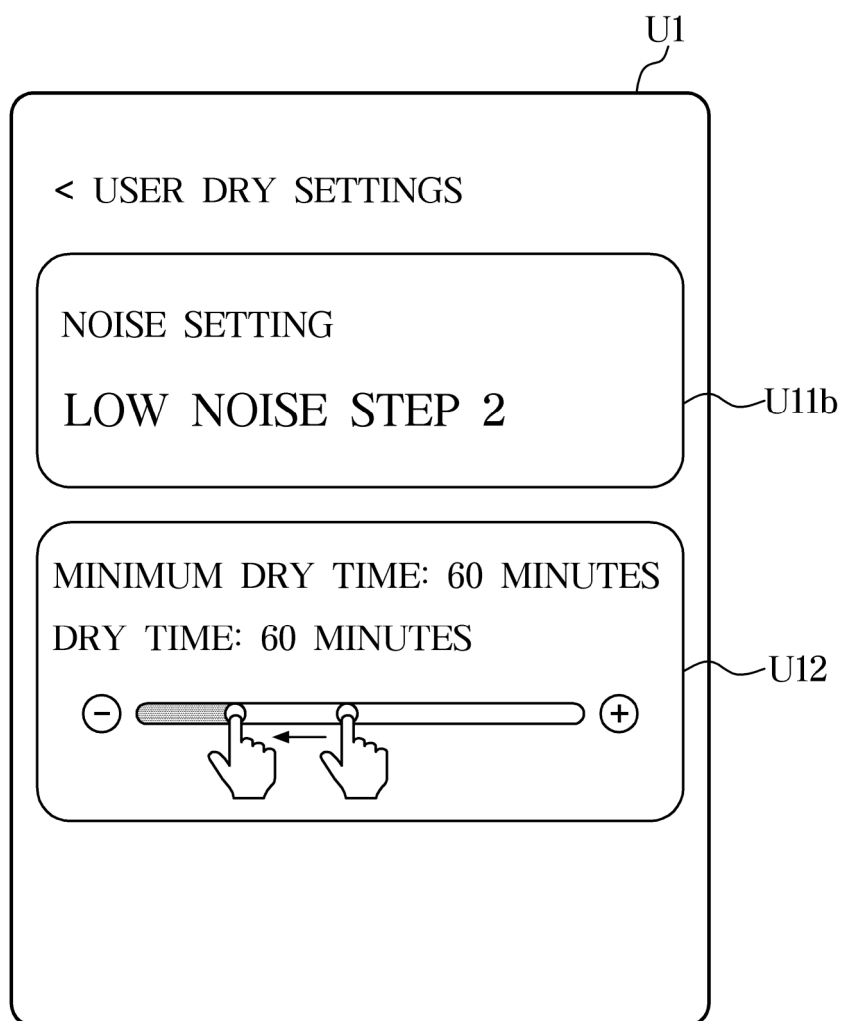


FIG. 16

< USER DRY SETTINGS

NOISE SETTING

LOW NOISE STEP 2

MINIMUM DRY TIME: 60 MINUTES

DRY TIME: 60 MINUTES

-

+

AIR CONDITIONER INTERNAL
DRYING EFFICIENCY

DEHUMIDIFYING EFFECT INSIDE AIR
CONDITIONER REDUCED BY 15%

POSSIBILITY OF MOLD GROWTH
INCREASE BY 5%

RECOMMENDED DRY TIME:
45 MINUTES

NOTIFICATION OF
LIMITED DRY TIME

MINIMUM DRY TIME IS LIMITED
TO MAINTAIN AIR CONDITIONER
PERFORMANCE

FROM LOW NOISE SETTING

CONFIRM

UT

FIG. 17

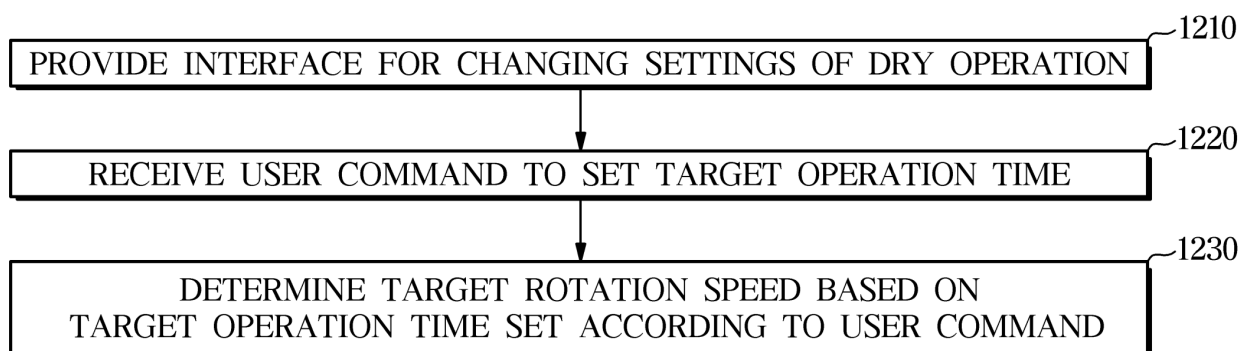


FIG. 18

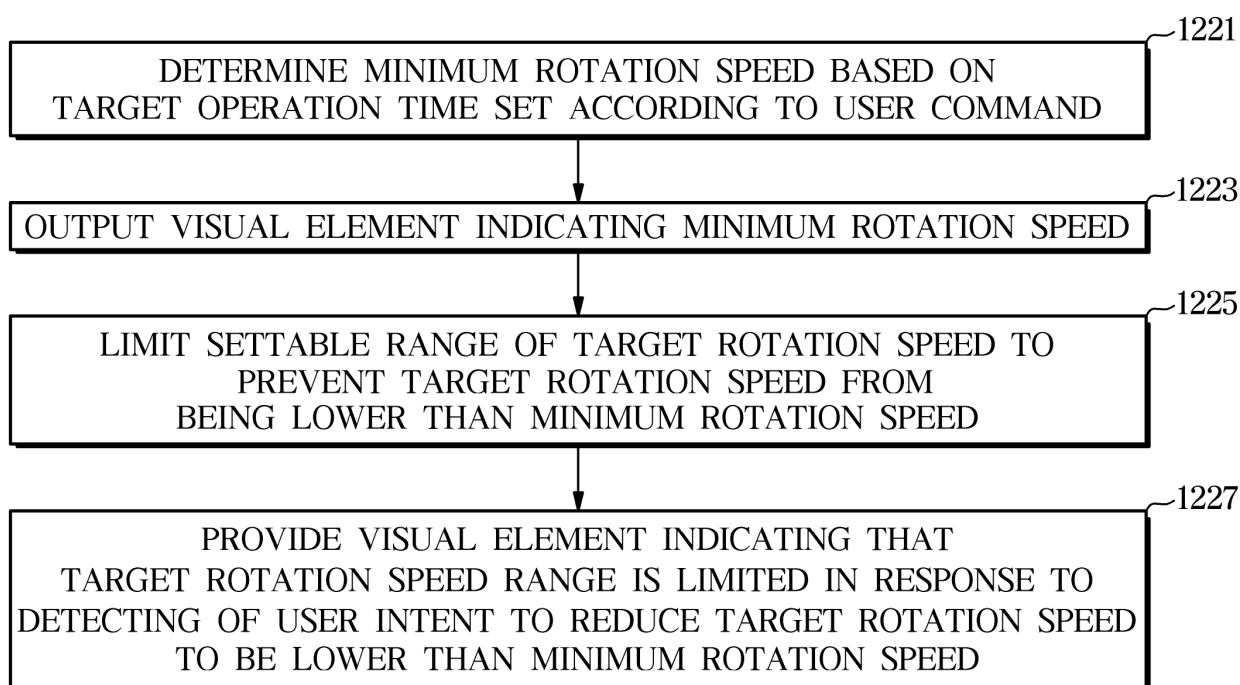


FIG. 19

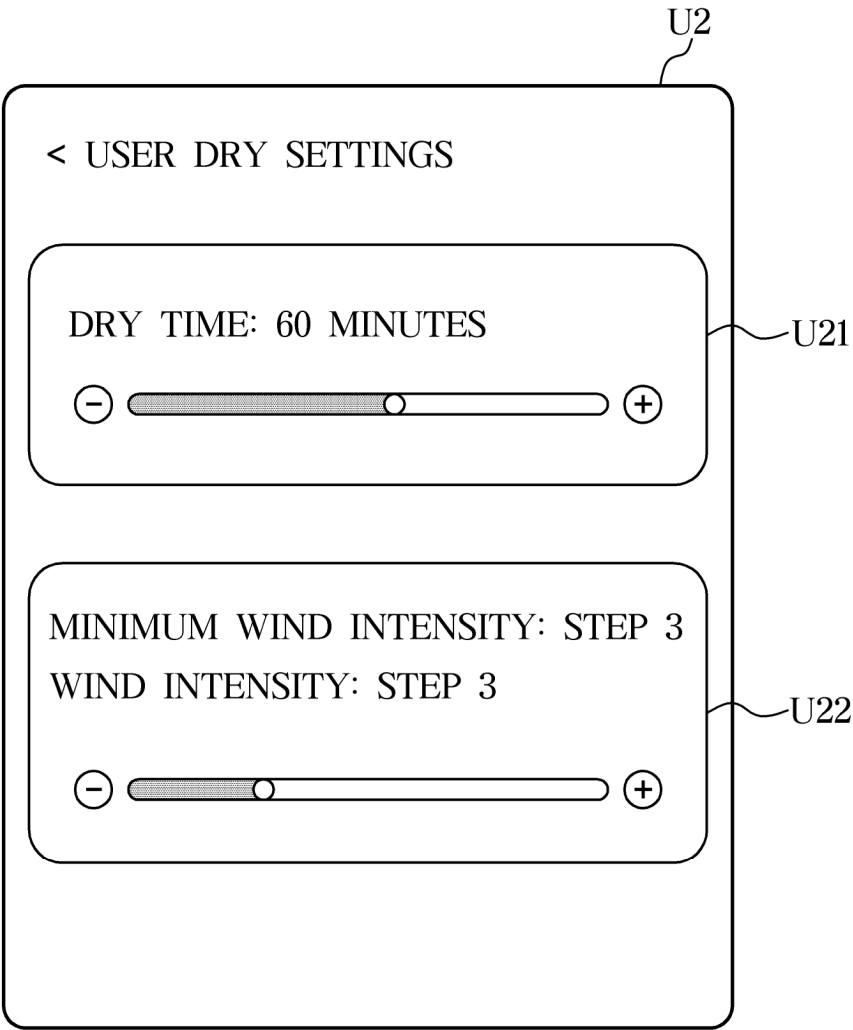


FIG. 20

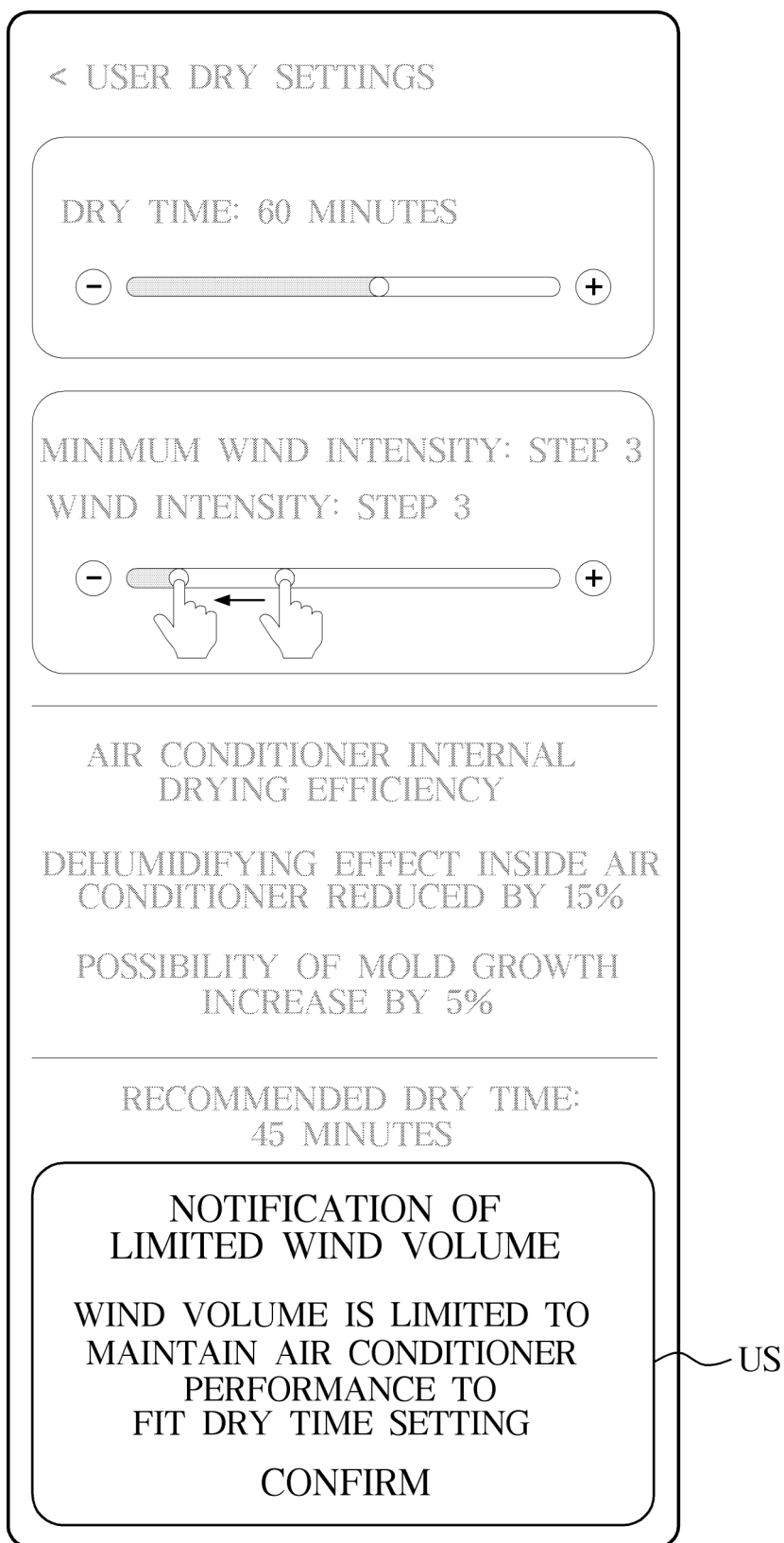


FIG. 21

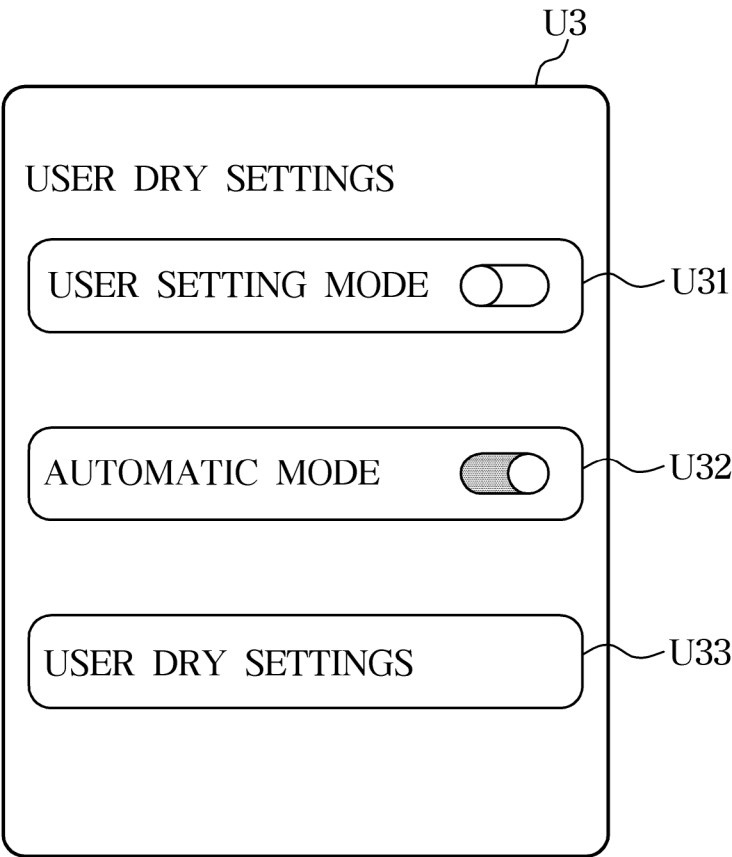
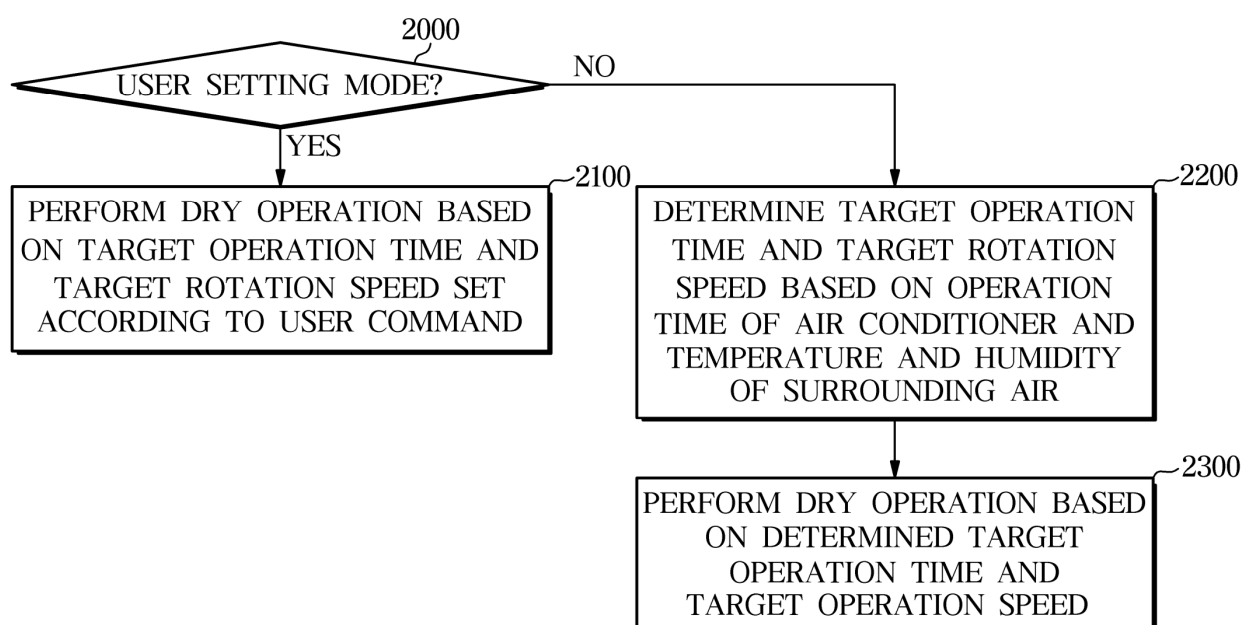


FIG. 22



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/015556

A. CLASSIFICATION OF SUBJECT MATTER

F24F 11/56(2018.01)i; F24F 11/61(2018.01)i; F24F 11/77(2018.01)i; F24F 11/52(2018.01)i; F24F 3/14(2006.01)i;
F24F 13/20(2006.01)i; F24F 110/10(2018.01)i; F24F 110/20(2018.01)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)

F24F 11/56(2018.01); F24F 1/0033(2019.01); F24F 11/00(2006.01); F24F 11/02(2006.01); F24F 11/65(2018.01);
F24F 11/77(2018.01); F24F 3/14(2006.01); G06N 3/02(2006.01)

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 공기 조화기(air conditioner), 건조(dry), 팬(fan), 시간(time), 속도(velocity), 소음
(noise)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2020-0062905 A (LG ELECTRONICS INC.) 04 June 2020 (2020-06-04) See paragraphs [0038], [0041]-[0043], [0047]-[0058], [0098] and [0106]-[0115], claim 1, and figures 1, 3 and 10.	1,4,12-15
Y		2-3,5-11
Y	KR 10-2023-0085701 A (SAMSUNG ELECTRONICS CO., LTD.) 14 June 2023 (2023-06-14) See paragraphs [0087]-[0092] and [0143]-[0149].	2-3,5-8,10-11
Y	JP 2002-156144 A (SANYO ELECTRIC CO., LTD.) 31 May 2002 (2002-05-31) See paragraph [0011] and figures 10-11.	8-9
A	KR 10-2022-0008427 A (SAMSUNG ELECTRONICS CO., LTD.) 21 January 2022 (2022-01-21) See paragraphs [0114]-[0117] and [0129]-[0151] and claims 1 and 5.	1-15

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

☒ See patent family annex.

* Special categories of cited documents:

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“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

12 February 2025

Date of mailing of the international search report

12 February 2025

Name and mailing address of the ISA/KR

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/015556

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2010-0093371 A (WINIAMANDO INC.) 25 August 2010 (2010-08-25) See paragraphs [0024]-[0051] and figures 2 and 4.	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2024/015556

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
KR	10-2020-0062905	A	04 June 2020	KR	10-2212216	B1	03 February 2021
KR	10-2023-0085701	A	14 June 2023	EP	4361520	A1	01 May 2024
				EP	4361520	A4	20 November 2024
				US	2023-0204230	A1	29 June 2023
				WO	2023-106627	A1	15 June 2023
JP	2002-156144	A	31 May 2002	None			
KR	10-2022-0008427	A	21 January 2022	US	2023-0093074	A1	23 March 2023
				WO	2022-014841	A1	20 January 2022
KR	10-2010-0093371	A	25 August 2010	None			