

- 1 -

Description

Title of Invention

HUMIDITY CONTROL DEVICE

5 Technical Field

[0001]

The present invention relates to a humidity control device having both a dehumidifying function and a humidifying function.

10

Background Art

[0002]

15

20

25

Conventionally, humidity control devices having both the dehumidifying function and the humidifying function have been provided and have also been commercially available. For example, Non-patent Literature 1 presents a humidity control device having a dehumidifying function, a humidifying function, and an air cleaning function and being capable of performing the following three operations: an air cleaning operation; a dehumidifying and air cleaning operation; and a humidifying and air cleaning operation. The air cleaning operation is an operation in which only air cleaning is performed. The dehumidifying and air cleaning operation is an operation in which air cleaning and dehumidification are performed simultaneously. The

- 2 -

humidifying and air cleaning operation is an operation in which air cleaning and humidification are performed simultaneously.

[0003]

5 Further, the humidity control device presented in Non-patent Literature 1 includes an automatic operation mode of switching between the humidifying and air cleaning operation and the dehumidifying and air cleaning operation to perform control to a humidity suitable for room
10 temperature. In the automatic operation mode, a temperature and a humidity in a space subjected to humidity control (hereinafter referred to as a humidity controlled space) are detected, and the humidifying and air cleaning operation, the dehumidifying and air cleaning operation, or the air cleaning
15 operation is selected accordingly to set a humidity in correspondence with a temperature in the humidity controlled space.

[0004]

20 Fig. 14 illustrates contents of a table for use in the operations performed in such an automatic operation mode, the table showing details of the operations performed according to a temperature and humidity. In the automatic operation mode, as illustrated in Fig. 14, the humidifying and air cleaning operation or the dehumidifying and air
25 cleaning operation is performed until a humidity reaches a

- 3 -

target humidity range. Then, when the target humidity range is reached, the air cleaning operation is performed.

[0005]

Patent Literature 1 discloses a humidity control device
5 in which a human detection sensor or an illuminance sensor determines whether a person is present, and in a case where a person is present, a change to the dehumidifying and air cleaning operation is not performed even when the humidity reaches a humidity at which dehumidification is to be
10 performed, and a change to the dehumidifying and air cleaning operation is performed after the person leaves.

Citation List

[Non-patent Literature]

15 [0006]

[Non-patent Literature 1]

Daikin Industries, Ltd., Date of search on the Internet:
March 9, 2016, URL: <http://www.daikinaircon.com/ca/cz/>

[Patent Literature]

20 [0007]

[Patent Literature 1]

Japanese Patent Application Publication *Tokukai* No.
2009-68802

25 Summary of Invention

Technical Problem

[0008]

The conventional humidity control device presented in Non-patent Literature 1 has a single table for use in the operations in the automatic operation mode and has a single target humidity range which is set in accordance with temperature and serves as a threshold to switch among the operations. However, in such a case, the target humidity range provides moderate humidification to achieve a balance between a moisturized space and prevention of condensation. Thus, the conventional humidity control device has the problem that it cannot perform comfort-oriented operations which vary according to the condition of the humidity controlled space.

[0009]

For example, in a case where the humidity controlled space is a living room, a dark condition where light is not on in the living room in the nighttime can be considered as a condition where a person is not present there. In this case, it is unlikely that humidification is required. Thus, a lower target humidity range is set in the dark condition than in the bright condition to minimize humidification. This makes it possible to more effectively prevent condensation. In the automatic operation mode of the conventional humidity control device, operations in the dark condition are

- 5 -

performed as in the bright condition. Therefore, it is impossible to more effectively prevent condensation.

[0010]

Further, in a living room, a bright condition in the daytime and a bright condition where light is on in the nighttime can be considered as conditions where a person is present there. In this case, active humidification is preferred in terms of measures against virus and others. Thus, it is preferable that the target humidity range in the bright condition be higher than that in the dark condition. In the automatic operation mode of the conventional humidity control device, operations in the bright condition are performed as in the dark condition. Therefore, it is impossible to more actively perform humidification.

[0011]

By employing the configuration presented in Non-patent Literature 1, it is possible to actively humidify air in a space where a person is present. Such an active humidification, however, cannot more effectively prevent condensation in a space where a person is not present in the nighttime.

[0012]

The present invention has been attained in view of the above problems, and it is an object of the present invention to provide a humidity control device capable of performing, in

- 6 -

an automatic operation mode, comfort-oriented operations which vary according to the condition of a humidity controlled space, in comparison with the conventional humidity control device.

5

Solution to Problem

[0013]

In order to solve the above problems, a humidity control device in accordance with an aspect of the present invention is a humidity control device for performing humidity control of a humidity controlled space which is a subject of humidity control, the humidity control device including: a humidifying section configured to humidify air; a dehumidifying section configured to dehumidify air; an air blower configured to blow air to the humidifying section and the dehumidifying section; and a control section configured to drive the humidifying section, the dehumidifying section, and the air blower so that a humidity of the humidity controlled space reaches one of a plurality of target humidity ranges which are set in accordance with temperature, the control section switching, for driving, among the plurality of target humidity ranges according to a condition of the humidity controlled space.

25

Advantageous Effects of Invention

[0014]

According to an aspect of the present invention, switching among the target humidity ranges can be performed according to the condition of the humidity controlled space. This yields the effect of providing a humidity control device capable of performing, in the automatic operation mode, comfort-oriented operations which vary according to the condition of the humidity controlled space, in comparison with the conventional humidity control device.

Brief Description of Drawings

[0015]

Fig. 1 is a perspective view illustrating an appearance of a humidity control device of Embodiment 1.

Fig. 2 is a longitudinal sectional view illustrating an internal configuration of the humidity control device.

Fig. 3 is a view illustrating air flow paths of air flowing in the humidity control device, wherein (a) of Fig. 3 illustrates an air flow path that does not pass through a dehumidifying section, (b) of Fig. 3 illustrates an air flow path that passes through the dehumidifying section.

Fig. 4 is an external view of an operation section in the humidity control device.

Fig. 5 is an external view of a display section in the

humidity control device.

Fig. 6 is a diagram schematically illustrating the configurations of a controller and of its peripheral sections in the humidity control device.

5 Fig. 7 is a view illustrating contents of a living room-use table (bright) used in the "set-and-forget automatic operation" of the humidity control device in the daytime and in a bright condition where the light is on in the nighttime, the table showing details of operations performed according
10 to a temperature and humidity.

 Fig. 8 is a view illustrating contents of a living room-use table (dark) used in the "set-and-forget automatic operation" of the humidity control device in a dark condition where the light is not on in the nighttime, the table showing
15 details of operations performed according to a temperature and humidity.

 Fig. 9 is a flowchart of a subroutine of table selection (switching), which subroutine is incorporated into a main flow of the "set-and-forget automatic operation" of the
20 humidity control device.

 Fig. 10 is a view illustrating contents of a bedroom-use table (bright) used in a humidity control device of another Embodiment in the daytime and in a bright condition where the light is on in the nighttime, the table showing details of
25 operations performed according to a temperature and

humidity.

Fig. 11 is a view illustrating contents of a bedroom-use table (dark) used in the "set-and-forget automatic operation" of the humidity control device in Fig. 10 in a dark condition where the light is not on in the nighttime, the table showing details of operations performed according to a temperature and humidity.

Fig. 12 is a diagram schematically illustrating the configurations of a controller and of its peripheral sections in a humidity control device of another Embodiment.

Fig. 13 is a diagram schematically illustrating the configurations of a controller and of its peripheral sections in a humidity control device of still another Embodiment.

Fig. 14 a view illustrating contents of a table used in the operations performed in an automatic operation mode of the conventional humidity control device, the table showing details of the operations performed according to a temperature and humidity.

Description of Embodiments

[0016]

[Embodiment 1]

The following description will discuss an embodiment of the present invention with reference to the drawings.

[0017]

- 10 -

Fig. 1 is a perspective view illustrating an appearance of a humidity control device A of Embodiment 1. Fig. 2 is a longitudinal sectional view illustrating an internal configuration of the humidity control device illustrated in Fig. 1. The following description assumes that the state illustrated in Fig. 1 is a usage state of the humidity control device A and assumes that a front surface of the humidity control device A is on a left side of the paper sheet of Fig. 1, and a rear surface thereof is on a right side of the paper sheet of Fig. 1.

[0018]

The humidity control device A is a device that draws in an ambient air around the humidity control device A and includes an air cleaning function of removing a foreign matter, such as dust particles, contained in the air, a dehumidifying function of removing moisture contained in the air, and a humidifying function of increasing humidity of the air.

[0019]

The humidity control device A includes, as illustrated in Fig. 1, a housing 1, which is an exterior component, and includes, as illustrated in Fig. 2, an air blower 2, an air cleaning filter 3, a dehumidifying section 4, a humidifying section 5, a controller (control section) 30, and other components inside the housing 1.

- 11 -

[0020]

Referring back to Fig. 1, the housing 1 includes a case 11, a front cover 12, and a rear cover 13. The case 11 is a component shaped like a box and having a space inside of it. Examples of the case 11 include, but are not limited to, a case made of, for example, a sheet metal, a synthetic resin, or other material. The case 11 has an opening (not illustrated) in its front surface and an opening (not illustrated) in its rear surface. A front cover 12 is detachably fit into the opening in the front surface of the case 11, and a rear cover 13 is detachably fit into the opening in the rear surface of the case 11.

[0021]

The rear cover 13 has an inlet 16 provided therein, and an outlet 15A is provided in an upper surface of the case 11, and an outlet 15B is provided in an upper area of the front cover 12 of the case 11. Air drawn in through the inlet 16 is subjected to removal of a foreign matter such as dust particles. After that, the air is humidified or dehumidified as necessary and is then discharged through the outlets 15A and 15B. The outlet 15A is provided with a blowout louver 14 for adjusting a direction in which air is discharged.

[0022]

Further, the case 11 has a display section 19 (described later) provided above the outlet 15B and also has

- 12 -

an operation section 18 (described later) which is provided on the upper surface of the case 11 so as to be closer to the front surface of the humidity control device A than the outlet 15A.
[0023]

5 As illustrated in Fig. 2, the air cleaning filter 3 is positioned inside the rear cover 13 in the opening in the rear surface of the case 11. The air having passed through the inlet 16, which is provided in the rear cover 13, is drawn in through the air cleaning filter 3. The air cleaning filter 3 is a
10 filter that serves to trap a foreign matter, such as microscopic dust particles and dust, in the passing air. Examples of the air cleaning filter 3 include, but are not limited to, a high efficiency particulate air (HEPA) filter formed of a nonwoven fabric into the form of a paper sheet.

15 [0024]

 The air blower 2 includes a dual blade fan 21, a fan case 22, a fan motor 23, and a duct 24. The dual blade fan 21 as used herein is a fan that lets out air in a centrifugal direction and rotates to draw in air from a central portion
20 and produce an air current flown outward. As an alternative to the dual blade fan 21, a turbofan or a high-pressure axial flow fan can be used.

[0025]

 The dual blade fan 21 is rotatably positioned inside the
25 fan case 22. The fan case 22 is coupled to the duct 24 and is

- 13 -

arranged so as to be able to discharge, toward the duct 24, an air current produced in a circumferential direction of the dual blade fan 21. The fan case 22 includes a heat exchanger-side air inlet 25A and a humidifying section-side
5 air inlet 25B.

[0026]

The dual blade fan 21 is attached to an output shaft of the fan motor 23. The fan motor 23 is fixed to the fan case 22 and is rotated with rotation of the fan motor 23. The duct 24
10 guides an air current produced by rotation of the dual blade fan 21 so that the air current enter the outlets 15A and 15B.

[0027]

In the duct 24, an ion generator 38 for causing an air current to contain ions is positioned. The ion generator 38
15 causes an atmospheric discharge to generate ions. The ion generator 38 is preferably configured to generate positive ions $H^+(H_2O)_m$ (m is a given natural number) and negative ions $O_2^-(H_2O)_n$ (n is a given natural number). In this case, the positive and negative ions adhere onto surfaces of airborne
20 bacteria or viruses in the air and react so that active species OH radicals ($\cdot OH$) and hydrogen peroxide (H_2O_2) are produced at the surfaces and thus exert their effect such as sterilization.

[0028]

25 The dehumidifying section 4 includes an evaporator 41,

- 14 -

a condenser 42, a dehumidification tray 43, and a dehumidification tank 44. The dehumidifying section 4 causes moisture contained in the air to condense through cooling of an air current passing through the dehumidifying section 4, thereby removing the moisture contained in the air (performing dehumidification). The dehumidifying section 4 includes a refrigerating cycle device that circulates a coolant and cools air through a change in the phase of the coolant. The refrigerating cycle device includes not only the evaporator 41 and the condenser 42, but also a compressor, an expander, and others (not illustrated).

[0029]

The evaporator 41 and the condenser 42 are each a heat exchanger. Examples of the heat exchanger include, but are not limited to, a heat exchanger using a fin and a tube. The dehumidifying section 4 is positioned on the front-surface side so as to be close to the air blower 2. When the air blower 2 is driven to cause the fan case 22 to draw in air through the heat exchanger-side air inlet 25A and then send the air out of the duct 24, an air current is produced flowing through a space between the fin of the evaporator 41 and the fin of the condenser 42 in the dehumidifying section 4.

[0030]

The evaporator 41 cools an air current, i.e., air,

- 15 -

whereas the condenser 42 warms the air current. Thus, in the dehumidifying section 4, the evaporator 41 is positioned upstream from the air current so as to cool the air current and condense moisture in the air. Then, the condenser 42
5 warms the air current having been cooled by the evaporator 41 by heat exchange with a high-temperature coolant to raise the temperature of the air current to a temperature higher than or equal to a temperature of the air current at the entry into the evaporator 41. On this account, in the dehumidifying
10 section 4, the evaporator 41 is positioned more upstream from the air current than the condenser 42.

[0031]

The dehumidification tray 43, which is a container positioned under the evaporator 41, is a receiving pan for
15 receiving condensed water caused by condensation on the surface of the evaporator 41. The water received by the dehumidification tray 43 is conveyed through a pipe (not illustrated) to the dehumidification tank 44. The dehumidification tank 44 is a container that is provided in
20 the case 11 so as to be able to slide out.

[0032]

The dehumidification tank 44 is capable of detecting the amount or level of an accumulated drain water. In the humidity control device A, when a certain amount of drain
25 water is accumulated in the dehumidification tank 44, an

- 16 -

alert is given, and at least the dehumidifying section 4 of the humidity control device A is stopped. When the user, in response to the alert, detaches the dehumidification tank 44 and drains the accumulated drain water, the dehumidifying function is enabled again. In Embodiment 1, a refrigeration cycle is used to perform dehumidification. This, however, is not the only way to perform dehumidification. Alternatively, a dehumidifying section using, for example, a desiccant which adsorbs moisture in the air can be used.

[0033]

The humidifying section 5 includes a humidification rotor 51, a humidifying section motor 52, a humidification tray 53, a humidification filter 54, a humidification tank 55, and an antibacterial agent 56. The humidification rotor 51 is configured to hold the humidification filter 54 in its circular support frame that has a cylindrical part and a support part, wherein the cylindrical part forms an outer circumferential part of the support frame, and the support part is provided inside the cylindrical part. The humidification rotor 51 is rotatably supported in the case 11. The humidification rotor 51 is rotated by an axial force which is outputted from the humidifying section motor 52 and is then transferred via a driving force transfer mechanism. The humidification rotor 51 and the humidification tray 53 are positioned such that a lower portion of the humidification rotor 51 passes inside the

- 17 -

humidification tray 53. The humidification filter 54 is a filter component that is formed of a water-absorbing material into the form of a corrugated cardboard. When the humidification rotor 51 is rotated, water retained in the humidification tray 53 is distributed throughout the humidification filter 54. In this way, water is supplied to the humidification filter 54.

[0034]

The humidification filter 54 includes a component that has countless pores, such as a nonwoven fabric, so that water is distributed throughout the humidification filter 54 by a capillary action. Note that the humidification tray 53 and the humidification tank 55 are connected to each other via a pipe, which is used to add water from the humidification tank 55 to the humidification tray 53 so that water is retained in the humidification tray 53 in a certain amount or larger or in a certain water level or higher.

[0035]

Alternatively, the humidification rotor 51 can be arranged to include a non-water-absorbing portion. This arrangement allows supply of water from the humidification tray 53 to be stopped by a halt of rotation in a state in which the non-water-absorbing portion is immersed in the humidification tray 53. Since no additional water is supplied except for water having already been contained in the humidification rotor 51, it is possible to avoid humidification

- 18 -

from being performed after the humidification rotor 51 becomes dry.

[0036]

The humidifying section 5 is provided in the housing 1 so as to be closer to a rear surface side than the dehumidifying section 4 with respect to the air blower 2. When the air blower 2 is driven to cause the fan case 22 to draw in air through the humidifying section-side air inlet 25B, an air current is produced to flow through the inside of the cylindrical part in the humidification rotor 51 in the axial direction. The humidification filter 54 is positioned in the cylindrical part, and the humidification filter 54 retaining water supplies water to the air current, that is, the humidification filter 54 retaining water humidifies a flowing air. Note that the position of the humidifying section 5 is so adjusted as to cause an air current flowing through the humidification rotor 51 to pass through the humidification filter 54 retaining water during humidifying operation.

[0037]

In the humidity control device A, the humidifying section 5 is arranged such that the rotation of the humidification rotor 51 causes the humidification filter 54 to contact water retained in the humidification tray 53 so that water is distributed by a capillary action. The arrangement of the humidifying section 5, however, is not limited to such an

- 19 -

arrangement. For example, the humidifying section 5 can alternatively have a structure such that a bucket provided around the perimeter of the humidification rotor 51 scoops water by rotation, and the scooped water is flown to the humidification filter 54 from the top.

[0038]

The antibacterial agent 56 serves to prevent deterioration of water accumulated in the humidification tray 53 and/or the humidification tank 55. Alternatively, the humidifying section 5 can include, instead of the antimicrobial agent 56 as a chemical agent, for example, a function of removing bacteria with use of antibacterial metal ions or a function of removing bacteria by electrolysis.

[0039]

Further, the humidifying section 5 can be arranged to further include a heater (not illustrated) for generating a high-temperature air, in connection with the humidification rotor 51.

[0040]

The controller 30 is provided in the housing 1 and serves to control individual sections of the humidity control device A. Although details will be described later, the controller 30 generates a control signal corresponding to a user operation accepted by the operation section 18, and controls an operation of each section based on the generated

control signal.

[0041]

Fig. 3 is a view illustrating air flow paths of air flowing in the humidity control device A, wherein (a) of Fig. 3 illustrates an air flow path that does not pass through the dehumidifying section 4, (b) of Fig. 3 illustrates an air flow path that passes through the dehumidifying section 4. The humidity control device A is capable of switching among the following three operations: (i) an operation in which only air cleaning is performed while the dehumidifying section 4 and the humidifying section 5 are stopped; (ii) an operation in which air cleaning and dehumidification are performed with only the dehumidifying section 4 brought into operation; and (iii) an operation in which air cleaning and humidification are performed with only the humidifying section 5 brought into operation.

[0042]

As illustrated in (a) and (b) of Fig. 3, when the air blower 2 is driven, air is taken in through the inlet 16, passes through the air cleaning filter 3, and then passes through the humidifying section 5. A portion of the air having passed through the humidifying section 5 enters the air blower 2 through the section-side air inlet 25B along an air flow path R1 and is then discharged through the outlets 15A and 15B. On the other hand, another portion of the air having passed

- 21 -

through the humidifying section 5 circles around an outer circumference of the air blower 2 on reach the front-surface side along an air flow path R2, enters the air blower 2 through the heat exchanger-side air inlet 25A, and is then
5 discharged through the outlets 15A and 15B.

[0043]

During the air cleaning operation, both the dehumidifying section 4 and the humidifying section 5 are stopped. Thus, the air taken in through the inlet 16 is just
10 subjected to trapping of a foreign matter by the air cleaning filter 3. During the dehumidification, only the dehumidifying section 4 is driven. Thus, of air having been taken in through the inlet 16 and subjected to trapping of a foreign matter by the air cleaning filter 3, some air passing along the air flow
15 path R2 is dehumidified by passing through the driven dehumidifying section 4. During the humidification, only the humidifying section 5 is driven. Air having been taken in through the inlet 16 and subjected to trapping of a foreign matter by the air cleaning filter 3 is humidified by passing
20 through the driven humidifying section 5. Some of the humidified air passes through the dehumidifying section 4 along the air flow path R2, but is not dehumidified because the dehumidifying section 4 is stopped.

[0044]

25 Fig. 4 is an external view of the operation section 18 in

- 22 -

the humidity control device A. As illustrated in Fig. 4, the operation section 18 includes: a set-and-forget automatic button 18A to be manipulated to select "set-and-forget automatic operation (automatic operation mode)"; an operation button 18B for switching power on and off; a button 18C for instructing to perform a single operation, i.e., humidification or dehumidification; a button 18D for switching among the operations; a button 18E for switching an airflow rate; a button 18F for switching a swing angle of the blowout louver 14; a button 18G for setting a timer; and a button 18H to be manipulated to dry the inside of the humidity control device A.

[0045]

Further, the operation section 18 includes indicators which each go on and out in response to manipulations of the above-described corresponding buttons. Specifically, the operation section 18 includes: an indicator 18a, corresponding to the set-and-forget automatic button 18A, for blinking to make a notification of whether the "set-and-forget automatic operation has been effected through a manipulation of the set-and-forget automatic button 18A; and an indicator 18b, corresponding to the operation button 18B, for going on to make a notification of an operating status corresponding to a manipulation of the operation button 18B. The operation section 18 further

- 23 -

includes: indicators 18c, 18d, 18e, 18f, 18g, and 18h, corresponding to the above-described buttons 18C, 18D, 18E, 18F, 18G, and 18H, respectively, for each going on to make a notification of an operating status and information which have been set through a manipulation of the corresponding button. The indicators 18a to 18h are each constituted by, for example, light emitting diodes (LEDs) provided near the corresponding buttons.

[0046]

Fig. 5 is an external view of the display section 19 in the humidity control device A illustrated in Fig. 1. The display section 19 includes: an area 19A for displaying a measured current humidity; an area 19B for displaying information indicating that ions are being released by the ion generator 38; an area 19C for displaying information indicating that the humidifying and air cleaning operation is being performed; an area 19D for displaying information indicating that the dehumidifying and air cleaning operation is being performed; and an area 19E for indicating cleanliness of ambient air by, for example, a change in color displayed in the area 19E. Displays of information in the areas 19A to 19E are each provided by turning the LEDs on and off.

[0047]

Fig. 6 is a diagram schematically illustrating the

- 24 -

configurations of the controller 30 and of its peripheral sections in the humidity control device A illustrated in Fig. 1. The controller 30 is an example of the control section for controlling the humidity control device A. The controller 30 includes a central processing unit (CPU) 31, a timer 32 for measuring time intervals, a memory 33 composed of volatile and nonvolatile storage devices, an input/output interface 31A for performing input/output from/to external sections, and an external interface 31B.

[0048]

The controller 30 connects the operation section 18 and the output section 17 via the input/output interface 31A. The output section 17 includes the display section 19 and an audio output section (not illustrated). The controller 30 is connected, via the external interface 31B, to a humidification driving section 61 for driving the humidification rotor 51, a fan driving section 63 for driving the dual blade fan 21, a dehumidification driving section 62 for driving a compressor (not illustrated) of the dehumidifying section 4, and a louver driving section 64 for adjusting the opening and closing of the blowout louver 14 and an inclination angle of the blowout louver 14.

[0049]

The humidification driving section 61 includes a humidifying-section motor 52 for rotating the humidification

- 25 -

rotor 51. The CPU 31 controls the humidifying-section motor 52 with use of a control signal, thereby controlling a rotation direction of the humidification rotor 51 and a rotation speed (the number of revolutions) of the humidification rotor 51.

5 The fan driving section 63 includes a fan motor 23 for rotating the dual blade fan 21. The CPU 31 controls the fan motor 23 based on a control signal, thereby changing a rotation speed (the number of revolutions) of the dual blade fan 21 and a rotation direction of the dual blade fan 21 to
10 adjust the volume of air blown.

[0050]

The dehumidification driving section 62 includes a compressor motor (not illustrated) for controlling the delivery rate of a coolant for use in heat exchange. When the
15 CPU31 controls a rotational or reciprocating motion of the compressor motor by a control signal, the CPU31 changes the delivery rate of the coolant to adjust the amount of dehumidification. The louver driving section 64 includes a stepping motor for driving the blowout louver 14. By
20 controlling the direction of rotation of the stepping motor and the amount of rotation of the stepping motor by a control signal, the CPU31 changes the degree of opening of the blowout louver 14 and the inclination angle of the blowout louver 14 to adjust the volume of air blown and direction in
25 which air is blown.

[0051]

The CPU 31 of the controller 30 is further connected to the ion generator 38 via the external interface 31B. The CPU 31 controls the ion generator 38 so that the ion generator 38 generates predetermined types of ions for air cleaning.

[0052]

The CPU 31 is further connected, via the external interface 31B, to a humidity sensor 36 for detecting a humidity (humidity of the humidity controlled space) of an area surrounding the humidity control device A; a temperature sensor 35 for detecting an ambient temperature (temperature of the humidity controlled space); an illuminance sensor 37 for detecting an ambient brightness (brightness of the humidity controlled space); and an odor sensor 34 for detecting the degree of pollution of surrounding air. The illuminance sensor 37 is an example of a "brightness sensor". The odor sensor 34 is an example of a "cleanness sensor" for detecting the degree of pollution of surrounding air. In order to detect the pollution of the surrounding air, a dust sensor can be used in place of the odor sensor 34, or both the odor sensor 34 and the dust sensor can be used.

[0053]

In the "set-and-forget automatic operation", the CPU 31 detects a temperature and humidity of the humidity controlled space and switches among the humidifying and air

- 27 -

cleaning operation, the dehumidifying and air cleaning operation, and the air cleaning operation so that the humidity of the humidity controlled space is set to a humidity corresponding to the temperature of the humidity controlled space. Specifically, the humidifying and air cleaning operation or the dehumidifying and air cleaning operation is performed so that the humidity of the humidity controlled space reaches a target humidity range, which is set in accordance with temperature of the humidity controlled space, and when the target humidity range is reached, the air cleaning operation is performed.

[0054]

Then, the humidity control device A is configured such that in the "set-and-forget automatic operation", the CPU 31 switches between target humidity ranges, which serve as thresholds to switch among the humidifying and air cleaning operation, the dehumidifying and air cleaning operation, and the air cleaning operation, according to the condition of the humidity controlled space.

[0055]

Specifically, the CPU 31 switches between tables for use in the "set-and-forget automatic operation" according to the condition of the humidity controlled space. The humidity control device A of Embodiment 1 can be used in a living room under the assumption that the humidity controlled space is a

- 28 -

living room. Thus, the humidity control device A uses a plurality of tables which include different target humidity ranges suited for a living room, that is, the humidity control device A here uses two tables illustrated in Figs. 7 and 8.

5 [0056]

Figs. 7 and 8 illustrate contents of the tables suitable for the "set-and-forget automatic operation" in the living room, each of the tables showing details of operations performed according to a temperature and humidity. In
10 Embodiment 1, the CPU 31 uses, as one of parameters indicating the condition of the living room, an illuminance detected by the illuminance sensor 37 and then selects one of the tables illustrated in Figs. 7 and 8 according to the illuminance. The CPU 31 performs the humidifying and air
15 cleaning operation or the dehumidifying and air cleaning operation according to the selected table until the humidity detected by the humidity sensor 36 reaches the corresponding target humidity range. When the detected humidity reaches the corresponding target humidity range,
20 the air cleaning operation is performed. Note that the tables illustrated in Figs. 7 and 8 are previously stored in the memory 33 of the humidity control device A.

[0057]

Fig. 7 is a view illustrating a table (bright) selected in
25 the daytime and in a bright condition where the light is on in

- 29 -

the nighttime. In the living room, a bright condition can be considered as a condition where a person is present there. Thus, the target humidity range relative to temperatures in the table illustrated in Fig. 7 is set to be higher than that in the aforementioned table presented in Non-patent Literature 1 (see Fig. 14) and indicated by dots in Fig. 7, so that humidification is performed actively.

[0058]

Particularly, in a temperature range of 18°C to 24°C, which are temperatures which are often set as a set temperatures for cooling and heating, humidification is performed until the humidity reaches 60%, and dehumidification is performed so that the humidity does not fall below 75%. Thus, in the temperature range of 18°C to 24°C, humidification is performed more actively in comparison with the humidity control device presented in Non-patent Literature 1. This allows the humidity control device A to effectively prevent virus infection.

[0059]

Fig. 8 is a view illustrating a table (dark) selected in a dark condition where the light is not on in the nighttime. In the living room, such a dark condition can be considered as a condition where a person is not present there. Thus, the target humidity range relative to temperatures in the table illustrated in Fig. 8 is set to be lower than that in the

aforementioned table presented in Non-patent Literature 1 (see Fig. 14) and indicated by dots in Fig. 8, so that dehumidification is performed actively to effectively prevent condensation.

5 [0060]

Particularly, in a temperature range of lower than 18°C, within which condensation tends to occur in winter, humidification is performed until the humidity reaches 35% or 45%, and dehumidification is performed until the humidity
10 reaches 60% or 70%. This allows the humidity control device A to more effectively prevent condensation in the temperature range of lower than 18°C in comparison with the humidity control device presented in Non-patent Literature 1.

[0061]

15 Further, in a temperature range of not lower than 18°C, which requires a measure against mold and a measure for indoor laundry drying through the time from the rainy season to autumn, humidification is performed until the humidity reaches 30%, and dehumidification is performed at
20 temperatures not lower than 18°C until the humidity reaches 50%. This allows the humidity control device A to provide an environment which is less likely to grow mold in the temperature range of not lower than 18°C and is more suitable for indoor laundry drying in an available room, in
25 comparison with the humidity control device presented in

- 31 -

Non-patent Literature 1.

[0062]

Fig. 9 is a flowchart of a subroutine of table selection (switching), which subroutine is incorporated into a main flow of the "set-and-forget automatic operation". A program corresponding to the flowchart in Fig. 9 is previously stored in the memory 33 so that the CPU 31 reads the program from the memory 33 to execute the corresponding processing.

[0063]

As shown in Fig. 9, the CPU 31 determines whether the living room is bright on the basis of a detection result obtained by the illuminance sensor 37 (S1). In a case where the CPU 31 determines that the living room is bright, the CPU 31 proceeds to S2 to select the table (bright) illustrated in Fig. 7, which table is suitable for a bright condition. On the other hand, in S1, when the CPU 31 determines that the living room is not bright, the CPU 31 proceeds to S3 to select the table (dark) illustrated in Fig. 8, which table is suitable for a dark condition. After the CPU 31 selects the table corresponding to the brightness in S2 or S3, the process returns to the main flow in the "set-and-forget automatic operation". The main flow is designed to have steps from which the process enters the subroutine of the table selection as necessary.

[0064]

As discussed above, the humidity control device A of Embodiment 1 includes a plurality of tables (two tables here) for the "set-and-forget automatic operation", wherein the tables have different target humidity ranges, which serve as
5 thresholds to switch among the humidifying and air cleaning operation, the dehumidifying and air cleaning operation, and the air cleaning operation, and switching among the tables is performed on the basis of the detection result obtained by the illuminance sensor 37 as one of the parameters indicating
10 the condition of the living room.

[0065]

In the living room, a dark condition can be considered as a condition where a person is not present there in the nighttime. Thus, in such a condition, the living room-use
15 table (dark) suitable for a space where a person is not present in the nighttime is selected so that humidification is minimized to prevent condensation. This makes it possible to more effectively prevent condensation.

[0066]

20 Further, in the living room, a bright condition can be considered as a condition in the daytime or a condition where a person is present in a lighted living room in the nighttime. Thus, in such a condition, the living room-use table (bright) suitable for a space where a person is present in the daytime
25 is selected so that humidification can be actively performed.

- 33 -

This makes it possible to provide a humidified space which can more effectively prevent virus infection.

[0067]

5 This configuration allows the humidity control device A to perform, in the "set-and-forget automatic operation", comfort-oriented operations which vary according to the level of brightness of the humidity controlled space, in comparison with the conventional configuration in which there is the only one table having a target humidity range which is fixed
10 irrespective of the condition of the humidity controlled space.

[0068]

Since the humidity control device A includes the air cleaning filter 3 through which air drawn in through the inlet
15 16 always passes, the humidity control device A switches among the humidifying and air cleaning operation, the dehumidifying and air cleaning operation, and the air cleaning operation. However, a humidity control device configured not to include the air cleaning filter 3 will switch
20 among a humidifying operation, a dehumidifying operation, and an air blowing operation.

[0069]

[Embodiment 2]

The following description will discuss another
25 embodiment of the present invention with reference to Figs.

10 and 11. For convenience, members having functions identical to those described in the foregoing embodiment are given the same reference numerals, and the descriptions of such members are omitted.

5 [0070]

The above-described humidity control device A of Embodiment 1 is the one for use in a living room and has the living room-use table (bright) and the living room-use table (dark). In contrast, a humidity control device A of Embodiment 2 is the one for use in a bedroom and has a bedroom-use table (bright) and a bedroom-use table (dark). This is the only difference between the humidity control device A of Embodiment 1 and the humidity control device A of Embodiment 2.

15 [0071]

Figs. 10 and 11 illustrate contents of the tables suitable for the "set-and-forget automatic operation" in the living room, each of the tables showing details of operations performed according to a temperature and humidity. In the bedroom, contrary to the living room, a bright condition such as a condition in the daytime can be considered as a condition where a person is not present there, and a dark condition can be considered as a condition where a person who is sleeping is present there. In the bedroom, it can also be considered that there is a period during which a person is

- 35 -

present there in the nighttime in a state in which the bedroom is lighted. Such a period, however, is sufficiently shorter than a sleeping period and is thus treated as a period during which a person is not present there.

5 [0072]

Thus, the humidity control device A for use in a bedroom, contrary to the humidity control device A for use in a living room, uses the living room-use table (dark) illustrated in Fig. 8 as a bedroom-use table (bright) and uses
10 the living room-use table (bright) illustrated in Fig. 7 as a bedroom-use table (dark). That is, the bedroom-use table (bright) illustrated in Fig. 10 is identical to the table illustrated in Fig. 8, and the bedroom-use table (dark) illustrated in Fig. 11 is identical to the table illustrated in
15 Fig. 7.

[0073]

With this configuration, humidification is actively performed in a bedroom in which a person is considered to be present in a dark condition in the nighttime. This makes it
20 possible to effectively prevent virus infection. On the other hand, in a bright condition in which a person is considered not to be present there in the daytime, humidification is minimized, and dehumidification has priority over humidification. This makes it possible to effectively prevent
25 condensation in winter. Further, through the time from the

- 36 -

rainy season to autumn, it is possible to prevent mold growth and to provide an environment suitable for indoor laundry drying in an available room.

[0074]

5 The humidity control device A of Embodiment 2 is configured such that it is adaptable to a living room and a bedroom with use of two tables, i.e., the table based on which humidification is actively performed (table in Fig. 7 or Fig. 11) and the table based on which minimized humidification and active dehumidification are performed (table in Fig. 8 or 10 Fig. 10). Note, however, that it is a matter of course that the humidity control device A of Embodiment 2 can be alternatively configured so as to include a plurality of tables designed for a bedroom.

15 [0075]

 [Embodiment 3]

 The following description will discuss still another embodiment of the present invention. For convenience, members having functions identical to those described in the 20 foregoing embodiments are given the same reference numerals, and the descriptions of such members are omitted.

[0076]

 The humidity control device A of Embodiment 3 is configured such that the user is allowed to make a 25 specification as to whether a living room or a bedroom will be

- 37 -

treated as the humidity control space through the use of, for example, the operation section 18. Information on the specified humidity controlled space, as one of the parameters indicating the condition of the humidity controlled space, is stored in the memory 33.

[0077]

The CPU 31 uses two tables illustrated in Figs. 7 and 8 on the basis of the information, stored in the memory 33, on the humidity controlled space. That is, in a case where the humidity controlled space is a living room, the table illustrated in Fig. 7 is selected in a bright condition, whereas the table illustrated in Fig. 8 is selected in a dark condition. Further, in a case where the humidity controlled space is a bedroom, the table illustrated in Fig. 7 (identical to the table illustrated in Fig. 11) is selected in a dark condition, whereas the table illustrated in Fig. 8 (identical to the table illustrated in Fig. 10) is selected in a bright condition.

[0078]

This allows a single unit of the humidity control device A to be adaptable to a use in a living room and a use in a bedroom.

[0079]

Embodiment 3 has shown, as an example, the arrangement in which the information indicating the type of room, which is one of the parameters indicating the condition

- 38 -

of the humidity controlled space, is used in combination with the detection result obtained by the illuminance sensor 37. Note, however, that an arrangement in which the information indicating the type of room is used alone or an arrangement
5 in which the information indicating the type of room is used in combination with a parameter, other than the detection result obtained by the illuminance sensor 37, indicating the condition of the humidity controlled space can alternatively be adopted.

10 [0080]

[Embodiment 4]

The following description will discuss yet another embodiment of the present invention. For convenience, members having functions identical to those described in the
15 foregoing embodiments are given the same reference numerals, and the descriptions of such members are omitted.

[0081]

The humidity control device A of Embodiment 4 is configured such that not only a living room and a bedroom
20 but also a kid's room are available as options about what to specify as the humidity controlled space. Further, as illustrated in Fig. 12, in Embodiment 4, the CPU 31 is also connected to a clock 39 via the external interface 31B.

[0082]

25 The CPU 31 uses two tables illustrated in Figs. 7 and 8

- 39 -

on the basis of the information, stored in the memory 33, on the humidity controlled space. That is, in a case where the humidity controlled space is a living room, the table illustrated in Fig. 7 is selected in a bright condition, whereas the table illustrated in Fig. 8 is selected in a dark condition. Further, in a case where the humidity controlled space is a bedroom, the table illustrated in Fig. 7 (identical to the table illustrated in Fig. 11) is selected in a dark condition, whereas the table illustrated in Fig. 8 (identical to the table illustrated in Fig. 10) is selected in a bright condition. This arrangement is the same as that of the humidity control device A of Embodiment 4.

[0083]

The humidity control device A of Embodiment 4 is configured such that in a case where the humidity controlled space is a kid's room, the kid's room is treated as a living room or a bedroom according to a time. That is, the humidity control device A of Embodiment 4 uses information on time as one of the parameters indicating the condition of the humidity controlled space.

[0084]

For example, during a time period from 7:00 a.m. to 10:00 p.m., the living room-use table (bright) or the living room-use table (dark) is selected according to brightness of the kid's room on the assumption that the kid's room is used

in the same way as a living room. On the other hand, during a time period from 10:00 p.m. to 7:00 a.m., the bedroom-use table (bright) or the bedroom-use table (dark) is selected according to brightness of the kid's room on the assumption
5 that the kid's room is used in the same way as a bedroom.

[0085]

This allows the humidity control device A of Embodiment 4 to be adaptable to not only a living room and a bedroom but also a kid's room with use of two tables, i.e., the
10 table based on which humidification is actively performed (table in Fig. 7 or Fig. 11) and the table based on which minimized humidification and active dehumidification are performed (table in Fig. 8 or Fig. 10).

[0086]

15 Embodiment 4 has shown, as an example, the arrangement in which the information on time, which is one of the parameters indicating the condition of the humidity controlled space, is used in combination with the detection result obtained by the illuminance sensor 37. Note, however,
20 that an arrangement in which the information on time is used alone or an arrangement in which the information on time is used in combination with a parameter, other than the detection result obtained by the illuminance sensor 37, indicating the condition of the humidity controlled space can
25 alternatively be adopted.

[0087]

[Embodiment 5]

The following description will discuss further another embodiment of the present invention. For convenience, members having functions identical to those described in the foregoing embodiments are given the same reference numerals, and the descriptions of such members are omitted.

[0088]

A humidity control device A of Embodiment 5 is configured, as illustrated in Fig. 13, such that the CPU 31 is connected to the human detection sensor 40, instead of the illuminance sensor 37, via the external interface 31B. The human detection sensor 40 is, for example, a pyroelectric sensor. When the human detection sensor 40 detects a human in its field of view, the human detection sensor 40 outputs a signal in response to a change in heat (amount of infrared radiation). Base on the output from the human detection sensor 40, detection as to whether a person is present in the humidity controlled space (presence or absence of a person) can be made.

[0089]

The humidity control device A of Embodiment 5 includes a plurality of tables (two tables here) for the "set-and-forget automatic operation", wherein the tables have different target humidity ranges, which serve as

thresholds to switch among the humidifying and air cleaning operation, the dehumidifying and air cleaning operation, and the air cleaning operation, and switching among the tables is performed on the basis of the detection result obtained by the human detection sensor 40 as one of the parameters indicating the condition of the humidity controlled space.

[0090]

The contents of the plurality of tables are not detailed here. However, it is basically preferable that, with use of the table based on which humidification is actively performed (table in Fig. 7 or Fig. 11) and the table based on which minimized humidification and active dehumidification are performed (table in Fig. 8 or Fig. 10), the humidity control device A of Embodiment 5 actively performs humidification in a case where a person is present, and minimizes humidification and actively performs dehumidification in a case where a person is not present.

[0091]

Embodiments 1 to 5 have shown, as examples of a parameter indicating the condition of the humidity controlled space, brightness, presence or absence of a person, room type, and time information. However, these are not intended to limit the present invention. For example, in a case where a humidity control device includes a microphone or other sound collecting device, determination of the presence or

- 43 -

absence of a person in the humidity controlled space can be made from sound data of a sound picked up by the microphone. In a state in which a person is not present, the absence of a sound continues at a certain decibel or less.

5 Thus, it is possible to detect the presence or absence of a person in the humidity controlled space from the sound data.

[0092]

[Recap]

10 A humidity control device A in accordance with a first aspect of the present invention is a humidity control device for performing humidity control of a humidity controlled space which is a subject of humidity control, the humidity control device including: a humidifying section 5 configured to humidify air; a dehumidifying section 4 configured to
15 dehumidify air; an air blower 2 configured to blow air to the humidifying section 5 and the dehumidifying section 4; and a control section (controller 30) configured to drive the humidifying section 5, the dehumidifying section 4, and the air blower 2 so that a humidity of the humidity controlled
20 space reaches one of a plurality of target humidity ranges which are set in accordance with temperature, the control section (controller 30) switching among the plurality of target humidity ranges according to a condition of the humidity controlled space.

25 [0093]

According to the above configuration, the control section (controller 30) drives the humidifying section 5, the dehumidifying section 4, and the air blower 2 so that a humidity of the humidity controlled space reaches one of the target humidity ranges which are set in accordance with temperature. This is a so-called automatic operation mode. Further, according to the above configuration, there are a plurality of target humidity ranges set in accordance with temperature, and the control section (controller 30) selects one of the target humidity ranges according to the condition of the humidity controlled space. This configuration allows the humidity control device A to perform, in the "automatic operation mode", comfort-oriented operations which vary according to the condition of the humidity controlled space, in comparison with the configuration in which there is a target humidity range which is fixed irrespective of the condition of the humidity controlled space.

[0094]

A humidity control device A in accordance with a second aspect of the present invention can be configured to further include a brightness sensor (illuminance sensor 37) configured to detect brightness of the humidity controlled space, wherein the control section (controller 30) uses a detection result obtained by the brightness sensor (illuminance sensor 37) as one of parameters indicating the

condition of the humidity controlled space to select one of the target humidity ranges according to the brightness of the humidity controlled space.

[0095]

5 According to the above configuration, the brightness sensor (illuminance sensor 37) detects brightness of the humidity controlled space, and the control section (controller 30) uses a detection result obtained by the brightness sensor (illuminance sensor 37) as one of parameters indicating the
10 condition of the humidity controlled space to select one of the target humidity ranges according to the detected brightness of the humidity controlled space.

[0096]

15 For example, in a case where the humidity controlled space is a living room, a dark condition can be considered as a condition where a person is not present there in the nighttime. Thus, in such a condition, the target humidity range based on which minimized humidification and active dehumidification are performed is selected. This makes it
20 possible to more effectively prevent condensation and mold growth. In the living room, a bright condition can be considered as a condition in the daytime or a condition where a person is present in a lighted living room in the nighttime. Thus, in such a condition, the target humidity range suitable
25 for a space where a person is present in the daytime is

- 46 -

selected so that humidification can be actively performed. This makes it possible to provide a humidified space which can more effectively prevent virus infection.

[0097]

5 A humidity control device A in accordance with a third aspect of the present invention can be configured to further include a storage section (memory 33) configured to store information indicating a room type of the humidity controlled space, wherein the control section (controller 30) uses the
10 information, stored in the storage section (memory 33), indicating the room type of the humidity controlled space as one of the parameters indicating the condition of the humidity controlled space to select one of the target humidity ranges according to the room type of the humidity controlled
15 space.

[0098]

 According to the above configuration, information indicating the room type of the humidity controlled space (e.g., a living room and a bedroom) is stored in the storage
20 section (memory 33), and the control section (controller 30) uses the stored information indicating the room type of the humidity controlled space as one of the parameters indicating the condition of the humidity controlled space to select one of the target humidity ranges according to the
25 room type of the humidity controlled space.

[0099]

For example, in a case where the humidity controlled space is a living room, a bright condition is a condition where a person is present there, whereas a dark condition is a condition where a person is not present there. On the other hand, in a case where the humidity controlled space is a bedroom, a bright condition is a condition where a person is not present there (assuming that in a state in which a curtain or the like is opened), whereas a dark condition is a condition where a person is present there.

[0100]

Thus, one of the target humidity ranges is selected according to the room type. This allows the humidity control device A to perform, in the automatic operation mode, comfort-oriented operations which vary according to the condition of the humidity controlled space, in comparison with the configuration in which there is a target humidity range which is fixed irrespective of the condition of the humidity controlled space.

[0101]

A humidity control device A in accordance with a fourth aspect of the present invention can be configured to further include a clock 39, wherein the control section (controller 30) uses information on time obtained by the clock 39 as one of the parameters indicating the condition of the humidity

controlled space.

[0102]

According to the above configuration, the humidity control device A has the clock 39, and the control section
5 (controller 30) uses the information on time obtained by the clock 39 as the condition of the humidity controlled space to select one of the target humidity ranges according to the time.

[0103]

10 For example, in a case where the humidity controlled space is a kid's room, a bright condition is a condition where a person is present there as in the case of the living room, whereas a dark condition is a condition where a person (who is sleeping) is present there as in the case of the bedroom.
15 Thus, the humidity control device A has time information so that the target humidity range which is identical to that selected for a living room can be selected during a time period in which a condition (brightness and the presence or absence of a person) of the kid's room is close to that of the living
20 room, whereas the target humidity range which is identical to that selected for a bedroom can be selected during a time period in which a condition (the presence or absence of a person) of the kid's room is close to that of the bedroom.

[0104]

25 A humidity control device A in accordance with a fifth

aspect of the present invention can be configured to further include a human detection sensor 40 configured to detect presence or absence of a person in the humidity controlled space, wherein the control section (controller 30) uses a
5 detection result obtained by the human detection sensor 40 as one of the parameters indicating the condition of the humidity controlled space to select one of the target humidity ranges according to the presence or absence of a person in the humidity controlled space.

10 [0105]

According to the above configuration, the human detection sensor 40 detects the presence or absence of a person in the humidity controlled space, and the control section (controller 30) uses the detection result on the
15 presence or absence of a person in the humidity controlled space as one of the parameters indicating the condition of the humidity controlled space to select one of the target humidity ranges according to the presence or absence of a person in the humidity controlled space.

20 [0106]

For example, in a case where the humidity controlled space is a living room, the target humidity range based on which minimized humidification and active dehumidification are performed is selected in a condition where a person is not
25 present there. This makes it possible to more effectively

- 50 -

prevent condensation and mold growth. Further, in a condition where a person is present in the living room, the target humidity range based on which humidification can be actively performed is selected. This makes it possible to provide a humidified space which can more effectively prevent virus infection.

[0107]

The present invention is not limited to the above embodiments, but can be altered by a skilled person in the art. The present invention also encompasses, in its technical scope, any embodiment derived by combining technical means disclosed in differing embodiments. Further, a new technical feature can be formed by combining technical means disclosed in the embodiments.

Reference Signs List

[0108]

A: Humidity control device

2: Air blower

3: Air cleaning filter

4: Dehumidifying section

5: Humidifying section

15A, 15B: Outlet

16: Inlet

18: Operation section

- 51 -

30: Controller (control section)

33: Memory (storage section)

35: Temperature sensor

36: Humidity sensor

5 37: Illuminance sensor (brightness sensor)

39: Clock

40: Human detection sensor

Abstract

The present invention provides a humidity control device capable of performing, in an automatic operation mode, comfort-oriented operations which vary according to the condition of a humidity controlled space, in comparison with the conventional humidity control device. The humidity control device (A) includes: a humidifying section (5); a dehumidifying section (4); an air blower (2); and a controller (30) configured to drive the humidifying section (5), the dehumidifying section (4), and the air blower (2) so that a humidity of the humidity controlled space reaches a target humidity range which is set in accordance with temperature. The humidity control device (A) has a plurality of target humidity ranges which are set in accordance with temperature, and the controller (30) switches among the target humidity ranges on the basis of a detection result obtained by an illuminance sensor (37) as one of parameters indicating the condition of the humidity controlled space.

Claims

Claim 1

A humidity control device for performing humidity control of a humidity controlled space which is a subject of
5 humidity control,

the humidity control device comprising:

a humidifying section configured to humidify air;

a dehumidifying section configured to dehumidify air;

an air blower configured to blow air to the humidifying
10 section and the dehumidifying section; and

a control section configured to drive the humidifying section, the dehumidifying section, and the air blower so that a humidity of the humidity controlled space reaches one of a plurality of target humidity ranges which are set in
15 accordance with temperature,

the control section switching among the plurality of target humidity ranges according to a condition of the humidity controlled space.

20 Claim 2

The humidity control device according to claim 1, further comprising:

a brightness sensor configured to detect brightness of the humidity controlled space,

25 wherein the control section uses a detection result

- 53 -

obtained by the brightness sensor as one of parameters indicating the condition of the humidity controlled space to select one of the target humidity ranges according to the brightness of the humidity controlled space.

5

Claim 3

The humidity control device according to claim 1 or 2, further comprising:

10 a storage section configured to store information indicating a room type of the humidity controlled space,

wherein the control section uses the information, stored in the storage section, indicating the room type of the humidity controlled space as one of the parameters indicating the condition of the humidity controlled space to
15 select one of the target humidity ranges according to the room type of the humidity controlled space.

Claim 4

20 The humidity control device according to any one of claims 1 to 3, further comprising:

a clock,

wherein the control section uses information on time obtained by the clock as one of the parameters indicating the condition of the humidity controlled space.

25

Claim 5

The humidity control device A according to claim 1 or 2,
further comprising:

5 a human detection sensor configured to detect
presence or absence of a person in the humidity controlled
space,

10 wherein the control section uses a detection result
obtained by the human detection sensor as one of the
parameters indicating the condition of the humidity
controlled space to select one of the target humidity ranges
according to the presence or absence of a person in the
humidity controlled space.