

DESCRIPTION

AIRFLOW ENVIRONMENT SYSTEM

5 TECHNICAL FIELD

[0001]

The present disclosure relates to an airflow environment system that forms an airflow in an environmental space.

10 BACKGROUND ART

[0002]

As a conventional example, an air cleaner disclosed in PTL 1 is described. This air cleaner (smoke separator) takes in and cleans air containing smoke, smell, or the like generated from tobacco. The air cleaner includes a body, a
15 cylindrical pole extending upward from the body and having an air suction port at an upper part of the pole, and a shade provided at the upper part of the pole. The air cleaner includes, inside the body, a purifier that purifies air contaminated by cigarette smoke, smell, or the like by ventilation, and a fan that generates an induced upward flow that rises around the pole. This air
20 cleaner can effectively suppress diffusion of smoke and the like.

Citation List

Patent Literature

[0003]

PTL 1: Unexamined Japanese Patent Publication No. 2003-97833

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SUMMARY OF THE INVENTION

[0004]

In this conventional air cleaner, air containing smoke and the like generated from tobacco is taken in from the air suction port at the upper part of the pole and passes through the pole. In other words, in this air cleaner, in order to suppress diffusion of smoke and the like, a flow path of the airflow returning toward the body is isolated from an environmental space by the pole. Therefore, in a case where the airflow formed in the environmental space is sensed by a person in the environmental space, there is a possibility that sufficient physical sensation cannot be obtained by this air cleaner.

[0005]

The present disclosure has been made in view of the above circumstances, and an object of the present disclosure is to provide an airflow environment system capable of improving physical sensation of an airflow formed in an environmental space.

[0006]

An airflow environment system according to one aspect of the present disclosure includes a discharge port and a reflector. The discharge port discharges an airflow flowing at least along a specific direction to an environmental space. The reflector is disposed so as to face the discharge port in the specific direction, and is hit by the airflow flowing along the specific direction. The reflector is configured to return the hit airflow toward the discharge port in the environmental space.

[0007]

In the airflow environment system according to one aspect of the present disclosure, the airflow discharged from the discharge port to the environmental space hits the reflector and is returned toward the discharge port, and thus an airflow is formed in the environmental space. Therefore, the airflow environment system according to one aspect of the present disclosure can

improve physical sensation of an airflow to a user (person) in the environmental space, for example.

BRIEF DESCRIPTION OF DRAWINGS

5 [0008]

FIG. 1 is an external perspective view of an airflow environment system according to an exemplary embodiment.

FIG. 2 is a front view of a discharge port in the airflow environment system.

10 FIG. 3 is a block diagram showing a configuration of a blower system in the airflow environment system.

FIG. 4 is a schematic diagram illustrating an airflow formed by the airflow environment system.

15 FIG. 5 is a schematic diagram illustrating an airflow formed by an airflow environment system according to Modification 1.

FIG. 6 is a schematic diagram illustrating an airflow formed by an airflow environment system according to another example of Modification 1.

20 FIG. 7 is a schematic diagram illustrating an airflow formed by an airflow environment system according to still another example of Modification 1.

FIG. 8 is a schematic diagram illustrating an airflow formed by an airflow environment system according to still another example of Modification 1.

25 FIG. 9 is an external perspective view of an airflow environment system according to Modification 2.

FIG. 10 is an external perspective view of an airflow environment system according to Modification 3.

FIG. 11 is an external perspective view of an airflow environment system according to another example of Modification 3.

FIG. 12 is an external perspective view of an airflow environment system according to Modification 4.

5 FIG. 13 is an external perspective view of an airflow environment system according to Modification 5.

FIG. 14 is an external perspective view of an airflow environment system according to Modification 6.

10 FIG. 15 is an external perspective view of an airflow environment system according to another example of Modification 6.

DESCRIPTION OF EMBODIMENT

[0009]

(1) Overview

15 Each of the drawings described in the following exemplary embodiment is a schematic view, and the ratio of the size and the thickness of each component in each drawing does not necessarily reflect the actual dimensional ratio.

[0010]

20 Airflow environment system 1 according to the exemplary embodiment is configured to form a flow (airflow) in environmental space 100 (see FIG. 1). As an example of an “environmental space” in the present disclosure, a space (environmental space 100) in a facility is assumed in the exemplary embodiment.

[0011]

25 Here, the facility may be, for example, a non-residential building such as an office building, a theater, a movie theater, a public hall, a game hall, a complex, a restaurant, a department store, a school, a hotel, an inn, a hospital, a nursing home, a kindergarten, a library, a museum, an art gallery, an

underground mall, a station, or an airport. Alternatively, the facility may be a residential building such as an individual house or an apartment (housing complex) instead of a non-residential building. Note that the “environmental space” in the present disclosure is not limited to a space inside a facility, and
5 may be a space outside the facility (outdoors).

[0012]

Airflow environment system 1 includes discharge port 5 and reflector 3. Discharge port 5 discharges an airflow flowing at least along specific direction A1 to environmental space 100. Reflector 3 is disposed so as to face discharge
10 port 5 in specific direction A1, and is hit by the airflow flowing along specific direction A1. As an example of the “specific direction” in the present disclosure, “specific direction A1” of the exemplary embodiment is assumed to be vertically upward. Therefore, reflector 3 of the exemplary embodiment is disposed directly above discharge port 5. Reflector 3 is configured to return the hit
15 airflow toward discharge port 5 in environmental space 100 (see return direction A2 in FIG. 1).

[0013]

In this configuration, the airflow flowing along specific direction A1 is discharged to environmental space 100, and in environmental space 100, the
20 airflow that has hit reflector 3 is returned toward discharge port 5. Thus, as compared with a case where a flow path of the airflow returning to the body is isolated from the environmental space by the pole as in the air cleaner disclosed in PTL 1, a person (user) in environmental space 100 is more likely to sense the airflow formed in environmental space 100. It is therefore possible to improve
25 physical sensation of the airflow formed in environmental space 100.

[0014]

(2) Details

Hereinafter, an overall configuration of airflow environment system 1 according to the exemplary embodiment will be described in detail with reference to FIGS. 1 to 4.

[0015]

5 (2.1) Overall configuration

FIG. 1 is an external perspective view of airflow environment system 1 according to the exemplary embodiment. FIG. 2 is a front view of discharge port 5 in airflow environment system 1. FIG. 3 is a block diagram showing a configuration of blower system 2 in airflow environment system 1. FIG. 4 is a
10 schematic diagram illustrating an airflow formed by airflow environment system 1.

[0016]

Hereinafter, a direction perpendicular (orthogonal) to a horizontal plane (floor surface 101) in a state where air blower system 2 is installed on floor
15 surface 101 as illustrated in FIG. 1 is referred to as a “vertical direction”. However, this direction is not intended to limit a direction of use of air blower system 2.

[0017]

As described above, airflow environment system 1 is configured to form
20 an airflow in environmental space 100 (see FIG. 1) in the facility, for example. As illustrated in FIG. 1, airflow environment system 1 includes blower system 2 and reflector 3.

[0018]

(2.2) Blower system

25 As illustrated in FIG. 3, blower system 2 includes blower 4 (fan), light projector E1, speaker unit F1, functional unit G1, control unit H1, operation unit J1, housing 7, and the like.

[0019]

Housing 7 is configured to accommodate or hold blower 4, light projector E1, speaker unit F1, functional unit G1, control unit H1, operation unit J1, and the like inside housing 7. Specifically, as illustrated in FIG. 1, housing 7 includes table top 70, column 71, and discharge part 72, and is configured to function as a table as a whole. Housing 7 is installed on floor surface 101 in environmental space 100.

[0020]

Table top 70 has a circular plate shape. Table top 70 has a circular hole penetrating in a thickness direction at a center of table top 70. Column 71 has a hollow truncated cone shape. Blower 4 and control unit H1 are accommodated in column 71. An upper surface of column 71 is opened, and table top 70 is attached to an upper end of column 71 so as to close the opened upper surface of column 71. As illustrated in FIG. 1, column 71 has suction port 6 in a peripheral wall of column 71. Suction port 6 includes, for example, a plurality of slit-shaped holes elongated in the vertical direction. In other words, airflow environment system 1 includes suction port 6 connected to environmental space 100 in housing 7. A material of table top 70 and column 71 is not limited, but desirably has enough dimensions and durability for housing 7 to function as a table. A power cord is exposed from a bottom of column 71, and a plug of the power cord is connected to, for example, a floor outlet on floor surface 101, and then operation power for driving blower 4, light projector E1, speaker unit F1, functional unit G1, and the like can be supplied. Casters may be provided at the bottom of column 71 such that housing 7 can be easily moved.

[0021]

Discharge part 72 has a cylindrical shape with both upper and lower

ends opened. Discharge part 72 is attached such that a peripheral edge of a lower end of discharge part 72 is accommodated in an edge of a hole at the center of table top 70. In order to prevent entry of foreign matters or the like, the upper surface of discharge part 72 is covered with protective cover 73 configured such that a plurality of elongated blades is arranged at equal intervals (see FIG. 2). Light projector E1, speaker unit F1, and functional unit G1 are accommodated in discharge part 72 or column 71. The open upper surface of discharge part 72 corresponds to discharge port 5 that discharges the airflow flowing at least along specific direction A1 to environmental space 100. In other words, airflow environment system 1 includes discharge port 5 in housing 7. A material of discharge part 72 is not particularly limited, but is desirably a material having high heat dissipation because light projector E1 is accommodated in discharge part 72.

[0022]

Operation unit J1 that receives an operation input from outside (user) is installed on table top 70 or discharge part 72. The user can turn on and off a power supply of blower system 2 by operating operation unit J1. Control unit H1 starts driving blower 4 upon receipt of an operation of turning on the power at operation unit J1. Operation unit J1 may be a remote controller. In this case, a light receiver that receives infrared rays emitted from operation unit J1 may be provided on table top 70 or discharge part 72.

[0023]

Blower 4 is configured to generate an airflow flowing along specific direction A1 (here, vertically upward) and send the airflow to discharge port 5 under the control of control unit H1. Blower 4 is, for example, a sirocco fan that generates an airflow containing more rectilinear components than swirl components. Blower 4 sucks air (airflow returned from reflector 3 toward

discharge port 5 as described below) in environmental space 100 from suction port 6 and generates the airflow flowing along specific direction A1. Blower 4 is not limited to a sirocco fan, and may be a propeller fan. Blower 4 is accommodated in column 71 with its front surface facing upward, and is
5 connected to discharge port 5 via duct 74 (see FIG. 2) disposed in front of blower 4. Duct 74 has a cylindrical shape with both upper and lower ends opened. In short, the airflow containing a large amount of rectilinear component generated in blower 4 can be discharged from discharge port 5 as an airflow flowing directly along specific direction A1 (vertically upward in this case).

10 [0024]

Blower 4 may be capable of appropriately changing an air volume by adjusting a rotation speed of a motor by, for example, inverter control. For example, operation unit J1 may be provided with a volume for adjusting the air volume, and the user may appropriately adjust the air volume of blower 4 at an
15 installation site of airflow environment system 1, that is, in environmental space 100. Control unit H1 may periodically change the air volume of blower 4 automatically.

[0025]

Control unit H1 has a function of controlling blower 4. Control unit H1
20 includes, for example, a computer system including a processor and a memory. Then, when the processor executes a program stored in the memory, the computer system functions as control unit H1. Here, the program executed by the processor is assumed to be recorded in advance in the memory of the computer system, but may be provided by being recorded in a recording medium
25 such as a memory card, or may be provided through a telecommunication line such as the Internet.

[0026]

Light projector E1 is configured to emit light toward reflector 3. Light projector E1 includes, for example, one or a plurality of light emitting diodes (LEDs) as a light source. Light projector E1 includes a translucent cover that covers the light source, a power supply circuit, a lighting circuit, a control circuit,
5 and the like. At least some functions of the power supply circuit, the lighting circuit, and the control circuit may be integrated in control unit H1. The operation of light projector E1 may be controlled in conjunction with the operation of blower 4 under the control of control unit H1. The emission color, color temperature, and the like of the light source are not particularly limited.
10 In addition, light projector E1 is not limited to general illumination, and may provide performance illumination.

[0027]

The light source of light projector E1 is accommodated in discharge part 72 so as to face window 730 (see FIG. 2) of protective cover 73, and the light
15 emitted from the light source of light projector E1 is emitted toward reflector 3 via window 730. That is, similarly to the airflow, the light of light projector E1 can be emitted upward from discharge port 5 in the exemplary embodiment. Light projector E1 can be turned on, dimmed, and turned off by, for example, operating operation unit J1. Since light projector E1 is provided, light
20 (brightness) can be provided to environmental space 100 in addition to the airflow.

[0028]

Speaker unit F1 is configured to make a sound such as music toward reflector 3. Speaker unit F1 includes speaker F10 (see FIG. 2), a power supply
25 circuit, an acoustic circuit, a control circuit, and the like. At least some functions of the power supply circuit, the acoustic circuit, and the control circuit may be integrated in control unit H1. The operation of speaker unit F1 may be

controlled in conjunction with the operation of blower 4 under the control of control unit H1. Speaker F10 is disposed so as to face protective cover 73 with a front surface of speaker F10 facing upward. Therefore, a sound outputted from speaker F10 can be emitted upward from discharge port 5 in the exemplary embodiment, similarly to the airflow.

[0029]

Here, as an example, speaker unit F1 is assumed to be a so-called parametric speaker that provides directivity using ultrasonic waves. A part of the sound outputted from speaker unit F1 can be reflected by reflector 3. Since speaker unit F1 is a parametric speaker, a sound is provided to a person who is within a specific narrow range in environmental space 100, particularly, immediately below reflector 3. The power of speaker unit F1 can be turned on and off and the volume can be adjusted by operating operation unit J1, for example. Since speaker unit F1 is provided, it is possible to provide sound (acoustic sound) in addition to the airflow to environmental space 100.

[0030]

Functional unit G1 is configured to impart an additional element to the airflow discharged from discharge port 5 to environmental space 100. The additional element includes at least one of aroma, air purification, or temperature change.

[0031]

In a case where the additional element includes aroma, functional unit G1 has, for example, an aroma presenting device including a fragrance. The aroma presenting device is accommodated in discharge part 72. The aroma vaporized from the fragrance may mix into the airflow from blower 4 through duct 74. As a result, airflow environment system 1 can provide air having high-quality aroma to a person (user) in environmental space 100.

[0032]

In a case where the additional element includes air purification, functional unit G1 has, for example, an air cleaner. The air cleaner is accommodated in column 71. The air cleaner includes a dust collecting filter that collects fine particles such as pollen in the air sucked from suction port 6, a deodorizing filter, and the like. The air purified by the air cleaner can be discharged upward in the exemplary embodiment from discharge port 5 as an airflow from blower 4. As a result, airflow environment system 1 can provide purified air to a person (user) in environmental space 100.

10 [0033]

Further, in a case where the additional element includes air purification, functional unit G1 may have, for example, a space sterilization and deodorization apparatus. The space sterilization and deodorization apparatus is accommodated in column 71. The space sterilization and deodorization apparatus is configured to generate hypochlorous acid and mix the hypochlorous acid into the airflow generated by blower 4. The airflow containing hypochlorous acid is discharged upward from discharge port 5 in the exemplary embodiment to sterilize environmental space 100. As a result, airflow environment system 1 can provide purified air to a person (user) in environmental space 100.

20 environmental space 100.

[0034]

In a case where the additional element includes temperature change, functional unit G1 has, for example, an air conditioner. The air conditioner has a compressor, and cool air or warm air generated by the air conditioner can be discharged upward from discharge port 5 as an airflow from blower 4 in the exemplary embodiment. As a result, airflow environment system 1 can provide air having a comfortable temperature to a person (user) in environmental space

25 discharged upward from discharge port 5 as an airflow from blower 4 in the

100.

[0035]

In a case where functional unit G1 has the air cleaner, the space sterilization and deodorization apparatus, and the air conditioner described
5 above, the power supply of these devices can be turned on and off and various parameters in these devices can be adjusted by operating operation unit J1, for example. Note that control unit H1 may intensively perform control related to functional unit G1. The operation of functional unit G1 may be controlled in conjunction with the operation of blower 4 under the control of control unit H1.

10 [0036]

As described above, in airflow environment system 1, with functional unit G1, an additional element can be provided to the airflow.

[0037]

(2.3) Reflector

15 Reflector 3 is disposed so as to face discharge port 5 in specific direction A1. Reflector 3 is configured to be hit by the airflow discharged from discharge port 5 and flowing along specific direction A1. Reflector 3 is configured to return the hit airflow toward discharge port 5 in environmental space 100.

[0038]

20 Hereinafter, a configuration of reflector 3 will be described in detail. As illustrated in FIG. 1, reflector 3 includes body 30, support 33, and attachment part 35.

[0039]

Body 30 has a substantially shade-like shape (more specifically, a curved
25 bowl shape) with a lower surface opened. As an example, body 30 is assumed to be configured by a fabric and a plurality of frames maintaining the fabric in a shade-like shape, but is not particularly limited, and may have another

configuration. That is, body 30 may be a synthetic resin molded article or a metal molded article. Note that body 30 desirably includes a material in consideration of acoustic characteristics of the sound outputted from speaker unit F1, and for example, in a case where an acoustic effect is enhanced, a material having a low sound absorbing property is used.

[0040]

As shown in FIG. 4, body 30 has inner curved surface 300 facing discharge port 5. Curved surface 300 is inclined such that tangential direction D at an opening edge of curved surface 300 expands outward as going downward in the vertical direction. Body 30 has first region 31 and second region 32 on curved surface 300. First region 31 is a central region including a vertex of curved surface 300, and is a region hit by the airflow flowing along specific direction A1. Second region 32 is located around first region 31. In other words, second region 32 is a donut-shaped region when curved surface 300 is viewed from a front (from below). Second region 32 is a region that allows the airflow that has hit first region 31 to flow along second region 32 and return toward discharge port 5. In body 30 of the exemplary embodiment, second region 32 is curved so as to be closer to discharge port 5 as second region 32 is farther away from first region 31 along the direction orthogonal to specific direction A1 (a horizontal direction in the exemplary embodiment). The color of curved surface 300 is not particularly limited, but is desirably a color in consideration of reflection characteristics of light emitted from light projector E1.

[0041]

As illustrated in FIG. 1, support 33 is a part for hanging body 30 from a ceiling surface. In the exemplary embodiment, support 33 has a rod shape elongated in the vertical direction, but support 33 may have a string shape.

Attachment part 35 is provided at a first end (an upper end in FIG. 1) of support 33, and a second end (a lower end in FIG. 1) of support 33 is attached to an outer vertex of body 30.

[0042]

5 Attachment part 35 is configured to be detachably attached to wire duct 200. Wire duct 200 has a rail shape and is fixed to a ceiling or the like of the facility. Wire duct 200 may be, for example, a duct rail for illumination. Wire duct 200 includes a duct body having a so-called lip groove. Attachment part 35 has, for example, a terminal board protruding in a T shape. After the
10 terminal board is inserted into the lip groove of wire duct 200, attachment part 35 is rotated by about 90 degrees around an axis of attachment part 35. Thus, the terminal board is locked to the lip groove and is prevented from coming off from wire duct 200. With attachment part 35, workability regarding installation of reflector 3 is improved.

15 [0043]

As described above, in airflow environment system 1 of the exemplary embodiment, reflector 3 is configured to return the hit airflow toward discharge port 5 in environmental space 100. It is therefore possible to improve the physical sensation of the airflow formed in environmental space 100 for the user
20 (person) in environmental space 100. In addition, since reflector 3 has first region 31 and second region 32, a layer of the airflow returned toward discharge port 5 with first region 31 as a center is easily formed, and environmental space 100 is more likely to be divided into two spaces by the layer. This further improves the physical sensation of the airflow for the user (person) in
25 environmental space 100.

[0044]

As illustrated in FIG. 1, airflow environment system 1 may further

include illuminator E2 that emits light toward discharge port 5. Illuminator E2 is disposed in first region 31 of body 30 in reflector 3. Illuminator E2 includes, for example, one or a plurality of LEDs as a light source. Illuminator E2 includes a translucent cover that covers the light source, a power supply circuit, a lighting circuit, a control circuit, and the like. The lighting, dimming, and turning off of illuminator E2 can be executed by, for example, an operation unit (not illustrated) provided in illuminator E2. The emission color, color temperature, and the like of the light source are not particularly limited. In addition, illuminator E2 is not limited to general illumination, and may provide performance illumination.

[0045]

Operation power of illuminator E2 may be supplied from wire duct 200. The terminal board of attachment part 35 may be locked to the lip groove of wire duct 200 to achieve electrical connection with a conductor of wire duct 200. A power cord may be incorporated in support 33, and the terminal board of attachment part 35 may be electrically connected to the power supply circuit of illuminator E2 via the power cord. The power supply circuit of illuminator E2 may receive, for example, commercial AC power from the conductor of wire duct 200 via the power cord in support 33 and the terminal board of attachment part 35, and convert the AC power into DC power for LED lighting. With illuminator E2, airflow environment system 1 can provide light (brightness) to environmental space 100 in addition to the airflow.

[0046]

(2.4) Airflow in environmental space

Hereinafter, an airflow that can be formed in environmental space 100 by airflow environment system 1 will be described with reference to FIG. 4.

[0047]

FIG. 4 shows a simulation result of a state (streamline) in which the airflow discharged from discharge port 5 in airflow environment system 1 hits reflector 3 and the hit airflow returns toward discharge port 5 in environmental space 100. Note that airflow environment system 1 in FIG. 4 is slightly different from airflow environment system 1 in FIG. 1 and is schematically illustrated, and housing 7, support 33, and the like are omitted. Further, discharge port 5 in FIG. 4 is located at a position slightly higher than discharge port 5 in FIG. 1 (a position close to reflector 3).

[0048]

When airflow environment system 1 operates, first flow path P1 and second flow path P2 are formed in environmental space 100 as illustrated in FIG. 4. First flow path P1 is a flow path through which the airflow discharged from discharge port 5 flows toward reflector 3, and second flow path P2 is a flow path through which the airflow that has hit reflector 3 returns toward discharge port 5.

[0049]

That is, the airflow discharged from discharge port 5 flows toward first region 31 of reflector 3 through first flow path P1. Then, the airflow that hits first region 31 of reflector 3 and spreads outward along second region 32 of reflector 3 returns toward discharge port 5 (vertically downward) through second flow path P2. When viewed along specific direction A1 (for example, from above in the exemplary embodiment), second flow path P2 is formed so as to surround first flow path P1.

[0050]

Thus, for example, a person (user) approaching first flow path P1 from outside of airflow environment system 1 is more likely to come in contact with the layer of the airflow returning through second flow path P2. This further

improves the physical sensation of the airflow. In particular, a speed of the airflow returning through second flow path P2 is attenuated by reflector 3 and thus can be smaller than a speed of the airflow discharged from discharge port 5. Therefore, conversely, as compared with a case where the airflow discharged from discharge port 5 is directed to reflector 3 through second flow path P2 and returns toward discharge port 5 through first flow path P1, a possibility of giving discomfort to a person (user) approaching first flow path P1 can be reduced.

[0051]

In the exemplary embodiment, discharge port 5 and reflector 3 are separated from each other in specific direction A1 via hollow part 9 as a gap. The airflow (forward airflow) discharged from discharge port 5 and the airflow (return airflow) returning toward discharge port 5 flow through hollow part 9. In other words, there is no obstacle (wall or the like) that isolates first flow path P1 and second flow path P2 from each other between discharge port 5 and reflector 3. It is therefore possible to increase a possibility of giving a sense of openness to a person (user) in environmental space 100.

[0052]

In the exemplary embodiment, blower 4 sucks the airflow returned from reflector 3 toward discharge port 5 from suction port 6 and generates the airflow flowing along specific direction A1, and thus the airflow formed in environmental space 100 can be more stably circulated. In particular, because suction port 6 is disposed at a position lower than discharge port 5, second flow path P2 can be formed as a flow path having a relatively long distance in the vertical direction.

[0053]

In the exemplary embodiment, a shape of second region 32 of reflector 3, a distance from discharge port 5 to first region 31 of reflector 3, or the like is

defined such that intermediate layer X1 of airflow having a relatively small flow rate is formed between first flow path P1 and second flow path P2. The user who uses airflow environment system 1 can sense presence of intermediate layer X1 separated by the airflow by entering intermediate layer X1 after passing through second flow path P2 from outside of airflow environment system 1. Although intermediate layer X1 is not partitioned by a physical partition wall, intermediate layer X1 is provided as an environment isolated from outside. The user can sense intermediate layer X1 with a gentle airflow as a field of relaxation. In addition, costs can be reduced as compared with a case of intermediate layer X1 is partitioned by a physical partition wall, and the user can easily enter intermediate layer X1, which is highly convenient.

[0054]

Further, in airflow environment system 1 according to the exemplary embodiment, when the airflow discharged from discharge port 5 hits reflector 3 and then returns toward discharge port 5 (vertically downward) through second flow path P2, a part of the airflow is sucked from suction port 6 and can circulate as a whole. It is therefore possible to expect a reduction in a use amount related to the additional element in functional unit G1.

[0055]

In a case where the additional element includes air purification, there is a high possibility that the air purified by the air cleaner included in functional unit G1 is discharged from discharge port 5, then returned, and sucked again from suction port 6. As a result, airflow environment system 1 contributes to extension of life of the dust collecting filter, the deodorizing filter, and the like.

[0056]

When the additional element includes temperature change, there is a high possibility that cold air (or warm air) generated by the air conditioner

included in functional unit G1 is discharged from discharge port 5, then returned, and sucked again from suction port 6. As a result, airflow environment system 1 contributes to extension of life of the air conditioner or the like and reduction of power consumption by the air conditioner.

5 [0057]

Further, in airflow environment system 1 according to the exemplary embodiment, when the airflow discharged from discharge port 5 hits reflector 3 and then returns toward discharge port 5 (vertically downward) through second flow path P2, the airflow can function as an air curtain. In particular, the
10 returning airflow can be discharged in a form that is less likely to be mixed with the airflow in the space inside the air curtain. As a result, airflow environment system 1 can enclose, for example, the additional element by functional unit G1 included in the airflow discharged from discharge port 5 by means of the air curtain. It can be therefore expected that the additional element is prevented
15 from leaking to outside of the air curtain. In short, airflow environment system 1 facilitates maintenance of a situation in which the space inside the air curtain is filled with the additional element.

[0058]

(3) Modifications

20 The above exemplary embodiment is merely one of various exemplary embodiments of the airflow environment system of the present disclosure. The exemplary embodiment can be variously modified in accordance with a design and the like as long as the object of the airflow environment system of the present disclosure can be achieved. Modifications of the exemplary
25 embodiment will be listed below. Modifications described below can be appropriately combined and applied. Hereinafter, the exemplary embodiment may be referred to as a “basic example”.

[0059]

(3.1) Modification 1

Hereinafter, airflow environment system 1A according to Modification 1 will be described with reference to FIG. 5. However, components substantially
5 common to airflow environment system 1 of the basic example are denoted by the same reference numerals, and the description thereof is appropriately omitted.

[0060]

As a result of intensive verification, the inventors of the present
10 disclosure have found that the shape of reflector 3 is a factor that can greatly affect the formation of the airflow returning toward discharge port 5 than a height position of discharge port 5 (a distance from discharge port 5 to reflector 3), and the air volume and flow rate of blower 4.

[0061]

15 FIG. 5 is a schematic diagram illustrating an airflow formed by airflow environment system 1A according to Modification 1. As shown in FIG. 5, airflow environment system 1A of Modification 1 is different from airflow environment system 1 of the basic example in that airflow environment system 1A of Modification 1 is provided with reflector 3A having a different shape from
20 reflector 3 of the basic example instead of reflector 3 of the basic example. Note that discharge port 5 in FIG. 5 is at substantially the same height position as discharge port 5 in FIG. 1 in the basic example.

[0062]

Reflector 3A according to Modification 1 includes body 30A, support 33,
25 and attachment part 35 (support 33 and attachment part 35 are not illustrated in FIG. 5). Body 30A has a substantially shade-like shape with a lower surface opened. However, body 30 of the basic example has a curved surface 300 curved

in a bowl shape, while body 30A of Modification 1 has a curved surface 300A shaped in a flat cone. That is, curved surface 300A is a conical surface.

[0063]

As shown in FIG. 5, body 30A has first region 31A and second region 32A on inner curved surface 300A facing discharge port 5. First region 31A is a central region including a vertex of curved surface 300A, and is a region hit by the airflow flowing along specific direction A1. Second region 32A is located around first region 31A. Second region 32A is a region that allows the airflow that has hit first region 31A to flow along second region 32A and return toward discharge port 5. In body 30A according to the exemplary embodiment, second region 32A is inclined from the side of first region 31A to the outside so as to approach discharge port 5.

[0064]

FIG. 5 shows a simulation result of a state (streamline) in which the airflow discharged from discharge port 5 in airflow environment system 1A of Modification 1 hits reflector 3A and the hit airflow returns toward discharge port 5 in environmental space 100.

[0065]

When airflow environment system 1A operates, first flow path P1A and second flow path P2A are formed in environmental space 100 as illustrated in FIG. 5. That is, the airflow discharged from discharge port 5 flows toward first region 31A of reflector 3A through first flow path P1A. Then, the airflow that hits first region 31A of reflector 3A and spreads outward along second region 32A of reflector 3A returns toward discharge port 5 (vertically downward) through second flow path P2A.

[0066]

Here, unlike second flow path P2 of the basic example, second flow path

P2A of Modification 1 spreads in a direction away from blower system 2. Therefore, in Modification 1, a volume of intermediate layer X1A can be secured wider than that in the basic example. As a result, there is a high possibility that more users can use intermediate layer X1A. However, in terms of “circulation” in which the airflow discharged from discharge port 5 returns to suction port 6 again, there is a possibility that circularity is impaired in Modification 1 as compared with in the basic example. As in the basic example, when second region 32 is curved so as to be closer to discharge port 5 as second region 32 is farther away from first region 31, the layer of the airflow to be returned toward discharge port 5 is more easily formed. Therefore, for the user who uses airflow environment system 1A, the physical sensation of the airflow in the basic example is higher than in Modification 1.

[0067]

Next, another example (airflow environment system 1B) according to Modification 1 will be described with reference to FIG. 6.

[0068]

FIG. 6 is a schematic diagram illustrating an airflow formed by airflow environment system 1B according to another example of Modification 1. As illustrated in FIG. 6, airflow environment system 1B includes reflector 3B instead of reflector 3 of the basic example. Similarly to reflector 3 of the basic example, body 30B of reflector 3B has curved surface 300B (having first region 31B and second region 32B) curved in a bowl shape. However, curved surface 300B is different from curved surface 300 of the basic example in that tangential direction D1 at an opening edge of curved surface 300B is substantially parallel to the vertical direction. That is, tangential direction D1 is closer to parallel to the vertical direction than tangential direction D.

[0069]

Reflector 3B in FIG. 6 has higher circularity than in the basic example and in the example in FIG. 5. Therefore, the layer of the airflow to be returned toward discharge port 5 is easily formed, and the physical sensation of the airflow to a person (user) in environmental space 100 can be improved.

5 However, a volume of intermediate layer X1B formed between first flow path P1B and second flow path P2B tends to be small, and the possibility that the user can sense the presence of intermediate layer X1B separated by the airflow is reduced. The volume of intermediate layer X1B can be increased by increasing the air volume of blower 4 or adjusting the height position of

10 discharge port 5.

[0070]

Next, still another example (airflow environment system 1C) of Modification 1 will be described with reference to FIG. 7.

[0071]

15 FIG. 7 is a schematic diagram illustrating an airflow formed by airflow environment system 1C according to still another example of Modification 1. As illustrated in FIG. 7, airflow environment system 1C includes reflector 3C instead of reflector 3 of the basic example. Similarly to reflector 3 of the basic example, body 30C of reflector 3C has curved surface 300C (having first region

20 31C and second region 32C) curved in a bowl shape. However, curved surface 300C is different from curved surface 300 of the basic example in that tangential direction D2 at an opening edge of curved surface 300C is inclined so as to be narrowed inward as going downward.

[0072]

25 Reflector 3C in FIG. 7 has higher circularity than in the example in FIG. 6. Thus, the layer of the airflow to be returned toward discharge port 5 is more easily formed, and the physical sensation of the airflow to a person (user) in

environmental space 100 can be further improved. However, a volume of the intermediate layer X1C formed between first flow path P1C and second flow path P2C tends to be further reduced. The volume of intermediate layer X1C can be increased by increasing the air volume of blower 4 or adjusting the height position of discharge port 5.

[0073]

A still another example (airflow environment system 1D) of Modification 1 will be described with reference to FIG. 8.

[0074]

FIG. 8 is a schematic diagram illustrating an airflow formed by airflow environment system 1D according to still another example of Modification 1. As illustrated in FIG. 8, airflow environment system 1D includes reflector 3D instead of reflector 3 of the basic example. Similarly to reflector 3 of the basic example, body 30D of reflector 3D has curved surface 300D (having first region 31D and second region 32D) curved in a bowl shape. However, curved surface 300D is different from curved surface 300 of the basic example in that a distance (depth W1) from an opening surface to the vertex is deeper than a depth of curved surface 300 of the basic example. Note that tangential direction D3 at an opening edge of curved surface 300D is substantially parallel to the vertical direction.

[0075]

Reflector 3D in FIG. 8 also has relatively high circularity. Therefore, the layer of the airflow to be returned toward discharge port 5 is easily formed, and the physical sensation of the airflow to a person (user) in environmental space 100 can be improved. However, a volume of intermediate layer X1D formed between first flow path P1D and second flow path P2D tends to be small. The volume of intermediate layer X1D can be increased by increasing the air

volume of blower 4 or adjusting the height position of discharge port 5.

[0076]

(3.2) Modification 2

Hereinafter, airflow environment system 1E according to Modification 2
5 will be described with reference to FIG. 9. However, components substantially
common to airflow environment system 1 of the basic example are denoted by
the same reference numerals, and the description thereof is appropriately
omitted.

[0077]

10 FIG. 9 is an external perspective view of airflow environment system 1E
according to Modification 2. In airflow environment system 1 of the basic
example, discharge port 5 is provided in housing 7 configured to also function as
a table. On the other hand, airflow environment system 1E of Modification 2
is different from airflow environment system 1 of the basic example in that
15 discharge port 5 is provided directly on floor surface 101.

[0078]

In airflow environment system 1 of the basic example, reflector 3 has a
hanging structure. On the other hand, airflow environment system 1E of
Modification 2 is different from airflow environment system 1 of the basic
20 example in that reflector 3E having an embedded structure is provided.

[0079]

Here, discharge port 5 of Modification 2 is configured as, for example, a
circular through hole that penetrates a floor material in a thickness direction.
In this case, blower 4, light projector E1, speaker unit F1, functional unit G1,
25 control unit H1, and the like are installed under a floor. Operation unit J1 may
be installed near discharge port 5 or may be installed on wall surface 152.

[0080]

FIG. 9 illustrates an example in which reflector 3E of Modification 2 is embedded in one of a plurality of ceiling members 151 of a square type of system ceiling 150. Reflector 3E is not limited to be embedded in one ceiling member 151, and may be embedded over the plurality of (for example, four) ceiling members 151. Reflector 3E is directly fixed to, for example, a hanging bolt of a ceiling slab in an attic.

[0081]

As compared with, for example, a case where discharge port 5 is disposed on one surface of a dedicated housing, convenience can be improved while reducing a possibility that appearance of environmental space 100 is impaired in Modification 2. Further, in airflow environment system 1E according to Modification 2, components (the floor and the housing) can be shared.

[0082]

As another example of Modification 2, ceiling member 151 itself may be reflector 3E having curved surface 300 recessed in a shade-like shape.

[0083]

As still another example of Modification 2, airflow environment system 1E may include a plurality of sets of one reflector 3E and one discharge port 5 corresponding to each other. Specifically, a plurality of reflectors 3E may be embedded in system ceiling 150, and a plurality of discharge ports 5 may be provided on floor surface 101 so as to correspond to the plurality of reflectors 3E on a one-to-one basis. In this case, a number of blowers 4 and a number of control units H1 do not have to be the same as a number of discharge ports 5. For example, an airflow generated by one blower 4 may pass through a duct installed under the floor and be discharged from the plurality of discharge ports 5. Further, one control unit H1 may be installed in a management room or the like in the facility such that the plurality of blowers 4 can be collectively and

centrally managed. Similarly in the basic example, airflow environment system 1 may include a plurality of sets of one reflector 3 and one discharge port 5, and one control unit H1 may be configured to collectively and centrally manage the plurality of blowers 4.

5 [0084]

(3.3) Modification 3

Hereinafter, airflow environment system 1F according to Modification 3 will be described with reference to FIG. 10. However, components substantially common to airflow environment system 1 of the basic example are
10 denoted by the same reference numerals, and the description thereof is appropriately omitted.

[0085]

FIG. 10 is an external perspective view of airflow environment system 1F according to Modification 3. Airflow environment system 1F of Modification
15 3 is assumed to be installed in a hotel lobby or the like, and has a structure in consideration of convenience and design. Housing 7F of the air blower system of airflow environment system 1F is configured to also function as a long table. Housing 7F has a bottle-shaped ornament 75, and an open upper surface of ornament 75 serves as discharge port 5. Ornament 75 has an opening at a
20 bottom, and the airflow of blower 4 accommodated in the long table can be discharged upward from discharge port 5 through the opening of ornament 75. Further, a plurality of lobby sofas 301 is installed so as to surround housing 7F.
[0086]

Note that, in a case where a number of lobby sofas 301 is one (in the left
25 in FIG. 10), housing 7K may be provided instead of housing 7F. Housing 7K is configured to function as a side table, and has a configuration similar to housing 7F. That is, housing 7K has bottle-shaped ornament 75, and an open upper

surface of ornament 75 serves as discharge port 5.

[0087]

Here, reflector 3F of Modification 3 has a cylindrical body 30F with a lower surface opened. Reflector 3F does not have support 33 of the basic example, and body 30F is directly attached to the ceiling surface. Lobby sofa 301 is disposed so as to be substantially accommodated in a projection area in a case where the opening surface of body 30F is projected on floor surface 101. Therefore, reflectors 3F having various sizes and shapes are installed in accordance with the number and shapes of lobby sofas 301.

[0088]

In this way, by providing the airflow by airflow environment system 1F in a hotel lobby or the like, a local space different from the surroundings can be provided without blocking environmental space 100 with a physical partition wall. Furthermore, airflow environment system 1F can provide a local space as a more comfortable place of relaxation in environmental space 100 by appropriately combining light, sound, and an additional element (aroma or the like) with the airflow to be provided.

[0089]

Next, another example (airflow environment system 1G) of Modification 3 will be described with reference to FIG. 11.

[0090]

FIG. 11 is an external perspective view of airflow environment system 1G according to another example of Modification 3. Airflow environment system 1G in FIG. 11 is assumed to be installed in a waiting room in a hospital or the like, and has a structure in consideration of convenience and sterilization. A blower system of airflow environment system 1G has pole-shaped housing 7G. Discharge port 5 is formed on an upper surface of housing 7G. The airflow of

blower 4 accommodated in housing 7G can be discharged upward from discharge port 5. Waiting seat 302 having a donut shape is arranged so as to surround a periphery of housing 7G.

[0091]

5 Reflector 3G in FIG. 11 has body 30G having a shade-like shape with a lower surface opened. Similarly to lobby sofa 301 in FIG. 10, waiting seat 302 is arranged so as to be substantially accommodated in the projection area of the opening surface of body 30G. Reflector 3G in FIG. 11 has a relatively large size so as to be used by as many users (patients) as possible.

10 [0092]

In this way, by providing the airflow by airflow environment system 1G in a waiting room in a hospital or the like, a local space different from the surroundings can be provided without blocking environmental space 100 with a physical partition wall. In addition, the airflow passing through the second
15 flow path has an effect as a barrier function, and a risk of nosocomial infection can be reduced. Furthermore, airflow environment system 1G can provide a local space as a cleaner place in environmental space 100 by appropriately combining an additional element (air purification: hypochlorous acid or the like) with the airflow to be provided.

20 [0093]

(3.4) Modification 4

Hereinafter, airflow environment system 1H according to Modification 4 will be described with reference to FIG. 12. However, components substantially common to airflow environment system 1 of the basic example are
25 denoted by the same reference numerals, and the description thereof is appropriately omitted.

[0094]

FIG. 12 is an external perspective view of airflow environment system 1H according to Modification 4. Airflow environment system 1H of Modification 4 is different from airflow environment system 1 of the basic example in that discharge port 5 is disposed on one surface of a member constituting seat 303. Note that reflector 3 of airflow environment system 1H is common to the basic example, and thus illustration and description thereof are omitted.

[0095]

Airflow environment system 1H of Modification 4 includes housing 7H that functions as seat 303. Housing 7H includes hollow seating part 76 having a substantially rectangular parallelepiped shape, and prismatic backrest 77 provided at a center of an upper surface (seat surface 760) of seating part 76. Blower 4 and the like are accommodated in seating part 76 or backrest 77.

[0096]

Discharge port 5 is provided on an upper end surface of backrest 77. Suction port 6 is provided on seat surface 760 of seating part 76. Specifically, in seat surface 760, for example, a plurality of square bars 761 is assembled so as to be arranged at predetermined intervals, and a gap between adjacent square bars 761 serves as suction port 6.

[0097]

In airflow environment system 1H according to Modification 4, as compared with, for example, a case where discharge port 5 is disposed on one surface of a dedicated housing, convenience can be improved while reducing a possibility that appearance of environmental space 100 is impaired. In airflow environment system 1H of Modification 4, components (the seat and the housing) can be shared.

[0098]

(3.5) Modification 5

Hereinafter, airflow environment system 1I according to Modification 5 will be described with reference to FIG. 13. However, components substantially common to airflow environment system 1 of the basic example are
5 denoted by the same reference numerals, and the description thereof is appropriately omitted.

[0099]

Airflow environment system 1I of Modification 5 is different from airflow environment system 1 of the basic example in that airflow environment system
10 1I further includes guide 8.

[0100]

FIG. 13 is an external perspective view of airflow environment system 1I according to Modification 5. Airflow environment system 1I according to Modification 5 is assumed to be installed, for example, in a lobby of a hotel or a
15 waiting room in a hospital, a station, or an airport.

[0101]

Reflector 3H has body 30 and support 33H. In FIG. 13, body 30 of reflector 3H is illustrated only by an alternate long and short dash line. Body 30 of reflector 3H has a substantially shade-like shape with a lower surface
20 opened, and is substantially equal to body 30 of reflector 3 of the basic example.

[0102]

Unlike support 33 of reflector 3 of the basic example, support 33H of reflector 3H is not a part for hanging body 30 from the ceiling surface, but protrudes from base B1 to support body 30. That is, support 33H of reflector
25 3H is a part corresponding to pole (shaft) of shade (body 30). A first end (upper end) of support 33H is attached to an inner vertex of body 30, and a second end (lower end) of support 33H is fixed to base B1. However, here, support 33H of

reflector 3H is achieved by guide 8. In other words, guide 8 supports (body 30 of) reflector 3H.

[0103]

Housing 7I of the air blower system of airflow environment system 1I
5 also serves as base B1 on which person(s) can sit. That is, airflow environment system 1I includes base B1. Base B1 has a flat cylindrical shape in specific direction A1. Base B1 functions as a seat on which a person can sit. A central axis of base B1 substantially coincides with a central axis of support 33H corresponding to the pole of the shade (body 30). Blower 4 and the like are
10 accommodated in base B1 (housing 7I). Suction port 6 is disposed on an outer peripheral surface of base B1 (two suction ports are illustrated in FIG. 13). Here, an outer diameter of body 30 of reflector 3H having a shade-like shape is set to be larger than an outer diameter of base B1. The fact that the outer diameter of body 30 is larger than the outer diameter of base B1 facilitates
15 return of the airflow that has hit reflector 3H.

[0104]

Guide 8 is configured to guide the airflow discharged from discharge port
5 to flow toward reflector 3H along specific direction A1. A lower end of guide 8 is fixed to base B1. Guide 8 has one or a plurality of partitions 80 that divides
20 environmental space 100 into two or more along direction D4 orthogonal to specific direction A1. Here, for example, a total of four partitions 80 is provided (only three partitions are illustrated in FIG. 13), and environmental space 100 is divided into four. Each of partitions 80 has a long plate shape along specific direction A1. Here, four plate-shaped partitions 80 guide the airflow
25 discharged from discharge port 5 so as to flow toward reflector 3H along specific direction A1.

[0105]

Four partitions 80 protrude from base B1 along specific direction A1. Here, when base B1 is viewed from above, four partitions 80 are arranged so as to divide a region of an upper surface of base B1 into four equal parts around the central axis of base B1. That is, each of the regions obtained by dividing the upper surface of base B1 into four equal parts has a fan shape having a central angle of about 90 degrees. Here, for example, dimensions of base B1 are set to such an extent that one person can sit on each fan-shaped region. That is, here, the dimensions are set such that four people can sit on base B1 at the same time. However, a number of people who can be seated at the same time is not limited to four.

[0106]

An outer edge (an edge opposite to the central axis) of each partition 80 includes intermediate edge 800 extending along the vertical direction, first edge 801 continuous from a lower part of intermediate edge 800, second edge 802 continuous from an upper part of intermediate edge 800, and third edge 803 continuous from a tip of second edge 802. First edge 801 is curved so as to expand toward a peripheral edge of base B1 as approaching the upper surface of base B1. Second edge 802 is curved so as to protrude upward. Third edge 803 is curved so as to hang down along an inner surface of reflector 3H. Four partitions 80 function as a plurality of frames that stably holds reflector 3H having a shade-like shape by being in contact with the inner surface of reflector 3H at third edges 803.

[0107]

Guide 8 further includes backrest part 81 protruding from the upper surface of base B1 along specific direction A1 between two adjacent partitions 80 of four partitions 80. A total of four backrest parts 81 are provided such that one backrest is disposed in each fan-shaped region of base B1 (only two

backrests are illustrated in FIG. 13). A person seated in each fan-shaped region of base B1 can relax utilizing backrest part 81.

[0108]

Each backrest part 81 has a hollow cylindrical shape with both end
5 surfaces in a longitudinal direction opened. Further, each backrest part 81 communicates with an accommodation space of blower 4 in base B1. The opened upper surface of each backrest part 81 serves as discharge port 5. In short, the airflow of blower 4 in base B1 can pass through each backrest part 81 and be discharged upward from discharge port 5. Therefore, the airflow of
10 blower 4 is individually discharged upward from a total of four discharge ports 5. Here, an airflow from one common blower 4 branches at inlets of four backrest parts 81 and is discharged from four discharge ports 5.

[0109]

Airflow environment system 1I according to Modification 5 includes
15 guide 8, and thus the returning airflow can be further stabilized.

[0110]

Further, because guide 8 has partitions 80, the physical sensation of the airflow can be improved individually in each of the plurality of spaces divided by partitions 80. Furthermore, partitions 80 protrude from base B1 along
20 specific direction A1, and thus each person can sit on base B1 and sense the airflow in each space divided by partitions 80. In addition, guide 8 supporting reflector 3H eliminates the need for providing a support member for supporting reflector 3H separately from guide 8 for guiding the airflow.

[0111]

25 In airflow environment system 1I according to Modification 5, each person sits on the region between two adjacent partitions 80 on the upper surface of base B1, and thus each person can feel the airflow discharged from

corresponding discharge port 5 in the space surrounded by two partitions 80. In particular, because each space is partitioned by partitions 80, a certain distance from a person sitting next to each person is maintained, and a view of the person sitting next to each person is more likely to be blocked. As a result, a sense of security can be given to each person using airflow environment system 1I.

[0112]

Airflow environment system 1I according to Modification 5 eliminates the need for a part for hanging body 30 from the ceiling surface, and airflow environment system 1I can be easily installed and introduced even in a space where the ceiling is opened, for example.

[0113]

(3.6) Modification 6

Hereinafter, airflow environment system 1J according to Modification 6 will be described with reference to FIG. 14. However, components substantially common to airflow environment system 1 of the basic example are denoted by the same reference numerals, and the description thereof is appropriately omitted.

[0114]

Airflow environment system 1J of Modification 6 is different from airflow environment system 1 of the basic example in that airflow environment system 1J includes reflector 3I having a substantially semi-cylindrical (barrel-vaulted) body 30H.

[0115]

FIG. 14 is an external perspective view of airflow environment system 1J according to Modification 6. It is assumed that airflow environment system 1J of Modification 6 is applied to, for example, a work space in which a plurality

of (here, six) seats 401 and work desk 402 (long desks) are installed such that a plurality of people can use the system to study or work.

[0116]

Reflector 3I of airflow environment system 1J according to Modification 5 6 includes body 30H and one or more (here, a pair of) supports 33. Body 30H is elongated along one direction (a direction from the front to the back in FIG. 14). Body 30H has a substantially semi-cylindrical shape with both ends in the longitudinal direction and a lower surface opened. The longitudinal direction of body 30H is along the longitudinal direction of work desk 402. In other 10 words, an axial direction of body 30H having a substantially semi-cylindrical shape is along the longitudinal direction of work desk 402. Body 30H is a plate-like part curved in an arc shape so as to protrude toward the ceiling surface when viewed along the axial direction. The pair of supports 33 is a part for hanging body 30H from the ceiling surface.

15 [0117]

Housing 7J of the air blower system of airflow environment system 1J also serves as work desk 402. Work desk 402 includes base stand 403 having a rectangular parallelepiped shape elongated along the axial direction of body 30H, and top plate 404 having a flat plate shape placed on base stand 403. 20 Each person can sit on seat 401, place a laptop computer or the like on top plate 404, and work.

[0118]

Six seats 401 are arranged around work desk 402. Specifically, three seats 401 are arranged along the axial direction of body 30H so as to face first 25 side 402A as one of both sides in a width direction of work desk 402. Similarly, remaining three seats 401 are arranged along the axial direction of body 30H so as to face second side 402B as the other side of both sides in the width direction

of work desk 402. Here, a case where six seats 401 are arranged around work desk 402 has been described as an example, but work desk 402 has various dimensions and shapes depending on a number and arrangement of seats 401. Blower 4 and the like are accommodated in base stand 403 of work desk 402 (housing 7J). Suction port 6 is disposed on an outer peripheral surface of base stand 403 (two suction ports are illustrated in FIG. 13). Here, a width dimension (diameter dimension) of body 30H having a substantially semi-cylindrical shape is set such that each person seated on seat 401 is wrapped around the returning airflow.

10 [0119]

In airflow environment system 1J, discharge port 5 is configured by an opening provided in a center of top plate 404. The opening of top plate 404 communicates with an accommodation space accommodating blower 4 in base stand 403. Here, top plate 404 is desirably covered with, for example, a mesh-like protective cover such that foreign matters do not enter from the opening of top plate 404.

[0120]

Airflow environment system 1J has a configuration in which the airflow that has hit reflector 3I having a substantially semi-cylindrical shape easily returns. That is, the airflow discharged from discharge port 5 hits the inner surface of body 30H having a substantially semi-cylindrical shape, and returns so as to be divided into both sides (two directions) in the width direction. Therefore, each person seated on seat 401 can work while sensing the airflow.

[0121]

25 As another example of Modification 6, airflow environment system 1K as illustrated in FIG. 15 may be provided. In airflow environment system 1K, three seats 401 are arranged along the axial direction of body 30H so as to face

first side 402A as one of both sides in the width direction of work desk 402. On the other hand, second side 402B as the other side of both sides in the width direction of work desk 402 is close to wall 405 as a construction material of a building or the like.

5 [0122]

Further, reflector 3J of airflow environment system 1K has body 30I that is only one side (right side in FIG. 14) in a width direction of body 30H of reflector 3I described above.

[0123]

10 In airflow environment system 1K, each person seated on seat 401 works while facing wall 405. Also in this configuration, each person can work while sensing the airflow. In particular, wall 405 functions as “guide 8” described in Modification 5. That is, wall 405 can guide the airflow discharged from discharge port 5 so as to flow toward reflector 3J along specific direction A1. As
15 a result, in airflow environment system 1K, wall 405 can further improve the stability of the returning airflow.

[0124]

(3.7) Other modifications

Blower 4, light projector E1, speaker unit F1, and functional unit G1 in
20 the basic example are not essential components in airflow environment system 1, and airflow environment system 1 may lack one or more of the above components. Suction port 6 in the basic example is not an essential component in airflow environment system 1, and airflow environment system 1 may lack suction port 6.

25 [0125]

In the basic example, specific direction A1 is parallel to the vertical direction and is further vertically upward, but may be vertically downward.

Alternatively, specific direction A1 may be a direction intersecting the vertical direction. However, when specific direction A1 is at least parallel to the vertical direction, the airflow returning toward discharge port 5 can be easily formed.

5 [0126]

In the basic example, both light projector E1 and illuminator E2 are provided. However, it is sufficient that only one of light projector E1 or illuminator E2 is provided. An object to which attachment part 35 is attached may be a rail member having no power feeding function (conductor) other than
10 wire duct 200 of the basic example.

[0127]

In the basic example, reflector 3 is configured to hang body 30 from the ceiling surface via support 33. However, similarly to the pole (shaft) of the shade, the first end of support 33 may be attached to the inner vertex of body 30
15 (a center of first region 31), and the second end of support 33 may be fixed to table top 70 of housing 7.

[0128]

Alternatively, support 33 may have a substantially J shape as a whole. Specifically, the first end of support 33 may be attached to the outer vertex of
20 body 30 (as in the basic example), a middle of support 33 may be curved so as to bypass hollow part 9, and the second end of support 33 may be fixed to floor surface 101.

[0129]

In the basic example, it is sufficient that reflector 3 has a shade-like
25 shape as a whole and has curved surface 300 inside. For example, reflector 3 may have a block shape as a whole, and only the lower surface of reflector 3 may be recessed so as to be curved surface 300.

[0130]

In the basic example, reflector 3 has only one curved surface 300 inside. However, reflector 3 may have a plurality of continuous curved surfaces 300. In other words, inside reflector 3, there may be one or a plurality of inflection
5 points that protrudes in a direction toward discharge port 5.

[0131]

In the basic example, airflow environment system 1 operates via operation unit J1. However, for example, airflow environment system 1 may include a motion sensor and be configured to automatically operate upon
10 detection of a person.

[0132]

Body 30 of reflector 3 in the basic example may be collapsible or expandable such that the shade is folded around the pole. In short, an area of the opening of body 30 may be variable as appropriate at the installation site.

15 [0133]

(4) Summary

As described above, airflow environment system (1, 1A to 1K) according to a first aspect includes discharge port (5) and reflector (3, 3A to 3J). Discharge port (5) discharges an airflow flowing at least along specific direction
20 (A1) to environmental space (100). Reflector (3, 3A to 3J) is disposed so as to face discharge port (5) in specific direction (A1), and is hit by the airflow flowing along specific direction (A1). Reflector (3, 3A to 3J) is configured to return the hit airflow toward discharge port (5) in environmental space (100). Airflow environment system (1, 1A to 1K) according to the first aspect can improve, for
25 example, the physical sensation of the airflow formed in environmental space (100) to the user (person) in environmental space (100).

[0134]

In relation to airflow environment system (1, 1A to 1K) according to a second aspect, in the first aspect, reflector (3, 3A to 3J) preferably has first region (31, 31A to 31D) and second region (32, 32A to 32D). The airflow flowing along specific direction (A1) hits first region (31, 31A to 31D). Second region (32, 32A to 32D) is located around first region (31, 31A to 31D) and allows the airflow that has hit first region (31, 31A to 31D) to flow along second region (32, 32A to 32D) and return toward discharge port (5). In the second aspect, for example, a layer of an airflow returned toward discharge port (5) with first region (31, 31A to 31D) as a center is easily formed, and environmental space (100) is more likely to be divided into two spaces by the layer. Therefore, airflow environment system (1, 1A to 1K) according to the second aspect can further improve, for example, the physical sensation of the airflow to the user (person) in environmental space (100).

[0135]

In relation to airflow environment system (1, 1B to 1K) according to a third aspect, in the second aspect, second region (32, 32B to 32D) is preferably curved so as to be closer to discharge port (5) as second region (32, 32B to 32D) is farther away from first region (31, 31B to 31D) along a direction orthogonal to specific direction (A1). Airflow environment system (1, 1B to 1K) according to the third aspect can further facilitate formation of the layer of the airflow to be returned toward discharge port (5).

[0136]

In relation to airflow environment system (1, 1A to 1K) according to a fourth aspect, in any one of the first to third aspects, first flow path (P1, P1A to P1D) and second flow path (P2, P2A to P2D) are preferably formed in environmental space (100). In first flow path (P1, P1A to P1D), the airflow discharged from discharge port (5) flows toward reflector (3, 3A to 3J). In

second flow path (P2, P2A to P2D), the airflow that has hit reflector (3, 3A to 3J) returns toward discharge port (5). When viewed along specific direction (A1), second flow path (P2, P2A to P2D) is formed so as to surround first flow path (P1, P1A to P1D). In the fourth aspect, for example, a person approaching first
5 flow path (P1, P1A to P1D) is more likely to come in contact with the layer of the airflow returning through second flow path (P2, P2A to P2D). Thus, airflow environment system (1, 1A to 1K) according to the fourth aspect can further improve, for example, the physical sensation of the airflow to the user (person) in environmental space (100). In particular, a speed of the airflow returning
10 through second flow path (P2, P2A to P2D) can be smaller than a speed of the airflow discharged from discharge port (5). Therefore, conversely, airflow environment system (1, 1A to 1K) according to the fourth aspect can reduce the possibility of giving discomfort to a person approaching first flow path (P1, P1A to P1D), as compared with a case where the air discharged from discharge port
15 (5) flows toward reflector (3, 3A to 3J) through second flow path (P2, P2A to P2D) and returns toward discharge port (5) through first flow path (P1, P1A to P1D).
[0137]

In relation to airflow environment system (1, 1A to 1H, 1J) according to a fifth aspect, in any one of the first to fourth aspects, discharge port (5) and
20 reflector (3, 3A to 3G, 3I) are preferably spaced apart from each other via hollow part (9) of a gap in specific direction (A1). The airflow discharged from discharge port (5) and the airflow returning toward discharge port (5) flow through hollow part (9). In airflow environment system (1, 1A to 1H, 1J) according to the fifth aspect, discharge port (5) and reflector (3, 3A to 3G, 3I) are
25 spaced apart from each other via hollow part (9), and thus a possibility of giving a sense of openness to a person in environmental space (100) can be increased.
[0138]

In relation to airflow environment system (1, 1A to 1K) according to a sixth aspect, in any one of the first to fifth aspects, specific direction (A1) is preferably parallel to the vertical direction. Airflow environment system (1, 1A to 1K) according to the sixth aspect can easily form the airflow returning toward discharge port (5), for example, as compared with a case where specific direction (A1) intersects the vertical direction.

[0139]

In relation to airflow environment system (1, 1A to 1K) according to a seventh aspect, in the sixth aspect, specific direction (A1) is preferably vertically upward. Airflow environment system (1, 1A to 1K) according to the seventh aspect can more stably form the airflow returning toward discharge port (5) (vertically downward).

[0140]

Airflow environment system (1, 1A to 1K) according to an eighth aspect preferably further includes blower (4) in any one of the first to seventh aspects. Blower (4) generates the airflow flowing along specific direction (A1) and sends the airflow to discharge port (5). Airflow environment system (1, 1A to 1K) according to the eighth aspect can provide airflow environment system (1, 1A to 1K) with blower (4) capable of improving the physical sensation of the airflow formed in environmental space (100).

[0141]

Airflow environment system (1, 1A to 1K) according to a ninth aspect preferably further includes, in the eighth aspect, suction port (6) connected to environmental space (100). Blower (4) sucks, from suction port (6), the airflow returned from reflector (3, 3A to 3J) toward discharge port (5), and generates the airflow flowing along specific direction (A1). Airflow environment system (1, 1A to 1K) according to the ninth aspect can more stably circulate the airflow

formed in environmental space (100).

[0142]

In any one of the first to ninth aspects, airflow environment system (1, 1A to 1K) according to a tenth aspect preferably further includes light projector
5 (E1) configured to emit light toward reflector (3, 3A to 3J). Airflow environment system (1, 1A to 1K) according to the tenth aspect may provide light (brightness) to environmental space (100) in addition to the airflow.

[0143]

In any one of the first to tenth aspects, airflow environment system (1,
10 1A to 1K) according to an eleventh aspect preferably further includes illuminator (E2) configured to emit light toward discharge port (5). Airflow environment system (1, 1A to 1K) according to the eleventh aspect may provide light (for example, brightness) to environmental space (100) in addition to the airflow.

15 [0144]

In any one of the first to eleventh aspects, airflow environment system (1, 1A to 1K) according to a twelfth aspect preferably further includes speaker unit (F1) configured to make a sound toward reflector (3, 3A to 3J). Airflow environment system (1, 1A to 1K) according to the twelfth aspect can provide a
20 sound (for example, acoustic sound) to the environmental space (100) in addition to the airflow.

[0145]

In relation to airflow environment system (1, 1A to 1H, 1J, 1K) according to a thirteenth aspect, in any one of the first to twelfth aspects, reflector (3, 3A
25 to 3G, 3I, 3J) preferably has attachment part (35) attached to wire duct (200). Airflow environment system (1, 1A to 1H, 1J, 1K) according to the thirteenth aspect can improve workability related to installation of reflector (3, 3A to 3G,

3I, 3J).

[0146]

In any one of the first to thirteenth aspects, airflow environment system (1, 1A to 1K) according to a fourteenth aspect preferably further includes functional unit (G1) that gives an additional element to the airflow discharged from discharge port (5) to environmental space (100). The additional element includes at least one of aroma, air purification, or temperature change. Airflow environment system (1, 1A to 1K) according to a fourteenth aspect can provide the airflow provided with the additional element.

[0147]

In relation to airflow environment system (1E, 1I, 1H) according to a fifteenth aspect, in any one of the first to fourteenth aspects, discharge port (5) is preferably disposed on floor surface (101) or one surface of a member constituting seat (303). In airflow environment system (1E, 1I, 1H) according to the fifteenth aspect, as compared with, for example, a case where discharge port (5) is disposed on one surface of a dedicated housing, convenience can be improved while reducing a possibility that appearance of environmental space (100) is impaired.

[0148]

Airflow environment system (1I, 1K) according to a sixteenth aspect further includes guide (8) configured to guide the airflow discharged from discharge port (5) to flow toward reflector (3H, 3J) along specific direction (A1) in any one of the first to fifteenth aspects. Airflow environment system (1I, 1K) according to the sixteenth aspect can further improve stability of the returning airflow.

[0149]

In relation to airflow environment system (1I) according to a

seventeenth aspect, in the sixteenth aspect, guide (8) has one or a plurality of partitions (80) that divides environmental space (100) into two or more along direction (D4) orthogonal to specific direction (A1). Airflow environment system (1I) according to the seventeenth aspect can improve the physical sensation of the airflow individually in each of the plurality of spaces divided by partitions (80).

[0150]

Airflow environment system (1I) according to an eighteenth aspect further includes, in the seventeenth aspect, base (B1) configured to be seated by a person. Each partition (80) protrudes from base (B1) along specific direction (A1). In airflow environment system (1I) according to the eighteenth aspect, for example, a user (person) can sit on base (B1) and sense the airflow in each space divided by partition (80).

[0151]

In relation to airflow environment system (1I, 1K) according to a nineteenth aspect, in any one of the sixteenth to eighteenth aspects, guide (8) supports reflector (3H, 3J). Airflow environment system (1I, 1K) according to the nineteenth aspect eliminates the need for providing a support member that supports reflector (3H, 3J) separately from guide (8) that guides the airflow.

[0152]

Configurations according to the second to nineteenth aspects are not essential for airflow environment system (1, 1A to 1K), and can be omitted as appropriate.

REFERENCE MARKS IN THE DRAWINGS

[0153]

1: airflow environment system

	1A: airflow environment system
	1B: airflow environment system
	1C: airflow environment system
	1D: airflow environment system
5	1E: airflow environment system
	1F: airflow environment system
	1G: airflow environment system
	1H: airflow environment system
	1I: airflow environment system
10	1J: airflow environment system
	1K: airflow environment system
	2: blower system
	3: reflector
	3A: reflector
15	3B: reflector
	3C: reflector
	3D: reflector
	3E: reflector
	3F: reflector
20	3G: reflector
	3H: reflector
	3I: reflector
	3J: reflector
	30: body
25	30A: body
	30B: body
	30C: body

	30D: body
	30F: body
	30G: body
	30H: body
5	30I: body
	31: first region
	31A: first region
	31B: first region
	31C: first region
10	31D: first region
	32: second region
	32A: second region
	32B: second region
	32C: second region
15	32D: second region
	33: support
	33H: support
	35: attachment part
	300: curved surface
20	300A: urved surface
	300B: curved surface
	300C: curved surface
	300D: curved surface
	4: blower
25	5: discharge port
	6: suction port
	7: housing

	70: table top
	7F: housing
	7G: housing
	7H: housing
5	7I: housing
	7J: housing
	7K: housing
	71: column
	72: discharge part
10	73: protective cover
	730: window
	74: duct
	75: ornament
	76: seating part
15	760: seat surface
	761: square bar
	77: backrest
	8: guide
	80: partition
20	81: backrest part
	9: hollow part
	100: environmental space
	101: floor surface
	150: system ceiling
25	151: ceiling member
	152: wall surface
	200: wire duct

	301: lobby sofa
	302: waiting seat
	303: seat
	401: seat
5	402: work desk
	402A: first side
	402B: second side
	403: base stand
	404: top plate
10	405: wall
	800: intermediate edge
	801: first edge
	802: second edge
	803: third edge
15	A1: specific direction
	A2: return direction
	B1: base
	D: tangential direction
	D1: tangential direction
20	D2: tangential direction
	D3: tangential direction
	D4: direction orthogonal to specific direction
	E1: light projector
	E2: illuminator
25	F1: speaker unit
	F10: speaker
	G1: functional unit

	H1: control unit
	J1: operation unit
	P1: first flow path
	P1A: first flow path
5	P1B: first flow path
	P1C: first flow path
	P1D: first flow path
	P2: second flow path
	P2A: second flow path
10	P2B: second flow path
	P2C: second flow path
	P2D: second flow path
	W1: depth
	X1: intermediate layer
15	X1A: intermediate layer
	X1B: intermediate layer
	X1C: intermediate layer
	X1D: intermediate layer

CLAIMS

1. An airflow environment system comprising:

a discharge port configured to discharge an airflow flowing at least along

5 a specific direction to an environmental space; and

a reflector disposed to face the discharge port in the specific direction
and configured to be hit by the airflow flowing along the specific direction,

wherein the reflector allows the airflow that has hit the reflector to
return toward the discharge port in the environmental space.

10

2. The airflow environment system according to claim 1, wherein

the reflector includes a first region configured to be hit by the airflow
flowing along the specific direction, and a second region that is located around
the first region and allows the airflow that has hit the first region to flow along

15 the second region and return toward the discharge port.

3. The airflow environment system according to claim 2, wherein

the second region is curved to be closer to the discharge port as the
second region is farther away from the first region along a direction orthogonal

20 to the specific direction.

4. The airflow environment system according to any one of claims 1 to
3, wherein

the environmental space is provided with a first flow path through which
25 the airflow discharged from the discharge port flows toward the reflector and a
second flow path through which the airflow that has hit the reflector returns
toward the discharge port, and

the second flow path is provided to surround the first flow path when viewed along the specific direction.

5. The airflow environment system according to any one of claims 1 to 4, wherein

the discharge port and the reflector are separated from each other via a hollow part of a gap in the specific direction, and

the airflow discharged from the discharge port and the airflow returning toward the discharge port flow through the hollow part.

6. The airflow environment system according to any one of claims 1 to 5, wherein the specific direction is parallel to a vertical direction.

7. The airflow environment system according to claim 6, wherein the specific direction is vertically upward.

8. The airflow environment system according to any one of claims 1 to 7, further comprising a blower configured to generate the airflow flowing along the specific direction and send the airflow to the discharge port.

9. The airflow environment system according to claim 8, further comprising a suction port connected to the environmental space,

wherein the blower sucks, from the suction port, the airflow returned from the reflector toward the discharge port and generates the airflow flowing along the specific direction.

10. The airflow environment system according to any one of claims 1

to 9, further comprising a light projector configured to emit light toward the reflector.

11. The airflow environment system according to any one of claims 1 to 10, further comprising an illuminator configured to emit light toward the discharge port.

12. The airflow environment system of any one of claims 1 to 11, further comprising a speaker unit configured to make a sound toward the reflector.

13. The airflow environment system according to any one of claims 1 to 12, wherein the reflector includes an attachment part attached to a wire duct.

14. The airflow environment system according to any one of claims 1 to 13, further comprising a functional unit configured to give an additional element to the airflow discharged from the discharge port to the environmental space,

wherein the additional element includes at least one of aroma, air purification, or temperature change.

15. The airflow environment system according to any one of claims 1 to 14, wherein the discharge port is disposed on a floor surface or one surface of a member constituting a seat.

16. The airflow environment system according to any one of claims 1 to 14, further comprising a guide configured to guide the airflow discharged from

the discharge port to flow toward the reflector along the specific direction.

17. The airflow environment system according to claim 16, wherein the guide includes one or a plurality of partitions that divides the environmental
5 space into two or more along a direction orthogonal to the specific direction.

18. The airflow environment system according to claim 17, further comprising a base configured to be seated by a person,
wherein each of the plurality of partitions protrudes from the base along
10 the specific direction.

19. The airflow environment system according to any one of claims 16 to 18, wherein the guide supports the reflector.