

DESCRIPTION

BLOWER DEVICE

TECHNICAL FIELD

[0001] The present disclosure relates to a blower device.

BACKGROUND ART

[0002] In order to enhance the realistic feeling of an image displayed on an image display device, there is known a blower device (air conditioner) configured to blow out air (cold wind or hot wind) with temperature controlled in accordance with the image displayed on the image display device from an air blow-out port disposed in the vicinity of the image display device (see, for example, PTL 1).

[0003] In a conventional blower device, air having different environments (for example, temperature and humidity) is prepared using two air conditioning units, and temperature-controlled air is blown from one of the air conditioning units by switching between a plurality of opening and closing dampers. While one of the air conditioning units is blowing air, the other of the air conditioning units prepares for forming air in an environment corresponding to an image to be displayed next on the image display device. Due to this, the blower device is configured to make a rapid environmental change.

Citation List

Patent Literature

[0004] PTL 1: Unexamined Japanese Patent Publication No. H4-212388

SUMMARY

[0005] However, in the conventional blower device, the temperature-controlled air is switched with electrical switch between the fans in the two air conditioning units and electrical switch between plurality of opening and closing dampers. This causes a synchronization deviation between the fan and the opening and closing damper or a synchronization deviation between the opening and closing dampers. As a result, there is a problem that a deviation (error) occurs between the image displayed on the image display device and the timing at which the temperature-controlled air corresponding to the displayed video is blown to the user, and the realistic feeling of the image is reduced.

[0006] The present disclosure provides a blower device capable of improving switching responsiveness of airflows supplied from two air conditioning units. Furthermore, the present disclosure provides a blower device capable of suppressing an error that occurs between a timing at which a video is displayed on an image display device and a timing at which air-conditioned air corresponding to the displayed video is sent to the user, and reducing a possibility that a realistic feeling is impaired.

[0007] In one aspect, a blower device according to the present disclosure includes a first air conditioning unit, a second air conditioning unit, a junction, and a blow-out port. The first air conditioning unit supplies a first airflow from a first opening by the operation of a first blower. The second air conditioning unit supplies a second airflow from a second opening by the operation of a second blower. The junction is configured to allow the first airflow supplied from the first opening and the second airflow supplied from the second opening to join together. Through the blow-out port, an airflow including at least one of the first airflow and the second airflow sent from the junction is blown out into a control space. The junction includes a damper configured to be rotatable by the wind pressure of the first airflow and the wind pressure of the second airflow.

[0008] According to the present disclosure, it is possible to provide a blower device capable of improving switching responsiveness of airflows supplied from two air conditioning units. Furthermore, according to the present disclosure, it is possible to provide a blower device capable of suppressing an error that occurs between a timing at which a video is displayed on an image display device and a timing at which air-conditioned air corresponding to the displayed video is blown toward the user, and reducing a possibility that a realistic feeling is impaired.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Fig. 1 is a schematic configuration diagram of a video sensory system using a blower device according to a first exemplary embodiment of the present disclosure.

Fig. 2 is a schematic view illustrating an internal configuration in a state where the first blower of the blower device operates and the first airflow circulates.

Fig. 3 is a schematic view illustrating an internal configuration in a state where the second blower of the blower device operates and the second airflow circulates.

Fig. 4 is a schematic view illustrating an internal configuration in a state in which

the first blower and the second blower of the blower device operates and the first airflow and the second airflow circulate.

DESCRIPTION OF EMBODIMENT

[0010] A blower device according to the present disclosure includes the first air conditioning unit, the second air conditioning unit, the junction, and the blow-out port. The first air conditioning unit supplies the first airflow from the first opening by the operation of the first blower. The second air conditioning unit supplies the second airflow from the second opening by the operation of the second blower. The junction is configured to allow the first airflow supplied from the first opening and the second airflow supplied from the second opening to join together. Through the blow-out port, an airflow including at least one of the first airflow and the second airflow sent from the junction is blown out into the control space. The junction includes the damper configured to be rotatable by the wind pressure of the first airflow and the wind pressure of the second airflow.

[0011] According to such configuration, an air passage at the junction is controlled by controlling the blowing power of the first blower and the blowing power of the second blower. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching can be performed between a state of closing the first opening (the circulation state of the second airflow) and a state of closing the second opening (the circulation state of the first airflow). That is, it is possible to provide a blower device capable of improving switching responsiveness of airflows supplied from two air conditioning units.

[0012] The blower device according to the present disclosure may further include a flow divider configured to be able to divide the flow of air sucked from the control space into the first air conditioning unit and the second air conditioning unit. The flow divider may include a first branch panel configured to be rotatable in accordance with the blowing power of the first blower and a second branch panel configured to be rotatable in accordance with the blowing power of the second blower.

[0013] Due to this, the air passage in the flow divider is controlled by controlling the blowing power of the first blower and the blowing power of the second blower. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching

can be performed between a state in which only the first airflow is circulated by rotating the first branch panel and a state in which only the second airflow is circulated by rotating the second branch panel. That is, the blower device can further improve the switching responsiveness of the airflows supplied from the two air conditioning units.

[0014] In the blower device according to the present disclosure, the damper may be configured to be rotatable about a rotating shaft. The rotating shaft may be provided along the vertical direction.

[0015] This eliminates the need for continuously pressing the damper with the wind pressure of the airflow in the state where only the first airflow circulates or in the state where only the second airflow circulates. This reduces the ventilation resistance by the damper, and can thus efficiently blow the third airflow.

[0016] In the blower device according to the present disclosure, the first air conditioning unit may supply the first airflow having a first temperature. The second air conditioning unit may supply the second airflow having a second temperature different from the first temperature. The first temperature may be lower than the temperature of the air in the control space, and the second temperature may be higher than the temperature of the air in the control space.

[0017] Due to this, when the blower device is applied to a video sensory system, it is possible to blow out cool air having the first temperature or warm air having the second temperature in accordance with an image displayed on the display device. This can enhance the realistic feeling (sensory feeling) of the projected video.

[0018] In the blower device according to the present disclosure, the damper may be adjusted by changing the ratio between the blowing power of the first blower and the blowing power of the second blower within the range from a state where the rotation position closes the first opening to a state where the rotation position closes the second opening.

[0019] According to such configuration, an air passage at the junction is controlled by controlling the blowing power of the first blower and the blowing power of the second blower. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching can be performed between the state of closing the first opening (the circulation state of the second airflow) and the state of closing the second opening (the circulation state of the first airflow). That is, it is possible to provide a blower device

capable of improving switching responsiveness of airflows supplied from two air conditioning units.

[0020] An exemplary embodiment of the present disclosure will be described below with reference to the accompanying drawings. The following exemplary embodiment illustrates a preferred specific example of the present disclosure. Therefore, shapes, constituent elements, arrangement positions of the constituent elements, and the like illustrated in the following exemplary embodiment are merely examples, and are not intended to limit the present disclosure. Accordingly, among the constituent elements in the following exemplary embodiment, the constituent elements that are not described in the independent claims representing the most superordinate concept of the present disclosure are described as optional constituent elements. In each of the drawings, substantially the same configuration is denoted by the same reference mark, and redundant description will be omitted or simplified.

[0021] (First exemplary embodiment)
(Video sensory system 1)

First, an outline of video sensory system 1 using blower device 3 according to the first exemplary embodiment of the present disclosure will be described with reference to Fig. 1. Fig. 1 is a schematic configuration diagram of video sensory system 1 using blower device 3 according to the first exemplary embodiment of the present disclosure.

[0022] In the following description, description may be made as follows. That is, with a direction in which blower device 3 provided in video sensory system 1 and chair 51 oppose each other is defined as a front-rear direction, a side on which blower device 3 is provided with respect to chair 51 may be described as “front”, and a side on which chair 51 is provided with respect to blower device 3 may be described as “rear”. A left-right direction in a state where display device 50 provided in blower device 3 is viewed from the front may be referred to as “left side” or “right side”, and a perpendicular direction (vertical direction) may be referred to as “up or upper” or “down or lower” as the up-down direction.

[0023] Video sensory system 1 is a system configured as a box-type room unit that allows a user to feel an airflow (cool air or warm air) corresponding to a video (scenery, situation, or the like) projected onto a display screen, through which the user obtains realistic feeling (sensory feeling) of the projected video.

[0024] Specifically, as illustrated in Fig. 1, video sensory system 1 includes control space

2 in which the user (not illustrated) is seated on chair 51 and views a video, blower device 3 that blows an airflow toward the user, and circulation duct 7 that communicably connects control space 2 and blower device 3.

[0025] Control space 2 is a space for the user to view the video. Control space 2 is a space configured by a room (viewing room) surrounded by wall surfaces in the front-rear direction, the left-right direction, and the up-down direction. Chair 51 on which the user can be seated is installed at the center rear of control space 2 in the front-rear direction. The wall surface in front of chair 51 is provided with display device 50.

[0026] Both left and right ends of display device 50 are provided with a pair of airflow blow-out ports 4 through which an airflow (third airflow X3) is blown toward the user seated on chair 51. A ceiling (above) of control space 2 is provided with circulation port 5 through which air is discharged from control space 2. The wall surface behind chair 51 is provided with a door (not illustrated) serving as an entrance or exit to or from control space 2.

[0027] Control space 2 may be provided with an air conditioner that adjusts air in control space 2 to a predetermined temperature (for example, 25 °C). In addition to circulation port 5, control space 2 may be provided with an air supply port and an air exhaust port of a heat exchange type ventilator that performs heat exchange ventilation.

[0028] Display device 50 is a device having a large display screen such as a digital signage, which is an information medium for displaying various videos, for example. Display device 50 is installed on a wall surface of control space 2 in front of chair 51.

[0029] Chair 51 includes a seat on which the user can be seated and a backrest provided at a rear of the seat and capable of being tilted (capable of being reclined). This allows the user to sit back on chair 51 to view the video projected onto display device 50.

[0030] Blower device 3 is installed adjacent to control space 2 on the wall surface side in front of chair 51. Blower device 3 is a device that sends an airflow toward the user seated on chair 51 from each of the pair of airflow blow-out ports 4 provided at both left and right ends of display device 50. Blower device 3 has suction port 6 and the pair of airflow blow-out ports 4, and blows out, from the airflow blow-out ports 4 as third airflow X3, air sucked from suction port 6 (air supplied from control space 2). Details of blower device 3 will be described below.

[0031] Circulation duct 7 is a duct that communicably connects circulation port 5 provided on the ceiling of control space 2 and suction port 6 of blower device 3.

Circulation duct 7 extends in the ceiling of control space 2, and circulates the air discharged from circulation port 5 to suction port 6 during operation of blower device 3.

[0032] Circulation port 5 is an opening through which air is discharged from control space 2. Circulation port 5 is provided on the ceiling (ceiling (upper) on the wall surface side behind chair 51) on the wall surface side opposing the wall surface provided with airflow blow-out port 4 such that air is discharged from the rear side of chair 51.

[0033] (Blower device 3)

Next, blower device 3 used in video sensory system 1 will be described with reference to Figs. 2 and 3. Fig. 2 is a schematic view illustrating the internal configuration in a state where first blower 22 of blower device 3 operates and first airflow X1 circulates. Fig. 3 is a schematic view illustrating the internal configuration in a state where second blower 32 of blower device 3 operates and second airflow X2 circulates. Here, in Fig. 2, blower device 3 is in a state of performing the operation of first blower 22 and stopping the operation of second blower 32. On the other hand, in Fig. 3, blower device 3 is in a state of performing the operation of second blower 32 and stops the operation of first blower 22. In Figs. 2 and 3, the wall surface of blower device 3 on the front side of the box is omitted.

[0034] Blower device 3 prepares air having different environments (for example, temperature and humidity) using the two air conditioning units (first air conditioning unit 20 and second air conditioning unit 30), and changes a ratio (blowing power ratio) between a blowing power (air volume) of first blower 22 provided in first air conditioning unit 20 and a blowing power of second blower 32 provided in second air conditioning unit 30. Due to this, blower device 3 adjusts the junction rate of first airflow X1 supplied from first air conditioning unit 20 and second airflow X2 supplied from second air conditioning unit 30 and sends them as third airflow X3. The junction rate also includes a case where the ratio of first airflow X1 is "0" or the ratio of second airflow X2 is "0".

[0035] Specifically, as illustrated in Figs. 2 and 3, blower device 3 includes flow divider 11, first air conditioning unit 20, second air conditioning unit 30, and junction 15.

[0036] First, flow divider 11 will be described.

[0037] Flow divider 11 is a member that is positioned on an upper part of blower device 3 and divides air sucked through suction port 6 into first air conditioning unit 20 and second air conditioning unit 30. Flow divider 11 includes suction port 6, first branch panel 12, second branch panel 13, first fastener 12b, and second fastener 13b.

[0038] Suction port 6 is an opening through which air discharged from circulation port 5

is sucked into flow divider 11 through circulation duct 7. Suction port 6 is provided on the upper surface of blower device 3, that is, the upper part of flow divider 11.

[0039] First branch panel 12 is a member that opens and closes first inflow opening 23 of first air conditioning unit 20 by rotating about first rotating shaft 12a. More specifically, first branch panel 12 is a flat-plate member, and is configured to hang down by its own weight from first rotating shaft 12a fixed to the upper surface of flow divider 11. In the operation stopped state of first blower 22, as illustrated in Fig. 3, first branch panel 12 is brought into a state of closing the air passage from suction port 6 to first air conditioning unit 20 by its own weight. On the other hand, during the operation of first blower 22, as illustrated in Fig. 2, first branch panel 12 rotates on first air conditioning unit 20 side by the blowing power of first blower 22 and is brought into a state of opening the air passage from suction port 6 to first air conditioning unit 20.

[0040] Second branch panel 13 is a member that opens and closes second inflow opening 33 of second air conditioning unit 30 by rotating about second rotating shaft 13a. More specifically, second branch panel 13 is a flat-plate member, and is configured to hang down by its own weight from second rotating shaft 13a fixed to the upper surface of flow divider 11. In the operation stopped state of second blower 32, as illustrated in Fig. 2, second branch panel 13 is brought into a state of closing the air passage from suction port 6 to second air conditioning unit 30 by its own weight. On the other hand, during the operation of second blower 32, as illustrated in Fig. 3, second branch panel 13 rotates on second air conditioning unit 30 side by the blowing power of second blower 32, and is brought into a state of opening the air passage from suction port 6 to second air conditioning unit 30.

[0041] First rotating shaft 12a pivotally supports first branch panel 12 in a rotatable manner. First rotating shaft 12a is provided at the base of first branch panel 12.

[0042] First fastener 12b is a member that restricts a movable range of first branch panel 12. First fastener 12b restricts first branch panel 12 from further moving on second air conditioning unit 30 side from a state where the tip of first branch panel 12 is in contact with first fastener 12b. As illustrated in Fig. 3, first branch panel 12 is brought into a state of closing first inflow opening 23 of first air conditioning unit 20 in a state where the tip of first branch panel 12 is in contact with first fastener 12b.

[0043] Second rotating shaft 13a pivotally supports second branch panel 13 in a rotatable manner. Second rotating shaft 13a is provided at the base of second branch panel 13.

[0044] Second fastener 13b is a member that restricts a movable range of second branch panel 13. Second fastener 13b restricts second branch panel 13 from further moving on first air conditioning unit 20 side from a state where the tip of second branch panel 13 is in contact with second fastener 13b. As illustrated in Fig. 2, second branch panel 13 is brought into a state of closing second inflow opening 33 of second air conditioning unit 30 in a state where the tip of second branch panel 13 is in contact with second fastener 13b.

[0045] Next, first air conditioning unit 20 will be described with reference to Fig. 2.

[0046] First air conditioning unit 20 is a unit that controls the temperature of air (first airflow X1) introduced from first inflow opening 23 to the first temperature by first air conditioner 21 when first blower 22 operates and sends the air from first outflow opening 24 to junction 15. Here, the first temperature is set to a temperature lower than the air in control space 2, for example. That is, in blower device 3, cool air (cold wind) is sent from first air conditioning unit 20 as first airflow X1.

[0047] Specifically, as illustrated in Fig. 2, first air conditioning unit 20 includes first inflow opening 23, first air conditioner 21, first air blower 22, and first outflow opening 24. First outflow opening 24 corresponds to the "first opening" in the claims.

[0048] First inflow opening 23 is communicably connected to flow divider 11 on first branch panel 12 side of flow divider 11. First inflow opening 23 is an opening through which air flows into first air conditioning unit 20 from flow divider 11 when first branch panel 12 rotates to open the air passage.

[0049] First air conditioner 21 is a member that adjusts the temperature (for example, 25 °C) of first airflow X1 introduced into first air conditioning unit 20 to the first temperature (for example, 15 °C) at which first airflow X1 becomes cool air. First air conditioner 21 is only required to be a general cooler, for example.

[0050] First blower 22 is a device that generates a flow of first airflow X1 in first air conditioning unit 20. First blower 22 is only required to be a general blower fan, for example. Then, first blower 22 rotates junction panel 16 at junction 15 on second outflow opening 34 side of second air conditioning unit 30 by the wind pressure (blowing power of first blower 22) of first airflow X1 sent from first outflow opening 24 to open the air passage at junction 15. Furthermore, first blower 22 rotates first branch panel 12 in flow divider 11 on first air conditioning unit 20 side by the attractive force generated with the release of first airflow X1 supplied from first outflow opening 24 to open the air passage in flow divider 11. Due to this, in blower device 3, the air passage from flow divider 11 to

junction 15 via first air conditioning unit 20 is opened, and a flow of first airflow X1 is generated in blower device 3.

[0051] Next, second air conditioning unit 30 will be described with reference to Fig. 3.

[0052] Second air conditioning unit 30 is a unit that controls the temperature of air (second airflow X2) introduced from second inflow opening 33 to the second temperature by second air conditioner 31 when second blower 32 operates and sends the air from second outflow opening 34 to junction 15. Here, the second temperature is set to a temperature higher than the air in control space 2, for example. That is, in blower device 3, warm air (warm wind) is sent from second air conditioning unit 30 as second airflow X2.

[0053] Specifically, as illustrated in Fig. 3, second air conditioning unit 30 includes second inflow opening 33, second air conditioner 31, second blower 32, and second outflow opening 34. Second outflow opening 34 corresponds to the "second opening" in the claims.

[0054] Second inflow opening 33 is communicably connected to flow divider 11 on second branch panel 13 side of flow divider 11. Second inflow opening 33 is an opening through which air flows into second air conditioning unit 30 from flow divider 11 when second branch panel 13 rotates to open the air passage.

[0055] Second air conditioner 31 is a member that adjusts the temperature (for example, 25 °C) of second airflow X2 introduced into second air conditioning unit 30 to the second temperature (for example, 35 °C) at which second airflow X2 becomes warm air. Second air conditioner 31 is only required to be a general heater, for example.

[0056] Second blower 32 is a device that causes second air conditioning unit 30 to generate a flow of second airflow X2. Second blower 32 is only required to be a general blower fan, for example. Then, second blower 32 rotates junction panel 16 at junction 15 on first outflow opening 24 side of first air conditioning unit 20 by the wind pressure (blowing power of second blower 32) of second airflow X2 sent from second outflow opening 34 to open the air passage at junction 15. Furthermore, second blower 32 rotates second branch panel 13 in flow divider 11 on second air conditioning unit 30 side by the attractive force generated with the release of second airflow X2 supplied from second outflow opening 34 to open the air passage in flow divider 11. Due to this, in blower device 3, the air passage from flow divider 11 to junction 15 via second air conditioning unit 30 is opened, and a flow of second airflow X2 is generated in blower device 3.

[0057] In the present exemplary embodiment, blower fans having the same performance

(blowing capacity) are used as first blower 22 and second blower 32. A known centrifugal air blower can be employed as first blower 22. A known centrifugal air blower can be employed as second blower 32.

[0058] Next, junction 15 will be described.

[0059] Junction 15 is a member that joins and sends, as third airflow X3, first airflow X1 supplied from first air conditioning unit 20 and second airflow X2 supplied from second air conditioning unit 30. Third airflow X3 sent from junction 15 circulates through a blower duct (not illustrated) communicably connected to junction 15, and is blown out from the pair of airflow blow-out ports 4 (see Fig. 1). Airflow blow-out port 4 corresponds to the "blow-out port" in the claims.

[0060] Specifically, as illustrated in Figs. 2 and 3, the center of junction 15 is provided with flat-plate junction panel 16. The housing constituting junction 15 is provided with first outflow opening 24 of first air conditioning unit 20, second outflow opening 34 of second air conditioning unit 30, and a blow-out opening (not illustrated) communicably connected to the blower duct. Junction panel 16 corresponds to the "damper" in the claims.

[0061] Upon receiving at least one of the wind pressure due to first airflow X1 supplied from first air conditioning unit 20 and the wind pressure due to second airflow X2 supplied from second air conditioning unit 30, junction panel 16 rotates about third rotating shaft 16a. This makes junction panel 16 movable in a range from a state (see Fig. 3) of closing first outflow opening 24 of first air conditioning unit 20 to a state (see Fig. 2) of closing second outflow opening 34 of second air conditioning unit 30. In the present exemplary embodiment, third rotating shaft 16a is a shaft along the vertical direction (up-down direction), unlike first rotating shaft 12a and second rotating shaft 13a.

[0062] Third rotating shaft 16a pivotally supports junction panel 16 in a rotatable manner. Third rotating shaft 16a is provided at the base of junction panel 16. Third rotating shaft 16a is provided along the vertical direction (up-down direction). Third rotating shaft 16a is provided substantially in the middle between first outflow opening 24 and second outflow opening 34. In other words, the distance from third rotating shaft 16a to first outflow opening 24 and the distance from third rotating shaft 16a to second outflow opening 34 have substantially equal values.

[0063] In the operating state of first blower 22 (and the operation stopped state of second blower 32), as illustrated in Fig. 2, junction panel 16 rotates on second air conditioning unit 30 side by the wind pressure of first airflow X1 by first blower 22 (the blowing power of

first blower 22) and is brought into a state of closing second outflow opening 34. Then, junction 15 is brought into a state of opening the air passage of the airflow supplied from first air conditioning unit 20. On the other hand, in the operating state of second blower 32 (and the operation stopped state of first blower 22), as illustrated in Fig. 3, junction panel 16 rotates on first air conditioning unit 20 side by the wind pressure of second airflow X2 by second blower 32 (the blowing power of second blower 32) and is brought into a state of closing first outflow opening 24. Then, junction 15 is brought into a state of opening the air passage of the airflow supplied from second air conditioning unit 30.

[0064] (First airflow X1)

As described above, in blower device 3, when first blower 22 is brought into the operating state, first outflow opening 24 is brought into a state of opening by the wind pressure of first airflow X1 by first blower 22 (the blowing power of first blower 22). First inflow opening 23 is brought into the opening state by the attractive force generated with the release of first airflow X1 supplied from first outflow opening 24. That is, in blower device 3, the air passage from flow divider 11 to junction 15 via first air conditioning unit 20 is opened, and a flow of first airflow X1 is generated in blower device 3.

[0065] That is, when the operation of first blower 22 is started, the air in first air conditioning unit 20 is sent to junction 15 via first outflow opening 24. When the air in first air conditioning unit 20 is sent to junction 15, first branch panel 12 rotates on first air conditioning unit 20 side by the attractive airflow, and first inflow opening 23 is brought into the opening state. Due to first inflow opening 23 being brought into the opening state, the air in predetermined space 2 sucked into flow divider 11 from suction port 6 is introduced into first air conditioning unit 20. The air in first air conditioning unit 20 introduced into junction 15 rotates junction panel 16 on second air conditioning unit 30 side by the wind pressure, and is sent to predetermined space 2 via airflow blow-out port 4.

[0066] What has been described above is first airflow X1 generated by first blower 22.

[0067] The amount of rotation of first branch panel 12 depends on the operation output of first blower 22. That is, the larger the operation output of first blower 22 becomes, the larger the amount of rotation of first branch panel 12 becomes. The larger the amount of rotation of first branch panel 12 becomes, the larger the opening area of first inflow opening 23 becomes.

[0068] (Second airflow X2)

On the other hand, in blower device 3, when second blower 32 is brought into the

operating state, second outflow opening 34 is brought into a state of opening by the wind pressure of second airflow X2 by second blower 32 (the blowing power of second blower 32). Second inflow opening 33 is brought into the opening state by the attractive force generated with the release of second airflow X2 supplied from second outflow opening 34. That is, in blower device 3, the air passage from flow divider 11 to junction 15 via second air conditioning unit 30 is opened, and a flow of second airflow X2 is generated in blower device 3.

[0069] That is, when the operation of second blower 32 is started, the air in second air conditioning unit 30 is sent to junction 15 via second outflow opening 34. When the air in second air conditioning unit 30 is sent to junction 15, second branch panel 13 rotates on second air conditioning unit 30 side by the attractive airflow, and second inflow opening 33 is brought into the opening state. Due to second inflow opening 33 being brought into the opening state, the air in predetermined space 2 sucked into flow divider 11 from suction port 6 is introduced into second air conditioning unit 30. The air in second air conditioning unit 30 introduced into junction 15 rotates junction panel 16 on first air conditioning unit 20 side by the wind pressure, and is sent to predetermined space 2 via airflow blow-out port 4.

[0070] What has been described above is second airflow X2 generated by second blower 32.

[0071] The amount of rotation of second branch panel 13 depends on the operation output of second blower 32. That is, the larger the operation output of second blower 32 becomes, the larger the amount of rotation of second branch panel 12 becomes. The larger the amount of rotation of second branch panel 13 becomes, the larger the opening area of second inflow opening 33 becomes.

[0072] (Third airflow X3)

At junction 15, the introduced airflow (first airflow X1 or second airflow X2) is joined and sent as third airflow X3.

[0073] Next, a state in which both first blower 22 and second blower 32 of blower device 3 are operating will be described with reference to Fig. 4. Fig. 4 is a schematic view illustrating the internal configuration in a state in which first blower 22 and second blower 32 of blower device 3 operates and first airflow X1 and second airflow X2 circulate. Hereinafter, a case where the blowing power of first blower 22 and the blowing power of second blower 32 are the same will be described as an example.

[0074] In blower device 3, as illustrated in Fig. 4, when both first blower 22 and second blower 32 operate, first airflow X1 circulating through first air conditioning unit 20 and second airflow X2 circulating through second air conditioning unit 30 are generated. Then, both first airflow X1 supplied from first air conditioning unit 20 and second airflow X2 supplied from second air conditioning unit 30 simultaneously flow into junction 15. At this time, at junction 15, one surface (surface on the left side) of junction panel 16 is pushed by the wind pressure of first airflow X1. The opposite surface (surface on the right side) of junction panel 16 is pushed by the wind pressure of second airflow X2. When the blowing power (wind pressure) of first blower 22 and the blowing power (wind pressure) of second blower 32 are the same, junction panel 16 is brought into a balanced state (stopped state) at an intermediate position in the movable range. That is, at junction 15, third airflow X3 in which the junction rate of first airflow X1 and second airflow X2 is "1:1" is sent. At this time, third airflow X3 becomes an airflow having a temperature in the middle between cool air (first temperature) and warm air (second temperature).

[0075] In flow divider 11, first branch panel 12 rotates by the attractive force generated with the release of first airflow X1 to junction 15, and first inflow opening 23 is brought into the opening state. As a result, the same amount of air as the amount released to junction 15 flows into first air conditioning unit 20 as first airflow X1. Furthermore, in flow divider 11, second branch panel 13 rotates by the attractive force generated with the release of second airflow X2 to junction 15, and second inflow opening 33 is brought into the opening state. As a result, the same amount of air as the amount released to junction 15 flows into second air conditioning unit 30 as second airflow X2. At this time, also in flow divider 11, when the attractive force generated with the release of first airflow X1 and the attractive force generated with the release of second airflow X2 are the same, the movable amounts (opening rates) of first branch panel 12 and second branch panel 13 become the same. That is, in flow divider 11, the air sucked through suction port 6 is divided into first airflow X1 and second airflow X2 at a rate of "1:1".

[0076] As described above, when both first blower 22 and second blower 32 operate, in blower device 3, a flow of first airflow X1 from flow divider 11 to junction 15 via first air conditioning unit 20 by the blowing power of first blower 22 and a flow of second airflow X2 from flow divider 11 to junction 15 via second air conditioning unit 30 by the blowing power of second blower 32 are generated at a rate of "1:1". Thereafter, first airflow X1 and second airflow X2 join at junction 15 and are sent as third airflow X3.

[0077] Here, when the ratio between the blowing power of first blower 22 (the wind pressure of first airflow X1) and the blowing power of second blower 32 (the wind pressure of second airflow X2) is changed, for example, when the blowing power of first blower 22 is made stronger than the blowing power of second blower 32, junction panel 16 stops at a position on second air conditioning unit 30 side relative to the intermediate position of the movable range. That is, at junction 15, the rate of first airflow X1 becomes larger than that of second airflow X2, and they join together, and third airflow X3 is sent. On the other hand, when the blowing power of second blower 32 is made stronger than the blowing power of first blower 22, junction panel 16 stops at a position on first air conditioning unit 20 side relative to the intermediate position of the movable range. That is, at junction 15, the rate of second airflow X2 becomes larger than that of first airflow X1, and they join together, and third airflow X3 is sent. In other words, the position of junction panel 16 depends on the ratio between the wind pressure of first airflow X1 and the wind pressure of second airflow X2. That is, when the wind pressure of first airflow X1 with respect to the wind pressure of second airflow X2 is large (for example, wind pressure of first airflow X1: wind pressure of second airflow X2 = 2:1), junction panel 16 rotates on second air conditioning unit 30 side relative to the middle between first outflow opening 24 and second outflow opening 34. When the wind pressure of second airflow X2 with respect to the wind pressure of first airflow X1 is large (for example, wind pressure of first airflow X1: wind pressure of second airflow X2 = 1:2), junction panel 16 rotates on first air conditioning unit 20 side relative to the middle between first outflow opening 24 and second outflow opening 34. When the wind pressure of first airflow X1 and the wind pressure of second airflow X2 are substantially equal (wind pressure of first airflow X1: wind pressure of second airflow X2 = 1:1), junction panel 16 is positioned substantially in the middle between first outflow opening 24 and second outflow opening 34.

[0078] As described above, in blower device 3, by changing the ratio between the blowing power of first blower 22 (the wind pressure of first airflow X1) and the blowing power of second blower 32 (the wind pressure of second airflow X2), it is possible to adjust the junction rate between first airflow X1 and second airflow X2 that become third airflow X3 at junction 15.

[0079] (Operation of video sensory system 1)

Next, the operation of the video sensory system 1 will be described with reference to Figs. 1 to 3. Here, in first air conditioning unit 20, first air conditioner 21 controls in

advance the temperature of the air in first air conditioning unit 20 to the first temperature at which the air becomes cold. In second air conditioning unit 30, second air conditioner 31 controls in advance the temperature of the air in second air conditioning unit 30 to the second temperature at which the air becomes warm.

[0080] In video sensory system 1, when a video that reminds the user of a cold feeling is displayed on display device 50 in control space 2, first blower 22 of first air conditioning unit 20 is operated in a state where second blower 32 of second air conditioning unit 30 is stopped. Due to this, cool air is supplied to control space 2 as third airflow X3, and the visual sense of the user and the sense of the air are linked, and thus it is possible to give the user a realistic feeling. At this time, second blower 32 is stopped. Therefore, junction panel 16 is pushed by the wind pressure of first airflow X1 by first blower 22, and the air passage from second air conditioning unit 30 to junction 15 is closed. Therefore, the air generated by first air conditioning unit 20 circulates in video sensory system 1, and a desired air quality (cool air) can be continuously supplied efficiently.

[0081] On the other hand, in video sensory system 1, when a video that reminds the user of a warm feeling is displayed on display device 50 in control space 2, second blower 32 of second air conditioning unit 30 is operated in a state where first blower 22 of first air conditioning unit 20 is stopped. Due to this, warm air is supplied to control space 2 as third airflow X3, and the visual sense of the user and the sense of the air are linked, and thus it is possible to give the user a realistic feeling.

[0082] Then, when the video projected onto display device 50 is switched from a video that reminds the user of a cold feeling to a video that reminds the user of a warm feeling, video sensory system 1 switches between the operating state and the stopped state of first blower 22 and second blower 32. Accordingly, switching of the air passage is performed at the same time. Therefore, third airflow X3 can be adjusted from the state of cool air to the state of warm air. The same is true vice versa.

[0083] (Features of blower device 3)

Rotation of first branch panel 12, second branch panel 13, and junction panel 16 does not require electric control and is controlled by the operation output of first blower 22 and the operation output of second blower 32. Therefore, it is possible to generate first airflow X1, second airflow X2, and third airflow X3 in a short time as compared with a case where the rotation of first branch panel 12, second branch panel 13, and junction panel 16 is electrically controlled. This suppresses an error occurring between the timing of

displaying the video onto display device 50 and the timing of sending the air-conditioned airflow corresponding to the displayed video toward the user, and an effect of reducing the possibility of impairing the realistic feeling can be expected.

[0084] Junction panel 16 is pivotally supported by third rotating shaft 16a standing in the vertical direction. Therefore, the own weight of junction panel 16 is suppressed from becoming resistance to the rotation of junction panel 16. Therefore, the rotation of junction panel 16 becomes easy. This suppresses an error occurring between the timing of displaying the video onto display device 50 and the timing of sending the air-conditioned airflow corresponding to the displayed video toward the user, and an effect of reducing the possibility of impairing the realistic feeling can be expected.

[0085] As described above, blower device 3 according to the present first exemplary embodiment gives the following effects.

[0086] (1) Blower device 3 includes first air conditioning unit 20, second air conditioning unit 30, junction 15, and airflow blow-out port 4. First air conditioning unit 20 supplies first airflow X1 from first outflow opening 24 by the operation of first blower 22. Second air conditioning unit 30 supplies second airflow X2 from second outflow opening 34 by the operation of second blower 32. Junction 15 is configured to join first airflow X1 supplied from first outflow opening 24 and second airflow X2 supplied from second outflow opening 34. Airflow blow-out port 4 blows, to control space 2, an airflow including at least one of first airflow X1 and second airflow X2 sent from junction 15. Junction 15 has junction panel 16 configured to be rotatable by the wind pressure of first airflow X1 and the wind pressure of second airflow X2.

[0087] According to such configuration, the air passage at junction 15 is controlled by controlling the blowing power of first blower 22 and the blowing power of second blower 32. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching can be performed between the state of closing first outflow opening 24 (the circulation state of second airflow X2) and the state of closing second outflow opening 34 (the circulation state of first airflow X1). That is, it is possible to provide blower device 3 capable of improving switching responsiveness of airflows supplied from two air conditioning units.

[0088] (2) Blower device 3 further includes flow divider 11 configured to be able to divide the air sucked from control space 2 into first air conditioning unit 20 and second air

conditioning unit 30. Flow divider 11 includes first branch panel 12 configured to be rotatable in accordance with the blowing power of first blower 22 and second branch panel 13 configured to be rotatable in accordance with the blowing power of second blower 32.

[0089] Due to this, the air passage in flow divider 11 is controlled by controlling the blowing power of first blower 22 and the blowing power of second blower 32. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching can be performed between a state in which only first airflow X1 is circulated by rotating first branch panel 12 and a state in which only second airflow X2 is circulated by rotating second branch panel 13. That is, blower device 3 can further improve the switching responsiveness of the airflows supplied from the two air conditioning units.

[0090] (3) In blower device 3, junction panel 16 is configured to be rotatable about third rotating shaft 16a. Third rotating shaft 16a is provided along the vertical direction.

[0091] This eliminates the need for continuously pressing junction panel 16 with the wind pressure of the airflow in a state in which only first airflow X1 circulates or in a state in which only second airflow X2 circulates. This reduces the ventilation resistance by junction panel 16, and can thus efficiently blow third airflow X3.

[0092] (4) In blower device 3, first air conditioning unit 20 supplies first airflow X1 having the first temperature. Second air conditioning unit 30 supplies second airflow X2 having the second temperature different from the first temperature. The first temperature is lower than the temperature of the air in control space 2, and the second temperature is higher than the temperature in the air in control space 2.

[0093] Due to this, when blower device 3 is applied to video sensory system 1, it is possible to blow out cool air having the first temperature or warm air having the second temperature in accordance with an image displayed on display device 50. This can enhance the realistic feeling (sensory feeling) of the projected video.

[0094] (5) In blower device 3, the junction rate of first airflow X1 and second airflow X2 blown out as third airflow X3 at junction 15 is adjusted by changing the ratio between the blowing power of first blower 22 and the blowing power of second blower 32.

[0095] This makes it possible to optionally adjust the temperature of third airflow X3 blown out from blower device 3 in the range from the first temperature to the second temperature and blow out third airflow X3. This can further enhance the realistic feeling (sensory feeling) of the video projected onto display device 50.

[0096] (6) Blower device 3 is configured to perform the rotation operations of first branch panel 12, second branch panel 13, and junction panel 16 by at least one of the blowing power of first blower 22 and the blowing power of second blower 32.

[0097] This can simplify the panel configuration as compared with the case of electrically performing the rotation operation of each panel.

[0098] (7) Junction panel 16 is adjusted by changing the ratio between the blowing power of first blower 22 and the blowing power of second blower 32 within the range from the state where the rotation position closes first outflow opening 24 to the state where the rotation position closes second outflow opening 34.

[0099] According to such configuration, the air passage at junction 15 is controlled by controlling the blowing power of first blower 22 and the blowing power of second blower 32. For this reason, unlike the conventional blower device, the synchronization deviation caused by the electric opening and closing damper or the like does not occur, and for example, switching can be performed between the state of closing first outflow opening 24 (the circulation state of second airflow X2) and the state of closing second outflow opening 34 (the circulation state of first airflow X1). That is, it is possible to provide blower device 3 capable of improving switching responsiveness of airflows supplied from two air conditioning units.

[0100] While the present disclosure has been described above based on the exemplary embodiment, the present disclosure is not limited to the above exemplary embodiment at all, and it can be easily inferred that various modifications and variations can be made without departing from the gist of the present disclosure.

[0101] [Modifications]

Modifications will be described below. In the drawings and description of the modifications, the same or equivalent constituent elements and members as those in the exemplary embodiment are denoted by the same reference marks. The description overlapping with that of the exemplary embodiment will be omitted as appropriate, and the configuration different from the exemplary embodiment will be mainly described.

[0102] Video sensory system 1 may include an air supply port for supplying air in a space different from predetermined space 2, an air exhaust port for exhausting air in predetermined space 2 to a space different from predetermined space 2, and a ventilator capable of exchanging heat between air passing through the air supply port and air passing through the air exhaust port.

[0103] In blower device 3 according to the present exemplary embodiment, the first temperature is set to be lower than the temperature of the air in control space 2 in first air conditioner 21, and the second temperature is set to be higher than the temperature of the air in control space 2 in second air conditioner 31, but the present invention is not limited to this. For example, the temperature set in both first air conditioner 21 and second air conditioner 31 may be lower or higher than the temperature of the air in control space 2. This gives the above-described effects.

[0104] In blower device 3 according to the present exemplary embodiment, first air conditioner 21 and second air conditioner 31 adjust only the temperature of the air in each unit, but the present invention is not limited to this. For example, the temperature and humidity including the humidity of the air in each unit may be adjusted. This allows blower device 3 to blow out third airflow X3 adjusted to low temperature and low humidity (low temperature and dry), low temperature and high humidity, high temperature and low humidity (high temperature and dry), or high temperature and high humidity. Therefore, it is possible to further enhance the realistic feeling (sensory feeling) of the video projected onto display device 50.

[0105] In blower device 3 according to the present exemplary embodiment may be provided with, in addition to the air conditioners (first air conditioner 21 and second air conditioner 31), a perfumer that adds a scent component (for example, aromatic compounds) to the air circulating through the air conditioning units (first air conditioning unit 20 and second air conditioning unit 30), an air purifier that adds an air purifying component (for example, hypochlorous acid) to the air circulating through the air conditioning units, and the like. This allows blower device 3 to adjust in more detail the air quality of third airflow X3. Therefore, it is possible to further enhance the realistic feeling (sensory feeling) of the video projected onto display device 50.

INDUSTRIAL APPLICABILITY

[0106] The blower device according to the present disclosure is useful as a blower device that sends an airflow forward from a display surface of an image, and can be used, for example, in a video viewing system using such blower device. The blower device according to the present disclosure is also useful for a video sensory system or the like that sends an airflow from the image display device to the user.

REFERENCE MARKS IN THE DRAWINGS

[0107]	1	video sensory system
	2	control space
	3	blower device
	4	airflow blow-out port
	5	circulation port
	6	suction port
	7	circulation duct
	11	flow divider
	12	first branch panel
	12a	first rotating shaft
	12b	first fastener
	13	second branch panel
	13a	second rotating shaft
	13b	second fastener
	15	junction
	16	junction panel
	16a	third rotating shaft
	20	first air conditioning unit
	21	first air conditioner
	22	first blower
	23	first inflow opening
	24	first outflow opening
	30	second air conditioning unit
	31	second air conditioner
	32	second blower
	33	second inflow opening
	34	second outflow opening
	50	display device
	51	chair
	X1	first airflow
	X2	second airflow
	X3	third airflow

CLAIMS

1. A blower device comprising:

a first air conditioning unit including a first blower and a first opening, the first air conditioning unit supplying a first airflow from the first opening by an operation of the first blower;

a second air conditioning unit including a second blower and a second opening, the second air conditioning unit supplying a second airflow from the second opening by an operation of the second blower;

a junction configured to allow the first airflow supplied from the first opening and the second airflow supplied from the second opening to join together; and

a blow-out port through which an airflow including at least one of the first airflow and the second airflow sent from the junction is blown out into a control space,

wherein the junction includes a damper configured to rotate by a wind pressure of the first airflow and a wind pressure of the second airflow.

2. The blower device according to Claim 1, further comprising a flow divider configured to divide air sucked from the control space into the first air conditioning unit and the second air conditioning unit, wherein the flow divider includes

a first branch panel configured to rotate in accordance with a blowing power of the first blower, and

a second branch panel configured to rotate in accordance with a blowing power of the second blower.

3. The blower device according to Claim 1 or 2, wherein the damper is configured to rotate about a rotating shaft, and the rotating shaft is provided along a vertical direction.

4. The blower device according to any one of Claims 1 to 3, wherein the first airflow has a first temperature, the second airflow has a second temperature different from the first temperature, the first temperature is lower than a temperature of air in the control space, and the second temperature is higher than a temperature of air in the control space.

5. The blower device according to any one of Claims 1 to 4, wherein the damper is adjusted by changing a ratio between the blowing power of the first blower and the blowing power of the second blower within a range from a state where a rotation position closes the first opening to a state where the rotation position closes the second opening.