



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
26.10.2016 Bulletin 2016/43

(51) Int Cl.:
F24F 13/06 ^(2006.01) **F24F 13/14** ^(2006.01)

(21) Application number: **13899940.4**

(86) International application number:
PCT/JP2013/084324

(22) Date of filing: **20.12.2013**

(87) International publication number:
WO 2015/092926 (25.06.2015 Gazette 2015/25)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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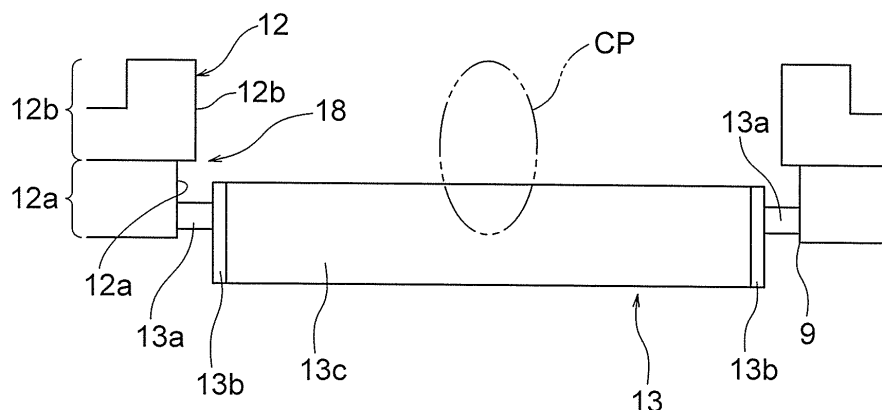
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(54) **AIR CONDITIONER**

(57) An air conditioner (100) includes a casing (50), an axial fan (1), and a heat exchanger (3). The casing includes a panel (6) having an air inlet (8) and an air outlet (9) formed therein to be open toward a target space. An air duct having the air outlet as an outlet is defined by a heat exchanger outlet-side wall (10), an opposing wall (11), and two side walls (12). An airflow direction flap (13)

is arranged at the air outlet, and includes a main body (13c), two support plates (13b), and two rotation shafts (13a). An air velocity reducing portion (18) configured to reduce a velocity of a current of air passing through a space between each side wall and each support plate is arranged in the air duct having the air outlet as the outlet.

FIG. 3



Description

Technical Field

[0001] The present invention relates to an air conditioner.

Background Art

[0002] As a ceiling-concealed air conditioner, which includes a main body placed in a ceiling of a room to be air-conditioned, for example, an air conditioner disclosed in Patent Literature 1 is known. In this air conditioner, a dimension of an airflow direction flap in a direction orthogonal to a rotation shaft becomes smaller at a vicinity of the rotation shaft of the airflow direction flap as approaching to the rotation shaft.

Citation List

Patent Literature

[0003] [PTL 1] JP 08-094160 (mainly FIG. 9)

Summary of Invention

Technical Problem

[0004] In general, in an air outlet of the ceiling-concealed air conditioner, each longitudinal end portion of the air outlet is an interface between the secondary air subjected to heat exchange and the air in an inside of a room. Thus, the air with high humidity is undesirably taken from the inside of the room during cooling operation, which may cause dew condensation on a downstream side of the airflow direction flap and on the rotation shaft. In addition, on a downstream side of the rotation shaft configured to support the airflow direction flap, a current of the blown-out air is separated, thereby generating a negative pressure. Accordingly, the air is undesirably taken from the inside of the room more easily, which may cause the dew condensation on the downstream side of the airflow direction flap and on the rotation shaft.

[0005] Further, with a view to coping with this problem, the above-mentioned air conditioner disclosed in Patent Literature 1 can suppress the dew condensation. However, a width of the airflow direction flap is reduced so that short cycling is more liable to occur, which is susceptible of improvement in terms of energy saving.

[0006] The present invention has been made in view of the above, and has an object to provide an air conditioner that is less liable to cause short cycling, and capable of preventing dew condensation on an airflow direction flap.

Solution to Problem

[0007] In order to achieve the above-mentioned object,

according to one embodiment of the present invention, there is provided an air conditioner, including: a casing; an air blowing part; and a heat exchanger, the casing including a panel having at least one air inlet and at least one air outlet formed therein to be open toward a target space, the heat exchanger being arranged in a flow passage of air that is sucked into the casing through the air inlet and blown out to the target space through the air outlet, in which an air duct having the air outlet as an outlet is defined by a heat exchanger outlet-side wall, an opposing wall, and two side walls, in which an airflow direction flap is arranged at the air outlet so as to be rotatable, in which the airflow direction flap includes a main body, two support plates, and two rotation shafts, and in which an air velocity reducing portion, which is configured to reduce a velocity of a current of the air passing through a space between each of the side walls and each of the support plates, is arranged in the air duct having the air outlet as the outlet.

[0008] Each of the side walls may include a first portion configured to support the airflow direction flap in a rotatable manner, and a second portion positioned on an upstream side of the first portion. The air velocity reducing portion may be constructed by the first portion and the second portion, and the second portion may be closer to a longitudinal center portion of the air duct having the air outlet as the outlet than the first portion.

[0009] The second portion may be more distant from the longitudinal center portion of the air duct having the air outlet as the outlet than the support plate.

[0010] The second portion may include a slope configured to guide a current of the air closer to the longitudinal center portion of the air duct having the air outlet as the outlet.

[0011] The second portion may include an inclined surface portion configured to guide a current of the air closer to the longitudinal center portion of the air duct having the air outlet as the outlet, and a straight surface portion extending in a direction orthogonal to the rotation shaft, and the straight surface portion may be positioned on a downstream side of the inclined surface portion.

[0012] In addition, in order to achieve the above-mentioned object, according to another embodiment of the present invention, there is provided an air conditioner, including: a casing; an air blowing part; and a heat exchanger, the casing including a panel having at least one air inlet and at least one air outlet formed therein to be open toward a target space, the heat exchanger being arranged in a flow passage of air that is sucked into the casing through the air inlet and blown out to the target space through the air outlet, in which an air duct having the air outlet as an outlet is defined by a heat exchanger outlet-side wall, an opposing wall, and two side walls, in which an airflow direction flap is arranged at the air outlet so as to be rotatable and includes a main body, two support plates, and two rotation shafts, and in which an airflow direction deflecting portion, which is configured to cause a current of the air passing through the heat ex-

changer outlet-side wall side with respect to each of the rotation shafts of the airflow direction flap to flow into a downstream side of each of the rotation shafts, and then deflect the current of the air to the opposing wall side, is arranged in the air duct having the air outlet as the outlet.

[0013] The airflow direction deflecting portion may be a rib extending toward each of the side walls from a surface of each support plate on which each rotation shaft is connected.

[0014] Alternatively, the airflow direction deflecting portion may include a rib extending from each of the side walls toward a surface of each support plate on which each rotation shaft is connected.

Advantageous Effects of Invention

[0015] According to the one embodiment of the present invention, short cycling is less liable to occur, and dew condensation on the airflow direction flap can be prevented.

Brief Description of Drawings

[0016]

FIG. 1 is a side view for illustrating an internal structure of an air conditioner according to a first embodiment of the present invention.

FIG. 2 is a top view for illustrating an air outlet of the air conditioner according to the first embodiment.

FIG. 3 is a side view for illustrating a vicinity of an airflow direction flap of the air conditioner according to the first embodiment and a second embodiment of the present invention.

FIG. 4 is a side view for illustrating a vicinity of a rotation shaft of an airflow direction flap of an air conditioner according to a third embodiment of the present invention.

FIG. 5 is a side view for illustrating a vicinity of a rotation shaft of an airflow direction flap of an air conditioner according to a fourth embodiment of the present invention.

FIG. 6 is a view for illustrating an airflow direction flap of an air conditioner according to a fifth embodiment of the present invention when seen from a direction of a rotation shaft.

FIG. 7 is a side view for illustrating a vicinity of the rotation shaft of the airflow direction flap of the air conditioner according to the fifth embodiment.

FIG. 8 is a view for illustrating a peripheral portion of an air outlet of an air conditioner according to a sixth embodiment of the present invention when seen from a direction of a rotation shaft.

FIG. 9 is a view for illustrating the sixth embodiment of the present invention in the same manner as that of FIG. 7.

Description of Embodiments

[0017] Now, an air conditioner according to embodiments of the present invention is described with reference to the accompanying drawings. Note that, in the drawings, the same reference symbols represent the same or corresponding parts.

First Embodiment

[0018] FIG. 1 is a side view for illustrating an internal structure of an air conditioner according to a first embodiment of the present invention. More specifically, the air conditioner according to the first embodiment corresponds to an indoor unit of a so-called package air conditioner. FIG. 1 is an illustration of a state in which a principal part of a main body of the air conditioner is embedded in a ceiling of a room and a lower part of the main body faces the inside of the room.

[0019] In a casing 50 of a ceiling-concealed air conditioner 100, at least an axial fan (turbofan) 1, a fan motor 2, and a heat exchanger 3 are arranged. The casing 50 of the air conditioner 100 is embedded on a back side (side opposite to a room 17) of a ceiling surface 15 of the room 17 being a target space.

[0020] As one example, in the first embodiment, the casing 50 includes a casing top panel 5 having a rectangular shape in plan view, and four casing side panels 4 extending downward from four sides of the casing top panel 5. In other words, the casing 50 is such a box that an upper surface of a rectangular tube defined by the four casing side panels 4 is closed by the casing top panel 5.

[0021] At the lower part of the main body 50, namely, at an opened lower end surface of the above-mentioned box, a decorative panel 6 is mounted on the casing 50 in a freely removable manner. As illustrated in FIG. 1, the casing top panel 5 is positioned above the ceiling surface 15, whereas the decorative panel 6 is positioned substantially flush with the ceiling surface 15.

[0022] Further, the casing 50 of the air conditioner 100 has at least one air inlet 8 and at least one air outlet 9. In the vicinity of a center of the decorative panel 6, a suction grille 7 is arranged, and the air inlet 8 is formed in the suction grille 7. A filter 7a configured to remove dust in the air passing through the suction grille 7 is arranged at an inner side of the suction grille 7.

[0023] As one example, in the first embodiment, the decorative panel 6 and the suction grille 7 each have a rectangular outer peripheral edge in plan view.

[0024] In a region between the outer peripheral edge of the decorative panel 6 and the outer peripheral edge of the suction grille 7, a plurality of air outlets 9 are formed as the outlets of the air. In the first embodiment, four air outlets 9 are formed in accordance with the structure in which the decorative panel 6 and the suction grille 7 each generally have the outer peripheral edge along four sides thereof, and the respective air outlets 9 are arranged so

as to extend along the corresponding sides of the decorative panel 6 and the suction grille 7. Further, the four air outlets 9 are positioned so as to surround the suction grille 7.

[0025] The fan motor 2 is arranged at a center portion of the inside of the main body 50. The fan motor 2 is supported by a lower surface of the casing top panel 5 (at an inner space side of the casing). An axial fan 1 serving as an air blowing part is fixed to a motor rotation shaft 2a of the fan motor 2, which extends downward.

[0026] Further, a bellmouth 14 that defines a suction air duct extending from the suction grille 7 toward the axial fan 1 is arranged between the axial fan 1 and the suction grille 7. The axial fan 1 is configured to suck the air into the casing through the suction grille 7, and cause the air to flow out to the inside of the room 17 being the target space through the air outlet 9.

[0027] The heat exchanger 3 is arranged at a radially outer side of the turbofan 1. In other words, the heat exchanger 3 is housed inside the main body 50, in particular, arranged in a flow passage of the air to be sucked into the casing 50 through the air inlet 8 and blown out to the target space through the air outlet 9, to thereby exchange heat between the air and a refrigerant.

[0028] The heat exchanger 3 includes a plurality of fins arranged at predetermined intervals in a horizontal direction, and heat transfer pipes passing through the fins. The heat transfer pipes are connected to a known outdoor unit (not shown) through a connection pipe so that a cooled or heated refrigerant is supplied to the heat exchanger 3. Note that, the structures of the turbofan 1, the bellmouth 14, and the heat exchanger 3 are not particularly limited, but known structures are employed in the first embodiment.

[0029] In this structure, when the axial fan 1 is rotated, the air in the inside of the room 17 is sucked through the air inlet 8 of the suction grille 7 of the decorative panel 6. Then, the air from which the dust is removed by the filter 7a is guided by the bellmouth 14, and is then sucked into the turbofan 1. Further, the air sucked into the axial fan 1 from bottom to top is blown out in a radially outward direction. When the air thus blown out passes through the heat exchanger 3, the heat is exchanged and the humidity is adjusted. After that, the air is blown out to the inside of the room 17 through each air outlet 9 with the flow direction switched to a downward direction.

[0030] Next, details of the air outlets 9 and structures related to the air outlets 9 are described with reference to FIG. 1 to FIG. 3. Note that, the four air outlets have the same configuration, and the structure related to the four air outlets have the same configuration. Accordingly, in the following, one air outlet and structure related to the one air outlet are described as a representative example. FIG. 2 is a top view for illustrating an air outlet of the air conditioner according to the first embodiment. FIG. 3 is a side view for illustrating a vicinity of an airflow direction flap of the air conditioner according to the first embodiment when seen from a direction indicated by the arrows

III of FIG. 2. Note that, FIG. 2 and FIG. 3 are schematic illustrations for easy understanding of the drawings. In FIG. 2, an illustration of the airflow direction flap is omitted.

[0031] As illustrated in FIG. 2, the air outlet 9 is formed between the heat exchanger 3 and the casing side panel 4 in a positional relationship in plan view. More specifically, as illustrated in FIG. 2, the air outlet 9 is formed between a heat exchanger outlet-side wall 10 and an opposing wall 11, which is opposed to the heat exchanger outlet-side wall 10. A casing center side (heat exchanger side or air blower side) of an air duct, which has the air outlet 9 as an outlet, is defined by the heat exchanger outlet-side wall 10, whereas an outer peripheral edge side of the decorative panel 6 of the air duct, which has the air outlet 9 as the outlet, is defined by the opposing wall 11 positioned on the side panel side of the casing. Both ends of the heat exchanger outlet-side wall 10 and both ends of the opposing wall 11 are connected to each other by two side walls 12.

[0032] An airflow direction flap 13 configured to adjust a direction of the air to be blown out is arranged at the air outlet 9. The airflow direction flap 13 includes two rotation shafts 13a, two support plates 13b, and a main body 13c.

[0033] Each of the two support plates 13b is positioned at a corresponding end portion of the main body 13c in a longitudinal direction (direction substantially orthogonal to a radial direction about the rotation shaft of the axial fan in plan view), and each of the two rotation shafts 13a is positioned on a part of the corresponding support plate 13b side opposite to the main body 13c. The airflow direction flap 13 is supported by the two rotation shafts 13a so as to be rotatable. Each of the support plates 13b is formed on at least a part of a region extending from an upstream end to a downstream end of the main body 13c. Note that, in the illustrated example, each of the support plates 13b extends from the upstream end to the downstream end of the main body 13c. That is, between the two rotation shafts 13a, the airflow direction flap 13 has a substantially constant width in a direction orthogonal to an extending direction of the rotation shafts 13a.

[0034] As illustrated in FIG. 3, each of the side walls 12 includes a first portion 12a configured to support the airflow direction flap 13 in a rotatable manner, and a second portion 12b positioned on an upstream side of the first portion 12a. The airflow direction flap 13 is not positioned between the two second portions 12b. A stepped portion 12c is formed between the first portion 12a and the second portion 12b. Further, each of the side walls 12 is constructed so that the second portion 12b is closer to a longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than the first portion 12a. In the first embodiment, at least the first portion 12a and the second portion 12b construct an air velocity reducing portion 18 configured to reduce a velocity of a current of the air passing through a space between each side wall 12 and each support plate 13b. Note that, for example,

the first portion 12a may be constructed by a component of the decorative panel 6, and the second portion 12b may be constructed by a component of the casing.

[0035] In the air conditioner according to the first embodiment having the above-mentioned configuration, regarding the air duct having the air outlet as the outlet, a part of the air duct defined between each side wall and each support plate is enlarged to a downstream side. Accordingly, the velocity of the current of the air passing through the air duct is reduced, thereby preventing separation of the current of the blown-out air at each rotation shaft of the airflow direction flap. As a result, the current of the blown-out air easily flows into the downstream side of the rotation shaft, thereby reducing a separation area on the downstream side of the rotation shaft of the airflow direction flap. Thus, there is reduced an amount of the air taken from the inside of the room into a negative pressure caused by the separation. As described above, according to the air conditioner of the first embodiment, without depending on a configuration of reducing the width of the airflow direction flap at a vicinity of the rotation shaft, the separation area on the downstream side of the rotation shaft of the airflow direction flap is reduced. Accordingly, short cycling is less liable to occur, and dew condensation on the airflow direction flap can be prevented.

Second Embodiment

[0036] Next, a second embodiment of the present invention is described. The second embodiment further limits the above-mentioned first embodiment, and can be described with reference to a configuration illustrated in FIG. 3.

[0037] As illustrated in FIG. 3, each of the side walls 12 is constructed so that the second portion 12b is closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than the first portion 12a. Further, when each side wall is projected in a planar manner or projected from a side thereof as illustrated in FIG. 3, the second portion 12b is more distant from the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than the support plate 13b.

[0038] Also in the air conditioner according to the second embodiment having the above-mentioned configuration, the same advantage as that of the above-mentioned first embodiment can be obtained. In addition, in the second embodiment, a blowing air duct is closed only at an upstream portion of the rotation shaft 13a of the airflow direction flap 13, but the blowing air duct is not closed at an upstream portion of the main body 13c of the airflow direction flap 13. Accordingly, it is possible to suppress decrease in the current of the air blown out along both front and back surfaces of the airflow direction flap 13. Further, it is possible to suppress the current of the air flowing into the rotation shaft 13a of the airflow direction flap while suppressing increase in airflow resistance caused by reduction in an area of the air duct.

Third Embodiment

[0039] Next, a third embodiment of the present invention is described with reference to FIG. 4. FIG. 4 is a side view for illustrating a vicinity of a rotation shaft of an airflow direction flap of an air conditioner according to the third embodiment. Note that, the air conditioner according to the third embodiment has the same configuration as those of the first embodiment and the second embodiment except for parts described below.

[0040] As illustrated in FIG. 4, a second portion 112b of an air velocity reducing portion 118 is closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than the first portion 12a. In addition, a downstream portion of the second portion 112b is closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than an upstream portion of the second portion 112b. That is, the second portion 112b includes a slope configured to guide (deflect) the current of the air closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet.

[0041] Also in the air conditioner according to the third embodiment having the above-mentioned configuration, the same advantage as that of the above-mentioned first embodiment can be obtained. In addition, in the third embodiment, the air duct having the air outlet as the outlet is shaped to narrow the current of the air as approaching to the airflow direction flap. Accordingly, the current of the air is rectified, thereby being capable of further suppressing undesired intake of the air from the inside of the room.

Fourth Embodiment

[0042] Next, a fourth embodiment of the present invention is described with reference to FIG. 5. FIG. 5 is a side view for illustrating a vicinity of a rotation shaft of an airflow direction flap of an air conditioner according to the fourth embodiment. Note that, the air conditioner according to the fourth embodiment has the same configuration as that of the first embodiment except for parts described below.

[0043] As illustrated in FIG. 5, a second portion 212b of an air velocity reducing portion 218 is closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet than the first portion 12a. In addition, the second portion 212b includes an inclined surface portion 253 configured to guide (deflect) the current of the air closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the outlet, and a straight surface portion 255 extending in a direction (substantially vertical direction) substantially orthogonal to the rotation shaft 13a. The straight surface portion 255 is positioned on a downstream side of the inclined surface portion 253, and a downstream portion of the inclined surface portion 253 is closer to the longitudinal center portion CP of the air duct having the air outlet 9 as the

outlet than an upstream portion of the inclined surface portion 253.

[0044] Also in the air conditioner according to the fourth embodiment having the above-mentioned configuration, the same advantage as that of the above-mentioned first embodiment can be obtained. In addition, in the fourth embodiment, the straight surface portion is formed in the second portion formed on the upstream side with respect to a movable region of the airflow direction flap. Thus, the current of the air flows straight toward the airflow direction flap. Accordingly, the current of the blown-out air easily flows along the airflow direction flap up to the downstream end of the airflow direction flap. Also with this, it is possible to suppress undesired intake of the air with high humidity from the inside of the room.

Fifth Embodiment

[0045] Next, a fifth embodiment of the present invention is described with reference to FIG. 6 and FIG. 7. FIG. 6 is a view for illustrating an airflow direction flap of an air conditioner according to the fifth embodiment when seen from a direction of a rotation shaft. FIG. 7 is a side view for illustrating a vicinity of the rotation shaft of the airflow direction flap of the air conditioner according to the fifth embodiment. Note that, the air conditioner according to the fifth embodiment has the same configuration as that of the first embodiment except for parts described below.

[0046] As illustrated in FIG. 6 and FIG. 7, an airflow direction deflecting portion 320 is arranged in the air duct having the air outlet as the outlet. The airflow direction deflecting portion 320 is configured to cause the current of the air, which passes through the heat exchanger outlet-side wall 10 side with respect to the rotation shaft 13a of the airflow direction flap, to flow into the downstream side of the rotation shaft 13a, and then deflect the current of the air to the opposing wall 11 side.

[0047] The airflow direction deflecting portion 320 is formed of a rib slightly warped to the rotation shaft 13a side. In the fifth embodiment, the airflow direction deflecting portion 320 extends toward a side wall 312 from a surface (surface on a side opposite to the main body 13c) of the support plate 13b on which the rotation shaft 13a is connected (without being held in abutment against the side wall 312). In the fifth embodiment, the side wall 312 is formed of a wall surface having almost no step.

[0048] Also in the air conditioner according to the fifth embodiment having the above-mentioned configuration, the same advantage as that of the above-mentioned first embodiment can be obtained. In addition, in the fifth embodiment, the airflow direction deflecting portion is formed at a vicinity of a longitudinal end portion of the air outlet. Thus, the current of the blown-out air easily flows into the downstream side of the rotation shaft, and it is possible to suppress undesired intake of the air from the inside of the room.

Sixth Embodiment

[0049] Next, a sixth embodiment of the present invention is described with reference to FIG. 8 and FIG. 9. FIG. 8 is a view for illustrating a peripheral portion of an air outlet of an air conditioner according to the sixth embodiment when seen from a direction of a rotation shaft. FIG. 9 is a view for illustrating the sixth embodiment of the present invention in the same manner as that of FIG. 7. Note that, the air conditioner according to the sixth embodiment has the same configuration as that of the first embodiment except for parts described below.

[0050] As illustrated in FIG. 8 and FIG. 9, an airflow direction deflecting portion 420 is arranged in the air duct having the air outlet as the outlet. The airflow direction deflecting portion 420 is configured to cause the current of the air, which passes through the heat exchanger outlet-side wall 10 side with respect to the rotation shaft 13a of the airflow direction flap, to flow into the downstream side of the rotation shaft 13a, and then deflect the current of the air to the opposing wall 11 side.

[0051] The airflow direction deflecting portion 420 is a rib extending in a flat-plate shape. In the sixth embodiment, the airflow direction deflecting portion 420 extends from the side wall 312 toward the surface (surface on the side opposite to the main body 13c) of the support plate 13b on which the rotation shaft 13a is connected (without being held in abutment against the support plate 13b). In the sixth embodiment, the side wall 312 is formed of a wall surface having almost no step.

[0052] Also in the air conditioner according to the sixth embodiment having the above-mentioned configuration, the same advantage as that of the above-mentioned first embodiment can be obtained. In addition, also in the sixth embodiment, similarly to the fifth embodiment, the current of the blown-out air easily flows into the downstream side of the rotation shaft, and it is possible to suppress undesired intake of the air from the inside of the room.

[0053] Although the details of the present invention are specifically described above with reference to the preferred embodiments, it is apparent that persons skilled in the art may adopt various modifications based on the basic technical concepts and teachings of the present invention.

Reference Signs List

[0054] 1 axial fan (air blowing part), 2 fan motor, 3 heat exchanger, 6 decorative panel (panel), 8 air inlet, 9 air outlet, 10 heat exchanger outlet-side wall, 11 opposing wall, 12, 312 side wall, 12a first portion, 12b, 112b, 212b second portion, 12c stepped portion, 13 airflow direction flap, 13a rotation shaft, 13b support plate, 13c main body, 18, 118, 218 air velocity reducing portion, 50 casing, 100 air conditioner, 253 inclined surface portion, 255 straight surface portion, 320, 420 airflow direction deflecting portion

Claims**1.** An air conditioner, comprising:

a casing;
an air blowing part; and
a heat exchanger,

the casing comprising a panel having at least one air inlet and at least one air outlet formed therein to be open toward a target space,
the heat exchanger being arranged in a flow passage of air that is sucked into the casing through the air inlet and blown out to the target space through the air outlet,
wherein an air duct having the air outlet as an outlet is defined by a heat exchanger outlet-side wall, an opposing wall, and two side walls,
wherein an airflow direction flap is arranged at the air outlet so as to be rotatable,
wherein the airflow direction flap includes a main body, two support plates, and two rotation shafts, and
wherein an air velocity reducing portion, which is configured to reduce a velocity of a current of the air passing through a space between each of the side walls and each of the support plates, is arranged in the air duct having the air outlet as the outlet.

2. An air conditioner according to claim 1, wherein each of the side walls includes a first portion configured to support the airflow direction flap in a rotatable manner, and a second portion positioned on an up-stream side of the first portion, wherein the air velocity reducing portion is constructed by the first portion and the second portion, and wherein the second portion is closer to a longitudinal center portion of the air duct having the air outlet as the outlet than the first portion.**3.** An air conditioner according to claim 2, wherein the second portion is more distant from the longitudinal center portion of the air duct having the air outlet as the outlet than the support plate.**4.** An air conditioner according to claim 2, wherein the second portion comprises a slope configured to guide a current of the air closer to the longitudinal center portion of the air duct having the air outlet as the outlet.**5.** An air conditioner according to claim 2, wherein the second portion comprises an inclined surface portion configured to guide a current of the air closer to the longitudinal center portion of the air duct having the air outlet as the outlet, and a straight surface portion extending in a direction orthogonal to the rotation shaft, and

wherein the straight surface portion is positioned on a downstream side of the inclined surface portion.

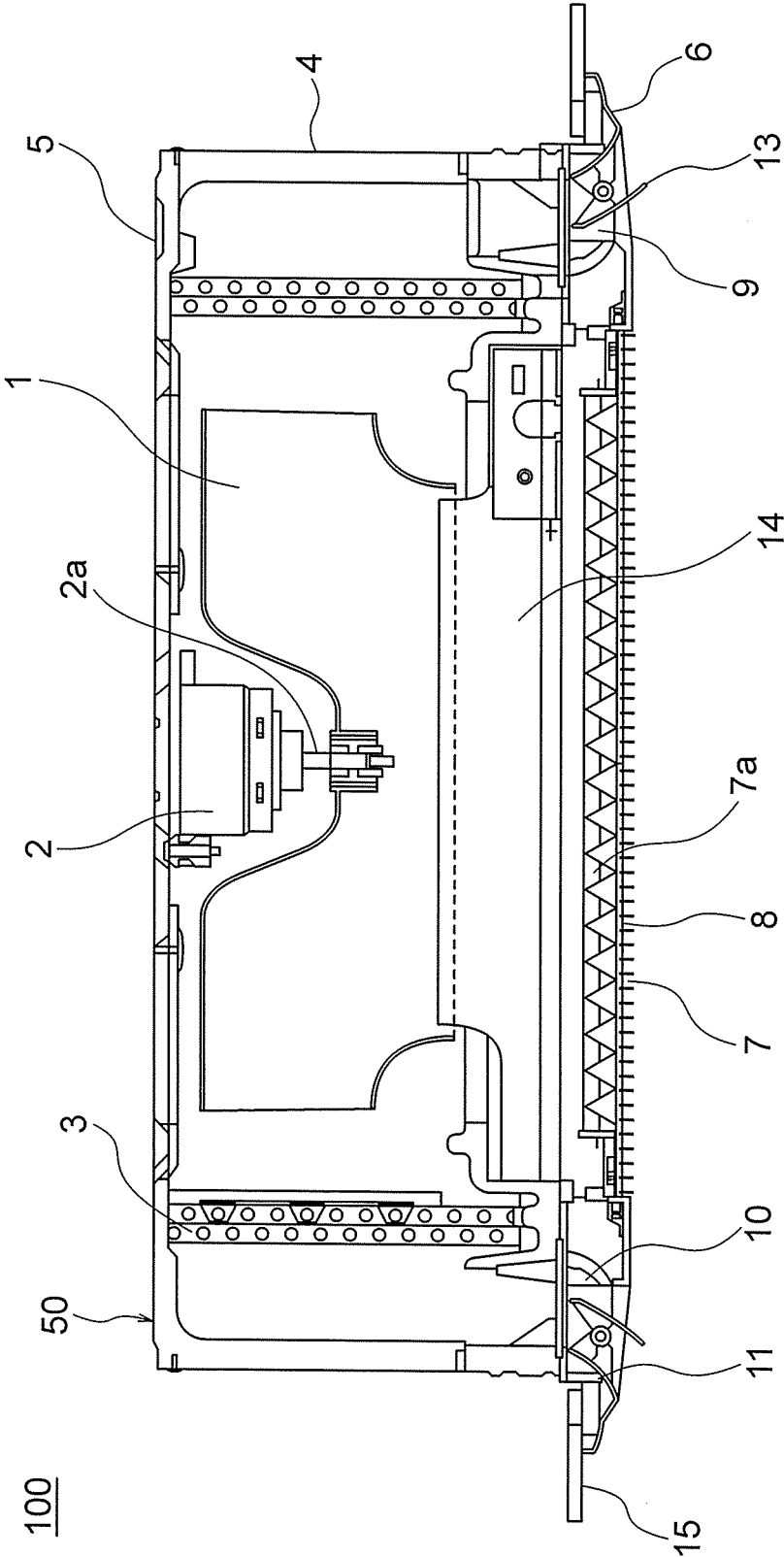
6. An air conditioner, comprising:

a casing;
an air blowing part; and
a heat exchanger,

the casing comprising a panel having at least one air inlet and at least one air outlet formed therein to be open toward a target space,
the heat exchanger being arranged in a flow passage of air that is sucked into the casing through the air inlet and blown out to the target space through the air outlet,
wherein an air duct having the air outlet as an outlet is defined by a heat exchanger outlet-side wall, an opposing wall, and two side walls,
wherein an airflow direction flap is arranged at the air outlet so as to be rotatable,
wherein the airflow direction flap comprises a main body, two support plates, and two rotation shafts, and
wherein an airflow direction deflecting portion, which is configured to cause a current of the air passing through the heat exchanger outlet-side wall side with respect to the rotation shaft of the airflow direction flap to flow into a downstream side of the rotation shaft, and then deflect the current of the air to the opposing wall side, is arranged in the air duct having the air outlet as the outlet.

7. An air conditioner according to claim 6, wherein the airflow direction deflecting portion comprises a rib extending toward each of the side walls from a surface of the support plate on which the rotation shaft is connected.**8.** An air conditioner according to claim 6, wherein the airflow direction deflecting portion comprises a rib extending from each of the side walls toward a surface of the support plate on which the rotation shaft is connected.

FIG. 1



~17~

FIG. 2

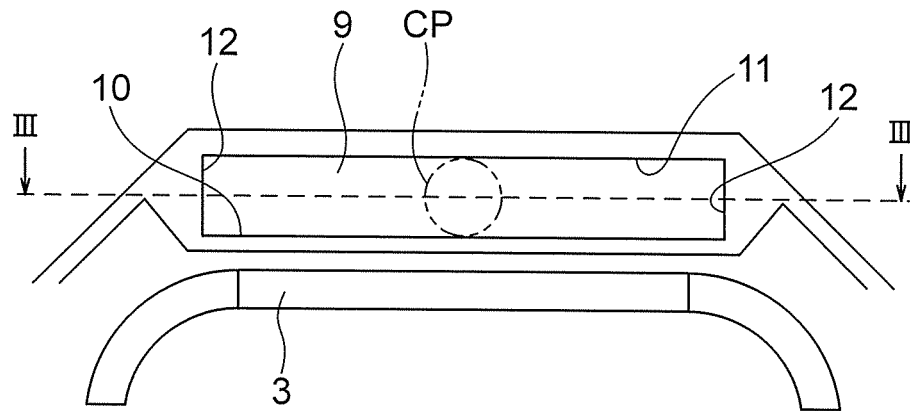


FIG. 3

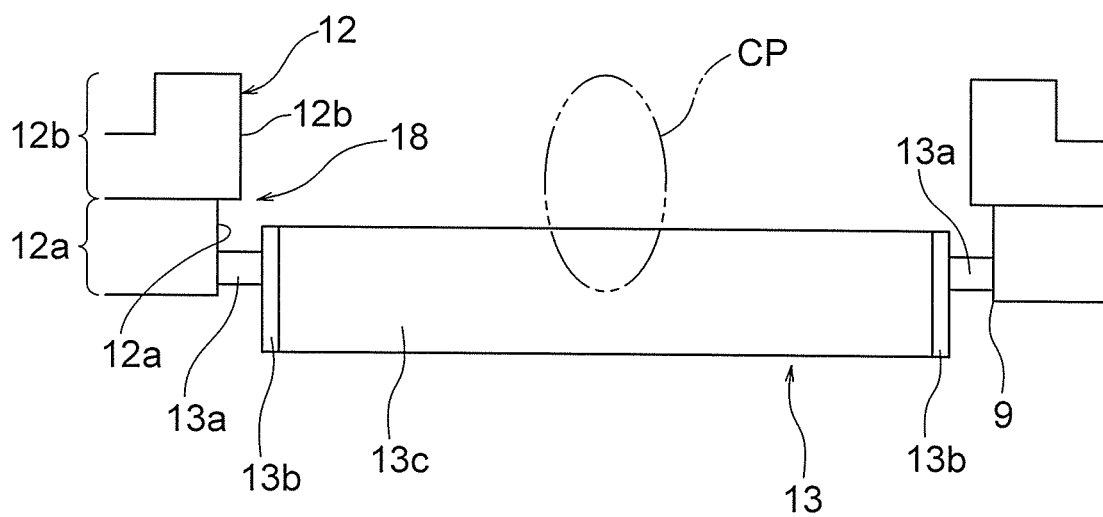


FIG. 4

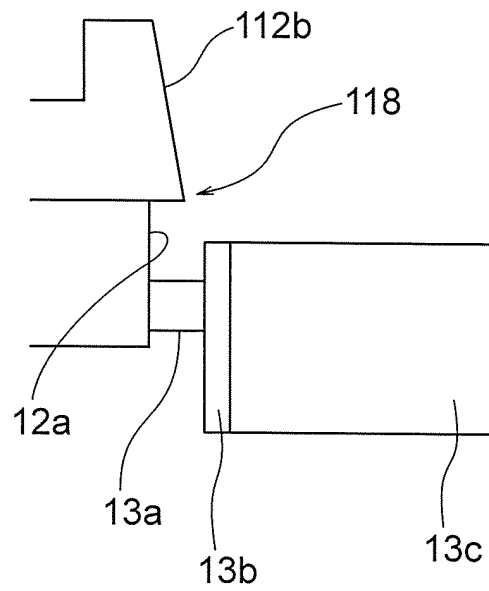


FIG. 5

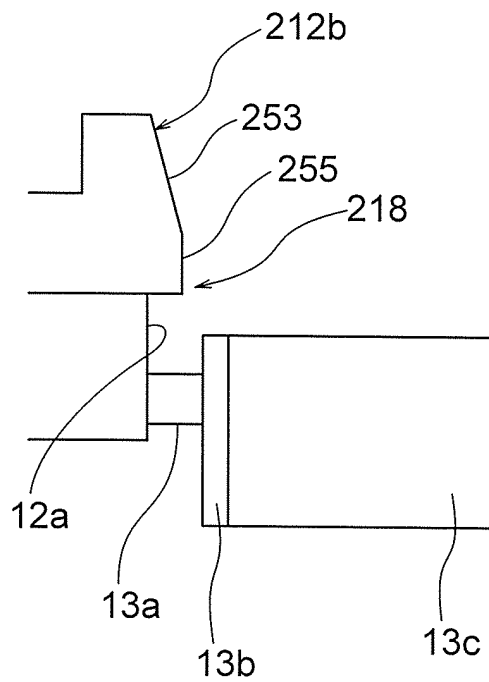


FIG. 6

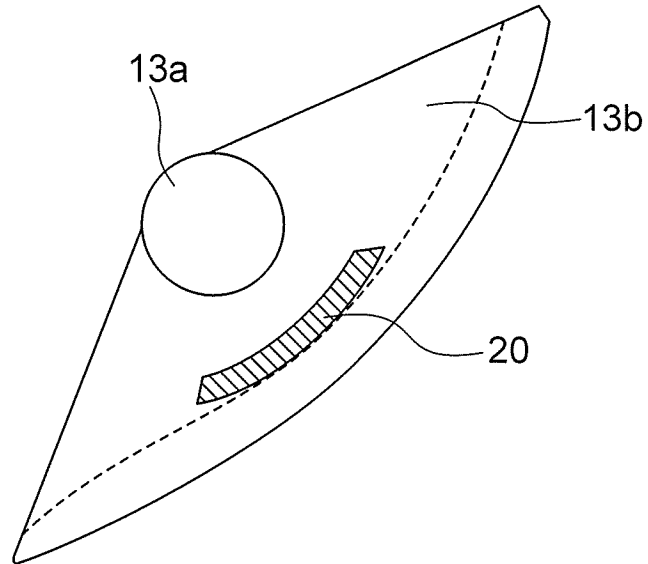


FIG. 7

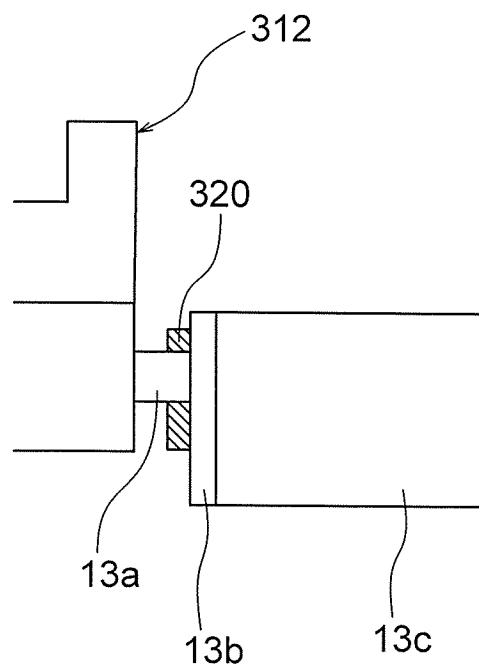


FIG. 8

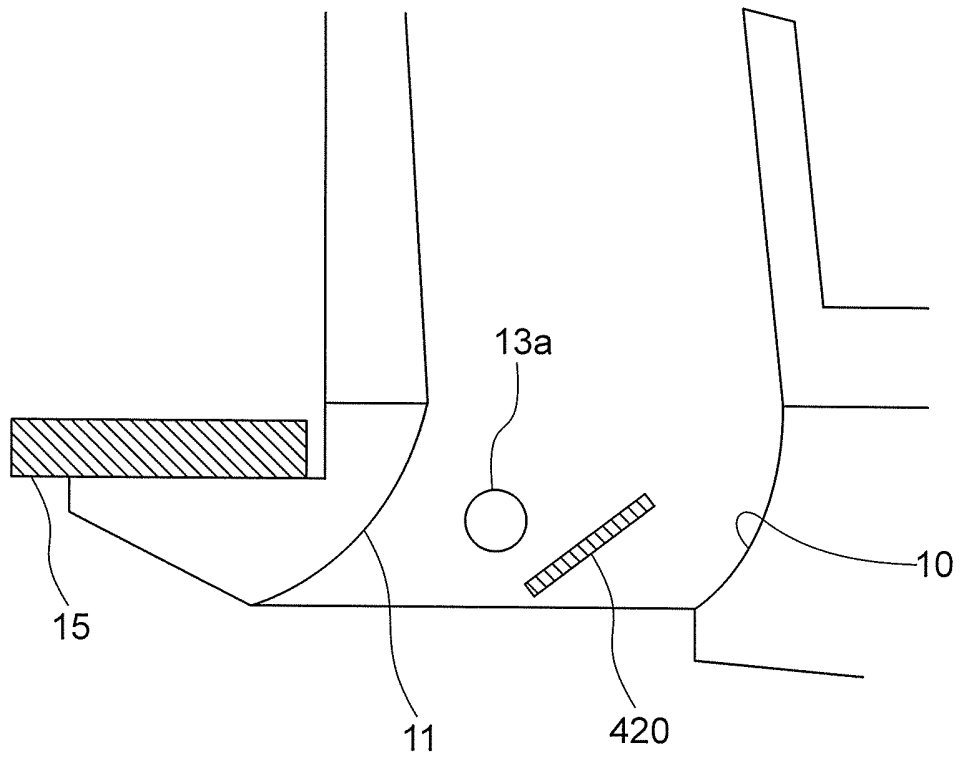
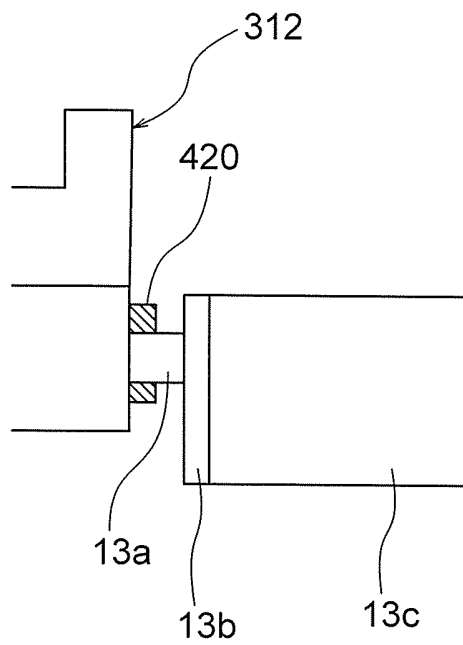


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/084324

A. CLASSIFICATION OF SUBJECT MATTER

F24F13/06(2006.01)i, F24F13/14(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F13/06, F24F13/14

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2014

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	WO 2012/169110 A1 (Mitsubishi Electric Corp.), 13 December 2012 (13.12.2012), claim 1; paragraphs [0021] to [0023]; fig. 4 to 6 (Family: none)	1-4, 6, 8 5, 7
Y A	JP 2009-24975 A (Mitsubishi Electric Corp.), 05 February 2009 (05.02.2009), paragraphs [0007], [0011] to [0019]; fig. 4 to 9 (Family: none)	1-4, 6, 8 5, 7
A	JP 11-118234 A (Daikin Industries, Ltd.), 30 April 1999 (30.04.1999), & WO 99/020945 A1 & EP 962716 A1 & CN 1242831 A	1-8

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

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Date of the actual completion of the international search

10 March, 2014 (10.03.14)

Date of mailing of the international search report

18 March, 2014 (18.03.14)

Name and mailing address of the ISA/
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Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/084324

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001-182959 A (Daikin Industries, Ltd.), 06 July 2001 (06.07.2001), (Family: none)	1-8

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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