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(54) **AIR SUPPLY DEVICE FOR AIR CONDITIONER**

(57) Disclosed is an air-conditioner air supply apparatus, including at least two annular air guiding bodies (11, 12, 13) that are hollow and have front and rear openings. Each of the annular air guiding bodies (11, 12, 13) is a single component. The rear openings of the annular air guiding bodies (11, 12, 13) are air inlets, and the front openings thereof are air outlets. The at least two annular air guiding bodies (11, 12, 13) are arranged sequentially from front to rear, and a through-duct which runs from front to end is formed in the middle. An annular heat-ex-

changed air duct (14, 15) is formed between two adjacent annular air guiding bodies (11, 12, 13). An air inlet of a rear-end annular air guiding body (12) located at the rear end is a non-heat-exchanged air inlet (31) of the air supply apparatus, and an air outlet of a front-end annular air guiding body (11) located at the front end is a mixed air outlet (21) of the air supply apparatus. The radial section of each of the annular air guiding bodies (11, 12, 13) is a curved surface.

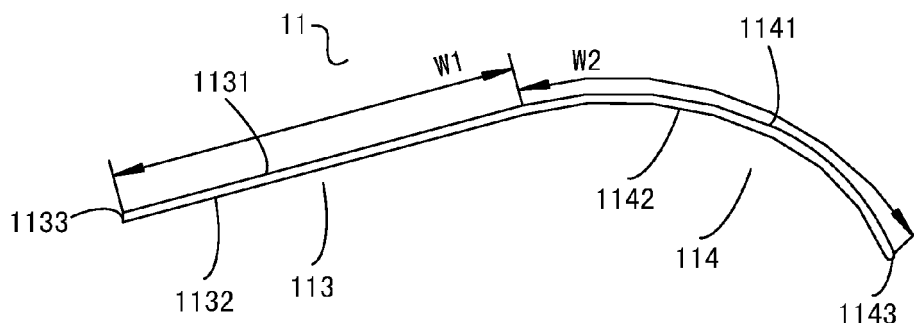


FIG. 4

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Description

BACKGROUND

Technical Field

[0001] The present invention relates to the field of air conditioning technologies, and particularly to an air-conditioner air supply apparatus.

Related Art

[0002] When a conventional vertical air-conditioner supplies air, air is subjected to heat exchange by a heat exchanger and is directly blown out from an air outlet provided on the air-conditioner under the action of an internal fan, and all of the blown-out air is heat-exchanged air. Generally, no additional air supply apparatus is disposed between the heat exchanger and the air outlet. One disadvantage of such an air supply method of the air-conditioner is that indoor air circulation is slow because the supplied air is all heat-exchanged air and the air flow rate is low; another disadvantage is that the supplied air is not mild enough, and especially in the cooling mode, the blown-out cool air directly blows on a user, making the user feel uncomfortable.

[0003] To solve the foregoing problems, the applicant proposed an air-conditioner air supply apparatus that can be applied to an air-conditioner. The air-conditioner air supply apparatus includes an annular cover body, where a through-duct running through the annular cover body is formed in the middle of the annular cover body, and an annular opening is formed on a wall of the annular cover body; several annular deflectors are disposed on the annular opening; and an annular air outlet duct is formed between adjacent annular deflectors. The installation of the air-conditioner air supply apparatus between a heat exchanger of an air-conditioner and an air outlet of a housing of the air-conditioner can not only increase the air intake volume, and accelerate indoor air circulation, but also enable the air-conditioner to supply milder air, thereby making the user feel more comfortable and improving the user experience. However, because the annular deflectors and the annular air outlet duct are both formed on an annular cover body, it is not convenient to flexibly select and control the structure of the annular deflector and the air outlet duct, thereby leading to a narrow application scope. Moreover, for an air-conditioner air supply apparatus that can achieve mixed air supply, the structure of the annular deflectors has a great effect on the air supply performance of the entire air supply apparatus, and is also a problem that needs to be researched.

SUMMARY

[0004] An objective of the present invention is to provide an air-conditioner air supply apparatus, so as to

solve a problem described in the related art.

[0005] To achieve the foregoing objective of the present invention, the present invention is implemented by means of the following technical solutions:

An air-conditioner air supply apparatus includes at least two annular air guiding bodies that are hollow and have front and rear openings, where each of the annular air guiding bodies is a single component; the rear openings of the annular air guiding bodies are air inlets and the front openings thereof are air outlets; the at least two annular air guiding bodies are arranged sequentially from front to end and a through-duct which runs from front to end is formed in the middle; an annular heat-exchanged air duct is formed between two adjacent annular air guiding bodies; an air inlet of a rear-end annular air guiding body located at the rear end is a non-heat-exchanged air inlet of the air supply apparatus, and an air outlet of a front-end annular air guiding body located at the front end is a mixed air outlet of the air supply apparatus; and the radical section of each of the annular air guiding bodies is a curved surface.

[0006] Preferably, the radical section of a plurality of the annular air guiding bodies is a curved surface that is not completely identical.

[0007] In the air-conditioner air supply apparatus described above, the front-end annular air guiding body includes two sections, a front section and a rear section, where the front section close to the air outlet of the annular air guiding body is a mixed air flow guiding portion which is extended outward, and the rear section close to the air inlet of the annular air guiding body is a heat-exchanged air flow guiding portion. A top surface contour and a bottom surface contour in the radical section of the mixed air flow guiding portion are both a straight line section or slight arc section; and a top surface contour and a bottom surface contour in the radical section of the heat-exchanged air flow guiding portion are both an arc section having a curvature radius of 40 to 100 mm.

[0008] Preferably, the width of the mixed air flow guiding portion is 0.9 to 1.1 times of the width of the heat-exchanged air flow guiding portion.

[0009] In the air-conditioner air supply apparatus described above, the rear-end annular air guiding body includes two sections, a front section and a rear section, where the front section close to the outlet of the annular air guiding body is a flow guiding portion, and the rear section close to the inlet of the annular air guiding body is an installation portion. A top surface contour and a bottom surface contour in the radical section of the flow guiding portion are both an arc section having a curvature radius of 50 to 80 mm; and a top surface contour and a bottom surface contour in the radical section of the installation portion are both a straight line section vertical to an axial direction of the annular air guiding body.

[0010] Preferably, the width of the installation portion

is 15% to 30% of the width of the heat-exchanged air flow guiding portion.

[0011] The air-conditioner air supply apparatus described above further includes at least one middle annular air guiding body located between the rear-end annular air guiding body and the front-end annular air guiding body, and the width of the middle annular air guiding body is not greater than the width of the heat-exchanged air flow guiding portion in the front-end annular air guiding body.

[0012] Preferably, a bottom surface contour in the radial section of the middle annular air guiding body is an arc section having a curvature radius of 50 to 80 mm. A top surface contour of the radial section includes at least a first arc section close to the air outlet of the middle annular air guiding body, and a second arc section close to the air inlet of the middle annular air guiding body, where a curvature radius of the first arc section is greater than the curvature radius of the bottom surface contour of the radial section, and a curvature radius of the second arc section is less than the curvature radius of the bottom surface contour of the radial section. In addition, a distance between the second arc section and the bottom surface contour of the radial section is greater than a distance between the first arc section and the bottom surface contour of the radial section.

[0013] Compared with the prior art, the present invention has the following advantages and positive effects: after an air-conditioner air supply apparatus of the present invention is applied in an air-conditioner, heat-exchanged air in an internal air duct of the air-conditioner can be blown out from the front end through a through-duct, and part of external air that is not subjected to heat exchange can be sucked under negative pressure and become part of the air finally supplied from the air-conditioner, which increases the overall air intake volume of the air-conditioner, accelerates indoor air circulation, and further improves the overall uniformity of indoor air. Moreover, the mixed air is mild, which makes the user feel more comfortable, thereby improving the comfort of the user. In addition, through adopting a plurality of annular air guiding bodies in the form of a single component to constitute the air-conditioner air supply apparatus, it can not only facilitate flexibly controlling the structure of each annular air guiding body according to air supply requirements and easily producing each annular air guiding body having a different structure, but also achieve flexible selection of an assembling manner of the entire air-conditioner air supply apparatus in the air-conditioner, thereby improving the application scope of the air-conditioner air supply apparatus and the production efficiency of an air-conditioner. Moreover, each annular air guiding body adopts a structure that the radial section is a curved surface, so as to improve primary air flow rate when guiding the heat-exchanged air to smoothly flow, facilitate introducing the non-heat-exchanged air as a secondary air flow into the through-duct, and obtain air supplied at a proper temperature while achieving increase of the

amount of the air supplied.

[0014] Other features and advantages of the present invention will become apparent after reading the detailed description of the present invention with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a schematic structural view of an embodiment of an air-conditioner having an air-conditioner air supply apparatus according to the present invention;

FIG. 2 is a schematic three-dimensional structural view of an embodiment of an air-conditioner air supply apparatus in the air-conditioner in FIG. 1;

FIG. 3 is a schematic structural radial section view of the air-conditioner air supply apparatus in FIG. 2;

FIG. 4 is a schematic structural radial section view of a front-end annular air guiding body in FIG. 3;

FIG. 5 is a schematic structural radial section view of a rear-end annular air guiding body in FIG. 3; and

FIG. 6 is a schematic structural radial section view of a middle annular air guiding body in FIG. 3.

DETAILED DESCRIPTION

[0016] The technical solutions of the present invention are further described in detail below with reference to the accompanying drawings and the detailed description.

[0017] First, technical terms involved in the detailed description are briefly described. The front end or rear end of each structural component as mentioned below is defined in terms of the position of the structural component in the normal use state relative to the user; front or rear, when used to describe the positions at which multiple structural components are arranged, is also defined in terms of the position of an apparatus formed by the multiple structural components in the normal use state relative to the user. In the following description, heat-exchanged air refers to air that is from the inside of an air-conditioner and has been subjected to heat exchange by a heat exchanger; non-heat-exchanged air refers to air from the environmental space in which the air-conditioner is located, is relative to the heat-exchanged air, and is part of air that is not directly from the heat exchanger; and mixed air refers to air formed by mixing the heat-exchanged air with the non-heat-exchanged air. In the following description, the shape being annular refers to an enclosed structure that is formed by encircling, but is not limited to a circular ring.

[0018] Then, the design concept of the present inven-

tion is briefly described. For an air-conditioner air supply apparatus that can produce and supply mixed air by mixing heat-exchanged air of a heat exchanger of an air-conditioner with external non-heat-exchanged air, the structure of an annular air guiding body that forms a heat-exchanged air duct, and especially the structure of the radical section thereof is vital for movement of air flow, and then may affect the amount of external non-heat-exchanged air sucked by the air-conditioner air supply apparatus and the temperature of the mixed air supplied. As a result, based on a research point of the structure of the annular air guiding body and especially the shape of the radical section thereof, the present invention intends to search a preferred structure that can improve the performance of an air-conditioner air supply apparatus.

[0019] FIG. 1 is a schematic structural view of an embodiment of an air-conditioner having an air-conditioner air supply apparatus 1.

[0020] As shown in FIG. 1, the air-conditioner of this embodiment includes a front panel 2, a rear panel 3, a left panel, a right panel, a top plate and a bottom plate (not marked in the figure) that constitute a housing of the air-conditioner. The housing defines an internal air duct 4 of the air-conditioner. A mixed air outlet 21 is formed on an upper part of the front panel 2 of the air-conditioner, and a non-heat-exchanged air inlet 31 is formed on an upper part of the rear panel 3 of the air-conditioner and at a position corresponding to the mixed air outlet 21 on the front panel 2. A blower 6, a heat exchanger 5 and an air-conditioner air supply apparatus 1 are disposed from bottom to top in the internal air duct 4, and the blower 6 is arranged in such a manner that air from the internal air duct 4 of the air-conditioner is blown out from the mixed air outlet 21 on the front panel 2.

[0021] The structure of the air-conditioner air supply apparatus 1 is shown in a schematic three-dimensional structural view of FIG. 2 and a schematic structural radial section view of FIG. 3.

[0022] Referring to FIG. 2 and FIG. 3 together with FIG. 1, the air-conditioner air supply apparatus 1 of this embodiment includes three annular air guiding bodies, which are respectively a front-end annular air guiding body 11, a first middle annular air guiding body 13 and a rear-end annular air guiding body 12. Each of the three annular air guiding bodies that are arranged sequentially from front to rear is a single component and formed independently. The front-end annular air guiding body 11 is hollow and has two openings, a front opening and a rear opening, where the front opening is an air outlet, specifically a mixed air outlet 111, and the rear opening is an air inlet 112; the first middle annular air guiding body 13 is hollow and has two openings, a front opening and a rear opening, which are respectively an air outlet 131 and an air inlet 132; and the rear-end annular air guiding body 12 is hollow and has two openings, a front opening and a rear opening, where the front opening is an air outlet 121, and the rear opening is an air inlet, specifically a non-heat-exchanged air inlet 122. After the front-end

annular air guiding body 11, the first middle annular air guiding body 13 and the rear-end annular air guiding body 12 are arranged sequentially from front to rear, a through-duct that runs through all the three annular air guiding bodies from front to rear is formed in the middle (not marked in the figure). Moreover, a first annular heat-exchanged air duct 14 is formed between the front-end annular air guiding body 11 and the first middle annular air guiding body 13, and a second annular heat-exchanged air duct 15 is formed between the first middle annular air guiding body 13 and the rear-end annular air guiding body 12. The internal air duct 4 of the air-conditioner is connected to the through-duct in the air-conditioner air supply apparatus 1 through the first annular heat-exchanged air duct 14 and the second annular heat-exchanged air duct 15. The radical section of each annular air guiding body in the air-conditioner air supply apparatus 1 is a curved surface, so as to improve primary air flow rate when guiding the heat-exchanged air to smoothly flow, facilitate introducing the non-heat-exchanged air as a secondary air flow into the through-duct, and obtain air supplied at a proper temperature while achieving increase of the amount of the air supplied. In addition, each annular air guiding body preferably adopts a curved surface that is not completely identical as the radical section, so as to ensure the uniformity of air supplied in different direction through each heat-exchanged air duct. For the specific structure of the radical section of each annular air guiding body, please refer to FIG. 4 to FIG. 6 and the following description of each figure.

[0023] In this embodiment, adopting a plurality of annular air guiding bodies in the form of a single component to constitute the air-conditioner air supply apparatus 1, can make it easier to flexibly control the structure of each annular air guiding body, and easily produce each annular air guiding body having a different structure, thereby ensuring the uniformity and speed of air supply. In addition, because each annular air guiding body is a single component, an assembling manner of the entire air-conditioner air supply apparatus 1 in the air-conditioner can be selected flexibly, thereby improving the application scope of the air-conditioner air supply apparatus 1 and the production efficiency of an air-conditioner. Moreover, the air-conditioner air supply apparatus 1 adopts various annular air guiding bodies having the radical section of a curved surface to constitute a heat-exchanged air duct, which can not only contribute to uniform air supply through the heat-exchanged air duct in the circumferential direction, but also effectively guide the flow direction of heat-exchanged air, thereby achieving acceleration during turning of the air flow, reducing total pressure loss of the air flow, achieving a high-speed air supply at low noise, and improving the air supply performance of the air supply apparatus.

[0024] When assembling the air-conditioner air supply apparatus 1 in the air-conditioner, the rear-end annular air guiding body 12 is fastened with the rear panel 3 of the air-conditioner. The first middle annular air guiding

body 13 is first fastened with the front-end annular air guiding body 11 through a screw, and then the front-end annular air guiding body 11 fastened with the first middle annular air guiding body 13 is fixed on the front panel 2 of the air conditioner. After being fixed in place, the mixed air outlet 111 of the front-end annular air guiding body 11, as an air outlet of the entire air-conditioner air supply apparatus 1, is enclosed and assembled with the mixed air outlet 21 on the front panel 2; and the non-heat-exchanged air inlet 122 in the rear-end annular air guiding body 12, as a non-heat-exchanged air inlet of the entire air-conditioner air supply apparatus 1, is enclosed and assembled with the non-heat-exchanged air inlet 31 on the rear panel 3.

[0025] After the air-conditioner air supply apparatus 1 of the above structure is adopted in an air-conditioner, when the air-conditioner operates, indoor air enters the air-conditioner, is accelerated by the blower 6, and enters the heat exchanger 5 for heat exchange. The heat-exchanged air is blown from the internal air duct 4 to the air-conditioner air supply apparatus 1, and enters the through-duct through the first annular heat-exchanged air duct 14 and the second annular heat-exchanged air duct 15, and then is blown out from the mixed air outlet 111 on the front-end annular air guiding body 11 and the mixed air outlet 21 on the front panel 2 through the through-duct. As the heat-exchanged air is blown from the internal air duct 4 with a large area to the annular heat-exchanged air duct with a decreased area, the flow rate of the heat-exchanged air blown out from the annular heat-exchanged air duct is increased, so that the surface pressure of the corresponding annular air guiding body decreases to form a negative pressure in the through-duct. Under the negative pressure, indoor air outside the air-conditioner as the non-heat-exchanged air, enters the through-duct from the non-heat-exchanged air inlet 31 on the rear panel 3 and the non-heat-exchanged air inlet 122 of the rear-end annular air guiding body 12, and is mixed with the heat-exchanged air blown out from the annular heat-exchanged air duct to form mixed air, and then sent to the indoors. The mixed air is mild, which makes the user feel more comfortable, thereby improving the comfort of the user. In addition, part of external air that is not subjected to heat exchange is sucked under the negative pressure generated by the air supply apparatus 1 and becomes part of the air finally supplied from the air-conditioner, which increases the overall air intake volume of the air-conditioner, accelerates indoor air circulation, and further improves the overall uniformity of indoor air.

[0026] In this embodiment, as a preferred implementation manner, the mixed air outlet 21 on the front panel 2 and the non-heat-exchanged air inlet 31 on the rear panel 3 have a circular shape, and correspondingly, each annular air guiding body in the air-conditioner air supply apparatus 1 has an annular shape. However, in addition to the above shapes, the technical objective of the present invention may also be achieved by designing as

a combination of other shapes, for example, an ellipse and an elliptical ring, a regular polygon and a regular polygonal ring, and the like.

[0027] FIG. 4 shows the specific structure of the front-end annular air guiding body 11 in FIG. 3. As shown in the schematic structural radial section view of FIG. 4, the front-end annular air guiding body 11 includes two sections, a front section and a rear section, where the front section close to the front-opening thereof, i.e. the mixed air outlet 111 is a mixed air flow guiding portion 113 which is extended outward, and the rear section close to the rear opening thereof, i.e. the air inlet 112 is a heat-exchanged air guiding portion 114. The mixed air guiding portion 113 acts as a main component for guiding flow of the mixed air of the heat-exchanged air and non-heat-exchanged air, where a top surface contour 1131 and a bottom surface contour 1132 in the radial section thereof are both preferably a straight line section or a slight arc section (i.e. an arc having a great curvature radius) similar to a straight line. The heat-exchanged air guiding portion 114 acts as a main component for guiding flow of the heat-exchanged air, where a top surface contour 1141 and a bottom surface contour 1142 in the radial section thereof are both an arc section having a curvature radius of 40 to 100 mm. The top surface contours and the bottom surface contours of the mixed air flow guiding portion 113 and the heat-exchanged air flow guiding portion 114 are connected in sequence, and form an enclosed area through end closure lines 1133 and 1143, so that the radial section obtained finally is a streamlined curved surface. In addition, the end closure line 1143 for enclosing the top surface contour 1141 and the bottom surface contour 1142 of the heat-exchanged air flow guiding portion 114 is preferably an arc section, so as to ensure that the heat-exchanged air smoothly enters the heat-exchanged air duct, and avoid generation of a vortex flow. Moreover, comprehensively considering the air supply performance, structural strength and aesthetics, the surface width W1 of the mixed air flow guiding portion 113 is 0.9 to 1.1 times of the surface width W2 of the heat-exchanged air flow guiding portion 114, and preferably, the both have a same width. For example, in this embodiment, $W1=W2=90.7$ mm.

[0028] FIG. 5 shows the specific structure of the rear-end annular air guiding body 12 in FIG. 3. As shown in the schematic structural radial section view of FIG. 5, the rear-end annular air guiding body 12 also includes two sections, a front section and a rear section, where the front section close to the front opening thereof, i.e. the air outlet 121 is a flow guiding portion 123, and the rear section close to the rear opening thereof, i.e. the non-heat-exchanged air inlet 122 is a turn-up installation portion 124. The flow guiding portion 123 acts as a main component for guiding flow of the heat-exchanged air, where a top surface contour 1231 and a bottom surface contour 1232 in the radial section thereof are both an arc section having a curvature radius of 50 to 80 mm. In this embodiment, the curvature radius is 61.4 mm. The

turn-up installation portion 124 acts as a main installation component, where a top surface contour 1241 and a bottom surface contour 1242 are both a straight line section vertical to an axial direction of the rear-end annular air guiding body 12. The top surface contours and the bottom surface contours of the flow guiding portion 123 and the installation portion 124 are connected in sequence, and form an enclosed area through end closure lines 1233 and 1243, so that the radical section obtained finally is a streamlined curved surface. Preferably, the end closure line 1233 is an arc section, so as to ensure that the heat-exchanged air smoothly enters the heat-exchanged air duct and avoid generation of a vortex flow. In addition, the surface width W3 of the installation portion 124 should neither be excessively large nor excessively small. The width thereof is preferably 15% to 30% of the surface width W4 of the air guiding portion 123, and more preferably is 25%.

[0029] FIG. 6 shows the specific structure of the first middle annular air guiding body 13 in FIG. 3. As shown in the schematic structural radial section view of FIG. 6, in the air-conditioner air supply apparatus 1 having the first middle annular air guiding body 13, the first middle annular air guiding body 13 is located between the rear-end annular air guiding body 12 and the front-end annular air guiding body 11, and the surface width (W5+W6) of the first middle annular air guiding body 13 is not greater than the surface width W2 of the heat-exchanged air flow guiding portion 114 in the front-end annular air guiding body 12. For example, in this embodiment, W2 is 90.7 mm, and (W5+W6) is 61.3 mm. A bottom surface contour 133 in the radical section of the first middle annular air guiding body 13 is an arc section having a curvature radius of 50 to 80 mm, and a top surface contour 134 thereof includes at least a first arc section 1341 close to the front opening of the first middle annular air guiding body 13, i.e. the air outlet 131, and a second arc section 1342 close to the rear opening of the first middle annular air guiding body 13, i.e. the air inlet 132. The top surface contour 134 and the bottom surface contour 133 are enclosed through end closure lines 1343 and 1344, to form a curved surface of an enclosed streamline structure. The end closure lines 1343 and 1344 are both an arc section. In this embodiment, the first arc section 1341 has a curvature radius greater than that of the bottom surface contour 133, while the second arc section 1342 has a curvature radius less than that of the bottom surface contour 133. For example, the curvature radius of the bottom surface contour 133 is 60.2 mm, the curvature radius of the first arc section 1341 is 115.3 mm and the curvature radius of the second arc section 1342 is 51.4 mm. In addition, a distance between the second arc section 1342 and the bottom surface contour 133 is greater than a distance between the first arc section 1341 and the bottom surface contour 133, thereby forming a structure that is thin in the front and thick in the rear.

[0030] After each annular air guiding body adopts a radical section of the above structure, the pressure loss

can be reduced to a greatest extent, thereby reducing the noise during air supply by the air-conditioner air supply apparatus 1.

[0031] Besides adopting the above three annular air guiding bodies to constitute the air-conditioner air supply apparatus 1, more middle annular air guiding bodies may also be disposed between the front-end annular air guiding body 11 and the rear-end annular air guiding body 12. Each middle annular air guiding body may be designed by reference to the radical section of the first middle annular air guiding body 13 as described above.

[0032] The foregoing embodiments are merely used to describe rather than limit the technical solutions of the present invention. Although the present invention is described in detail with reference to the foregoing embodiments, a person of ordinary skill in the art can still make modifications to the technical solutions described in the foregoing embodiments, or make equivalent replacements to some technical features thereof. Such modifications or replacements should not make the essence of corresponding technical solutions depart from the spirit and scope of the technical solutions of the present invention.

Claims

1. An air-conditioner air supply apparatus, comprising at least two annular air guiding bodies that are hollow and have front and rear openings, wherein each of the annular air guiding bodies is a single component; the rear openings of the annular air guiding bodies are air inlets and the front openings thereof are air outlets; the at least two annular air guiding bodies are arranged sequentially from front to end, and a through-duct which runs from front to end is formed in the middle; an annular heat-exchanged air duct is formed between two adjacent annular air guiding bodies; an air inlet of a rear-end annular air guiding body located at the rear end is a non-heat-exchanged air inlet of the air supply apparatus, and an air outlet of a front-end annular air guiding body located at the front end is a mixed air outlet of the air supply apparatus; and the radical section of each of the annular air guiding bodies is a curved surface.
2. The air-conditioner air supply apparatus according to claim 1, wherein the radical section of a plurality of the annular air guiding bodies is a curved surface that is not completely identical.
3. The air-conditioner air supply apparatus according to claim 2, wherein the front-end annular air guiding body comprises two sections, a front section and a rear section, wherein the front section close to the air outlet of the annular air guiding body is a mixed air flow guiding portion which is extended outward, and the rear section close to the air inlet of the an-

nular air guiding body is a heat-exchanged air flow guiding portion, wherein a top surface contour and a bottom surface contour in the radical section of the mixed air flow guiding portion are both a straight line section or slight arc section; and a top surface contour and a bottom surface contour in the radical section of the heat-exchanged air flow guiding portion are both an arc section having a curvature radius of 40 to 100 mm.

4. The air-conditioner air supply apparatus according to claim 3, wherein the width of the mixed air flow guiding portion is 0.9 to 1.1 times of the width of the heat-exchanged air flow guiding portion. 5
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5. The air-conditioner air supply apparatus according to claim 2, wherein the rear-end annular air guiding body comprises two sections, a front section and a rear section, wherein the front section close to the air outlet of the annular air guiding body is a flow guiding portion, and the rear section close to the air inlet of the annular air guiding body is an installation portion, wherein a top surface contour and a bottom surface contour in the radical section of the flow guiding portion are both an arc section having a curvature radius of 50 to 80 mm, and a top surface contour and a bottom surface contour in the radical section of the installation portion are both a straight line section vertical to an axial direction of the annular air guiding body. 15
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6. The air-conditioner air supply apparatus according to claim 5, wherein the width of the installation portion is 15% to 30% of the width of the heat-exchanged air flow guiding portion. 35
7. The air-conditioner air supply apparatus according to any one of claims 2 to 6, wherein the air supply apparatus further comprises at least one middle annular air guiding body located between the rear-end annular air guiding body and the front-end annular air guiding body, and the width of the middle annular air guiding body is not greater than the width of the heat-exchanged air flow guiding portion in the front-end annular air guiding body. 40
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8. The air-conditioner air supply apparatus according to claim 7, wherein a bottom surface contour in the radical section of the middle annular air guiding body is an arc section having a curvature radius of 50 to 80 mm, and a top surface contour of the radical section comprises at least a first arc section close to an air outlet of the middle annular air guiding body, and a second arc section close to an air inlet of the middle annular air guiding body, wherein a curvature radius of the first arc section is greater than the curvature radius of the bottom surface contour of the radical section, and a curvature radius of the second arc 50
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section is less than the curvature radius of the bottom surface contour of the radical section; and a distance between the second arc section and the bottom surface contour of the radical section is greater than a distance between the first arc section and the bottom surface contour of the radical section.

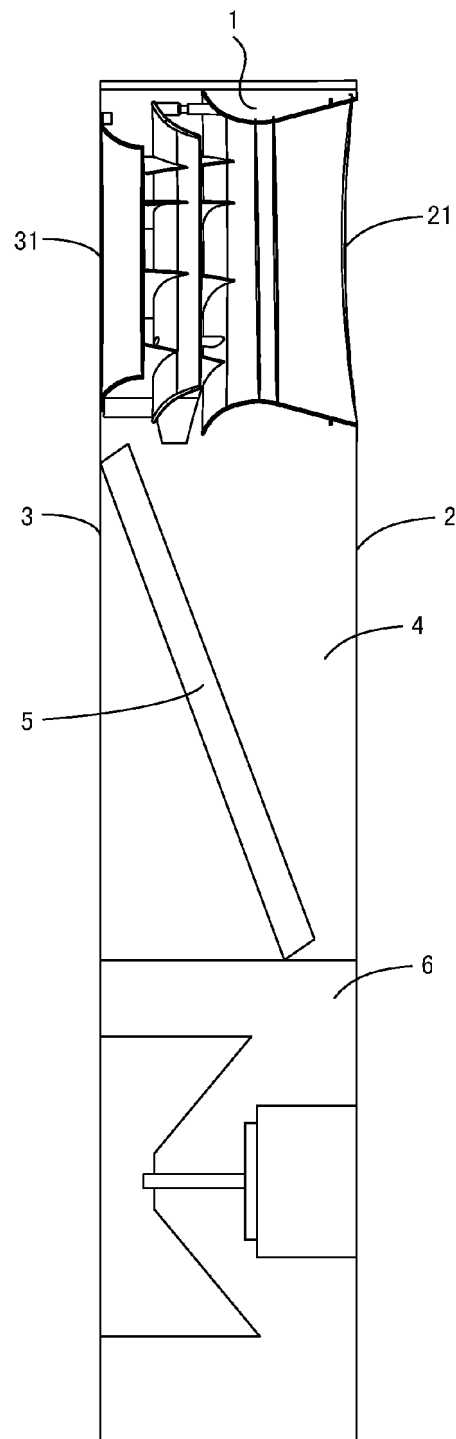


FIG. 1

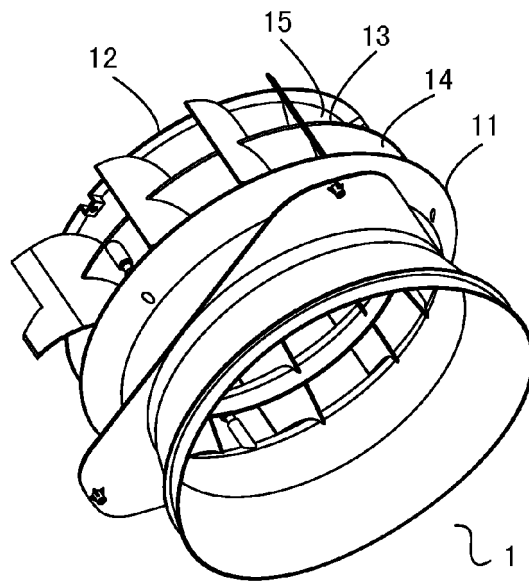


FIG. 2

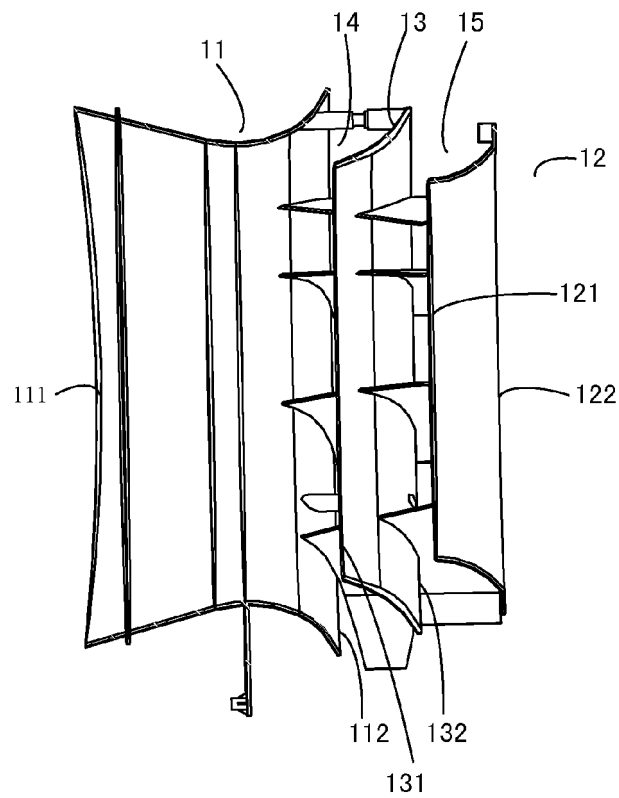


FIG. 3

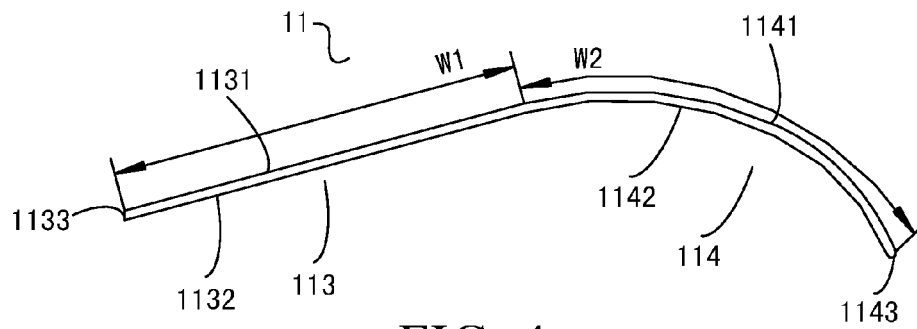


FIG. 4

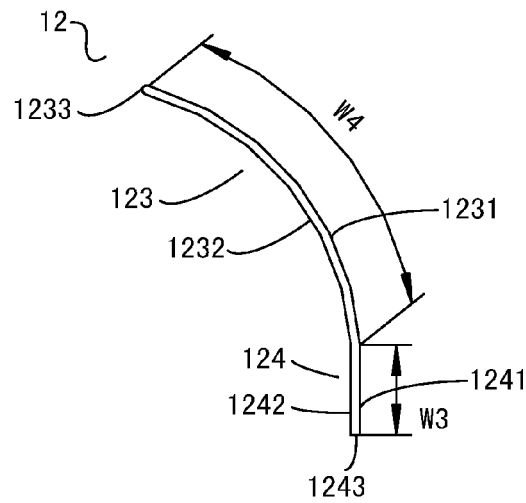


FIG. 5

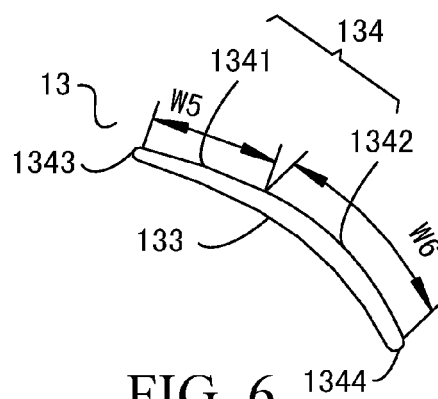


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/078216

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/062 (2006.01) i; F24F 13/08 (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)

F24F 13

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

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

CNPAT, CNKI: air condition, wind guide, drainage, jet flow, rotate, heat exchange

WPI, EPODOC: air condition+, induct+, guide, annular, heat exchange

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 101234065 B1 (LG ELECTRONICS INC.), 15 February 2013 (15.02.2013), description, paragraphs 0046-0125, and figures 1-15	1-8
A	CN 201983401 U (KIMURA KOHKI CO., LTD.), 21 September 2011 (21.09.2011), description, paragraphs 0054-0060, and figures 1-5	1-8
A	CN 202900773 U (NINGBO SHIRONG ELECTRICAL APPLIANCE TECHNOLOGY CO., LTD.), 24 April 2013 (24.04.2013), description, paragraphs 0016-0021, and figures 1-3	1-8
A	JPH 0833425 A (KYORITSU KK), 06 February 1996 (06.02.1996), the whole document	1-8
PX	CN 103453641 A (HAIER ELECTRONICS GROUP CO., LTD. et al.), 18 December 2013 (18.12.2013), the whole document	1-8
PX	CN 103453638 A (HAIER ELECTRONICS GROUP CO., LTD. et al.), 18 December 2013 (18.12.2013), the whole document	1-8

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 11 July 2014 (11.07.2014)	Date of mailing of the international search report 12 September 2014 (12.09.2014)
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer LV, Liqiang Telephone No.: (86-10) 62085048

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2014/078216

5	Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
	KR 101234065 B1	15 February 2013	CN 103175260 A	26 June 2013
			EP 2607807 A1	26 June 2013
10	CN 201983401 U	21 September 2011	JP 2012026611 A	09 February 2012
			JP 5028511 B	19 September 2012
			CN 102345922 A	08 February 2012
	CN 202900773 U	24 April 2013	None	
15	JPH 0833425 A	06 February 1996	None	
	CN 103453641 A	18 December 2013	None	
	CN 103453638 A	18 December 2013	None	
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Form PCT/ISA/210 (patent family annex) (July 2009)