(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 006 855 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
26.09.2018 Bulletin 2018/39

(21) Application number: **14807746.4**

(22) Date of filing: **23.05.2014**

(51) Int Cl.:
F24F 13/22 *(2006.01)*
F24F 13/08 *(2006.01)*
F24F 13/062 *(2006.01)*
F24F 1/01 *(2011.01)*
F24F 1/00 *(2011.01)*

(86) International application number:
PCT/CN2014/078205

(87) International publication number:
WO 2014/194764 (11.12.2014 Gazette 2014/50)

(54) **METHOD FOR PREVENTING CONDENSATION BY AIR SUPPLY APPARATUS OF AIR CONDITIONER**

VERFAHREN ZUR VERHINDERUNG VON KONDENSATION DURCH LUFTZUFUHRVORRICHTUNG EINER KLIMAANLAGE

PROCÉDÉ DE PRÉVENTION DE CONDENSATION PAR UN APPAREIL D'ALIMENTATION EN AIR D'UN CLIMATISEUR

(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

(30) Priority: **03.06.2013 CN 201310215919**

(43) Date of publication of application:
13.04.2016 Bulletin 2016/15

(73) Proprietors:
- **Haier Group Corporation**
  Qingdao, Shandong 266101 (CN)
- **Qingdao Haier Air Conditioner Gen Corp., Ltd.**
  Qingdao, Shandong 266101 (CN)

(72) Inventors:
- **WANG, Yongtao**
  Shandong 266101 (CN)
- **WANG, Xiaogang**
  Shandong 266101 (CN)
- **GUAN, Tingting**
  Shandong 266101 (CN)
- **JIA, Guangfen**
  Shandong 266101 (CN)

(74) Representative: **Ziebig, Marlene et al**
Ziebig & Hengelhaupt
Patentanwälte PartG mbB
Leipziger Straße 49
10117 Berlin (DE)

(56) References cited:

EP-A1- 1 069 381	**WO-A1-2006/087410**
CN-A- 103 453 648	**CN-U- 201 983 401**
CN-U- 202 692 257	**CN-Y- 2 597 872**
JP-A- H04 268 130	**JP-A- 2012 042 085**
KR-B1- 101 234 065	**US-A1- 2009 233 539**

Printed by Jouve, 75001 PARIS (FR)

Description

BACKGROUND

Technical Field

[0001] The present invention relates to the field of air conditioning technologies, and particularly to a method for preventing an air-conditioner air supply apparatus used in an air conditioner from generating condensation.

Related Art

[0002] CN 202 692 257 U discloses an air conditioner, comprising a main body, wherein the main body is provided with an air suction hole, a space and an discharged main body which is arranged in the space. An opening part and an air outlet are arranged at the discharged main body; the opening part is provided with a discharging space; air is guided by the air outlet to discharge outside the space from the periphery of the opening part; the discharged main body comprises a first main body and a second main body; the first main body is provided with a discharging space; and the air outlet is jointly formed by the second main body and the first main body and is used for guiding air blowed from the main body to disperse towards the air outlet.

[0003] 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, an air volume is small, 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.

[0004] 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. A through-duct running through the annular cover body is formed in the middle of the annular cover body. An annular opening is formed on a wall of the annular cover body. Several annual deflectors are provided on the annular opening, and an annular air outlet duct is formed between adjacent annular deflectors. After the air-conditioner air supply apparatus is disposed between an air conditioner heat exchanger and an air conditioner housing, not only the air intake volume can be increased, and indoor air circulation can be accelerated, but also the air-conditioner is enabled to supply milder air, thereby making the user feel more comfortable and improving the user experience. However, when the air conditioner is running, particularly during cooling and air supply, cold air blown out from the annular air outlet duct of the air-conditioner air supply apparatus is directly mixed with air at a room temperature that is introduced from the back of the apparatus, so that condensation is easily generated on an air outlet of a mixed air and on the annular deflectors, thereby affecting air supply performance of the air conditioner, and causing complaints of a user.

SUMMARY

[0005] An objective of the present invention is to provide a method for preventing condensation on an air-conditioner air supply apparatus, which effectively prevents generation of condensation by setting the air-conditioner air supply apparatus to being in a proper structure, thereby improving usage performance of an air supply apparatus.

[0006] To achieve the foregoing objective of the present invention, the present invention is implemented by means of the following technical solutions:

A method for preventing condensation on an air-conditioner air supply apparatus in an air conditioner, wherein the air conditioner comprises a housing with a blower, a heat exchanger and the air supply apparatus, being arranged in the housing from bottom to top in an internal air duct, wherein the air supply apparatus comprises a non-heat-exchanged air inlet and a mixed air outlet of the air-conditioner and the blower drives air from the internal air duct to the mixed air outlet.

[0007] The invention is characterized in that, the air supply apparatus comprises at least three air guiding bodies being single components that are annular in shape and sequentially and coaxially arranged from the non-heat-exchanged air inlet to the mixed air outlet and with the annular air guiding bodies being hollow with a trough-duct there through and further with the annular air guiding bodies having front and rear openings, with a rear opening of the annular air guiding bodies are air inlets, front openings of the annular air guiding bodies are air outlets and an air inlet of a rear-end annular air guiding body located at the rear end is the 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 the mixed air outlet of the air supply apparatus and wherein further, a heat-exchanged air duct, being annular in shape, is formed between two adjacent annular air guiding bodies and heat exchanged air is driven into the trough-duct via the heat-exchanged air ducts by the blower.

[0008] Preferably, in the method, the multiple annular air guiding bodies are coaxially disposed, the annular air guiding bodies are set in a manner that inner bores of air outlets of the annular air guiding bodies gradually increase in the direction from the non-heat-exchanged air inlet to the mixed air outlet, each of the annular air guiding bodies is set in a manner that the annular air guiding body is at least partially tapered from back to front, where an inner bore of the air inlet is larger than the inner bore of the air outlet, and radial sections of the multiple annular air guiding bodies are set to curved surfaces that are not exactly identical.

[0009] Preferably, the air supply apparatus is set to including the front-end annular air guiding body, the rear-end annular air guiding body, and at least one middle annular air guiding body between the front-end annular air guiding body and the rear-end annular air guiding body, where a bottom surface contour in the radial section of the middle annular air guiding body is an arc segment of which a curvature radius ranges from 50 to 80mm, a top surface contour of the radial section at least includes a first arc segment close to the air outlet of the middle annular air guiding body, and a second arc segment close to the air inlet of the middle annular air guiding body, a curvature radius of the first arc segment is greater than the curvature radius of the bottom surface contour of the radial section, a curvature radius of the second arc segment is less than the curvature radius of the bottom surface contour of the radial section, a distance between the second arc segment and the bottom surface contour of the radial section is greater than a distance between the first arc segment and the bottom surface contour of the radial section, and a top surface contour and a bottom surface contour in the radial section of a guiding portion of the rear-end annular air guiding body are both arc segments of which a curvature radius ranges from 50 to 80mm.

[0010] Preferably, the front-end annular air guiding body includes a front segment and a rear segment, the front segment close to the air outlet of the annular air guiding body is a mixed air guiding portion that is extended outward, the rear segment close to the air inlet of the annular air guiding body is a heat-exchanged air guiding portion, a top surface contour and a bottom surface contour in a radial section of the mixed air guiding portion are both straight segments or slightly arched segments, a top surface contour and a bottom surface contour in a radial section of the heat-exchanged air guiding portion are both arc segments of which a curvature radius ranges from 40 to 100mm, and a width of the heat-exchanged air guiding portion is greater than a width of the middle annular air guiding body.

[0011] Preferably, a width of the mixed air guiding portion is 0.9-1.1 times the width of the heat-exchanged air guiding portion.

[0012] In the foregoing method, in order to prevent generation of condensation, an airflow distribution assembly is disposed in the annular heat-exchanged air ducts, to distribute, by using the airflow distribution assembly, heat-exchanged air that has been subjected to heat exchange by a heat exchanger in an internal air duct of the air conditioner and then send the heat-exchanged air to the annular heat-exchanged air ducts.

[0013] Preferably, the airflow distribution assembly is disposed, in at least one of the annular heat-exchanged air ducts, in a structure of uniformly distributing, along a circumferential direction of the annular heat-exchanged air duct, the heat-exchanged air entering the annular heat-exchanged air duct.

[0014] Preferably, airflow distribution assemblies are disposed in all the annular heat-exchanged air ducts.

[0015] Preferably, the airflow distribution assembly includes multiple airflow distribution plates, and the multiple airflow distribution plates are bilaterally symmetrically arranged in the circumferential direction of the annular heat-exchanged air duct, and along an air supply direction of the heat-exchanged air.

[0016] Preferably, the multiple airflow distribution plates are bent distribution plates of the same bending direction, and the bending direction of the multiple bent distribution plates is reverser to the air supply direction of the heat-exchanged air from the heat exchanger.

[0017] Compared with the prior art, the present invention has the following advantages and positive effects: in the method of the present invention, an air-conditioner air supply apparatus constituted by multiple annular air guiding bodies that are single components are disposed, and a rear annular air guiding body is set in a manner that heat-exchanged air that is blown out from an annular heat-exchanged air duct formed between the rear annular air guiding body and a front annular air guiding body adjacent to the rear annular air guiding body forms a heat-exchanged air film on a whole annular surface of the front annular air guiding body, so that a problem that when the air-conditioner air supply apparatus supplies heat-exchanged air and non-heat-exchanged air at the same time, mixed air of the two encounters with each other on surfaces of annular air guiding bodies to generate condensation is effectively avoided, thereby improving supply air performance.

[0018] 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

[0019]

FIG. 1 is a schematic structural view of an embodiment of an air conditioner in which a method of the present invention is applied;

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

FIG. 3 is an exploded schematic structural view of the air-conditioner air supply apparatus of FIG. 2;

FIG. 4 is a schematic structural radial section view of the air-conditioner air supply apparatus of FIG. 2;

FIG. 5 is a schematic structural radial section view of a front-end annular air guiding body in FIG. 4;

FIG. 6 is a schematic structural radial section view of a rear-end annular air guiding body in FIG. 4;

FIG. 7 is a schematic structural radial section view of a middle annular air guiding body in FIG. 4;

FIG. 8 is a schematic structural view of another embodiment of an air conditioner in which an air supply method of the present invention is applied;

FIG. 9 is a schematic structural three-dimensional assembly view of an air-conditioner air supply apparatus in the embodiment of FIG. 8; and

FIG. 10 is a schematic structural rear view of the air-conditioner air supply apparatus in FIG. 9.

DETAILED DESCRIPTION

[0020] The technical solutions of the present invention are further described in detail below with reference to the accompanying drawings and the detailed description.

[0021] 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 an enclosed structure that is formed by encircling, but is not limited to a circular ring.

[0022] Then, the design concept of the present invention is briefly described. To conveniently and flexibly supply mixed air in an air conditioner, an air-conditioner air supply apparatus formed by a combination of multiple annular air guiding bodies in the form of a single component may be disposed, so that external non-heat -exchanged air is introduced while heat-exchanged air in an internal air duct of the air conditioner is supplied, so as to supply mixed air at a proper temperature, and increase the amount of air supplied. When such an air-conditioner air supply apparatus supplies air, to avoid generation of condensation on the annular air guiding body of the air-conditioner air supply apparatus because of convergence and collision of cold and hot air at different temperatures, the present invention proposes a method for preventing condensation. Specifically, a structure of the air-conditioner air supply apparatus is properly set, so that because of the rear annular air guiding body disposed in a direction from a non-heat-exchanged air inlet to a mixed air outlet, in two front-back adjacent annular air guiding bodies, heat-exchanged air blown out from an annular heat-exchanged air duct formed between two adjacent annular air guiding bodies forms a heat-exchanged air film on a whole annular surface of an adjacent annular air guiding body. The mixed air is avoided, by using the heat-exchanged air film, from mixing on the surface of the annular air guiding bodies, thereby effectively avoid the generation of condensation on the annular air guiding body, and improving air supply performance.

[0023] Referring to FIG. 1, FIG. 1 is a schematic structural view of an embodiment of an air conditioner in which a method for preventing condensation of the present invention is applied.

[0024] 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. Corresponding to a structure of an air-conditioner air supply apparatus 1, a mixed air outlet 21 is provided an upper part of the front panel 2 of the air-conditioner, and a non-heat-exchanged air inlet 31 is provided 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 the air-conditioner air supply apparatus 1 are disposed from bottom to top in the internal air duct 4, and the blower 6 is set in 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.

[0025] For the structure of the air-conditioner air supply apparatus 1, reference is made to a schematic structural three-dimensional assembly view of FIG. 2, an exploded schematic structural view of FIG. 3, and a schematic structural radial section view of FIG. 4.

[0026] As shown in FIG. 2, FIG. 3 and FIG. 4, the air-conditioner air supply apparatus 1 includes three annular air guiding bodies, which separately are 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 sequentially arranged 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, which respectively are a mixed air outlet 111, and 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 respectively are 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, which respectively are an air outlet 121 and 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 sequentially arranged from front to rear, a through-duct (not marked in the figure) that runs through all the three annular air guiding bodies from front to rear is formed in the middle. 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.

[0027] Surfaces of 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 all curved surfaces, and an inner bore of the air inlet of each annular air guiding body is larger than an inner bore of the air outlet of the annular air guiding body. That is, by using the first middle annular air guiding body 13 as an example, the air outlet 131 of the first middle annular air guiding body 13 is a front opening, and the air inlet 132 of the first middle annular air guiding body 13 is a rear opening, and the inner bore of the air inlet 132 is greater than the inner bore of the air outlet 131 of the first middle annular air guiding body 13.

[0028] Moreover, the three annular air guiding bodies are coaxially disposed, inner bores of air outlets of the annular air guiding bodies gradually increase along a direction from the non-heat-exchanged air inlet 122 to the mixed air outlet 111. That is, from front to rear, the inner bore of the mixed air outlet 111 of the front-end annular air guiding body 11 is greater than the inner bore of the air outlet 131 of the first middle annular air guiding body 13, and the inner bore of the air outlet 131 of the first middle annular air guiding body 13 is greater than the inner bore of the air outlet 121 of the rear-end annular air guiding body 12. The inner bore herein refers to inner perimeter of the opening.

[0029] In this embodiment, the air-conditioner air supply apparatus 1 is formed by a combination of multiple annular air guiding bodies in the form of a single component, so that it is easier to flexibly control a structure of each annular air guiding body according to an air supply requirement, and produce each annular air guiding body having a different structure, thereby ensuring the uniformity and a speed of air supply. In addition, because each annular air guiding body is a single component, a manner in which the whole air-conditioner air supply apparatus 1 is assembled in the air-conditioner can be flexibly selected, thereby improving applicable scope of the air-conditioner air supply apparatus 1 and production efficiency of the air-conditioner.

[0030] When the air-conditioner air supply apparatus 1 is assembled 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 by using 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 acts as an air outlet of the whole air-conditioner air supply apparatus 1, and 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 acts as a non-heat-exchanged air inlet of the whole air-conditioner air supply apparatus 1, and is enclosed and assembled with the non-heat-exchanged air inlet 31 on the rear panel 3.

[0031] Based on the air-conditioner air supply apparatus 1 of the foregoing structure, the method for preventing condensation during an air supply process, of this embodiment is implemented as follows:

When the air-conditioner is running, indoor air enters the air-conditioner, is accelerated, under the action of the blower 6, to be blown to a heat exchanger 5 for a heat exchange. The heat-exchanged air after the heat exchange is blown from the internal air duct 4 to the air-conditioner air supply apparatus 1, enters the through-duct through the first annular heat-exchanged air duct 14 and the second annular heat-exchanged air duct 15, and is further supplied to the mixed air outlet 21 through the through-duct. Meanwhile, a negative pressure is formed in the through-duct. Under the action of the negative pressure, indoor air, which is used as the non-heat-exchanged air, outside the air-conditioner, is sucked into 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 sent indoors together with the heat-exchanged air from the mixed air outlet 21 of the air-conditioner air supply apparatus 1 and from the mixed air outlet 21 on the front panel 2. The mixed air is mild, which makes a user feel more comfortable, thereby improving the comfort of the user. Because the structure described above is used by the annular air guiding bodies, the heat-exchanged air (cold air in a cooling mode) sent out from the first annular heat-exchanged air duct 14 forms a uniform film on the surface of the front-end annular air guiding body 11. The film can effectively prevent the non-heat-exchanged air (for example, hot air) sucked into the through-duct from colliding on the surface of the front-end annular air guiding body 11, thereby avoiding generation of condensation on the surface of the front-end annular air guiding body 11. Correspondingly, the heat-exchanged air sent out from the second annular heat-exchanged air duct 15 forms a uniform film on a posterior surface of the middle annular air guiding body 13, and the film can effectively prevent the non-heat-exchanged air sucked into the through-duct from colliding on a posterior surface of the middle annular air guiding body 13, thereby avoiding generation of condensation on the surface of the middle annular air guiding body 13. For others, condensation is not generated on a surface of an annular air guiding body on which mixing of heat-exchanged air and non-heat-exchanged air does not exist, and therefore, condensation is not generated on the whole air-conditioner air supply apparatus 1.

[0032] In addition to the foregoing structure, shapes of the annular air guiding bodies, particularly the shapes of the middle annular air guiding body 13 and the rear-end annular air guiding body 12, are also important to an effect of preventing condensation, and therefore, to improve performance of preventing condensation, the structures of the annular air guiding bodies are designed in this embodiment as follows.

[0033] The structures of the annular air guiding bodies are described in detail with reference to a schematic structural radial section view of the front-end annular air guiding body shown in FIG. 5, a schematic structural radial section view of the rear-end annular air guiding body shown in FIG. 6, and a schematic structural radial section view of the middle annular air guiding body shown in FIG. 7.

[0034] As shown in FIG. 5, the front-end annular air guiding body 11 includes two segments: a front segment and a rear segment, where the front segment close to the front opening thereof, that is, the mixed air outlet 111, is a mixed air guiding portion 113 that is extended outward, and the rear segment close to the rear opening thereof, that is, 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 the mixed air of the heat-exchanged air and the non-heat-exchanged air, where a top surface contour 1131 and a bottom surface contour 1132 in the radial section of the mixed air guiding portion 113 both preferably are straight segments or slightly arched segments similar to straight segments (an arc with a great curvature radius). The heat-exchanged air guiding portion 114 acts as a main component for guiding the heat-exchanged air, where a top surface contour 1141 and a bottom surface contour 1142 in the radial section of the heat-exchanged air guiding portion 114 both are arc segments of which a curvature radius ranges from 40 to 100mm. The top surface contour and the bottom surface contour of the mixed air guiding portion 113 and the heat-exchanged air guiding portion 114 are sequentially connected, to form an enclosed area by using end closure lines 1133 and 1143, so that a curved surface with a streamlined radial section is finally obtained. Moreover, the end closure line 1143 for blocking the top surface contour 1141 and the bottom surface contour 1142 of the heat-exchanged air guiding portion 114 preferably is an arc segment, to ensure that the heat-exchanged air smoothly enters the heat-exchanged air duct, and avoid generation of a vortex flow. Moreover, comprehensively considering air supply performance, performance of preventing condensation, and beauty, a surface width W1 of the mixed air guiding portion 113 is 0.9 to 1.1 times a surface width W2 of the heat-exchanged air guiding portion 114, and preferably, the two have a same width. For example, in this embodiment, Wl=W2=90.7mm.

[0035] As shown in FIG. 6, the rear-end annular air guiding body 12 also includes two segments: a front segment and a rear segment, where the front segment close to the front opening thereof, that is, the air outlet 121, is a guiding portion 123, and the rear segment close to the rear opening thereof, that is, the non-heat-exchanged air inlet 122, is a turn-up installation portion 124. The guiding portion 123 acts as a main component for guiding the heat-exchanged air, where a top surface contour 1231 and a bottom surface contour 1232 in the radial section of the guiding portion 123 both are arc segments of which a curvature radius ranges from 50 to 80mm. In this embodiment, the curvature radius is 61.4mm. The turn-up installation portion 124 acts as a main installation component, where a top surface contour 1241 and a bottom surface contour 1242 of the radial section of the turn-up installation portion 12 both are straight segments vertical to an axial direction of the rear-end annular air guiding body 12. The top surface contour and the bottom surface contour of the guiding portion 123 and the installation portion 124 are sequentially connected, to form an enclosed area by using end closure lines 1233 and 1243, so that a curved surface with a streamlined radial section is finally obtained. Preferably, the end closure line 1233 is an arc segment, so as to ensure that the heat-exchanged air smoothly enters the heat-exchanged air duct and avoid generation of a vortex flow. Moreover, a surface width W3 of the installation portion 124 should neither be excessively large nor excessively small. The width of the surface width W3 preferably is 15% to 30% of a surface width W4 of the air guiding portion 123, and more preferably is 25%.

[0036] As shown in FIG. 7, in the air-conditioner air supply apparatus 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 a 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 guiding portion 114 in the front-end annular air guiding body 12. For example, in this embodiment, W2 is 90.7mm, and (W5+W6) is 61.3mm. The bottom surface contour 133 in the radial section of the first middle annular air guiding body 13 is an arc segment with a curvature radius ranging from 50 to 80mm, and the top surface contour 134 of the first middle annular air guiding body 13 at least includes a first arc segment 1341 close to the front opening, that is, the air outlet 131, of the first middle annular air guiding body 13, and a second arc segment 1342 close to the rear opening, that is, the air inlet 132, of the first middle annular air guiding body 13. The top surface contour 134 and the bottom surface contour 133 are blocked by using the end closure lines 1343 and 1344, to form a curved surface having an enclosed streamline structure. The end closure lines 1343 and 1344 both are arc segments. In this embodiment, the first arc segment 1341 has a curvature radius greater than that of the bottom surface contour 133, while the second arc segment 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 60.2mm, the curvature radius of the first arc segment 1341 is 115.3mm and the curvature radius of the second arc segment 1342 is 51.4mm. In addition, a distance between the second arc segment 1342 and the bottom surface contour 133 is greater than the distance between the first arc segment 1341 and the bottom surface contour 133, thereby forming a structure that is thin in the front and thick in the rear.

[0037] In addition that the air-conditioner air supply apparatus 1 is constituted by using the foregoing three annular air guiding bodies, more middle annular air guiding bodies may further 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 with reference to the radial section of the foregoing first middle annular air guiding body 13.

[0038] For an air-conditioner air supply apparatus with an annular air guiding body, uniformity of air supply in a circumferential direction also is a key factor affecting condensation. When air is supplied more uniformly in the circumferential direction, the condensation is generated less easily. Therefore, the effect of preventing condensation may be further improved by furthering considering uniformly and circumferentially distributing the heat-exchanged air entering the annular heat-exchanged air duct.

[0039] Referring to FIG. 8 to FIG. 10, FIG. 8 is a schematic structural diagram of another embodiment of an air conditioner in which the air supply method of the present invention is applied. FIG. 9 is a schematic structural three-dimensional assembly view of an air-conditioner air supply apparatus in FIG. 8, and FIG. 10 is a schematic structural rear view of the air-conditioner air supply apparatus in FIG. 9.

[0040] As shown in FIG. 8, 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 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.

[0041] For a structure of the air-conditioner air supply apparatus 1, reference is made to the schematic structural three-dimensional assembly view of FIG. 9 and the schematic structural rear view of FIG. 10.

[0042] As shown in FIG. 9 and FIG. 10 together with FIG. 8, the air-conditioner air supply apparatus 1 of this embodiment includes three annular air guiding bodies, which separately are 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 sequentially arranged from front to rear is a single component and formed independently. For a specific structure of each annular air guiding body, reference may be made to the embodiment shown in FIG. 3 to FIG. 7, which is not described herein again. 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 sequentially arranged from front to rear, a through-duct (not marked in the figure) that runs through all the three annular air guiding bodies from front to rear is formed in the middle. 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. An airflow distribution assembly 16 extending into the first annular heat-exchanged air duct 14 and the second annular heat-exchanged air duct 15 is disposed on the first middle annular air guiding body 13. Moreover, for ease of processing, the airflow distribution assembly 16 and the first middle annular air guiding body 13 are preferably integrally formed. Certainly, the airflow distribution assembly 16 and the first middle annular air guiding body 13 may also be formed separately, and then the airflow distribution assembly 16 is installed and fixed on the first middle annular air guiding body 13.

[0043] For a specific structure of the airflow distribution assembly 16, reference is made to a rear view of FIG. 10. The airflow distribution assembly 16 of this embodiment is implemented by using multiple airflow distribution plates. The airflow distribution assembly 16 of this embodiment totally includes four pairs (eight) of airflow distribution plates, which separately are primary airflow distribution plates 161 and 162, first auxiliary airflow distribution plates 163 and 164, second auxiliary airflow distribution plates 165 and 166, and third auxiliary airflow distribution plates 167 and 168. All the airflow distribution plates are bent distribution plates of a same bending direction, and a surface of each airflow distribution plate is an arc-shaped curved surface, which can effectively guide a direction of air, and reduce pressure loss and noise of airflow during a process of airflow distribution, thereby implementing high-speed air supply in low noise. The four pairs of the airflow distribution plates are bilaterally symmetrically arranged in a circumferential direction of the first annular heat-exchanged air duct 14 and the second annular heat-exchanged air duct 15 in a sequence that the primary airflow distribution plates 161 and 162 are at bottom, and the first auxiliary airflow distribution plates 163 and 164, the second auxiliary airflow distribution plates 165 and 166, and the auxiliary airflow distribution plate 167 and 168 are sequentially disposed upwards. That is, in a bottom-up air supply direction of the heat-exchanged air, the primary airflow distribution plate 161, the first auxiliary airflow distribution plate 163, the second auxiliary airflow distribution plate 165, and the third auxiliary airflow distribution plate 167 are disposed from bottom up on the left side (in terms of the left and right sides in a rear view direction) of the air-conditioner air supply apparatus 1; and the primary airflow distribution plate 162, the first auxiliary airflow distribution plate 164, the second auxiliary airflow distribution plate 166 and the third auxiliary airflow distribution plate 168 are disposed in a bilaterally symmetrical form on the right side of the air-conditioner air supply apparatus 1. Moreover, the bending direction of the airflow distribution plates is reverse to the air supply direction of the heat-exchanged air. That is, the air supply direction of the heat-exchanged air is from bottom up, and the bending direction of the airflow distribution plates is reverse to the air supply direction, that is, the airflow distribution plates are bent at a counterclockwise direction shown in FIG. 7.

[0044] The airflow distribution assembly 16 constituted by multiple bent airflow distribution plates radially symmetrically arranged is disposed in the heat-exchanged air duct, so that the primary airflow distribution plates 161 and 162 can be used to divide the heat-exchanged air from the heat exchanger into left, middle and right parts, and the heat-exchanged air on the left and right sides may further be divided by the auxiliary airflow distribution plates, uniform air intake and outtake in the circumferential direction of the heat-exchanged air duct of the air-conditioner air supply apparatus 1 are finally implemented, thereby improving the uniformity of air supply from the air-conditioner air supply apparatus 1. When the heat-exchanged air is blown to the front annular air guiding body, a uniform air film can be formed on the whole surface of the annular air guiding body, so that a problem that because the air supply is not uniform, a vortex flow is generated, thereby leading to generation of condensation is effectively avoided.

[0045] Certainly, in addition to being implemented by using multiple bent airflow distribution plates, another structure may also be used by the airflow distribution assembly 16, as long as it can be ensured that the heat-exchanged air from the heat exchanger 5 is uniformly distributed in the circumferential direction.

[0046] 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, without departing from the scope as defined in the claims.

Claims

1. A method for preventing condensation on an air-conditioner air supply apparatus (1) in an air conditioner, wherein the air conditioner comprises a housing with a blower (6), a heat exchanger (5) and the air supply apparatus (1), being arranged in the housing from bottom to top in an internal air duct (4), wherein the air supply apparatus (1) comprises a non-heat-exchanged air inlet (31) and a mixed air outlet (21) of the air-conditioner and the blower drives air from the internal air duct to the mixed air outlet,
characterized in that,
the air supply apparatus comprises at least three air guiding bodies (11, 12, 13) being single components that are annular in shape and sequentially and coaxially arranged from the non-heat-exchanged air inlet (31) to the mixed air outlet (21) and with the annular air guiding bodies being hollow with a trough-duct there through and further with the annular air guiding bodies having front and rear openings, with a rear opening of the annular air guiding bodies being air inlets (112, 122, 132), front openings of the annular air guiding bodies bein air outlets (111, 121, 131) and an air inlet (122) of a rear-end annular air guiding body (12) located at the rear end is the non-heat-exchanged air inlet (31) of the air supply apparatus (1), and an air outlet (111) of a front-end annular air guiding body (11) located at the front end is the mixed air outlet (21) of the air supply apparatus (1) and wherein further, heat-exchanged air ducts (14, 15), being annular in shape, are formed between two adjacent annular air guiding bodies (11/13, 13/12) and heat exchanged air is driven into the trough-duct via the heat-exchanged air ducts (14, 15) by the blower (6).

2. The method according to claim 1, wherein an inner bore of the air outlet (121) of the rear-end annular air guiding body (12) is gradually smaller than that of the air outlet (131) of the middle annular air guiding body (13) and the inner bore of the air outlet (131) of the middle annular air guiding body (13) is gradually smaller than that of the air outlet (111) of the front-end annular air guiding body (11) the annular air guiding bodies, with the inner bores forming the trough-duct and each of the annular air guiding bodies is at least partially tapered from back to front and an inner bore of each air inlet is larger than the inner bore of each air outlet.

3. The method according to claim 2, wherein the air supply apparatus comprises the front-end annular air guiding body (11), the rear-end annular air guiding body (12) and at least the one middle annular air

guiding body (13) between the front-end annular air guiding body and the rear-end annular air guiding body, wherein a bottom surface contour (133) in a radial cross-sectional view of the middle annular air guiding body is an arc segment of which a curvature radius ranges from 50 to 80mm, a top surface contour (134) at least comprises a first arc segment (1341) close to the air outlet of the middle annular air guiding body, and a second arc segment (1342) close to the air inlet of the middle annular air guiding body, a curvature radius of the first arc segment is greater than the curvature radius of the bottom surface contour of the radial section, a curvature radius of the second arc segment is less than the curvature radius of the bottom surface contour of the radial section, a distance between the second arc segment and the bottom surface contour of the radial section is greater than a distance between the first arc segment and the bottom surface contour of the radial section, and a top surface contour and a bottom surface contour in the radial section of a guiding portion of the rear-end annular air guiding body are both arc segments of which a curvature radius ranges from 50-80mm.

4. The method according to claim 3, wherein the front-end annular air guiding body (11) comprises a front segment and a rear segment, the front segment close to the air outlet of the annular air guiding body is a mixed air guiding portion (113) that is extended outward, the rear segment close to the air inlet of the annular air guiding body is a heat-exchanged air guiding portion (114), a top surface contour (1131) and a bottom surface contour (1132) in a radial cross-sectional view of the mixed air guiding portion (113) are both straight segments or slightly arched segments, a top surface contour (1141) and a bottom surface contour (1142) in a radial cross-sectional view of the heat-exchanged air guiding portion (114) are both arc segments of which a curvature radius ranges from 40 to 100mm, and a width of the heat-exchanged air guiding portion is greater than a width of the middle annular air guiding body.

5. The method according to claim 4, wherein a width (W1) of the mixed air guiding portion is 0.9-1.1 times the width (W2) of the heat-exchanged air guiding portion.

6. The method according to any one of claims 2 to 5, wherein an airflow distribution assembly (16) is disposed in at least one annular heat-exchanged air duct, to distribute heat-exchanged air, that has been subjected to heat exchange by the heat exchanger in the internal air duct of the air conditioner, and then send the heat-exchanged air to the annular heat-exchanged air duct.

7. The method according to claim 6, wherein the airflow distribution assembly is disposed in the annular heat-exchanged air duct in a structure of uniformly distributing heat-exchanged air entering the annular heat-exchanged air duct along a circumferential direction of the annular heat-exchanged air duct.

8. The method according to claim 7, wherein airflow distribution assemblies are disposed in all the annular heat-exchanged air ducts.

9. The method according to claim 6, wherein the airflow distribution assembly comprises multiple airflow distribution plates (161... 168), and the multiple airflow distribution plates are bilaterally symmetrically arranged in the circumferential direction of the annular heat-exchanged air duct, and along an air supply direction of the heat-exchanged air.

10. The method according to claim 9, wherein the multiple airflow distribution plates are bent distribution plates of the same bending direction, and the bending direction of the multiple bent distribution plates is reverser to the air supply direction of the heat-exchanged air from the heat exchanger.

Patentansprüche

1. Verfahren zur Verhinderung von Kondensation an einer Luftzufuhrvorrichtung (1) in einer Klimaanlage, wobei die Klimaanlage ein Gehäuse mit einem Gebläse (6), einem Wärmetauscher (5) und der Luftzufuhrvorrichtung (1) umfasst, die im Gehäuse von unten nach oben in einem inneren Luftkanal (4) angeordnet sind, wobei die Luftzufuhrvorrichtung (1) einen wärmetauschfreien Lufteinlass (31) und einen gemischten Luftauslass (21) der Klimaanlage umfasst und das Gebläse Luft vom inneren Luftkanal zum gemischten Luftauslass treibt,
dadurch gekennzeichnet, dass
die Luftzufuhrvorrichtung mindestens drei Luftführungskörper (11, 12, 13) umfasst, die Einzelkomponenten sind, die eine ringförmige Form aufweisen und sequenziell und koaxial vom wärmetauschfreien Lufteinlass (31) zum gemischten Luftauslass (21) angeordnet sind und wobei die ringförmigen Luftführungskörper hohl mit einem hindurch verlaufenden Trogkanal sind und wobei ferner die ringförmigen Luftführungskörper vordere und hintere Öffnungen aufweisen, wobei eine hintere Öffnung der ringförmigen Luftführungskörper Lufteinlässe (112, 122, 132) sind, vordere Öffnungen der ringförmigen Luftführungskörper Luftauslässe (111, 121, 131) sind und ein Lufteinlass (122) eines hintersten ringförmigen Luftführungskörpers (12), der sich am hinteren Ende befindet, der wärmetauschfreie Lufteinlass (31) der Luftzufuhrvorrichtung (1) ist und ein Luft-

auslass (111) eines vordersten ringförmigen Luftführungskörper (11), der sich am vorderen Ende befindet, der gemischte Luftauslass (21) der Luftzufuhrvorrichtung (1) ist und wobei ferner wärmegetauschte Luftkanäle (14, 15), die eine ringförmige Form aufweisen, zwischen zwei benachbarten ringförmigen Luftführungskörpern (11/13, 13/12) gebildet sind und wärmegetauschte Luft durch das Gebläse (6) über die wärmegetauschten Luftkanäle (14, 15) in den trogartigen Kanal getrieben werden.

2. Verfahren nach Anspruch 1, wobei eine Innenbohrung des Luftauslasses (121) des hintersten ringförmigen Luftführungskörpers (12) allmählich kleiner ist als diejenige des Luftauslasses (131) des mittleren ringförmigen Luftführungskörpers (13) und die Innenbohrung des Luftauslasses (131) des mittleren ringförmigen Luftführungskörpers (13) allmählich kleiner ist als diejenige des Luftauslasses (111) des vordersten ringförmigen Luftführungskörpers (11) der ringförmigen Luftführungskörper, wobei die Innenbohrungen den Trogkanal bilden und jeder der ringförmigen Luftführungskörper zumindest teilweise von hinten nach vorn verjüngt ist und eine Innenbohrung jedes Lufteinlasses größer ist als die Innenbohrung jedes Luftauslasses.

3. Verfahren nach Anspruch 2, wobei die Luftzufuhrvorrichtung den vordersten ringförmigen Luftführungskörper (11), den hintersten ringförmigen Luftführungskörper (12) und mindestens den einen mittleren ringförmigen Luftführungskörper (13) zwischen dem vordersten ringförmigen Luftführungskörper und dem hintersten ringförmigen Luftführungskörper umfasst, wobei eine Bodenflächenkontur (133) in einer radialen Querschnittsansicht des mittleren ringförmigen Luftführungskörpers ein Bogensegment ist, dessen Krümmungsradius von 50 bis 80 mm beträgt, eine Oberflächenkontur (134) mindestens ein erstes Bogensegment (1341) nahe dem Luftauslass des mittleren ringförmigen Luftführungskörpers und ein zweites Bogensegment (1342) nahe dem Lufteinlass des mittleren ringförmigen Luftführungskörpers umfasst, ein Krümmungsradius des ersten Bogensegments größer ist als der Krümmungsradius der Bodenflächenkontur des radialen Schnitts, ein Krümmungsradius des zweiten Bogensegments kleiner ist als der Krümmungsradius der Bodenflächenkontur des radialen Schnitts, ein Abstand zwischen dem ersten Bogensegment und der Bodenflächenkontur des radialen Schnitts größer ist als ein Abstand zwischen des dem ersten Bogensegment und der Bodenflächenkontur des radialen Schnitts und eine Oberflächenkontur und eine Bodenflächenkontur im radialen Schnitt eines Führungsabschnitts des hintersten ringförmigen Luftführungskörpers beide Bogensegmente sind, deren Krümmungsradius im Bereich von 50 bis 80 mm liegt.

4. Verfahren nach Anspruch 3, wobei der vorderste ringförmige Luftführungskörper (11) ein vorderes Segment und ein hinteres Segment umfasst, das vordere Segment nahe dem Luftauslass des ringförmigen Luftführungskörpers ein gemischter Luftführungsabschnitt (113) ist, der sich nach außen erstreckt, das hintere Segment nahe dem Lufteinlass des ringförmigen Luftführungskörpers ein wärmegetauschter Luftführungsabschnitt (114) ist, eine Oberflächenkontur (1131) und eine Bodenflächenkontur (1132) in einer radialen Querschnittsansicht des gemischten Luftführungsabschnitts (113) beide gerade Segmente oder leicht gekrümmte Segmente sind, eine Oberflächenkontur (1141) und eine Bodenflächenkontur (1142) in einer radialen Querschnittsansicht des wärmegetauschten Luftführungsabschnitts (114) beide Bogensegmente sind, deren Krümmungsradius im Bereich von 40 bis 100 mm liegt und eine Breite des wärmegetauschten Luftführungsabschnitts größer ist als eine Breite des mittleren ringförmigen Luftführungskörpers.

5. Verfahren nach Anspruch 4, wobei eine Breite (W1) des gemischten Luftführungsabschnitts 0,9 bis 1,1 mal die Breite (W2) des wärmegetauschten Luftführungsabschnitts aufweist.

6. Verfahren nach einem der Ansprüche 2 bis 5, wobei eine Luftstromverteilungsbaugruppe (16) in mindestens einem ringförmigen wärmegetauschten Luftkanal angeordnet ist, um wärmegetauschte Luft zu verteilen, die einem Wärmetausch durch den Wärmetauscher im inneren Luftkanal der Klimaanlage ausgesetzt war, und dann die wärmegetauschte Luft zum ringförmigen wärmegetauschten Luftkanal zu senden.

7. Verfahren nach Anspruch 6, wobei die Luftstromverteilungsbaugruppe im ringförmigen wärmegetauschten Luftkanal in einer Struktur der gleichmäßigen Verteilung wärmegetauschter Luft angeordnet ist, die in den ringförmigen wärmegetauschten Luftkanal entlang einer Umfangsrichtung des ringförmigen wärmegetauschten Luftkanals eintritt.

8. Verfahren nach Anspruch 7, wobei die Luftstromverteilungsbaugruppen in allen der ringförmigen wärmegetauschten Luftkanäle angeordnet sind.

9. Verfahren nach Anspruch 6, wobei die Luftstromverteilungsbaugruppe mehrere Luftstromverteilungsplatten (161...168) umfasst und die mehreren Luftstromverteilungsplatten beidseitig symmetrisch in der Umfangsrichtung des ringförmigen wärmegetauschten Luftkanal und entlang einer Luftzufuhrrichtung der wärmegetauschten Luft angeordnet

sind.

10. Verfahren nach Anspruch 9, wobei die mehreren Luftstromverteilungsplatten gebogene Verteilungsplatten derselben Biegerichtung sind und die Biegerichtung der mehreren gebogenen Verteilungsplatten umgekehrt zur Luftzufuhrrichtung der wärmegetauschten Luft vom Wärmetauscher verläuft.

Revendications

1. Procédé de prévention de la condensation sur un appareil d'alimentation en air dans un climatiseur (1), le climatiseur comprenant un carter avec un ventilateur (6), un échangeur de chaleur (5) et l'appareil d'alimentation en air (1), disposés de bas en haut dans le carter dans un conduit d'air intérieur (4), l'appareil d'alimentation en air (1) comprenant une entrée d'air non soumis à échange de chaleur (31) et une sortie d'air mixte (21) du climatiseur, et le ventilateur refoule l'air du conduit d'air intérieur vers la sortie d'air mixte,
caractérisé en ce que
l'appareil d'alimentation en air comprend au moins trois corps de guidage d'air (11, 12, 13) qui sont des composants simples de forme annulaire, disposés séquentiellement et coaxialement de l'entrée d'air non soumis à échange de chaleur (31) à la sortie d'air mixte (21), lesdits corps de guidage d'air étant creux avec un conduit de passage traversant, lesdits corps de guidage d'air annulaires présentant en outre des ouvertures avant et arrière, une ouverture arrière des corps de guidage d'air annulaires formant des entrées d'air (112, 122, 132), des ouvertures avant des corps de guidage d'air annulaires formant des sorties d'air (111, 121, 131), et une entrée d'air (122) d'un corps de guidage d'air annulaire (12) d'extrémité arrière, situé à l'extrémité arrière, est l'entrée d'air non soumis à échange de chaleur (31) de l'appareil d'alimentation en air (1), et une sortie d'air (111) d'un corps de guidage d'air annulaire (11) d'extrémité avant, situé à l'extrémité avant, est la sortie d'air mixte (21) de l'appareil d'alimentation en air (1), et où des conduits d'air soumis à échange de chaleur (14, 15) de forme annulaire sont en outre formés entre deux corps de guidage d'air annulaires adjacents (11/13, 13/12) et de l'air soumis à échange de chaleur est refoulé par le ventilateur (6) dans le conduit traversant via les conduits d'air soumis à échange de chaleur (14, 15).

2. Procédé selon la revendication 1, une ouverture intérieure de la sortie d'air (121) du corps de guidage d'air annulaire d'extrémité arrière (12) étant légèrement inférieure à celle de la sortie d'air (131) du corps de guidage d'air annulaire central (13) et l'ouverture intérieure de la sortie d'air (131) du corps de guidage d'air annulaire central (13) étant légèrement inférieure à celle de la sortie d'air (111) du corps de guidage d'air annulaire d'extrémité avant (11) des corps de guidage d'air annulaires, les ouvertures intérieures formant le conduit traversant et chaque corps de guidage d'air annulaire étant effilées au moins en parie de l'arrière vers l'avant, et une ouverture intérieure de chaque entrée d'air étant plus grande que l'ouverture intérieure de chaque sortie d'air.

3. Procédé selon la revendication 2, l'appareil d'alimentation en air comprenant le corps de guidage d'air annulaire d'extrémité avant (11), le corps de guidage d'air annulaire d'extrémité arrière (12) et au moins le premier corps de guidage d'air annulaire central (13) entre le corps de guidage d'air annulaire d'extrémité avant et le corps de guidage d'air annulaire d'extrémité arrière, un contour de surface inférieure (133) en vue en section transversale radiale du corps de guidage d'air annulaire central étant un arc de cercle dont un rayon de courbure est compris entre 50 et 80 mm, un contour de surface supérieure (134) comprend au moins un premier segment de cercle (1341) proche de la sortie d'air du corps de guidage d'air annulaire central, et un deuxième segment de cercle (1342) proche de l'entrée d'air du corps de guidage d'air annulaire central, un rayon de courbure du premier segment de cercle est supérieur au rayon de courbure du contour de surface inférieure de la section radiale, un rayon de courbure du deuxième segment de cercle est inférieur au rayon de courbure du contour de surface inférieure de la section radiale, une distance entre le deuxième segment de cercle et le contour de surface inférieure de la section radiale est supérieure à une distance entre le premier segment de cercle et le contour de surface inférieure de la section radiale, et un contour de surface supérieure et un contour de surface inférieure dans la section radiale d'une partie de guidage du corps de guidage d'air annulaire d'extrémité inférieure sont des segments de cercle dont le rayon de courbure est compris entre 50 et 80 mm.

4. Procédé selon la revendication 3, le corps de guidage d'air annulaire d'extrémité avant (11) comprenant un segment avant et un segment arrière, le segment avant proche de la sortie d'air du corps de guidage d'air annulaire est une partie de guidage d'air mixte (113) s'étendant vers l'extérieur, le segment arrière proche de l'entrée d'air du corps de guidage d'air annulaire est une partie de guidage d'air soumis à échange de chaleur (114), un contour de surface supérieure (1131) et un contour de surface inférieure (1132) en vue en section transversale radiale de la partie de guidage d'air mixte (113) sont des segments rectilignes ou légèrement incurvés, un contour de surface supérieure (1141) et un contour de surface inférieure (1142) en vue en section transversale radiale de la partie de guidage d'air soumis à échange de chaleur (114) sont des segments de cercle dont le rayon de courbure est compris entre 40 et 100 mm, et la largeur de la partie de guidage d'air soumis à échange de chaleur est supérieure à la largeur du corps de guidage d'air annulaire central.

5. Procédé selon la revendication 4, la largeur (W1) de la partie de guidage d'air mixte représentant entre 0,9 et 1,1 fois la largeur (W2) de la partie de guidage d'air soumis à échange de chaleur.

6. Procédé selon l'une des revendications 2 à 5, une unité de répartition de flux d'air (16) étant disposée dans au moins un conduit annulaire d'air soumis à échange de chaleur, pour répartir l'air ayant été soumis à un échange de chaleur par l'échangeur de chaleur dans le conduit d'air intérieur du climatiseur, avant de refouler l'air soumis à échange de chaleur vers le conduit annulaire d'air soumis à échange de chaleur.

7. Procédé selon la revendication 6, l'unité de répartition de flux d'air étant disposée dans le conduit annulaire d'air soumis à échange de chaleur, dans une structure de répartition homogène d'air soumis à échange de chaleur circulant dans le conduit annulaire d'air soumis à échange de chaleur dans une direction circonférentielle du conduit annulaire d'air soumis à échange de chaleur.

8. Procédé selon la revendication 7, dans lequel des unités de répartition de flux d'air sont disposées dans tous les conduits annulaires d'air soumis à échange de chaleur.

9. Procédé selon la revendication 6, l'unité de répartition de flux d'air comprenant plusieurs plaques de distribution d'air (161...168), et où les plusieurs plaques de distribution d'air étant disposées de manière symétrique bilatéralement dans la direction circonférentielle du conduit annulaire d'air soumis à échange de chaleur, et dans la direction de refoulement de l'air soumis à échange de chaleur.

10. Procédé selon la revendication 9, où les plusieurs plaques de distribution d'air étant des plaques de distribution courbées dans la même direction de courbure, et où la direction de courbure des plusieurs plaques de distribution d'air étant opposée à la direction de refoulement de l'air soumis à échange de chaleur par l'échangeur de chaleur.

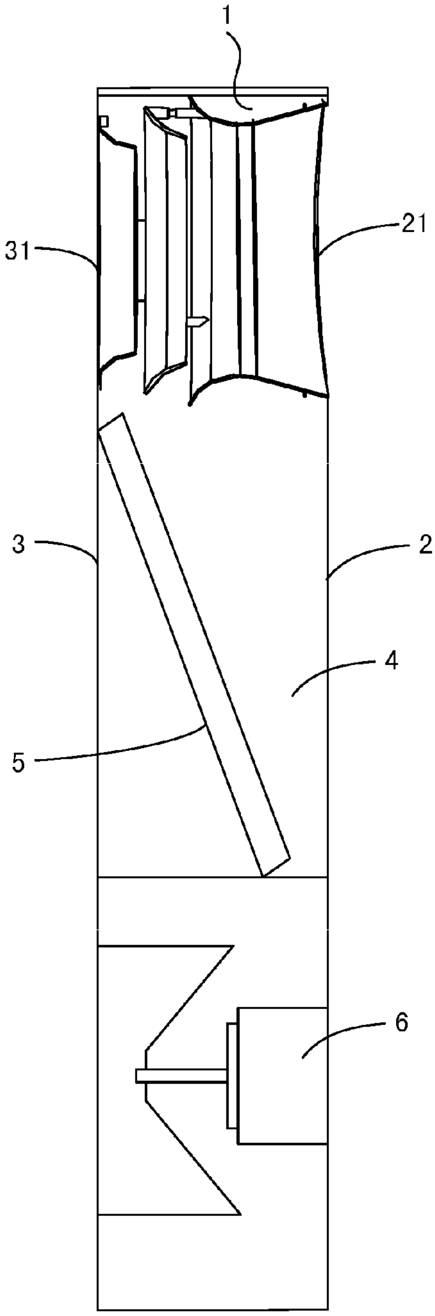

FIG. 1

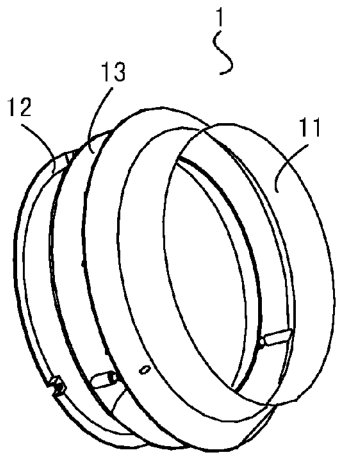

FIG. 2

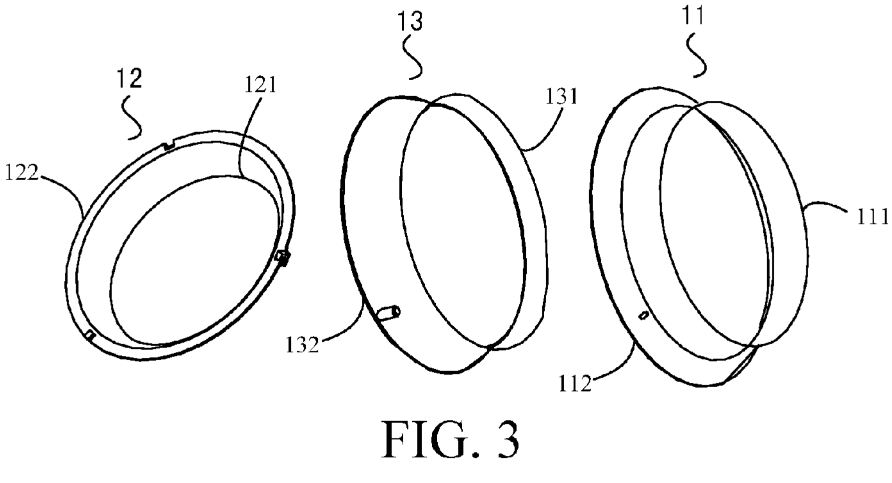

FIG. 3

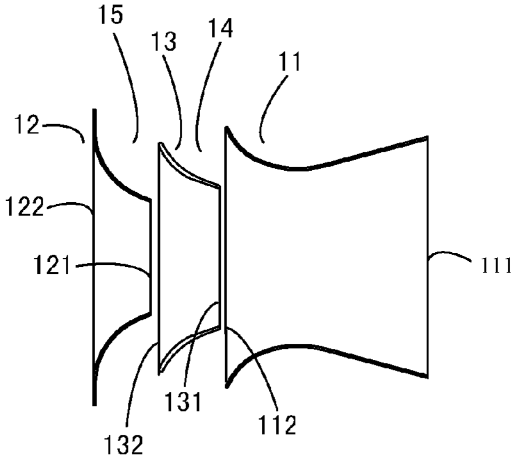
15
13
14
11
12
122
121
111
132
131
112

FIG. 4

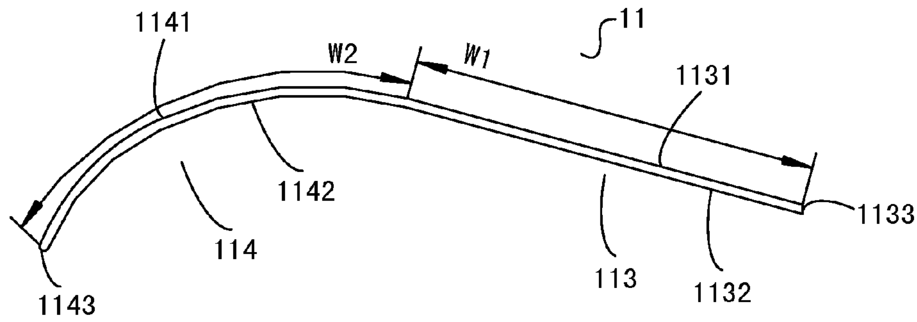
1141
W2
W1
11
1131
1142
1133
114
113
1132
1143

FIG. 5

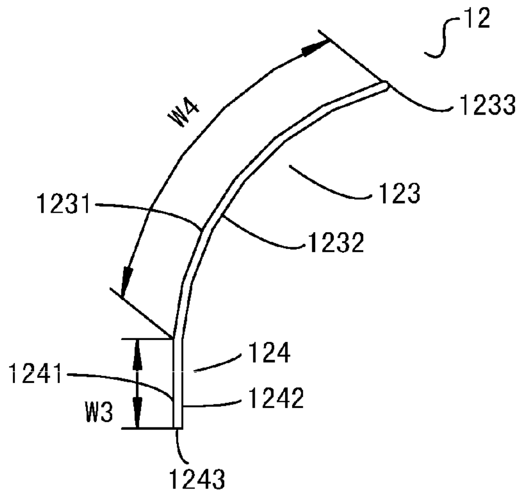
12
W4
1233
123
1231
1232
124
1241
1242
W3
1243

FIG. 6

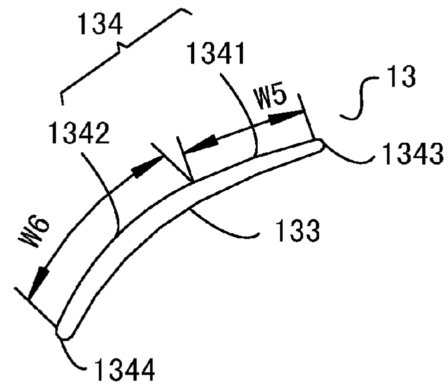
134
1341
W5
13
1342
1343
W6
133
1344

FIG. 7

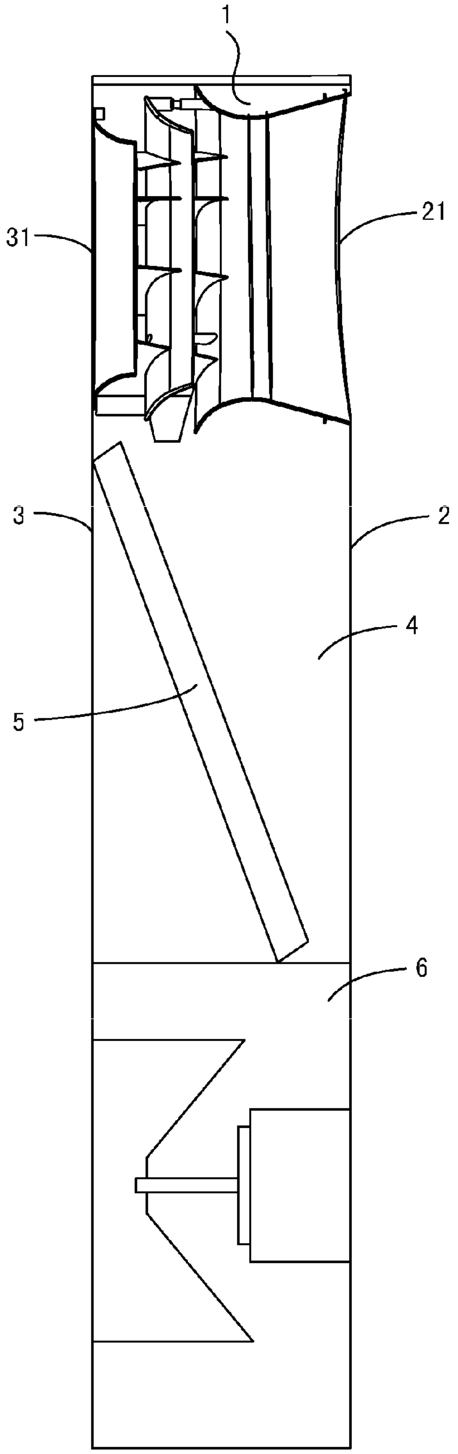

FIG. 8

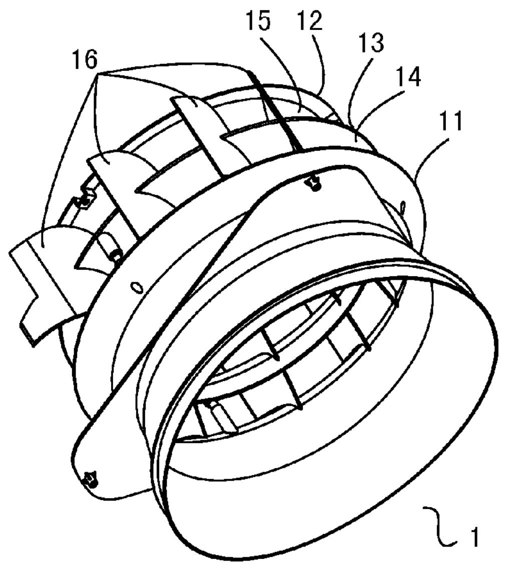

FIG. 9

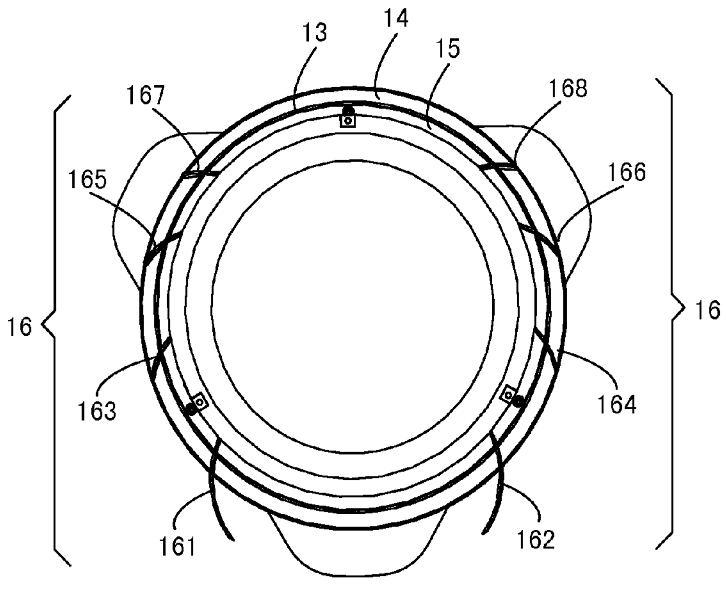

FIG. 10

REFERENCES CITED IN THE DESCRIPTION

Patent documents cited in the description

- CN 202692257 U **[0002]**