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(54) **AXIAL FAN ASSEMBLY AND MOTOR HOME AIR-CONDITIONER USING SAME**

(57) Disclosed are an axial fan assembly and a motor home air-conditioner using same. The motor home air-conditioner comprises an air-conditioner body (1). A heat exchanging system, a central air-inlet channel (2) and a peripheral air-outlet channel (3) are arranged in the air-conditioner body (1). The heat exchanging system comprises an evaporator assembly (4) distributed in a ring and an axial fan assembly (5) located within the evaporator assembly (4). The axial fan assembly (5) comprises an axial fan (6) and a skeleton-type blast ring (7). The

axial fan (6) is mounted within the skeleton-type blast ring (7). The skeleton-type blast ring (7) comprises a drainage pressurized region (71) and an airflow diffusion region (72) for air to flow out. The airflow diffusion region (72) comprises a circumferential air-outlet region (721) and an axial air-outlet region (722). The present axial fan assembly not only meets the requirement of strength in installation, but also changes the direction of airflow blown by the axial fan to achieve the blowing effect of mixed windflows

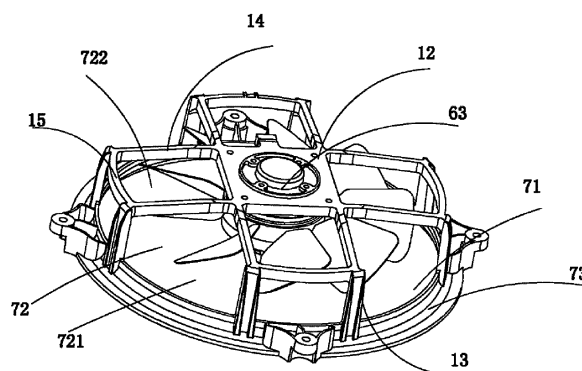


Fig. 1

Description**TECHNICAL FIELD**

5 **[0001]** The present invention relates to a fan assembly and a motor home air-conditioner, and more particularly, to an axial fan assembly and a motor home air-conditioner using same.

BACKGROUND

10 **[0002]** A motor home air-conditioner includes an outdoor unit, an indoor unit, and air inlet and outlet channels. The outdoor unit includes an air conditioning system formed of a condenser, an evaporator, a compressor, an evaporative fan, a condensing fan, or the like. The indoor unit is mainly formed of a panel component, an air duct support, and the like. Air inlets and outlets are disposed on the panel component. The air inlet and outlet channels are mounted between the air duct support and the outdoor unit. Air inside a vehicle flows through the air inlet and outlet channels and is sent
15 into the motor home air-conditioner. Heat is exchanged between the air and the evaporator, and then the air enters the vehicle again, so as to achieve effects of air circulation and adjusting the temperature of indoor air.

[0003] The evaporative fan or the condensing fan may be a centrifugal fan or an axial fan. During working of the centrifugal fan, an airflow enters a blade space in an axial direction of the fan. Then the airflow is driven by an impeller to rotate with the impeller. The airflow also gains energy under the effect of inertia, and leaves the impeller in a radial
20 direction. A generated centrifugal force does work to enable the airflow to leave from a peripheral portion of the impeller. During working of the axial fan, an airflow flows into an impeller from an end of a fan in an axial direction and flows out along the other end of the fan in the axial direction. A distinct difference between the centrifugal fan and the axial fan is that the flowing direction of a medium inside an air pipe is changed in the centrifugal fan, whereas the flowing direction of a medium inside an air pipe is not changed in the axial fan. Compared with the axial fan, it is more difficult to mount
25 the centrifugal fan, and the centrifugal fan has a more complex structure, a heavier weight, and higher costs. However, in conventional axial fans, the flowing directions of inlet air and outlet air are consistent due to the structure of the axial fans. Consequently, the application scope of the conventional axial fans is largely restricted.

SUMMARY

30 **[0004]** A technical problem to be resolved by the present invention is to provide an axial fan assembly and a motor home air-conditioner using same. Air flows into the fan assembly in an axial direction and is blown out from the fan assembly in both an axial direction and a circumferential direction, so as to form a special blowing mode with mixed flows, thereby expanding the application scope of an axial fan.

35 **[0005]** Air flows into the motor home air-conditioner in a central-axis direction of an axial fan. The axial fan blows out the air in mixed flows. The air flows through an evaporator assembly on the periphery of the fan, and is then sent into a vehicle compartment through an air-outlet channel.

[0006] A technical solution used by the present invention to resolve the foregoing technical problem is: An axial fan assembly includes an axial fan and a skeleton-type blast ring, where the axial fan is mounted within the skeleton-type blast ring, the skeleton-type blast ring includes a pressurization region and an airflow diffusion region for air to flow out, the airflow diffusion region is located downstream from the pressurization region, and the airflow diffusion region includes a circumferential air-outlet region and an axial air-outlet region.

40 **[0007]** A further preferred solution of the present invention is: The pressurization region is enclosed by a closed annular body, the circumferential air-outlet region is an open-ended lateral air-outlet region located downstream from the closed annular body, and the axial air-outlet region is an axial air outlet adjacent to the lateral air-outlet region.
45 **[0008]** A further preferred solution of the present invention is: The skeleton-type blast ring includes a substrate for installing the axial fan, the closed annular body and the substrate are connected through longitudinal connecting posts distributed in a ring, the circumferential air-outlet region is arranged between the closed annular body and the substrate, and the axial air-outlet region is arranged on the substrate.

50 **[0009]** A further preferred solution of the present invention is: The axial fan includes a driver, a rotating impeller, and a base, the base is mounted at the center of the substrate, the rotating impeller is located between the base and the driver, and the axial air-outlet region is arranged in a peripheral region of the substrate.

[0010] A further preferred solution of the present invention is: A ratio of the height of the closed annular body to the height of the skeleton-type blast ring is 1/5 to 1/2.

55 **[0011]** A further preferred solution of the present invention is: Transverse connecting posts connected to upper ends of the longitudinal connecting posts are disposed on the substrate.

[0012] A further preferred solution of the present invention is: Segmented reinforcing ribs are disposed on the periphery of the transverse connecting posts of the substrate. The segmented reinforcing ribs may increase the overall strength

of the skeleton-type blast ring, and at the same time ensure normal blowing in an axial direction and a circumferential direction of an axial motor.

[0013] A further preferred solution of the present invention is: The skeleton-type blast ring is injection molded.

[0014] A motor home air-conditioner using an axial fan assembly includes an air-conditioner body, a heat exchanging system, a central air-inlet channel, and a peripheral air-outlet channel being arranged in the air-conditioner body, where the heat exchanging system includes an evaporator assembly that is distributed in a ring or has a segmented structure and an axial fan assembly located within the evaporator assembly, the axial fan assembly includes an axial fan and a skeleton-type blast ring, the axial fan is mounted within the skeleton-type blast ring, the skeleton-type blast ring includes a pressurization region and an airflow diffusion region for air to flow out, and the airflow diffusion region includes a circumferential air-outlet region and an axial air-outlet region.

[0015] A further preferred solution of the present invention is: The air-conditioner body includes an evaporator volute wrapping the evaporator assembly, the evaporator volute includes a lateral assembly and a top cover, the top cover is located above the evaporator assembly, the lateral assembly is located on an outer side of the evaporator assembly, and an independent and closed heat exchange space is formed within the evaporator volute.

[0016] A further preferred solution of the present invention is: The air-conditioner body includes a bottom plate on which a water collection tray is mounted, the evaporator assembly is mounted on the water collection tray, the evaporator volute covers the bottom plate, the water collection tray has an air inlet hole, and a concave step into which a rotating impeller of the axial fan extends is disposed on the water collection tray.

[0017] A further preferred solution of the present invention is: The evaporator volute is made of a polymer composite material having thermal insulation performance.

[0018] A further preferred solution of the present invention is: The pressurization region is enclosed by a closed annular body, the circumferential air-outlet region is an open-ended lateral air-outlet region located downstream from the closed annular body, and the axial air-outlet region is an axial air outlet adjacent to the lateral air-outlet region.

[0019] A further preferred solution of the present invention is: The skeleton-type blast ring includes a substrate for installing the axial fan, the closed annular body and the substrate are connected through longitudinal connecting posts distributed in a ring, the circumferential air-outlet region is arranged between the closed annular body and the substrate, and the axial air-outlet region is arranged on the substrate.

[0020] A further preferred solution of the present invention is: The axial fan includes a driver, a rotating impeller, and a base, the base is mounted at the center of the substrate, the rotating impeller is located between the base and the driver, and the axial air-outlet region is arranged in a peripheral region of the substrate.

[0021] A further preferred solution of the present invention is: A ratio of the height of the closed annular body to the height of the skeleton-type blast ring is 1/5 to 1/2.

[0022] A further preferred solution of the present invention is: Transverse connecting posts connected to upper ends of the longitudinal connecting posts are disposed on the substrate, and segmented reinforcing ribs are disposed on the periphery of the transverse connecting posts of the substrate.

[0023] A further preferred solution of the present invention is: The air-conditioner body includes a panel component, an air duct assembly is disposed between the panel component and the air inlet hole of the water collection tray, the central air-inlet channel is located on an inner side of the air duct assembly, and the peripheral air-outlet channel is located on an outer side of the air duct assembly.

[0024] A further preferred solution of the present invention is: Cross-sections of the central air-inlet channel and the peripheral air-outlet channel have a quasi-R-shaped structure.

[0025] Compared with the prior art, an advantage of the present invention is that after air flows into the fan assembly in an axial direction, the air undergoes pressurization and is blown out in both an axial direction and a circumferential direction, so as to form a special blowing mode with mixed flows, thereby expanding the application scope of an axial fan. A skeleton-type support structure is used for a blast ring. The requirement of strength in installation of an axial fan is met. Further, a pressurized structure at a lower portion of the blast ring and a diffusion structure at an upper portion of the blast ring change the direction of airflow blown by the axial fan. The axial fan not only blows air in a vertical direction but also blows air in a circumferential direction, so as to achieve the blowing effect of mixed windflows. For a conventional manner in which an axial fan is mounted to suck in and blow out air in only a same direction, a breakthrough is achieved.

[0026] During working of an air-conditioner, air inside a vehicle enters an air-conditioner body from a central air-inlet channel. Air enters an axial fan assembly in an axial direction and undergoes pressurization. Air is blown out in an axial direction and a circumferential direction, so that air is blown out in mixed flows. After heat is exchanged between the air and an evaporator assembly, and the air is then blown from a peripheral air-outlet channel, so as to achieve an objective of adjusting the temperature of the air inside the vehicle. A skeleton-type support structure is used for a blast ring. The requirement of strength in installation of an axial fan is met. Further, a pressurized structure at a lower portion of the blast ring and a diffusion structure at an upper portion of the blast ring change the direction of airflow blown by the axial fan. The axial fan not only blows air in a vertical direction but also blows air in a circumferential direction, so as to achieve the blowing effect of mixed windflows. For a conventional manner in which an axial fan is mounted to suck in and blow

out air in only a same direction, a breakthrough is achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027]

FIG. 1 is a perspective view 1 of an axial fan assembly according to the present invention;
 FIG. 2 is a perspective view 2 of an axial fan assembly according to the present invention;
 FIG. 3 is a perspective view of a skeleton-type blast ring of an axial fan assembly according to the present invention;
 FIG. 4 is a structural diagram of an axial fan of an axial fan assembly according to the present invention;
 FIG. 5 is a perspective view of assembling an axial fan assembly and a water collection tray in Embodiment 1 according to the present invention;
 FIG. 6 is a sectional view of assembling the axial fan assembly and the water collection tray in Embodiment 1 according to the present invention;
 FIG. 7 is a perspective view of assembling an axial fan assembly and a water collection tray in Embodiment 2 according to the present invention;
 FIG. 8 is a structural diagram of application of the axial fan assembly in Embodiment 2 to a motor home air-conditioner according to the present invention.
 FIG. 9 is a partial structural diagram of a motor home air-conditioner according to the present invention;
 FIG. 10 is a sectional structural diagram of a motor home air-conditioner according to the present invention; and
 FIG. 11 is a partial exploded view of a motor home air-conditioner according to the present invention.

DETAILED DESCRIPTION

[0028] The present invention is further described below in detail in conjunction with the accompanying drawings and embodiments.

[0029] Embodiment 1: As shown in FIG. 9, FIG. 10, and FIG. 11, a motor home air-conditioner using an axial fan assembly includes an air-conditioner body 1. A heat exchanging system, a central air-inlet channel 2, and a peripheral air-outlet channel 3 are arranged in the air-conditioner body 1. The heat exchanging system includes an evaporator assembly 4 distributed in a ring and an axial fan assembly 5 located within the evaporator assembly 4. The axial fan assembly 5 includes an axial fan 6 and a skeleton-type blast ring 7. The axial fan 6 is mounted within the skeleton-type blast ring 7. The skeleton-type blast ring 7 includes a pressurization region 71 and an airflow diffusion region 72 for air to flow out. The airflow diffusion region 72 includes a circumferential air-outlet region 721 and an axial air-outlet region 722. The axial fan assembly 5 is located within the evaporator assembly 4 distributed in a ring, so as to fully utilize an internal space of the air-conditioner, and facilitate the reduction of the overall height of the entire air-conditioner while heat exchange is efficiently performed. The evaporator assembly 4 may be continuously arranged on a water collection tray, or may be arranged on the water collection tray in a segmented manner. As shown in FIG. 10, cross-sections of the central air-inlet channel 2 and the peripheral air-outlet channel 3 have a quasi-R-shaped structure.

[0030] Because the axial fan 6 is mounted on the independent skeleton-type blast ring 7, compared with a conventional manner in which the axial fan 6 is mounted in an air inlet hole 91 of a water collection tray 9, the diameter of the axial fan 6 of the present invention may be made as large as possible within the internal space. In this way, the air volume of the axial fan 6 is relatively large. Under a condition of a same power, the noise of a motor is relatively low.

[0031] As shown in FIG. 11, the air-conditioner body includes an evaporator volute 8 wrapping the evaporator assembly 4. The evaporator volute 8 includes a lateral assembly 81 and a top cover 82. The top cover 82 is located above the evaporator assembly 4. The lateral assembly 81 is located on an outer side of the evaporator assembly 4. An independent and closed heat exchange space is formed within the evaporator volute 8. Air blown out in an axial direction from an axial fan 5 is blocked by the top cover of the evaporator volute 8 and flows towards the evaporator assembly 4 together with air blown out in a circumferential direction. In this way, air blown out from the axial fan 5 is mainly in a lateral direction, and the efficiency of heat exchange is higher.

[0032] As shown in FIG. 9 to FIG. 11, the air-conditioner body 1 includes a bottom plate 10 on which the water collection tray 9 is mounted. The evaporator assembly 4 is mounted on the water collection tray 9. The evaporator volute 8 covers the bottom plate 10. The water collection tray 9 has an air inlet hole 91. A concave step 11 into which a rotating impeller 62 of the axial fan 6 extends is disposed on the water collection tray 9. As shown in FIG. 5 and FIG. 6, a side wall 12 of the concave step 11 also has an effect of performing pressurization on air that enters the axial fan 5, so that the blowing power of the axial fan 5 is increased.

[0033] The evaporator volute 8 is made of a polymer composite material having thermal insulation performance. The evaporator volute 8 has desirable thermal insulation performance.

[0034] As shown in FIG. 1 and FIG. 2, the pressurization region 71 is enclosed by a closed annular body 73. The

circumferential air-outlet region 721 is an open-ended lateral air-outlet region located downstream from the closed annular body 73. The axial air-outlet region 722 is an axial air outlet adjacent to the lateral air-outlet region.

[0035] As shown in FIG. 3, the skeleton-type blast ring 7 includes a substrate 12 for installing the axial fan 6. The closed annular body 73 and the substrate 12 are connected through longitudinal connecting posts 13 distributed in a ring. The circumferential air-outlet region 721 is arranged between the closed annular body 73 and the substrate 12. The axial air-outlet region 722 is arranged on the substrate 12. The skeleton-type blast ring 7 is injection molded.

[0036] As shown in FIG. 4, the axial fan 6 includes a driver 61, a rotating impeller 62, and a base 63. The base 63 is mounted at the center of the substrate 12. The rotating impeller 62 is located between the base 63 and the driver 61. The axial air-outlet region 722 is arranged in a peripheral region of the substrate 12.

[0037] As shown in FIG. 1 and FIG. 2, a ratio of the height of the closed annular body 73 to the height of the skeleton-type blast ring 7 is 1/5 or 1/3 or 1/2. Under the condition that the rotational speed of the motor is 1250 rpm, the overall height of the skeleton-type blast ring is 70 mm. If the lateral portion of the skeleton-type blast ring 7 is completely open (the closed annular body is omitted), the air output volume is only 470 cubic meter/hour. Under the condition that lateral portion of the skeleton-type blast ring 7 is completely closed, the air output volume is 424 cubic meter/hour. When the height of the closed annular body 73 is 25 mm, the air output volume reaches 514 cubic meter/hour. Experimental parameters are shown in the following table:

Height of closed annular body (Unit: mm)	0	14	25	30	35	70
Air output volume of axial fan (cubic meter/hour)	470	493	514	508	503	424

[0038] Transverse connecting posts 14 connected to upper ends of the longitudinal connecting posts 13 are disposed on the substrate 12. Segmented reinforcing ribs 15 are disposed on the periphery of the transverse connecting posts 14 of the substrate 12. The segmented reinforcing ribs 15 may increase the overall strength of the skeleton-type blast ring 7, and at the same time ensure normal blowing in an axial direction and a circumferential direction of an axial motor.

[0039] As shown in FIG. 11, the air-conditioner body 1 includes a panel component 16. An air duct assembly 17 is disposed between the panel component 16 and the air inlet hole 91 of the water collection tray 9. The central air-inlet channel 2 is located on an inner side of the air duct assembly 17. The peripheral air-outlet channel 3 is located on an outer side of the air duct assembly 17. The air duct assembly 17 includes an air duct 18, an air duct ring 19, and an air duct support 20. An upper end of the air duct 18 is connected to a support on the water collection tray 9. The air duct 18 is connected to the air duct support 20 through the air duct ring 19. The air duct support 20 is mounted on the panel component 16.

[0040] In the present invention, the axial fan 6 having a large diameter is used to blow air, so that the noise is low, and the air volume is large. The bottom plate 10, the water collection tray 9, and the evaporator volute 8 work together to form an independent refrigeration/heating exchange space. The air duct support 20, the air duct ring 19, the air duct 18, and the panel component 16 isolates air obtained after heat exchange inside a vehicle compartment and form a circulation. When the axial fan 6 rotates to generate a negative pressure, the air inside the vehicle compartment is sucked through the panel component 16 and the air duct 18 into a heat exchange space formed of the bottom plate 10 and the evaporator volute 8. After heat exchange is performed by the annular evaporator assembly 4, air is blown through the circumference of the air duct 18 and four sides of the panel component 16 and sent into the vehicle compartment, and the entire air circulation duct forms an R-shaped channel, so as to achieve an objective of adjusting the temperature of air. A high-strength thermal insulation structure is used for the evaporator volute 8, and the evaporator volute 8 is directly molded by using a polymer composite material. The evaporator volute 8 has excellent thermal insulation performance. The evaporator assembly 4 distributed in a ring and the axial fan 6 are horizontally placed to fully utilize an internal space of the air-conditioner, and facilitate reduction of the height of the entire air-conditioner while heat exchange is efficiently performed.

[0041] Embodiment 2: As shown in FIG. 5 and FIG. 6, in Embodiment 1, the axial fan 6 is suspended on the skeleton-type blast ring 7, and the airflow diffusion region 72 on the skeleton-type blast ring 7 is located above an airflow pressurization region 71. As shown in FIG. 7 and FIG. 8, an axial fan assembly is mounted within a motor home air-conditioner in an opposite direction. Specifically, in Embodiment 2, the axial fan 5 is placed on the skeleton-type blast ring 7, and the airflow diffusion region 72 on the skeleton-type blast ring 7 is located below the airflow pressurization region 71.

[0042] The axial fan assembly and the motor home air-conditioner using same provided in the present invention are described above in detail. Although the principle and implementations of the present invention are described by using specific examples in this application, descriptions of the embodiments are merely intended to help understand the present invention and the core ideas. It should be noted that a person of ordinary skill in the art may further make several improvements and modifications to the present invention without departing from the principle of the present invention. These improvements and modifications also fall within the scope of protection of the present invention.

Claims

1. An axial fan assembly, **characterized by** comprising an axial fan and a skeleton-type blast ring, wherein the axial fan is mounted within the skeleton-type blast ring, the skeleton-type blast ring comprises a pressurization region and an airflow diffusion region for air to flow out, the airflow diffusion region is located downstream from the pressurization region, and the airflow diffusion region comprises a circumferential air-outlet region and an axial air-outlet region.
2. The axial fan assembly according to claim 1, **characterized in that** the pressurization region is enclosed by a closed annular body, the circumferential air-outlet region is an open-ended lateral air-outlet region located downstream from the closed annular body, and the axial air-outlet region is an axial air outlet adjacent to the lateral air-outlet region.
3. The axial fan assembly according to claim 2, **characterized in that** the skeleton-type blast ring comprises a substrate for installing the axial fan, the closed annular body and the substrate are connected through longitudinal connecting posts distributed in a ring, the circumferential air-outlet region is arranged between the closed annular body and the substrate, and the axial air-outlet region is arranged on the substrate.
4. The axial fan assembly according to claim 3, **characterized in that** the axial fan comprises a driver, a rotating impeller, and a base, the base is mounted at the center of the substrate, the rotating impeller is located between the base and the driver, and the axial air-outlet region is arranged in a peripheral region of the substrate.
5. The axial fan assembly according to claim 2, **characterized in that** a ratio of the height of the closed annular body to the height of the skeleton-type blast ring is 1/5 to 1/2.
6. The axial fan assembly according to claim 3, **characterized in that** transverse connecting posts connected to upper ends of the longitudinal connecting posts are disposed on the substrate.
7. The axial fan assembly according to claim 6, **characterized in that** segmented reinforcing ribs are disposed on the periphery of the transverse connecting posts of the substrate.
8. The axial fan assembly according to claim 1, **characterized in that** the skeleton-type blast ring is injection molded.
9. A motor home air-conditioner using an axial fan assembly, comprising an air-conditioner body, a heat exchanging system, a central air-inlet channel, and a peripheral air-outlet channel being arranged in the air-conditioner body, **characterized in that** the heat exchanging system comprises an evaporator assembly distributed in a ring and an axial fan assembly located within the evaporator assembly, the axial fan assembly comprises an axial fan and a skeleton-type blast ring, the axial fan is mounted within the skeleton-type blast ring, the skeleton-type blast ring comprises a pressurization region and an airflow diffusion region for air to flow out, and the airflow diffusion region comprises a circumferential air-outlet region and an axial air-outlet region.
10. The motor home air-conditioner using an axial fan assembly according to claim 9, **characterized in that** the air-conditioner body comprises an evaporator volute wrapping the evaporator assembly, the evaporator volute comprises a lateral assembly and a top cover, the top cover is located above the evaporator assembly, the lateral assembly is located on an outer side of the evaporator assembly, and an independent and closed heat exchange space is formed within the evaporator volute.
11. The motor home air-conditioner using an axial fan assembly according to claim 10, **characterized in that** the air-conditioner body comprises a bottom plate on which a water collection tray is mounted, the evaporator assembly is mounted on the water collection tray, the evaporator volute covers the bottom plate, the water collection tray has an air inlet hole, and a concave step into which a rotating impeller of the axial fan extends is disposed on the water collection tray.
12. The motor home air-conditioner using an axial fan assembly according to claim 10, **characterized in that** the evaporator volute is made of a polymer composite material having thermal insulation performance.
13. The motor home air-conditioner using an axial fan assembly according to claim 9, **characterized in that** the pressurization region is enclosed by a closed annular body, the circumferential air-outlet region is an open-ended lateral air-outlet region located downstream from the closed annular body, and the axial air-outlet region is an axial air

outlet adjacent to the lateral air-outlet region.

- 5 14. The motor home air-conditioner using an axial fan assembly according to claim 13, **characterized in that** the skeleton-type blast ring comprises a substrate for installing the axial fan, the closed annular body and the substrate are connected through longitudinal connecting posts distributed in a ring, the circumferential air-outlet region is arranged between the closed annular body and the substrate, and the axial air-outlet region is arranged on the substrate.
- 10 15. The motor home air-conditioner using an axial fan assembly according to claim 14, **characterized in that** the axial fan comprises a driver, a rotating impeller, and a base, the base is mounted at the center of the substrate, the rotating impeller is located between the base and the driver, and the axial air-outlet region is arranged in a peripheral region of the substrate.
- 15 16. The motor home air-conditioner using an axial fan assembly according to claim 13, **characterized in that** a ratio of the height of the closed annular body to the height of the skeleton-type blast ring is 1/5 to 1/2.
- 20 17. The motor home air-conditioner using an axial fan assembly according to claim 14, **characterized in that** transverse connecting posts connected to upper ends of the longitudinal connecting posts are disposed on the substrate, and segmented reinforcing ribs are disposed on the periphery of the transverse connecting posts of the substrate.
- 25 18. The motor home air-conditioner using an axial fan assembly according to claim 11, **characterized in that** the air-conditioner body comprises a panel component, an air duct assembly is disposed between the panel component and the air inlet hole of the water collection tray, the central air-inlet channel is located on an inner side of the air duct assembly, and the peripheral air-outlet channel is located on an outer side of the air duct assembly.
- 30 19. The motor home air-conditioner using an axial fan assembly according to claim 9, **characterized in that** cross-sections of the central air-inlet channel and the peripheral air-outlet channel have a quasi-R-shaped structure.

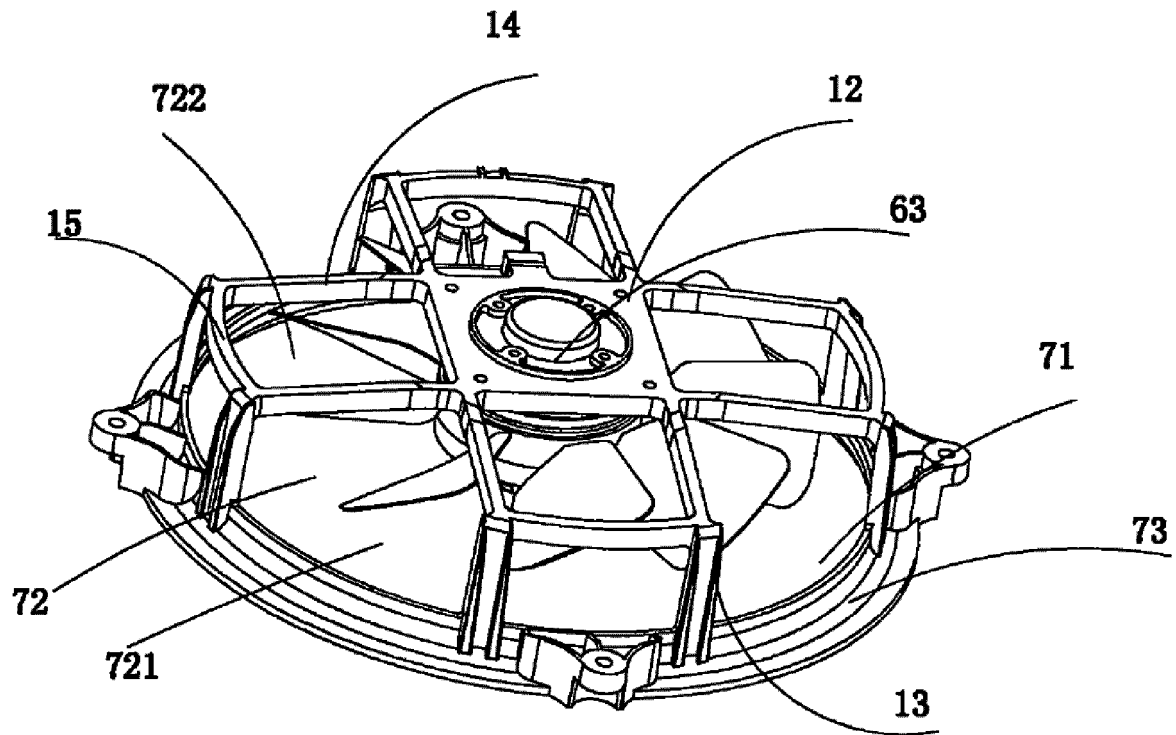


Fig.1

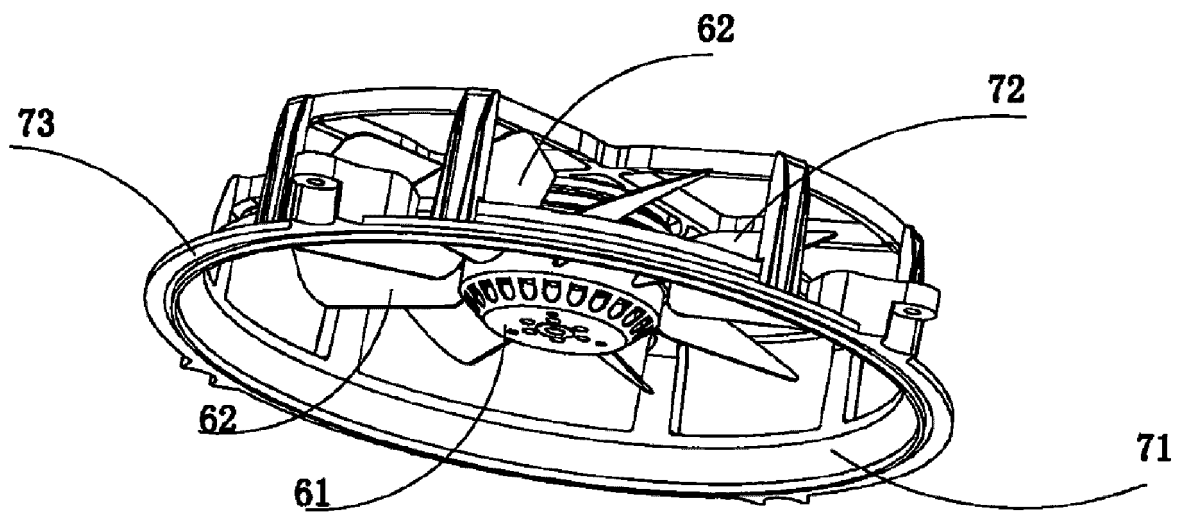


Fig.2

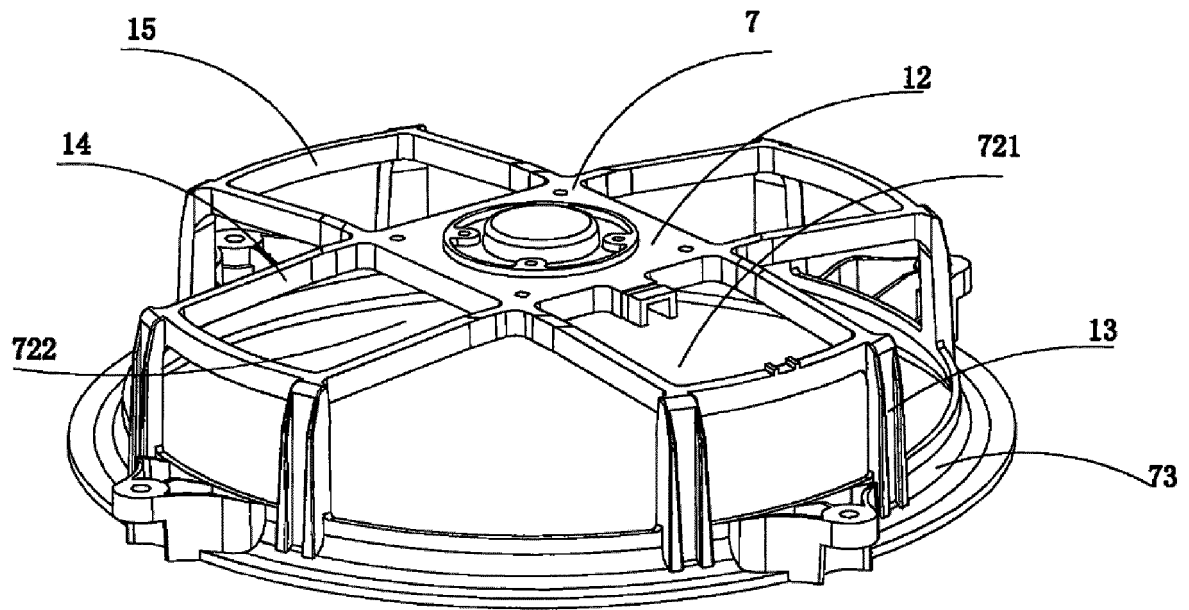


Fig.3

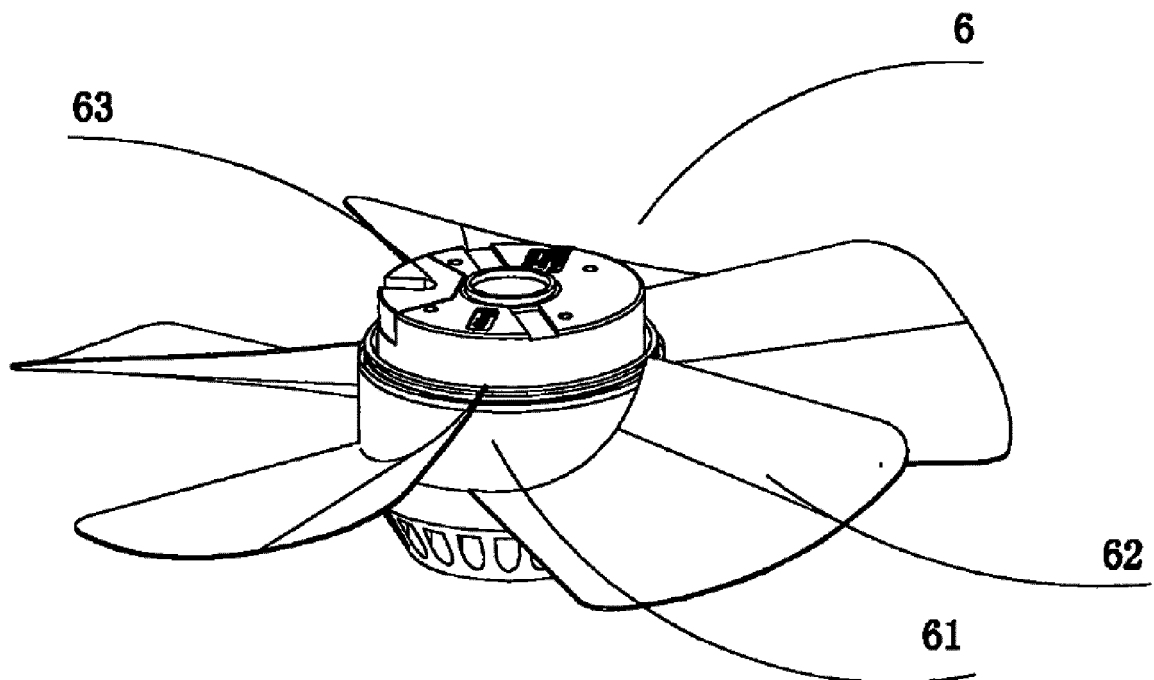


Fig.4

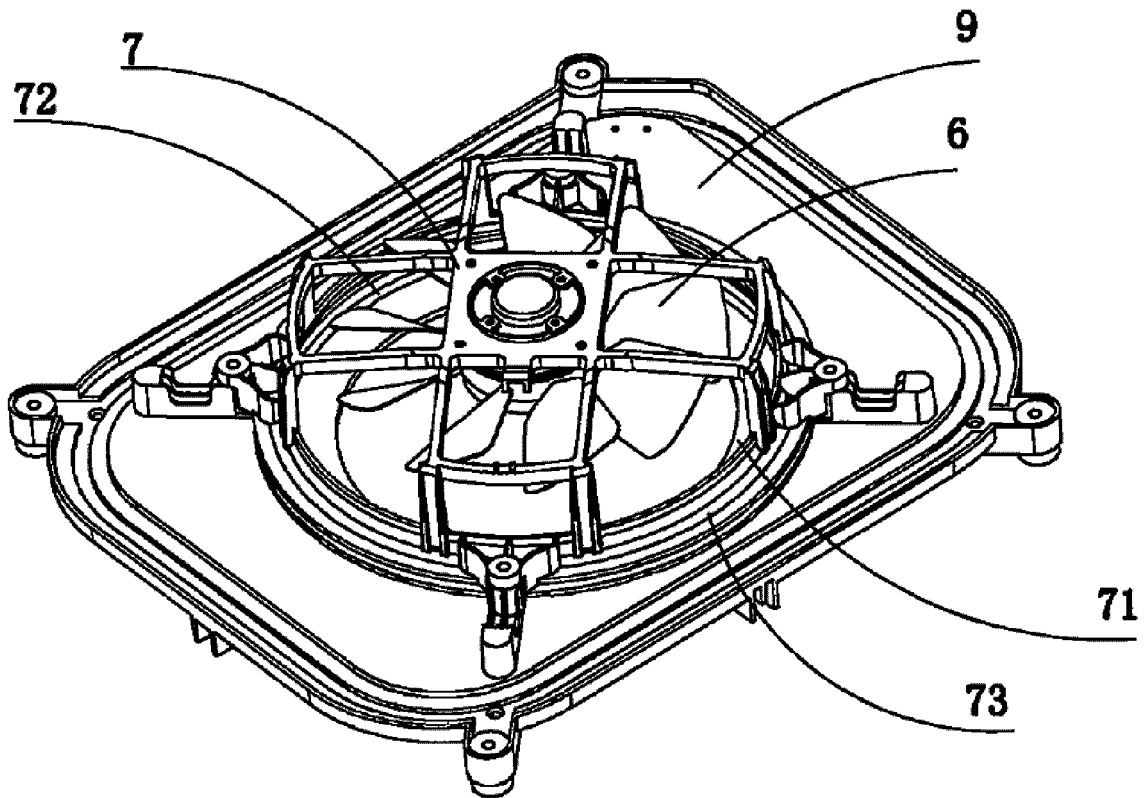


Fig.5

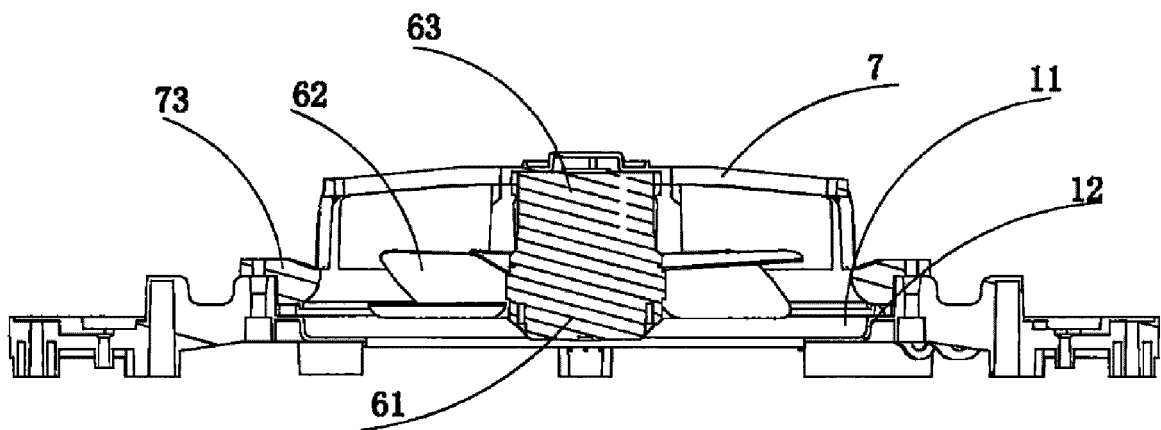


Fig.6

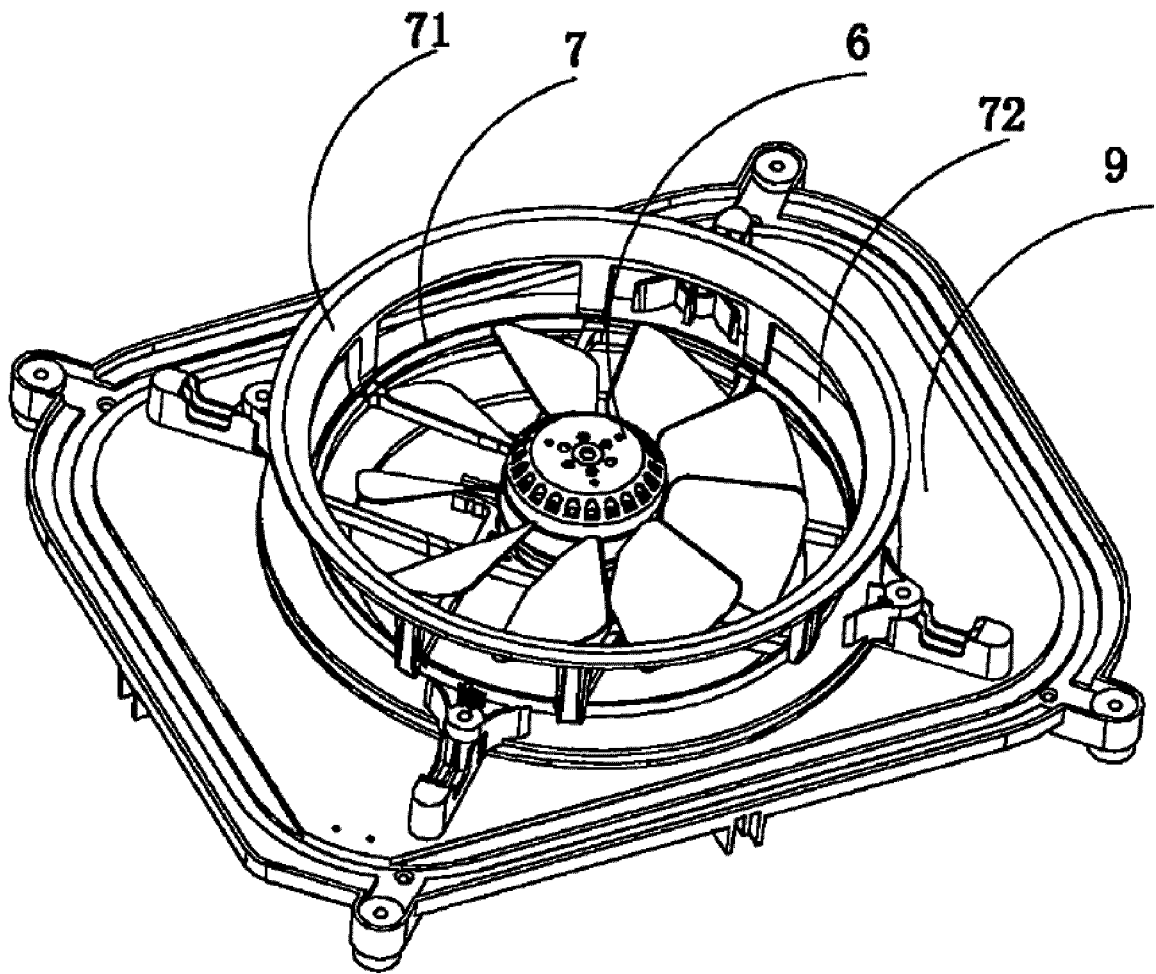


Fig.7

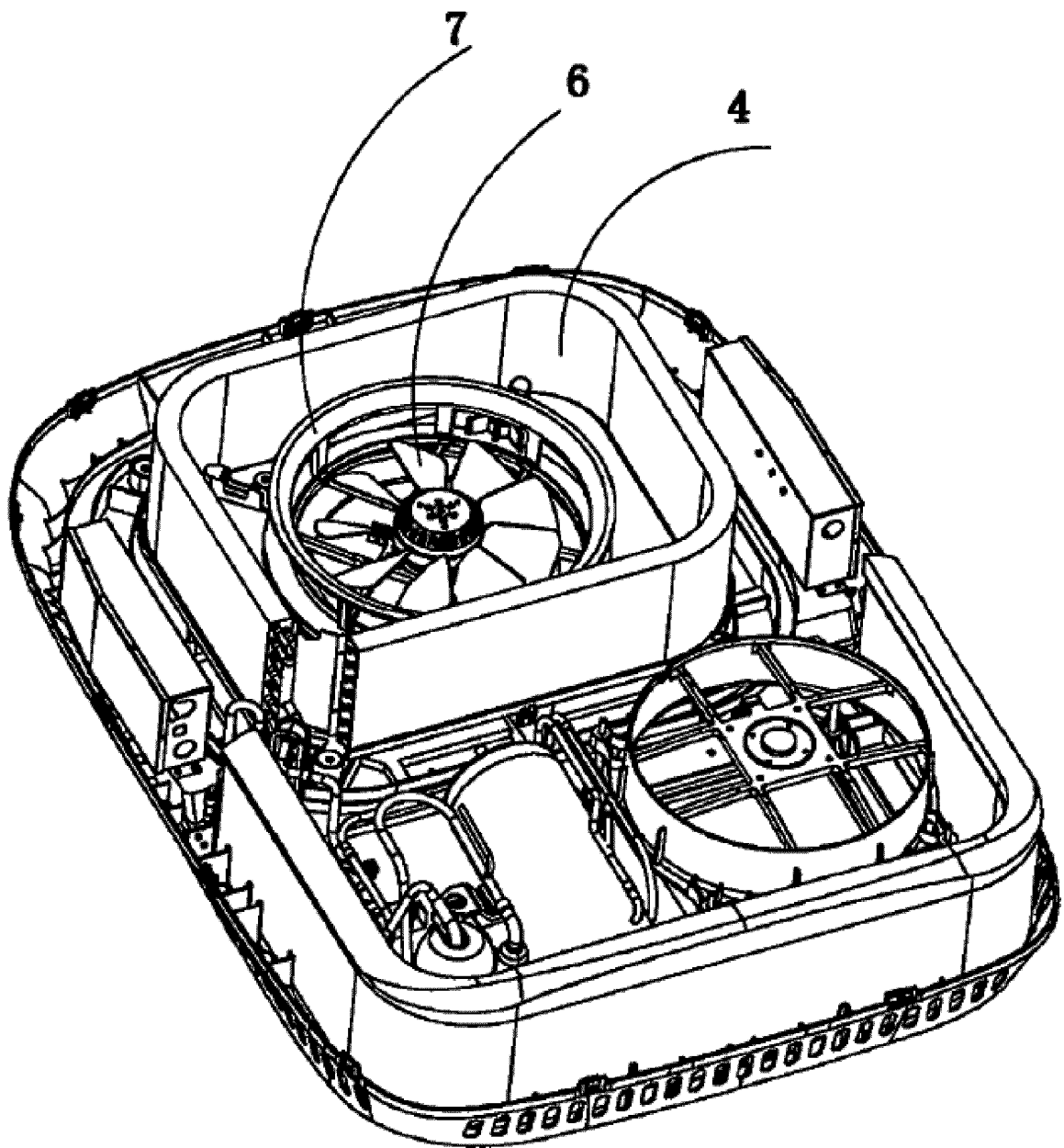


Fig.8

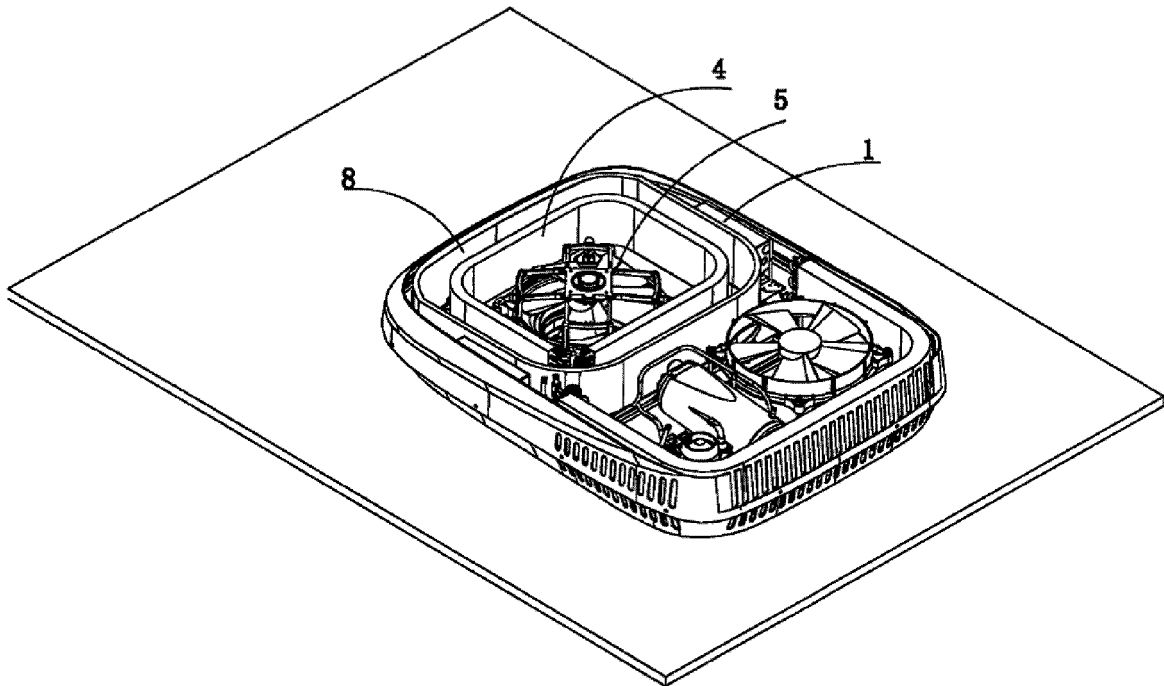


Fig.9

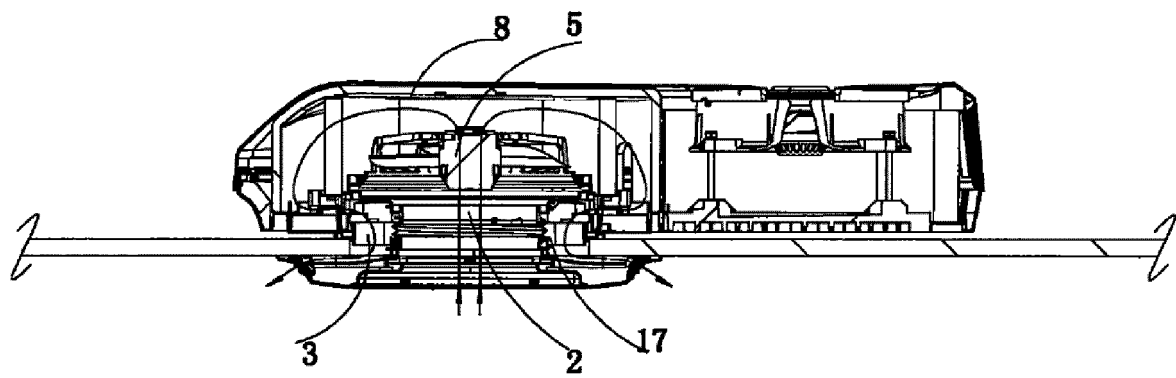


Fig.10

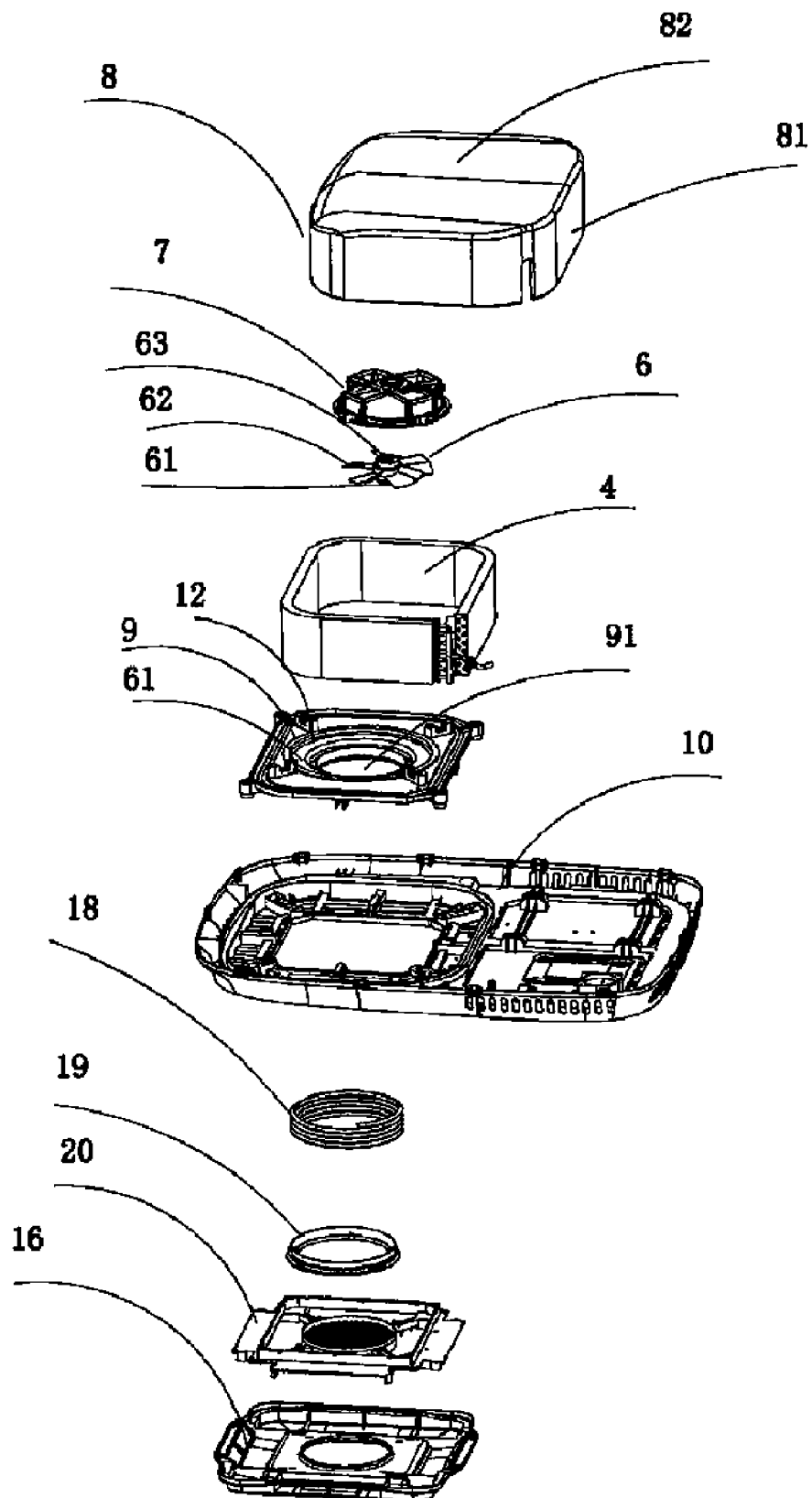


Fig.11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/000715

A. CLASSIFICATION OF SUBJECT MATTER

F04D 17/02 (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)

F04D

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)

CNABS: axial flow, mixed flow, fan, air conditioner, axial direction, radial direction, centrifuge

VEN: mixed, fan, air, condition

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 203453120 U (COOLER MASTER CO., LTD.), 26 February 2014 (26.02.2014), description, paragraphs 16-18, and figures 1-2	1-8
Y	CN 203453120 U (COOLER MASTER CO., LTD.), 26 February 2014 (26.02.2014), description, paragraphs 16-18, and figures 1-2	9-19
Y	CN 204586424 U (SHENZHEN DA TECHNOLOGY CO., LTD.), 26 August 2015 (26.08.2015), description, paragraphs 15-18, and figure 1	9-19
PX	CN 205349868 U (NINGBO HONGDU ELECTRICAL APPLIANCE CO., LTD.), 29 June 2016 (29.06.2016), claims 1-8	1-8
PX	CN 105443445 A (NINGBO HONGDU ELECTRICAL APPLIANCE CO., LTD.), 30 March 2016 (30.03.2016), claims 1-8	1-8
PX	CN 105416003 A (NINGBO HONGDU ELECTRICAL APPLIANCE CO., LTD.), 23 March 2016 (23.03.2016), claims 1-10, and description, particular embodiments	1-19
PX	CN 205273116 U (NINGBO HONGDU ELECTRICAL APPLIANCE CO., LTD.), 01 June 2016 (01.06.2016), claims 1-10, and description, particular embodiments	1-19

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

* Special categories of cited documents:

“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

“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)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“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

“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

“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

“&” document member of the same patent family

Date of the actual completion of the international search

14 March 2017 (14.03.2017)

Date of mailing of the international search report

31 March 2017 (31.03.2017)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/000715

C (Continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6634855 B1 (ROLLO ENTPR LTD.), 21 October 2003 (21.10.2003), the whole document	1-19

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2016/000715

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 203453120 U	26 February 2014	EP 2843239 A2	04 March 2015
		EP 2843239 A3	08 April 2015
		US 2015064011 A1	05 March 2015
CN 204586424 U	26 August 2015	None	
CN 205349868 U	29 June 2016	None	
CN 105443445 A	30 March 2016	None	
CN 105416003 A	23 March 2016	None	
CN 205273116 U	01 June 2016	None	
US 6634855 B1	21 October 2003	CA 2252794 A1	13 November 1997
		EP 0897479 A1	24 February 1999
		ZA 9703937 A	04 December 1997
		EP 0897479 A4	05 December 2001
		ZA 9703937 B	04 December 1997
		WO 9742416 A1	13 November 1997
		AU 2715697 A	26 November 1997
		JP 2001509226 A	10 July 2001

Form PCT/ISA/210 (patent family annex) (July 2009)