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(54) **DRYING DEVICE FOR DISHWASHER AND DISHWASHER**

(57) A drying device (10) for a dishwasher and the dishwasher (1). The drying device (10) comprises: a body (100) which has a first air passage (110) and a second air passage (120), the first air passage (110) has a first air inlet (111) and a first air outlet (112), and the second air passage (120) has a second air inlet (121) and a second air outlet (122), the first air inlet (111) is adapted to be in communication with a tub (20) of the dishwasher (1), and the second air inlet (121) is in communication with the outside; and a heat exchanger (200) which is provided in the body (100) and is in communication with the first air passage (110) and the second air passage (120), respectively, one of the first air outlet (112) and the second air outlet (122) is in communication with the outside and the other is adapted to be in communication with the tub (20).

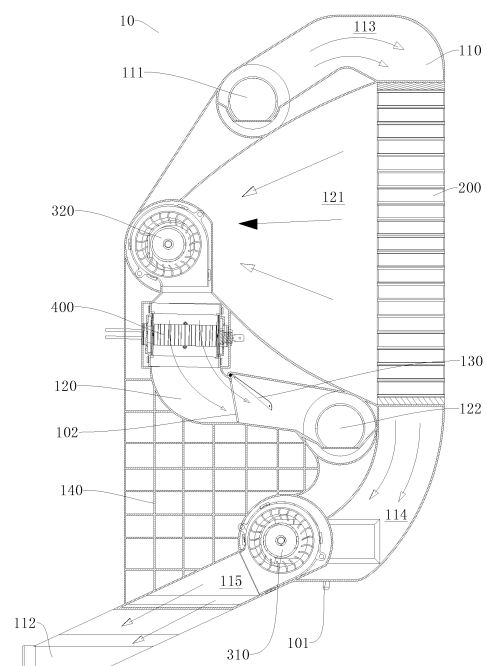


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to Chinese Patent Application Serial No. 201810044410.4, filed on January 17, 2018, Chinese Patent Application Serial No. 201820080895.8, filed on January 17, 2018, Chinese Patent Application Serial No. 201810044426.5, filed on January 17, 2018, Chinese Patent Application Serial No. 201820080936.3, filed on January 17, 2018, the entire content of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to a field of dishwashers, specifically to a drying device for a dishwasher and a dishwasher having the drying device.

BACKGROUND

[0003] A dishwasher in the related art dries a tub thereof generally by technologies such as automatic door opening, drawing moisture, using zeolite, etc., i.e. removing the steam in the tub and on the tableware after washing.

[0004] Specifically, the drying technology of automatic door opening refers that the door is opened at an angle after washing to rapidly discharge the steam accumulated in the tub. However, if the door is not manually closed timely after opening, outside mosquitos or dust may enter the tub and contaminate the tableware, affecting the user experience.

[0005] The drying technology of drawing moisture refers that the steam in the tub is drawn and discharged out of the tub by using a fan, and the drying is performed by utilizing the excess temperature of the tableware. However, the drawing process is slow, and the drying efficiency of the tableware is low. Furthermore, the discharged steam will condense on a kitchen cabinet or on the ground, which affects the senses and easily erodes the kitchen cabinet. Moreover, the moisture is condensed in an air passage, a quantity of heat is wasted, the drawing process is slow, and the drying efficiency of the tableware is low.

[0006] The drying technology of using zeolite refers that the steam in the tub is drawn out, and passed through a drying box equipped with the zeolite, and then discharged into the tub again after moisture absorption by the zeolite. However, a zeolite cavity, a fan and a heating module have large footprint, and the zeolite has a peculiar smell, affecting the user experience.

SUMMARY

[0007] The present disclosure seeks to solve at least one of the problems existing in the related art. To this

end, the present disclosure proposes a drying device for a dishwasher, which has advantages of good drying effect, high drying efficiency, high energy utilization, small footprint and excellent user experience.

[0008] The present disclosure further proposes a dishwasher having the drying device.

[0009] The drying device according to embodiments of a first aspect of the present disclosure includes a body having a first air passage and a second air passage, the first air passage having a first air inlet and a first air outlet, the second air passage having a second air inlet and a second air outlet, the first air inlet being adapted to be in communication with a tub of the dishwasher, and the second air inlet being in communication with an outside; a heat exchanger provided to the body and in communication with the first air passage and the second air passage, respectively; and a first fan and a second fan, the first fan being provided in the first air passage, the second fan being provided in the second air passage. One of the first air outlet and the second air outlet is in communication with the outside, and the other of the first air outlet and the second air outlet is adapted to be in communication with the tub.

[0010] The drying device for the dishwasher the according to embodiments of the present disclosure has good drying effect, high drying efficiency, high energy utilization, small footprint and excellent user experience.

[0011] In addition, the drying device according to embodiments of the present disclosure further includes the following additional technical features.

[0012] According to some embodiments of the present disclosure, a part of the heat exchanger is located in the first air passage, and another part of the heat exchanger is located at the second air passage.

[0013] According to some embodiments of the present disclosure, the first air passage includes a first transition section, a heat exchange section and a device mounting section in a direction from the first air inlet to the first air outlet, a part of the heat exchanger is located at the heat exchange section, and the first fan is located at the device mounting section.

[0014] Further, an end of the first transition section close to the first air inlet is located above the first air inlet.

[0015] In some embodiments of the present disclosure, a bottom of the heat exchange section is provided with a drain port configured to drain condensation water.

[0016] Optionally, the first air passage includes the first transition section, the heat exchange section, a second transition section, and the device mounting section in the direction from the first air inlet to the first air outlet, and the second transition section extends obliquely upwards relative to a vertical direction from the heat exchange section.

[0017] In some specific embodiments of the present disclosure, the part of the heat exchanger includes a plurality of first fins arranged in a width direction of the first air passage, and each first fin extends in a length direction of the first air passage; the another part of the heat ex-

changer includes a plurality of second fins arranged in the length direction of the first air passage, and each second fin extends in the width direction of the first air passage.

[0018] Optionally, the heat exchanger further includes a heat exchange plate having a heat exchange cavity therein, the plurality of first fins being provided in the heat exchange cavity, and the plurality of second fins being distributed on two opposite side surfaces of the heat exchange plate.

[0019] According to some embodiments of the present disclosure, the first air passage has a safety port provided close to the first air outlet, a toggle piece is provided at the safety port, and only when the first fan is in operation, the toggle piece opens the safety port to communicate an air outlet of the first fan with the first air outlet; or the second air passage has a safety port provided close to the second air outlet, a toggle piece is provided at the safety port, and only when the second fan is in operation, the toggle piece opens the safety port to communicate an air outlet of the second fan with the second air outlet.

[0020] Further, the toggle piece is rotatably provided in the first air passage or the second air passage, and normally closes the safety port under its own gravity.

[0021] According to some embodiments of the present disclosure, the drying device further includes a heater. The heater is provided to the first air passage and located between the first fan and the first air outlet, or the heater is provided to the second air passage and located between the second fan and the second air outlet.

[0022] According to some embodiments of the present disclosure, a part of the second air passage located between the heat exchanger and the second fan has a gradually reduced flow area in a direction from the heat exchanger to the second fan.

[0023] According to some embodiments of the present disclosure, air gaps are provided between the first fan and a wall face of the first air passage, and between the second fan and a wall face of the second air passage, respectively.

[0024] According to some embodiments of the present disclosure, the first air outlet is in communication with the outside, and the second air outlet is adapted to be in communication with the tub.

[0025] Further, the first air inlet is provided close to the second fan, and the second air outlet is provided close to the first fan.

[0026] According to some embodiments of the present disclosure, the first air outlet is adapted to be in communication with the tub, and the second air outlet is in communication with the outside.

[0027] Further, the first air inlet and the first air outlet are provided away from a center of the body, and the first fan and the second fan are provided close to the center of the body.

[0028] The dishwasher according to embodiments of a second aspect of the present disclosure includes a housing; a tub provided in the housing and having an

inlet and an outlet; a door mounted to the housing to open and close the tub; a drying device according to embodiments of the first aspect of the present disclosure. The body is mounted to at least one of the tub and the door, the other of the first air outlet and the second air outlet is in communication with the inlet, and the first air inlet is in communication with the outlet.

[0029] The dishwasher according to embodiments of the present disclosure, by utilizing the drying device for the dishwasher as described above, has good drying effect, high drying efficiency, high energy utilization, small footprint and excellent user experience.

[0030] Additional aspects and advantages of embodiments of present disclosure will be given in part in the following descriptions, or be learned from the practice of the embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031]

FIG. 1 is a sectional view of a drying device for a dishwasher according to an embodiment of the present disclosure;

FIG. 2 is a schematic view of a drying device for a dishwasher according to an embodiment of the present disclosure;

FIG. 3 is a perspective view of a heat exchanger of a drying device for a dishwasher according to an embodiment of the present disclosure;

FIG. 4 is a schematic view of a heater of a drying device for a dishwasher according to an embodiment of the present disclosure;

Fig. 5 is an exploded view of a dishwasher according to an embodiment of the present disclosure;

FIG. 6 is a sectional view of a drying device for a dishwasher according to an optional embodiment of the present disclosure;

FIG. 7 is a schematic view of a drying device for a dishwasher according to an optional embodiment of the present disclosure;

FIG. 8 is a perspective view of a heat exchanger of a drying device for a dishwasher according to an optional embodiment of the present disclosure;

FIG. 9 is a schematic view of a heater of a drying device for a dishwasher according to an optional embodiment of the present disclosure; and

Fig. 10 is an exploded view of a dishwasher according to an optional embodiment of the present disclosure.

Reference numerals:

[0032]

dishwasher 1,
drying device 10 for dishwasher,
body 100, drain port 101, safety port 102,

first air passage 110, first air inlet 111, first air outlet 112, first transition section 113, heat exchange section 114, device mounting section 115, second transition section 116, second air passage 120, second air inlet 121, second air outlet 122, toggle piece 130, reinforcing rib 140,

heat exchanger 200, first fin 210, second fin 220, heat exchange plate 230, first fan 310, second fan 320, heater 400, heating plate 410, third fin 420, temperature controller 430, wiring harness 440, tub 20, inlet 21, outlet 22, fastener 23, seal ring 24.

DETAILED DESCRIPTION

[0033] Embodiments of the present disclosure will be described in detail and examples of the embodiments will be illustrated in the drawings, where same or similar reference numerals are used to indicate same or similar members or members with same or similar functions. The embodiments described herein with reference to drawings are explanatory, illustrative, and used to generally understand the present disclosure. The embodiments shall not be construed to limit the present disclosure.

[0034] A drying device 10 for a dishwasher according to embodiments of a first aspect of the present disclosure will be described below with reference to the drawings.

[0035] As illustrated in FIGS. 1 to 10, the drying device 10 for the dishwasher according to embodiments of the present disclosure includes a body 100, a heat exchanger 200, a first fan 310, and a second fan 320.

[0036] Specifically, the body 100 has a first air passage 110 and a second air passage 120. The first air passage 110 has a first air inlet 111 and a first air outlet 112, and the first air inlet 111 is adapted to be in communication with a tub of the dishwasher. The second air passage 120 has a second air inlet 121 and a second air outlet 122, and the second air inlet 121 is in communication with outside. The heat exchanger 200 is provided to the body 100, and the heat exchanger 200 is in communication with the first air passage 110 and the second air passage 120. The first fan 310 is provided in the first air passage 110, and the second fan 320 is provided in the second air passage 120.

[0037] The first air outlet 112 is in communication with the outside, and the second air outlet 122 is adapted to be in communication with the tub of the dishwasher. Thus, the first fan 310 controls steam in the tub to enter the first air passage 110 through the first air inlet 111, and finally to be discharged into the outside environment after heat exchange with the heat exchanger 200; meanwhile, the second fan 320 draws air from the outside environment through the second air inlet 121, and makes the air flow into the tub through the second air outlet 122 after heat exchange with the heat exchanger 200. In this way, the gas containing the steam is condensed when

flowing through the heat exchanger 200, and the released heat is absorbed by the outside air flowing through the heat exchanger 200. That is, the outside air is heated by the heat of the steam, and the steam is condensed by the outside air, such that the drying system can be configured with limited space, and the heat of the steam can be fully recycled, producing a hot-air drying effect.

[0038] Alternatively, the first air outlet 112 is adapted to be in communication with the tub, and the second air outlet 122 is in communication with the outside. Thus, the first fan 310 controls the steam in the tub to enter first the air passage 110 through the first air inlet 111, and flow into the tub through the first air outlet 112 after heat exchange with the heat exchanger 200; meanwhile, the second fan 320 draws the air from the outside environment through the second air inlet 121, and makes the air finally be discharged into the outside environment after heat exchange with the heat exchanger 200. In this way, the gas containing the steam is condensed when flowing through the heat exchanger 200, and the released heat is absorbed by the outside air flowing through the heat exchanger 200. That is, the steam is condensed by the outside air, such that the drying system can be configured with the limited space.

[0039] In general, the drying device 10 for the dishwasher according to embodiments of the present disclosure can achieve that the steam in the tub can be drawn out and condensed by the outside air, meanwhile the outside air is heated by the heat released due to condensation of the steam, and then the outside air is guided into the tub again, achieving the purpose of gradually replacing the steam with dry and hot air. The drying device can solve the technical problem existed in the related art, and has good drying effect, high drying efficiency, high energy utilization, small footprint and excellent user experience. Or, by guiding the air having reduced humidity into the tub again, the purpose of continuously reducing the humidity of the air in the tub can be achieved, improving the drying effect. Furthermore, the above drying process also prevents the gas containing the steam from condensing on a kitchen cabinet or the ground, promoting the user experience.

[0040] The drying device 10 according to a specific embodiment of the present disclosure will be described below with reference to the drawings.

[0041] As illustrated in FIGS. 1 to 5, the drying device 10 for the dishwasher according to embodiments of the present disclosure includes a body 100, a heat exchanger 200, a first fan 310, and a second fan 320.

[0042] Specifically, the body 100 has a first air passage 110 and a second air passage 120. The first air passage 110 has a first air inlet 111 and a first air outlet 112, the first air inlet 111 is adapted to be in communication with the tub of the dishwasher, and the first air outlet 112 is in communication with the outside; the second air passage 120 has a second air inlet 121 and a second air outlet 122, the second air inlet 121 is in communication with the outside, and the second air outlet 122 is adapted

to be in communication with the tub. The heat exchanger 200 is provided to the body 100, and the heat exchanger 200 are in communication with the first air passage 110 and the second air passage 120. The first fan 310 is provided in the first air passage 110, and the second fan 320 is provided in the second air passage 120.

[0043] Thus, the first fan 310 controls steam in the tub to enter the first air passage 110 through the first air inlet 111, and finally to be discharged into the outside environment after heat exchange with the heat exchanger 200; meanwhile, the second fan 320 draws air from the outside environment through the second air inlet 121, and makes the air flow into the tub through the second air outlet 122 after heat exchange with the heat exchanger 200. In this way, the gas containing the steam is condensed when flowing through the heat exchanger 200, and the released heat is absorbed by the outside air flowing through the heat exchanger 200. That is, the outside air is heated by the heat of the steam, and the steam is condensed by the outside air, such that the drying system can be configured with limited space, and the heat of the steam can be fully recycled, producing a hot-air drying effect.

[0044] In general, the drying device 10 for the dishwasher according to embodiments of the present disclosure can achieve that the steam in the tub can be drawn out and condensed by the outside air, meanwhile the outside air is heated by the heat released due to condensation of the steam, and then the outside air is guided into the tub again, achieving the purpose of gradually replacing the steam with dry and hot air. The drying device can solve the technical problem existed in the related art, and has good drying effect, high drying efficiency, high energy utilization, small footprint and excellent user experience.

[0045] According to some embodiments of the present disclosure, as illustrated in FIG. 1, a part of the heat exchanger 200 is located in the first air passage 110, and another part of the heat exchanger 200 is located at the second air inlet 121. In this way, the steam in the first air passage 110 may perform heat exchange with the part of the heat exchanger 200, and the outside air may perform heat exchange with the another part of the heat exchanger 200, such that the outside air and the steam in the first air passage 110 can perform energy exchange, and footprint is reduced.

[0046] Further, as illustrated in FIG. 1, the first air passage 110 includes a first transition section 113, a heat exchange section 114 and a device mounting section 115 in a direction from the first air inlet 111 to the first air outlet 112, the part of the heat exchanger 200 is located at the heat exchange section 114, and the first fan 310 is located at the device mounting section 115. In other words, in an airflow direction, the part of the heat exchanger 200 is located upstream of the first fan 310, leading to more sufficient heat exchange and better drying effect.

[0047] Advantageously, as illustrated in FIG. 1, the first

transition section 113 is used to communicate the first air inlet 111 with the heat exchange section 114, and the highest position of the first transition section 113 is higher than the highest position of the first air inlet 111. For example, an end of the first transition section 113 close to the first air inlet 111 is located above the first air inlet 111, the airflow gradually flows upwards from the first air inlet 111 to the first transition section 113, and the airflow gradually flows downwards from the first transition section 113 to the heat exchange section 114. Thus, the water can be prevented from directly entering the heat exchanger 200 through the first air inlet 111 in the washing process.

[0048] Optionally, as illustrated in FIG. 1, an end of the heat exchange section 114 close to the device mounting section 115 has an arc shape, and a bottom of the heat exchange section 114 is provided with a drain port 101, for draining condensation water accumulated at the bottom of the heat exchange section 114. For example, a water storage tank may be provided at the bottom of the heat exchange section 114, for storing the condensation water, and the drain port 101 is provided in the water storage tank. The drain port 101 is engaged with a hose, and the condensation water is smoothly guided into a water cup or a drain line through the hose.

[0049] In some embodiments of the present disclosure, as illustrated in FIG. 3, the part of the heat exchanger 200 includes a plurality of first fins 210, the plurality of first fins 210 is arranged in a width direction of the first air passage 110, and each first fin 210 extends in a length direction of the first air passage 110. The another part of the heat exchanger 200 includes a plurality of second fins 220 arranged in the length direction of the first air passage 110, and each second fin 220 extends in the width direction of the first air passage 110. For example, the plurality of first fins 210 is connected to each other to form a wave shape, and the plurality of second fins 220 is connected to each other to form a wave shape.

[0050] The plurality of second fins 220 may be arranged to be two layers on the plurality of first fins 210. In other words, the heat exchanger 200 includes the plurality of first fins 210 located in a middle layer, and the plurality of second fins 220 located at two opposite sides of the middle layer. In this way, the gas containing the steam is condensed when flowing through the plurality of first fins 210 located in the middle layer, the released heat is transferred to the two outside layers of second fins 220, the outside air absorbs the heat when flowing through the second fins 220 for achieving cold and heat exchange, and then the outside air is guided into the tub again.

[0051] Advantageously, as illustrated in FIG. 3, the heat exchanger 200 further includes a heat exchange plate 230. The heat exchange plate 230 has a heat exchange cavity therein. The plurality of first fins 210 is provided in the heat exchange cavity, and the plurality of second fins 220 is distributed at two opposite surfaces of the heat exchange plate 230. That is, the first fins 210

located in the middle layer are separated from the above-mentioned two layers of second fins 220 through the heat exchange plates 230, to improve heat exchange effect. For example, the heat exchange plate 230 is a metal member, and the surfaces of the heat exchange plates 230 facing the first fins 210 and the second fins 220 are planar.

[0052] It could be appreciated that, the number of the layers of first fins 210 and the second fins 220 is not specifically limited, the number of the layers of the first fins 210 into which the steam is guided and the number of the layers of the second fins 220 into which the outside air is guided are also not specifically limited, as long as the extending directions of the first fins 210 and the second fins 220 do not hinder the flowing of the airflow.

[0053] According to some embodiments of the present disclosure, the drying device 10 for the dishwasher further includes a heater 400. The heater 400 is provided at the second air passage 120, and the heater 400 is located between the second fan 320 and the second air outlet 122, to heat the airflow about to enter the tub and to have a hot-air drying effect, enhancing the drying effect. For example, the heater 400 may be a PCT heating element. The heater 400 may be turned on when requiring rapid and efficient drying and the heater 400 may be turned off when requiring economic drying manner.

[0054] Specifically, the heater 400 includes a heating plate 410, a third fin 420, a temperature controller 430 and a wiring harness 440. A plurality of third fins 420 is provided at the heating plate 410, for example, the plurality of third fins 420 may be connected to each other to form a wave shape. The temperature controller 430 is connected to at least one of the heating plate 410 and the third fin 420. That is, the temperature controller 430 may be connected to the heating plate 410 or the third fin 420, and the temperature controller 430 may also be connected to the heating plate 410 and the third fin 420 at the same time. The wiring harness 440 is connected to the heating plate 410, to achieve the heating of the heating plate 410.

[0055] When the heater 400 is turned on, a temperature of the heating plate 410 rises, and the heat is transferred to the third fins 420, the outside air flows through the third fins 420 and takes away the heat, and enters the tub again through the second air outlet 122, realizing the hot-air drying. The first fin 210, the second fin 220 and the third fin 420 all may be metal members, to ensure good heat exchange effect.

[0056] According to some embodiments of the present disclosure, as illustrated in FIG. 1, the second air passage 120 has a safety port 102. The safety port 102 is provided close to the second air outlet 122, a toggle piece 130 is provided at the safety port 102, and only when the second fan 320 is in operation, the toggle piece 130 opens the safety port 102 to communicate an air outlet of the second fan 320 with the second air outlet 122. For example, the safety port 102 is provided between the heater 400 and the second air outlet 122, such that when the second fan

320 is not in operation, the steam can be effectively prevented from entering the second fan 320 and the heater 400 through the second air outlet 122 in the washing process.

[0057] In some specific embodiments of the present disclosure, as illustrated in FIG. 1, a part of the second air passage 120 located between the heater 400 and the safety port 102 has an arc shape, to reduce flow resistance of the gas, facilitating smooth flowing of the gas.

[0058] Advantageously, as illustrated in FIG. 1, the toggle piece 130 is rotatably provided in the second air passage 120, and the toggle piece 130 normally closes the safety port 102 under its own gravity. In this way, when the second fan 320 is not in operation, the toggle piece 130 closes the safety port 102 under its own gravity; when the second fan 320 is in operation, the toggle piece 130 is blown up by the airflow under the action of the air force to open the safety port 102, such that the airflow may enter the tub via the second air outlet 122.

[0059] According to some embodiments of the present disclosure, as illustrated in FIG. 1, the body 100 is provided with a reinforcing rib 140, and the reinforcing rib 140 is located between the first fan 310 and the second fan 320, to reduce vibration during operation of the first fan 310 and the second fan 320.

[0060] According to some embodiments of the present disclosure, as illustrated in FIG. 1, the first air inlet 111 is provided close to the second fan 320, and the second air outlet 122 is provided close to the first fan 310. Advantageously, the second fan 320 is provided close to the heat exchanger 200, such that the limited space can be fully utilized, the layout can be reasonable, the drying efficiency can be high, and the drying effect can be good.

[0061] In some embodiments of the present disclosure, as illustrated in FIG. 1, a part of the second air passage 120 located between the heat exchanger 200 and the second fan 320 has a gradually reduced flow area in a direction from the heat exchanger 200 to the second fan 320, to facilitate inhale of the second fan 320.

[0062] According to some embodiments of the present disclosure, as illustrated in FIG. 2, air gaps are provided between the first fan 310 and a wall face of the first air passage 110, and between the second fan 320 and a wall face of the second air passage 120, respectively. The air gap between the first fan 310 and the wall face of the first air passage 110 is in communication with the first air passage 110, facilitating the inhale of the first fan 310; the air gap between the second fan 320 and the wall face of the second air passage 120 is in communication with the second air passage 120 and the two layers of second fins 220, facilitating inhale of the second fan 320.

[0063] A drying device 10 for a dishwasher according to an optional embodiment of the present disclosure will be described below with reference to the drawings.

[0064] As illustrated in FIGS. 6 to 10, the drying device 10 for the dishwasher according to embodiments of the present disclosure includes a body 100, a heat exchanger 200, a first fan 310, and a second fan 320.

[0065] Specifically, the body 100 has a first air passage 110 and a second air passage 120. The first air passage 110 has a first air inlet 111 and a first air outlet 112, and the first air inlet 111 and the first air outlet 112 are adapted to be in communication with the tub of the dishwasher; the second air passage 120 has a second air inlet 121 and a second air outlet 122, the second air inlet 121 and the second air outlet 122 are in communication with the outside. The heat exchanger 200 is provided to the body 100, and the heat exchanger 200 are in communication with first air passage 110 and the second air passage 120. The first fan 310 is provided in the first air passage 110, and the second fan 320 is provided in the second air passage 120.

[0066] Thus, the first fan 310 controls steam in the tub to enter the first air passage 110 through the first air inlet 111, and flow into the tub through the first air outlet 112 after heat exchange with the heat exchanger 200; meanwhile, the second fan 320 draws air from the outside environment through the second air inlet 121, and makes the air finally be discharged into the outside environment after heat exchange with the heat exchanger 200. In this way, the gas containing the steam is condensed when flowing through the heat exchanger 200, and the released heat is absorbed by the outside air flowing through the heat exchanger 200. That is, the steam is condensed by the outside air, such that the drying system can be configured with the limited space.

[0067] The drying device 10 for the dishwasher according to embodiments of the present disclosure can achieve that the steam in the tub can be drawn out and condensed by the outside air, meanwhile the air having reduced humidity is guided into the tub again, the purpose of continuously reducing the humidity of the air in the tub can be achieved, improving the drying effect. Furthermore, the above drying process also prevents the gas containing the steam from condensing on a kitchen cabinet or the ground, promoting the user experience.

[0068] Briefly, the drying device 10 for the dishwasher according to embodiments of the present disclosure can solve the technical problems existed in the related art, and has good drying effect, high drying efficiency, small footprint and excellent user experience.

[0069] According to some embodiments of the present disclosure, as illustrated in FIG. 6, a part of the heat exchanger 200 is located in the first air passage 110, and another part of the heat exchanger 200 is located at the second air inlet 121. In this way, the steam in the first air passage 110 may perform heat exchange with the part of the heat exchanger 200, and the outside air may perform the heat exchange with the another part of the heat exchanger 200, such that the outside air and the steam in the first air passage 110 can perform energy exchange, and footprint is reduced.

[0070] Further, as illustrated in FIG. 6, the first air passage 110 includes a first transition section 113, a heat exchange section 114, a second transition section 116 and a device mounting section 115 in a direction from

the first air inlet 111 to the first air outlet 112, the part of the heat exchanger 200 is located at the heat exchange section 114, and the first fan 310 is located at the device mounting section 115. In other words, in an airflow direction, the part of the heat exchanger 200 is located upstream of the first fan 310, leading to more sufficient heat exchange and better drying effect.

[0071] Advantageously, as illustrated in FIG. 6, the first transition section 113 is used to communicate the first air inlet 111 with the heat exchange section 114, and the highest position of the first transition section 113 is higher than the highest position of the first air inlet 111. For example, the first transition section 113 has a substantially U shape, an end of the first transition section 113 close to the first air inlet 111 is located above the first air inlet 111, the airflow gradually flows upwards from the first air inlet 111 to the first transition section 113, and the airflow gradually flows downwards from the first transition section 113 to the heat exchange section 114. Thus, the water can be prevented from directly entering the heat exchanger 200 through the first air inlet 111 in the washing process.

[0072] Advantageously, as illustrated in FIG. 6, the heat exchange section 114 is a straight section, and a bottom of the heat exchange section 114 is provided with a drain port 101, for draining the condensation water accumulated at the bottom of the heat exchange section 114. For example, a water storage tank may be provided at the bottom of the heat exchange section 114, for storing the condensation water, and the drain port 101 is provided in the water storage tank. The drain port 101 is engaged with a hose, and the condensation water is smoothly guided into a water cup or a drain line through the hose.

[0073] Optionally, as illustrated in FIG. 6, the second transition section 116 extends obliquely upwards relative to a vertical direction from the heat exchange section 114, to prevent the condensation water from entering the first fan 310.

[0074] In some specific embodiments of the present disclosure, as illustrated in FIG. 6, the part of the heat exchanger 200 includes a plurality of first fins 210, the plurality of first fins 210 is arranged in a width direction of the first air passage 110, and each first fin 210 extends in a length direction of the first air passage 110. The another part of the heat exchanger 200 includes a plurality of second fins 220 arranged in the length direction of the first air passage 110, and each second fin 220 extends in the width direction of the first air passage 110. For example, the plurality of first fins 210 is connected to each other to form a wave shape, and the plurality of second fins 220 is connected to each other to form a wave shape.

[0075] The plurality of second fin 220 may be arranged to be two layers on the plurality of first fins 210. In other words, the heat exchanger 200 includes the plurality of first fins 210 located in a middle layer, and the plurality of second fins 220 located at two opposite sides of the

middle layer. In this way, the gas containing the steam is condensed when flowing through the plurality of first fins 210 located in the middle layer, the released heat is transferred to the two outside layers of second fins 220, the outside air absorbs the heat when flowing through the second fins 220 for achieving the cold and heat exchange, and then the outside air is discharged out again, and the gas having reduced humidity is guided into the tub again.

[0076] Advantageously, as illustrated in FIG. 8, the heat exchanger 200 further includes a heat exchange plate 230. The heat exchange plate 230 has a heat exchange cavity therein. The plurality of first fins 210 is provided in the heat exchange cavity, and the plurality of second fins 220 is distributed at two opposite surfaces of the heat exchange plate 230. That is, the first fins 210 located in the middle layer are separated from the above-mentioned two layers of second fins 220 through the heat exchange plates 230, to improve heat exchange effect. For example, the heat exchange plate 230 is a metal member, and the surfaces of the heat exchange plates 230 facing the first fins 210 and the second fins 220 are planar.

[0077] It could be appreciated that, the number of the layers of first fins 210 and the second fins 220 is not specifically limited, the number of the layers of the first fins 210 into which the steam is guided and the number of the layers of the second fins 220 into which the outside air is guided are also not specifically limited, as long as the extending directions of the first fins 210 and the second fins 220 do not hinder the flowing of the airflow.

[0078] According to some embodiments of the present disclosure, the drying device 10 for the dishwasher further includes a heater 400. The heater 400 is provided at the device mounting section 115, and the heater 400 is located between first fan 310 and the first air outlet 112, to heat the airflow about to enter the tub and to have a hot-air drying effect, enhancing the drying effect. For example, the heater 400 may be a PCT heating element. The heater 400 may be turned on when requiring rapid and efficient drying, and the heater 400 may be turned off when requiring economic drying manner.

[0079] Specifically, the heater 400 includes a heating plate 410, a third fin 420, a temperature controller 430 and a wiring harness 440. A plurality of third fins 420 is provided at the heating plate 410, for example, the plurality of third fins 420 may be connected to each other to form a wave shape. The temperature controller 430 is connected to at least one of the heating plate 410 and the third fin 420. That is, the temperature controller 430 may be connected to the heating plate 410 or the third fin 420, and the temperature controller 430 may also be connected to the heating plate 410 and the third fin 420 at the same time. The wiring harness 440 is connected to the heating plate 410, to achieve the heating of the heating plate 410.

[0080] When the heater 400 is turned on, a temperature of the heating plate 410 rises, and the heat is trans-

ferred to the third fin 420, the dehumidified air flows through the third fins 420 and takes away the heat, and then enters the tub again through the first air outlet 112, realizing the hot-air drying. The first fin 210, the second fin 220 and the third fin 420 all may be metal members, to ensure good heat exchange effect.

[0081] According to some embodiments of the present disclosure, as illustrated in FIG. 6, the device mounting section 115 has a safety port 102. The safety port 102 is provided close to the first air outlet 112, a toggle piece 130 is provided at the safety port 102, and only when the first fan 310 is in operation, the toggle piece 130 opens the safety port 102 to communicate the air outlet of the first fan 310 and the first air outlet 112. For example, the safety port 102 is provided between the heater 400 and the first air outlet 112, such that when the first fan 310 is not in operation, the steam can be effectively prevented from entering the first fan 310 and the heater 400 through the first air outlet 112 in the washing process.

[0082] In some specific embodiments of the present disclosure, as illustrated in FIG. 6, a part of the device mounting section 115 located between the heater 400 and the safety port 102 has an arc shape, to reduce flow resistance of the gas, facilitating smooth flowing of the gas.

[0083] Further, as illustrated in FIG. 6, the toggle piece 130 is rotatably provided in the first air passage 110, and the toggle piece 130 normally closes the safety port 102 under its own gravity. In this way, when the first fan 310 is not in operation, the toggle piece 130 closes the safety port 102 under its own gravity; when the first fan 310 is in operation, the toggle piece 130 is blown up by the airflow under the action of the air force to open the safety port 102, such that the airflow may enter the tub via the first air outlet 112.

[0084] According to some embodiments of the present disclosure, as illustrated in FIG. 6, the first air inlet 111 and the first air outlet 112 are provided away from a center of the body 100, and the first fan 310 and the second fan 320 are provided close to the center of the body 100. Advantageously, the second fan 320 is provided close to the heat exchanger 200, such that the limited space can be fully utilized, the layout can be reasonable, the drying efficiency can be high, and the drying effect can be good.

[0085] In some embodiments of the present disclosure, as illustrated in FIG. 6, a part of the second air passage 120 located between the heat exchanger 200 and the second fan 320 has a gradually reduced flow area in a direction from the heat exchanger 200 to the second fan 320, to facilitate inhale of the second fan 320.

[0086] According to some embodiments of the present disclosure, as illustrated in FIG. 7, air gaps are provided between the first fan 310 and a wall face of the first air passage 110, and between the second fan 320 and a wall face of the second air passage 120, respectively. The air gap between the first fan 310 and the wall face of the first air passage 110 is in communication with the

first air passage 110, facilitating the inhale of the first fan 310; the air gap between the second fan 320 and the wall face of the second air passage 120 is in communication with the second air passage 120 and the two layers of second fins 220, facilitating inhale of the second fan 320.

[0087] As illustrated in FIGS. 1 to 10, a dishwasher 1 according to embodiments of a second aspect of the present disclosure includes a housing, a tub 20, a door and a drying device 10 according to embodiments of the first aspect of the present disclosure.

[0088] Specifically, the tub 20 is provided in the housing, the tub 20 has an inlet 21 and an outlet 22. The door is mounted to the housing to open and close the tub 20; and the body 100 is mounted to a side or a top of the tub 20 through a fastener 23, the second air outlet 122 is in communication with the inlet 21, and the first air inlet 111 is in communication with the outlet 22. Of course, the body 100 may also be mounted to the door, or, the body 100 may also be mounted to the door and the tub 20 at the same time.

[0089] The inlet 21 is close to a bottom wall of the tub 20, and the outlet 22 is close to a top end of the tub 20. The fastener 23 may be a screw cap. The second air outlet 122 and the inlet 21 are provided with a seal ring 24 therebetween, and the first air inlet 111 and the outlet 22 are also provided with a seal ring 24 therebetween.

[0090] In a drying stage, the first fan 310 and the second fan 320 are turned on, the steam in the tub 20 is drawn out of the outlet 22 due to a suction force of the first fan 310, the airflow enters the first transition section 113 through the first air inlet 111, flows through the first fins 210, and the first fan 310, and finally is discharged out through the first air outlet 112; meanwhile, the second fan 320 draws the outside air, the outside air flows through the second fins 220, after the steam flowing through the first fins 210 is condensed, then the outside air flows through the second fan 320, the heater 400, and flows into the tub 20 through the second air outlet 122.

[0091] Alternatively, the first air outlet 112 is in communication with the inlet 21, and the first air inlet 111 is in communication with the outlet 22. In this way, in the drying stage, the first fan 310 and the second fan 320 are turned on, the steam in the tub 20 is drawn out of the outlet 22 due to a suction force of the first fan 310, the airflow enters the first transition section 113 through the first air inlet 111, flows through the first fins 210, the second transition section 116, the first fan 310 and the heater 400, and finally is discharged into the tub 20 through the first air outlet 112; meanwhile, the second fan 320 draws the outside air, the outside air flows through the second fins 220, after the steam flowing through the first fins 210 is condensed, then the outside air flows through the second fan 320, and finally is discharged to the outside environment through the second air outlet 122.

[0092] The dishwasher 1 according to embodiments of the present disclosure, by utilizing the drying device 10 for the dishwasher as described above, has good drying effect, high drying efficiency, high energy utilization,

small footprint and excellent user experience.

[0093] Other constitutions and operations of the dishwasher 1 according to embodiments of the present disclosure are well known by those skilled in the art, which will not be described in detail herein.

[0094] In the specification, it is to be understood that terms such as "central," "longitudinal," "lateral," "length," "width," "thickness," "upper," "lower," "front," "rear," "left," "right," "vertical," "horizontal," "top," "bottom," "inner," "outer," "clockwise," "counterclockwise," "axial," "radial" and "circumferential" should be construed to refer to the orientation as then described or as shown in the drawings under discussion. These relative terms are for convenience of description and do not require that the present disclosure be constructed or operated in a particular orientation.

[0095] In addition, terms such as "first" and "second" are used herein for purposes of description and are not intended to indicate or imply relative importance or significance. Thus, features limited by "first" and "second" are intended to indicate or imply including one or more than one these features. In the description of the present disclosure, "a plurality of" relates to two or more than two.

[0096] In the description of the present disclosure, unless specified or limited otherwise, it should be noted that, terms "mounted," "connected" and "coupled" may be understood broadly, such as permanent connection or detachable connection, electronic connection or mechanical connection, direct connection or indirect connection via intermediary, inner communication or interaction between two elements. Those having ordinary skills in the art should understand the specific meanings in the present disclosure according to specific situations.

[0097] Reference throughout this specification to "an embodiment," "some embodiments," "an example," "a specific example," or "some examples," means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. Thus, the appearances of the phrases in various places throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0098] Although embodiments of the present disclosure have been shown and illustrated, it shall be understood by those skilled in the art that various changes, modifications, alternatives and variants without departing from the principle of the present disclosure are acceptable. The scope of the present disclosure is defined by the claims or the like.

Claims

1. A drying device for a dishwasher, comprising:

- a body having a first air passage and a second air passage, the first air passage having a first air inlet and a first air outlet, the second air passage having a second air inlet and a second air outlet, the first air inlet being adapted to be in communication with a tub of the dishwasher, and the second air inlet being in communication with an outside;
a heat exchanger provided to the body and in communication with the first air passage and the second air passage, respectively; and
a first fan and a second fan, the first fan being provided in the first air passage, the second fan being provided in the second air passage, wherein one of the first air outlet and the second air outlet is in communication with the outside, and the other of the first air outlet and the second air outlet is adapted to be in communication with the tub.
2. The drying device according to claim 1, wherein a part of the heat exchanger is located in the first air passage, and another part of the heat exchanger is located at the second air passage.
 3. The drying device according to claim 1 or 2, wherein the first air passage comprises a first transition section, a heat exchange section and a device mounting section in a direction from the first air inlet to the first air outlet, a part of the heat exchanger is located at the heat exchange section, and the first fan is located at the device mounting section.
 4. The drying device according to claim 3, wherein an end of the first transition section close to the first air inlet is located above the first air inlet.
 5. The drying device according to claim 3, wherein a bottom of the heat exchange section is provided with a drain port configured to drain condensation water.
 6. The drying device according to claim 3, wherein the first air passage comprises the first transition section, the heat exchange section, a second transition section, and the device mounting section in the direction from the first air inlet to the first air outlet, and the second transition section extends obliquely upwards relative to a vertical direction from the heat exchange section.
 7. The drying device according to claim 2, wherein the part of the heat exchanger comprises a plurality of first fins arranged in a width direction of the first air passage, and each first fin extends in a length direction of the first air passage;
the another part of the heat exchanger comprises a plurality of second fins arranged in the length direction of the first air passage, and each second fin extends in the width direction of the first air passage.
 8. The drying device according to claim 7, wherein the heat exchanger further comprises:
a heat exchange plate having a heat exchange cavity therein, the plurality of first fins being provided in the heat exchange cavity, and the plurality of second fins being distributed on two opposite side surfaces of the heat exchange plate.
 9. The drying device according to any one of claims 1 to 8, wherein the first air passage has a safety port provided close to the first air outlet, a toggle piece is provided at the safety port, and only when the first fan is in operation, the toggle piece opens the safety port to communicate an air outlet of the first fan with the first air outlet; or
the second air passage has a safety port provided close to the second air outlet, a toggle piece is provided at the safety port, and only when the second fan is in operation, the toggle piece opens the safety port to communicate an air outlet of the second fan with the second air outlet.
 10. The drying device according to claim 9, wherein the toggle piece is rotatably provided in the first air passage or the second air passage, and normally closes the safety port under its own gravity.
 11. The drying device according to any one of claims 1 to 10, further comprising:
a heater, the heater being provided to the first air passage and located between the first fan and the first air outlet, or
the heater being provided to the second air passage and located between the second fan and the second air outlet.
 12. The drying device according to any one of claims 1 to 11, wherein a part of the second air passage located between the heat exchanger and the second fan has a gradually reduced flow area in a direction from the heat exchanger to the second fan.
 13. The drying device according to any one of claims 1 to 12, wherein air gaps are provided between the first fan and a wall face of the first air passage, and between the second fan and a wall face of the second air passage, respectively.
 14. The drying device according to any one of claims 1 to 13, wherein the first air outlet is in communication with the outside, and the second air outlet is adapted to be in communication with the tub.
 15. The drying device according to claim 14, wherein the first air inlet is provided close to the second fan, and

the second air outlet is provided close to the first fan.

16. The drying device according to any one of claims 1 to 13, wherein the first air outlet is adapted to be in communication with the tub, and the second air outlet is in communication with the outside. 5

17. The drying device according to claim 16, wherein the first air inlet and the first air outlet are provided away from a center of the body, and the first fan and the second fan are provided close to the center of the body. 10

18. A dishwasher, comprising: 15
- a housing;
 - a tub provided in the housing and having an inlet and an outlet;
 - a door mounted to the housing to open and close the tub; and 20
 - a drying device according to any one of claims 1 to 17, the body being mounted to at least one of the tub and the door, the other of the first air outlet and the second air outlet being in communication with the inlet, and the first air inlet being in communication with the outlet. 25

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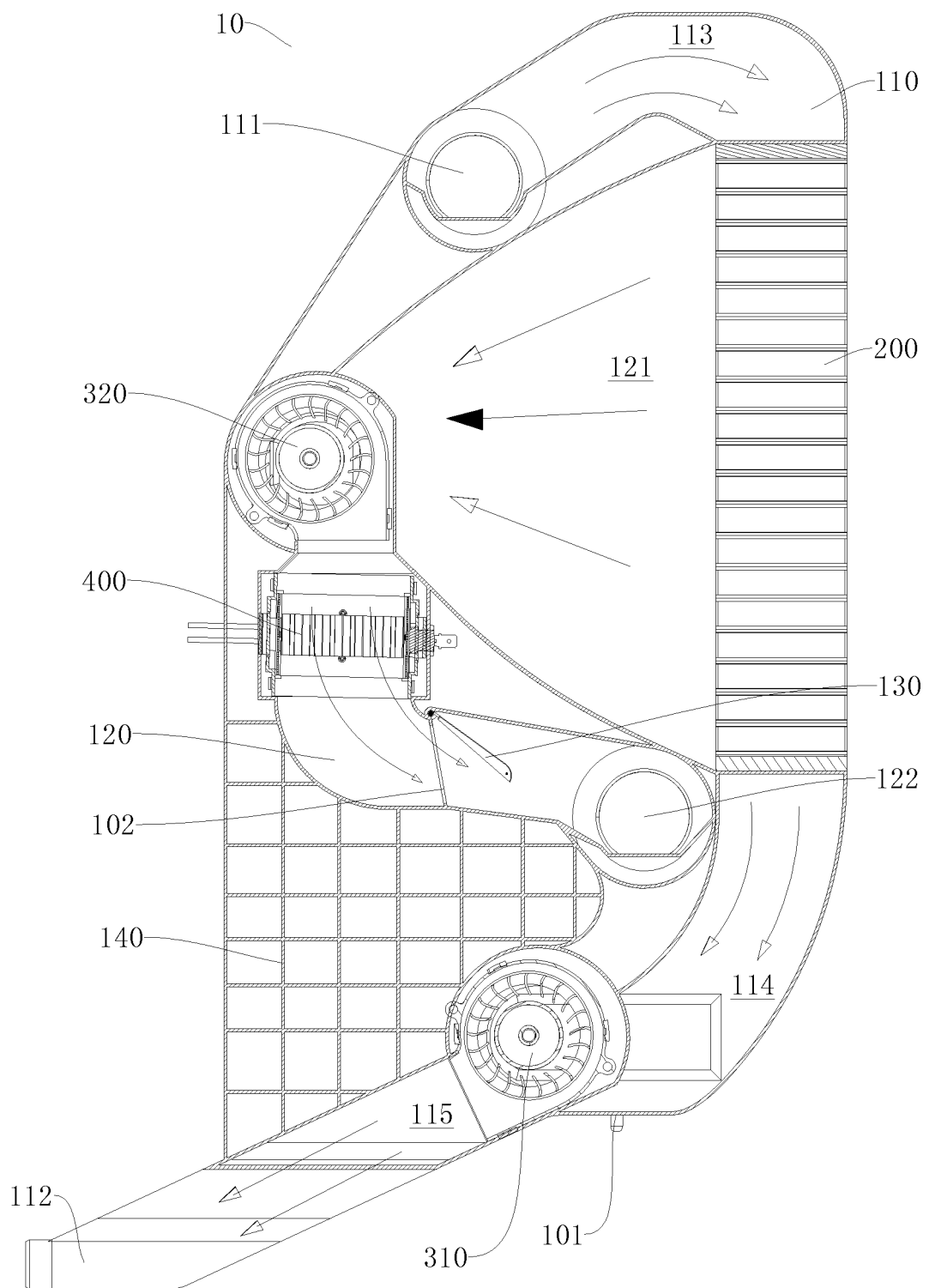


FIG. 1

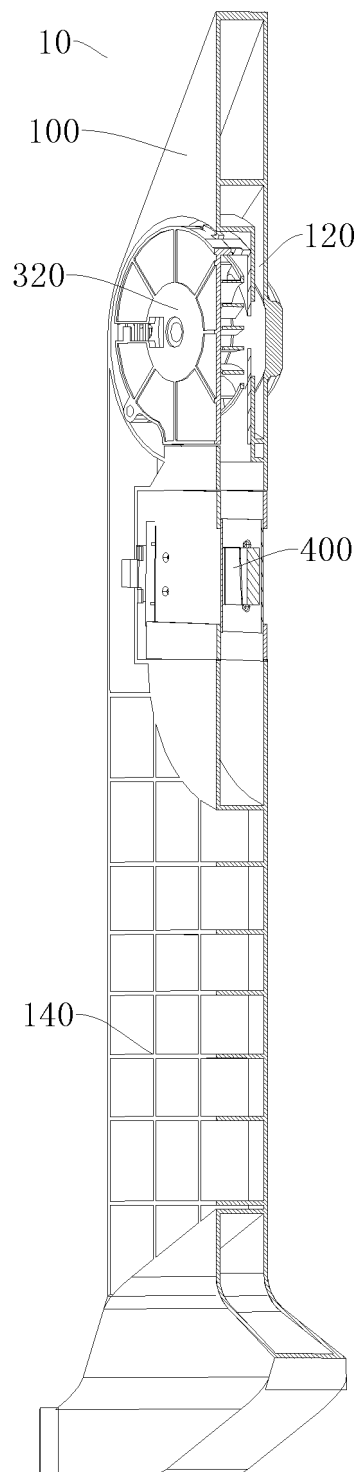


FIG. 2

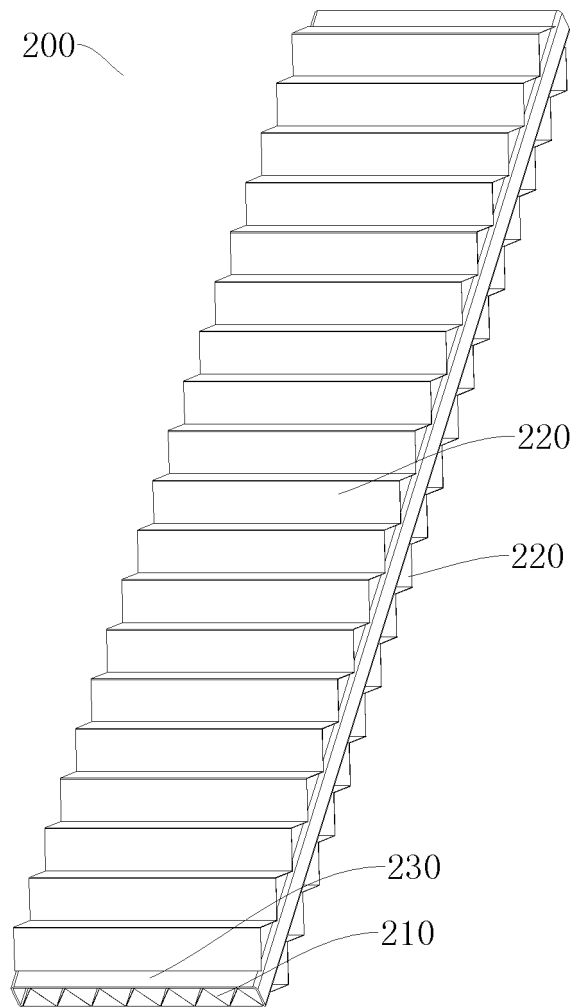


FIG. 3

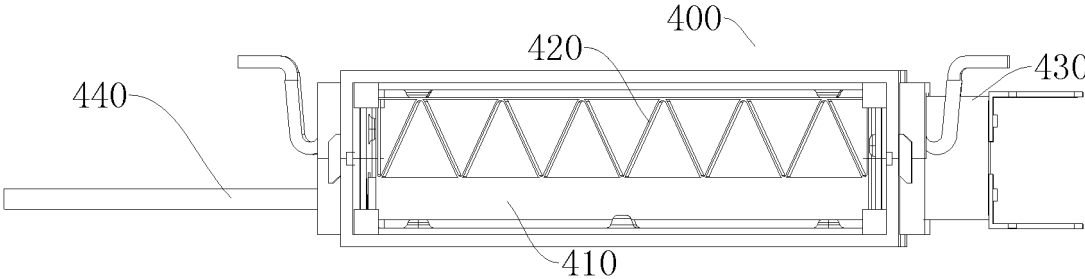


FIG. 4

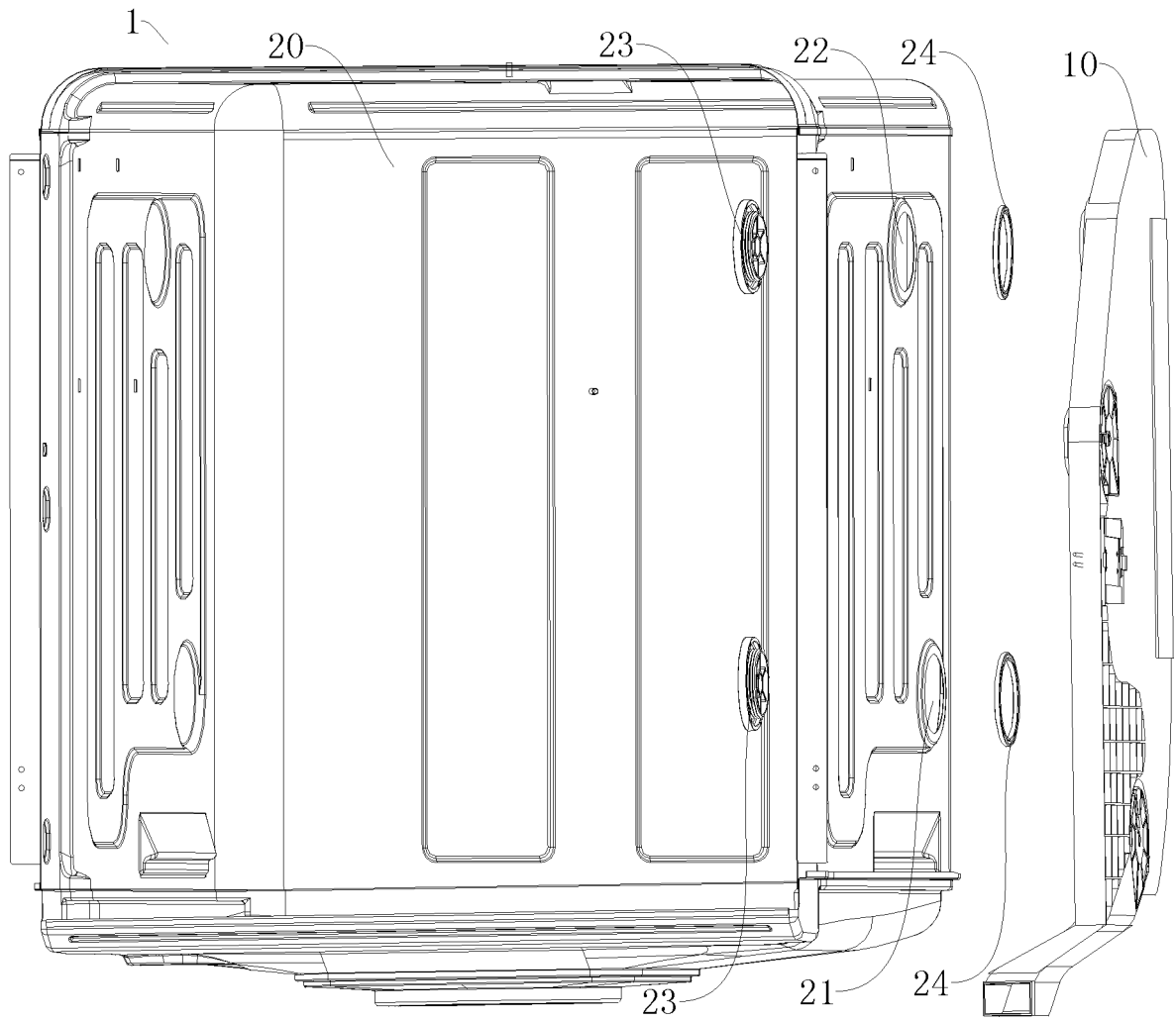


FIG. 5

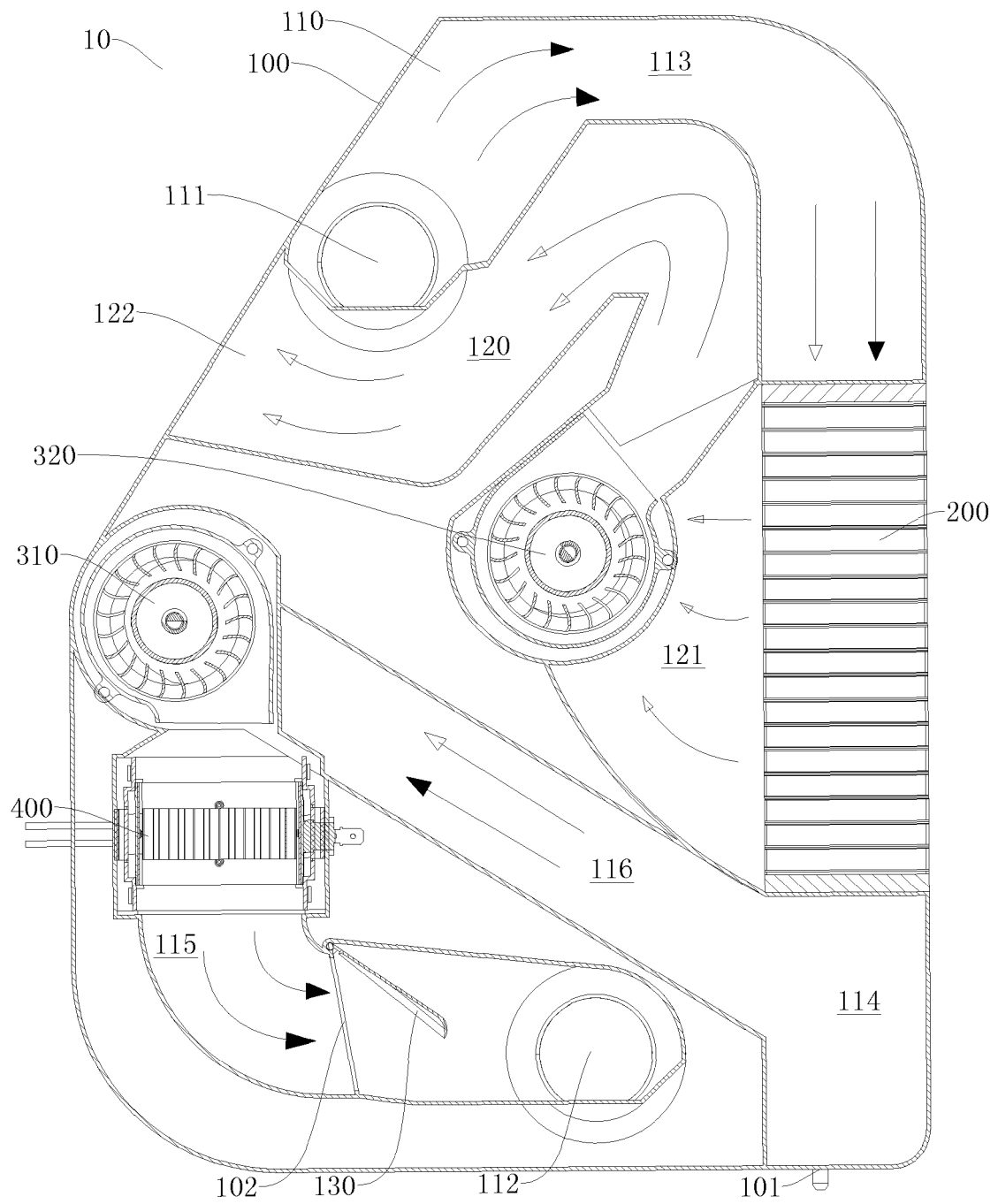


FIG. 6

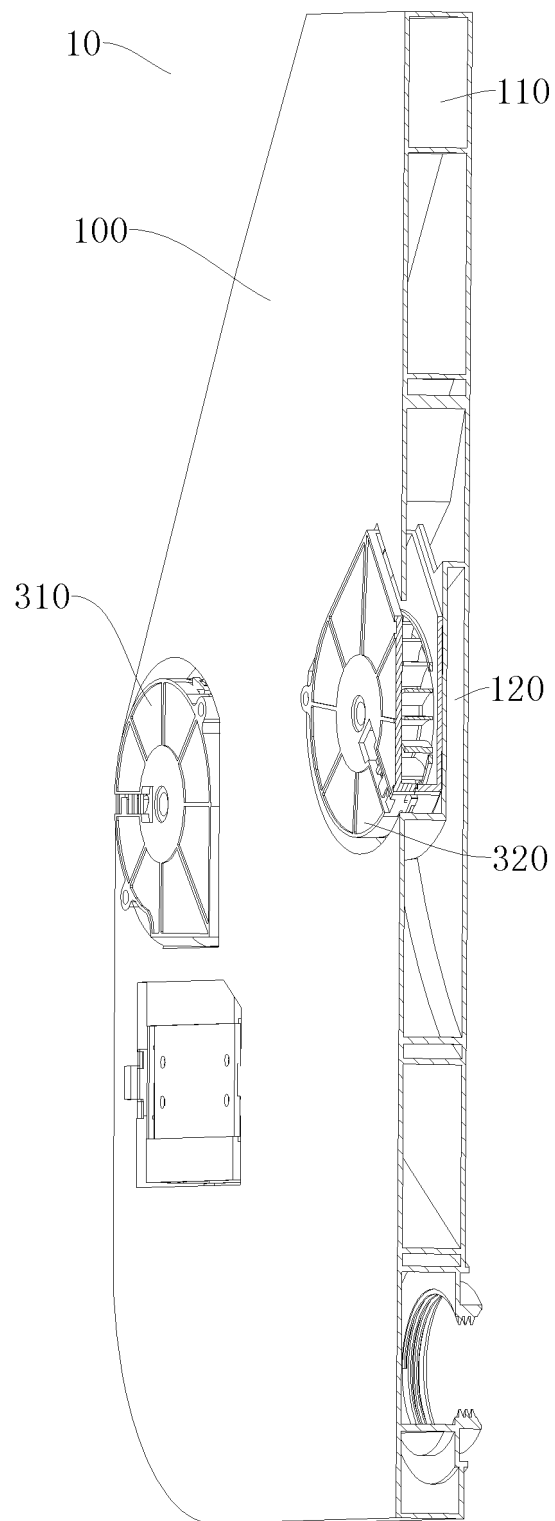


FIG. 7

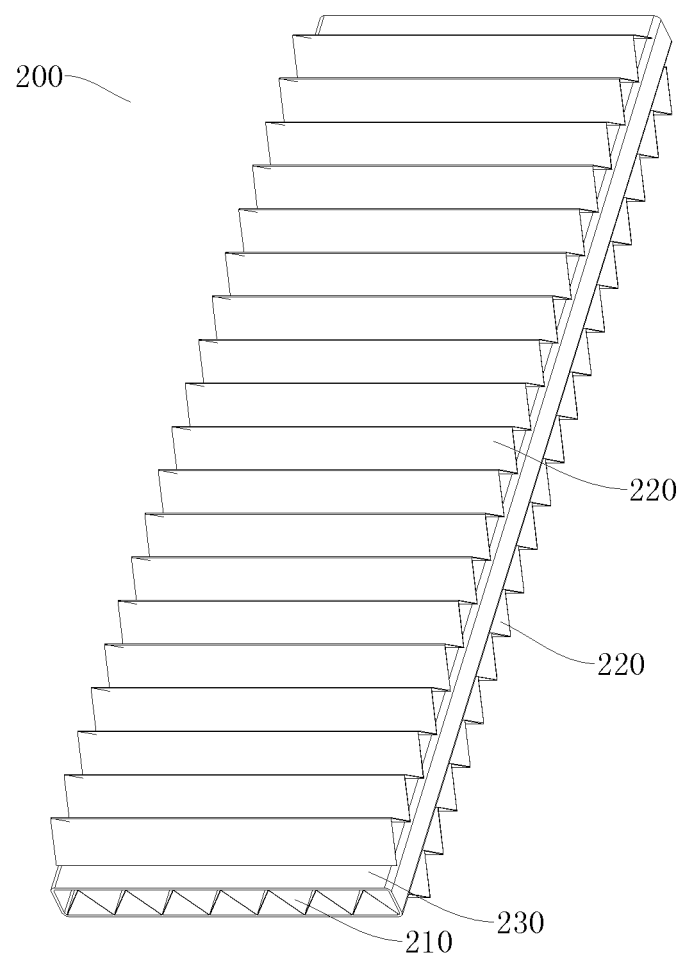


FIG. 8

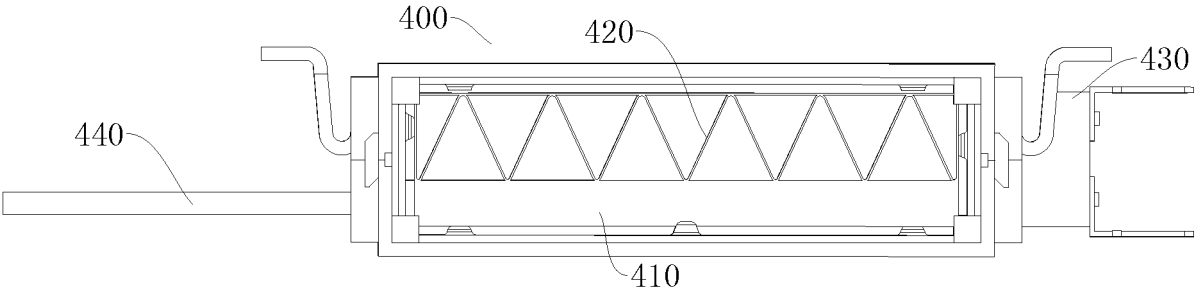


FIG. 9

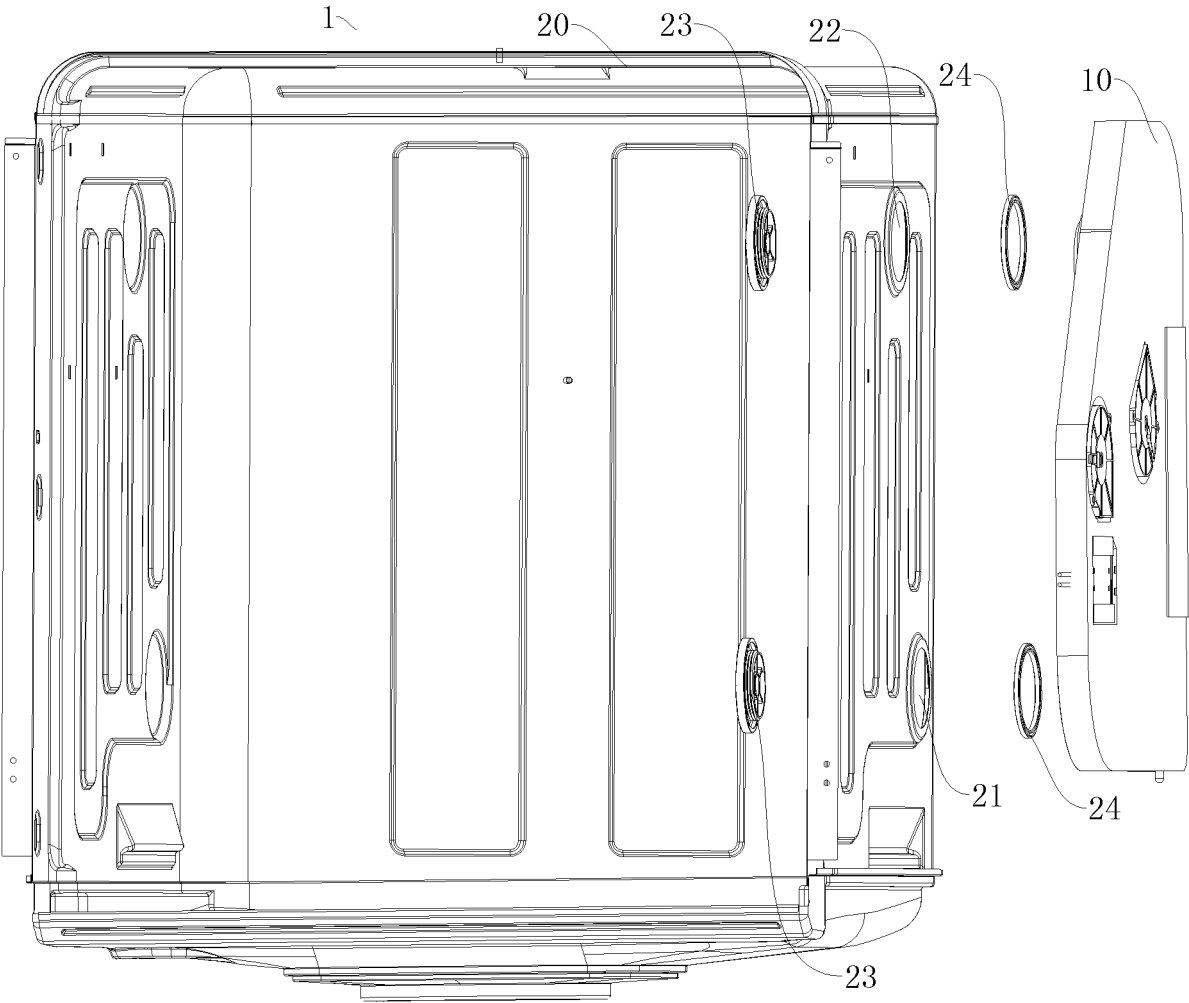


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/071965

A. CLASSIFICATION OF SUBJECT MATTER A47L 15/48(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) A47L15/- 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) VEN; CNABS; CNTXT: 洗碗机, 洗碟机, 餐具, 清洗, 清洁, 干燥, 换热, 热交换, 冷凝, 冷却, 散热, 蒸发, 风道, 风机, 鼓风, 风扇, 排风, 进风, 吹干, 吹风, 呼吸, 翅片, dish, washer, clean, wash, dry, blower, fan, air, conduit, flue, duct, exhaust, intake, inlet, condenser, condenser, heat, exchanger, transfer																					
C. DOCUMENTS CONSIDERED TO BE RELEVANT																					
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>JP 2008148795 A (HITACHI APPLIANCES INC.) 03 July 2008 (2008-07-03) description, paragraphs [0026]-[0069], and figures 1-7</td> <td>1-6, 11-13, 16-18</td> </tr> <tr> <td>Y</td> <td>JP 2008148795 A (HITACHI APPLIANCES INC.) 03 July 2008 (2008-07-03) description, paragraphs [0026]-[0069], and figures 1-7</td> <td>7-13, 16-18</td> </tr> <tr> <td>X</td> <td>CA 2193336 A1 (ELECTROLUX ZANUSSI ELETTRODOME) 20 June 1997 (1997-06-20) see description, page 4, line 1 to page 6, line 16, and figure 1</td> <td>1-6, 11-13, 16-18</td> </tr> <tr> <td>Y</td> <td>CA 2193336 A1 (ELECTROLUX ZANUSSI ELETTRODOME) 20 June 1997 (1997-06-20) see description, page 4, line 1 to page 6, line 16, and figure 1</td> <td>7-13, 16-18</td> </tr> <tr> <td>X</td> <td>CN 105796033 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 27 July 2016 (2016-07-27) description, paragraphs [0039]-[0052], and figures 1-5</td> <td>1-6, 11-15, 18</td> </tr> <tr> <td>Y</td> <td>CN 105796033 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 27 July 2016 (2016-07-27) description, paragraphs [0039]-[0052], and figures 1-5</td> <td>7-15, 18</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	JP 2008148795 A (HITACHI APPLIANCES INC.) 03 July 2008 (2008-07-03) description, paragraphs [0026]-[0069], and figures 1-7	1-6, 11-13, 16-18	Y	JP 2008148795 A (HITACHI APPLIANCES INC.) 03 July 2008 (2008-07-03) description, paragraphs [0026]-[0069], and figures 1-7	7-13, 16-18	X	CA 2193336 A1 (ELECTROLUX ZANUSSI ELETTRODOME) 20 June 1997 (1997-06-20) see description, page 4, line 1 to page 6, line 16, and figure 1	1-6, 11-13, 16-18	Y	CA 2193336 A1 (ELECTROLUX ZANUSSI ELETTRODOME) 20 June 1997 (1997-06-20) see description, page 4, line 1 to page 6, line 16, and figure 1	7-13, 16-18	X	CN 105796033 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 27 July 2016 (2016-07-27) description, paragraphs [0039]-[0052], and figures 1-5	1-6, 11-15, 18	Y	CN 105796033 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 27 July 2016 (2016-07-27) description, paragraphs [0039]-[0052], and figures 1-5	7-15, 18
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Y	JP 2008148795 A (HITACHI APPLIANCES INC.) 03 July 2008 (2008-07-03) description, paragraphs [0026]-[0069], and figures 1-7	7-13, 16-18																			
X	CA 2193336 A1 (ELECTROLUX ZANUSSI ELETTRODOME) 20 June 1997 (1997-06-20) see description, page 4, line 1 to page 6, line 16, and figure 1	1-6, 11-13, 16-18																			
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X	CN 105796033 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 27 July 2016 (2016-07-27) description, paragraphs [0039]-[0052], and figures 1-5	1-6, 11-15, 18																			
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Date of the actual completion of the international search 14 April 2019	Date of mailing of the international search report 19 April 2019																				
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/071965

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 104605804 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.) 13 May 2015 (2015-05-13) description, paragraphs [0024]-[0035], and figures 2 and 3	7-18
Y	CN 106491063 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 15 March 2017 (2017-03-15) description, paragraphs [0024]-[0035], and figures 2 and 3	9-18
PX	CN 108209831 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 29 June 2018 (2018-06-29) description, paragraphs [0045]-[0073], and figures 1-5	1-5, 7-18
PX	CN 108078528 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 29 May 2018 (2018-05-29) description, paragraphs [0045]-[0074], and figures 1-5	6-18
A	CN 205083420 U (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.; MIDEA GROUP CO., LTD.) 16 March 2016 (2016-03-16) entire document	1-18

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2019/071965

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2008148795 A	03 July 2008	None	
CA 2193336 A1	20 June 1997	FR 2742329 B3	17 October 1997
		IT PN950049 V0	19 December 1995
		ES 1035691 Y	16 November 1997
		GB 9625180 D0	22 January 1997
		FR 2742329 A3	20 June 1997
		IT PN950049 U1	19 June 1997
		GB 2308431 A	25 June 1997
		DE 29621351 U1	06 February 1997
		ES 1035691 U	16 May 1997
		IT 238875 Y1	15 November 2000
CN 105796033 A	27 July 2016	None	
CN 104605804 A	13 May 2015	None	
CN 106491063 A	15 March 2017	None	
CN 108209831 A	29 June 2018	None	
CN 108078528 A	29 May 2018	None	
CN 205083420 U	16 March 2016	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201810044410 **[0001]**
- CN 201820080895 **[0001]**
- CN 201810044426 **[0001]**
- CN 201820080936 **[0001]**