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(54) DISH-WASHING MACHINE

(57) A dish-washing machine (100), comprising: a body (1) having an accommodation cavity (11) therein, a wall of the accommodation cavity (11) defining an air inlet (111) and an air outlet (112) thereon; a heat exchanger (2) having a hot-air inlet (21), a hot-air outlet (22), a cooling air inlet (23) and a cooling air outlet (24), the hot-ai r inlet (21) being in communication with the air outlet (112), the cooling air inlet (23) being in communication with external environment, and at least one of the hot-air outlet (22) and the cooling air outlet (24) being in communication with the external environment; a first fan (3); a heater (4), an inlet (43) of the heater (4) being in communication with at least one of the hot-air outlet (22) and the cooling air outlet (24), and an outlet (44) of the heater (4) being in communication with the air inlet (111); and a second fan (5) located between the air outlet (112) and the hot-air inlet (21) or between the hot-air outlet (22) and the air inlet (111).

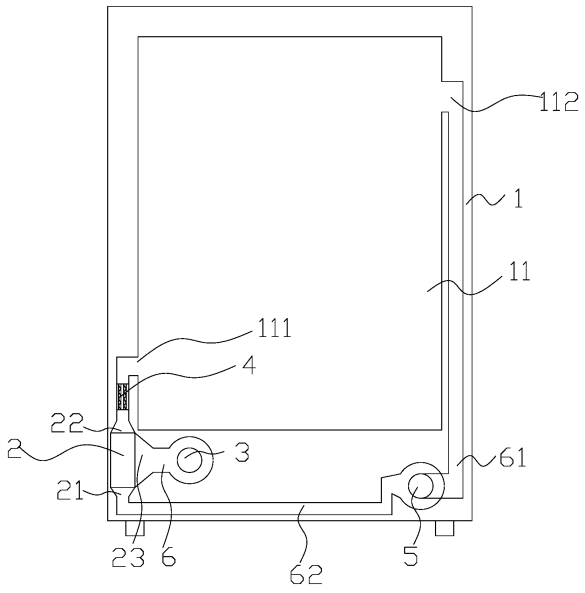


Fig. 1

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Description

FIELD

[0001] The present disclosure relates to a field of household appliances, and more particularly to a dishwasher.

BACKGROUND

[0002] For a dishwasher of the related art, an accommodating cavity of a body is heated up during a drying process, and tableware in the accommodating cavity is dried by the heat in the accommodating cavity. However, the heat in the accommodating cavity may be lost through a wall of the accommodati ng cavity.

SUMMARY

[0003] Embodiments of the present disclosure seek to solve at least one of the problems existing in the related art to at least some extent. Accordingly, the present disclosure provides a dishwasher having advantages of high heating efficiency and low energy consumption.

[0004] The dishwasher according to embodiments of the present disclosure includes: a body defining an accommodating cavity, a wall of the accommodating cavity defining an air inlet and an air outlet; a heat exchanger having a hot air inlet, a hot air outlet, a cooling air inlet and a cooling air outlet, the hot air inlet being in communication with the air outlet, the cooling air inlet being in communication with external environment, and at least one of the hot air outlet and the cooling air outlet being in communication with the external environment; a first fan configured to convey cooling air to the heat exchanger; a heater having an inlet and an outlet, the inlet of the heater being in communication with at least one of the hot air outlet and the cooling air outlet, and the outlet of the heater being in communication with the air inlet; and a second fan configured to convey hot air in the accommodation cavity to the heat exchanger, and located between the air outlet and the hot air inlet or between the hot air outlet and the air inlet.

[0005] The dishwasher according to embodiments of the present disclosure has advantages of high heating efficiency and low energy consumption.

[0006] In addition, the dishwasher according to the above embodiments of the present disclosure can have the following technical features.

[0007] According to some embodiment of the present disclosure, the hot air outlet is in communication with the inlet of the heater, and the cooling air outlet is in communication with the external environment.

[0008] According to some embodiment of the present disclosure, an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage.

[0009] According to some embodiment of the present disclosure, the hot air outlet is in communication with the external environment, and the cooling air outlet is in communication with the inlet of the heater.

[0010] According to some embodiment of the present disclosure, an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; the cooling air outlet is in communication with the inlet of the heater through a third passage; the hot air outlet is in communication with the external envi ronment through a fourth passage; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage.

[0011] According to some embodiment of the present disclosure, the hot air outlet is in communication with each of the inlet of the heater and the external environment, and the cooling ai r outlet is in communication with each of the inlet of the heater and the external environment.

[0012] According to some embodiment of the present disclosure, an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage; the dishwasher further includes a fifth passage, a sixth passage, a seventh passage and an eighth passage; a first end of the fifth passage is connected with the hot air outlet, and a second end of the fifth passage is in communication with the external environment; a first end of the eighth passage is connected with the fifth passage, and a second end of the eighth passage is connected with the inlet of the heater; a first end of the sixth passage is connected with the cooling air outlet, and a second end of the sixth passage is in communication with the external environment; and a first end of the seventh passage is connected with the sixth passage, and a second end of the seventh passage is connected with the inlet of the heater.

[0013] According to some embodiment of the present disclosure, the heater includes a tube and a heating element provided in the tube; the tube has an inlet and an outlet, the inlet of the tube is in communi cati on with at least one of the hot air outlet and the cooling air outlet, and the outlet of the tube is in communication with the air inlet.

[0014] According to some embodiment of the present disclosure, the air inlet is connected with the outlet of the heater through a ninth passage.

[0015] According to some embodiment of the present disclosure, the air inlet is defined in a peripheral wall of the accommodating cavity and adjacent to a bottom wall

of the accommodating cavity, and the air outlet is defined in the peripheral wall of the accommodating cavity and adjacent to a top wall of the accommodati ng cavity.

[0016] Additional aspects and advantages of embodiments of present disclosure will be given in part in the following descriptions, become apparent in part from the following descriptions, or be learned from the practice of the embodiments of the present disclosure.

BRIEF DESCRIPTION OFTHE DRAWINGS

[0017] These and other aspects and advantages of embodiments of the present disclosure will become apparent and more readily appreciated from the following descriptions made with reference to the drawings, in which:

Fig. 1 is a schematic view of a dishwasher according to an embodiment of the present disclosure.
Fig. 2 is a schematic view of a dishwasher according to another embodiment of the present disclosure.
Fig. 3 is a schematic view of a dishwasher according to still another embodiment of the present disclosure.
Fig. 4 is a schematic view of a heater of a dishwasher according to embodiments of the present disclosure.

Reference numerals:

[0018]

dishwasher 100,
body 1, accommodati ng cavity 11, air inlet 111, air outlet 112,
heat exchanger 2, hot air inlet 21, hot air outlet 22, cooling air inlet 23, cooling air outlet 24,
first fan 3,
heater 4, tube 41, heating element 42, inlet 43 of heater, outlet 44 of heater,
second fan 5,
air inlet pipe 6, first passage 61, second passage 62, third passage 63, fourth passage 64, fifth passage 65, sixth passage 66, seventh passage 67, eighth passage 68, ninth passage 69.

DETAILED DESCRIPTION

[0019] Embodiments of the present disclosure will be described in detail in the following, and examples of the embodiments will be shown in drawings. The embodiments described herein with reference to drawings are explanatory, and used to interpret the present disclosure. The embodiments shall not be construed to limit the present disclosure.

[0020] A dishwasher 100 according to embodiments of the present disclosure will be described with reference to Figs. 1 to 4. As shown in Figs. 1 to 4, the dishwasher 100 according to embodiments of the present disclosure includes a body 1, a heat exchanger 2, a first fan 3 configured to convey cooling air to the heat exchanger 2, a heater 4, and a second fan 5 configured to convey hot air in an accommodation cavity 11 to the heat exchanger 2.

[0021] The body 1 defines the accommodating cavity 11 therein, and a wall of the accommodating cavity 11 defines an air inlet 111 and an air outlet 112. The heat exchanger 2 has a hot air inlet 21, a hot air outlet 22, a cooling air inlet 23 and a cooling air outlet 24. The hot air inlet 21 is in communication with the air outlet 112, the cooling air inlet 23 is in communication with external environment, and at least one of the hot air outlet 22 and the cooling air outlet 24 is in communication with the external environment.

[0022] An inlet 43 of the heater 4 is in communication with at least one of the hot air outlet 22 and the cooling air outlet 24, and an outlet 44 of the heater 4 is in communication with the air inlet 111. The first fan 3 can be configured to convey the cooling air to the heat exchanger 2, and the second fan 5 is configured to convey the hot air in the accommodation cavity 11 to the heat exchanger 2. The second fan 5 can be located between the air outlet 112 and the hot air inlet 21, or between the hot air outlet 22 and the air inlet 111.

[0023] A present dishwasher heats up an accommodating cavity of a body during a drying process, and tableware in the accommodating cavity is dried by the heat in the accommodating cavity. However, the heat in the accommodating cavity may be lost through a wall of the accommodating cavity, such that only part of the heat is transferred to the tableware in the accommodating cavity. Moreover, when a fan is started to reduce humidity in the accommodating cavity, the temperature of the accommodating cavity will be lowered, and the heat in the accommodating cavity will flow out of the accommodating cavity along with an airstream produced by the fan. Thus, the present dishwasher has defects of low heating efficiency and high energy consumption.

[0024] Since the air outlet 112 of the accommodating cavity 11 is in communication with the hot air inlet 21 of the heat exchanger 2, the hot air in the accommodating cavity 11 enters the heat exchanger 2 through the air outlet 112 and the hot air inlet 21 sequentially when the second fan 5 is started. The first fan 3 conveys cooling air from the external environment to the heat exchanger 2 through the cooling air inlet 23 of the heat exchanger 2. The cooling air from the external environment conducts heat exchange, in the heat exchanger 2, with the hot air from the accommodating cavity 11, such that the hot air from the accommodating cavity 11 is condensed to lower humidity of the hot air from the accommodati ng cavity 11, thereby taking away moisture on the tableware.

[0025] Meanwhile, the cooling air from the external environment is heated by the hot air form the accommodati ng cavity 11. T hat is, part of the heat of the hot air from the accommodati ng cavity 11 is transferred to the cooling air from the external environment. In other words, the part of heat leaving the accommodating cavity 11 along

with the hot air remains in the cooling air, and the rest heat remai ns in the hot ai r.

[0026] Since the inlet 43 of the heater 4 is in communi cati on with the at least one of the hot air outlet 22 and the cooling air outlet 24, the part of heat leaving the accommodating cavity 11 enters the heater 4 and hence returns to the accommodating cavity 11. That is, the part of heat leaving the accommodating cavity 11 is not lost but returns to the accommodating cavity 11. The heater 4 heats up the air entering the heater 4, and the heated air enters the accommodating cavity 11 to dry the tableware in the accommodating cavity 11.

[0027] By utilizing the hot air to dry the tableware in the accommodating cavity 11, the dishwasher 100 according to embodiments of the present disclosure may reduce the quantity of heat lost through the wall of the accommodating cavity 11 considerably, such that more heat is conveyed to the tableware in the accommodating cavity 11, thereby improving heating efficiency and drying speed of the dishwasher 100, and loweri ng energy consumption of the dishwasher 100.

[0028] In addition, for the dishwasher 100 according to embodiments of the present disclosure, by communicating the inlet of the heater 4 with the at least one of the hot air outlet 22 and the cooling air outlet 24, the part of heat leaving the accommodating cavity 11 can return to the accommodating cavity 11 again, and hence it is possible to prevent the heat in the accommodating cavity 11 from getti ng lost along with the ai rstream produced by the fan, so as to reduce the energy consumption of the dishwasher 100.

[0029] Therefore, the dishwasher 100 according to embodiments of the present disclosure has advantages of high heating efficiency, high drying speed and low energy consumption.

[0030] As shown in Figs. 1 to 4, the dishwasher 100 according to some embodiments of the present disclosure includes the body 1, the heat exchanger 2, the fi rst fan 3, the heater 4 and the second fan 5.

[0031] As shown in Fig. 1, the body 1 defines the accommodating cavity 11 therein, and the tableware can be stored in the accommodating cavity 11. The air inlet 111 and the air outlet 112 are defi ned in the wall of the accommodati ng cavity 11.

[0032] Advantageously, the air inlet 111 is located below the air outlet 112. Since the hot air flows from the bottom up, the air inlet 111 is provided below the air outlet 112, thereby facilitating flow of the hot air into the accommodati ng cavity 11.

[0033] According to some embodiments of the present disclosure, as shown in Fig. 1, the wall of the accommodating cavity 11 is provided with the air inlet 111 and the air outlet 112. For example, the air inlet 111 can be defined in a peri pheral wall of the accommodati ng cavity 11 and adjacent to a bottom wall of the accommodating cavity 11; the air outlet 112 can be defined in the peripheral wall of the accommodating cavity 11 and adjacent to a top wall of the accommodating cavity 11, so as to facilitate flow of the hot ai r into the accommodati ng cavity 11. The peri pheral wall of the accommodating cavity 11 includes a front wall, a rear wall, a left wall and a right wall of the accommodati ng cavity 11.

[0034] In a specific example of the present disclosure, the heat exchanger 2 can internally define a first cavity in communication with the hot air inlet 21 and the hot air outlet 22, and a second cavity in communication with the cooling air inlet 23 and the cooling air outlet 24, the first cavity being separated from the second cavity. The cooling air from the external environment and the hot air from the accommodating cavity 11 can conduct heat exchange in the heat exchanger 2 through a wall partitioning the first cavity from the second cavity.

[0035] As shown in Fig. 1, in an embodiment of the present disclosure, the hot air inlet 21 is in communication with the air inlet 111, the hot air outlet 22 is in communication with the inlet 43 of the heater 4, and the cooling air inlet 23 and the cooling air outlet 24 are both in communication with the external environment. In such a case, the accommodating cavity 11, the second fan 5, the heat exchanger 2 and the heater 4 constitute a closed loop, such that the hot air is kept within the closed loop to minimize the heat loss. The first fan 3 and the heat exchanger 2 constitute an open loop.

[0036] After the cooling air from the external environment conducts heat exchange with the hot air from the accommodating cavity 11 in the heat exchanger 2, the cooling air from the external environment returns to the external environment through the cooling air outlet 24, while the hot ai r from the accommodating cavity 11 enters the heater 4 through the hot air outlet 22. The hot air from the accommodating cavity 11 is heated by the heater 4 and then returns to the accommodating cavity 11. That is, the heat of the hot air from the accommodating cavity 11 returns to the accommodati ng cavity 11.

[0037] Specifically, an air inlet of the first fan 3 can be in communication with the external environment, and an air outlet of the first fan 3 can be connected with the cooling air inlet 23; the air inlet of the first fan 3 can also be connected with the cooling air outlet 24, and the air outlet of the first fan 3 can be in communication with the external environment. An air inlet of the second fan 5 can be connected with the air outlet 112, and an air outlet of the second fan 5 can be connected with the hot air inlet 21; the air inlet of the second fan 5 can also be connected with the hot air outlet 22, and the air outlet of the second fan 5 can be connected with the inlet 43 of the heater 4; the air inlet of the second fan 5 can further be connected with the outlet 44 of the heater 4, and the ai r outlet of the second fan 5 can be connected with the air inlet 111.

[0038] As shown in Fig. 1, in a specific example of the present disclosure, the air inlet of the first fan 3 is in communication with the external environment, and the air outlet of the first fan 3 is connected with the cooling air inlet 23 through an air inlet pipe 6. Under the action of the first fan 3, the cooling air from the external environment enters the heat exchanger 2 through the air inlet pi pe 6 and the

cool i ng air inlet 23.

[0039] The air inlet of the second fan 5 is connected with the air outlet 112 through a first passage 61, and the air outlet of the second fan 5 is connected with the hot air inlet 21 through a second passage 62. In other words, a first end of the first passage 61 is connected with the air inlet of the second fan 5, a second end of the first passage 61 is connected with the air outlet 112, a first end of the second passage 62 is connected with the air outlet of the second fan 5, and a second end of the second passage 62 is connected with the hot air inlet 21.

[0040] As shown in Fig. 2, in a second embodiment of the present disclosure, the hot air inlet 21 is in communication with the air inlet 111, the hot air outlet 22 is in communication with the external environment, the cooling air inlet 23 is in communication with the external environment, and the cooling air outlet 24 is in communication with the inlet 43 of the heater 4. Thus, the dishwasher 100 forms a semi-closed loop.

[0041] After the cooling air from the external environment conducts heat exchange with the hot air from the accommodati ng cavity 11 in the heat exchanger 2, the hot air from the accommodati ng cavity 11 enters the external environment through the hot air outlet 22, while the cooling air from the external environment enters the heater 4 through the cooling air outlet 24. The cooling air from the external environment is heated by the heater 4 and then enters the accommodating cavity 11. That is, the heat stored in the cooling air from the external environment returns to the accommodati ng cavity 11.

[0042] Specifically, the air inlet of the first fan 3 can be in communication with the external environment, and the air outlet of the first fan 3 can be connected with the cooling air inlet 23; the air inlet of the first fan 3 can also be connected with the cooling air outlet 24, and the air outlet of the first fan 3 can be connected with the inlet 43 of the heater 4. The air inlet of the second fan 5 can be connected with the air outlet 112, and the air outlet of the second fan 5 can be connected with the hot air inlet 21; the air inlet of the second fan 5 can also be connected with the hot air outlet 22, and the air outlet of the second fan 5 can be in communication with the external environment.

[0043] As shown in Fig. 2, in an example of the present disclosure, the air inlet of the first fan 3 is in communication with the external environment, and the air outlet of the first fan 3 is connected with the cooling air inlet 23 through the air inlet pipe 6. Under the action of the first fan 3, the cooling air from the external environment enters the heat exchanger 2 through the air inlet pipe 6 and the cooling air inlet 23. The cooling air outlet 24 is in communication with the inlet 43 of the heater 4 through a third passage 63. That is, a first end of the third passage 63 is connected with the cooling air outlet 24, and a second end of the third passage 63 is connected with the inlet 43 of the heater 4. The hot air outlet is in communication with the external environment through a fourth passage 64. That is, a first end of the fourth passage 64 is connected with the hot air outlet 22, and a second of the fourth passage 64 is in communication with the external environment.

[0044] The air inlet of the second fan 5 is connected with the air outlet 112 through the first passage 61, and the air outlet of the second fan 5 is connected with the hot air inlet 21 through the second passage 62. In other words, the fi rst end of the fi rst passage 61 is connected with the air inlet of the second fan 5, the second end of the first passage 61 is connected with the air outlet 112, the first end of the second passage 62 is connected with the air outlet of the second fan 5, and the second end of the second passage 62 is connected with the hot air inlet 21.

[0045] As shown in Fig. 3, in a third embodiment of the present disclosure, the hot air inlet 21 is in communication with the air inlet 111, the hot air outlet 22 is in communication with each of the inlet of the heater 4 and the external environment, the cooling air inlet 23 is in communication with the external environment, and the cooling air outlet 24 is in communication with each of the inlet 43 of the heater 4 and the external environment. In other words, the hot air outlet 22 and the cooling air outlet 24 both can be in communication with the inlet of the heater 4 and the external environment simultaneously. In such a case, the dishwasher 100 forms a semi-closed loop.

[0046] After the cooling air from the external environment conducts heat exchange with the hot air from the accommodating cavity 11 in the heat exchanger 2, part of the hot air from the accommodati ng cavity 11 enters the external environment while rest of the hot air enters the heater 4, and part of the cooling air from the external environment enters the external environment while rest of the cool i ng ai r enters the heater 4.

[0047] Specifically, the air inlet of the first fan 3 can be in communication with the external environment, and the air outlet of the first fan 3 can be connected with the cooling air inlet 23; the air inlet of the first fan 3 can also be connected with the cooling air outlet 24, and the air outlet of the first fan 3 can be communication with the inlet 43 of the heater and the external environment. The air inlet of the second fan 5 can be connected with the air outlet 112, and the air outlet of the second fan 5 can be connected with the hot air inlet 21; the air inlet of the second fan 5 can also be connected with the hot air outlet 22, and the air outlet of the second fan 5 can be in communication with the air inlet of the heater 4 and the external environment.

[0048] As shown in Fig. 4, the air inlet of the first fan 3 is in communication with the external environment, and the air outlet of the first fan 3 is connected with the cooling air inlet 23 through the air inlet pipe 6. Under the action of the first fan 3, the cooling air from the external environment enters the heat exchanger 2 through the air inlet pipe 6 and the cooling air inlet 23. The air inlet of the second fan 5 is connected with the air outlet 112 through the first passage 61, and the air outlet of the second fan 5 is connected with the hot air inlet 21 through the second

passage 62.

[0049] The dishwasher 100 further includes a fifth passage 65, a sixth passage 66, a seventh passage 67 and an eighth passage 68. A first end of the fifth passage 65 is connected with the hot air outlet 22, and a second end of the fifth passage 65 is in communication with the external environment. A first end of the eighth passage 68 is connected with the fifth passage 65, and a second end of the eighth passage 68 is connected with the inlet 43 of the heater 4. A first end of the sixth passage 66 is connected with the cooling air outlet 24, and a second end of the sixth passage 66 is in communication with the external environment. A first end of the seventh passage 67 is connected with the sixth passage 66, and a second end of the seventh passage 67 is connected with the inlet 43 of the heater.

[0050] As shown in Fig. 5, in some examples of the present disclosure, the heater 4 includes a tube 41 and a heating element 42 provided in the tube 41. The tube 41 has an inlet and an outlet, the inlet of the tube 41 is in communi cati on with at least one of the hot air outlet 22 and the cooling air outlet 24, and the outlet of the inner tube 41 is in communication with the air inlet 111. The air heated by the heater 4 enters the accommodating cavity 11 and is used to dry the tableware in the accommodati ng cavity 11.

[0051] Advantageously, as shown in Fig. 4, the heater 4 includes a plurality of heating elements 42, and the plurality of heating elements 42 are disposed in the tube 41 and spaced apart from each other.

[0052] As shown in Figs. 1 to 3, in a specific example of the present disclosure, the air inlet 111 is connected with the outlet 44 of the heater 4 through a ninth passage 69. In other words, a first end of the ninth passage 69 is connected with the air inlet 111, and a second end of the ninth passage 69 is connected with the outlet 44 of the heater.

[0053] In the specification, it is to be understood that terms such as 'central,_ longitudinal,_ 'transverse,_ '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 invention be constructed or operated in a particular orientation. Terms used herein should not be construed to limit the present disclosure.

[0054] 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 or to imply the number of indicated technical features. Thus, the feature defined with 'first_ and 'second_ may comprise one or more of this feature. In the description of the present invention, the term 'a plurality of_ means two or more than two, unless specified otherwise.

[0055] In the present invention, unless specified or limited otherwise, the terms 'mounted,_ connected,_ 'coupled,_ 'fixed_ and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications of two elements, which can be understood by those skilled in the art according to specific situations.

[0056] In the present invention, unless specified or limited otherwise, a structure in which a first feature is 'on_ or 'below_ a second feature may include an embodiment in which the first feature is in direct contact with the second feature, and may also include an embodiment in which the first feature and the second feature are not in direct contact with each other, but are contacted via an additional feature formed therebetween. Furthermore, a first feature 'on,_ 'above,_ or 'on top of_ a second feature may include an embodiment in which the first feature is right or obliquely 'on,_ 'above,_ or 'on top of_ the second feature, or just means that the first feature is at a height higher than that of the second feature; while a first feature 'below,_ 'under,_ or 'on bottom of_ a second feature may include an embodiment in which the first feature is right or obliquely 'below,_ 'under,_ or 'on bottom of_ the second feature, or just means that the first feature is at a height lower than that of the second feature.

[0057] 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 embodi ment or example of the present disclosure. Thus, the appearances of the phrases such as 'in some embodiments,_ 'in one embodiment_, 'in an embodiment_, 'in another example,_ 'in an example,_ 'in a specific example,_ or 'in some examples,_ 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.

[0058] Although explanatory embodiments have been shown and described, it would be appreciated by those skilled in the art that the above embodiments cannot be construed to limit the present disclosure, and changes, alternatives, and modifications can be made in the embodiments without departi ng from the scope of the present disclosure.

Claims

1. A dishwasher, comprising:

a body defining an accommodating cavity, a wall

of the accommodating cavity defining an air inlet and an air outlet;
a heat exchanger having a hot air inlet, a hot air outlet, a cooling air inlet and a cooling air outlet, the hot air inlet being in communication with the air outlet, the cooling air inlet being in communication with external environment, and at least one of the hot air outlet and the cooling air outlet being in communication with the external environment;
a first fan configured to convey cooling air to the heat exchanger;
a heater having an inlet and an outlet, the inlet of the heater being in communication with at least one of the hot air outlet and the cooling air outlet, and the outlet of the heater being in communication with the air inlet; and
a second fan configured to convey hot air in the accommodation cavity to the heat exchanger, and located between the air outlet and the hot air inlet or between the hot air outlet and the air inlet.

2. The dishwasher according to claim 1, wherein the hot air outlet is in communication with the inlet of the heater, and the cooling air outlet is in communication with the external environment.

3. The dishwasher according to claim 2, wherein an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage.

4. The dishwasher according to claim 1, wherein the hot air outlet is in communication with the external environment, and the cooling air outlet is in communication with the inlet of the heater.

5. The dishwasher according to claim 4, wherein an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; the cooling air outlet is in communication with the inlet of the heater through a third passage; the hot air outlet is in communication with the external environment through a fourth passage; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage.

6. The dishwasher according to claim 1, wherein the hot air outlet is in communication with each of the inlet of the heater and the external environment, and the cooling air outlet is in communication with each of the inlet of the heater and the external environment.

7. The dishwasher according to claim 6, wherein an air inlet of the first fan is in communication with the external environment, and an air outlet of the first fan is connected with the cooling air inlet through an air inlet pipe; an air inlet of the second fan is connected with the air outlet through a first passage, and an air outlet of the second fan is connected with the hot air inlet through a second passage;
wherein the dishwasher further comprises a fifth passage, a sixth passage, a seventh passage and an eighth passage; a first end of the fifth passage is connected with the hot air outlet, and a second end of the fifth passage is in communication with the external environment; a first end of the eighth passage is connected with the fifth passage, and a second end of the eighth passage is connected with the inlet of the heater; a first end of the sixth passage is connected with the cooling air outlet, and a second end of the sixth passage is in communication with the external environment; and a first end of the seventh passage is connected with the sixth passage, and a second end of the seventh passage is connected with the inlet of the heater.

8. The dishwasher according to claim 1, wherein the heater comprises a tube and a heating element provided in the tube; the tube has an inlet and an outlet, the inlet of the tube is in communication with at least one of the hot air outlet and the cooling air outlet, and the outlet of the tube is in communication with the air inlet.

9. The dishwasher according to claim 1, wherein the air inlet is connected with the outlet of the heater through a ninth passage.

10. The dishwasher according to claim 1, wherein the air inlet is defined in a peripheral wall of the accommodating cavity and adjacent to a bottom wall of the accommodating cavity, and the air outlet is defined in the peripheral wall of the accommodating cavity and adjacent to a top wall of the accommodating cavity.

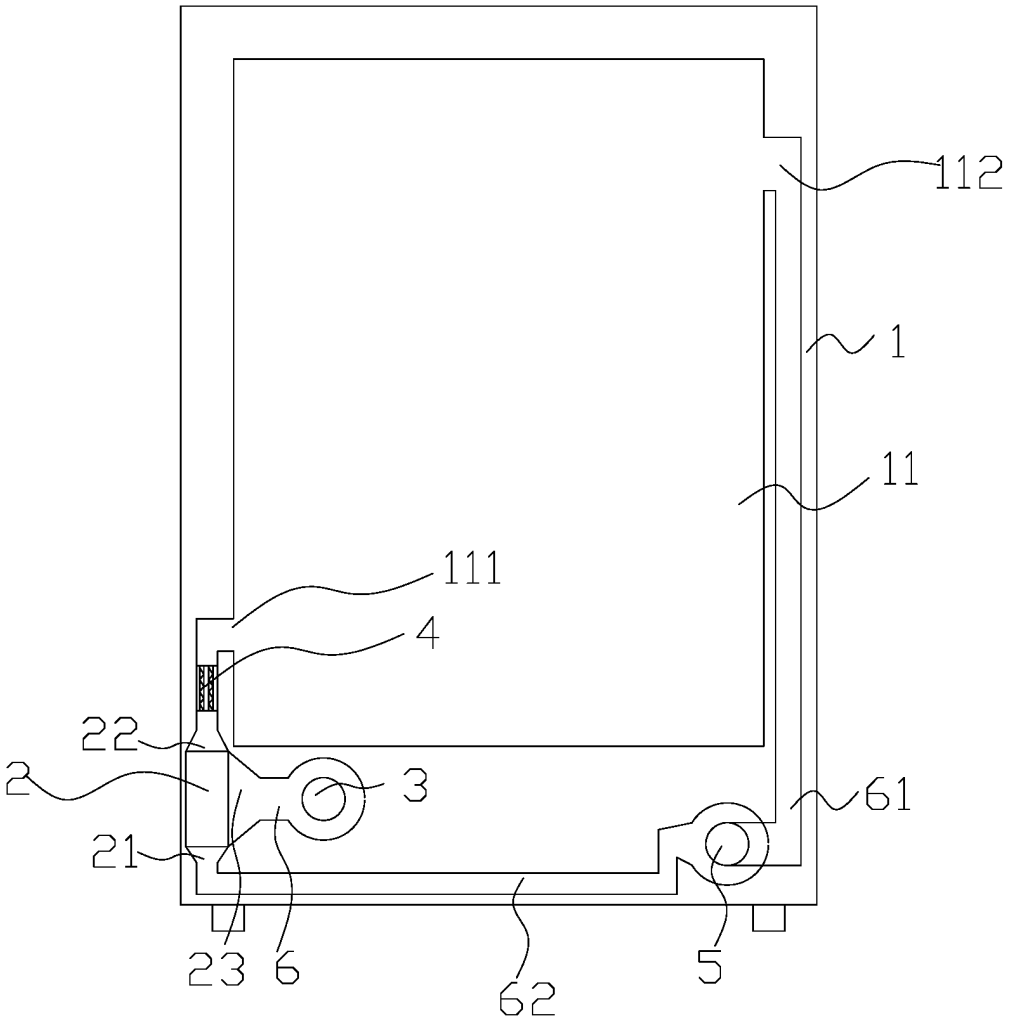


Fig. 1

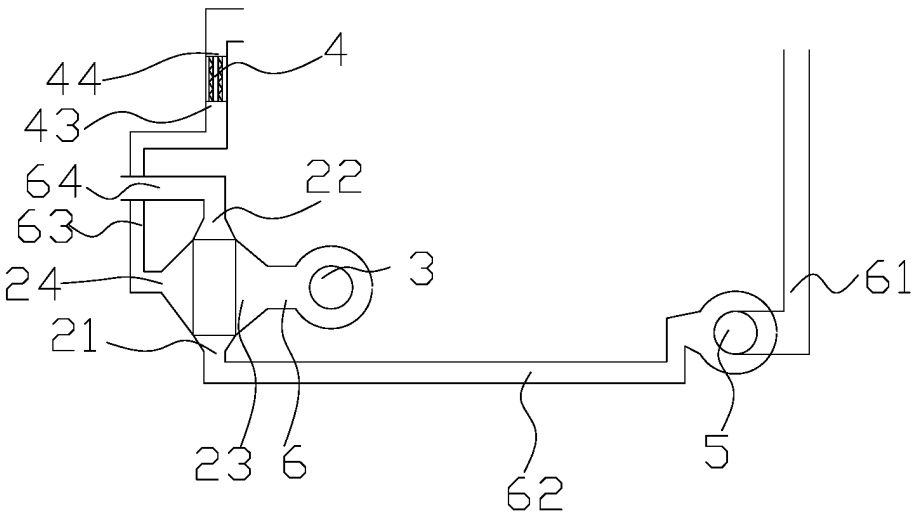


Fig. 2

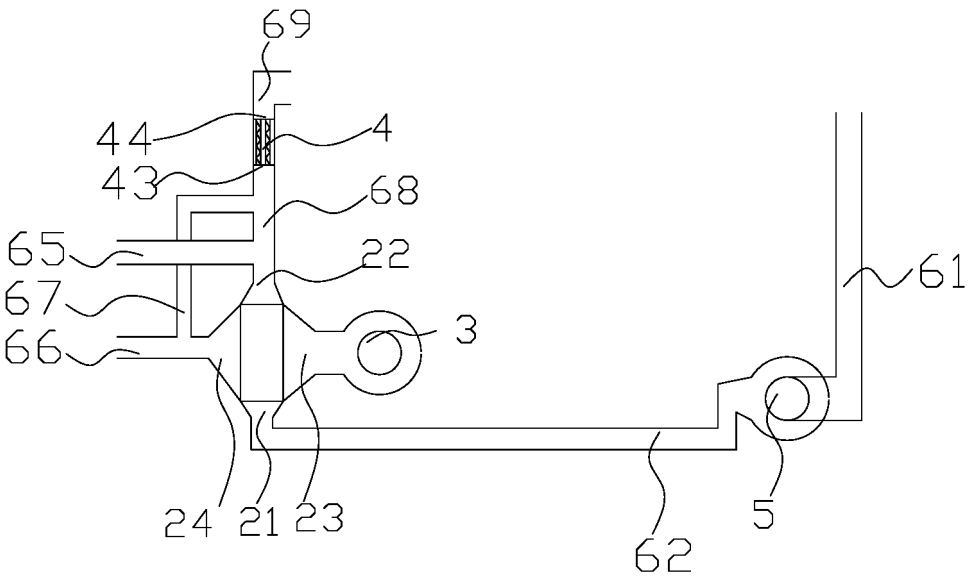


Fig. 3

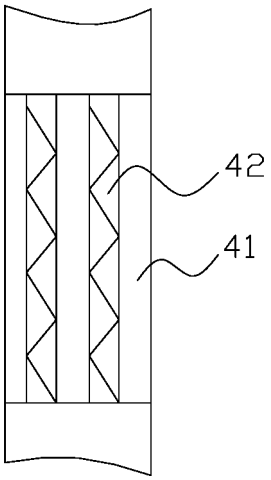


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/072954

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)

A47L 15/-

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

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

CNPAT, CNKI, WPI, EPODOC; heat exchange; cold air, dishwasher, heat+, air, fan?, dry+, cold, condenser, condensation, freezing

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	CN 104739352 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD.), 01 July 2015 (01.07.2015), the claims	1-10
A	CN 1889883 A (BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH), 03 January 2007 (03.01.2007), description, pages 8-11, abstract, and figure 1	1-10
A	CN 1611181 A (LG ELECTRONICS (TIANJIN) APPLIANCES CO., LTD.), 04 May 2005 (04.05.2005), the whole document	1-10
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A	CN 103200855 A (ARCELIK A.S.), 10 July 2013 (10.07.2013), the whole document	1-10
A	US 2014007767 A1 (EICHENAUER HEIZELEMENTE GMBH & CO. KG), 09 January 2014 (09.01.2014), the whole document	1-10

☒ 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	Date of mailing of the international search report
21 October 2015 (21.10.2015)	**29 October 2015 (29.10.2015)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **LUO, Xiaoming** Telephone No.: (86-10) **61648479**

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/072954

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2168470 A1 (BONFERRARO SPA), 31 March 2010 (31.03.2010), the whole document	1-10

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2015/072954

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