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(54) **FAN DEVICE AND DISHWASHER**

(57) A fan device (10) and a dishwasher (100). The dishwasher (100) comprises an inner liner (20), the inner liner (20) being provided with a washing chamber (21). The fan device (10) comprises a cover body (11), a fan (12), a humidity detection device (13) and a controller (14), the cover body (11) being provided with an air channel (111) which connects the washing chamber (21) and the outside, the fan (12) being used to establish an air flow through the air channel (111) so as to ventilate the washing chamber (21), the humidity detection device (13) being mounted on the cover body (11), the humidity detection device (13) comprising a humidity detecting element (131) fixed to a side wall (1131) of the air channel (111), the humidity detecting element (131) comprising a detecting end (132) located inside the air channel (111), the humidity detecting element (131) being used to detect the humidity in the air channel (111) by means of the detecting end (132), the controller (14) being electrically connected to the humidity detecting element (131) and the fan (12), and the controller (14) being used to control the operating state of the fan (12) according to the humidity. The controller (14) controls the fan (12) to operate according to the humidity in the air channel (111) to accelerate the air flow communication between the washing chamber (21) and the outside, so as to effectively reduce the steam content of the washing chamber (21), thereby avoiding the generation of odor, and the return of moisture to the washing chamber (21) of the dishwasher (100).

EP 3 656 273 A1

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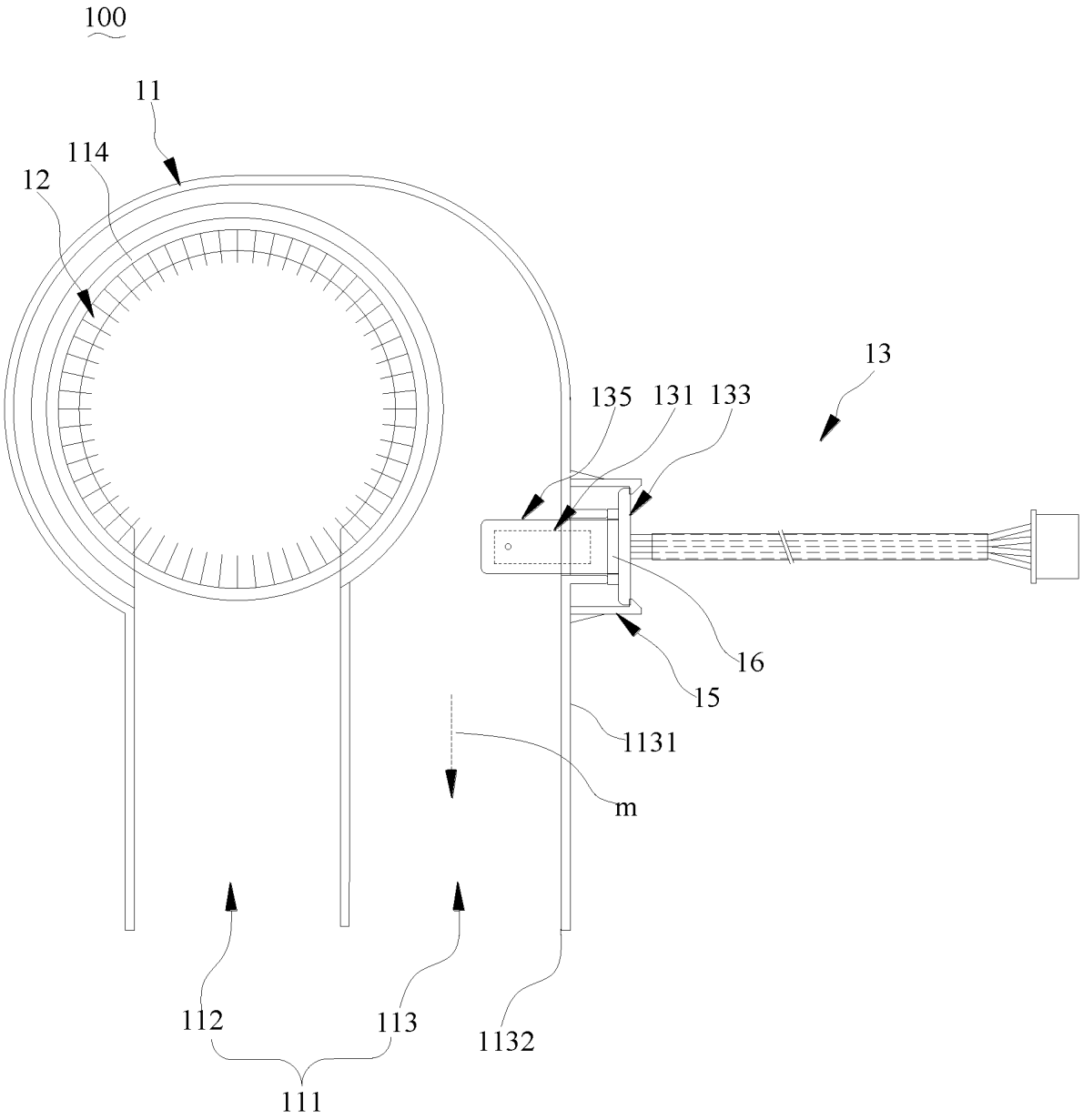


Fig. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority and right of the patent application No. 201720901859.9 filed in the State Intellectual Property Office of China on July 21, 2017, and is hereby incorporated by reference in its entirety.

FIELD

[0002] The present disclosure relates to the technical field of household appliances, in particular to a fan device and a dishwasher.

BACKGROUND

[0003] Dishwashers generally only dry during the drying stage of the washing program. In order to avoid the tableware from being wet due to the subsequent increase in humidity, users need to take out the tableware as soon as possible after the washing program is finished, so as to avoid bacteria breeding problem possibly caused by the wet tableware. When the user cannot take out the tableware in a short time, how to prevent the tableware from being wet becomes a technical problem to be solved.

SUMMARY

[0004] The present disclosure provides a fan device and a dishwasher.

[0005] A fan device according to an embodiment of the present disclosure is used in a dishwasher. The dishwasher includes an inner container defining a washing chamber. The fan device includes a shell, a fan, a humidity detection device and a controller. The shell defines an air duct communicating the washing chamber with the outside. The fan is configured to establish an airflow passing through the air duct to ventilate the washing chamber. The humidity detection device is mounted on the shell. The humidity detection device includes a humidity detection element fixed on the side wall of the air duct. The humidity detection element includes a detection end positioned in the air duct. The humidity detection element is used for detecting a humidity in the air duct through the detection end. The controller is electrically connected with the humidity detection element and the fan, and is configured to control an operating state of the fan according to the humidity.

[0006] In the above fan device, the humidity detection element can detect the humidity in the air duct, so that the controller can control the operation of the fan according to the humidity in the air duct to speed up the air circulation between the washing chamber and the outside, and further can effectively reduce the content of water vapor in the washing chamber, thereby avoiding the generation of peculiar smell and the re-wetting of the washing chamber of the dishwasher.

[0007] In some embodiments, the air duct comprises an air input duct and an air output duct. The shell defines an accommodating cavity. The fan is positioned in the accommodating cavity, and the accommodating cavity communicates the air input duct with the air output duct.

[0008] In some embodiments, the humidity detection element is fixed on a side wall of the air output duct, and the detection end is located in the air output duct.

[0009] In some embodiments, the detection end is located within the air input duct.

[0010] In some embodiments, the detection end is closer to the outlet of the accommodating cavity than to the outlet of the air output duct.

[0011] In some embodiments, the shell is provided with a first positioning and fixing structure, and the humidity detection device comprises a second positioning and fixing structure. The humidity detection element is fixed to the second positioning and fixing structure, and is disposed through the first positioning and fixing structure so that the detection end is positioned in the air duct. The first positioning and fixing structure and the second positioning and fixing structure are fitted with each other so that the humidity detection element is fixed on the side wall of the air duct.

[0012] In some embodiments, the snap structure includes two snapping members spaced apart from each other, and the two snapping members are respectively snapped with two sides of the fixing plate so that the humidity detection element is fixed on the side wall of the air duct, and the humidity detection element is positioned between the two snapping members.

[0013] In some embodiments, the first positioning and fixing structure includes a fitting end extending outward from the side wall of the air duct. The first positioning and fixing structure defines a fitting groove penetrating through the fitting end and the side wall of the air duct. The humidity detection element is disposed through the fitting groove so that the detection end is positioned in the air duct. A part of the humidity detection element is accommodated in the fitting groove, and the fitting end is positioned between the two snapping members.

[0014] In some embodiments, the humidity detection device comprises a cover. One end of the cover is fixed to the second positioning fixing structure so that the cover covers the humidity detection element, and the other end of the cover is disposed through the first positioning fixing structure to be fixed to the side wall of the air duct. The detection end is accommodated in the other end of the cover, and the other end of the cover defines a plurality of through holes communicated with an inside of the cover.

[0015] In some embodiments, the cover is provided with a flow guiding surface on an upper side thereof, and the flow guiding surface is inclined downwards.

[0016] In some embodiments, the fan device includes an elastic sealing ring compressed and arranged be-

tween the first positioning fixing structure and the second positioning fixing structure.

[0017] In some embodiments, the humidity detection device includes a wire harness and a connector, wherein the wire harness electrically connects the humidity detection element and the connector, and the connector is electrically connected with the controller.

[0018] In some embodiments, the humidity detection element is a humidity sensor.

[0019] In some embodiments, the first positioning and fixing structure includes a snap structure protruding from an outer surface of the side wall of the air duct, the second positioning and fixing structure includes a fixing plate to which the humidity detection element is fixed, and the snap structure is snapped with the fixing plate to fix the humidity detection element on the side wall of the air duct.

[0020] In some embodiments, the snap structure includes two snapping members spaced apart from each other. The two snapping members are respectively snapped with both sides of the fixing plate so that the humidity detection element is fixed on the side wall of the air duct, and the humidity detection element is positioned between the two snapping members.

[0021] In some embodiments, the humidity detection element is detachably fixed to the fixing plate.

[0022] In some embodiments, the first positioning and fixing structure includes a fitting end extending outward from the side wall of the air duct. The first positioning and fixing structure defines a fitting groove penetrating through the fitting end and the side wall of the air duct. The humidity detection element is disposed through the fitting groove so that the detection end is positioned in the air duct, and a part of the humidity detection element is accommodated in the fitting groove. The fitting end is positioned between the two snapping members.

[0023] In some embodiments, the humidity detection device comprises a cover, one end of the cover is fixed to the second positioning fixing structure so that the cover covers the humidity detection element, and the other end of the cover is disposed through the first positioning fixing structure and thus fixed to the side wall of the air duct. The detection end is accommodated in the other end of the cover, and the other end of the cover defines a plurality of through holes communicated with an inside of the cover.

[0024] In some embodiments, the fan device includes an elastic sealing ring compressed and disposed between the first positioning fixing structure and the second positioning fixing structure.

[0025] The dishwasher according to an embodiment of the present disclosure comprises an inner container and a fan device according to any one of the above embodiments. The inner container defines a washing chamber, and the fan device is mounted on a side wall of the inner container. The side wall of the inner container is provided with an air outlet, and the air outlet communicates the washing chamber with the air duct.

[0026] In the dishwasher of the embodiment of the present disclosure, the humidity detection element can detect the humidity in the air duct, so that the controller can control the operation of the fan according to the humidity in the air duct to speed up the air circulation between the washing chamber and the outside, and further can effectively reduce the content of water vapor in the washing chamber, thereby avoiding the generation of peculiar smell and the re-wetting of the washing chamber of the dishwasher.

[0027] Additional aspects and advantages of embodiments of the present disclosure will be set forth in part in the following description, and in part will be apparent from the following description, or may be learned by practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The above and/or additional aspects and advantages of the present disclosure will become apparent and readily understood from the description of the embodiments in conjunction with the following drawings, in which:

Fig. 1 is a schematic structural view of a fan device according to an embodiment of the present disclosure;

Fig. 2 is a schematic block view of a fan device according to an embodiment of the present disclosure;

Fig. 3 is a schematic structural view of a shell and a fan of a fan device according to an embodiment of the present disclosure;

Fig. 4 is a schematic structural view of a side wall of a shell of a fan device according to the embodiment of the present disclosure;

Fig. 5 is a schematic structural view of a humidity detection device of a fan device according to an embodiment of the present disclosure;

Fig. 6 is another schematic structural view of a humidity detection device of a fan device according to an embodiment of the present disclosure;

Fig. 7 is another schematic structural view of a humidity detection device of a fan device according to an embodiment of the present disclosure;

Fig. 8 is a perspective view of a dishwasher according to an embodiment of the present disclosure.

Reference numerals:

[0029] Dishwasher 100;
Fan device 10, shell 11, air duct 111, air input duct 112, air output duct 113, side wall 1131, outlet 1132, accommodating cavity 114, fan 12, humidity detection device 13, humidity detection element 131, detection end 132, second positioning fixing structure 133, fixing plate 134, cover 135, through hole 1351, flow guiding surface 1352, wire harness 136, connector 137, controller 14, first positioning fixing structure 15, snap structure 151, clamp 152, fitting end 153, fitting groove 154, sealing ring 16;

inner container 20, washing chamber 21, side wall 22 and air outlet 23.

DETAILED DESCRIPTION

[0030] Hereinafter, embodiments of the present disclosure will be described in detail, examples of which are illustrated in the accompanying drawings, wherein the same or similar reference numerals refer to the same or similar elements or elements having the same or similar functions throughout. The embodiments described below with reference to the accompanying drawings are exemplary and are only for the purpose of explaining the present disclosure and should not be construed as limiting the present disclosure.

[0031] In the description of the present disclosure, it should be understood that the terms "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise", "counterclockwise" and the like indicate the orientational or positional relationship based on the orientational or positional relationship shown in the drawings. It is only for the convenience of describing the present disclosure and simplifying the description, and is not intended to indicate or imply that the indicated devices or elements must have a specific orientation, be constructed and operate in a specific orientation, and thus cannot be understood as a limitation of the present disclosure. Furthermore, the terms "first" and "second" are used for descriptive purposes only and cannot be understood as indicating or implying relative importance or implicitly indicating the number of technical features indicated. Thus, features defined by "first" and "second" may explicitly or implicitly include one or more of the features. In the description of the present disclosure, the meaning of "plurality" is two or more, unless otherwise specifically defined.

[0032] In the description of the present disclosure, it should be noted that the terms "mounted", "connected" and "coupled" should be understood in a broad sense unless otherwise specified and defined, for example, they may be fixed connection, removable connection or integral connection. It can be a mechanical connection or an electrical connection. It can be directly connected, can also be indirectly connected through an intermediate medium. It can be the internal communication of two elements or the interaction relationship of two elements. For those of ordinary skill in the art, the specific meanings of the above terms in the present disclosure can be understood according to specific situations.

[0033] Referring to Figs. 1 to 7, a fan device 10 according to an embodiment of the present disclosure is used in a dishwasher 100. The dishwasher 100 includes an inner container 20. The inner container 20 defines a washing chamber 21. The fan device 10 comprises a shell 11, a fan 12, a humidity detection device 13 and a controller 14.

[0034] The shell 11 defines an air duct 111 communicating the washing chamber 21 with the outside. The fan 12 is configured to establish air flow through the air duct 111 to ventilate the washing chamber 21. The humidity detection device 13 is mounted on the shell 11. The humidity detection device 13 includes a humidity detection element 131 fixed on the side wall of the air duct 111. The humidity detection element 131 includes a detection end 132 located in the air duct 111. The humidity detection element 131 is configured to detect humidity in the air duct 111 through the detection end 132. The controller 14 is electrically connected to the humidity detection element 131 and the fan 12. The controller 14 is configured to control the operating state of the fan 12 according to the humidity.

[0035] In the fan device 10 described above, the humidity detection element 131 can detect the humidity in the air duct 111, so that the controller 14 can control the operation of the fan 12 according to the humidity in the air duct 111 to speed up the air circulation between the washing chamber 21 and the outside, so as to effectively reduce the content of water vapor in the washing chamber 21, thereby avoiding the generation of peculiar smell and the re-wetting of the washing chamber 21 of the dishwasher 100.

[0036] It should be noted that the controller 14 can be configured to control the humidity detection element 131 to detect humidity after the washing of the dishwasher 100 is finished, and to control the operating state of the fan 12 after the washing of the dishwasher 100 is finished according to the humidity. That is, the dishwasher 100 with the fan device 10 can control the operation of the fan 12 according to the humidity detected by the humidity detection element 131, so as to circulate air between the washing chamber 21 and the outside, thereby reducing the content of the water vapor of the washing chamber 21. The completion of washing of the dishwasher 100 means that the dishwasher 100 has finished the washing program. The washing program generally includes several programs such as pre-washing, main washing, rinsing and drying and the like. The completion of washing of the dishwasher 100 generally means that the drying program has finished. In addition, the humidity in the air duct 111 can be regarded as the humidity in the washing chamber 21.

[0037] For example, in some examples, after the washing of the dishwasher 100 is finished, the controller 14 controls the humidity detection element 131 to detect humidity, and according to the humidity, controls the fan 12 to operate for a second predetermined time after stopping for a first predetermined time after the washing of the dishwasher 100 is finished. The humidity is inversely related to the first predetermined time, and the humidity is positively related to the second predetermined time. It can be understood that when the humidity is relatively low, it means that the water vapor in the dishwasher 100 is not easy to condense into water droplets, so the fan 12 can be controlled to stop for a long time (i.e., the first predetermined time is relatively long) and run for a short

time (i.e., the second predetermined time is relatively short). When the humidity is relatively high, it means that the water vapor in the dishwasher 100 is easy to condense into water droplets, so the fan 12 can be controlled to stop for a short time (i.e., the first predetermined time is relatively short) and run for a long time (i.e., the second predetermined time is relatively long), thereby removing the water vapor in the dishwasher 100 and further preventing the water vapor from condensing into water droplets.

[0038] In some embodiments, the air duct 111 includes an air input duct 112 and an air output duct 113. The shell 11 defines an accommodating cavity 114. The fan 12 is located in accommodating cavity 114. The accommodating cavity 114 communicates the air input duct 112 with the air output duct 113.

[0039] Thus, when the controller 14 controls the fan 12 to rotate, hot wet air or wet air flow in the washing chamber 21 passes through the air input duct 112 and then enters the air output duct 113 through the accommodating chamber 114, thus facilitating the operation of the fan 12.

[0040] It will be understood that the controller 14 can drive the fan 12 to rotate through a drive mechanism (not shown).

[0041] In some embodiments, the humidity detection element 131 is fixed on the side wall 1131 of the air output duct 113. The detection end 132 is located in the air output duct 113.

[0042] In this way, the humidity detected by the humidity detection element 131 through the detection end 132 is close to the humidity in the washing chamber 21 and can be regarded as the humidity in the washing chamber 21, thus improving the accuracy of the controller 14 in controlling the operation of the fan 12 according to the humidity. In addition, since the air output duct 113 is more outward than the air input duct 112, installation of the humidity detection device 13 is facilitated.

[0043] Of course, it is understood that the detection end 132 may also be located in the air input duct 112.

[0044] In the example shown in Fig. 1, the air flow direction m in the air output duct 113 is downward (may be vertically downward). The detection end 132 is disposed substantially perpendicular to the air flow direction m. In this way, the downward flowing wet air can flow down under the action of gravity in the air output duct 113, so that the water entrained by the wet air is not easy to remain on the detection end 132, thereby effectively preventing the water from remaining on the detection end 132 and affecting the detection accuracy of the humidity detection element 131.

[0045] In some embodiments, the detection end 132 is closer to the outlet of the receiving chamber 114 than to the outlet 1132 of the air output duct 113.

[0046] In this way, the detection accuracy of the detection end 132 can be improved.

[0047] In some embodiments, the shell 11 is provided with a first positioning fixing structure 15. The humidity detection device 13 includes a second positioning fixing structure 133. The humidity detection element 131 is fixed on the second positioning fixing structure 133. The humidity detection element 131 passes through the first positioning and fixing structure 15 so that the detection end 132 is located in the air duct 111. The first positioning fixing structure 15 and the second positioning fixing structure 133 cooperate to fix the humidity detection element 131 on the side wall of the air duct 111.

[0048] In this way, the first positioning and fixing structure 15 and the second positioning and fixing structure 133 can be cooperated and fixed in such a way that the humidity detection element 131 is stably fixed on the side wall of the air duct 111, thus ensuring that the detection end 132 will not move due to the impact of the air flow in the air duct 111.

[0049] It should be noted that the depth at which the detection end 132 extends into the air duct 111 can be set according to specific circumstances.

[0050] In some embodiments, the first positioning and fixing structure 15 includes a snap structure 151 protruding on the outer surface of the side wall of the air duct 111. The second positioning fixing structure 133 includes a fixing plate 134. The humidity detection element 131 is fixed on the fixing plate 134. The snap structure 151 is snapped with the fixing plate 134 so that the humidity detection element 131 is fixed on the side wall of the air duct 111.

[0051] In this way, the snap structure 151 is snapped with the fixing plate 134 in a manner that facilitates the mounting and dismounting of the humidity detection device 13. For example, when the sensitivity of the humidity detection element 131 decreases and thus the humidity detection element 131 needs to be replaced, the snap structure 151 can be directly separated from the fixing plate 134 to detach the humidity detection element 131 with decreased sensitivity, and a new humidity detection element 131 can be mounted on the side wall of the air duct 111 by clamping the fixing plate 134 using the snap structure 151, thereby completing the replacement of the humidity detection element 131.

[0052] It is to be understood that the humidity detection element 131 may also be detachably fixed to the fixing plate 134.

[0053] In some embodiments, the snap structure 151 includes two snapping members 152 spaced apart from each other. The two snapping members 152 are respectively snapped with both sides of the fixing plate 134 so that the humidity detection element 131 is fixed on the side wall of the air duct 111. The humidity detection element 131 is located between the two snapping members 152.

[0054] In this way, the two snapping members 152 clamp in a manner that the snapping members 152 can further improve the stability of the humidity detection element 131 fixed on the side wall of the air duct 111.

[0055] In some embodiments, the first positioning and fixing structure 15 includes a fitting end 153 extending

outward from the side wall of the air duct 111. The first positioning and fixing structure 15 defines a fitting groove 154 penetrating through the fitting end 153 and the side wall of the air duct 111. The humidity detection element 131 is disposed through the fitting groove 154 so that the detection end 132 is positioned in the air duct 111. Part of the humidity detection element 131 is accommodated in the fitting groove 154. The fitting end 153 is located between the two snapping members 152.

[0056] Thus, under the guidance of the fitting groove 154, the humidity detection element 131 can smoothly pass through the fitting groove 154 so that the detection end 132 is located in the air duct 111. In addition, the arrangement of the fitting end 153 can also improve the stability of the humidity detection element 131 fixed on the side wall of the air duct 111.

[0057] In some embodiments, the humidity detection device 13 includes a cover 135. One end of the cover 135 is fixed on the second positioning fixing structure 133 so that the cover 135 covers the humidity detection element 131. The other end of the cover 135 is disposed through the first positioning and fixing structure 15 and is fixed on the side wall of the air duct 111. The detection end 132 is housed in the other end of the cover 135. The other end of the cover 135 defines a plurality of through holes 1351 communicating with the inside of the cover 135.

[0058] In this way, the arrangement of the cover 135 can effectively reduce the influence of wet air and other substances (e.g., ash layer) in the air duct 111 on the humidity detection element 131, thereby ensuring the detection accuracy of the humidity detection element 131. In addition, the cover 135 can realize air inflow and outflow through a plurality of through holes 1351.

[0059] In some embodiments, the cover 135 is provided with a downwardly inclined flow guiding surface 1352 on its upper side.

[0060] Thus, under the action of the flow guiding surface 1352, the water in the wet air can flow obliquely downward along the flow guiding surface 1352, thus effectively reducing the water in the wet air from entering the cover 135.

[0061] Referring to Figs. 1 and 6, in some examples, one end of the cover 135 is fixed on the fixing plate 134 so that the cover 135 covers the humidity detection element 131. The other end of the cover 135 is disposed through the fitting groove 154 and is fixed on the side wall 1131 of the air output duct 113. The flow guiding surface 1352 slopes downward from the side wall 1131 of the air output duct 113 towards the air duct 111. The included angle a between the flow guiding surface 1352 and the horizontal direction n is greater than 0 degrees and less than or equal to 10 degrees. It is understood that the included angle a may be 1 degree, 2 degrees or 3 degrees. The included angle a can be set according to specific conditions.

[0062] In some embodiments, the fan assembly 10 includes an elastic sealing ring 16. The sealing ring 16 is compressed and arranged between the first positioning and fixing structure 15 and the second positioning and fixing structure 133.

[0063] In this way, the arrangement of the sealing ring 16 can effectively prevent wet air in the air duct 111 from leaking from the gap between the first positioning and fixing structure 15 and the second positioning and fixing structure 133, and can prevent leaked wet air from entering other components of the humidity detection device 13 (e.g., the wire harness 136) to negatively affect the humidity detection device 13.

[0064] In the example shown in Fig. 1, the sealing ring 16 is compressed and disposed between the fitting end 153 and the fixing plate 134 to seal the fitting groove 154.

[0065] In some embodiments, the humidity detection device 13 includes a wire harness 136 and a connector 137. The wire harness 136 electrically connects the humidity detection element 131 and the connector 137. The connector 137 is electrically connected to the controller 14. In this way, the humidity detection element 131 can realize the transmission of electrical signals through the wire harness 136 and the connector 137.

[0066] In some embodiments, the humidity detection element 131 is a humidity sensor.

[0067] Referring to Fig. 8, a dishwasher 100 according to an embodiment of the present disclosure includes an inner container 20 and a fan device 10 according to any embodiment. The inner container 20 defines a washing chamber 21. The fan device 10 is mounted on the side wall 22 of the inner container 20. The side wall 22 of the inner container 20 defines an air outlet 23. The air outlet 23 communicates the washing chamber 21 and the air duct 111.

[0068] In the dishwasher 100 according to the embodiment of the present disclosure, the humidity detection element 131 can detect the humidity in the air duct 111, so that the controller 14 can control the operation of the fan 12 according to the humidity in the air duct 111 to speed up the air circulation between the washing chamber 21 and the outside, so as to effectively reduce the content of water vapor in the washing chamber 21, thereby avoiding the generation of peculiar smell and the re-wetting of the washing chamber 21 of the dishwasher 100.

[0069] It should be noted that when the fan 12 is in operation, wet air in the washing chamber 21 can flow out from the air outlet 23, then enter the air duct 111, and can be directly discharged to the outside under the action of the fan 12.

[0070] In the present disclosure, unless otherwise explicitly specified and defined, the first feature "above" or "under" the second feature may include direct contact of the first and second features, or may include contact of the first and second features not directly but through another feature therebetween. Moreover, the first feature "above", "over" the second feature include the first feature directly above and obliquely above the second feature, or simply indicate that the first feature has a higher

horizontal height than the second feature. The first feature "below", "under" and "beneath" the second feature includes the first feature directly below and obliquely below the second feature, or simply indicates that the first feature has a lower level than the second feature.

[0071] The disclosure herein provides many different embodiments or examples to implement different structures of the present disclosure. In order to simplify the disclosure of the present disclosure, components and arrangements of specific examples are described herein. Of course, they are merely examples and are not intended to limit the present disclosure. In addition, the present disclosure may repeat reference numerals and/or reference letters in different examples, such repetition is for the purpose of simplification and clarity, and does not in itself indicate the relationship between the various embodiments and/or arrangements discussed. In addition, the present disclosure provides examples of various specific processes and materials, but one of ordinary skill in the art can recognize the application of other processes and/or the use of other materials.

[0072] In the description of this specification, the description referring to the terms "one embodiment," "some embodiments," "exemplary embodiments," "examples," "specific examples," or "some examples" and the like means that a specific 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. In this specification, the schematic representation of the above-mentioned terms does not necessarily refer to the same embodiment or example. Moreover, the specific features, structures, materials, or characteristics described may be combined in any one or more embodiments or examples in a suitable manner.

[0073] Although embodiments of the present disclosure have been shown and described, it will be understood by those skilled in the art that various changes, modifications, substitutions and variations can be made to these embodiments without departing from the principles and purposes of the present disclosure, the scope of which is defined by the claims and their equivalents.

Claims

1. A fan device for a dishwasher, the dishwasher comprising an inner container defining a washing chamber, wherein the fan device comprises:

   a shell defining an air duct communicating the washing chamber with the outside;
   a fan configured to establish an airflow passing through the air duct to ventilate the washing chamber;
   a humidity detection device mounted on the shell, the humidity detection device comprising a humidity detection element fixed on a side wall of the air duct, the humidity detection element comprising a detection end positioned in the air duct, the humidity detection element being configured to detect a humidity in the air duct through the detection end; and
   a controller electrically connected with the humidity detection element and the fan, and configured to control an operating state of the fan according to the humidity.

2. The fan device according to claim 1, wherein the air duct comprises an air input duct and an air output duct, the shell defines an accommodating cavity, the fan is positioned in the accommodating cavity, and the accommodating cavity communicates the air input duct with the air output duct.

3. The fan device according to claim 2, wherein the humidity detection element is fixed on a side wall of the air output duct, and the detection end is located in the air output duct.

4. The fan device according to claim 2, wherein the detection end is located in the air input duct.

5. The fan device according to claim 2, wherein the detection end is closer to an outlet of the accommodating cavity than to an outlet of the air output duct.

6. The fan device according to claim 1, wherein the shell is provided with a first positioning and fixing structure, the humidity detection device comprises a second positioning and fixing structure, the humidity detection element is fixed to the second positioning and fixing structure, the humidity detection element is disposed through the first positioning and fixing structure so that the detection end is positioned in the air duct, and the first positioning and fixing structure is fitted with the second positioning and fixing structure so that the humidity detection element is fixed on the side wall of the air duct.

7. The fan device according to claim 6, wherein the first positioning and fixing structure comprises a snap structure protruding from an outer surface of the side wall of the air duct, the second positioning and fixing structure comprises a fixing plate, the humidity detection element is fixed to the fixing plate, and the snap structure is snapped with the fixing plate so that the humidity detection element is fixed on the side wall of the air duct.

8. The fan device according to claim 7, wherein the snap structure comprises two snapping members spaced apart from each other, the two snapping members are respectively snapped with two sides of the fixing plate so that the humidity detection element is fixed on the side wall of the air duct, and the

humidity detection element is positioned between the two snapping members.

9. The fan device according to claim 8, wherein the first positioning and fixing structure comprises a fitting end extending outward from the side wall of the air duct, the first positioning and fixing structure defines a fitting groove penetrating through the fitting end and the side wall of the air duct, the humidity detection element is disposed through the fitting groove so that the detection end is positioned in the air duct, a part of the humidity detection element is accommodated in the fitting groove, and the fitting end is positioned between the two snapping members.

10. The fan device according to claim 6, wherein the humidity detection device comprises a cover, one end of the cover is fixed to the second positioning fixing structure so that the cover covers the humidity detection element, the other end of the cover is disposed through the first positioning fixing structure to be fixed to the side wall of the air duct, the detection end is accommodated in the other end of the cover, and the other end of the cover defines a plurality of through holes communicating with an inside of the cover.

11. The fan device according to claim 10, wherein the cover is provided with a flow guiding surface on an upper side thereof, and the flow guiding surface is inclined downwards.

12. The fan device according to claim 6, wherein the fan device comprises an elastic sealing ring, and the sealing ring is compressed and arranged between the first positioning and fixing structure and the second positioning and fixing structure.

13. The fan device according to claim 1, wherein the humidity detection device comprises a wire harness and a connector, the wire harness is electrically connected with the humidity detection element and the connector, and the connector is electrically connected with the controller.

14. The fan device according to claim 1, wherein the humidity detection element is a humidity sensor.

15. The fan device according to claim 7, wherein the snap structure comprises two snapping members spaced apart from each other, the two snapping members are respectively snapped with two sides of the fixing plate so that the humidity detection element is fixed on the side wall of the air duct, and the humidity detection element is positioned between the two snapping members.

16. The fan device according to claim 15, wherein the first positioning and fixing structure comprises a fitting end extending outward from the side wall of the air duct, the first positioning and fixing structure defines a fitting groove penetrating through the fitting end and the side wall of the air duct, the humidity detection element is disposed through the fitting groove so that the detection end is positioned in the air duct, and a part of the humidity detection element is accommodated in the fitting groove;
the fitting end is positioned between the two snapping members.

17. The fan device according to claim 7, wherein the humidity detection element is detachably fixed to the fixing plate.

18. The fan device according to claim 6, wherein the humidity detection device comprises a cover, one end of the cover is fixed to the second positioning and fixing structure so that the cover covers the humidity detection element, the other end of the cover is disposed through the first positioning and fixing structure to fixed to the side wall of the air duct, the detection end is accommodated in the other end of the cover, and the other end of the cover defines a plurality of through holes communicating with an inside of the cover.

19. The fan device according to claim 6, wherein the fan device comprises an elastic sealing ring, and the sealing ring is compressed and arranged between the first positioning and fixing structure and the second positioning and fixing structure.

20. A dishwasher, comprising an inner container and a fan device according to any one of claims 1 to 19, wherein the inner container defines a washing chamber, the fan device is mounted on a side wall of the inner container, the side wall of the inner container is provided with an air outlet, and the air outlet communicates the washing chamber with the air duct.

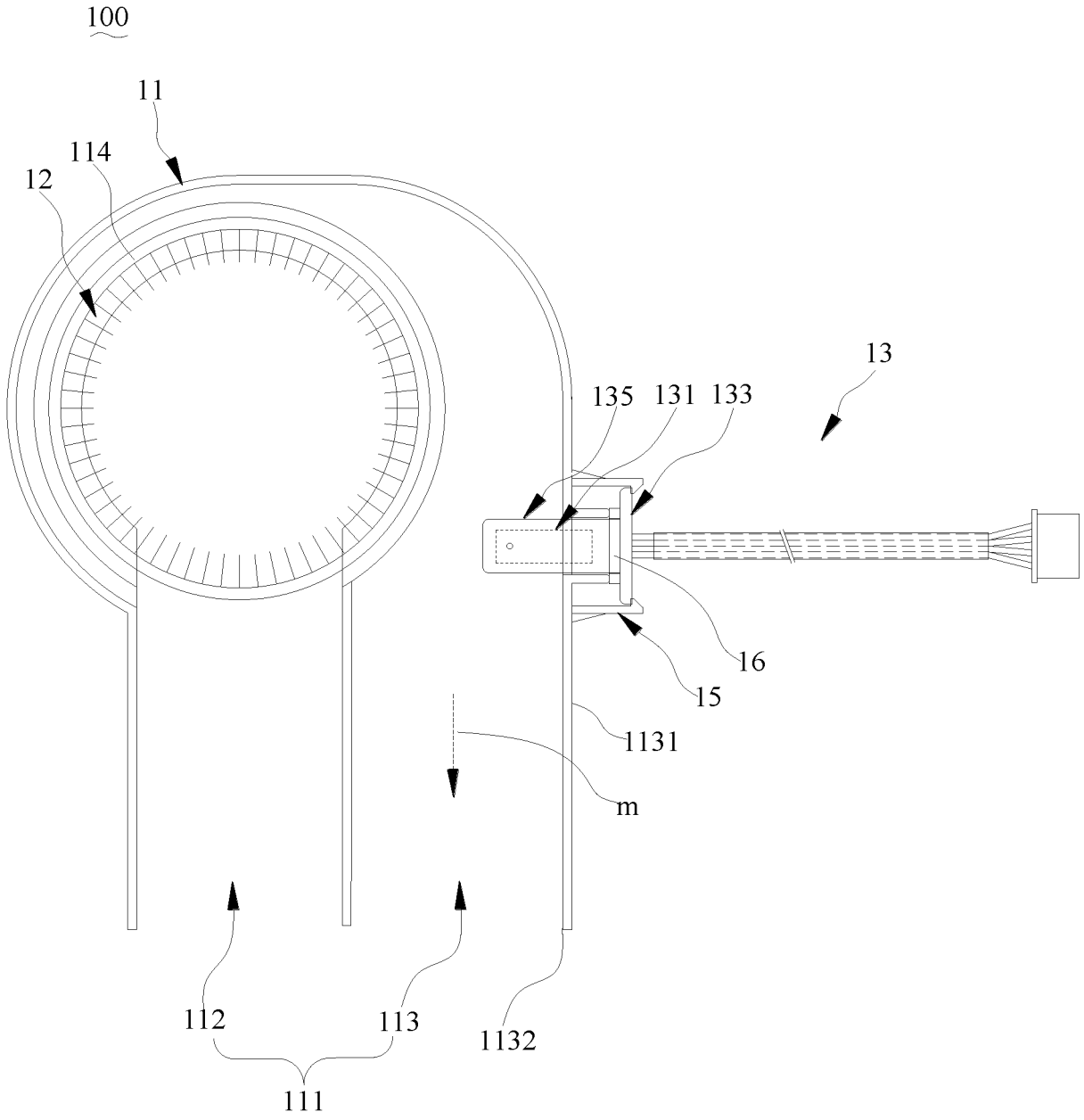


Fig. 1

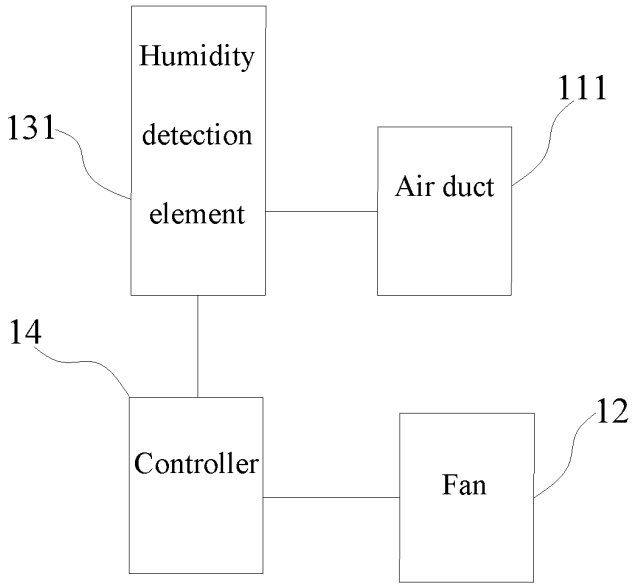
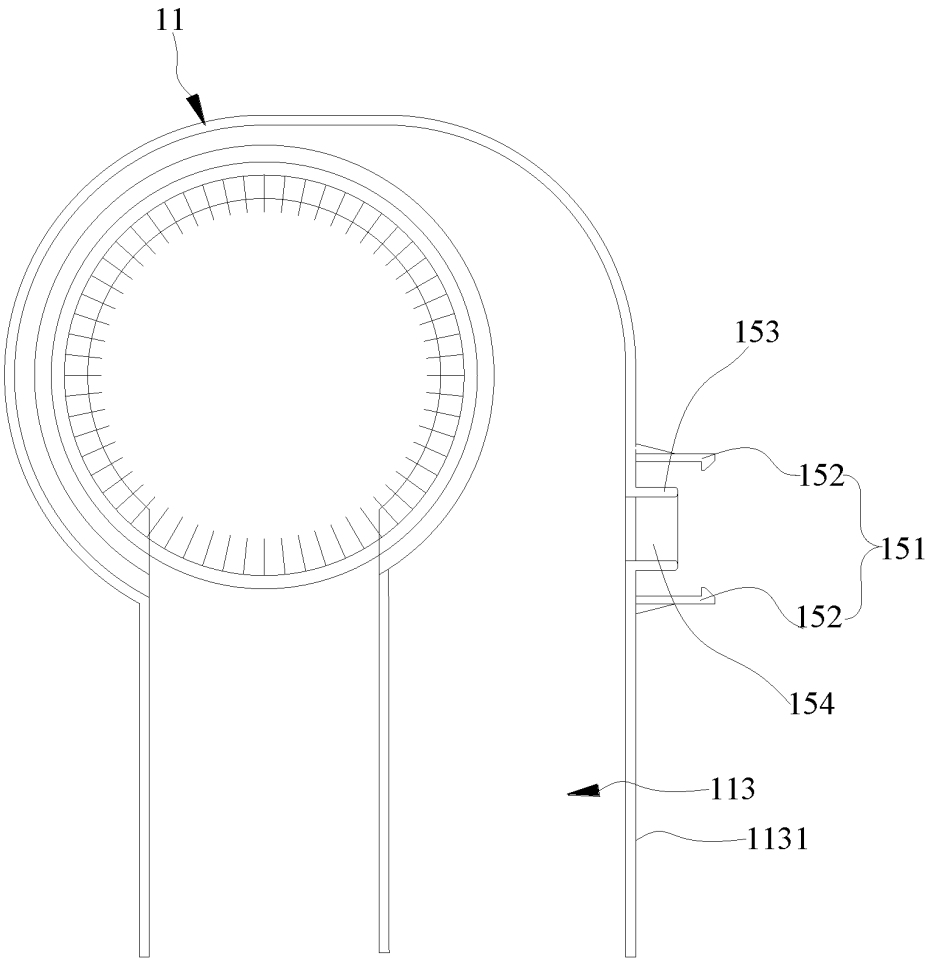

Humidity detection element
131
Air duct
111
14
Controller
Fan
12

Fig. 2


11
153
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154
113
1131

Fig. 3

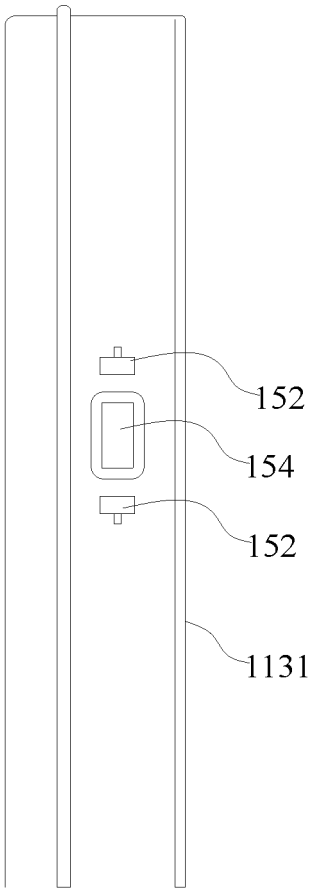

Fig. 4

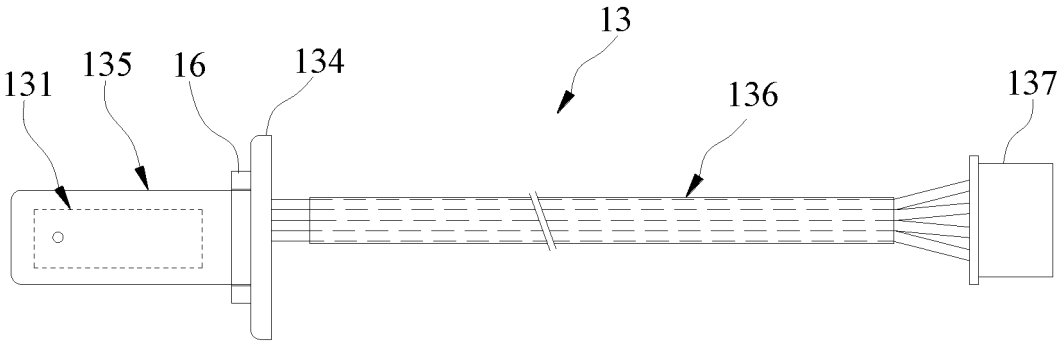

Fig. 5

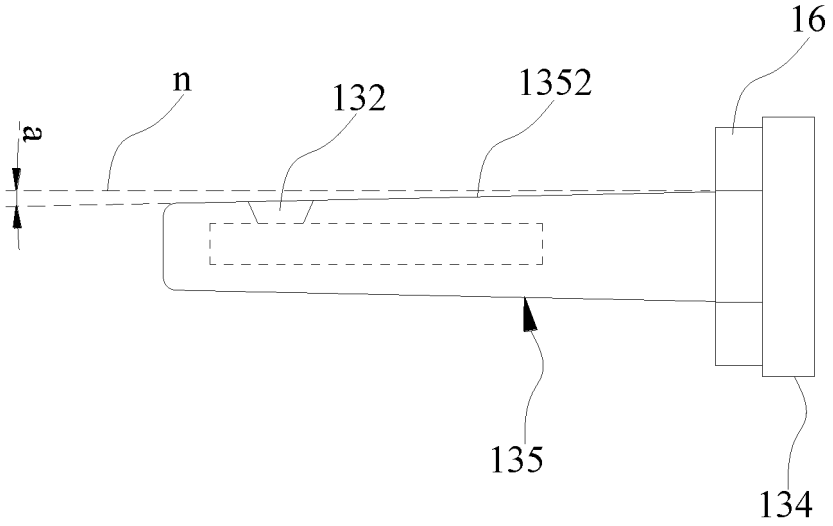

Fig. 6

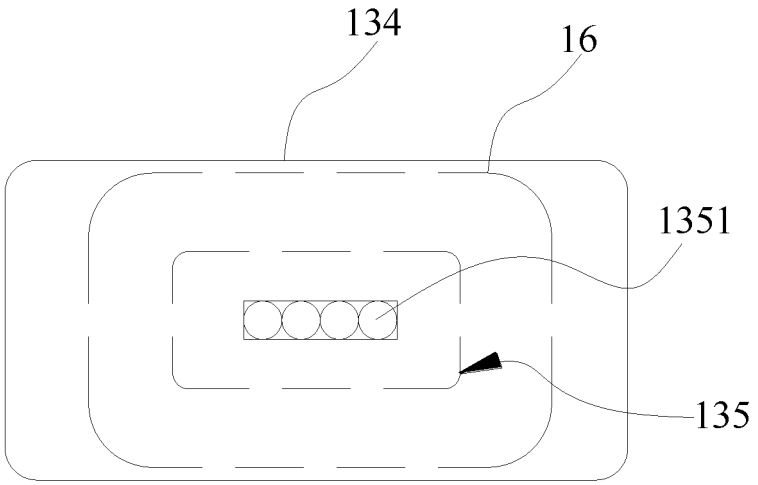

Fig. 7

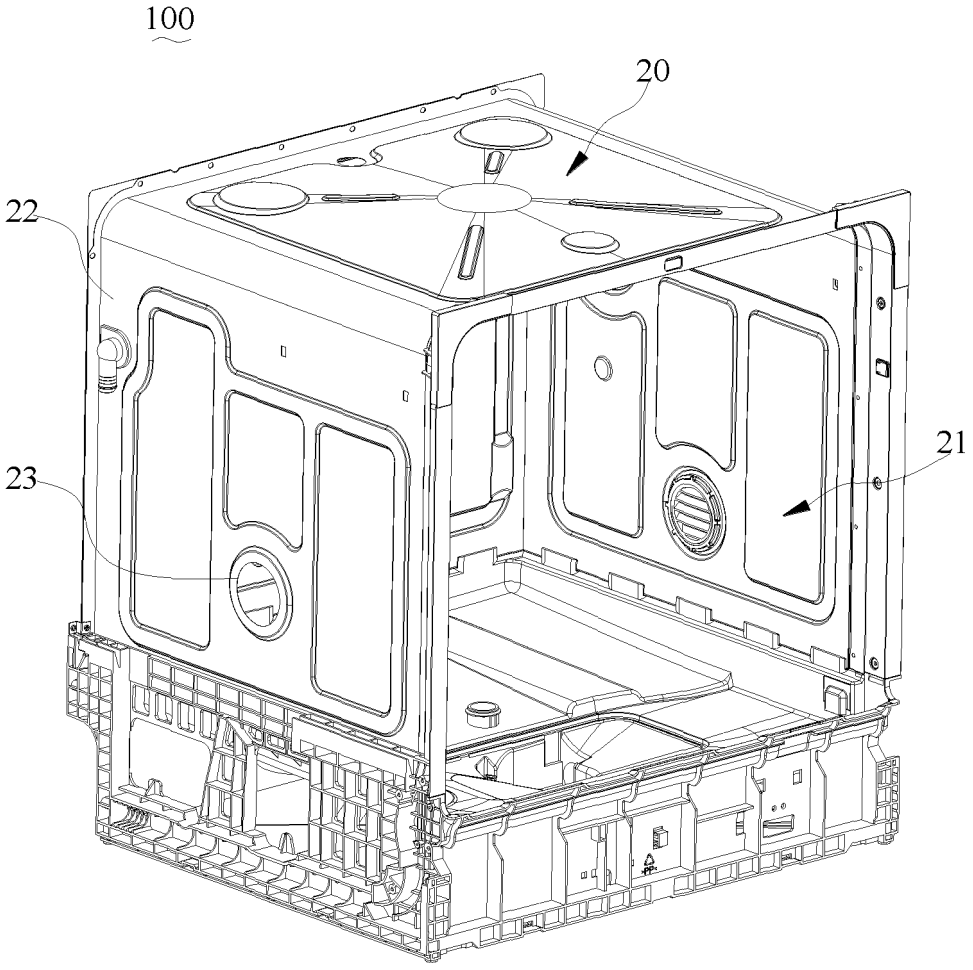

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/073707

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)

CNKI, CNPAT, WPI, EPODOC: 佛山市顺德区美的洗涤电器制造有限公司, 美的集团股份有限公司, 黄华明, 辛载奎, 王海洋, 仇灿华, 韩冰, 风机, 洗碗机, 洗涤, 干燥, 风道, 湿度, 传感器, 状态, 调整, 调节, 固定, 安装, 罩, 壳, 壁, fan, dish, wash, dry+, desiccation, duct, dampness, humidity, humidness, moistness, moisture, sensor, transducer, state, status, adjust, regulat+, mount, fix+, cover, shell, shield, wall

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 107456188 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 12 December 2017 (12.12.2017), description, paragraphs [0058]-[0073], and figures 1-2	1-5, 13-14, 20
PX	CN 107468189 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 15 December 2017 (15.12.2017), description, paragraphs [0067]-[0075], and figures 1 and 4	1-5, 13-14, 20
PX	CN 107307825 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 03 November 2017 (03.11.2017), description, paragraphs [0083]-[0104], and figures 1-2	1-5, 13-14, 20
X	CN 106859565 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 20 June 2017 (20.06.2017), description, paragraphs [0041]-[0058], and figures 1-2 and 6	1-5, 13-14, 20
A	CN 106859565 A (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 20 June 2017 (20.06.2017), entire document	6-12, 15-19

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

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"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
11 April 2018	25 April 2018
Name and mailing address of the ISA 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 WANG, Ning Telephone No. 86-(010)-53962609

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/073707

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 204363928 U (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 03 June 2015 (03.06.2015), description, paragraphs [0041]-[0046] and [0065], and figures 1-3, 7 and 10	1-5, 13-14, 20
A	CN 204363928 U (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 03 June 2015 (03.06.2015), entire document	6-12, 15-19
X	CN 204618152 U (WUHU MIDEA WASHING APPLIANCES MFG CO., LTD.), 09 September 2015 (09.09.2015), description, paragraphs [0027]-[0031] and [0044]-[0046], and figures 1-7	1-5, 13-14, 20
A	CN 204618152 U (WUHU MIDEA WASHING APPLIANCES MFG CO., LTD.), 09 September 2015 (09.09.2015), entire document	6-12, 15-19
A	CN 105832263 A (JOYOUNG CO., LTD.), 10 August 2016 (10.08.2016), entire document	1-20
A	CN 106691348 A (HANGZHOU SANHUA HOME APPLIANCE THERMAL MANAGEMENT SYSTEM CO., LTD.), 24 May 2017 (24.05.2017), entire document	1-20
A	CN 104586336 A (MIDEA GROUP CO., LTD. et al.), 06 May 2015 (06.05.2015), entire document	1-20
A	CN 204467996 U (FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG. CO., LTD. et al.), 15 July 2015 (15.07.2015), entire document	1-20
A	US 2015342441 A1 (SAMSUNG ELECTRONICS CO., LTD.), 03 December 2015 (03.12.2015), entire document	1-20
A	US 2016022115 A1 (WHIRLPOOL CORPORATION), 28 January 2016 (28.01.2016), entire document	1-20

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/073707

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 107456188 A	12 December 2017	None	
CN 107468189 A	15 December 2017	None	
CN 107307825 A	03 November 2017	None	
CN 106859565 A	20 June 2017	None	
CN 204363928 U	03 June 2015	None	
CN 204618152 U	09 September 2015	None	
CN 105832263 A	10 August 2016	None	
CN 106691348 A	24 May 2017	None	
CN 104586336 A	06 May 2015	CN 104586336 B	06 March 2018
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		US 9795275 B2	24 October 2017
		KR 20150137602 A	09 December 2015
US 2016022115 A1	28 January 2016	US 2016022116 A1	28 January 2016

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201720901859 **[0001]**