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(54) **HEAT PUMP DRYING OR WASHING-DRYING MACHINE**

(57) The present disclosure provides a heat pump drying or washing-drying machine (100), including a cabinet (1); a fan assembly (2) disposed in the cabinet (1) and provided with a draining adapting port (21); a draining duct (3) disposed in the cabinet (1) and connected with the draining adapting port (21); and a base (4) disposed

to the cabinet (1), located above the fan assembly (2) and provided with a water outlet (41), in which the water outlet (41) is corresponding to the draining adapting port (21) in terms of position and configured to be connected with the draining adapting port (21).

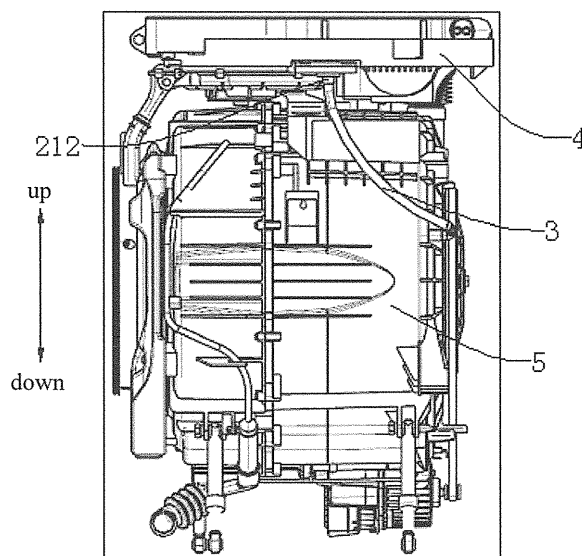


Fig. 5

Description

FIELD

[0001] The present disclosure relates to a technology field of household electrical appliances, and more particularly to a heat pump drying or washing-drying machine.

BACKGROUND

[0002] The heat pump drying or washing-drying machine in the related art has a plurality of drying manners, and a heat pump drying is one thereof. A heat pump drying system of the heat pump washing-drying machine in the current industry is mostly separately arranged, i.e., a compressor and a combination of a condenser and an evaporator are respectively distributed in an upper part and a lower part of the machine, and are connected by a duct in the middle. This kind of distribution results in a complicated structure, and is not conducive to production and maintenance thereof.

[0003] The heat pump drying or washing-drying machine of the related art has a relatively heavy weight, since the whole heat pump system is integrated in the base. In the installation process, the integrated base needs to be uplifted, so as to implement the connection of a condensed water duct, which makes the integration operation complex, and thus wastes time and effort of workers during the operation.

SUMMARY

[0004] The present disclosure seeks to solve at least one of the problems existing in the related art to at least some extent.

[0005] Thus, an objective of the present disclosure is to provide a heat pump drying or washing-drying machine. The heat pump drying or washing-drying machine is easy and convenient to be assembled, and thus the time and effort consumed during the engineering assembling can be reduced.

[0006] The heat pump drying or washing-drying machine according to embodiments of the present disclosure includes a cabinet; a fan assembly disposed in the cabinet and provided with a draining adapting port; a draining duct disposed in the cabinet and connected with the draining adapting port; and a base disposed to the cabinet, located above the fan assembly and provided with a water outlet, in which the water outlet is corresponding to the draining adapting port in terms of position and configured to be connected with the draining adapting port.

[0007] In the heat pump drying or washing-drying machine according to embodiments of the present disclosure, by providing the fan assembly with the draining adapting port, when assembling the heat pump drying or washing-drying machine, the water outlet is connected

with the draining adapting port, and the draining duct is connected with the draining adapting port of the fan assembly, but does not need to be in direct connection with the water outlet of the base, such that the base does not need to be uplifted to conduct the installation, thus facilitating the connection of the draining duct and the water drainage, reducing the assembling complexity of the heat pump drying or washing-drying machine, and decreasing the time and effort consumed during assembling.

[0008] In addition, the heat pump drying or washing-drying machine may further include following additional features.

[0009] According to some embodiments of the present disclosure, the draining adapting port includes a first segment connected with the water outlet and a second segment connected with the draining duct, in which the first segment and the second segment are communicated with each other, and a radial dimension of the first segment is larger than a radial dimension of the second segment.

[0010] Optionally, an end of the draining duct is fitted over the second segment.

[0011] Optionally, the water outlet is inserted in the first segment.

[0012] Furthermore, the heat pump drying or washing-drying machine further includes a sealing gasket, in which the sealing gasket is disposed between the first segment and the water outlet and configured to seal a gap between the first segment and the water outlet.

[0013] Furthermore, the draining adapting port further includes a transition segment, in which the transition segment extends perpendicularly to axial directions of the first segment and the second segment, and the sealing gasket is disposed on the transition segment.

[0014] Furthermore, the sealing gasket is configured to have a ring shape and a substantially L-shaped section, a long limb of the sealing gasket is located between the first segment and the water outlet, and a short limb of the sealing gasket is located on the transition segment.

[0015] Furthermore, a lower end of the water outlet abuts against the short limb.

[0016] Optionally, the sealing gasket is configured as a rubber gasket.

[0017] Optionally, the first segment and the second segment are disposed coaxially.

[0018] 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 OF THE DRAWINGS

[0019] 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 heat pump drying or washing-drying machine according to embodiments of the present disclosure;

Fig. 2 is a partially enlarged view of a heat pump drying or washing-drying machine washer-dryer according to embodiments of the present disclosure; Fig. 3 is a partially sectional view of a heat pump drying or washing-drying machine washer-dryer according to embodiments of the present disclosure; Fig. 4 is a partially schematic view of a heat pump drying or washing-drying machine washer-dryer according to embodiments of the present disclosure; and

Fig. 5 is a partially schematic view of a heat pump drying or washing-drying machine washer-dryer according to embodiments of the present disclosure.

Reference numerals:

[0020]

100: heat pump drying or washing-drying machine;
1: cabinet;
2: fan assembly; 21: draining adapting port; 211: first segment; 212: second segment; 213: transition segment;
3: draining duct;
4: base; 41: water outlet; 42: water guiding groove;
5: drum;
6: sealing gasket.

DETAILED DESCRIPTION

[0021] Reference will be made in detail to embodiments of the present disclosure. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions. 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.

[0022] 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," and "counterclockwise" 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.

[0023] 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 disclosure, "a plurality of" means two or more than two, unless specified otherwise.

[0024] In the present disclosure, 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.

[0025] A heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure will be described with reference to accompanying drawings in the following.

[0026] As shown in Figs. 1-5, the heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure includes a cabinet 1, a fan assembly 2, a draining duct 3 and a base 4.

[0027] Specifically, the fan assembly 2 is disposed in the cabinet 1 and provided with a draining adapting port 21. The draining duct 3 is disposed in the cabinet 1 and connected with the draining adapting port 21. The base 4 is disposed to the cabinet 1, located above the fan assembly 2 and provided with a water outlet 41. The water outlet 41 is corresponding to the draining adapting port 21 in terms of position and configured to be connected with the draining adapting port 21. In other words, a position of the water outlet 41 is corresponding to that of the draining adapting port 21.

[0028] As shown in Fig. 1, the base 4 is disposed on the cabinet 1, and a heat pump system is integrated in the base 4. The fan assembly 2 is disposed below the base 4 and communicated with the base 4. Wet and hot air in a drum 5 of the heat pump drying or washing-drying machine 100 may be conveyed to the heat pump system, and then the heat pump system may cool the wet and hot air so as to lower a temperature thereof and may further heat the dry air after being cooled. Under effect of the fan assembly 2, the hot air generated by the heat pump system may flow to the fan assembly 2 and further into the drum 5 of the heat pump drying or washing-drying machine 100 to dry laundry.

[0029] The heat pump drying or washing-drying machine in the related art has a relatively heavy weight, since the heat pump system is disposed in the base. In the installation process, the base 4 in which the heat pump system is integrated needs to be uplifted, so as to implement the connection of a condensed water duct, which makes connecting and mounting operations of the heat pump drying or washing-drying machine complex, and wastes much time and effort of workers during the operation.

[0030] However, in the heat pump drying or washing-drying machine 100 of the present disclosure, as shown in Figs. 2-5, the base 4 is provided with the water outlet 41, the fan assembly is provided with the draining adapting

port 21, and the water outlet 41 is corresponding to the draining adapting port 21 in terms of position, so that when the base 4 is pressed onto the fan assembly 2, the draining adapting port 21 is configured to be connected with the water outlet 41. Furthermore, the draining duct 3 is disposed in the cabinet 1 and connected with the draining adapting port 21. In this way, a condensed water generated by condensation of the wet and hot air can be discharged out from the water outlet 41 of the base 4, and then flow to the draining duct 3 through the draining adapting port 21, so as to be further discharged out of the cabinet 1.

[0031] When assembling the heat pump drying or washing-drying machine 100, the base 4 may be disposed above the fan assembly 2, the water outlet 41 is directly connected with the draining adapting port 21, and the draining adapting port 21 is connected with the draining duct 3. Thus, the draining duct 3 is connected with the draining adapting port 21, but does not need to be in direct connection with the water outlet 41 of the base 4, such that it is convenient for the connection of the draining duct 3 and the water drainage without the need to uplift the base 4, thus reducing the assembling complexity of the heat pump drying or washing-drying machine 100 and decreasing the time and effort consumed during assembling.

[0032] In the heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure, by providing the draining adapting port 21 in the fan assembly 2, when assembling the heat pump drying or washing-drying machine 100, the water outlet 41 is connected with the draining adapting port 21, and the draining duct 3 is connected with the draining adapting port 21 of the fan assembly, but does not need to be in direct connection with the water outlet 41 of the base 4. Thereby, it does not need to uplift the base 4 to conduct the installation, which facilitates the connection of the draining duct 3 and the water drainage, thus reducing the assembling complexity of the heat pump drying or washing-drying machine 100 and decreasing the time and effort consumed during assembling.

[0033] In some embodiments of the present disclosure, as shown in Fig. 3, the draining adapting port 21 includes a first segment 211 and a second segment 212. The first segment 211 and the second segment 212 are communicated with each other, a radial dimension of the first segment 211 is larger than a radial dimension of the second segment 212, the first segment 211 is connected with the water outlet 41 and the second segment 212 is connected with the draining duct 3. Thus, it is convenient for the water outlet 41 and the draining duct 3 to be connected with the draining adapting port 21, and it is also helpful for the condensed water to flow from the water outlet 41 to the first segment 211, and then to flow through the second segment 212 to the draining duct 3.

[0034] Optionally, as shown in Figs. 4 and 5, an end of the draining duct 3 may be fitted over the second segment 212, thus facilitating the connection between the

draining duct 3 and the second segment 212. For example, the second segment 212 may be connected with the end of the draining duct 3 by an interference fit, thereby improving the stability and reliability of structures of the second segment 212 and the draining duct 3, and moreover ensuring the condensed water to flow from the second segment 212 to the draining duct 3, so as to prevent the water leakage.

[0035] Optionally, the water outlet 41 may be inserted in the first segment 211. As shown in Fig. 3, a radial dimension of the water outlet 41 is less than that of the first segment 211, and the water outlet 41 is inserted in the first segment 211, such that it is ensured that the condensed water can completely flow from the water outlet 41 to the first segment 211, thus preventing the condensed water from leaking. Moreover, when the base 4 is pressed on the fan assembly 2, it is helpful for the assembling of the water outlet 41 and the first segment 211.

[0036] Furthermore, as shown in Fig. 3, the heat pump drying or washing-drying machine 100 further includes a sealing gasket 6, and the sealing gasket 6 is disposed between the first segment 211 and the water outlet 41 and configured to seal a gap between the first segment 211 and the water outlet 41. The sealing gasket 6 abuts against the first segment 211 and the water outlet 41, thus improving the sealing effect between the first segment 211 and the water outlet 41 and preventing the water leakage.

[0037] In some embodiments of the present disclosure, the draining adapting port 21 may further include a transition segment 213. The transition segment 213 extends perpendicularly to axial directions of the first segment 211 and the second segment 212, and the sealing gasket 6 is disposed on the transition segment 213. Specifically, as shown in Fig. 3, the transition segment connects the first segment 211 with the second segment 212, the sealing gasket 6 is disposed on the transition segment 213 and abuts against the water outlet 41 and the transition segment 213 respectively. By providing the transition segment 213, it is beneficial for mounting and positioning the sealing gasket 6.

[0038] Optionally, the sealing gasket 6 may be configured to have a ring shape and a substantially L-shaped section. A long limb (specifically a long limb of the L shape) of the sealing gasket 6 is located between the first segment 211 and the water outlet 41, and a short limb (specifically a short limb of the L shape) of the sealing gasket 6 is located on the transition segment 213. The long limb of the sealing gasket 6 may extend along the axial direction of the first segment 211, the short limb of the sealing gasket 6 may extend perpendicularly to the axial direction of the first segment 211, and the sealing gasket 6 seals the first segment 211 and the water outlet 41. Furthermore, a lower end of the water outlet 41 may abut against the short limb. Thus, the sealing gasket 6 abuts against the first segment 211, the transition segment 213 and the water outlet 41, thereby further improv-

ing the sealing effect between the draining adapting port 21 and the water outlet 41, and preventing a butt-gap water leakage between the water outlet 41 and the draining adapting port 21.

[0039] In some embodiments of the present disclosure, the sealing gasket 6 may be configured as a rubber gasket. Thus, the corresponding cost can be reduced and the sealing effect of the sealing member can be ensured, and also a shock absorbing function can be obtained to some extent.

[0040] Optionally, the first segment 211 and the second segment 212 are disposed coaxially. Thus, a production process of the draining adapting port 21 can be simplified, and thereby it is convenient to produce and manufacture the draining adapting port 21.

[0041] The heat pump drying or washing-drying machine 100 according to a specific embodiment of the present disclosure will be described in detail in the following with reference to drawings. It should be understood that the descriptions below are just explanatory and illustrative, and cannot be construed to limit the present disclosure.

[0042] As shown in Figs. 1-5, the heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure may include the cabinet 1, the drum 5, the fan assembly 2, the draining duct 3, the sealing gasket 6 and the base 4.

[0043] The base 4 is disposed on the cabinet 1, and the heat pump system is integrated in the base 4. The heat pump system may include a condenser, an evaporator, and a compressor and so on. The fan assembly 2, the drum 5 and the draining duct 3 are disposed in the cabinet 1, and specifically the fan assembly 2 is disposed below the base 4 and located under the condenser. The wet and hot air in the drum 5 may flow into the base 4, and the heat pump system may cool the wet and hot air, and further heat the cold and dry air after being cooled. Under the effect of the fan assembly 2, the dry and hot air after being heated may flow to the drum 5, so as to dry the laundry. The heat pump system is integrated in the base 4, thus facilitating mounting the heat pump system, and reducing the assembling complexity thereof.

[0044] As shown in Fig. 3, the base 4 is provided with the water outlet 41, and a water guiding groove 42 communicated with a space where the evaporator is located is formed in the base 4. The water guiding groove 42 obliquely extends downwards gradually along a direction from the space where the evaporator is located to the water outlet 41, such that the condensed water generated by condensation of the wet and hot air can flow through the water guiding groove 42 to the water outlet 41.

[0045] As shown in Figs. 2 and 3, the fan assembly 2 is provided with the draining adapting port 21. The draining adapting port 21 includes the first segment 211, the transition segment 213 and the second segment 212. The first segment 211 and the second segment 212 are disposed coaxially, the radial dimension of the first segment 211 is larger than that of the second segment 212,

and the first segment 211 and the second segment 212 are communicated with each other. As shown in Figs. 3-5, the draining duct 3 is fitted over the second segment 212, and the water outlet 41 is inserted in the first segment 211. Thus, the draining duct 3 is connected with the draining adapting port 21, but does not need to be in direct connection with the water outlet 41 of the base 4, thereby facilitating the connection of the draining duct 3 and the water drainage, reducing the assembling complexity of the heat pump drying or washing-drying machine 100, and decreasing the time and effort consumed during assembling.

[0046] As shown in Figs. 4 and 5, one end of the draining duct 3 is fitted over the second segment 212 and the other end thereof is connected to a rear end of the drum 5, such that the condensed water flows through the draining duct 3 and eventually gathers to a draining pump of the heat pump drying or washing-drying machine 100, so as to be discharged out via the draining pump.

[0047] The transition segment 213 extends perpendicularly to the axial directions of the first segment 211 and the second segment 212. The sealing gasket 6 is disposed on the transition segment 213, and the sealing gasket 6 is configured to have the ring shape and the substantially L-shaped section. The long limb (specifically the long limb of the L shape) of the sealing gasket 6 is located between the first segment 211 and the water outlet 41, and the short limb (specifically the short limb of the L shape) of the sealing gasket 6 is located on the transition segment 213. The lower end of the water outlet 41 abuts against the short limb. When the base 4 is pressed on the fan assembly 2, the sealing gasket 6 abuts against the first segment 211, the transition segment 213 and the water outlet 41, thereby sealing the gap between the water outlet 41 and the draining adapting port 21, and preventing the butt-gap water leakage between the water outlet 41 and the draining adapting port 21.

[0048] Thus, in the heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure, the draining duct 3 is capable of being connected with the draining adapting port 21, but does not need to be in direct connection with the water outlet 41 of the base 4, thereby facilitating the connection of the draining duct 3 and the water drainage, reducing the assembling complexity of the heat pump drying or washing-drying machine 100, and decreasing the time and effort consumed during the assembling. Moreover, the sealing gasket 6 can seal the gap between the water outlet 41 and the draining adapting port 21, so as to prevent the butt-gap water leakage between the water outlet 41 and the draining adapting port 21, thus improving the safety and reliability of the heat pump drying or washing-drying machine 100.

[0049] Other components and operations of the heat pump drying or washing-drying machine 100 according to embodiments of the present disclosure are known to those skilled in the related art, and will not be described in detail herein.

[0050] In the present disclosure, 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.

[0051] Reference throughout this specification to "an embodiment," "some embodiments," "one embodiment," "another example," "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 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.

[0052] 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 departing from spirit, principles and scope of the present disclosure.

Claims

1. A heat pump drying or washing-drying machine (100), comprising:

a cabinet (1);
a fan assembly (2) disposed in the cabinet (1) and provided with a draining adapting port (21);
a draining duct (3) disposed in the cabinet (1) and connected with the draining adapting port (21); and
a base (4) disposed to the cabinet (1), located above the fan assembly (2) and provided with a water outlet (41), in which the water outlet (41)

is corresponding to the draining adapting port (21) in terms of position and configured to be connected with the draining adapting port (21).

2. The heat pump drying or washing-drying machine (100) according to claim 1, wherein the draining adapting port (21) comprises a first segment (211) connected with the water outlet (41) and a second segment (212) connected with the draining duct (3), in which the first segment (211) and the second segment (212) are communicated with each other, and a radial dimension of the first segment (211) is larger than a radial dimension of the second segment (212).
3. The heat pump drying or washing-drying machine (100) according to claim 2, wherein an end of the draining duct (3) is fitted over the second segment (212).
4. The heat pump drying or washing-drying machine (100) according to claim 2 or 3, wherein the water outlet (41) is inserted in the first segment (211).
5. The heat pump drying or washing-drying machine (100) according to claim 4, further comprising a sealing gasket (6), wherein the sealing gasket (6) is disposed between the first segment (211) and the water outlet (41) and configured to seal a gap between the first segment (211) and the water outlet (41).
6. The heat pump drying or washing-drying machine (100) according to claim 5, wherein the draining adapting port (21) further comprises a transition segment (213), in which the transition segment (213) extends perpendicularly to axial directions of the first segment (211) and the second segment (212), and the sealing gasket (6) is disposed on the transition segment (213).
7. The heat pump drying or washing-drying machine (100) according to claim 6, wherein the sealing gasket (6) is configured to have a ring shape and a substantially L-shaped section, a long limb of the sealing gasket (6) is located between the first segment (211) and the water outlet (41), and a short limb of the sealing gasket (6) is located on the transition segment (213).
8. The heat pump drying or washing-drying machine (100) according to claim 7, wherein a lower end of the water outlet (41) abuts against the short limb.
9. The heat pump drying or washing-drying machine (100) according to one of claims 5 to 7, wherein the sealing gasket (6) is configured as a rubber gasket.
10. The heat pump drying or washing-drying machine (100) according to any one of claims 2-8, wherein

the first segment (211) and the second segment (212) are disposed coaxially.

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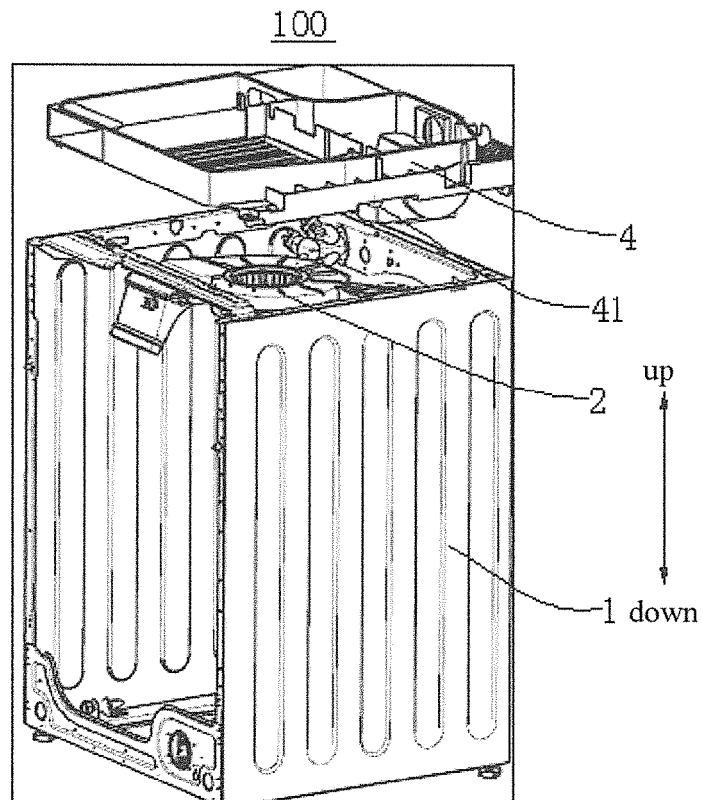


Fig. 1

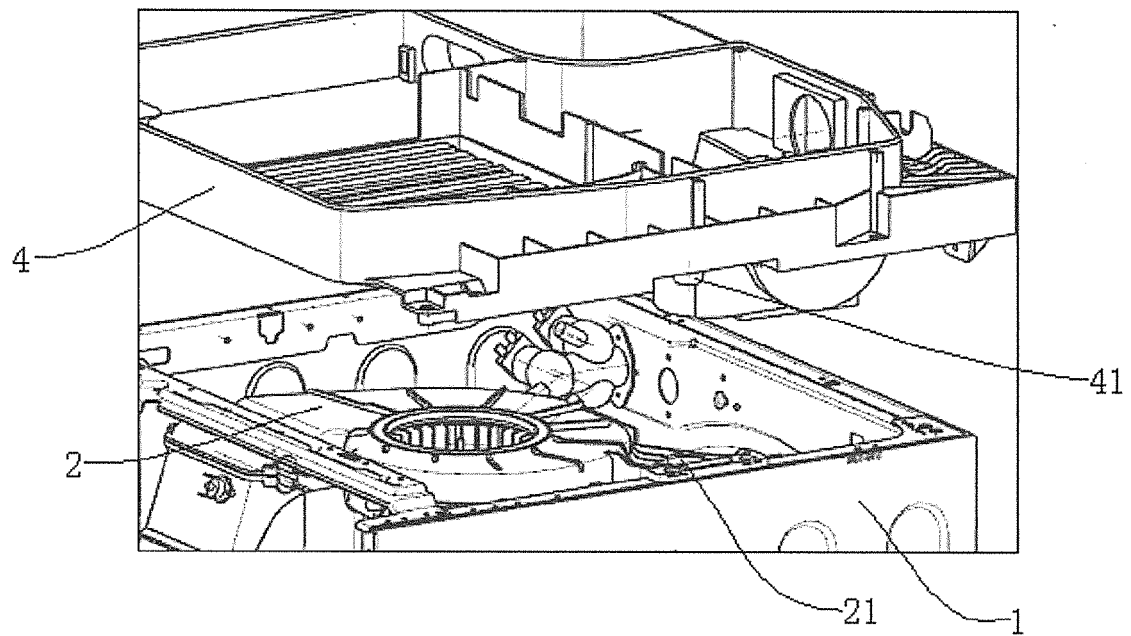


Fig. 2

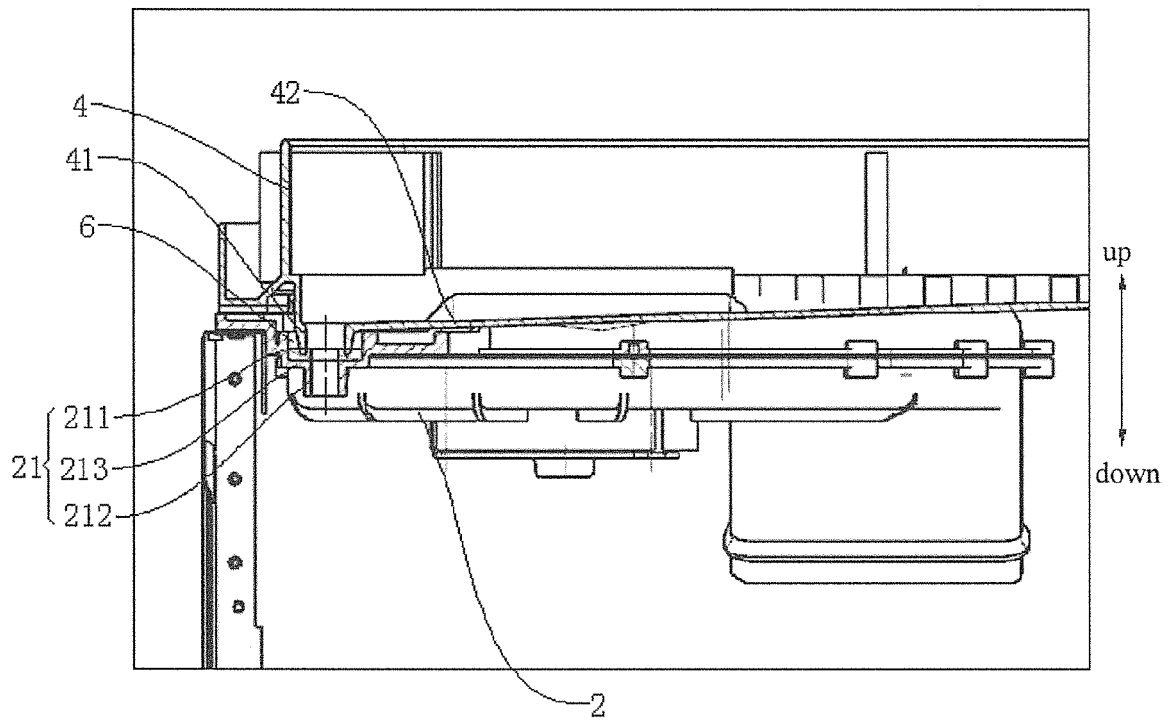


Fig. 3

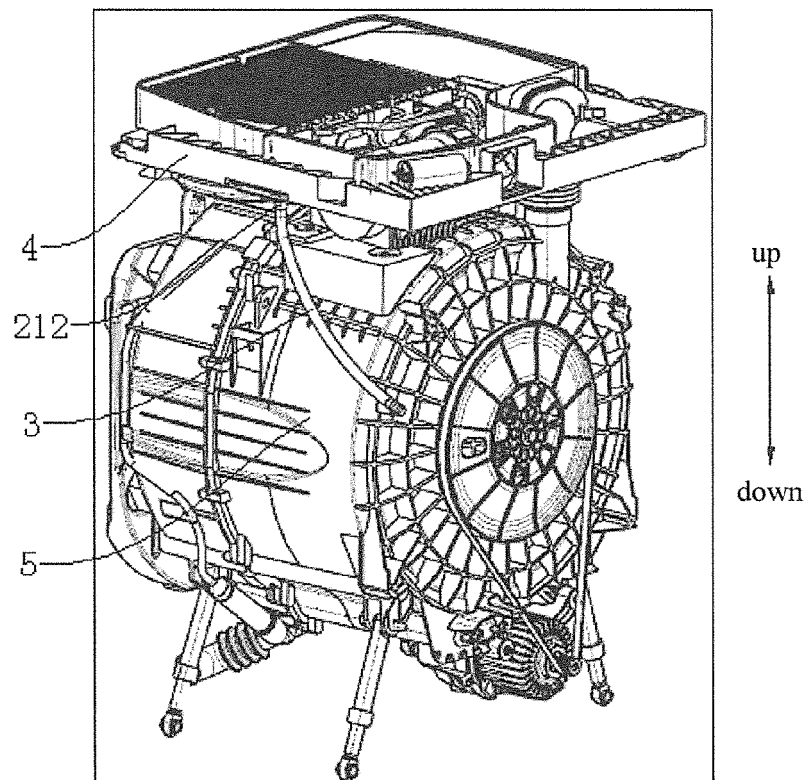


Fig. 4

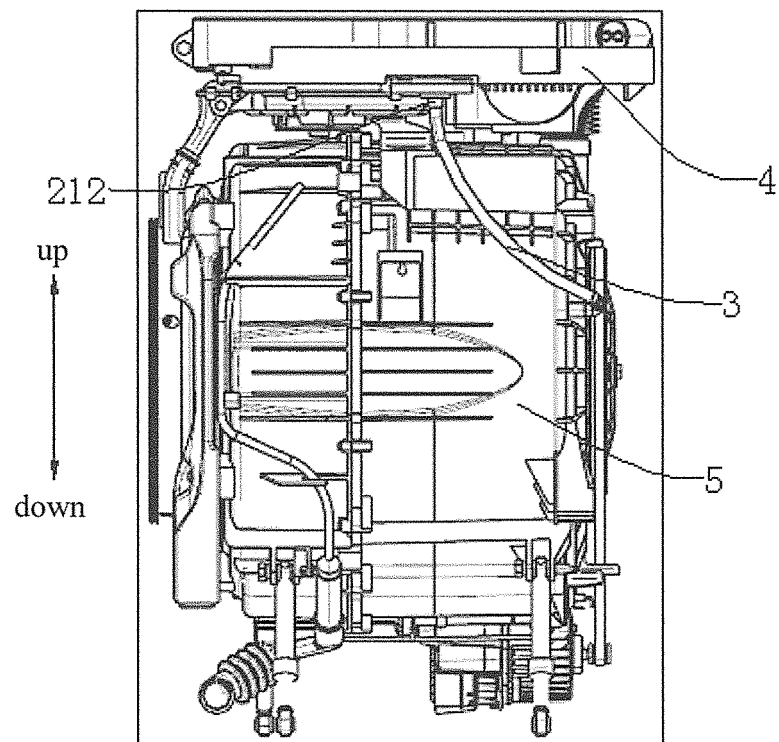


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 17 15 0224

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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