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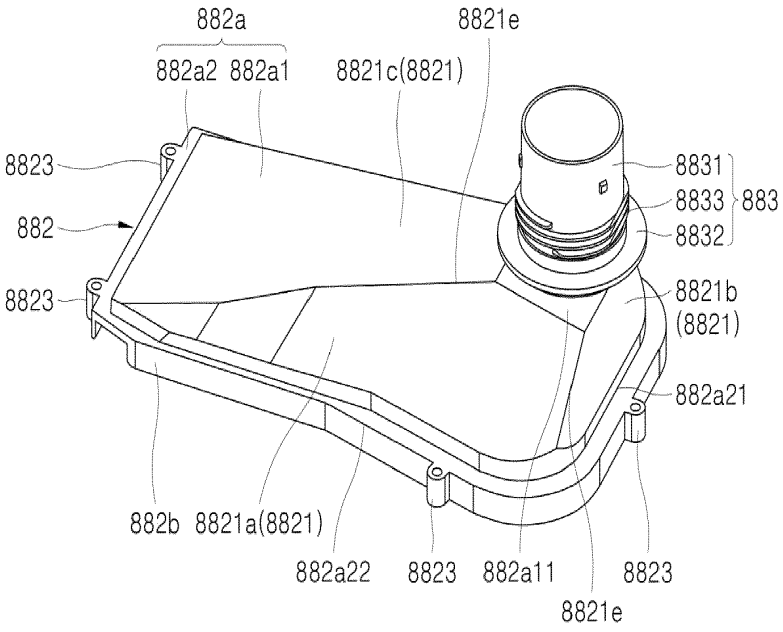
(54) DISH WASHER

(57) Disclosed is a dish washer (1) in which a space (S4) that functions as a discharge flow path through which air flow having passed through the moisture absorbent (85) flows is defined between a cover (882) closing a moisture absorbent receiving space (S3) of a main housing and disposed downstream of the moisture absorbent (85) and the moisture absorbent, thereby minimizing non-uniformity in resistance of the flow path against air flow having passed through the moisture absorbent (85) inside the main housing (84) and local non-uniformity in a moisture absorption amount, and thus preventing deterioration of moisture absorption efficiency.

FIG. 14



EP 4 480 376 A1

Description

[0001] The present disclosure relates to a dish washer. More specifically, the present disclosure relates to a dish washer in which a space that functions as a discharge flow path through which air flow having passed through the moisture absorbent flows is defined between a cover closing a moisture absorbent receiving space of a main housing and disposed downstream of the moisture absorbent and the moisture absorbent, thereby minimizing non-uniformity in resistance of the flow path against air flow having passed through the moisture absorbent inside the main housing and local non-uniformity in a moisture absorption amount, and thus preventing deterioration of moisture absorption efficiency.

[0002] A dish washer is an apparatus that washes dishes and cooking utensils as washing targets stored therein by spraying washing water thereto. In this regard, the washing water may contain washing detergent.

[0003] A dish washer generally includes a washing tub having a washing space defined therein, a dish rack that accommodates therein a washing target inside the washing tub, a spraying arm that sprays the washing water into the dish rack, and a sump that stores therein water and supplies the washing water to the spraying arm.

[0004] Using this dish washer may allow a time and effort required to wash the dishes and other washing targets after a meal to be reduced, thereby contributing to user convenience.

[0005] Typically, the dish washer is configured to perform a washing cycle for washing a washing target, a rinsing cycle for rinsing a washing target, and a drying cycle for drying a washing target that has been washed and rinsed.

[0006] Recently, a dish washer equipped with a moisture-absorption device that may reduce a drying time of the washing target by absorbing moisture contained in the air discharged from the tub during the drying cycle and then re-supplying the air to the tub has been released.

[0007] In this regard, in U.S. Patent No. 8858727 (Prior Art Document 001), a dish washer is disclosed that is equipped with a moisture absorbing device to remove water vapor contained in the air discharged from the tub during a drying process using a moisture absorbent and to supply the air from which the water vapor has been removed back to the tub.

[0008] The moisture absorbing device of the dish washer disclosed in Prior Art Document 001 is configured so that a cover having an outlet defined therein for supplying air that has passed through the moisture absorbent to the tub is disposed in downstream of the moisture absorbent, that is, on top of the moisture absorbent.

[0009] However, in Prior Art Document 001, a sufficient space is not defined between the cover of the moisture absorbing device and a top of the moisture absorbent.

[0010] That is, substantially no space is formed between the cover and the top of the moisture absorbent at a location far away from the outlet except an area around the outlet of the cover.

[0011] Therefore, in the configuration of Prior Art Document 001, a flow path to guide the air having passed through the moisture absorbent toward the outlet is not formed at a location far away from the outlet and downstream of the moisture absorbent. Thus, in the moisture absorbent housing, a resistance of the flow path against the air flow may not be uniform locally. A difference between an amount of air flow at a location relatively far away from the outlet and that at a location close to the outlet, and a difference between a moisture absorption amount at the location relatively far away from the outlet and that at a location close to the outlet inevitably occur, and the overall moisture absorption efficiency is inevitably deteriorated.

[0012] Prior art literature: Patent Document 001: U.S. Patent No. 8858727

[0013] The present disclosure is designed to solve the problems of the prior art as described above. Thus, a first purpose of the present disclosure is to provide a dish washer in which a space that functions as a discharge flow path through which air flow having passed through the moisture absorbent flows is defined between a cover closing a moisture absorbent receiving space of a main housing and disposed downstream of the moisture absorbent and the moisture absorbent, thereby minimizing non-uniformity in resistance of the flow path against air flow having passed through the moisture absorbent inside the main housing and local non-uniformity in a moisture absorption amount, and thus preventing deterioration of moisture absorption efficiency.

[0014] Further, a second purpose of the present disclosure is to provide a dish washer in which the air flow to be directed to the outlet is divided using a plurality of guide ribs arranged around the outlet and disposed on an inner surface of the cover, such that generation of eddy and turbulence as generated as airs flowing in different directions flow toward the outlet may be minimized to reduce flow loss of the air flow.

[0015] Furthermore, a third purpose of the present disclosure is to provide a dish washer in which the plurality of guide ribs generates a rotational velocity component in the flow direction of the air flow in the air flow to be directed to the outlet to lower a flow speed of the air flow and thus reducing the flow speed of the air flow having passed through the moisture absorbent, such that a time for which the air flow stays in the moisture absorbent receiving space may be maximized and thus the moisture absorption efficiency of the moisture absorbent may be maximized.

[0016] Furthermore, a fourth purpose of the present disclosure is to provide a dish washer in which a lower end of each of the plurality of guide ribs acts as a free end extending toward the moisture absorbent holder that defines an upper end of the moisture absorbent receiving space, and the lower end of the guide rib is in contact with

the moisture absorbent holder, and the lower end of the guide rib and the moisture absorbent holder are spaced from each other by a predetermined spacing or smaller, so that the moisture absorbent holder may be effectively prevented from being removed from the housing by the pressure of the air flow.

[0017] Purposes of the present disclosure are not limited to the above-mentioned purpose. Other purposes and advantages of the present disclosure that are not mentioned may be understood based on following descriptions, and may be more clearly understood based on embodiments of the present disclosure. Further, it will be easily understood that the purposes and advantages of the present disclosure may be realized using means shown in the claims and combinations thereof.

[0018] The invention is defined by independent claim 1. Further embodiments of the invention are defined by the dependent claims. One aspect of the present disclosure provides a dish washer including a tub having a washing space defined therein and constructed to accommodate therein a dish; and a moisture-absorption and drying device configured to absorb moisture from air discharged from the tub and supply the moisture-free air to the tub, wherein the moisture-absorption and drying device may include: a blow fan configured to generate flow of the air; a moisture absorbent disposed downstream of the blow fan in a flow direction of the air flow, a heater disposed between the blow fan and the moisture absorbent in the flow direction of the air flow, wherein the heater is configured to heat the air flow to be supplied to the moisture absorbent; a housing including: a heater receiving portion having a heater receiving space defined therein, wherein the air flow having passed through the blow fan flows in the heater receiving space, and a heater is received in the heater receiving space; and a moisture absorbent receiving portion having a moisture absorbent receiving space defined therein, wherein the air flow having passed through the heater receiving space flows in the moisture absorbent receiving space, and the moisture absorbent is received in the moisture absorbent receiving space; and a cover coupled to an open one surface of the moisture absorbent receiving portion so as to close the moisture absorbent receiving space, wherein the cover has an outlet defined therein through which the air having flowed through the moisture absorbent is discharged, wherein a space is defined between the cover and the open one surface of the moisture absorbent receiving portion, wherein the space acts as a discharge flow path guiding the air flow having passed through the moisture absorbent toward the outlet.

[0019] In accordance with some embodiments of the dish washer of the present disclosure, the cover may include a cover body having a convex portion convex in a direction in which the cover body extends away from the open one surface of the moisture absorbent receiving portion. The outlet may extend through the cover body The convex portion of the cover body may be constructed such that an area size in a plan view of the discharge flow path gradually decreases as the discharge flow path extends toward the outlet.

[0020] In accordance with some embodiments of the dish washer of the present disclosure, the convex portion may include a combination of a plurality of inclined surfaces having different inclinations.

[0021] In accordance with some embodiments of the dish washer of the present disclosure, the convex portion may include a combination of a plurality of curved surfaces having different curvatures.

[0022] In accordance with some embodiments of the dish washer of the present disclosure, the cover may further include a plurality of guide ribs, each having one end as a fixed end connected to an inner surface of the cover body and the other end as a free end extending across the discharge flow path toward the open one surface of the moisture absorbent receiving portion. Each guide rib may be formed as a wall. The plurality of guide ribs may be arranged to divide the air flow to be directed toward the outlet.

[0023] In accordance with some embodiments of the dish washer of the present disclosure, the plurality of guide ribs may be arranged around the outlet so as to be spaced from each other by an equal angular spacing along a circumferential direction of the outlet.

[0024] In accordance with some embodiments of the dish washer of the present disclosure, each of the plurality of guide ribs may have a front edge as an upstream side thereof in a flow direction of the air flow and a rear edge as a downstream side thereof in the flow direction of the air flow. Each of the plurality of guide ribs may extend linearly from the front edge toward the rear edge.

[0025] In accordance with some embodiments of the dish washer of the present disclosure, a virtual extension line passing through the front edge and the rear edge may passe through a center of the outlet.

[0026] In accordance with some embodiments of the dish washer of the present disclosure, a virtual extension line passing through the front edge and the rear edge may not pass through a center of the outlet.

[0027] In accordance with some embodiments of the dish washer of the present disclosure, each of the plurality of guide ribs may have a front edge as an upstream side thereof in a flow direction of the air flow and a rear edge as a downstream side thereof in the flow direction of the air flow. Each of the plurality of guide ribs may extend non-linearly from the front edge toward the rear edge.

[0028] In accordance with some embodiments of the dish washer of the present disclosure, each of the plurality of guide ribs may have a first linear portion extending from the rear edge, and a second linear portion extending from the first linear portion in a bent manner therefrom toward the front edge.

[0029] In accordance with some embodiments of the dish washer of the present disclosure, the moisture-absorption and drying device may further include a moisture absorbent holder constructed to define an upper end of the moisture absorbent receiving space and prevent the

moisture absorbent from being removed from the moisture absorbent receiving space. The other end of each of the plurality of guide ribs may have a shape corresponding to a shape of one surface of the moisture absorbent holder through which the air flow passes.

[0030] In accordance with some embodiments of the dish washer of the present disclosure, the other end of at least one of the plurality of guide ribs may be in contact with the one surface of the moisture absorbent holder.

[0031] In accordance with some embodiments of the dish washer of the present disclosure, the other end of each of the plurality of guide ribs may be spaced apart from the one surface of the moisture absorbent holder by a predetermined spacing.

[0032] In accordance with some embodiments of the dish washer of the present disclosure, the predetermined spacing may be smaller than a thickness of the moisture absorbent holder.

[0033] In accordance with some embodiments of the dish washer of the present disclosure, the cover may further include a flange-shaped outward extension integrally connected to an outer edge of the cover body and extending outwardly in a direction away from the cover body. A pair of first sealing ribs may be disposed between an inner edge and an outer edge of the outward extension and protrude toward the open one surface of the moisture absorbent receiving portion. A pair of second sealing ribs coupled to the pair of first sealing ribs may be disposed on an edge defining the open one surface of the moisture absorbent receiving portion.

[0034] In accordance with some embodiments of the dish washer of the present disclosure, one of the pair of first sealing ribs may be sandwiched between the pair of second sealing ribs.

[0035] In accordance with some embodiments of the dish washer of the present disclosure, the cover may further include an outer peripheral wall extending along an outer edge of the outward extension and protruding toward the moisture absorbent receiving portion.

[0036] In accordance with some embodiments of the dish washer of the present disclosure, the first sealing ribs and the second sealing ribs may be coupled to each other such that the outer peripheral wall is in surface-contact with an outer side surface of the moisture absorbent receiving portion.

[0037] In accordance with some embodiments of the dish washer of the present disclosure, a vertical dimension by which the outer peripheral wall protrudes from the outward extension may be greater than a vertical dimension by which the first sealing rib protrudes from the outward extension.

[0038] According to the dish washer of the present disclosure, the space that functions as a discharge flow path through which air flow having passed through the moisture absorbent flows may be defined between the cover closing the moisture absorbent receiving space of the main housing and disposed downstream of the moisture absorbent and the moisture absorbent, thereby minimizing non-uniformity in resistance of the flow path against air flow having passed through the moisture absorbent inside the main housing and local non-uniformity in a moisture absorption amount, and thus preventing deterioration of moisture absorption efficiency.

[0039] Further, according to the dish washer of the present disclosure, the air flow to be directed to the outlet may be divided using the plurality of guide ribs arranged around the outlet and disposed on an inner surface of the cover, such that generation of eddy and turbulence as generated as airs flowing in different directions flow toward the outlet may be minimized to reduce flow loss of the air flow.

[0040] Furthermore, according to the dish washer of the present disclosure, the plurality of guide ribs may generate a rotational velocity component in the flow direction of the air flow in the air flow to be directed to the outlet to lower a flow speed of the air flow and thus reducing the flow speed of the air flow having passed through the moisture absorbent, such that a time for which the air flow stays in the moisture absorbent receiving space may be maximized and thus the moisture absorption efficiency of the moisture absorbent may be maximized.

[0041] Furthermore, a lower end of each of the plurality of guide ribs may act as a free end extending toward the moisture absorbent holder that defines an upper end of the moisture absorbent receiving space. The lower end of the guide rib may be in contact with the moisture absorbent holder. The lower end of the guide rib and the moisture absorbent holder may be spaced from each other by a predetermined spacing or smaller, so that the moisture absorbent holder may be effectively prevented from being removed from the housing by the pressure of the air flow.

[0042] In addition to the above-mentioned effects, the specific effects of the present disclosure as not mentioned will be described below along with the descriptions of the specific details for carrying out the present disclosure.

BRIEF DESCRIPTION OF DRAWINGS

[0043]

FIG. 1 is a front perspective view of a dish washer according to one embodiment of the present disclosure.

FIG. 2 is a schematic cross-sectional view of the dish washer as shown in FIG. 1.

FIG. 3 is a front perspective view showing a state in which a door of the dish washer as shown in FIG. 1 is opened.

FIG. 4 is a front perspective view showing a state in which a moisture-absorption and drying device of the

dish washer according to an embodiment of the present disclosure is accommodated in a base.

FIG. 5 is a plan view of FIG. 4.

FIG. 6 is a front perspective view showing a state in which a tub has been removed in FIG. 4.

FIG. 7 is a front perspective view of a moisture-absorption and drying device of a dish washer according to an embodiment of the present disclosure.

FIG. 8 is a cross-sectional view of the moisture-absorption and drying device as shown in FIG. 7.

FIG. 9 is an exploded perspective view of an air intake duct and a blower of the moisture-absorption and drying device as shown in FIG. 7.

FIG. 10 and FIG. 11 are front perspective views showing a combined state of a heater, a housing, and a cover of the moisture-absorption and drying device as shown in FIG. 7.

FIG. 12 is an exploded perspective view of FIG. 10 and FIG. 11.

FIG. 13 is an exploded perspective view of the heater as shown in FIG. 12.

FIG. 14 is a front perspective view of a second cover shown in FIG. 11 to FIG. 12.

FIG. 15 is a rear perspective view of the second cover shown in FIG. 14.

FIG. 16 is a bottom perspective view of the second cover shown in FIG. 14.

FIG. 17 is a bottom view of the second cover shown in FIG. 14.

FIG. 18 is a partial enlarged view of FIG. 16.

FIG. 19 is a partial enlarged view of FIG. 8.

FIG. 20 to FIG. 22 are partial enlarged views of FIG. 17, and show embodiments of an arrangement and a shape of guide ribs.

FIG. 23 and FIG. 24 are bottom views of the second cover included in a moisture-absorption and drying device of the dish washer according to another embodiment of the present disclosure.

[0044] The above-mentioned purpose, features and advantages are described in detail below with reference to the attached drawings. Accordingly, a person skilled in the art in the technical field to which the present disclosure belongs will be able to easily implement the technical idea of the present disclosure. Hereinafter, preferred embodiments according to the present disclosure will be described in detail with reference to the attached drawings. In the drawings, identical reference numerals are used to indicate identical or similar components.

[0045] It will be understood that, although the terms "first", "second", "third", and so on may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are used to distinguish one element, component, region, layer or section from another element, component, region, layer or section. Thus, a first element, component, region, layer or section described below could be termed a second element, component, region, layer or section.

[0046] The terminology used herein is directed to the purpose of describing particular embodiments only and is not intended to be limiting of the present disclosure. As used herein, the singular constitutes "a" and "an" are intended to include the plural constitutes as well, unless the context clearly indicates otherwise.

[0047] It will also be understood that when a first element or layer is referred to as being present "on" a second element or layer, the first element may be disposed directly on the second element or may be disposed indirectly on the second element with a third element or layer being disposed between the first and second elements or layers. It will also be understood that when a first element or layer is referred to as being present "under" a second element or layer, the first element may be disposed directly under the second element or may be disposed indirectly under the second element with a third element or layer being disposed between the first and second elements or layers.

[0048] It will be understood that when an element or layer is referred to as being "connected to", or "coupled to" another element or layer, it may be directly connected to or coupled to another element or layer, or one or more intervening elements or layers therebetween may be present. In addition, it will also be understood that when an element or layer is referred to as being "between" two elements or layers, it may be the only element or layer between the two elements or layers, or one or more intervening elements or layers therebetween may also be present.

[0049] It will be further understood that the terms "comprise", "comprising", "include", and "including" when used in this specification, specify the presence of the stated features, integers, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, operations, elements, components, and/or portions thereof. As used herein, the term "and/or" includes any and all combinations of one or more of associated listed items. Expression such as "at least one of" when preceding a list of

elements may modify the entire list of elements and may not modify the individual elements of the list. In interpretation of numerical values, an error or tolerance therein may occur even when there is no explicit description thereof.

[0050] Spatially relative terms, such as "beneath," "below," "lower," "under," "above," "upper," and the like, may be used herein for ease of explanation to describe one element or feature's relationship to another element or feature as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or in operation, in addition to the orientation depicted in the figures. For example, when the device in the drawings may be turned over, elements described as "below" or "beneath" or "under" other elements or features would then be oriented "above" the other elements or features. Thus, the example terms "below" and "under" may encompass both an orientation of above and below. The device may be otherwise oriented for example, rotated 90 degrees or at other orientations, and the spatially relative descriptors used herein should be interpreted accordingly.

[0051] As used herein, "A and/or B" means A, B or A and B, unless specifically stated otherwise. Expression such as "at least one of" when preceding a list of elements may modify the entirety of list of elements and may not modify the individual elements of the list. As used herein, "C to D" means C inclusive to D inclusive unless otherwise specified.

[0052] Hereinafter, the present disclosure will be described with reference to drawings showing a configuration according to an embodiment of the present disclosure.

[Overall structure of dish washer]

[0053] Hereinafter, an overall structure of a dish washer 1 according to an embodiment of the present disclosure will be described in detail with reference to the attached drawings.

[0054] FIG. 1 is a front perspective view showing the dish washer according to the present disclosure. FIG. 2 is a simplified cross-sectional view briefly showing an internal structure of the dish washer according to the present disclosure. FIG. 3 is a front perspective view showing a state in which a door 30 of the dish washer 1 as shown in FIG. 1 is in an open state.

[0055] As shown in FIG. 1 to FIG. 3, the dish washer 1 according to the present disclosure may include a casing 10 that constitutes an exterior appearance, a tub 20 installed in an inner space of the casing 10 and having a washing space 21 defined therein where the washing target is washed, wherein a front surface of the tub is open, a door 30 that opens/closes the open front surface of the tub 20, a driver 40 located under the tub 20 to supply, collect, circulate, and discharge the washing water for washing the washing target, a dish rack 50 removably provided in the inner washing space 21 of the tub 20 to receive therein the washing target, and a water sprayer installed adjacent to the dish rack 50 to spray the washing water for washing the washing target thereto.

[0056] In this regard, the washing target received in the dish rack 50 may be, for example, dishes such as bowls, plates, spoons, and chopsticks, and other cooking utensils. Hereinafter, unless otherwise specified, the washing target will be referred to as a dish.

[0057] The tub 20 may be formed in a box shape with an entirely open front surface, and have a configuration of a so-referred to as washing tub.

[0058] The washing space 21 may be defined inside the tub 20. The open front surface of the tub 20 may be opened/closed by the door 30.

[0059] The tub 20 may be formed via pressing of a metal plate resistant to high temperature and moisture, for example, a stainless steel plate.

[0060] Moreover, on an inner surface of the tub 20, a plurality of brackets may be disposed for the purpose of supporting and installing functional components such as the dish rack 50 and the water sprayer which will be described later thereon within the tub 20.

[0061] In one example, the driver 40 may include a sump 41 that stores therein washing water, a sump cover 42 that distinguishes the sump 41 from the tub 20, a water supply 43 that supplies washing water from an external source to the sump 41, a water discharger 44 that discharges the washing water of the sump 41 to an outside, and a washing pump 45 and a supply flow path 46 that supply the washing water of the sump 41 to the water sprayer.

[0062] The water supply 43 serves to supply washing water supplied from an external water supply source to the sump 41.

[0063] Although not shown, the water supply 43 may include a water jacket that stores therein the washing water supplied from the external water supply source, and a water softening device that softens the washing water stored in the water jacket.

[0064] The sump cover 42 may be disposed at a top of the sump 41 and may serve to distinguish the tub 20 and the sump 41 from each other. Moreover, the sump cover 42 may have a plurality of collecting holes defined therein for collecting washing water sprayed into the washing space 21 through the water sprayer into the sump 41.

[0065] That is, the washing water sprayed from the water sprayer toward the dish may fall down to a bottom of the washing space 21, and may be collected again through the sump cover 42 and into the sump 41.

[0066] The washing pump 45 may be disposed at a side or a bottom of the sump 41 and may serve to pressurize the washing water and supply the pressurized washing water to the water sprayer.

[0067] One end of the washing pump 45 may be connected to the sump 41 and the other end thereof may be connected to the supply flow path 46. The washing pump

45 may be equipped with an impeller 451 and a motor 453. When power is supplied to the motor 453, the impeller 451 may rotate, and thus the washing water in the sump 41 may be pressurized, and then may be supplied to the water sprayer through the supply flow path 46.

[0068] Although not shown, a wash water heater may be provided at the other end of the wash pump 45 to heat the wash water supplied during a wash cycle or a heat rinse cycle. In one example, the supply flow path 46 may serve to selectively supply the washing water supplied from the washing pump 45 to the water sprayer.

[0069] For example, the supply flow path 46 may include a first supply flow path 461 connected to a lower spraying arm 61, and a second supply flow path 463 connected to an upper spraying arm 62 and a top nozzle 63. The supply flow path 46 may be provided with a supply flow path switching valve 465 that selectively opens/closes the supply flow paths 461 and 463.

[0070] In this regard, the supply flow path switching valve 465 may be controlled so that the supply flow paths 461 and 463 are opened sequentially or simultaneously.

[0071] In one example, the water sprayer may be constructed to spray the washing water to the dishes stored in the dish rack 50.

[0072] More specifically, the water sprayer may include the lower spraying arm 61 located under the tub 20 to spray the washing water to a lower rack 51, the upper spraying arm 62 located between the lower rack 51 and an upper rack 52 to spray the washing water to the lower rack 51 and the upper rack 52, and the top nozzle 63 located on top of the tub 20 to spray the washing water to a top rack 53 or the upper rack 52.

[0073] In particular, the lower spraying arm 61 and the upper spraying arm 62 may be rotatably disposed in the washing space 21 of the tub 20 and may spray the washing water toward the dish of the dish rack 50 while being rotating.

[0074] The lower spraying arm 61 may be rotatably supported on a top of the sump cover 42 so as to spray the washing water toward the lower rack 51 while being rotating and being disposed under the lower rack 51.

[0075] Moreover, the upper spraying arm 62 may be rotatably supported by a spraying arm holder 467 so as to spray the washing water on the dish while being rotating and being disposed between the lower rack 51 and the upper rack 52.

[0076] In one example, although not shown, in order to increase washing efficiency, additional means for diverting the washing water sprayed from the lower spraying arm 61 into an upward direction (diverting in a U-direction) may be provided at a lower surface 25 of the tub 20.

[0077] Since a configuration already known in the art may be applied to a detailed configuration of the water sprayer, description of a specific configuration of the water sprayer will be omitted below.

[0078] The dish rack 50 for storing the dish therein may be disposed in the washing space 21.

[0079] The dish rack 50 may be constructed to extend or retract from or into the inner space of the tub 20 through the open front surface of the tub 20.

[0080] For example, in FIG. 2, an embodiment is shown in which the dish rack 50 includes the lower rack 51 located at a lower portion of the tub 20 to accommodate therein relatively large dishes, the upper rack 5 located on top of the lower rack 51 to accommodate therein medium-sized dishes, and the top rack 53 located at a top level of the tub 20 and capable of storing therein small dishes, etc. However, the present disclosure is not limited thereto. However, hereinafter, an example in which the dish washer includes the three dish racks 50 as shown is described.

[0081] Each of the lower rack 51, the upper rack 52, and the top rack 53 may be constructed to extend or retract from or into the inner space of the tub 20 through the open front surface of the tub 20.

[0082] For this purpose, guide rails 54 may be respectively disposed on both opposing walls constituting an inner surface of the tub 20. By way of example, the guide rails 54 may include an upper rail 541, a lower rail 541, and a top rail 543.

[0083] Wheels may be disposed on a bottom of each of the lower rack 51, the upper rack 52, and the top rack 53. The user may extend the lower rack 51, the upper rack 52, and the top rack 53 from the inner space of the tub 20 through the open front surface of the tub 20 and may place the dishes thereon, or easily withdraw the dishes that have been washed out thereof.

[0084] The guide rail 54 may be embodied as a simple rail-type fixed guide rail to guide the extending or the retracting of the rack 50, or a telescopic guide rail capable of guiding the extending or the retracting of the rack 50 and at the same time, increasing an extension distance thereof as the rack 50 further extends from the inner space of the tub.

[0085] In one example, the door 30 is configured for opening/closing the open front surface of the tub 20 as described above.

[0086] A hinge (not shown) around which the door 30 is closed or opened may be provided at a bottom of the open front surface. Thus, the door 30 may pivot around the hinge as a pivot axis.

[0087] In this regard, a handle 31 for opening the door 30 and a control panel 32 for controlling the dish washer 1 may be disposed on a front surface or a top surface as an outer side surface of the door 30.

[0088] As shown, the control panel 32 disposed on the front surface of the door 30 may include a display 33 that visually displays information regarding a current operating status of the dish washer, etc., and a button unit 34 including a selection button through which a user's selection manipulation is input and a power button through which a user's manipulation for turning the dish washer on and off is input.

[0089] In one example, an inner side surface of the door 30 may constitute a front surface as one surface of the tub 20 when the door 30 has been closed, and may

constitute a seat surface on which the lower rack 51 of the dish rack 50 is supported when the door 30 is fully opened.

[0090] For this purpose, when the door 30 is fully opened downwardly, the inner side surface of the door 30 may constitute a horizontal plane extending in the same direction as a direction in which the guide rail 54 guiding the displacement of the lower rack 51 extends.

[0091] In one example, a washing detergent supply device to automatically supply washing detergent to the inner space of the tub 20 may be disposed on the inner side surface of the door 30.

[0092] In one example, under the tub 20, a moisture-absorption and drying device 80 may be disposed which absorbs water vapor contained in the air discharged from the tub 20 during the drying cycle and then re-supplies the air back to the tub 20.

[0093] As shown, the moisture-absorption and drying device 80 may be configured to include an air intake duct 81 through which the air discharged from the tub 20 is sucked. The moisture-absorption and drying device 80 may be configured to include a blower 82 that generates a flow of air. The moisture-absorption and drying device 80 may be configured to include a heating unit 83 that heats the air sucked from the tub 20. The moisture-absorption and drying device 80 may be configured to include a moisture absorbent 85 that absorbs the water vapor contained in the air.

[0094] The lower surface 25 of the tub 20 may have an air supply hole 254 through which the air from which the water vapor has been removed using the moisture-absorption and drying device 80 is introduced into the inner space of the tub 20.

[0095] Moreover, as shown in FIG. 3, a grill cap 8113 coupled to an inlet of the air intake duct 81 may be fixed to one side surface of the tub 20, for example, to a right side surface thereof.

[0096] A detailed configuration of the moisture-absorption and drying device 80 will be described later with reference to FIG. 3 below.

[Detailed composition of moisture-absorption and drying device]

[0097] Hereinafter, with reference to FIG. 3 to FIG. 13, the detailed configuration of the moisture-absorption and drying device 80 according to an embodiment of the present disclosure is described.

[0098] First, as shown in FIGS. 3 to 6, remaining parts of the moisture-absorption and drying device 80 excluding a main duct 811 of the air intake duct 81 and a discharge guide 89 may be disposed to be accommodated between a base 90 and the lower surface 25 of the tub 20 and may be supported on a lower surface 91 of the base 90.

[0099] For example, the blower 82, the heater 83, and the housing 84 of the moisture-absorption and drying device 80 may be disposed adjacent to a rear surface 93 of the base 90, and may be arranged in a parallel manner to a length of the rear surface 93 of the base 90.

[0100] A position of the moisture-absorption and drying device 80 may be selected in consideration of characteristics of the heating unit 83 of the moisture-absorption and drying device 80, which generates high heat of approximately 200°C or higher in a moisture absorbent drying mode or a moisture absorbent regeneration mode. In other words, the position of the moisture-absorption and drying device 80 may be selected as a position other than positions of electrical components that are relatively affected by the high heat.

[0101] In this way, the blower 82, the heater 83, and the housing 84 of the moisture-absorption and drying device 80 may be adjacent to the rear surface 93 of the base 90 and may be arranged in a parallel manner to a length of the rear surface 93 of the base 90. Thus, when the door 30 is fully opened downwardly, a weight balance state may be achieved to prevent the dish washer 1 from tilting due to a load of the door 30.

[0102] Moreover, as shown in FIGS. 3 to 5, the position of the device 80 may be selected based on a location of the air supply hole 254 formed in the lower surface 25 of the tub 20. In consideration of user safety and in order to distinguish the air supply hole 254 from the water softener communication hole 255 located close to the front surface of the tub 20, the air supply hole 254 through which dry air is discharged may be formed in the lower surface 25 of the tub 20 and adjacent to a corner at which a rear surface and a left side surface meet each other.

[0103] The air supplied through the air supply hole 254 may be evenly distributed to the washing space 21 of the tub 20 through the discharge guide 89 exposed to the washing space 21.

[0104] In order to effectively supply the air from which the moisture has been absorbed to the air supply hole 254 formed at this location, the housing 84 of the moisture-absorption and drying device 80 that accommodates therein the moisture absorbent 85 may be disposed close to the air supply hole 254 and under the air supply hole 254.

[0105] However, the position of the moisture-absorption and drying device 80 is only an example. Embodiments of the present disclosure are not limited thereto. Alternatively, the moisture-absorption and drying device 80 may be located adjacent to a left side surface 94, a right side surface 95, or a front surface 92 rather than the rear surface 93 of the base 90. Embodiments of the present disclosure are not limited thereto. Hereinafter, the description will be based on an embodiment in which the moisture-absorption and drying device 80 is disposed adjacent to the rear surface 93 of the base 90 and extends in a parallel manner to the length of the rear surface 93 of the base 90.

[0106] In one example, as shown in FIG. 3 to FIG. 6, the blower 82, the heater 83, and housing 84 of the moisture-absorption and drying device 80 may be disposed adjacent to the rear surface 93 of the base 90 and may be

arranged in a parallel manner to the length of the rear surface 93 of the base 90. The air supply hole 254 may be formed adjacent to a corner at which the rear surface and the left side surface meet each other and in the lower surface 25 of the tub 20. In this case, an air intake hole 271 through which humid air is discharged from the tub 20 may be defined in a right side surface of the tub 20 and adjacent to a corner where the right side surface and the rear surface meet each other, and may be formed at a position close to an upper surface 24 of the tub 20.

[0107] The location of this air intake hole 271 may be selected as a location spaced as far as possible from the air supply hole 254 formed in the lower surface 25 of the tub 20.

[0108] In this way, the air intake hole 271 may be positioned so as to be as far as possible from the air supply hole 254 and the discharge guide 89. Thus, a possibility at which the air that has passed through the air supply hole 254 and the discharge guide 89 re-flows directly into the air intake hole 271 without passing through the washing target may be significantly reduced.

[0109] Moreover, the air intake hole 271 may be located at a higher position in a vertical direction than that of the upper rail 542 constituting the guide rail 54, for example, may be positioned between the top rail 543 and the upper rail 542.

[0110] Therefore, the air intake hole 271 may be formed at a higher position in the vertical direction than that of the upper rack 52 mounted on the upper rail 542 and moving along the upper rail 542. Thus, air flow F in the washing space 21 may be guided such that the air evenly flows through the lower rack 51 and the upper rack 52 and then flows into the air intake hole 271.

[0111] Moreover, as shown in FIG. 3, the air intake hole 271 together with the main duct 811, which will be described later, may be located in rear of a water jacket 110, where the washing water to be supplied to the sump 41, where the washing water is stored, is stored.

[0112] In this regard, as shown, a tub hole 118 may be formed in the water jacket 110 to communicate an internal space of the water jacket with the washing space 21 of the tub 20. A water jacket communication hole 272 may be defined in the right side surface 27 of the tub 20 in a corresponding manner to the tub hole 118.

[0113] The air intake hole 271 may be defined at a position other than a position of the water jacket 110 and may be formed at a higher position than that of the water jacket communication hole 272.

[0114] As shown, a grill cap 118a similar in shape to the grill cap 813 of the air intake hole 271 as described above may be coupled to the tub hole 118 to minimize inflow of the washing water and prevent inflow of foreign substances.

[0115] In one example, the grill cap 813 may be coupled to the air intake hole 271. Thus, the grill cap 813 may allow the washing water and foreign substances scattered from the inner space of the tub 20 from inflowing into the air intake duct 81 at a minimized level.

[0116] As will be described later, the grill cap 813 may pass through the air intake hole 271 and be coupled to an inlet 811a of the main duct 811 constituting the air intake duct 81.

[0117] FIGS. 7 to 13 show a detailed configuration of the moisture-absorption and drying device 80.

[0118] As shown, the moisture-absorption and drying device 80 may be configured include the blower 82 that generates flow F of air sucked from the tub 20 and to be supplied to the inner space of the tub 20, the heating unit 83 including the heater 831 that heats air to be supplied to the absorbent 85, a plurality of moisture absorbents 85 disposed downstream of the blower 82 and the heating unit 83 in a flow direction of air and absorb moisture contained in the air, the housing 84 having a heater receiving space S1 in which the heating unit 83 is accommodated and a moisture absorbent receiving space S3 in which the moisture absorbent 85 is accommodated, and the air intake duct 81 connecting the air intake hole of the tub 20 and the blower 82 to each other.

[0119] The blower 82 may be disposed upstream of the heating unit 83 and the moisture absorbent 85 in the flow direction of the air flow F, and may be disposed downstream of the air intake duct 81 in the flow direction of the air flow F and may suck the air from the tub 20, and may generate the air flow F so that the sucked air may pass through the moisture absorbent 85.

[0120] A blow fan (not shown) and a blower motor (not shown) that generates a rotational driving force of the blow fan may be modularized together to form an assembly accommodated inside a fan housing 821.

[0121] The fan housing 821 may be fixed to a main housing 841, which will be described later, via a connecting bracket 822.

[0122] As shown in FIG. 9, the connecting bracket 822 may include a fan connector 8221 in a shape of a circular plate coupled to one side surface of the fan housing 821, a rectangle plate-shaped housing connector 8222 coupled to an inlet IN1 of the main housing 841, and a bridge 8223 having one end fixed to the fan connector 8221, and extending in a bar shape and having the other end fixed to the other side surface of the fan housing 821.

[0123] The fan connector 8221 may be provided in a circular plate shape corresponding to a shape of one side surface of the fan housing 821, and may be fastened to the fan housing 821 using fastening means such as a screw bolt while being in surface contact with one side surface of the fan housing 821.

[0124] The housing connector 8222 may extend substantially perpendicular to the extension direction of the fan connector 8221 and may be integrally connected to an outer edge of the fan connector 8221. Therefore, the housing connector 8222 and the fan connector 8221 may be coupled to each other to achieve an overall L-shape.

[0125] The housing connector 8222 may be provided in the shape of a rectangle plate with taking into account a shape of a front end of the main housing 841 where the inlet IN1 is formed, that is, a shape of a front end of a

heater receiving portion 8411 of the main housing 841, as described later. The housing connector 8222 may be fastened to the front end of the heater receiving portion 8411 of the main housing 841 using fastening means such as a screw bolt.

[0126] Moreover, a rectangle hole may extend through the housing connector 8222 and may have a shape corresponding to a shape of a discharge hole 8211 of the fan housing 821 and a shape of the inlet IN1 of the heater receiving portion 8411 of the main housing 841.

[0127] The discharge hole 8211 of the fan housing 821 may extend through the rectangle hole formed in the housing connector 8222 and extend into the inlet IN1 of the main housing 841.

[0128] The bridge 8223 may have one end integrally connected to the fan connector 8221 and extend along a rotation axis of the blow fan and have the other end connected to the other side surface of the fan housing 821. In the other end of the bridge 8223, a fastening hole may be formed through which fastening means such as a screw bolt may pass. Therefore, a rigid fastening structure may be achieved in which the connecting bracket 822 is fastened to the other side surface of the fan housing 821 via the bridge 8223.

[0129] In one example, an auxiliary duct 812 constituting the air intake duct 81 may be coupled and fastened to the other side surface of the fan housing 821 where an intake hole is formed.

[0130] Moreover, as shown in FIG. 9, between the housing connector 8222 of the connecting bracket 822 and the front end of the heater receiving portion 8411 of the main housing 841, a gasket 823 which has a rectangle plate shape and is made of an elastic material may be disposed.

[0131] There is no limitation on a type of the blow fan applied to the moisture-absorption and drying device 80. However, in one example, a sirocco fan is preferable in consideration of constraints in terms of a position and a space where the blow fan is installed.

[0132] In the illustrated embodiment, when the sirocco fan is applied, air guided through the auxiliary duct 812 of the intake duct 81 may be introduced through the other side surface of the fan housing 821, that is, a rear surface thereof into the fan in a direction parallel to a rotation axis from a center of the sirocco fan, and then, the air may be accelerated radially and outwardly, and then may be discharged through the discharge hole 8211.

[0133] The accelerated and discharged air may generate the air flow F and may flow through the inlet IN1 of the heater receiving portion 8411 of the main housing 841 and be introduced into the inner space of the heater housing 832, which will be described later.

[0134] The heating unit 83 may be disposed between the blower 82 and the moisture absorbent 85 as described above in the flow direction of the air flow F, and may play a role in heating the air flow F to dry and regenerate the moisture absorbent 85 in the moisture absorbent drying mode or the moisture absorbent regeneration mode.

[0135] When the moisture-absorption and drying device 80 generates a high temperature air flow F in the moisture absorbent drying mode, power may be supplied to the heater 831 to heat the air flow F. When the moisture-absorption and drying device 80 generates a low-temperature air flow F in the moisture-absorption mode, the power supplied to the heater 831 may be cut off such that an operation of the heater 831 may be stopped.

[0136] In this regard, when the low-temperature air flow F is generated in the moisture-absorption mode, an operation of the blower motor may be maintained.

[0137] There is no limitation on the type of the heater 831 provided in the moisture-absorption and drying device 80 according to an embodiment of the present disclosure. For example, a tube-shaped sheath heater that has a relatively simple structure, has excellent heat generation efficiency, and is advantageous in preventing electric leakage due to the washing water flowing from the tub 20, may be selected.

[0138] In order to increase the heat exchange efficiency, a heater body 8311 of the heater 831 as the sheath heater may be directly exposed to the flow F of the air in an inner air passage of the heater housing 832, and may be bent multiple times to maximize a heat transfer area.

[0139] FIG. 13 and subsequent drawings show an example in which the heater body 8311 extends in a U-shape, that is, is bent twice by 90 degrees to form two rows. Embodiments of the present disclosure are not limited thereto. However, following description will be based on a configuration in which the heater body 8311 extends into two rows.

[0140] The heater body 8311 of the heater 831 may extend between the inlet IN1 formed at one end, i.e., the front end of the heater receiving portion 8411 of the main housing 841 and an outlet OUT1 formed at the other end, i.e., the rear end of the heater receiving portion 8411 thereof.

[0141] In this regard, the heater body 8311 may be disposed in the heater receiving portion 8411 such that a longitudinal direction thereof is parallel to a longitudinal direction of the heater receiving space S 1 and the heater housing 832.

[0142] Thus, the heat exchange performance and heat exchange efficiency of the heater body 8311 may be improved compared to a case where the longitudinal direction of the heater body 8311 intersects the longitudinal direction of the heater receiving space S1.

[0143] Further, the heater body 8311 may be closer to the outlet OUT1 formed at the rear end of the heater receiving portion 8411 than to the inlet IN1 formed at the front end of the heater receiving portion 8411, and thus may be disposed in the heater receiving portion 8411 of the housing 841.

[0144] That is, a spacing between the front end of the heater body 8311 and the inlet IN1 of the heater receiving portion 8411 may be larger than a spacing between the

rear end of the heater body 8311 and the outlet OUT1 of the heater receiving portion 8411.

[0145] Thus, the heater body 8311 may be disposed at a position spaced as far away from the blower 82 as possible. Thus, a possibility of damage to the blow fan and the blower motor of the blower 82 due to radiant heat from the heater body 8311 may be minimized.

[0146] The heater body 8311 may extend such that one end and the other end thereof extend through the front surface of the heater housing 832 and the front surface of the heater receiving portion 8411 of the main housing 841.

[0147] Moreover, a pair of terminals 8312 to receive power may be formed respectively at one end and the other end of the heater body 8311.

[0148] As shown, the pair of terminals 8312 may be fixedly installed onto the heater receiving portion 8411 of the main housing 841 via a terminal fixing portion 8313.

[0149] In this regard, a front surface of the heater receiving portion 8411 may have a fixing slot 8411c1 defined therein so that the terminal fixing portion 8313 may be fitted thereto in a sliding manner.

[0150] A slit-shaped groove extending in a sliding direction, that is, an up-down direction (U-D direction) may be formed on each of both opposing side surfaces of the terminal fixing portion 8313. While the terminal fixing portion 8313 slides upwardly, an edge of the fixing slot 8411c1 may be inserted into the slit-shaped groove and fitted thereto.

[0151] In this way, a front end of the heater body 8311 may be fixed to and supported on the terminal fixing portion 8313.

[0152] A rear end of the heater body 8311 may be fixed and supported to a single heater racket 8314, as shown in FIG. 13. That is, the rear end of the heater body 8311 may be supported on an air passage while being separated from the heater housing 832 and the heater receiving portion 8411 of the main housing 841 via the tub racket 8314.

[0153] The heater tub racket 8314 may be made of a metal material in consideration of a function of the heater body 8311 which generates high temperature heat, and may be preferably made of a metal plate that is resistant to high temperature and moisture. For example, the heater tub racket 8314 may be manufactured by pressing a plate made of a stainless steel-based material.

[0154] In one example, the heater housing 832 may be formed in a hollow form with an empty inner space to define an air passage in which the heater body 8311 is disposed. The air passage defined in the heater housing 832 together with an air introduction space S2 formed in a lower portion of the moisture absorbent receiving portion 8412 may constitute a first flow channel.

[0155] As described above, the heater body 8311 may be disposed in an inner space of the heater housing 832 so that a longitudinal direction thereof is parallel to the flow direction of the air flow F. Accordingly, like the heater body 8311, the heater housing 832 may be disposed in the heater receiving space S1 of the heater receiving portion 8411 of the main housing 841 so that a longitudinal direction thereof is parallel to the flow direction of the air flow F.

[0156] In this regard, in a corresponding manner to a shape of the heater receiving space S1, the heater housing 832 may extend linearly toward the air introduction space S2 along the longitudinal direction of the heater receiving portion 8411.

[0157] However, a length of the heater housing 832 may be greater than a length of the heater body 8311 so as to accommodate an entirety of the heater body 8311 therein.

[0158] In this regard, each of the front end of the heater housing 832 corresponding to a upstream side and the rear end thereof corresponding to a downstream side in the flow direction of the air flow F may be entirely opened so that the air may flow therethrough.

[0159] In this way, in order that each of the front end and the rear end may have the open air passage defined therein in an easy manner, the heater housing 832 may be divided into a lower housing 8321 and an upper housing 8322 arranged in the up-down direction (U-D) direction.

[0160] However, the present disclosure is not limited thereto. Hereinafter, as shown in FIG. 13, the description will be based on an embodiment in which the heater housing 832 is divided into the lower housing 8321 and the upper housing 8322 arranged in the up-down direction (U-D) direction.

[0161] The lower housing 8321, which constitutes a divided lower portion of the heater housing 832, constitutes a front surface, a rear surface, and a lower surface of the heater housing 832 in the illustrated state.

[0162] A passage slot 8321a may be formed in a U shape in a front surface 8321c of the lower housing 8321 so that the terminal 8312 of the heater body 8311 as described above may pass therethrough in a frontward direction.

[0163] A lower surface 8321e of the lower housing 8321, which constitutes a lower end surface of the inner air passage, may be approximately parallel to a bottom surface of the heater receiving portion 8411 of the main housing 841. As described later, the bottom surface of the heater receiving portion 8411 may extend parallel to a longitudinal direction of the heater receiving portion 8411. Thus, similarly, the lower surface 8321e of the lower housing 8321 may extend parallel to the longitudinal direction of the heater receiving portion 8411.

[0164] In this regard, a front edge of the lower surface 8321e of the lower housing 8321 may extend toward a lower end of the inlet IN1 of the heater receiving portion 8411, while a rear edge of the lower surface 8321e of the lower housing 8321 may extend toward the outlet OUT1 of the heater receiving portion 8411.

[0165] In this regard, the rear edge of the lower surface 8321e of the lower housing 8321 may extend to a position beyond a front end of the bottom surface of the moisture

absorbent receiving portion 8412.

[0166] Therefore, the lower surface 8321e of the lower housing 8321 may have a bent shape corresponding to a shape of a corner at which the rear end of the bottom surface of the heater receiving portion 8411 and the front end of the bottom surface of the moisture absorbent receiving portion 8412 meet each other.

[0167] More specifically, the lower surface 8321e of the lower housing 8321 may be configured to include a first surface 8321e1 extending linearly from the front edge to the lower end edge thereof so as to define a first crossing angle with respect to the bottom surface of the moisture absorbent receiving portion 8412, and a second surface 8321e2 that is bent from the first surface 8321e1 and extends parallel to the bottom surface of the moisture absorbent receiving portion 8412.

[0168] Therefore, an extension direction of a bottom surface of the first flow channel formed in an inner space of the heater housing 832 may be diverted at a position at which the second surface 8321e2 of the lower surface 8321e of the lower housing 8321 is bent from the first surface 8321e1.

[0169] In one example, the lower housing 8321 provides an air passage with a flow path area larger than a cross-sectional area of the inlet IN1 of the heater receiving portion 8411.

[0170] To this end, as shown in FIG. 13, the front end of the lower housing 8321 may include an expansion section whose cross-sectional area gradually increases in a front-rear direction while extending along the flow direction of the air flow F.

[0171] Due to the expansion section, the flow rate of the air flow F may be reduced while the air flow F flows through the inlet IN1 of the heater receiving portion 8411, such that the heat exchange efficiency between the heater body 8311 and the air flow F may be improved.

[0172] In one example, the upper housing 8322 is coupled to the open upper surface of the lower housing 8321, and serves to define a top surface of the inner air passage by closing the upper surface of the lower housing 8321.

[0173] To this end, an upper surface 8322a of the upper housing 8322 may be formed to have a corresponding size to a size of the open upper surface of the lower housing 8321. Moreover, the upper surface 8322a of the upper housing 8322 may be approximately parallel to an upper surface of the heater receiving portion 8411 of the main housing 841, which will be described later.

[0174] A front edge of the upper surface 8322a of the upper housing 8322 may extend toward an upper end of the inlet IN1 of the heater receiving portion 8411, while a rear edge of the upper surface 8322a of the upper housing 8322 may extend toward the outlet OUT1 of the heater receiving portion 8411.

[0175] In this regard, the rear edge of the upper surface 8322a of the upper housing 8322 may extend to an upper end of the outlet OUT1 of the heater receiving portion 8411.

[0176] Moreover, like the lower housing 8321, the upper surface 8322a of the upper housing 8322 may extend linearly from the front edge to the lower end edge thereof so as to define the first crossing angle relative to the bottom surface of the moisture absorbent receiving portion 8412.

[0177] Accordingly, a top surface of the first flow channel defined in an inner space of the heater housing 832 may extend linearly to the outlet OUT1 of the heater receiving portion 8411.

[0178] Moreover, a coupling surface 8322c bent downwardly may be formed at each of the front edge and the rear edge of the upper surface of the upper housing 8322.

[0179] When the upper housing 8322 and the lower housing 8321 are coupled to each other, these coupling surfaces 8322c may be in surface contact with a front surface 8321c and a rear surface 8321d of the lower housing 8321, respectively.

[0180] Thus, coupling and connection strength between the lower housing 8321 and the upper housing 8322 may be improved.

[0181] In one example, as shown in FIG. 13, a thermostat 871 constituting a temperature sensing unit 87 may be disposed on the upper surface 8322a of the upper housing 8322. The thermostat 871 may detect whether the heater body 8311 is overheated.

[0182] For example, the thermostat 871 may be provided as a pair of thermostats, and the pair of thermostats 871 may be arranged in a longitudinal direction of the heater body 8311 so as to effectively detect local overheating of the heater body 8311.

[0183] In one example, the temperature sensing unit 87 may further include a thermistor 872 that detects a temperature of the air flow F. In one example, as shown in FIG. 10 and FIG. 11, the thermistor 872 may extend through the front surface of the moisture absorbent receiving portion 8412 and a front surface of an auxiliary housing 842 into the air introduction space S2.

[0184] An output signal of the temperature sensing unit 87 may be transmitted to a controller, and the controller may receive the output signal of the temperature sensing unit 87 and may determine whether the heater body 8311 is overheated and the temperature of the air flow F based on the output signal. When the overheating occurs, the controller may stop the operation of the heater body 8311 by cutting off the power supply to the heater body 8311.

[0185] In one example, a plurality of second bead forming portions 8322b that is convex in an upward direction may be formed on the upper surface 8322a of the upper housing 8322.

[0186] Due to the second bead forming portion 8321b, an isolation space may be formed between the first cover 881 disposed on top of the upper housing 8322 and the upper housing 8322 by a predefined spacing.

[0187] This isolation space may act as a thermally insulating air layer for the upper housing 8322, in a similar manner to the isolation space for the lower housing 8321 as described above.

[0188] In one example, with in consideration of the fact that the heater body 8311 which generates high temperature heat is disposed in the housing composed of the lower housing 8321 and the upper housing 8322, each of the lower housing 8321 and the upper housing 8322 may be made of a metal plate resistant to high temperature heat and moisture. For example, each of the lower housing 8321 and the upper housing 8322 may be formed by pressing a plate made of a stainless steel-based material and having an approximately uniform thickness.

[0189] The moisture absorbent 85 absorbs moisture contained in the flow of air discharged from the tub 20 and inhaled by the device 80 when the moisture-absorption and drying device 80 operates in the moisture-absorption mode. When the moisture-absorption and drying device 80 operates in the moisture absorbent drying mode, the moisture absorbent 85 discharges the absorbed moisture into the air flow F.

[0190] In other words, the moisture absorbent 85 may be made of a reversibly dehydratable material so as to absorb the moisture or discharge the absorbed moisture depending on an operating temperature range.

[0191] The reversibly dehydratable material may include any one of aluminum oxide, silicon oxide, silica gel, alumina silica, or zeolite, or may be a composition having a combination of two or more selected therefrom.

[0192] In an example, the moisture absorbent 85 made of an alumina silica-based material including aluminum oxide and silicon oxide may be applied to the moisture-absorption and drying device 80 according to the present disclosure. Embodiments of the present disclosure are not limited thereto. However, following descriptions will be based on an example in which the alumina silica-based moisture absorbent 85 is employed.

[0193] In this way, the moisture absorbent 85 made of the alumina silica-based material may be provided in a form of particles with a predefined particle size so that a contact area with the air flow F may be secured as much as possible. Moreover, compared to the moisture absorbent made of pure aluminum oxide or silicon oxide, a moisture-absorption action of the moisture absorbent 85 made of the alumina silica-based material may be effective at a lower temperature range, and regeneration action may be effective at a lower temperature range.

[0194] However, while the air flow F may flow through a gap between the plurality of moisture absorbents 85 provided in the form of particles, the air flow F may contact the moisture absorbents 85 such that the moisture contained therein is absorbed into the moisture absorbents 85 or the air flow absorbs the moisture discharged from the moisture absorbents 85.

[0195] Therefore, the moisture absorbent 85 cannot help but act as flow resistance to the air flow F. The particle size of the moisture absorbent 85 may be selected such that a pore may be effectively formed between the particles to minimize such flow resistance, and optimal moisture-absorption efficiency may be secured.

[0196] For this purpose, the moisture absorbent 85 may have the particle size in a range of 2 mm to 6 mm.

[0197] In one example, the moisture absorbent 85 is disposed downstream of the blower 82 and the heating unit 83 in the flow direction of the air flow F.

[0198] More specifically, the moisture absorbent 85 may be accommodated in the moisture absorbent receiving space S3 of the main housing 841 positioned downstream of the blower 82 and the heater 83.

[0199] The moisture absorbent receiving space S3 may be defined in the moisture absorbent receiving portion 8412 of the main housing 841 and may be defined by a pair of moisture absorbent holders 86 disposed to be spaced apart from each other along the vertical direction.

[0200] As shown in FIG. 12, in one example, the pair of moisture absorbent holders 86 may be configured to include a first moisture absorbent holder 861 defining the lower end surface of the moisture absorbent receiving space S3 and dividing the inner space of the moisture absorbent receiving portion into the moisture absorbent receiving space S3 and the air introduction space S2, and a second moisture absorbent holder 862 defining a top surface of the moisture absorbent receiving space S3.

[0201] The first moisture absorbent holder 861 and the second moisture absorbent holder 862 may be formed in a plate shape so as to define the top surface and the lower end surface of the moisture absorbent receiving space S3, respectively.

[0202] More specifically, the first moisture absorbent holder 861 may be configured to include an outer edge 8611 to maintain overall strength thereof, and a mesh 8612 that is formed in an inner space defined by the outer edge 8611 and allows air to flow therethrough.

[0203] Likewise, the second moisture absorbent holder 862 may be configured to include an outer edge 8621 for maintaining overall strength thereof, and a mesh 8622 formed in an inner space defined by the outer edge 8621 and allows air to flow therethrough.

[0204] Thus, between the mesh 8612 of the first moisture absorbent holder 861 and the mesh 8622 of the second moisture absorbent holder 862, a second flow channel through which the air flow F may pass may be formed.

[0205] In this regard, in order to prevent the moisture absorbent 85 from leaving out of the moisture absorbent receiving space S3, a grid size of each of the mesh 8612 of the first moisture absorbent holder 861 and the mesh 8622 of the second moisture absorbent 85 may be smaller than the particle size of the moisture absorbent 85.

[0206] In one example, the mesh 8622 of the second moisture absorbent holder 862 may extend approximately parallel to the bottom surface of the moisture absorbent receiving portion 8412. The mesh 8612 of the first moisture absorbent holder 861 may extend so as to define a predefined crossing angle with respect to the bottom surface of the moisture absorbent receiving portion 8412.

[0207] In more detail, the mesh 8612 of the first moisture absorbent holder 861 may include a first holding

surface defining a second crossing angle relative to the bottom surface of the moisture absorbent receiving portion 8412, and a second holding surface 8612b defining a third crossing angle relative to the bottom surface of the moisture absorbent receiving portion 8412.

[0208] In one example, the housing 84 of the moisture-absorption and drying device 80 accommodates therein the above-described heating unit 83 and moisture absorbent 85. The housing 84 may define therein the first flow channel of the air flow F having passed through the heater body 8311 and the second flow channel of the air flow F having passed through the moisture absorbent 85.

[0209] In one example, as shown in FIGS. 10 to 12, the housing 84 may be configured to include the main housing 841 having the heater receiving space S1 in which the heating unit 83 is accommodated and the moisture absorbent receiving space S3 in which the moisture absorbent 85 is accommodated defined therein, and the auxiliary housing 842 coupled to an outer peripheral surface of the main housing 841.

[0210] First, the main housing 841 may include the heater receiving portion 8411 in which the heater receiving space S1 is formed. The main housing 841 may include the moisture absorbent receiving portion 8412 in which the moisture absorbent receiving space S3 is formed.

[0211] As shown, based on a state in which the device 80 is disposed on the base 90, the upper surface of the heater receiving portion 8411 may be entirely open and the heater receiving portion 8411 may have a hollow box shape having an overall hexahedral shape.

[0212] The heater housing 832 and the heater body 8311 may be inserted through the open upper surface of the heater receiving portion 8411.

[0213] The open upper surface of the heater receiving portion 8411 may be closed by coupling the first cover 881 which will be described later thereto after the placement and the assembly of the heating unit 83 has been completed. For this purpose, a fastening boss 8411g may be integrally formed with the front surface 8411c and the rear surface 8411d of the heater receiving portion 8411 as a position corresponding to a fastening boss 8812 of the first cover 881.

[0214] The heater receiving space S1 having a shape corresponding to the shape of the heater housing 832 may be formed in an inner space of the hollow heater receiving portion 8411.

[0215] In one example, based on the state in which the device 80 is disposed on the base 90, the moisture absorbent receiving portion 8412 of the main housing 841 may have an entirely open upper surface, and may have a generally hexahedral hollow box.

[0216] The open upper surface of the moisture absorbent receiving portion 8412 may function as the outlet OUT2 through which the air having passed through the moisture absorbent 85 is discharged out.

[0217] The open upper surface of the moisture absorbent receiving portion 8412 may be closed by combining a second cover 882, which will be described later thereto, after the placement of the moisture absorbent holder 86 and the moisture absorbent 85 into the inner space of the moisture absorbent receiving portion 8412 has been completed.

[0218] For this purpose, a fastening boss 8412g may be integrally formed with each of a front surface, a rear surface, a right surface and a left surface of an outer peripheral surface of the moisture absorbent receiving portion 8412 as a position corresponding to each of fastening bosses 8823 of the second cover 882.

[0219] In one example, the auxiliary housing 842 may be coupled to the main housing 841 so as to at least partially surround the outer surface of the main housing 841, and serves to thermally insulate the inner space of the main housing 841 from the outside.

[0220] As shown, the auxiliary housing 842 may be disposed to surround an outer peripheral surface and an outer bottom surface of the main housing 841.

[0221] In this regard, a gap may be formed at least locally between an inner surface of the auxiliary housing 842 and the outer peripheral surface and the outer bottom surface of the main housing 841.

[0222] Due to this gap, a thermally insulating air layer may be formed between the auxiliary housing 842 and the main housing 841 in a similar manner to the thermally insulating air layer formed between the heater housing 832 and the heater receiving portion 8411 of the main housing 841 as described above.

[0223] Therefore, an amount of heat transfer from the inner space of the main housing 841 to the outside may be minimized. An internal temperature of the main housing 841 may be maintained in a temperature environment suitable for operation in the moisture-absorption mode or the moisture absorbent regeneration mode. Accordingly, power consumption may be minimized and the drying time of the washing target and the regeneration time of the moisture absorbent may be shortened.

[0224] The auxiliary housing 842 may be provided as divided structures arranged along the front and rear direction, as shown in FIG. 12, in consideration of ease of manufacturing and assembly.

[0225] In one example, as described above, the open upper surface of the heater receiving portion 8411 of the main housing 841 and the open upper surface of the moisture absorbent receiving portion 8412 may be closed by the cover 88.

[0226] As shown by way of example, in consideration of the shape of the main housing 841, the cover 88 may be configured to include a first cover 881 coupled to the heater receiving portion 8411 and a second cover 882 coupled to the moisture absorbent receiving portion 8412.

[0227] The first cover 881 coupled to the heater receiving portion 8411 may be provided in a plate shape corresponding to the shape of the upper housing 8322 of the heater housing 832.

[0228] A pair of through holes 8811 may be formed in the first cover 881 to allow the aforementioned thermostat 871 to pass therethrough.

[0229] Moreover, a plurality of fastening bosses 8812 for fastening the main housing 841 and the auxiliary housing 842 to each other may be integrally formed with the outer edge of the first cover 881. A fastening means such as a screw bolt may extend through the fastening boss 8812, and may be screw-coupled to the fastening boss 8411g provided at the heater receiving portion 8411 of the main housing 841 or the fastening boss 8421 provided at the auxiliary housing 842.

[0230] In a similar manner to the thermally insulating air layer defined between the lower housing 8321 of the heater housing 832 and the heater receiving portion 8411 of the main housing 841, a thermally insulating air layer may be formed between the first cover 881 and the upper housing 8322.

[0231] In one example, unlike the first cover 881, the second cover 882 coupled to the moisture absorbent receiving portion 8412 may be formed to have a three-dimensional shape similar to an inverted funnel shape.

[0232] That is, the second cover 882 may be constructed to have an inverted funnel shape that is convex upwardly so that the air that has passed through the moisture absorbent 85 and the second moisture absorbent holder 862 as described above may converge.

[0233] Therefore, as the second cover 882 is provided with a converging surface 8821 that is convex upwardly, a predefined space S4 may be formed between the second moisture absorbent holder 862 which defines the top surface of the moisture absorbent receiving space S3, and the converging surface 8821 of the second cover 882. The space S4 constitutes a discharge flow path through which the air flow F that has passed through the moisture absorbent 85 is discharged. Because the discharge flow path continuously communicates with the second flow channel formed between the pair of moisture absorbent holders 86, the discharge flow path may be referred to as a third flow channel.

[0234] An upper end of the inner converging surface 8821 of the second cover 882 may have an outlet defined therein through which the air having passed through the third flow channel as the discharge flow path is discharged.

[0235] A lower end of a connection duct 883 which guides the air flow F toward the lower surface 25 of the tub 20 may be integrally connected to the outlet.

[0236] Moreover, like the first cover 881, a plurality of fastening bosses 8823 for fastening the main housing 841 and the auxiliary housing 842 to each other may be formed integrally with the outer edge of the second cover 882. The fastening means such as the screw bolt may extend through the fastening boss 8823, and may be screw-coupled to the fastening boss 8412g provided at the moisture absorbent receiving portion 8412 of the main housing 841 or the fastening boss 8421 provided at the auxiliary housing 842.

[0237] A detailed configuration of the second cover 882 will be described later with reference to FIG. 14.

[0238] In one example, the moisture-absorption and drying device 80 may further include the connection duct 883 which is connected to the outlet passing through the second cover 882 and which has an air passage defined therein.

[0239] As described above, the heater 83, the blower 82, and the moisture absorbent 85 are disposed under the lower surface 25 of the tub 20. The connection duct 883 serves to guide the air flow F discharged from the space S4 formed under the second cover 882 toward the air supply hole 254 formed in the lower surface 25 of the tub 20.

[0240] As shown in the illustrated embodiment, a duct body 8831 of the connection duct 883 may be constructed to have a shape to connect the air supply hole 254 of the tub 20 and the outlet of the heater housing 832 to each other so as to guide the air flow F.

[0241] For example, as shown in FIG. 10 and FIG. 11, the duct body 8831 of the connection duct 883 may have a cylinder shape having a lower end in fluid communication with the outlet of the second cover 882, and an upper end extending in an upward direction (U-direction) and through the air supply hole 254.

[0242] In one example, as a means to improve fastening efficiency and prevent water leakage, a ring-shaped flange surface 8832 and a male screw member 8833 may be integrally formed with an outer peripheral surface of the duct body 8831.

[0243] The upper end of the duct body 8831 may extend upwardly (in the U-direction) through the lower surface 25 of the tub 20. The upper end of the duct body 8831 and the male screw member 8833 may at least partially extend through the lower surface 25 of the tub 20 and protrude toward the inner space of the tub 20.

[0244] A fastening nut (not shown) may be coupled to the male screw member 8833 extending through the inner space of the tub 20.

[0245] In fixing and fastening the duct body 8831, the upper end 8511 of the duct body 8831 may be fixed in an exposed state to the inner space of the tub 20 by screw-coupling the fastening nut to the male screw member 8833 in the inner space of the tub 20.

[0246] In one example, a discharge guide 89 that changes the discharge direction of the air flow F supplied through the connection duct 883 may be coupled to the upper end of the duct body 8831.

[0247] Through the discharge guide 89, a portion of the air flow F may be directed toward the lower surface 25 of the tub 20, while a portion of the air flow F may be directed toward the upper surface 24 of the tub 20.

[0248] In one example, the moisture-absorption and drying device 80 may further include the air intake duct 81 which has a front end connected to the air intake hole of the tub 20, and has a rear end connected to the blower 82, and that serves to guide the air flow F discharged from the tub 20 through the air supply hole 254 to the blower 82

and the heater 83 to the moisture absorbent 85.

[0249] More specifically, as shown in FIGS. 7 to 9, the air intake duct 81 may be configured to include the main duct 811 extending along the vertical direction and disposed on an outside of the right side surface of the tub 20, and the auxiliary duct 812 located between the rear end of the main duct 811 and the blower 82 and under the lower surface 25 of the tub 20.

[0250] The main duct 811 may be disposed on the outside of the right side surface of the tub 20 and may be in close contact with the right side surface, and serves to guide the air flow F sucked through the air intake hole formed in the right side surface of the tub 20 to a position under the lower surface 25 of the tub 20.

[0251] To this end, as shown, the main duct 811 may be disposed so as to extend linearly as long as possible along the vertical direction between the upper end and the lower end. Thus, maximum condensation of moisture may occur inside the main duct 811.

[0252] Further, as shown in FIG. 8, the inner space of the main duct 811 extends generally vertically. An air passage C through which the air flow F flows in the downward direction may be formed in the inner space thereof.

[0253] The air flow F having passed through the air passage C of the main duct 811 may be introduced into the blower 82 through the auxiliary duct 812, which will be described later. The air flow F having passed through the blower 82 may be introduced into the heater receiving space S1 of the heater receiving portion 8411 having the downward inclination.

[0254] As described above, the heater receiving portion 8411 extends in a downward inclination of the first crossing angle with respect to the bottom surface of the moisture absorbent receiving portion 8412. Therefore, the flow direction of the air flow F in the heater receiving space S1 may be changed so as to define an obtuse angle greater than 90 degrees with respect to the main duct 811.

[0255] Moreover, as the air flow F having passed through the heater receiving space S1 flows into the air introduction space S2 of the moisture absorbent receiving portion 8412, the flow direction thereof may be changed. In this case as well, the flow direction of the air flow F may be changed so as to define an obtuse angle greater than 90 degrees with respect to the flow direction of the heater receiving space S1.

[0256] The air flow F whose flow direction has been changed in the heater receiving space S1 may be introduced into the moisture absorbent receiving space S3. Then, the flow direction thereof may be changed as the air flow flows into the connection duct 883 through the moisture absorbent 85. In this case as well, the flow direction of the air flow F may be changed so as to define an obtuse angle larger than 90 degrees while passing through the moisture absorbent 85 and flowing into the connection duct 883.

[0257] Therefore, the flow direction of the air flow F may be changed so as to define an obtuse angle larger than 90 degrees while the air follow flows along the main duct 811, the main housing 841, and the connection duct 883, such that the change in the flow direction of the air flow F so as to define the acute angle may be minimum, and flow resistance due to the flow direction change may be minimized. Accordingly, the power consumption to generate the air flow F may be minimized.

[0258] In this way, the main duct 811 may be manufactured in a hollow shape so that the air passage through which the air flow F may flow is formed therein.

[0259] In order to easily implement the hollow shape and for convenience of manufacturing, as shown in FIG. 9, in one example, the main duct 811 may be divided into the first duct body 8111 and the second duct body 8112, and each of the first duct body 8111 and the second duct body 8112 may be divided into segments along a vertical plane.

[0260] The first duct body 8111 may be formed in a shape of a hollow box with an open left side surface so that an inverted U-shaped air passage may be formed therein.

[0261] An inner space of the first duct body 8111 is maintained in a hollow state. Therefore, in the inner space of the first duct body 8111, a reinforcing rib 8113 extending along the extension direction of the air passage may be integrally disposed on the right side surface and may protrude from the right side surface to the left side surface.

[0262] The lower end of the first duct body 8111 may have one portion of an outlet-defining portion 8115 open downwardly and defining an outlet 811b. The air flows through the outlet 811b.

[0263] The second duct body 8112 is coupled to the open left side surface of the first duct body 8111 and serves to close the air passage formed in the first duct body 8111.

[0264] To this end, the second duct body 8112 may be provided in a plate shape corresponding to a shape of the open left side surface of the first duct body 8111.

[0265] An inlet-defining portion 8114 may be formed on the second duct body 8112. An inlet 811a having a shape and size corresponding to those of the air intake hole of the tub 20 may be defined by the inlet-defining portion 8114. In one example, the inlet-defining portion 8114 may be embodied as a rib in a ring shape corresponding to a shape of the air intake hole of the tub such that the rib may be inserted into the air intake hole. As described above, the grill cap 813 may be fastened to the inlet-defining portion 8114 defining the inlet 811a to minimize the inflow of the washing water and prevent the inflow of foreign substances.

[0266] The lower end of the second duct body 8112 may have the other portion of the outlet-defining portion 8115 open downwardly and defining the outlet 811b. That is, the first and second duct bodies 8111 and 8112 may be coupled to each other such that one portion and the other portion of the outlet-defining portion 8115 may be coupled

to each other to define the outlet 811b.

[0267] The outlet-defining portion 8115 constituting the lower end of the first duct body 8111 and the lower end of the second duct body 8112 may be connected to the auxiliary duct 812 so as to be inserted into the inlet of the auxiliary duct 812, which will be described later. An air-tight ring 814 made of an elastic material may be disposed between the outlet-defining portion 8115 of the main duct 811 and an inlet 812a of the auxiliary duct 812. The auxiliary duct 812 may be disposed between the lower end of the main duct 811 and the blower 82, and serves to change the flow direction of the air flow having passed through the outlet 811b of the main duct 811 toward to the blower 82.

[0268] Like the main duct 811, an air passage through which the air flow F having passed through the main duct 811 may flow may be formed in an inner space of the auxiliary duct 812.

[0269] However, in order to change the flow direction of the air having passed through the main duct 811 toward the inlet of the fan housing 821 of the blower 82, an air passage extending in an approximately L shape may be formed in an inner space of the auxiliary duct 812.

[0270] Likewise, a shape of the auxiliary duct 812 may have an approximately L-shape corresponding to the shape of the air passage defined therein.

[0271] The inlet 812a through which the flow of air is introduced may be formed at one end of the L-shape, that is, at an upper end thereof, based on the state shown in the drawing. The outlet 812b may be formed at one end of the L-shape, that is, at a lower end thereof, based on the state shown in the drawing. That is, a vertical level of the outlet 812b of the auxiliary duct 812 may be lower than a vertical level of the inlet 812a thereof.

[0272] The inlet 812a of the auxiliary duct 812 may have a rectangular cross-section shape corresponding to a shape of the outlet 811b of the main duct 811. The outlet 812b of the auxiliary duct 812 may have a circular shape corresponding to a shape of a circular inlet disposed in the other side surface of the fan housing 821.

[0273] In one example, a bridge 8123 as a fastening means for the fan housing 821may be provided around the outlet 812b of the auxiliary duct 812.

[0274] In a manner similar to the bridge 8223 of the aforementioned connecting bracket 822, one end of the bridge 8123 of the auxiliary duct 812 may be fixed to the upper side of the outlet 812b of the auxiliary duct 812, while the other end thereof may extend in a bar shape to one side surface of the fan housing 821.

[0275] A fastening hole through which a fastening means such as a screw bolt passes may be defined in the other end of the bridge 8123 of the auxiliary duct 812. The fastening means may pass through the fastening hole and be fixed to one side surface of the fan housing 821.

[Detailed configuration of second cover]

[0276] Hereinafter, with reference to FIG. 14 to FIG. 22, the detailed configuration of the second cover 882 included in the moisture-absorption and drying device 80 of the dish washer 1 according to the present disclosure is described.

[0277] First, referring to FIG. 14, the second cover 882 may include a cover body 882a coupled to one open surface of the moisture absorbent receiving portion 8412 of the main housing 841 to close the moisture absorbent receiving space S3, wherein the cover body 882a has an outlet 8822 defined therein through which air having flowed through the moisture absorbent 85 is discharged.

[0278] As shown, the cover body 882a may be constructed to have a three-dimensional shape similar to an inverted funnel shape.

[0279] In this regard, as described above, in consideration of the air flow within the washing space 21, the air supply hole 254 may be formed closer to the innermost corner of the tub 20 at which left and rear sides of the tub 20 meet each other. In consideration of this location of the air supply hole 254, the outlet 8822 through which air flow F exits from the cover body 882a may be formed in a top flat portion 882a11 and at a position closer to a corner at which a rear edge and a left edge of the cover body 882a meet each other.

[0280] Therefore, the outlet 8822 is formed at the position closer to the corner at which the rear and left sides meet each other, such that the cover body 882a has an asymmetrical funnel shape.

[0281] In this regard, as shown in FIG. 14 to FIG. 17, the outlet 8822 may be defined by an outlet-defining portion that partially protrudes outwardly beyond an outward extension 882a2 which will be described later.

[0282] However, the protruding portion of the outlet-defining portion defining the outlet 8822 that protrudes outwardly beyond the outward extension 882a2 may have a minimum protrusion amount so as not to interfere with the tub 20, the base 90, and other components of the dish washer 1.

[0283] Because the protruding portion of the outlet-defining portion defining the outlet 8822 protrudes outwardly beyond the outward extension 882a2, a cut portion may be present at a location where the protruding portion of the outlet-defining portion defining the outlet 8822 is connected to the top flat portion 882a11. As shown in FIG. 18, a connection portion 8822a may be formed that gently connects this cut portion to a lower end of the connection duct 883.

[0284] In one example, the lower end of the connection duct 883 is integrally connected with the top flat portion 882a11 of the cover body 882a, as shown. In consideration of an extension direction of the connection duct 883, that is, an approximately vertical direction, the top flat portion 882a11 of the cover body 882a may have a flat shape extending in a parallel manner to a horizontal direction.

[0285] In order to achieve the asymmetrical inverted funnel shape, the cover body 882a may have a convex portion 882a1 that is formed to be convex upwardly in a direction away from the open one surface of the moisture absorbent receiving portion.

[0286] As shown, the convex portion 882a1 may have a roughly constant thickness. Therefore, shapes of an inner surface and an outer surface of the convex portion 882a1 may be identical with each other and may be approximately the inverted funnel shape.

[0287] As the convex portion 882a1 has the asymmetrical inverted funnel shape, an entirety of the convex portion 882a1 may be maintained in a state spaced upwardly from the open upper surface 8412c of the moisture absorbent receiving portion 8412 and the second moisture absorbent holder 862.

[0288] Thus, the predetermined space S4 may be formed between the inner surface of the convex portion 882a1 and the second moisture absorbent holder 862, as shown in FIG. 19. This space S4 may constitute a discharge flow path through which air having flowed through the mesh 8622 of the second moisture absorbent holder 862 may flow under minimal flow resistance.

[0289] In one example, the convex portion 882a1 may have the converging surface 8821 so that an area size in a plan view of the discharge flow path may gradually decrease as the discharge flow path extends toward the outlet 8822.

[0290] In consideration of the asymmetric inverted funnel shape, the converging surface 8821 may be embodied as a combination of curved surfaces with different curvatures, or a combination of inclined surfaces with different inclinations.

[0291] FIG. 14 and subsequent drawings show an example in which the converging surface 8821 of the convex portion 882a1 is embodied as a combination of multiple inclined surfaces with different inclinations.

[0292] However, embodiments of the present disclosure are not limited thereto. Hereinafter, an example in which the converging surface 8821 of the convex portion 882a1 is embodied aa the combination of multiple inclined surfaces with different inclinations is described.

[0293] As shown, when the converging surface 8821 is embodied as a combination of a plurality of inclined surfaces, the converging surface 8821 may include a first converging surface 8821a disposed in front of the top flat portion 882a11, a second converging surface 8821b disposed on a left side of the top flat portion 882a11, and the third converging surface 8821c disposed on a right side of the top flat portion 882a11 .

[0294] As described above, because the top flat portion 882a11 is positioned to be closer to the corner at which the rear edge and the left edge meet each other, a width of the first converging surface 8821a from the top flat portion 882a11 may be the smallest, and a width of the third converging surface 8821c from the top flat portion 882a11 may be the largest.

[0295] Accordingly, the first converging surface 8821a may have the largest inclination, and the third converging surface 8821c may have the smallest inclination.

[0296] In one example, as shown in FIG. 16 and FIG. 17, a chamfered surface 8821f may be formed at each of edges 8821e at which adjacent ones of the first converging surface 8821a, the second converging surface 8821b, and the third converging surface 8821c may meet each other. A chamfered surface 8821e may be formed at each edge 8821e at which each of the first converging surface 8821a, the second converging surface 8821b, and the third converging surface 8821c meets with the top flat portion 882a11. The chamfered surface 8821e may prevent generation of the eddy of the air flow F.

[0297] In this regard, as shown, the chamfer surface 8821f may extend toward the top flat portion 882a11 in a straight line or curve shape, or in a combination of a straight line and a curve. Accordingly, the chamfered surface 8821e having a three-dimensional curve may extend toward the top flat portion 882a11.

[0298] In one example, the second cover 882 may further include the outward extension 882a2 integrally connected to an outer edge of the cover body 882a and extending outwardly in a direction away from the cover body 882a.

[0299] Based on the illustrated embodiment, the outward extension 882a2 may extend in a direction away from the cover body 882a having the three-dimensional shape convex upwardly along the horizontal direction and thus may act as a flange.

[0300] Like the convex portion 882a1, the outward extension 882a2 may be formed to have a generally uniform thickness.

[0301] An inner edge 882a21 of the outward extension 882a2 may be integrally connected to an outer edge of the convex portion 882a1 of the cover body 882a.

[0302] In this regard, as shown, the inner edge 882a21 of the outward extension 882a2 and the outer edge of the convex portion 882a1 may constitute a step due to the shape of the convex portion 882a1.

[0303] A horizontal width of the outward extension 882a2 between the inner edge 882a21 and an outer edge 882a22 of the outward extension 882a2 may be approximately uniform as the outward extension 882a2 extends along the outer edge of the convex portion 882a1.

[0304] However, due to the asymmetric shape of the convex portion 882a1, the outward extension 882a2 may be formed to have an asymmetric shape.

[0305] In one example, the second cover 882 may further include an outer peripheral wall 882b that extends along the outer edge 882a22 of the outward extension 882a2 and protrudes downward toward the moisture absorbent receiving portion 8412 of the main housing 841.

[0306] As shown, the outer peripheral wall 882b may be formed to have a predetermined barrier shape that protrudes downwards from the outer edge 882a22 of the outward extension 882a2 toward the moisture absorbent receiving portion 8412.

[0307] A vertical dimension by which the outer peripheral wall 882b protrudes downwards from the outward extension 882a2 may be approximately constant as the outer peripheral wall 882b extends along the outer edge 882a22 of the outward extension 882a2.

[0308] In particular, a vertical level of a lower end of the outer peripheral wall 882b may be lower than a vertical level of an upper end of the moisture absorbent receiving portion 8412 of the main housing 841. When the second cover 882 is fastened to the housing, the outer peripheral wall 882b may surround an outer side surface of the moisture absorbent receiving portion 8412.

[0309] Furthermore, the outer peripheral wall 882b may have a protrusion dimension greater than a protrusion vertical dimension by which each of a pair of first sealing ribs 882a23 which will be described later protrudes from a lower surface of the outward extension 882a2.

[0310] In one example, the outer peripheral wall 882b may extend continuously or partially and discontinuously along the outer edge 882a22 of the outward extension 882a2.

[0311] FIG. 14 and subsequent drawings show an example in which the outer peripheral wall 882b extends continuously in an area in which the outer peripheral wall 882b avoids interference with other components constituting the dish washer 1, that is, an area other than a corner at which an outer front edge and an outer right edge of the outward extension 882a2 meet each other. However, embodiments of the present disclosures are not limited thereto. Hereinafter, a following description is based on a configuration in which the outer peripheral wall 882b extends continuously along the outer edge 882a22 of the outward extension 882a2 except for the predetermined area, that is, the corner area at which the outer front edge and the outer right edge of the outward extension 882a2 meet each other.

[0312] In this way, the outer peripheral wall 882b extends continuously, and has a generally uniform protrusion dimension as the outer peripheral wall 882b extends along the outer edge 882a22 of the outward extension 882a2, such that the rigidity of the outward extension 882a2 may be strengthened.

[0313] In one example, a plurality of fastening bosses 8823 may be disposed on an outer side surface of the outer peripheral wall 882b. As described above, a fastening means such as a screw bolt may extend through each fastening boss 8823, and may be screw-fastened to the fastening boss 8412g disposed on the moisture absorbent receiving portion 8412 of the main housing 841 or the fastening boss 8421 disposed on the auxiliary housing 842, such that the second cover 882 may be firmly fastened to the main housing 841 and the auxiliary housing 842.

[0314] In one example, when the second cover 882 is fastened thereto, an inner side surface of the outer peripheral wall 882b may at least partially surface-contact the outer side surface of the moisture absorbent receiving portion 8412 of the main housing 841.

[0315] In this way, a bonding strength between the second cover 882 and the moisture absorbent receiving portion 8412 of the main housing 841 may be strengthened, and the leakage prevention performance between the second cover 882 and the moisture absorbent receiving portion 8412 of the main housing 841 may be improved.

[0316] In one example, the second cover 882 may further include a pair of first sealing ribs 882a23 that protrude downwardly from a lower surface of the outward extension 882a2 toward the open upper surface 8412c of the moisture absorbent receiving portion 8412 of the main housing 841.

[0317] The pair of first sealing ribs 882a23 may be disposed between the inner edge 882a21 and the outer edge 882a22 of the outward extension 882a2 and may be provided in a form of barriers extending parallel to each other.

[0318] In this regard, dimensions by which the pair of first sealing ribs 882a23 protrude from the lower surface of the outward extension 882a2, respectively may be equal to each other or be different from each other.

[0319] FIG. 16 and FIG. 19 illustrate an embodiment in which the downward protrusion dimension of an outer sealing rib of the pair of first sealing ribs 882a23 is larger than the downward protrusion dimension of an inner sealing rib of the pair of first sealing ribs 882a23. However, embodiments of the present disclosure are not limited thereto. A following description based on a configuration in which the downward protrusion dimension of the outer sealing rib of the pair of first sealing ribs 882a23 is larger than the downward protrusion dimension of the inner sealing rib of the pair of first sealing ribs 882a23.

[0320] The downward protrusion dimension of the outer sealing rib of the pair of first sealing ribs 882a23 is larger than the downward protrusion dimension of the inner sealing rib of the pair of first sealing ribs 882a23 but is smaller than the downward protrusion dimension of the outer peripheral wall 882b as described above.

[0321] In one example, the outer sealing rib of the pair of first sealing ribs 882a23 having the larger downward protrusion dimension than that of the inner sealing rib of the pair of first sealing ribs 882a23 may be fitted into between second sealing ribs 8412c1 which will be described later when the second cover 882 is fastened to the housing 84.

[0322] As the pair of first sealing ribs 882a23 are provided as the barriers parallel to each other, an inverted U-shaped first coupling groove that is open downwardly may be formed between the pair of first sealing ribs 882a23.

[0323] One of a pair of second sealing ribs 8412c1 formed on an upper end of an edge of the moisture absorbent receiving portion 8412 of the main housing 841, that is, an edge defining the open upper surface 8412c of the moisture absorbent receiving portion 8412 may be inserted and fitted into the first coupling groove.

[0324] Like the first sealing ribs 882a23, the pair of second sealing ribs 8412c1 are formed to protrude upwardly from the edge of the upper end of the moisture absorbent receiving portion 8412 of the main housing 841. The second sealing ribs 8412c 1 extend in a parallel manner to each other.

[0325] Accordingly, a U-shaped second coupling groove that is open upwardly may be formed between the pair of second sealing ribs 8412c1.

[0326] For example, as shown in FIG. 19, the outer sealing rib of the pair of first sealing ribs 882a23 may be constructed to be inserted and be fitted into the second coupling groove.

[0327] Furthermore, the inner sealing rib of the pair of second sealing ribs 8412c1 may be constructed to be inserted and be fitted into the first coupling groove.

[0328] Therefore, as shown in FIG. 19, when the second cover 882 is fastened to the moisture absorbent receiving portion 8412 of the main housing 841, a leakage prevention structure or a sealing structure similar to a gear meshing structure may be formed between the first sealing rib 882a23 and the second sealing rib 8412c1. This may allow a separate sealing member used conventionally to be omitted, or allow a volume of the sealing member to have a minimum value. Thus, an assembly of the moisture-absorption and drying device 80 according to the present disclosure may be improved, and a manufacturing cost thereof may be reduced.

[0329] In one example, a horizontal spacing between the aforementioned outer peripheral wall 882b and the first sealing rib 882a23 may be approximately equal to a thickness of the outer sealing rib of the pair of second sealing ribs 8412c1.

[0330] Thus, a surface contact between the outer peripheral wall 882b and the outer sealing rib of the pair of second sealing ribs 8412c1 may be additionally achieved, such that the leakage prevention performance of the second cover 882 may be further improved.

[0331] Furthermore, as described above, the downward protrusion dimension of the outer peripheral wall 882b may be greater than the downward protrusion dimension of each of the pair of first sealing ribs 882a23 and the pair of second sealing ribs 8412c1.

[0332] Thus, a vertical level of the lower end of the outer peripheral wall 882b may be lower than a vertical level of each of the pair of second sealing ribs 8412c1.

[0333] Therefore, as shown in FIG. 19, the outer peripheral wall 882b may extend further downwardly beyond the pair of second sealing ribs 8412c1 when the second cover 882 is fastened to the housing 84. The inner side surface of the outer peripheral wall 882b may be in direct surface contact with the outer side surface of the moisture absorbent receiving portion 8412.

[0334] In this way, the outer peripheral wall 882b of the second cover 882 is constructed to directly surface-contact the outer surface of the moisture absorbent receiving portion 8412, such that the bonding strength between the second cover 882 and the moisture absorbent receiving portion 8412 may be further improved.

[0335] In one example, the second cover 882 may further include a guide rib 8824 having an upper end as one end connected to the inner surface of the convex portion 882a1 of the cover body 882a, and a lower end as the other end extending toward the open upper surface 8412c of the moisture absorbent receiving portion 8412.

[0336] Based on a state in which the second cover 882 is fastened to the housing 84, the upper end of the guide rib 8824 may become a fixed end integrally connected to the convex portion 882a1 of the cover body 882a, while the lower end thereof may become a free end extending across the discharge flow path. The guide rib 8824 may be constructed to have a wall shape with a generally uniform thickness.

[0337] FIG. 16 and subsequent drawings show an embodiment in which the guide rib 8824 includes a total of four guide ribs 8824 of substantially the same shape and size. Embodiments of the present disclosure are not limited thereto. A following description will be based on an embodiment in which the guide rib 8824 includes the total of four guide ribs 8824 having substantially the same shape and size.

[0338] For convenience of the description, among the four guide ribs 8824, one disposed closest to the second converging surface 8821b of the convex portion 882a1 is referred to as a first guide rib 8824a. One disposed on a right side of the first guide rib 8824a is referred to as a second guide rib 8824b. One disposed on a right side of the second guide rib 8824b is referred to as a third guide rib 8824c. One disposed between the third guide rib 8824c and a front edge of the convex portion 882a1 is referred to as a fourth guide rib 8824d.

[0339] The first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d play a role of evenly dividing the discharge flow path of the air flow F having passed through the second moisture absorbent holder 862 and to be directed toward the outlet into portions.

[0340] For this purpose, the first guide ribs to the fourth guide ribs 8824a, 8824b, 8824c, and 8824d may be arranged to be spaced from each other by a substantially equal angular spacing around the outlet 8822 in a plan view.

[0341] In this regard, as shown in FIG. 16 and FIG. 17, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d is constructed in a simple plate shape. Each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may extend linearly between each of front edges 8824a2, 8824b2, 8824c2, and 8824d2 as an upstream edge in the air flow direction and each of rear edges 8824a1, 8824b1, 8824c1, and 8824d1 as a downstream edge in the air flow direction. Each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may extend radially around the outlet 8822. The first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be arranged in an arc direction the outlet 8822.

[0342] Therefore, each virtual extension line L1 ex-

tending through each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 and each of the rear edges 8824a1, 8824b1, 8824c1, and 8824d1 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d extends through a center CE of the outlet 8822.

[0343] Thus, the air flow F to be introduced into the outlet 8822 may be divided equally by the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d. Thus, when air flows F flowing in different directions merge with each other before being introduced into the outlet 8822, such that generation of eddy and turbulence may be significantly reduced.

[0344] In one example, as described above, the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may extend across the discharge flow path in the vertical direction and may extend radially around outlet 8822 and may be arranged in the arc manner around the center of the outlet.

[0345] Therefore, the air flow F flowing toward outlet 8822 may collide an edge of each of the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, and each of the front edges 8824a2, 8824b2, 8824c2 and 8824d2 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, such that a high possibility that eddy or turbulence are generated may occur.

[0346] For this reason, a means for reducing the generation of the eddy and turbulence caused by the collisions may be provided. To this end, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may have each of first chamfered surface 8824a5, 8824b5, 8824c5, and 8824d5, each of second chamfered surfaces 8824a6, 8824b6, 8824c6, and 8824d6, and each of third chamfered surfaces 8824a7, 8824b7, 8824c7, and 8824d7.

[0347] As shown in FIG. 18, each of the first chamfered surfaces 8824a5, 8824b5, 8824c5, and 8824d5 may be formed by chamfering each angled edge defined by each of the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d and one side surface thereof, and each angled edge defined by each of the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d and the other side surface thereof so as to have a predetermined width.

[0348] Furthermore, each of the second chamfered surface 8824a6, 8824b6, 8824c6, and 8824d6 may be formed by chamfering each angled edge defined by each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d and one side surface thereof, and each angled edge defined by each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d and the other side surface thereof so as to have a predetermined width.

[0349] Furthermore, each of the third chamfered surface 8824a7, 8824b7, 8824c7, and 8824d7 may be formed by chamfering each angled edge defined by each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 and each of the lower ends 8824a4, 8824b4, 8824c4 and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d so as to have a predetermined width.

[0350] In this way, the front edge or the upstream edge in the flow direction of air flow F of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be chamfered so as to have a predetermined width to form each chamfered surface, such that a cross-sectional area size of the upstream end in the flow direction of air flow F of each guide rib may be reduced. Therefore, the generation of the eddy and turbulence due to the collision between the edge portion and the air flow F may be minimized, thereby reducing the flow loss of the air flow F.

[0351] In one example, the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may additionally perform a reinforcing function on the top flat portion 882a11 around the outlet 8822 to which the connection duct 883 is integrally connected.

[0352] As described above, the second cover 882 is constructed such that the top flat portion 882a11 thereof is integrally connected with a lower end of the connection duct 883. The connection duct 883 is fixedly inserted into the air supply hole 254 formed in the lower surface 25 of the tub 20.

[0353] Therefore, there is a high possibility that the stress due to the impact or load transmitted from the tub 20 or the stress due to the shock or load transmitted from the main housing 841 may be concentrated on the top flat portion 882a11 of the cover body 882a.

[0354] The first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may function as a reinforcing means to prevent damage to the cover body 882a due to such stress concentration.

[0355] More specifically, as shown in FIG. 17, the rear edge 8824a1 of the first guide rib 8824a and the rear edge 8824b1 of the second guide rib 8824b may vertically overlap the top flat portion 882a11 in which the outlet 8822 is formed. The front edge 8824a2 of the first guide rib 8824a and the front edge 8824b2 of the second guide rib 8824b may vertically overlap the first converging surface 8821a of the convex portion 882a1.

[0356] Therefore, each of the first guide rib 8824a and the second guide rib 8824b may extend from the top flat portion 882a11 to the first converging surface 8821a, so that the rigidity of an edge at which the top flat portion 882a11 and the first converging surface 8821a meet each other may be effectively reinforced.

[0357] In one example, the rear edge 8824c 1 of the third guide rib 8824c and the rear edge 8824d1 of the fourth guide rib 8824d may vertically overlap the top flat portion 882a11 where the outlet 8822 is formed. The front edge 8824c2 of the third guide rib 8824c and the front

edge 8824d2 of the fourth guide rib 8824d may vertically overlap the third converging surface 8821c of the convex portion 882a1.

[0358] Therefore, each of the third guide rib 8824c and the fourth guide rib 8824d may extend from the top flat portion 882a11 to the third converging surface 8821c, such that the rigidity of an edge at which the top flat portion 882a11 and the third converging surface 8821c meet each other may be effectively strengthened.

[0359] In one example, the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may additionally perform a stopper function to prevent the second moisture absorbent holder 862 from being removed from its fixed position with respect to the moisture absorbent receiving portion 8412.

[0360] As described above, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d extends such that each of the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 thereof faces the mesh 8622 of the second moisture absorbent holder 862.

[0361] In this regard, each of the lower ends 8824a4, 8824b4, 8824c4, 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be in direct contact with the mesh 8622 of the second moisture absorbent holder 862. Alternatively, each of the lower ends 8824a4, 8824b4, 8824c4, 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be spaced from the mesh 8622 of the second moisture absorbent holder 862 by a predetermined spacing and may be disposed on top of the mesh 8622.

[0362] When each of the lower ends 8824a4, 8824b4, 8824c4, 8824d4 of the first guide rib to fourth guide rib 8824a, 8824b, 8824c, and 8824d comes into contact with the mesh 8622 of the second moisture absorbent holder 862, each of the lower ends 8824a4, 8824b4, 8824c4, 8824d4 of the first guide rib to fourth guide rib 8824a, 8824b, 8824c, and 8824d may be in mere contact with the mesh 8622 of the second moisture absorbent holder 862 so as not to apply a pressing force to the mesh 8622 of the second moisture absorbent holder 862.

[0363] Thus, the mesh 8622 of the second moisture absorbent holder may be prevented from being damaged by the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d during the action of external shock or vibration to the second cover.

[0364] Furthermore, when the second moisture absorbent holder 862 is disposed on top of the mesh 8622, and is spaced from, by the predetermined spacing, with respect to the mesh 8622, the predetermined spacing may be smaller than a thickness of an outer edge portion 8621 of the second moisture absorbent holder 862.

[0365] This is designed in consideration of that, as described above, the second moisture absorbent holder 862 is entirely inserted into an upper end of the moisture absorbent receiving portion 8412 while being coupled to the moisture absorbent receiving portion 8412. Even when the second moisture absorbent holder 862 receives a force to cause the second moisture absorbent holder 862 to deviate from its correct position, the second moisture absorbent holder 862 862 may be effectively prevented from being entirely deviated from its correct position because the lower ends of the first guide rib to the fourth guide ribs 8824a, 8824b, 8824c, and 8824d are spaced from the mesh by the spacing smaller than the thickness of the outer edge portion 8621 of the second moisture absorbent holder 862.

[0366] In one example, in order that the first guide rib to the fourth guide ribs 8824a, 8824b, 8824c, and 8824d may effectively perform this stopper function, each of the lower ends 8824a4, 8824b4, 8824c4, 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may have a shape corresponding to a shape of the mesh 8622 of the second moisture absorbent holder 862.

[0367] That is, as shown in FIG. 19, when the mesh 8622 of the second moisture absorbent holder 862 has a flat plate shape parallel to the horizontal direction, each of the lower ends 8824a4, 8824b4, 8824c4, and 8824d4 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may have a flat end surface parallel to a top flat surface of the mesh 8622.

[0368] In one example, an arrangement form in which the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d of the second cover 882 are arranged on the cover body 882a, or a shape of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c and 8824d may be modified to generate a rotational velocity component in the air flow F to be introduced into the outlet 8822.

[0369] FIG. 21 shows an embodiment in which the arrangement form in which the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d are arranged on the cover body 882a is modified.

[0370] In the embodiment as shown in FIG. 21, in a similar manner to the embodiment as shown in FIG. 20, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be constructed to extend from each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 to each of the rear edges 8824a1, 8824b1, 8824c1, and 8824d1 in a linear manner.

[0371] However, unlike the embodiment as shown in FIG. 20, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be oriented such that the virtual extension line L1 extending through each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 and each of the rear edges 8824a1, 8824b1, 8824c1, and 8824d1 of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may not extend through the center CE of the outlet 8822.

[0372] In other words, based on FIG. 21, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d is oriented such that each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d has been rotated clockwise by a predetermined angle a from an orientation in the arrangement of FIG. 20 around each of the rear edges 8824a1, 8824b1, 8824c1, and

8824d1.

[0373] Therefore, the air flow F have passed through a position between adjacent guide ribs is not directed to toward the center of the outlet 8822.

[0374] Accordingly, the rotational velocity component may be generated in the air flow F as it is introduced into the outlet 8822 and the connection duct 883. As the rotational velocity component is created in this way, a linear velocity component of the air flow F flowing along the connection duct 883 may be reduced.

[0375] FIG. 22 shows an embodiment in which the shape of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d is modified.

[0376] Unlike the above-described embodiments, each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may extend from each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 to each of the rear edges 8824a1, 8824b1, 8824c1, and 8824d1 in a non-linear manner.

[0377] FIG. 22 is an example of a configuration in which each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d extends from each of the front edges 8824a2, 8824b2, 8824c2, and 8824d2 to each of the rear edges 8824a1, 8824b1, 8824c1, and 8824d1 in the non-linear manner. Each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may include a combination of a first linear extension P1 that extends linearly and a second linear extension P2 that is bent from the first linear extension P1 and extends linearly.

[0378] In this regard, as shown in FIG. 22, the second linear extension P2 that is bent from the first linear extension P1 may be connected to the front end in the air flow direction of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, while the first linear extension P1 may be connected to the rear end in the air flow direction of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d.

[0379] However, embodiments of the present disclosure are not limited thereto. the second linear extension P2 may be connected to the rear end of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, while the first linear extension P1 may be connected to the front end of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d. Hereinafter, an example in which the second linear extension P2 that is bent from the first linear extension P1 is connected to the front end of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, while the first linear extension P1 is connected to the rear end of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d is described.

[0380] As shown in FIG. 22, as the second linear extension P2 bent from the first linear extension P1 is connected to the front end in the air flow direction of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d, the rotational velocity component may be generated in the air flow F guided by the combination of the first and second extensions P1 and P2.

[0381] As the rotational velocity component is generated in this way and the then the air flow having the rotational velocity component is introduced into the outlet 8822, the linear velocity component of the air flow F flowing along the connection duct 883 may be reduced.

[0382] According to the embodiments as shown in FIG. 21 and FIG. 22, the rotational velocity component is generated in the air flow F while the linear velocity component is reduced in the air flow F under the guidance of each of the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d. Thus, an average flow speed of the air flow F passing through the moisture absorbent receiving portion 8412 of the main housing 841 and the second cover 882 may be lowered.

[0383] Therefore, an additional time for which the air flow F remains in the moisture absorbent receiving portion 8412 may be secured, and thus the moisture absorption efficiency of the moisture absorbent 85 may be improved.

[0384] In one example, FIG. 23 and FIG. 24, unlike the above-described embodiments show an embodiment in which the outlet-defining portion defining the outlet 8822 does not have a portion protruding outwardly from the outward extension 882a2, that is, the outlet 8822 is disposed inwardly of the inner edge 882a21 of the outward extension 882a2 such that the outlet 8822 does not overlap with the inner edge 882a21 thereof.

[0385] In this way, when the outlet 8822 is disposed closer to a center of the convex portion 882a1 and thus is positioned inwardly of the inner edge 882a21 of the outward extension 882a2, a sufficient free space may be secured between the outlet 8822 and the inner edge 882a21 of the outward extension 882a2. Thus, the guide ribs may be disposed in the sufficient free space and may be arranged along the entire circumference of the outlet 8822.

[0386] Accordingly, the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be arranged around the outlet 8822 such the arrangement thereof surrounds the outlet 8822.

[0387] In this regard, in order to equally divide the flow path of the air flow flowing into the outlet 8822, as in the above-described embodiment, the first guide rib to the fourth guide rib 8824a, 8824b, 8824c, and 8824d may be arranged so as to be spaced from each other by approximately an equal angular spacing.

[0388] Therefore, the angular spacing between adjacent ones of the four guide ribs may be approximately 90 degrees or smaller.

[0389] In one example, in the embodiments as shown in FIG. 23 and FIG. 24, the guide ribs are shown as including a total of four guide ribs 8824a, 8824b, 8824c, and 8824d in the same manner as in the above-described embodiment. However, a guide rib (not shown) may be added between adjacent guide ribs to further divide the flow path formed between adjacent guide ribs.

[0390] For example, auxiliary guide ribs (not shown) may be further disposed respectively between the first guide rib 8824a and the second guide rib 8824b, between the second guide rib 8824b and the third guide rib 8824c, between the third guide rib 8824c and the fourth guide rib, and between the fourth guide rib 8824d and the first guide rib 8824a.

[0391] Even when the plurality of auxiliary guide ribs are added in this way, the spacings between the respective main guide ribs and the respective auxiliary guide ribs adjacent thereto may be equal to each other so that the flow path may be divided evenly.

[0392] Therefore, when the plurality of auxiliary guide ribs are added, the spacing between each of the guide ribs 8824a, 8824b, 8824c, and 8824d and each of the auxiliary guide ribs may be approximately 45 degrees or smaller.

[0393] In one example, FIG. 23 shows a configuration in which the guide ribs 8824a, 8824b, 8824c, and 8824d have the same shape and size.

[0394] However, as shown in FIG. 24, the shape and size of at least one guide rib 8824b and 8824d may be different from the shape and size of the remaining guide ribs 8824a, 8824c.

[0395] As shown, the outlet 8822 and the top flat portion 882a11 in which the outlet 8822 is formed are disposed at the center of the convex portion 882a1. Thus, a length and an area size of each of the second converging surface 8821b and the third converging surface 8821c may be larger than a length and an area size of each of the first converging surface 8821a and the fourth converging surface 8821d.

[0396] In order to effectively reinforce each of the second converging surface 8821b and the third converging surface 8821c which has a relatively larger length and area size, a length of each of the second guide rib 8824b and the fourth guide rib 8824d may be larger than a length of each of the first guide rib 8824a and the third guide rib 8824c in a plan view.

[0397] FIG. 23 shows that the extension lengths of the second guide rib 8824b and the fourth guide rib 8824d are equal to each other. Alternatively, the extension lengths of the second guide rib 8824b and the fourth guide rib 8824d may be set to be different from each other depending on a position of the outlet 8822 and the length of each of the second converging surface 8821b and the third converging surface 8821c.

[0398] For example, as shown in FIG. 24, when the area size and length of the second converging surface 8821b is larger than the area size and length of the third converging surface 8821c, the extension length of the second guide rib 8824b which reinforces the second converging surface 8821b may be larger than the extension length of the fourth guide rib 8824d.

[0399] Although the embodiments of the present disclosure have been described in more detail with reference to the accompanying drawings, the present disclosure is not necessarily limited to these embodiments. Therefore, it should be understood that the embodiments described above are not restrictive but illustrative in all respects. In addition, even though an effect of a configuration of the present disclosure is not explicitly described in describing the embodiment of the present disclosure above, it is obvious that the predictable effect from the configuration should be recognized.

Claims

1. A dish washer (1) comprising:

a tub (20) having a washing space (21) defined therein and constructed to accommodate therein a dish; and
a sorption drying device (80) configured to absorb moisture from air discharged from the tub (20) and supply the air to the tub (20),
wherein the sorption drying device (80) includes:

a absorbent (85);
a housing (84) including:
a absorbent receiving portion (8412) having a absorbent receiving space (S3) defined therein, and the absorbent (85) is received in the absorbent receiving space (S3); and

a cover (882) coupled to an open one surface of the absorbent receiving portion (8412) so as to close the absorbent receiving space (S3),
wherein the cover (882) has an outlet (8822) defined therein through which the air having flowed through the absorbent (85) is discharged,
wherein a space (S4) is defined between the cover (882) and the open one surface of the absorbent receiving portion (8412),
wherein the space (S4) acts as a discharge flow path guiding the air flow having passed through the absorbent (85) toward the outlet (8822).

2. The dish washer (1) of claim 1, wherein the cover (882) includes a cover body (882a) having a convex portion (882a1) convex in a direction in which the cover body (882a) extends away from the open one surface of the absorbent receiving portion (8412),

wherein the outlet (8822) extends through the cover body (882),
wherein the convex portion (882a1) of the cover body (882a) is constructed such that an area size in a plan view of the discharge flow path gradually decreases as the discharge flow path extends toward the outlet (8822).

3. The dish washer (1) of claim 2, wherein the convex portion (882a1) includes a combination of a plurality

of inclined surfaces having different inclinations, or wherein the convex portion (882a1) includes a combination of a plurality of curved surfaces having different curvatures.

4. The dish washer (1) of claim 1 or 2, wherein the cover (882) further includes a plurality of guide ribs (8824), each having one end as a fixed end connected to an inner surface of the cover body (882a) and the other end as a free end extending across the discharge flow path toward the open one surface of the absorbent receiving portion (8412),

wherein each guide rib (8824) is formed as a wall,
wherein the plurality of guide ribs (8824) are arranged to divide the air flow to be directed toward the outlet (8822).

5. The dish washer (1) of claim 4, wherein each of the plurality of guide ribs (8824) has a front edge (8824a2, 8824b2, 8824c2, 8824d2) as an upstream side thereof in a flow direction of the air flow and a rear edge (8824a1, 8824b1, 8824c1, 8824d1) as a downstream side thereof in the flow direction of the air flow,
wherein each of the plurality of guide ribs (8824a, 8824b, 8824c, 8824d) extends linearly from the front edge (8824a2, 8824b2, 8824c2, 8824d2) toward the rear edge (8824a1, 8824b1, 8824c1, 8824d1).

6. The dish washer (1) of claim 5, wherein a virtual extension line (L1) passing through the front edge (8824a2, 8824b2, 8824c2, 8824d2) and the rear edge (8824a1, 8824b1, 8824c1, 8824d1) passes through a center (CE) of the outlet (8822).

7. The dish washer (1) of claim 5, wherein a virtual extension line (L1) passing through the front edge (8824a2, 8824b2, 8824c2, 8824d2) and the rear edge (8824a1, 8824b1, 8824c1, 8824d1) does not pass through a center (CE) of the outlet (8822).

8. The dish washer (1) of claim 4, wherein each of the plurality of guide ribs (8824) has a front edge (8824a2, 8824b2, 8824c2, 8824d2) as an upstream side thereof in a flow direction of the air flow and a rear edge (8824a1, 8824b1, 8824c1, 8824d1) as a downstream side thereof in the flow direction of the air flow,
wherein each of the plurality of guide ribs (8824) extends non-linearly from the front edge (8824a2, 8824b2, 8824c2, 8824d2) toward the rear edge (8824a1, 8824b1, 8824c1, 8824d1).

9. The dish washer (1) of claim 8, wherein each of the plurality of guide ribs (8824) has a first linear portion extending from the rear edge (8824a1, 8824b1, 8824c1, 8824d1), and a second linear portion extending from the first linear portion in a bent manner therefrom toward the front edge (8824a2, 8824b2, 8824c2, 8824d2).

10. The dish washer (1) of claim 4, wherein the sorption drying device (80) further includes a absorbent holder (862) constructed to define an upper end of the absorbent receiving space (S3) and prevent the absorbent (85) from being removed from the absorbent receiving space (S3),
wherein the other end of each of the plurality of guide ribs (8824) has a shape corresponding to a shape of one surface of the absorbent holder (862) through which the air flow passes.

11. The dish washer (1) of claim 10, wherein the other end of at least one of the plurality of guide ribs (8824) is in contact with the one surface of the absorbent holder (862, or
wherein the other end of each of the plurality of guide ribs (8824) is spaced apart from the one surface of the absorbent holder (862) by a predetermined spacing.

12. The dish washer (1) of claim 2, wherein the cover (882) further includes a flange-shaped outward extension (882a2) integrally connected to an outer edge of the cover body (882a) and extending outwardly in a direction away from the cover body (882a),

wherein a pair of first sealing ribs (882a23) are disposed between an inner edge (882a21) and an outer edge (882a22) of the outward extension (882a2) and protrude toward the open one surface of the absorbent receiving portion (8412),
wherein a pair of second sealing ribs (8412c1) coupled to the pair of first sealing ribs (882a23) are disposed on an edge defining the open one surface of the absorbent receiving portion (8412).

13. The dish washer (1) of claim 12, wherein one of the pair of first sealing ribs (882a23) is sandwiched between the pair of second sealing ribs (8412c1).

14. The dish washer (1) of any one of claims 1 to 13, wherein the moisture-absorption and drying device (80) further includes a blow fan (82) configured to generate flow of the air; and/or a heater (83) disposed between the blow fan and the absorbent (85) in the flow direction of the air flow, wherein the heater (83) is configured to heat the air flow to be supplied to the absorbent (85).

15. The dish washer (1) of any one of claims 1 to 14,

wherein the housing (84) further includes a heater receiving portion (8411) having a heater receiving space (S1) defined therein, wherein the air flow having passed through the blow fan (82) flows in the heater receiving space (S1), and a heater (83) is received in the heater receiving space (S1), and
wherein the air flow having passed through the heater receiving space (S1) flows in the absorbent receiving space (S3).

FIG. 1

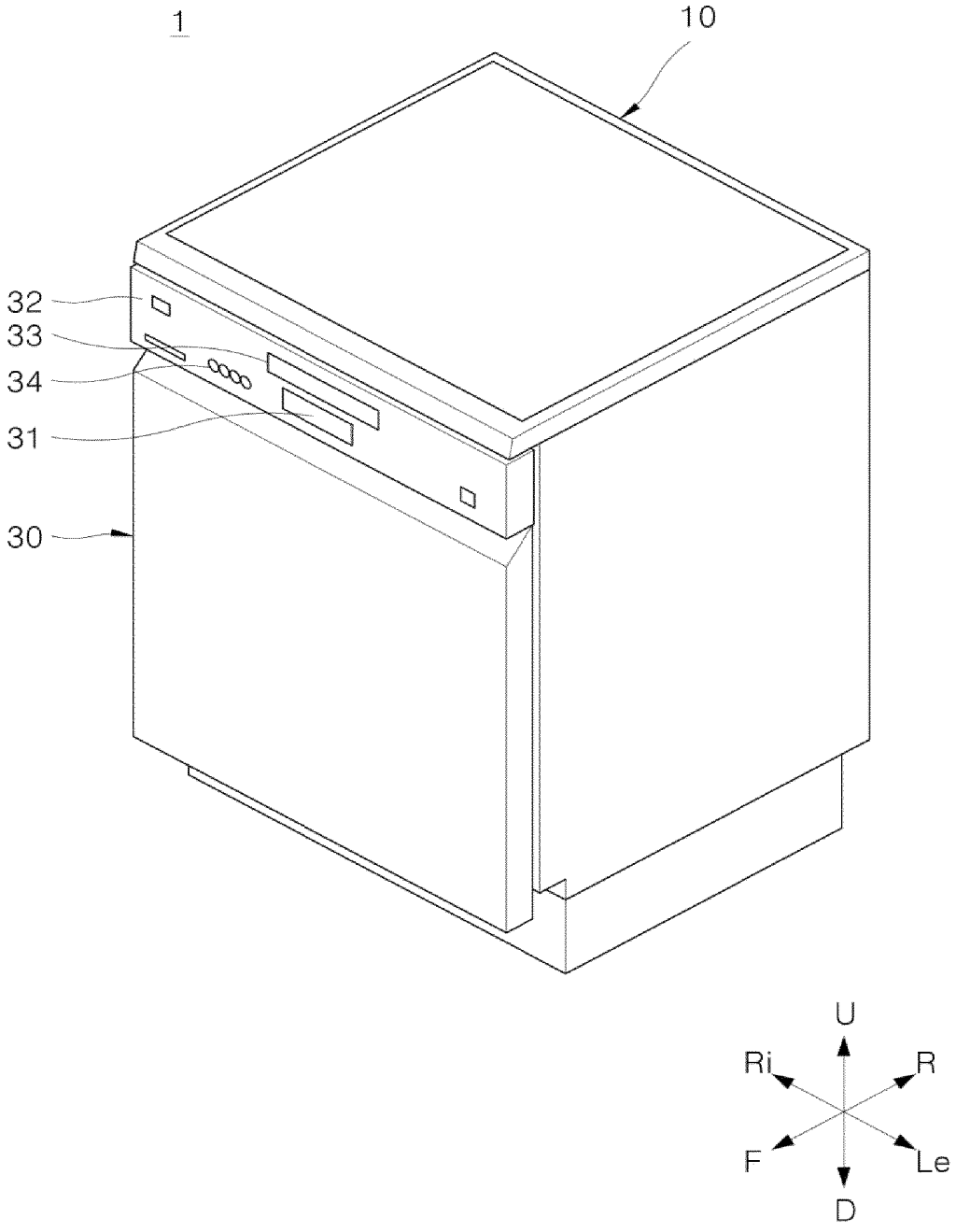
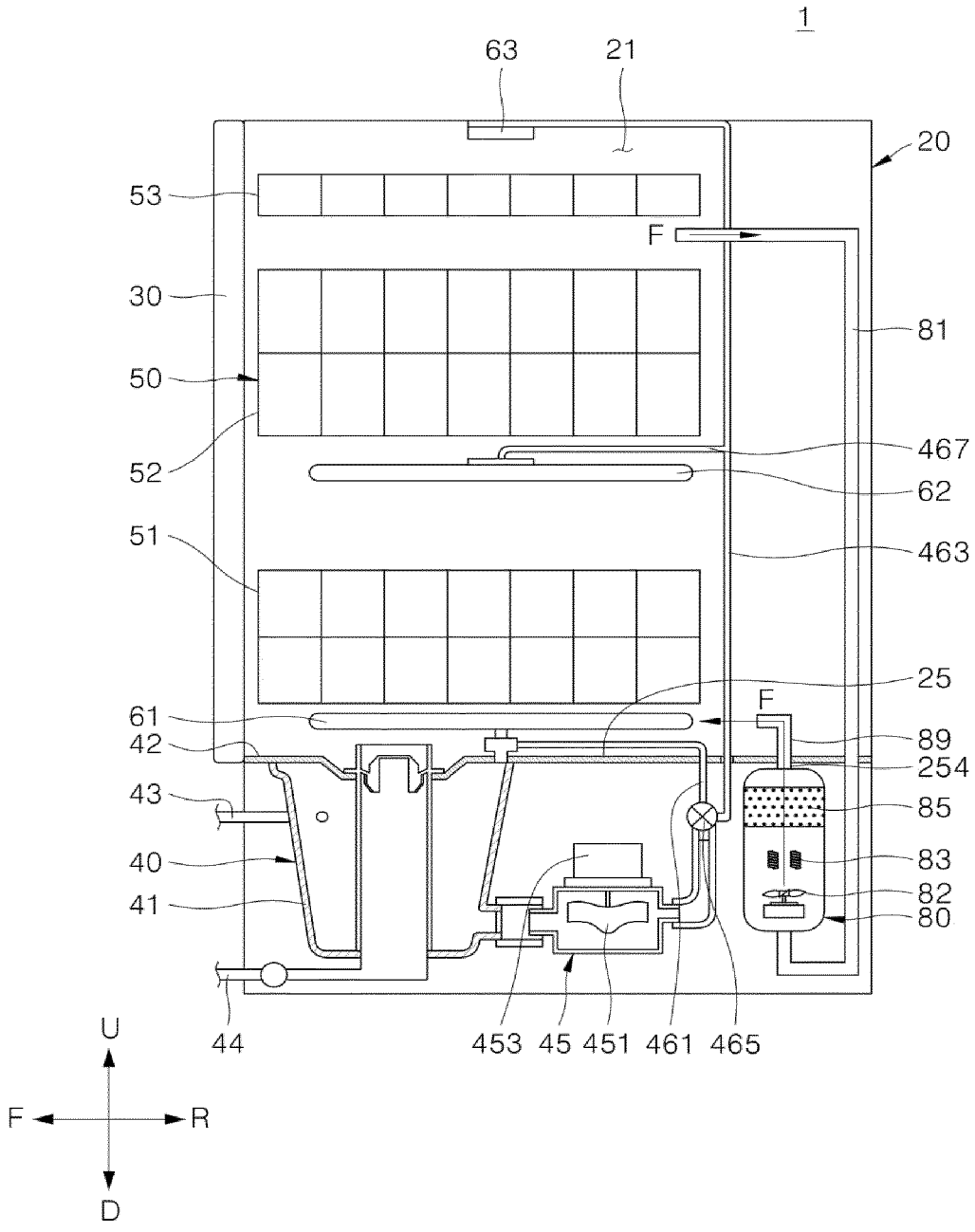


FIG. 2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F
30
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467
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61
89
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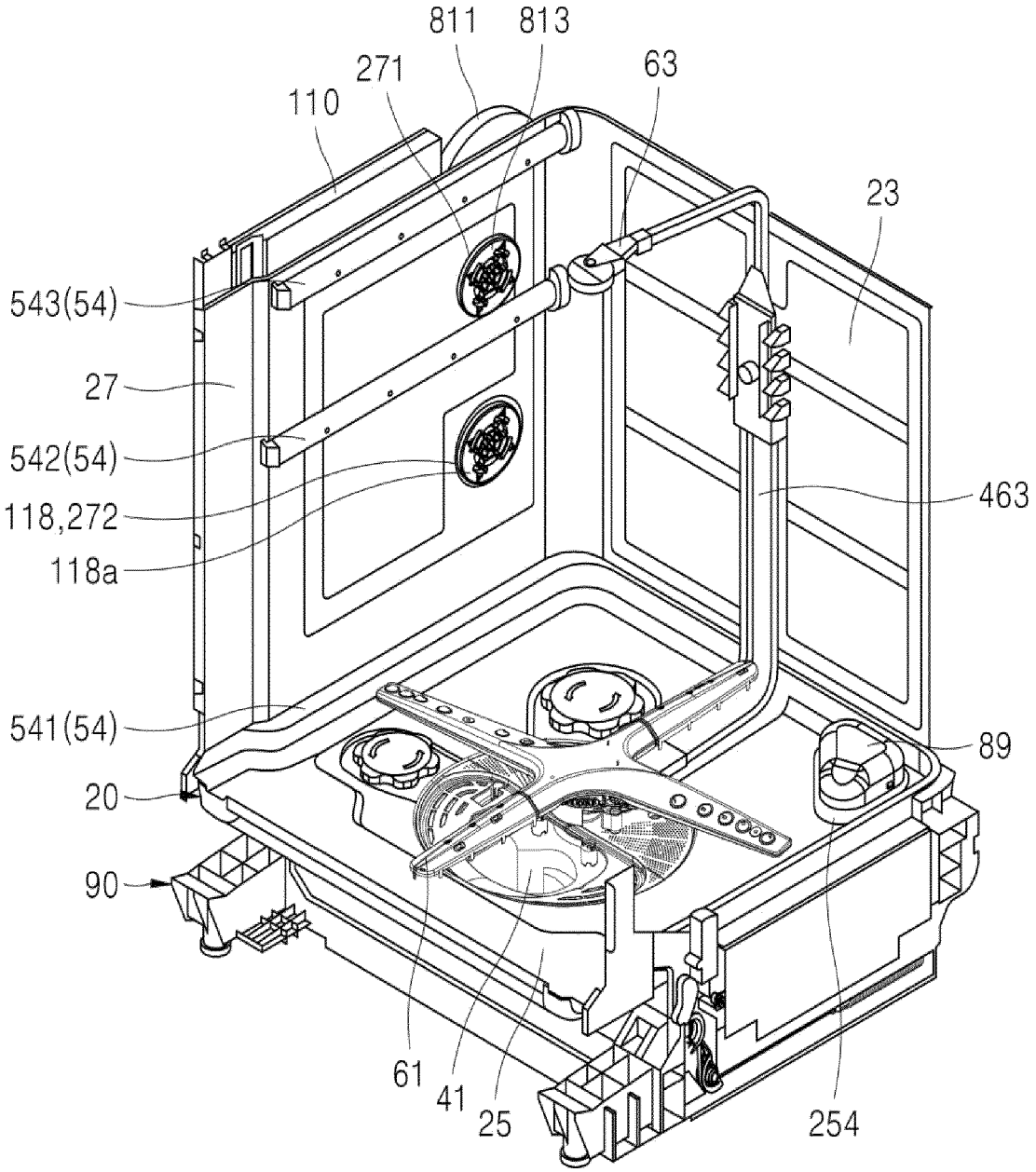
40
83
41
82
80
44
453
45
451
461
465
U
F
R
D

FIG. 3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813
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110
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543(54)
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542(54)
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118a
463
541(54)
89
20
90
61
41
25
254

FIG. 4

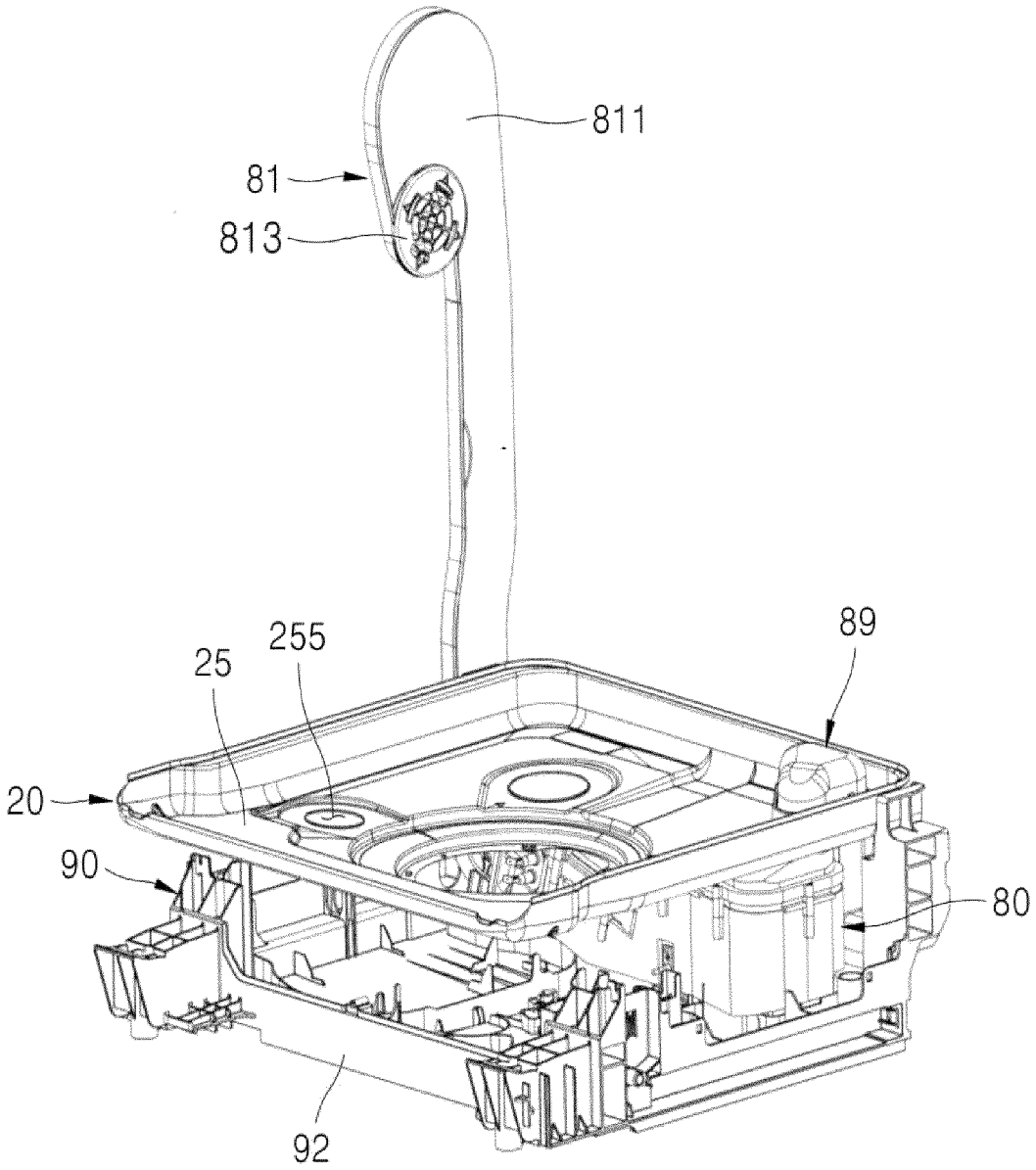


FIG. 5

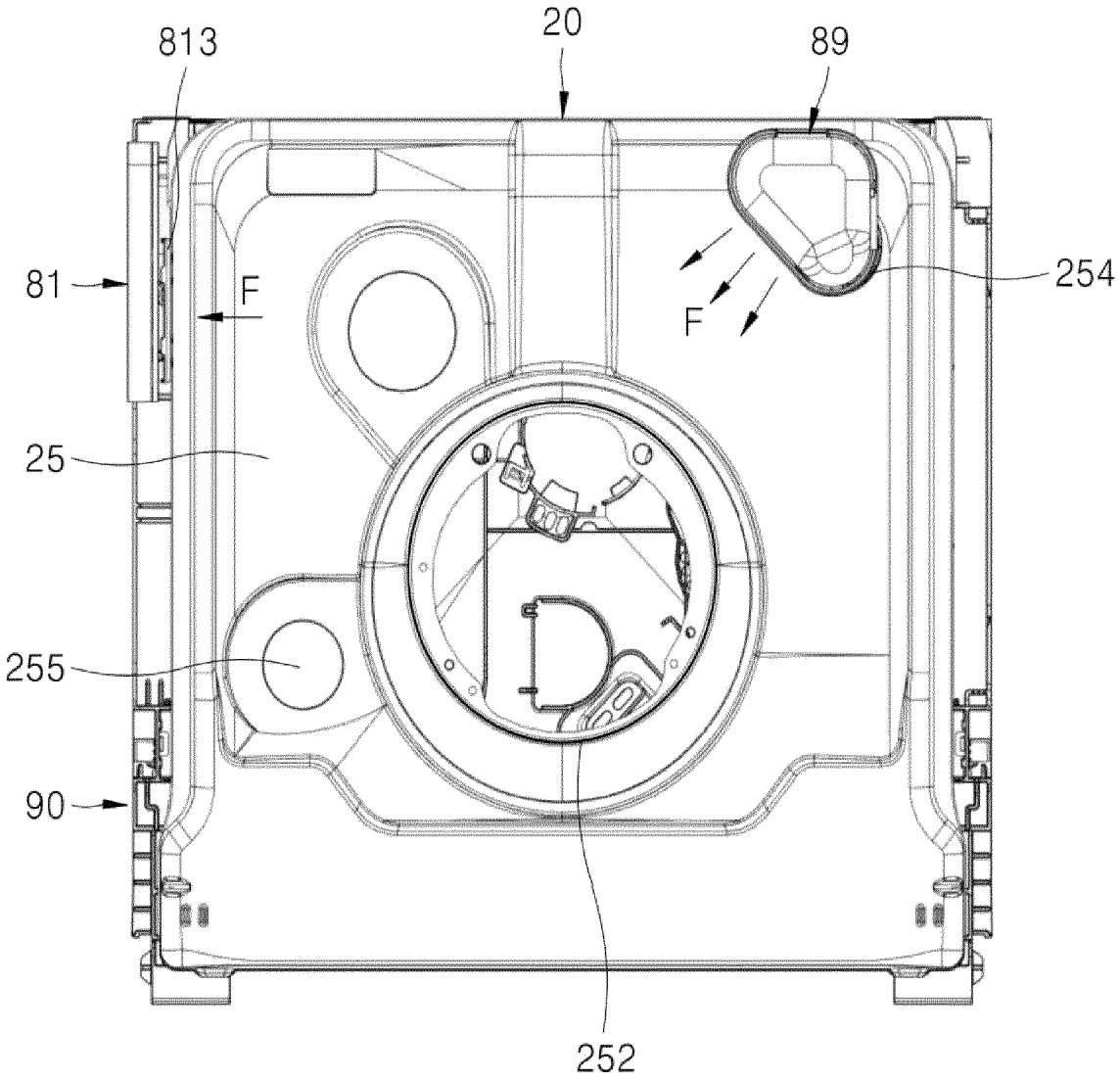


FIG. 6

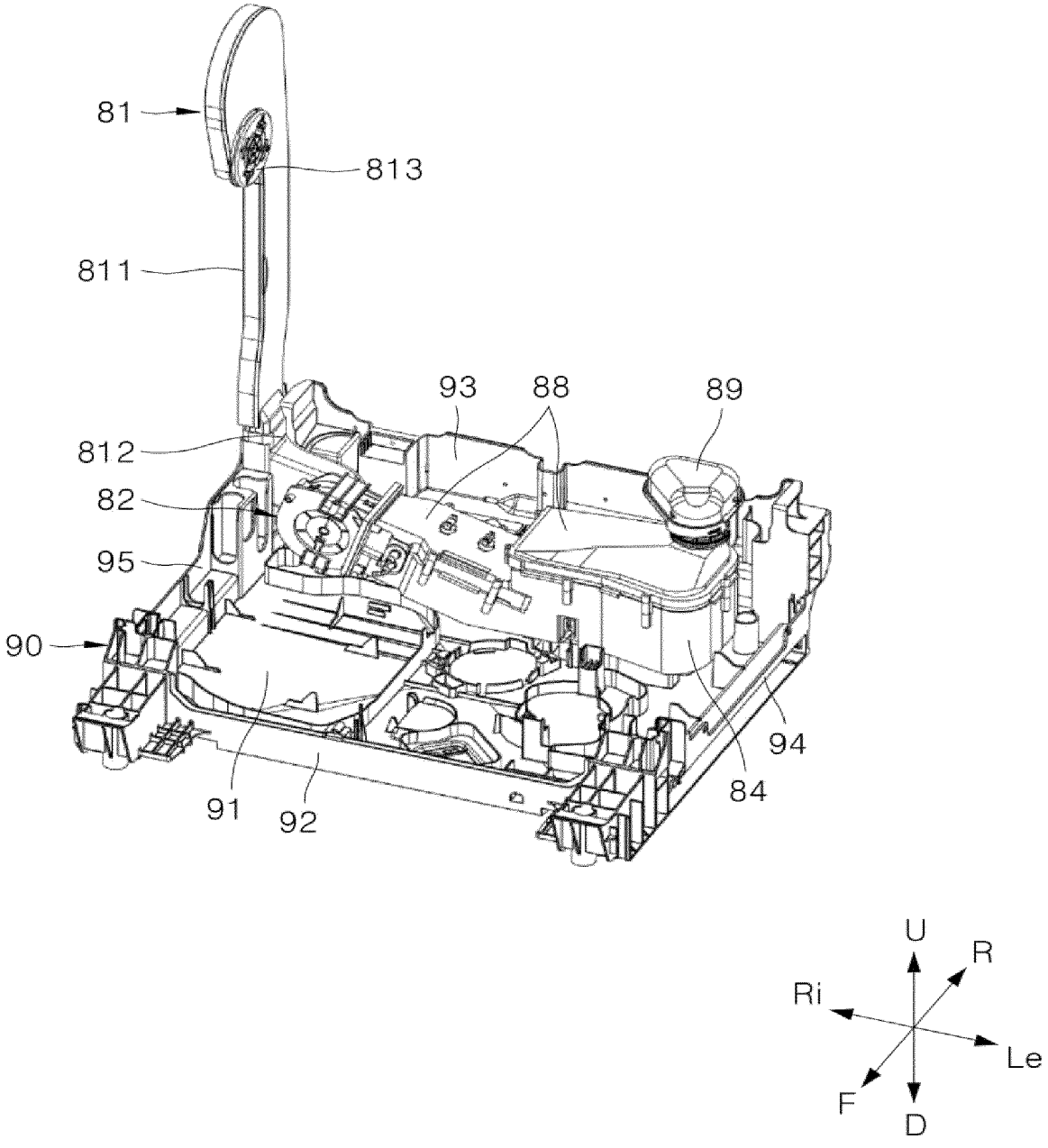


FIG. 7

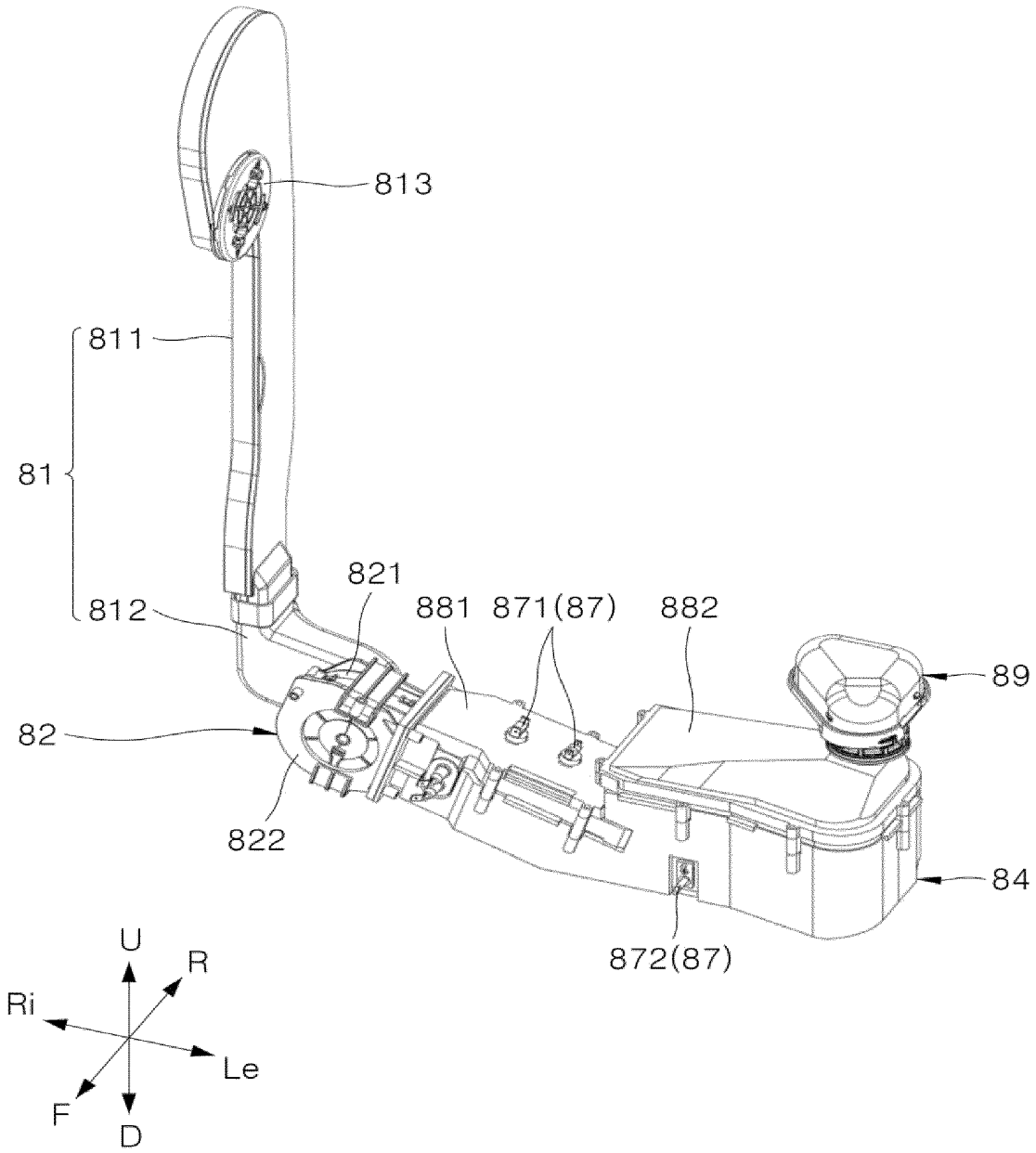


FIG. 8

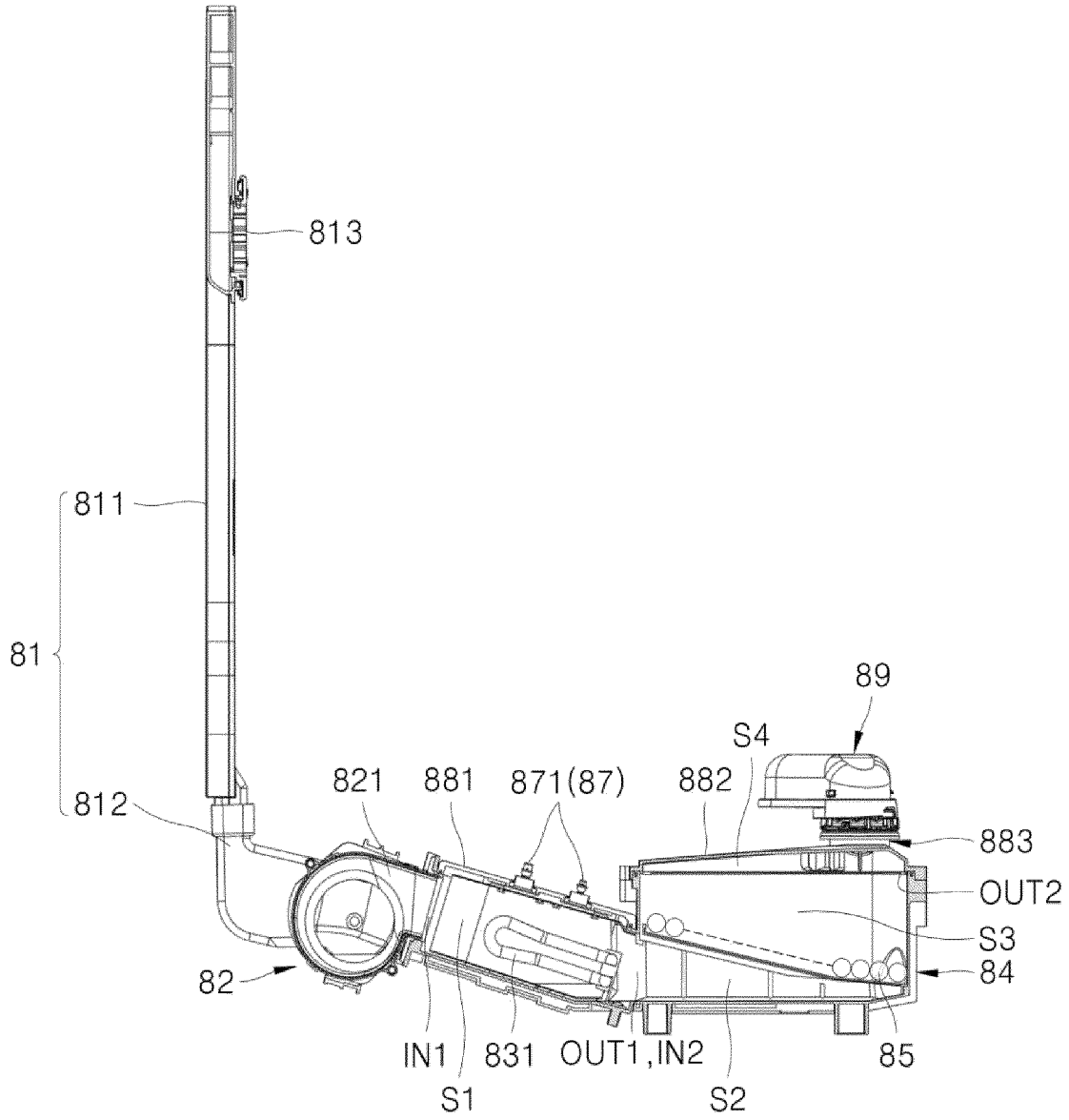
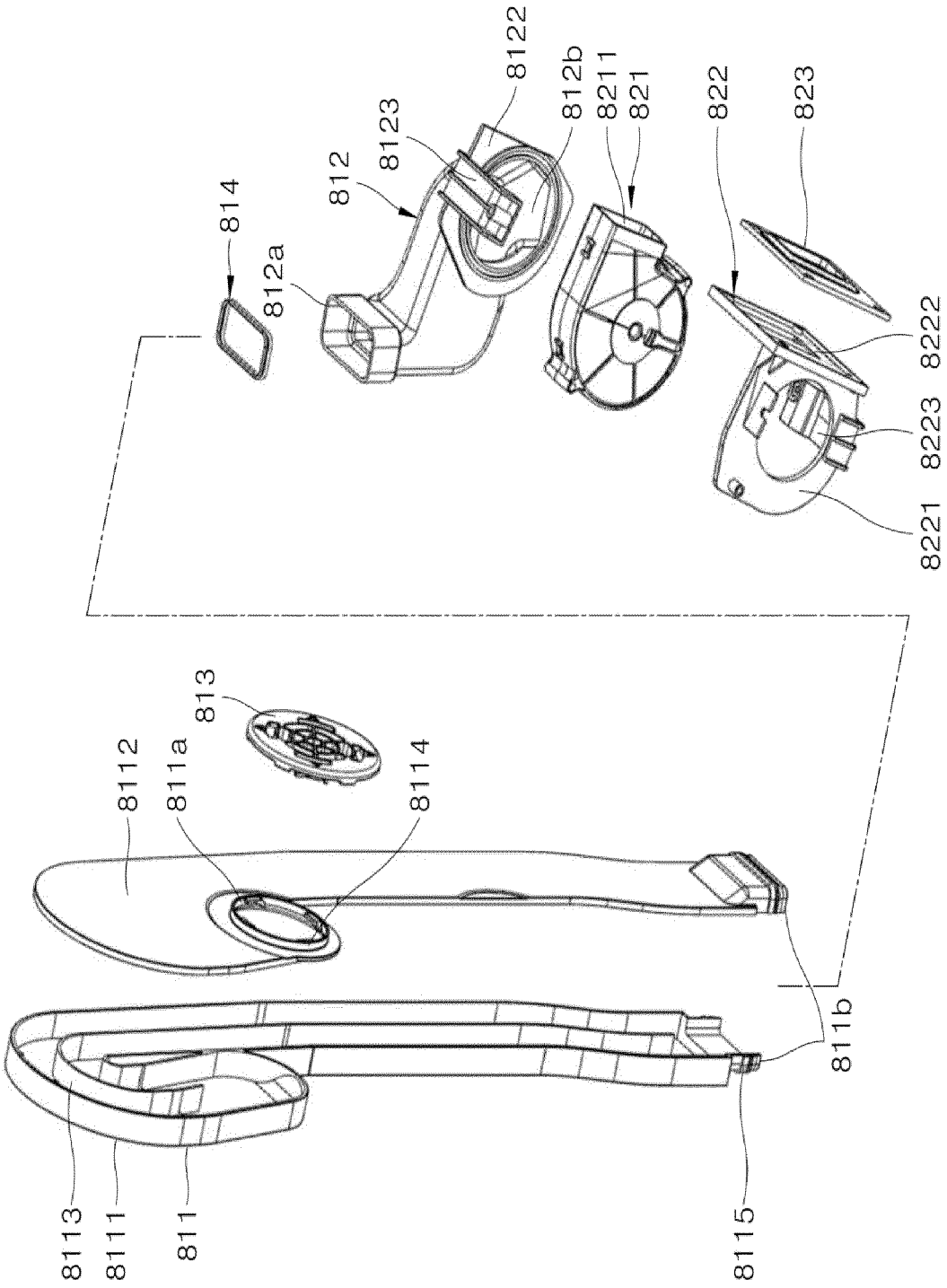

813
811
81
812
89
S4
821
881
871(87)
882
883
OUT2
S3
84
82
IN1
831
OUT1,IN2
85
S1
S2

FIG. 9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8112
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811b
8113
8111
811
8115

FIG. 10

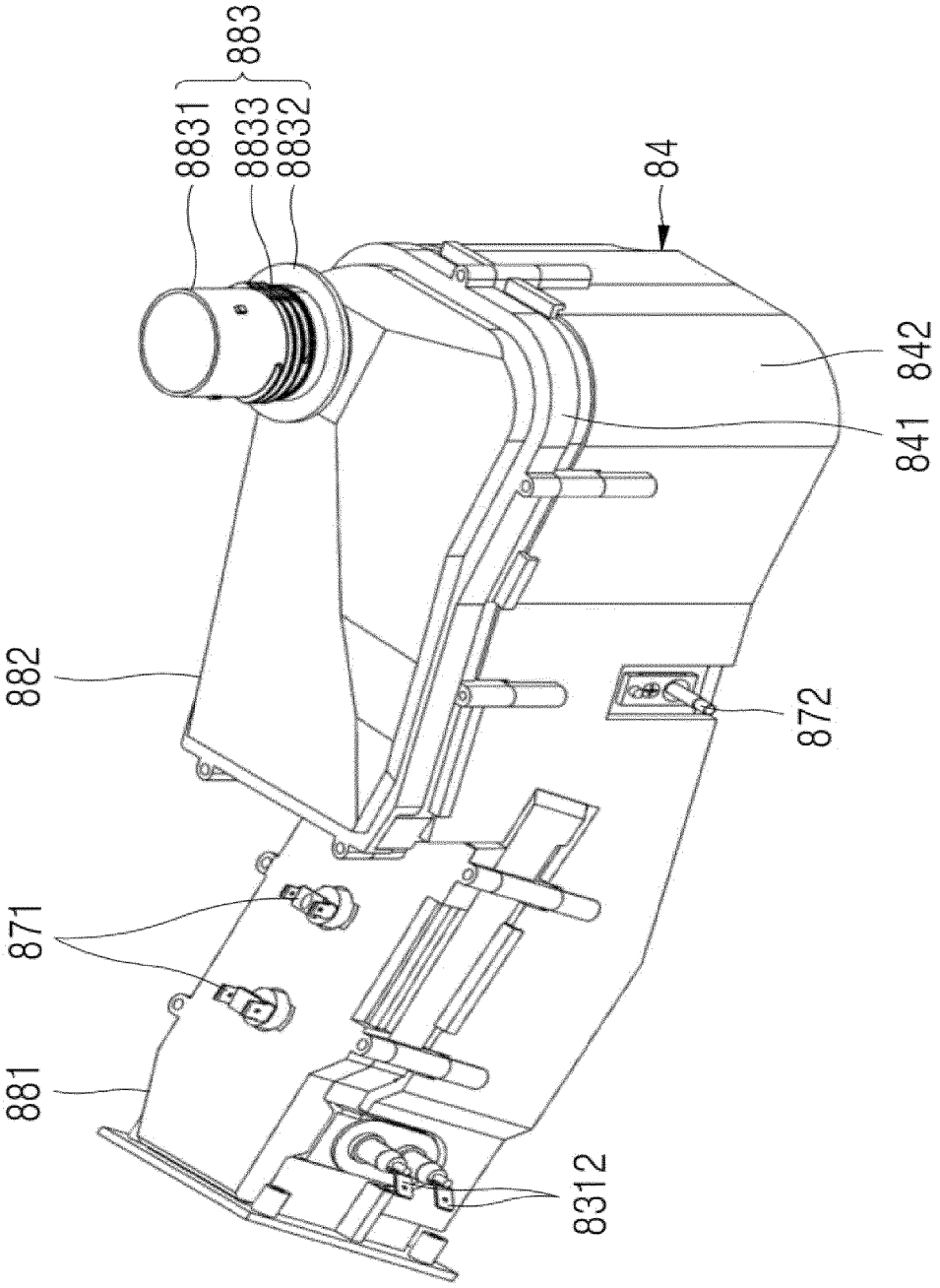
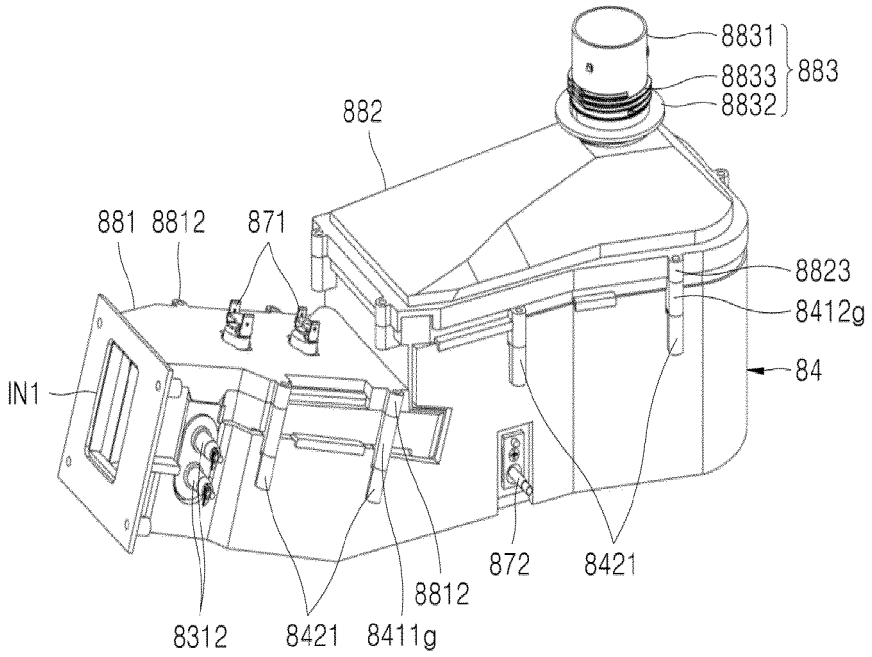


FIG. 11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872
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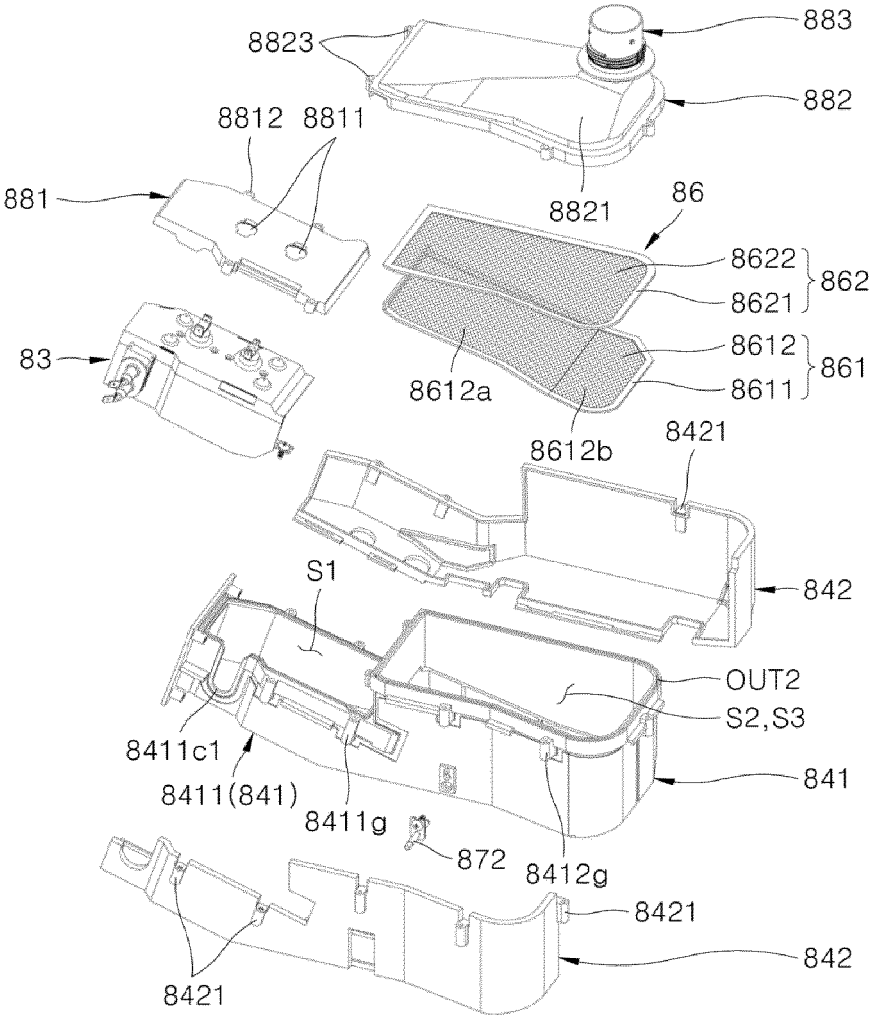
8312
8421
8411g

FIG. 12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86
8622
8621
862
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8612
8611
861
8612a
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8421
842
S1
OUT2
S2,S3
8411c1
8411(841)
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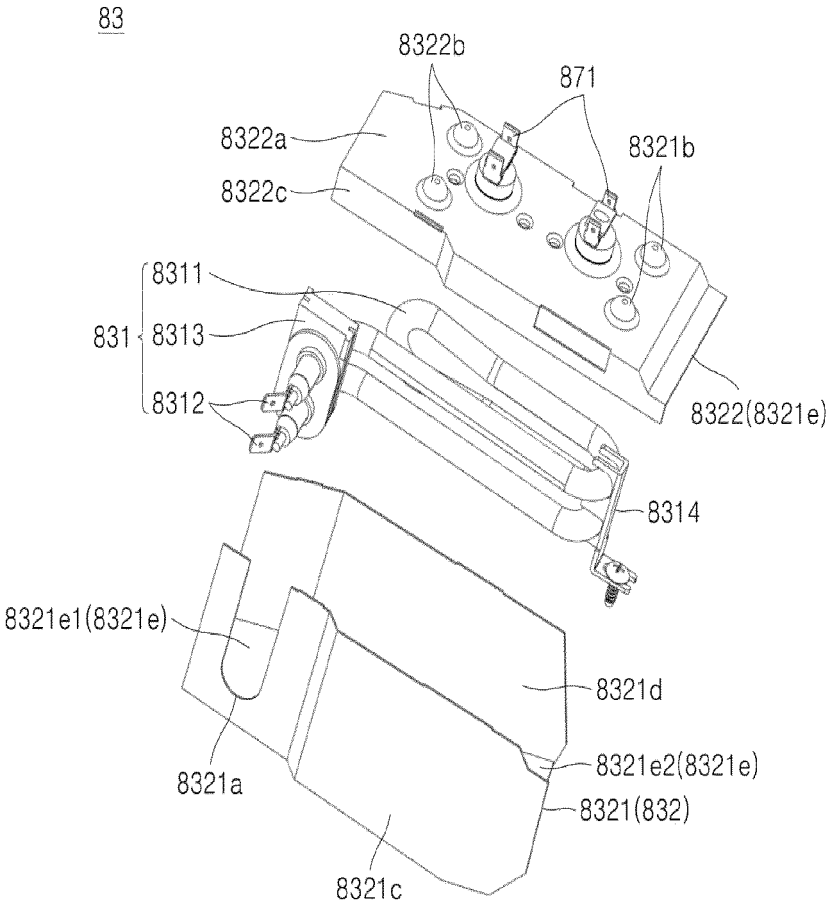
872
8412g
841
8421
842
8421

FIG. 13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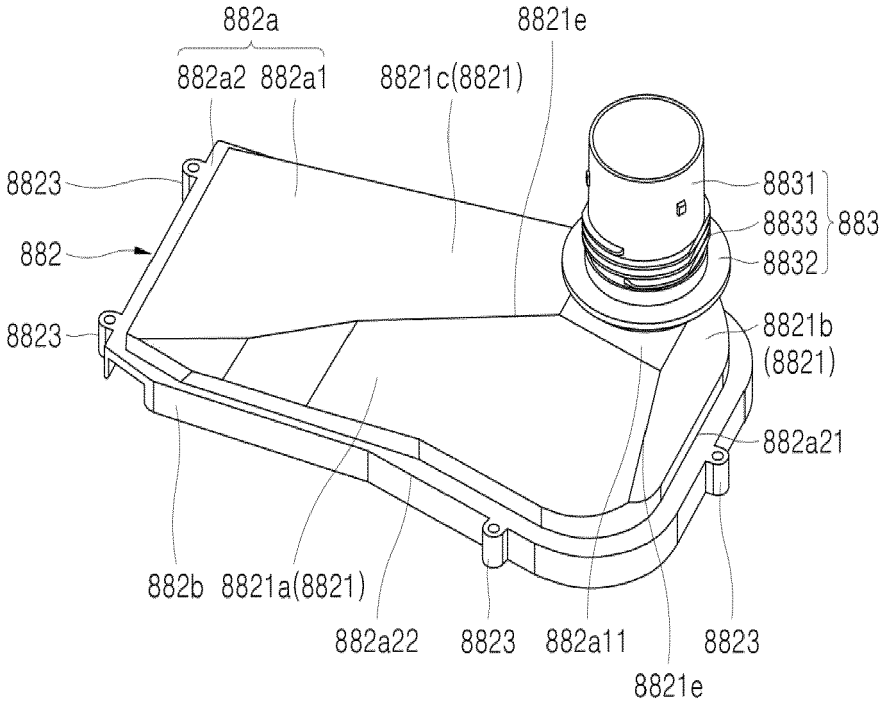
8321d
8321e2(8321e)
8321a
8321(832)
8321c

FIG. 14


882a
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882a2
882a1
8821c(8821)
8823
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8833
883
882
8832
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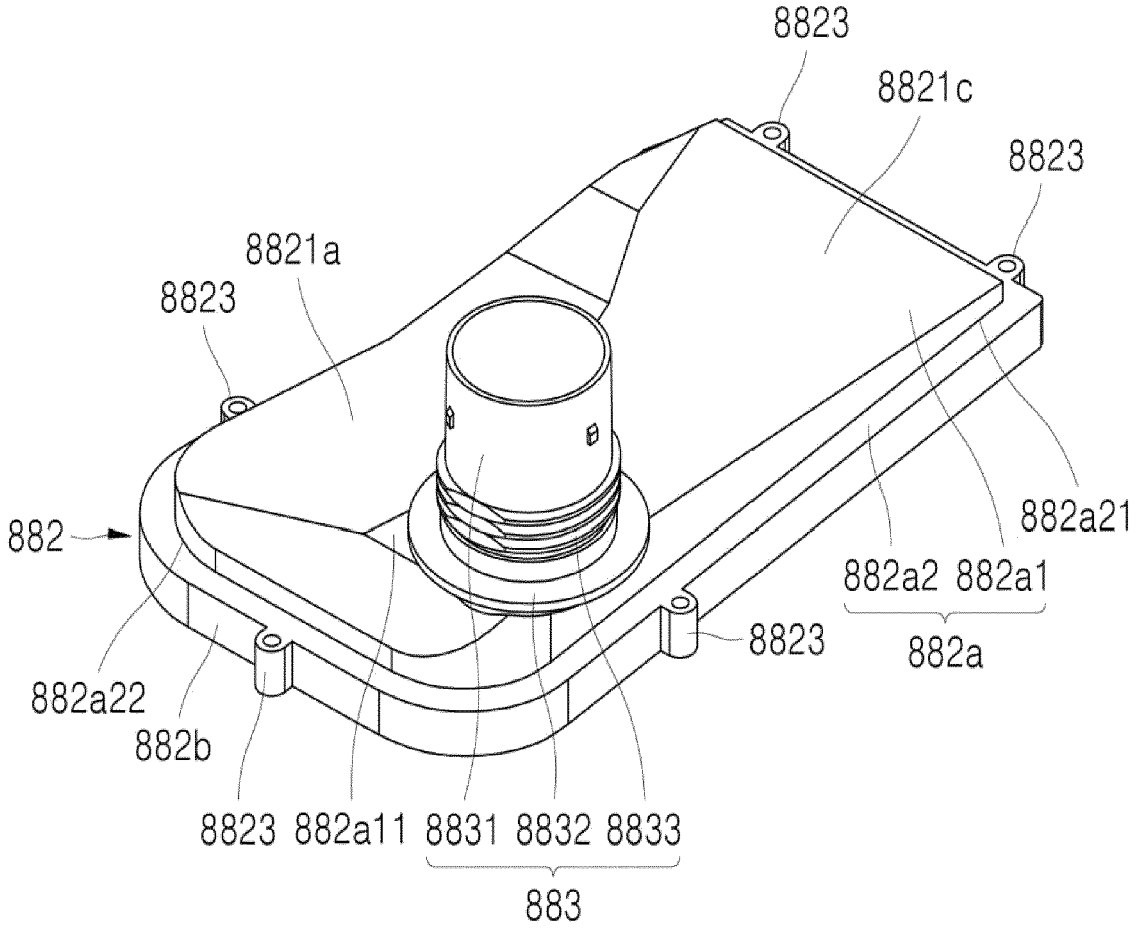
8821b
(8821)
882a21
882b
8821a(8821)
882a22
8823
882a11
8823
8821e

FIG. 15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882a2 882a1
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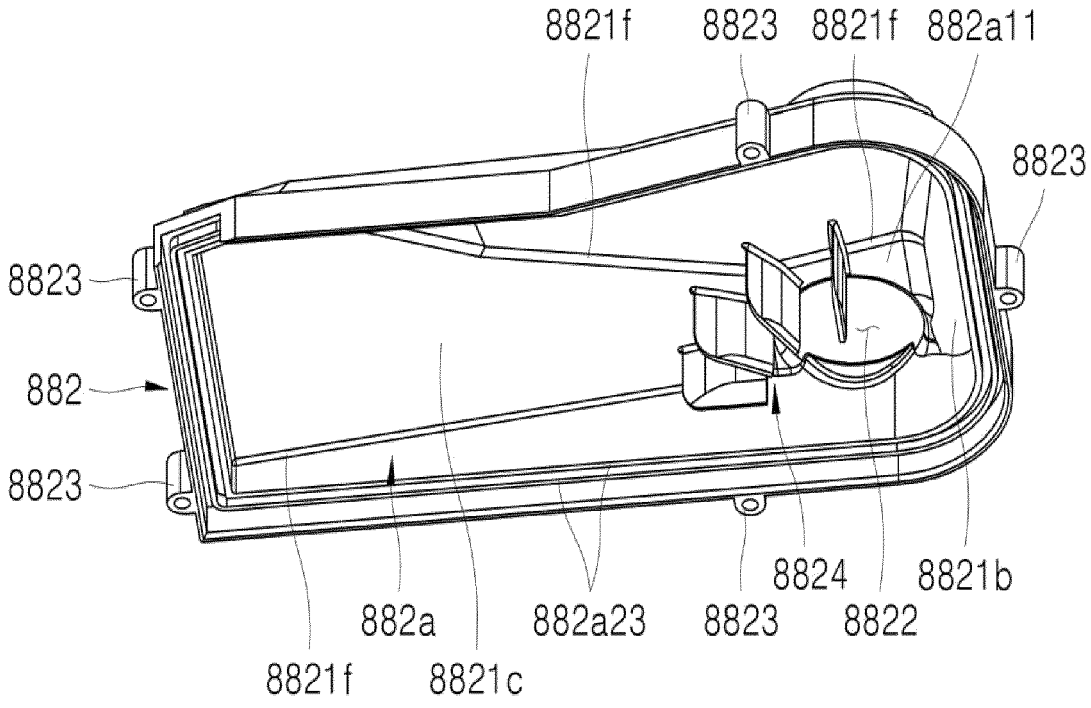
8823
882a22
882b
8823 882a11 8831 8832 8833
883

FIG. 16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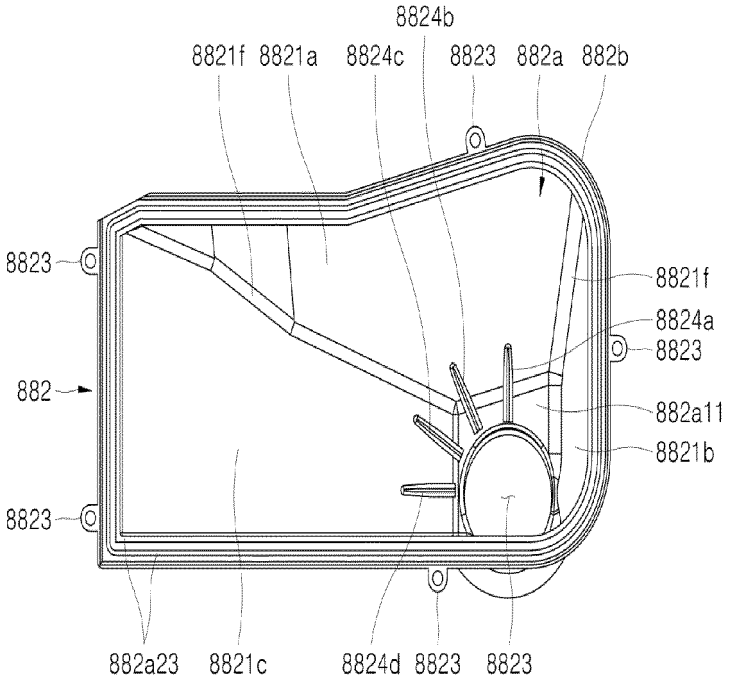
8824 8821b
882a 882a23 8823 8822
8821f 8821c

FIG. 17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882b
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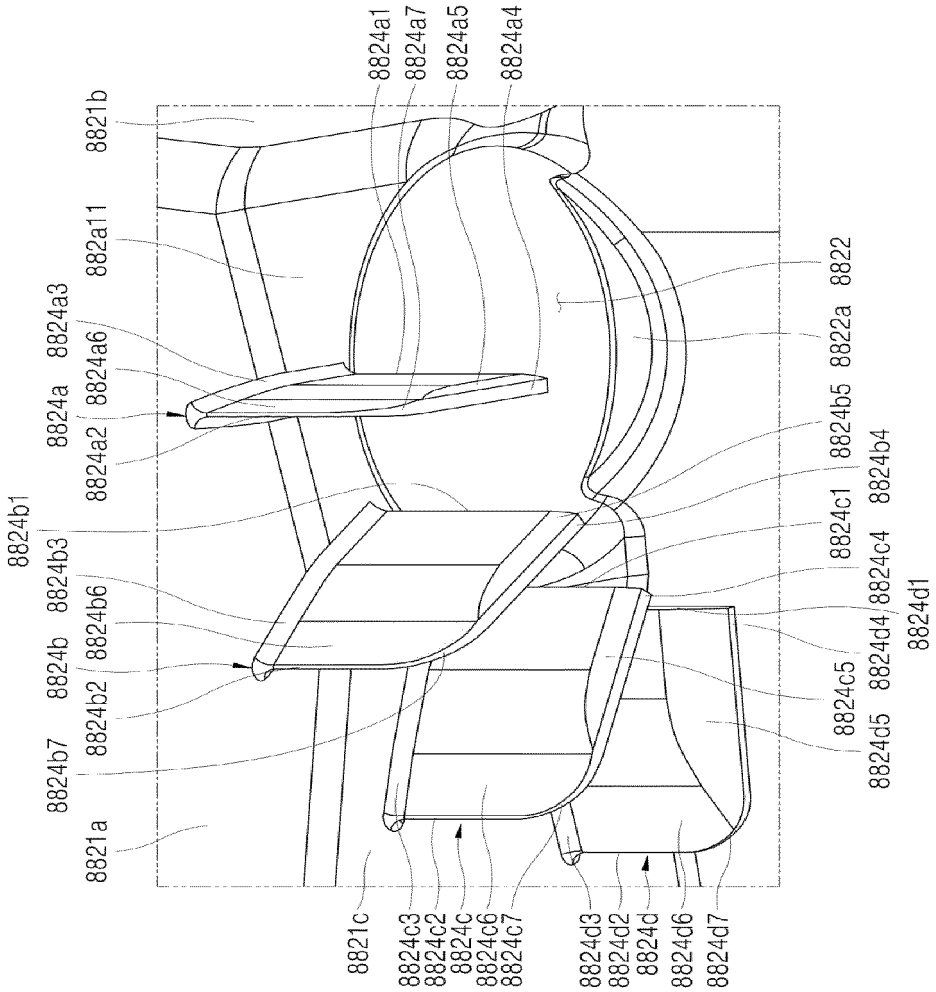
8821c
8824d
8823
8823

FIG. 18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8821c
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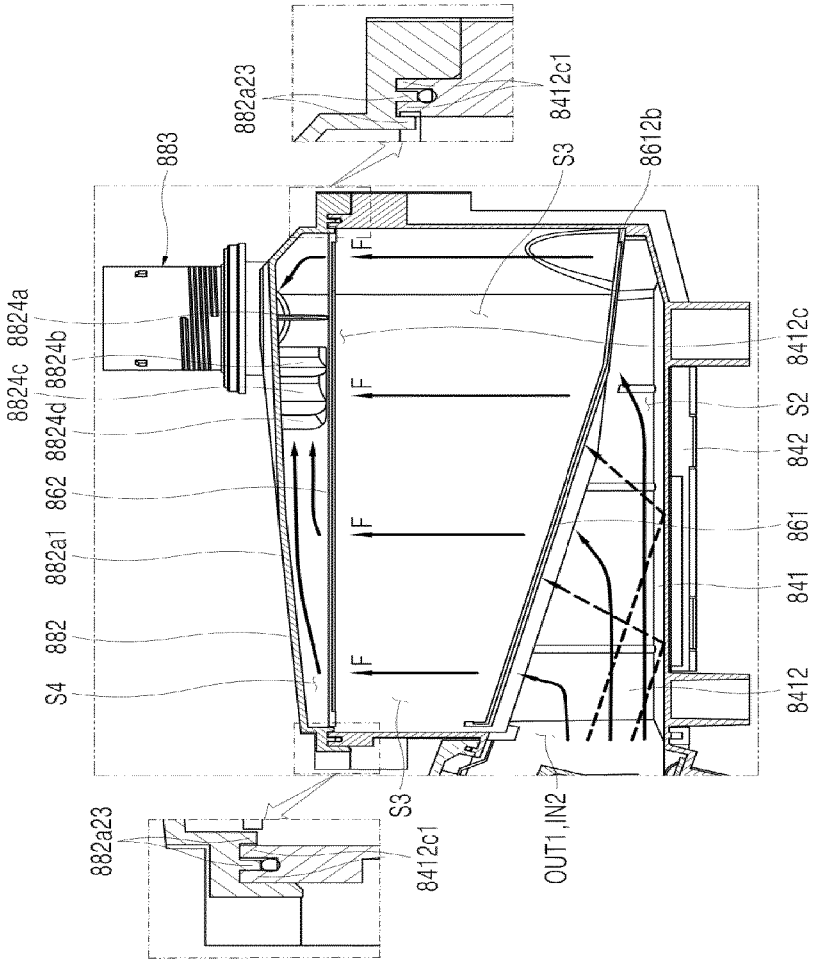
8824d
8824d6
8824d7

FIG. 19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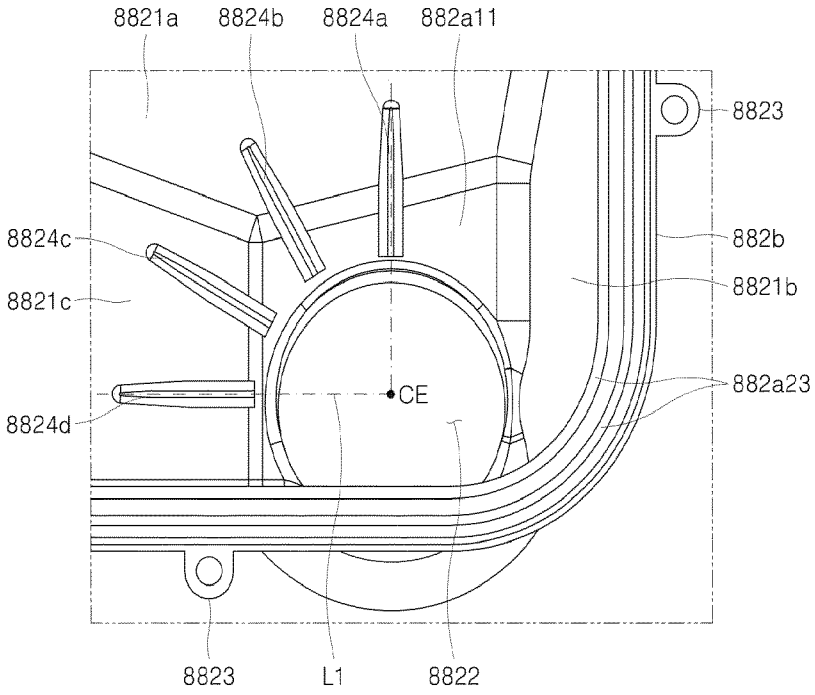
S3
8412c1
OUT1, IN2

FIG. 20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L1
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FIG. 21

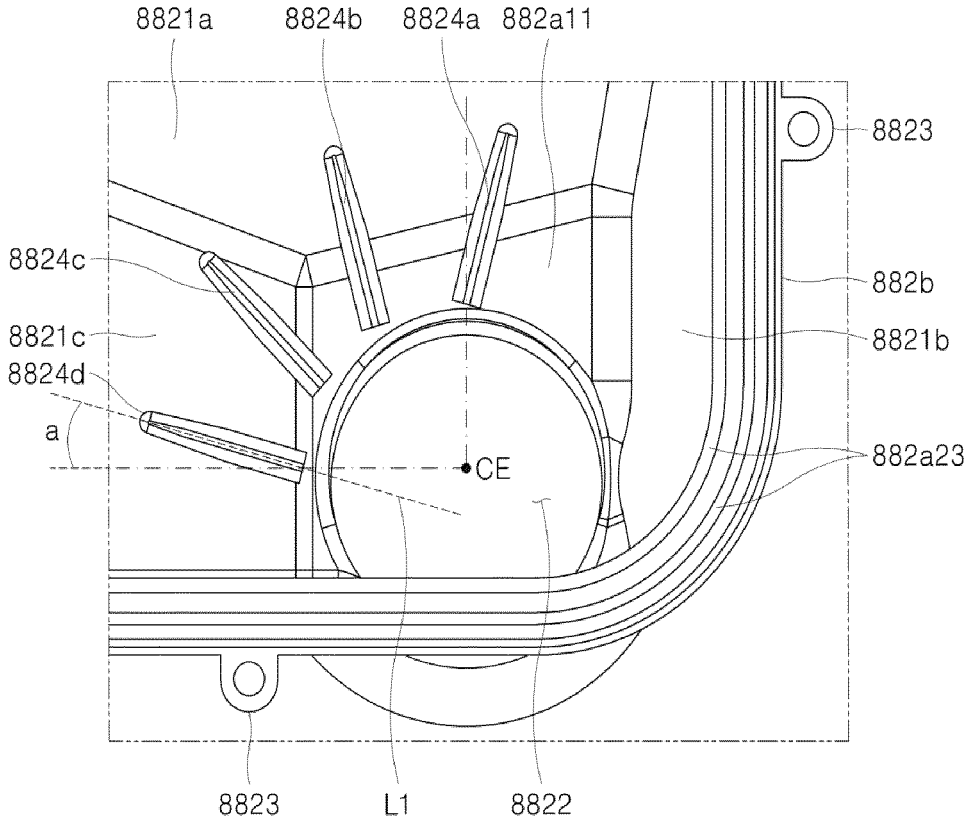
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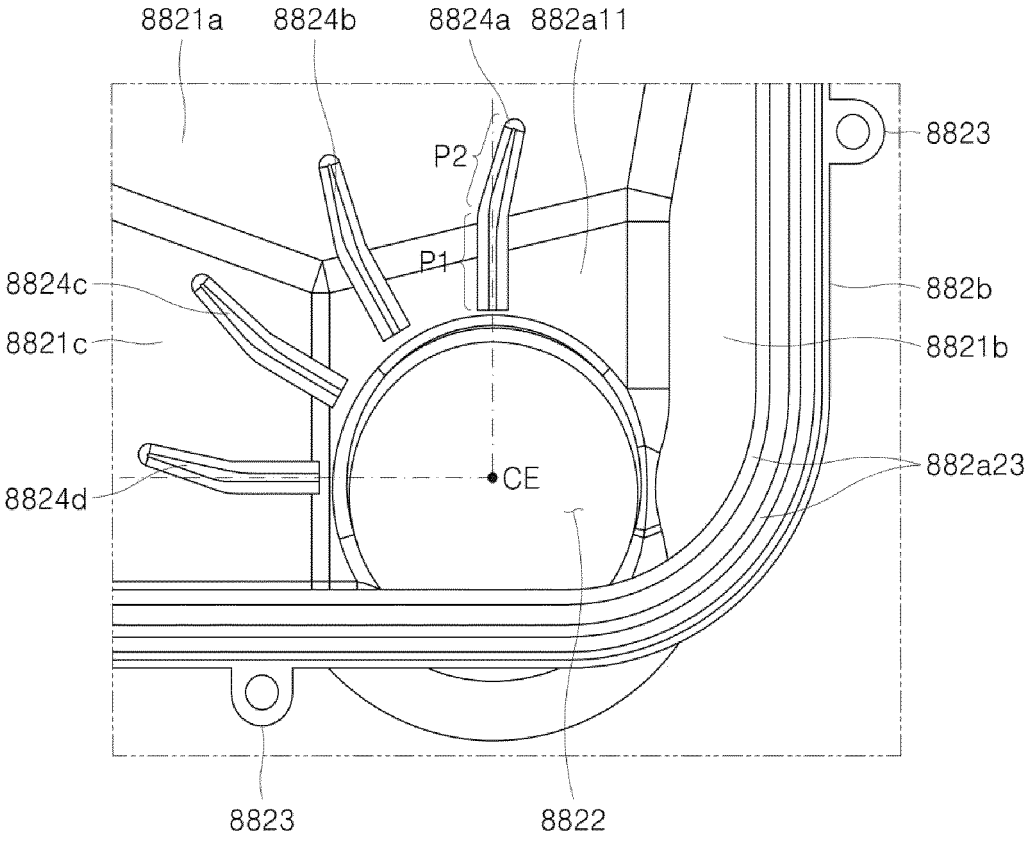
FIG. 22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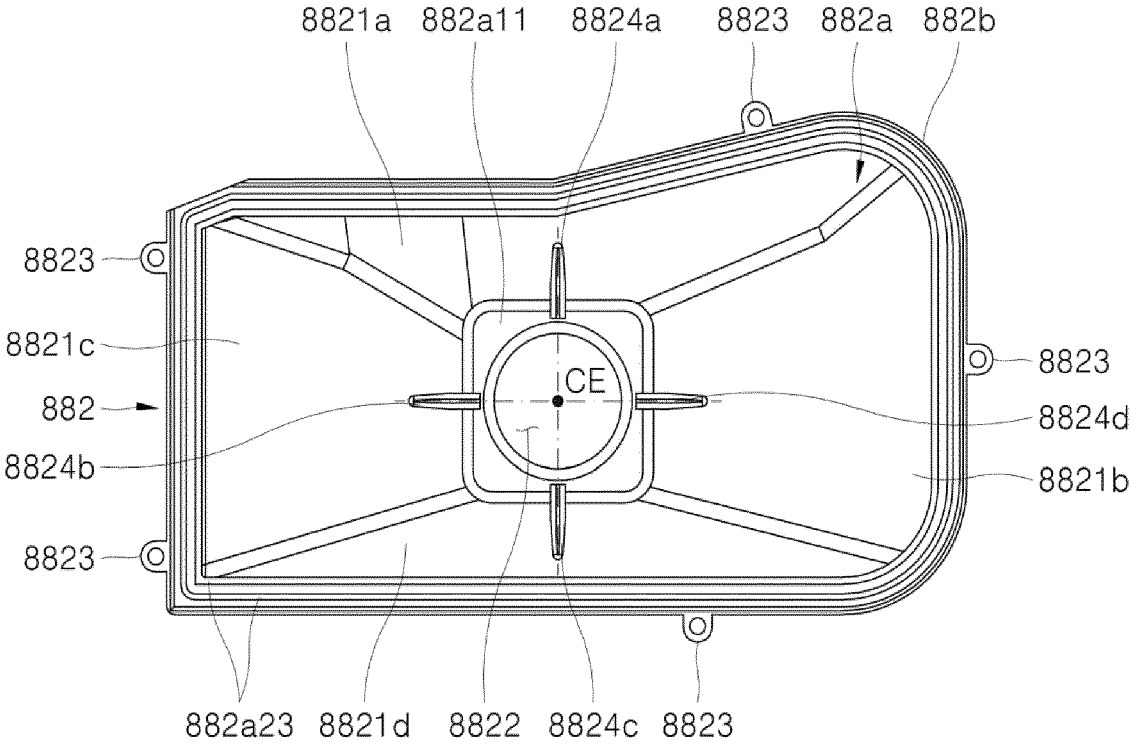
8823
8822

FIG. 23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8821d
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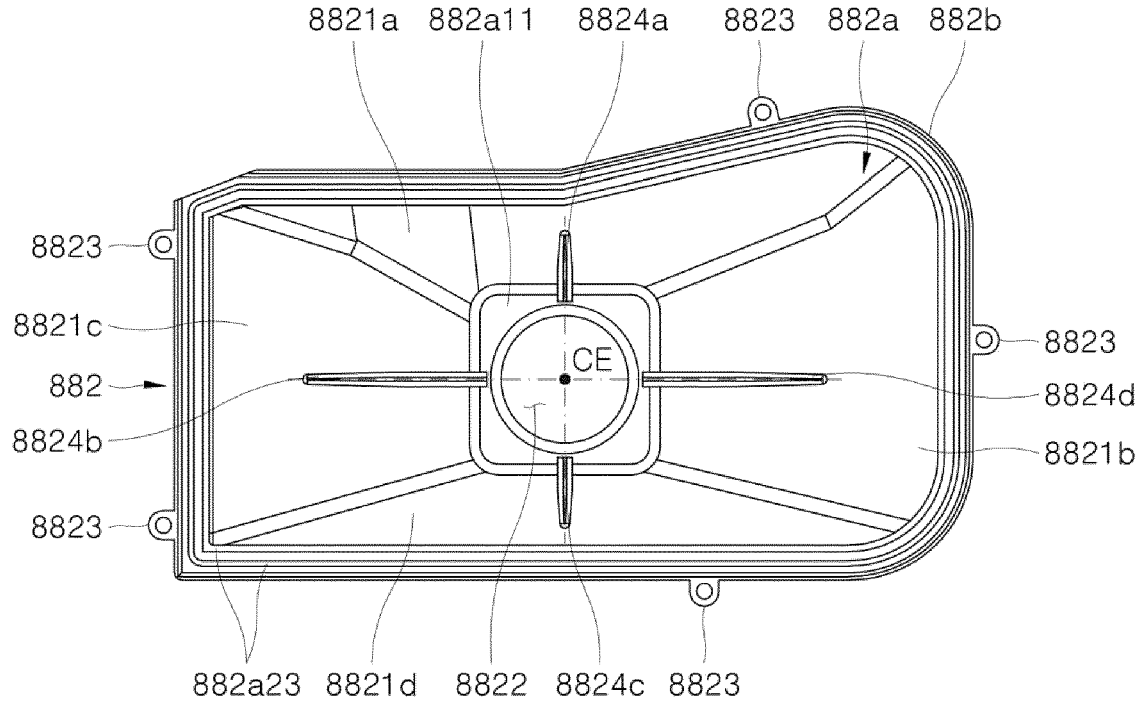
8824c
8823

FIG. 24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8824c
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EUROPEAN SEARCH REPORT

Application Number
EP 24 18 2833

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 October 2024	Prosig, Christina

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