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DISHWASHER

Abstract

A dishwasher according to an embodiment includes a tub, a basket arrangeable within the tub to receive dishware, a spraying device including a spray rotor rotatable by spraying washing water to wash the dishware, a duct including a duct body configured to allow washing water to flow, a duct bearing configured to rotatably support the spray rotor and supply washing water from the duct body to the spray rotor, and a duct holder configured to rotatably support the spray rotor together with the duct bearing, wherein the spray rotor includes a nozzle body rotatably coupleable to the duct bearing and configured to be supplied with washing water from the duct bearing, and a base body supported by the duct holder and coupleable to the nozzle body enabled to receive the washing water flowing into the nozzle body.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of International Application No. PCT/KR2024/020812, filed Dec. 20, 2024, and claims priority to Korean Application No. 10-2024-0021371, filed Feb. 14, 2024, and which are incorporated herein by reference in their entireties.

TECHNICAL FIELD
[0002] The disclosure relates to a dishwasher including a spraying device.
BACKGROUND ART
[0003] A dishwasher is an appliance that automatically washes food residues and the like from dishes using detergent and washing water.
[0004] The dishwasher may include a main body, a tub arranged inside the main body, a basket arranged inside the tub to store dishes, a spray unit arranged to spray washing water onto the basket, and a duct for guiding the washing water to the spray unit.
[0005] The spray unit may include a bearing and a spray arm that rotates around the bearing. A propulsion nozzle that generates a propulsion force while spraying washing water may be formed on the spray arm. The propulsion nozzle needs to be secured at a sufficient distance from the bearing to generate a moment. That is, the spray arm may be formed to have a sufficient length.
[0006] The dishwasher can effectively wash small dishes by miniaturizing the spray unit. Friction with the bearing can be reduced so that the miniaturized spray unit generates a sufficient moment to rotate.
DISCLOSURE
Technical Problem
[0007] An embodiment of the present disclosure can provide a dishwasher having improved washing performance.
[0008] An embodiment of the present disclosure can provide a dishwasher including a miniaturized spray unit.
[0009] An embodiment of the present disclosure can provide a dishwasher capable of reducing friction of a bearing.
[0010] Technical tasks to be achieved in this document are not limited to the technical tasks mentioned above, and other technical tasks not mentioned will be clearly understood by those skilled in the art from the description below.
Technical Solution
[0011] According to an embodiment of the present disclosure, a dishwasher may include a tub, a basket in the tub and configured to receive dishware, a sprayer, and a duct. The sprayer may include a spray rotor, wherein the spray rotor may include a nozzle body, and a base body coupled to the nozzle body so that the base body and the nozzle body together form a space. The duct may include a duct body in which washing water is flowable. The duct may further include a duct bearing to which the nozzle body is rotatably coupled, wherein the duct bearing is configured to

supply washing water flowing in the duct body from the duct body to the space formed by the base body and the nozzle body. The duct may further include a duct holder that supports the base body so that the duct holder, together with the duct bearing, rotatably supports the spray rotor, and so that the washing water supplied to the space formed by the base body and the nozzle body is sprayed by the spray rotor toward the basket to wash dishware received in the basket.

[0012] The duct holder may include a support bearing facing the duct bearing and having a section whose cross-sectional area decreases as the support bearing approaches the base body.

[0013] The duct holder may further include an extension portion extending along a protruding direction of the duct bearing from the duct body, and a holder portion bent from the extension portion. The support bearing may be at an end of the holder portion.

[0014] The spray rotor may include a nozzle to spray the washing water in the space formed by the base body and the nozzle body toward the basket to wash dishware received in the basket.

[0015] The nozzle may include a propulsion nozzle on an outer circumferential surface of the spray rotor.

[0016] The nozzle may further include an upper nozzle formed in the nozzle body and configured to spray washing water in a direction different from a direction in which washing water is sprayed by the propulsion nozzle.

[0017] The nozzle body may include a nozzle portion having a flow path with a cross-sectional area of a size corresponding to a cross-sectional area of a flow path of the duct bearing so as to form a distribution flow path together with the duct bearing.

[0018] The duct body may include a curved portion to prevent a decrease in a flow rate of the washing water flowing from the duct body to a flow path of the duct bearing.

[0019] The nozzle portion may be configured so that the cross-sectional area of the flow path of the nozzle portion increases as the nozzle portion is further away from the duct bearing.

[0020] The nozzle portion may include a sealing portion surrounding the duct bearing to prevent washing water from flowing out between the nozzle portion and the duct bearing.

[0021] The duct holder may include an elastic material so as to be elastically deformable while the nozzle body is being coupled to the duct bearing and the base body is being positioned to be supported by the duct holder.

[0022] The basket may include a bottom portion configured to support the dishware. The duct body may be on an upper side of the bottom portion.

[0023] The bottom portion may include an inclined support portion configured to support the dishware so as to be inclined downwardly, and a duct support portion connected to the inclined support portion and having the duct body seated thereon.

[0024] The spray rotor may be on a lower side of the duct body to spray washing water onto dishware supported on the inclined support portion.

[0025] The dishwasher may include a plurality of the duct bearings and a plurality of the duct holders arranged at predetermined intervals along a direction along which the duct body longitudinally extends. The dishwasher may include a plurality of the spray rotors. The duct holders of the plurality of duct holders, together with the duct bearings of the plurality of duct bearings, may support spray rotors of the plurality of the spray rotors, respectively.

[0026] According to an embodiment of the present disclosure, a dishwasher may include a basket including a bottom portion to support dishware, a duct configured to allow washing water to flow, the duct including a duct body positioned above the bottom portion, a duct bearing protruding from the duct body, and a duct holder including a support bearing facing the duct bearing, and a spray rotor configured to receive washing water from the duct bearing and to spray the washing water to wash the dishware, the spray rotor rotatably coupled between the duct bearing and the support bearing.

[0027] According to an embodiment of the present disclosure, a dishwasher may include a tub, a basket in the tub and including a bottom portion for supporting dishware, a duct in which washing

water flows and including a duct body positioned above the bottom portion, a duct bearing protruding from the duct body, and a duct holder including a support bearing facing the duct bearing, and a spray rotor configured to receive washing water from the duct bearing to spray the washing water to wash the dishware, the spray rotor rotatably coupled between the duct bearing and the support bearing, wherein the spray rotor includes a nozzle body rotatably coupleable to the duct bearing and configured to receive washing water from the duct bearing, and a base body rotatably supported by the support bearing.

Description

DESCRIPTION OF DRAWINGS

[0028] FIG. **1** is a perspective view illustrating a dishwasher according to an embodiment.

[0029] FIG. **2** is a cross-sectional view illustrating a cross-section of the dishwasher of FIG. **1**.

[0030] FIG. **3** is a front view illustrating some configurations of the dishwasher according to an embodiment.

[0031] FIG. **4** is a perspective view illustrating some configurations of the dishwasher according to an embodiment.

[0032] FIG. **5** is an exploded view of a basket, duct, and spray rotor shown in FIG. **4**.

[0033] FIG. **6** is a perspective view illustrating the duct and the spray rotor, according to an embodiment.

[0034] FIG. **7** is an exploded perspective view illustrating the duct and the spray rotor.

[0035] FIG. **8** is an exploded view of the duct and the spray rotor of FIG. **7** from a different angle.

[0036] FIG. **9** is an exploded view illustrating the spray rotor according to an embodiment.

[0037] FIG. **10** is a side view illustrating a coupled structure of the duct and the spray rotor of FIG. **6**.

[0038] FIG. **11** is a cross-sectional view of the duct and a spraying device of FIG. **6** cut along an extension direction of the duct.

[0039] FIG. **12** is a top view of the spray rotor illustrating the action of washing water sprayed from the spray rotor.

MODES OF THE INVENTION

[0040] Various embodiments of the present document and terms used therein are not intended to limit the technical features described in this document to specific embodiments, and should be understood to include various modifications, equivalents, or substitutes of the corresponding embodiments.

[0041] In addition, the same reference numerals or signs shown in the drawings of the disclosure indicate elements or components performing substantially the same function.

[0042] Also, the terms used herein are used to describe the embodiments and are not intended to limit and/or restrict the disclosure. The singular forms “a”, “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. In this disclosure, the terms “including”, “having”, and the like are used to specify features, figures, steps, operations, elements, components, or combinations thereof, but do not preclude the presence or addition of one or more of the features, figures, steps, operations, elements, components, or combinations thereof.

[0043] It will be understood that, although the terms “first”, “second”, “primary”, “secondary”, etc., may be used herein to describe various elements, but elements are not limited by these terms. These terms are only used to distinguish one element from another element. For example, without departing from the scope of the disclosure, a first element may be termed as a second element, and a second element may be termed as a first element. The term of “and/or” includes a plurality of combinations of relevant items or any one item among a plurality of relevant items.

[0044] Meanwhile, as used in the disclosure, the terms “vertical direction”, “lower”, and “front-rear

direction" the like are defined with reference to the drawings, and are not intended to limit the shape and position of any element.

[0045] Hereinafter, various embodiments according to the disclosure will be described in detail with reference to the accompanying drawings.

[0046] FIG. **1** is a perspective view illustrating a dishwasher according to an embodiment. FIG. **2** is a cross-sectional view illustrating a cross-section of the dishwasher of FIG. **1**.

[0047] Referring to FIGS. **1** and **2**, a dishwasher **1** may include a main body **10**. The main body **10** may form an exterior of the dishwasher **1**.

[0048] The dishwasher **1** may include a tub **12** arranged in an inside of the main body **10**. The tub **12** may form a washing chamber **10***a*. The tub **12** may be arranged in an approximately box shape. One side of the tub **12** may be open. In other words, the tub **12** may have an opening **12***a*. In an example, a front side of the tub **12** may be open.

[0049] The dishwasher **1** may include a door **11**. The door **11** may be configured to open or close the tub **12**. The door **11** may be arranged to open or close the opening **12***a* of the tub **12**. The door **11** may be arranged to open or close the washing chamber **10***a*. The door **11** may be installed on the main body **10** to open or close the tub **12**. The door **11** may be rotatably mounted on the main body **10**. The door **11** may be detachably mounted to the main body **10**.

[0050] The dishwasher **1** may include a storage container **50**. The storage container **50** may be arranged in the inside of the tub **12**. The storage container **50** may accommodate dishware. The storage container **50** may store dishes. The storage container **50** may be load dishware. The storage container **50** may hold dishes.

[0051] The storage container **50** may include at least one basket for storing dish ware, such as tableware, utensils, crockery or the like. The storage container **50** may include at least one rack assembly for storing dishware. The basket and the rack assembly may be interchangeable. It should be understood that the basket described below may be referred to as a rack assembly.

[0052] For example, the storage container **50** may include a plurality of baskets **51**, **52** and **53**. The plurality of baskets **51**, **52** and **53** may be configured to store a variety of dishware. However, the present disclosure is not limited thereto. For example, the storage container **50** may include only some of the plurality of baskets **51**, **52** and **53**. For example, the storage container **50** may further include additional baskets other than the plurality of baskets **51**, **52** and **53**. For example, the storage container **50** may include a single basket.

[0053] The storage container **50** may include the intermediate basket **52** positioned at the middle in a height direction of the dishwasher **1**. The intermediate basket **52** may be configured to be moved out of the tub **12** or into the tub **12**. For example, the intermediate basket **52** may be configured to be supported on an intermediate guide rack (not shown). For example, the intermediate guide rack (not shown) may be installed on a side **12***c* of the tub **12** so as to be slidable toward the opening **12***a* of the tub **12**.

[0054] The storage container **50** may include the lower basket **51** positioned at a lower portion in the height direction of the dishwasher **1**. The lower basket **51** may be configured to be moved out of the tub **12** or into the tub **12**. For example, the lower basket **51** may be configured to be supported on a lower guide rack **13***a*. For example, the lower guide rack **13***a* may be installed on the side **12***c* of the tub **12** so as to be slidable toward the opening **12***a* of the tub **12**.

[0055] The plurality of baskets **51** and **52** may store relatively large dishware. However, the types of dishware stored in the plurality of baskets **51** and **52** are not limited to relatively large dishware. In other words, plurality of baskets **51** and **52** may store relatively small dishware as well as relatively large dishware.

[0056] The storage container **50** may include the upper basket **53** positioned at the upper portion in the height direction of the dishwasher **1**. The upper basket **53** may be formed in the shape of a rack assembly, such that relatively small volume dishware may be stored therein. For example, the upper basket **53** may store utensils or cutlery, such as ladles, knives, flippers, and the like. For

example, the upper basket **53** may store smaller sized tableware, such as cups. However, this is only an example, and the types of dishware stored in the upper basket **53** are not limited to the above examples.

[0057] The upper basket **53** may be configured to be moved out of the tub **12** or into the tub **12**. For example, the upper basket **53** may be slidably movable by an upper guide rack **13***c*. For example, the upper basket **53** may be configured to be supported by the upper guide rack **13***c*. For example, the upper guide rack **13***c* may be installed on the side **12***c* of the tub **12**.

[0058] The dishwasher **1** may include the washing chamber **10***a*, which is a space formed within the tub **12**. The washing chamber **10***a* may be defined as an inner space of the tub **12**. The washing chamber **10***a* may refer to a space in which dishware placed in the storage container **50** may be washed and dried by washing water.

[0059] The dishwasher **1** may include a spraying device (e.g., sprayer) **40** configured to spray washing water. The spraying device **40** may spray washing water into the washing chamber **10***a*. The spraying device **40** may spray washing water toward dishware placed in the storage container **50**. The spraying device **40** may receive washing water from a sump **70**, which will be described later.

[0060] The spraying device **40** may include at least one spray arm. The spraying device **40** may include a plurality of spray units **41**, **42** and **43**.

[0061] For example, the spraying device **40** may include the first spray unit **41** arranged at a lower portion of the lower basket **51** in the height direction of the dishwasher **1**. For example, the spraying device **40** may include the second spray unit **42** arranged at a lower portion of the intermediate basket **52** in the height direction of the dishwasher **1**. For example, the spraying device **40** may include the third spray unit **43** arranged at an upper portion of the upper basket **53** in the height direction of the dishwasher **1**. However, the number of spray units is not limited to the above examples. The spraying device **40** may include two or fewer spray units. The spraying device **40** may include four or more spray units.

[0062] The spray units **41**, **42** and **43** may include a spray arm. The operation of the spray arm will be briefly described using the second spray unit **42** as an example. The description of the second spray unit **42** may be applicable to the first spray unit **41** and/or the third spray unit **43**.

[0063] The second spray unit **42** may include the spray arm. The spray arm may be configured to be rotatable relative to a duct **100**. The spray arm may spray washing water while rotating relative to the duct **100**.

[0064] The spray arm may have a shape extending in one direction. The spray arm may extend in a direction perpendicular to an axis of rotation. Alternatively, the spray arm may extend along a diameter direction of a circle drawn by the rotation of the spray arm.

[0065] The spray arm may form a channel through which washing water flows. The second spray unit **42** may include a spray hole for spraying washing water. The spray hole may be formed in the spray arm. For example, the spray holes may be provided in a plurality. For example, the plurality of spray holes may be arranged to be spaced apart from each other along an extension direction of the spray arm.

[0066] The spraying device **40** according to an embodiment of the present disclosure may include a spray rotor **200**.

[0067] The spray rotor **200** may rotate while spraying washing water. In other words, the spray rotor **200** may rotate by spraying the washing water. The spray rotor **200** may be rotatably coupled to the duct **100** to be described later.

[0068] The dishwasher **1** may include the sump **70**. The sump **70** may be configured to receive washing water. The sump **70** may collect washing water from the washing chamber **10***a*. For example, a lower surface **12***b* of the tub **12** may be configured to be inclined downwardly toward the sump **70** to facilitate water collection in the sump **70**. Washing water from the washing chamber **10***a* may flow down the slope of the lower surface **12***b* of the tub **12** and smoothly flow into the

sump **70**. In addition, the sump **70** may be configured to provide the collected washing water to the spraying device **40**.

[0069] The dishwasher **1** may include a circulation pump **71** configured to pump washing water stored in the sump **70**. The circulation pump **71** may be provided as a configuration of the sump **70**. For example, the circulation pump **71** may be arranged in a machine chamber **10***b*. The washing water pumped by the circulation pump **71** may flow to the spraying device **40**.

[0070] The dishwasher **1** may include a drain pump **72** for draining washing water and/or foreign substances (e.g., food waste, etc.) remaining in the sump **70**. The drain pump **72** may be provided as a configuration of the sump **70**. For example, the drain pump **72** may be arranged in the machine chamber **10***b*.

[0071] The dishwasher **1** may include the machine chamber **10***b* which is a space arranged below the tub **12**. The machine chamber **10***b* may be a place where a configuration for circulating washing water is arranged. The dishwasher **1** may include a base frame **16** forming the machine chamber **10***b*.

[0072] For example, at least a portion of the sump **70** may be arranged in the machine chamber **10***b*. The majority of the sump **70** may be arranged in the machine chamber **10***b*. In other words, the area of the sump **70** located in the washing chamber **10***a* may be smaller than the area of the sump **70** located in the machine chamber **10***b*. By reducing the area of the sump **70** occupying the washing chamber **10***a*, the area of the washing chamber **10***a* may be secured. As a result, the capacity of the washing chamber **10***a* may be increased, thereby improving the storage capacity of the dishware.

[0073] The dishwasher **1** may include a filter assembly **60**. The filter assembly **60** may be configured to filter foreign substances contained in the washing water entering the sump **70**. The washing water filtered through the filter assembly **60** may be pumped by the circulation pump **71** and supplied to the spraying device **40**. The filter assembly **60** may be detachably mounted to the sump **70**. For example, the filter assembly **60** may include at least one of a fine filter, a coarse filter, or a micro filter.

[0074] The dishwasher **1** may include an inlet duct **14** configured to allow washing water to flow in from the sump **70**. In addition, the dishwasher **1** may include the duct **100** for guiding the washing water introduced through the inlet duct **14** to the spray rotor **200**.

[0075] The inlet duct **14** and the duct **100** may be arranged in the tub **12**. The duct assembly may be arranged in the washing chamber **10***a*.

[0076] The inlet duct **14** may be arranged between the sump **70** and the duct **100**. For example, the duct **100** may be arranged between the inlet duct **14** and the spraying device **40**. For example, the inlet duct **14** and the duct **100** may be provided as a duct assembly.

[0077] However, the present disclosure is not limited to the example described above and the inlet duct **14** and the duct **100** may be provided as an integral configuration. In this case, the integral duct may directly guide the washing water from the sump **70** to the spraying device **40**.

[0078] FIG. **3** is a front view showing a partial configuration of the dishwasher according to an embodiment. FIG. **4** is a perspective view showing a partial configuration of the dishwasher according to an embodiment. FIG. **5** is an exploded view showing the basket, the duct, and the spray rotor shown in FIG. **4**.

[0079] Referring to FIGS. **3** to **5**, the dishwasher **1** according to an embodiment may include the duct **100** arranged to supply washing water to the spray rotor **200**.

[0080] The duct **100** may extend along one direction. The duct **100** may be arranged along a front-to-back direction.

[0081] The duct **100** may be arranged on an upper side of the basket **53**. The duct **100** may be seated on the upper side of the basket **53**. The duct **100** may be configured to supply washing water for washing dishware held by the basket **53**.

[0082] The basket **53** may include a bottom portion **531** configured to support dishware. The

bottom portion **531** may form a base of the basket **53**. For example, the bottom portion **531** may be formed by wires **53***a* and **53***b*, which will be described later. The bottom portion **531** may be referred to as a bottom frame.

[0083] The first wire **53***a* and the second wire **53***b* may be arranged orthogonally to each other. For example, as shown, the first wire **53***a* may extend along a left-to-right direction, and the second wire **53***b* may extend along the front-to-back direction. The first wire **53***a* and the second wire **53***b* may be spaced apart and intersect each other.

[0084] The wires **53***a* and **53***b* may be provided in a plurality, and the plurality of wires **53***a* and **53***b* may be formed into the integral basket **53** by welding, deep drawing, or the like. In other words, a plurality of openings (not shown) may be formed between the first wires **53***a* and the second wires **53***b*.

[0085] The basket **53** may include a side portion **532**. The side portion **532** may be arranged to surround the bottom portion **531**. The side portion **532** may have a shape extending upwardly from an edge of the bottom portion **531**. For example, the side portion **532** may be formed into a frame shape by the wires **53***a* and **53***b*, which will be described later. The side portion **532** may be referred to as a side frame.

[0086] The bottom portion **531** may include a horizontal support portion **5311** extending horizontally. The horizontal support portion **5311** may form at least a portion of the bottom portion **531**. The horizontal support portion **5311** may support the dishware horizontally.

[0087] The bottom portion **531** may include inclined support portions **5312***a* and **5312***b* arranged to support the dishware in an inclined manner. The inclined support portions **5312***a* and **5312***b* may extend from the horizontal support portion **5311**. The inclined support portions **5312***a* and **5312***b* may be formed to be inclined downwardly. In other words, the dishware supported by the inclined support portions **5312***a* and **5312***b* may be placed with an open side thereof facing downward.

[0088] The inclined support portions **5312***a* and **5312***b* may include the first inclined support portion **5312***a* and the second inclined support portion **5312***b* that are arranged to have different inclinations and/or lengths.

[0089] The first inclined support portion **5312***a* and the second inclined support portion **5312***b* may be configured to have different inclinations. As shown, the first inclined support portion **5312***a* may have a smaller inclination than the second inclined support portion **5312***b*. In other words, the first inclined support portion **5312***a* may have a greater length than the second inclined support portion **5312***b*. As a result, dishware with a taller height may be placed on the first inclined support portion **5312***a*, and dishware with a shorter height may be placed on the second inclined support portion **5312***b*.

[0090] The first inclined support portion **5312***a* and the second inclined support portion **5312***b* may support dishware of a certain height. For example, the first inclined support portion **5312***a* and the second inclined support portion **5312***b* may support a cup or the like. However, the dishware that may be placed on the first inclined support portion **5312***a* and the second inclined support portion **5312***b* is not limited thereto, and any other type of dishware may be placed thereon.

[0091] The bottom portion **531** may include a duct support portion **5313** connected to the inclined support portions **5312***a* and **5312***b*. The duct support portion **5313** may be configured to seat a duct body **110** thereon.

[0092] The duct support portion **5313** may be arranged along one direction to support the duct body **110** extending in one direction. For example, the duct support portion **5313** may be arranged along the front-to-back direction.

[0093] The duct support portion **5313** may be arranged at predetermined intervals. The bottom portion **531** may include a rotor opening **533***a* arranged between the duct support portions **5313** to allow the spray rotor **200** to pass through. In other words, the duct **100** may be positioned on the upper side of the duct support portion **5313**, and the spray rotor **200** may be positioned on a lower side of the duct support portion **5313**.

[0094] A space may be formed between the first inclined support portion **5312***a* and the second inclined support portion **5312***b* on the lower side of the duct support portion **5313**. The spray rotor **200** may be positioned between the first inclined support portion **5312***a* and the second inclined support portion **5312***b*.
[0095] The open side of the dishware supported on the inclined support portions **5312***a* and **5312***b* may be supported toward the spray rotor **200**. The spray rotor **200** may spray washing water into an interior of the dishware through the open side of the dishware.
[0096] The duct **100** may be positioned on the upper side of the bottom portion **531**. In other words, the duct **100** may be positioned above the horizontal support portion **5311**, the inclined support portions **5312***a* and **5312***b*, and the duct support portion **5313** forming the bottom portion **531**. In another expression, the duct support portion **5313** configured to allow the duct **100** to be seated may be positioned above the horizontal bottom portion **5311**. The duct support portion **5313** may be positioned at least flush with the horizontal bottom portion **5311**.
[0097] The duct **100** positioned above the bottom portion **531** may allow the spray rotor **200** to be positioned between the inclined support portions **5312***a* and **5312***b*. In other words, since the spray rotor **200** may be positioned to face the open side of the dishware, the interior of the dishware may be uniformly washed.
[0098] In addition, the spray rotor **200** may drain residual water inside the duct **100**. Since the duct **100** is extended for relatively long distance along one direction, the washing water may remain inside the duct **100** without flowing. In particular, when no washing water is supplied after the operation of the dishwasher **1** is completed, the washing water may not flow, and thus residual water may be generated inside the duct **100**. Since the spray rotor **200** is positioned below the duct **100**, the residual water inside the duct **100** may be drained to the spray rotor **200**.
[0099] In addition, since the duct **100** is positioned on the upper side of the bottom portion **531**, the size of the spray rotor **200** positioned on the lower side of the duct **100** may be increased. By increasing the size of the spray rotor **200**, the rotational force generated by a propulsion nozzle **200***a*, which will be described later, may be increased, allowing the rotation of the spray rotor **200** to be more smoothly. In addition, the rotation of the spray rotor **200** may be prevented from stopping.
[0100] Furthermore, since the duct **100** is positioned on the upper side of the bottom portion **531**, the dishware supported by the inclined support portions **5312***a* and **5312***b* may also be supported by the duct **100**. More particularly, the dishware may be supported by the inclined support portions **5312***a* and **5312***b* and the duct body **110**.
[0101] In addition, since the duct **100** is positioned on the upper side of the bottom portion **531**, the length of the spray rotor **200** in an up-and-down direction may be secured. More particularly, the length of a nozzle portion **211** of the spray rotor **200**, which will be described later, may be secured. By securing the length of the nozzle portion **211**, an inside of the nozzle portion **211** may be provided with a venturi tube structure whose diameter gradually increases. In other words, the flow rate of the washing water entering the nozzle portion **211** may be secured.
[0102] The duct **100** may be configured to provide washing water to the spray rotor **200**. The spray rotor **200** may be positioned on the lower side of the duct **100**. The washing water flowing inside the duct **100** may flow to the spray rotor **200** by gravity.
[0103] The spray rotor **200** may be positioned on the lower side of the duct **100**. The spray rotor **200** may be rotatably coupled to the duct **100**. The spray rotor **200** may obtain rotational power from the force of spraying the washing water. The spray rotor **200** may rotate on the lower side of the duct **100** and spray the washing water.
[0104] The spray rotor **200** may rotate to spray washing water in multiple directions. The spray rotor **200** may spray the washing water toward nearby dishware.
[0105] FIG. **6** is a perspective view showing the duct and the spray rotor according to an embodiment. FIG. **7** is an exploded perspective view showing the duct and the spray rotor. FIG. **8**

is an exploded view of the duct and the spray rotor of FIG. **7** from a different angle.
[0106] Referring to FIGS. **6** to **8**, a coupling structure of the duct **100** and the spray rotor **200** will be described.
[0107] The duct **100** may include the duct body **110** that forms a flow path **110***f* (see FIG. **2**) through which the washing water flows. The duct **100** may be arranged such that the duct body **110** extends along one direction. For example, the duct body **110** may be arranged along the front-to-back direction.
[0108] The spray rotors **200** may be provided in a plurality. The plurality of spray rotors **200** may be arranged at predetermined intervals along the extension direction of the duct **100**.
[0109] The duct **100** may include a plurality of duct holders **130** configured to rotatably support the plurality of spray rotors **200**. In other words, the plurality of duct holders **130** and the plurality of spray rotors **200** may be coupled such that each spray rotor **200** may be rotatable.
[0110] While one spray rotor **200** and one duct holder **130** are described herein, the description may be applied to the plurality of spray rotors **200** and the plurality of duct holders **130**.
[0111] The duct body **110** may include a connecting portion **111** configured to receive washing water from the inlet duct **14**. The connecting portion **111** may be connected to the inlet duct **14** that receives washing water from the sump **70** (see FIG. **2**). However, the present disclosure is not limited thereto, and for example, the connecting portion **111** may be directly connected to the sump **70**.
[0112] The duct body **110** may include a support guide **112** configured to be supported by the duct support portion **5313**. The support guide **112** may guide the duct **100** to be seated on the duct support portion **5313**.
[0113] The support guide **112** may be supported by the duct support portion **5313**. The support guide **112** may include a contact portion **1121** (see FIG. **10**) configured to be supported by the duct support portion **5313**. More particularly, the contact portion **1121** may be positioned on a front side of the duct body **110** and may be supported by the duct support portion **5313** positioned on the most forward side of the duct support portion **5313**.
[0114] The duct body **110** may include an insertion guide **113** into which at least a portion of the duct support portion **5313** is inserted. The insertion guide **113** may be configured such that at least a portion of the duct support portion **5313** is inserted between the duct body **110** and the insertion guide **113**.
[0115] The duct support portion **5313** may be held in a gap formed between the insertion guide **113** and the duct body **110** with the duct support portion **5313** being inserted therein. The insertion guide **113** may be formed on a portion of the duct body **110**. After the duct support portion **5313** is inserted between the insertion guide **113** and the duct body **110**, the support guide **112** may be arranged to contact the duct support portion **5313** positioned at the most forward side.
[0116] The duct body **110** may be seated such that the duct **100** is easily coupled or decoupled from the duct support portion **5313** by contacting the duct support portion **5313** positioned at the most forward side after at least a portion of the duct support portion **5313** is inserted into the insertion guide **113**.
[0117] The duct support portions **5313** may be arranged to be spaced apart at predetermined intervals. The bottom portion **531** may include the rotor opening **533***a* arranged between the duct support portions **5313** to allow the spray rotor **200** to pass therethrough.
[0118] The spray rotor **200** may be coupled to the lower side of the duct **100**. With the spray rotor **200** coupled to the lower side of the duct **100**, the duct **100** may be seated on the duct support portion **5313**. In other words, the spray rotor **200** may pass through the rotor opening **533***a* and be positioned lower than the duct support portion **5313**.
[0119] The spray rotor **200** may be rotatably coupled to the duct **100**.
[0120] The duct **100** may include a duct bearing **120** for supplying washing water from the duct body **110** to the spray rotor **200**. The duct bearing **120** may be rotatably coupled to the spray rotor

200.
[0121] The duct bearing **120** may protrude downwardly from the duct body **110**. The duct bearing **120** may be configured such that the washing water flowing through the flow path **110***f* (see FIG. **2**) inside the duct body **110** may be supplied to the spray rotor **200**.
[0122] The duct **100** may include the duct holder **130** configured to rotatably support the spray rotor **200** together with the duct bearing **120**.
[0123] The duct holder **130** may include a support bearing **133** positioned to face the duct bearing **120**. The support bearing **133** may be spaced apart from the duct bearing **120** by at a predetermined distance. The spray rotor **200** may be coupled between the duct bearing **120** and the support bearing **133**.
[0124] The duct holder **130** may include an extension portion **131** extending along a protruding direction of the duct bearing **120** from the duct body **110**. The extension portion **131** may form a gap for the spray rotor **200** to be coupled between the duct bearing **120** and the support bearing **133**.
[0125] The duct **100** may be integrally formed. More particularly, the duct body **110**, the duct bearing **120**, and the duct holder **130** may be integrally formed. By integrally forming the duct body **110** and the duct holder **130**, the gap between the duct bearing **120** and the duct holder **130** may be manufactured to be constant. Accordingly, the tolerance of the spray rotor **200** coupled between the duct bearing **120** and the duct holder **130** may be minimized.
[0126] In addition, the duct holder **130** may include an elastically deformable material. The spray rotor **200** may have a height corresponding to the gap between the duct bearing **120** and the duct holder **130**. In other words, in response to the spray rotor **200** being coupled between the duct bearing **120** and the duct holder **130**, the duct holder **130** needs to be elastically deformed. In order for the spray rotor **200** to be coupled, a portion of the duct holder **130** needs to be elastically deformed to increase the gap between the duct bearing **120** and the duct holder **130**. Accordingly, the duct holder **130** may be configured to be elastically deformable.
[0127] The duct holder **130** may include a holder portion **132** that is bent from the extension portion **131**. The holder portion **132** may extend in a direction approximately the same as the extension direction of the duct body **110**. In other words, the extension portion **131** and the holder portion **132** may be formed to be approximately orthogonal. However, the shape of the duct holder **130** is not limited thereto, and any shape may be provided as long as the support bearing **133** is arranged to face the duct bearing **120**.
[0128] The support bearing **133** may be located at an end of the holder portion **132**. In another expression, the support bearing **133** may be formed at a position opposite to the position where the holder portion **132** is bent from the extension portion **131**.
[0129] The support bearing **133** may include a support end **133***a* whose cross-sectional area is decreased toward the spray rotor **200** in order to reduce frictional force generated while supporting the spray rotor **200**.
[0130] The support end **133***a* may have an approximately pointed shape. However, the present disclosure may be formed to have a surface contact such that the spray rotor **200** has a certain level of stability for rotation.
[0131] The spray rotor **200** may be rotatable. The spray rotor **200** may be rotatable while being coupled between the duct bearing **120** and the support bearing **133**. The spray rotor **200** may be rotatable by spraying washing water.
[0132] The spray rotor **200** may include a nozzle body **210** configured to receive a supply of washing water. The nozzle body **210** may be rotatably coupled with the duct bearing **120**.
[0133] The spray rotor **200** may include a base body **220** configured to be coupled with the nozzle body **210** to receive the washing water entering the nozzle body **210**. The base body **220** may form, together with the nozzle body **210**, a space in which the washing water is received.
[0134] The base body **220** may be rotatably supported by the duct holder **130**.

[0135] The base body **220** may include a recessed portion **221** that is recessed with which the support bearing **133** contacts. The recessed portion **221** of the base body **220** may be rotatably supported by the support bearing **133** of the duct holder **130**. More particularly, the base body **220** may be in contact with the support end **133***a* of the support bearing **133**.
[0136] The spray rotor **200** may include the propulsion nozzle **200***a* formed on an outer circumferential surface of the spray rotor **200**. The propulsion nozzle **200***a* may generate a rotational force of the spray rotor **200** by spraying washing water. The propulsion nozzle **200***a* may be configured to form a given angle with a radial direction of the spray rotor **200**.
[0137] Since the propulsion nozzle **200***a* is formed on the outer circumferential surface of the spray rotor **200**, it may be spaced apart by approximately the radius of the spray rotor **200**. In other words, the magnitude of the moment generated by the tangential force of the spray rotor **200** among the force components caused by the washing water sprayed from the propulsion nozzle **200***a* may be maximized.
[0138] The spray rotor **200** may include an upper nozzle **210***a* (see FIG. **12**) configured to spray the washing water in a direction different from a direction in which the propulsion nozzle **200***a* sprays.
[0139] The upper nozzle **210***a* may be formed in the nozzle body **210**. The upper nozzle **210***a* may be formed by an upper nozzle forming portion **212**. The upper nozzle **210***a* may spray washing water upwardly along the radial direction of the spray rotor **200**.
[0140] The upper nozzle **210***a* may be formed along the radial direction of the spray rotor **200**. However, the present disclosure is not limited thereto, and the upper nozzle **210***a* may be configured to form a given angle with the radial direction of the spray rotor **200**, similar to the propulsion nozzle **200***a*. In other words, the upper nozzle **210***a* may also spray washing water to generate a rotational force of the spray rotor **200**.
[0141] As such, since the spraying directions of the upper nozzle **210***a* and the propulsion nozzle **200***a* are provided differently, the efficiency of washing dishware may be improved.
[0142] While the propulsion nozzle **200***a* and the upper nozzle **210***a* are shown in the drawings as being one each, they are not limited thereto. The position, size, and/or number of the propulsion nozzles **200***a* and the upper nozzles **210***a* are not limited thereto, and may have different shapes and/or structures.
[0143] FIG. **9** is an exploded view showing the spray rotor according to an embodiment.
[0144] Referring to FIG. **9**, the spray rotor **200** according to an embodiment of the present disclosure may be formed by combining the nozzle body **210** and the base body **220**. The spray rotor **200** may include a sealing body **230** configured to cover a coupling portion of the nozzle body **210** and the base body **220**.
[0145] The nozzle body **210** may include a nozzle body coupling portion **2101**. The nozzle body coupling portion **2101** may be formed along a circumferential direction of the nozzle body **210**. The nozzle body coupling portion **2101** may have a shape protruding from an outer circumferential surface of the nozzle body **210**.
[0146] The base body **220** may include a base body coupling portion **2201**. The base body coupling portion **2201** may be formed along a circumferential direction of the base body **220**. The base body coupling portion **2201** may have a shape protruding from an outer circumferential surface of the base body **220**.
[0147] The nozzle body coupling portion **2101** and the base body coupling portion **2201** may be positioned to correspond to each other. The nozzle body coupling portion **2101** and the base body coupling portion **2201** may be inserted into a coupling groove **231** of the sealing body **230** while being coupled.
[0148] The coupling groove **231** may accommodate the nozzle body coupling portion **2101** and the base body coupling portion **2201**. In other words, the sealing body **230** may cover a gap between the nozzle body coupling portion **2101** and the base body coupling portion **2201**. Accordingly, it is possible to prevent washing water from leaking out between the nozzle body coupling portion **2101**

and the base body coupling portion **2201**.
[0149] The nozzle body **210** and the base body **220** may together form the propulsion nozzle **200***a*. The nozzle body **210** may include a first nozzle forming portion **213**. The base body **220** may include a second nozzle forming portion **223**. In other words, the first nozzle forming portion **213** and the second nozzle forming portion **223** may form the propulsion nozzle **200***a*.
[0150] The propulsion nozzle **200***a* may not be covered by the sealing body **230**. The sealing body **230** may have a portion corresponding to the first nozzle forming portion **213** and the second nozzle forming portion **223** cut out.
[0151] The base body **220** according to an embodiment of the present disclosure may include a drainage portion **224** formed to prevent residual water.
[0152] Washing water may be left inside the spray rotor **200**. Alternatively, food or the like soiled on the dishware may enter the interior of the spray rotor **200** through the propulsion nozzle **200***a* or the upper nozzle **210***a*. This may cause the interior of the spray rotor **200** to become contaminated, or may cause the dishware to be washed with contaminated washing water. Therefore, it is necessary to discharge the washing water or food inside the spray rotor **200**.
[0153] The drainage portion **224** may be formed to be recessed in an inner side of the base body **220**. The drainage portion **224** may be formed to be inclined downwardly toward the propulsion nozzle **200***a*. Washing water, food, or the like remaining in the drainage portion **224** may be drained through the propulsion nozzle **200***a*.
[0154] In addition, residual water inside the duct **100** may be drained. Since the duct **100** is extended for relatively long distance along one direction, the washing water inside the duct **100** may not flow and may remain. In particular, when no washing water is supplied after the operation of the dishwasher **1** is completed, the washing water may not flow, and thus residual water may be generated inside the duct **100**.
[0155] The spray rotor **200** may be positioned on the lower side of the duct **100**, so that residual water inside the duct **100** may flow to the spray rotor **200** through the duct bearing **120**. The residual water that has flowed into the spray rotor **200** may be discharged to the propulsion nozzle **200***a* through the drainage portion **224**.
[0156] The spray rotor **200** according to an embodiment of the present disclosure has been described as having the nozzle body **210** and the base body **220** separated, but is not limited thereto. The nozzle body **210** and the base body **220** may be integrally formed. In addition, the nozzle body **210**, the base body **220**, and/or the sealing body **230** may be integrally formed. In addition, when the nozzle body **210** and the base body **220** are integrally formed, a separate sealing body **230** may be unnecessary.
[0157] FIG. **10** is a side view showing the coupled structure of the duct and the spray rotor of FIG. **6**. FIG. **11** is a cross-sectional view of the duct and the spray device of FIG. **6** cut along the extension direction of the duct. FIG. **12** is a top view of the spray rotor, showing the action of washing water sprayed by the spray rotor.
[0158] Referring to FIGS. **10** to **12**, the spray rotor **200** according to an embodiment of the present disclosure may be rotatably coupled to the lower portion of the duct **100**.
[0159] The spray rotor **200** may be rotated by spraying washing water flowing through the flow path **110***f* formed inside the duct **100**. The duct **100** may be configured such that the washing water moves through the duct bearing **120** protruding from the duct body **110**.
[0160] The nozzle portion **211** of the nozzle body **210** may be rotatably coupled with the duct bearing **120**. The nozzle portion **211** may be coupled to an outer side of the duct bearing **120**. More particularly, the nozzle portion **211** may be coupled to surround the duct bearing **120**. The nozzle portion **211** may be coupled to the duct bearing **120** with a slight clearance to allow the spray rotor **200** to rotate smoothly.
[0161] The nozzle portion **211** may have a flow path cross-sectional area of a size corresponding to a flow path cross-sectional area of the duct bearing **120** so as to form a distribution flow path P

together with the duct bearing **120**.
[0162] The duct bearing **120** may form a flow path **120***f* for supplying washing water to the spray rotor **200**. The nozzle portion **211** may form a flow path **211***f* in communication with the flow path **120***f* of the duct bearing **120**. In other words, the flow path **120***f* of the duct bearing **120** and the flow path **211***f* of the nozzle portion **211** may have diameters of corresponding sizes at the portion where they are connected. Accordingly, the washing water passing through the boundary between the flow path **120***f* of the duct bearing **120** and the flow path **211***f* of the nozzle portion **211** may have little change in flow rate.
[0163] The duct body **110** may include a curved portion **114** configured to prevent a decrease in the flow rate of the washing water flowing in the flow path **110***f* formed inside the duct body **110** when it flows to the duct bearing **120**.
[0164] The curved portion **114** may have a curved shape so as not to obstruct the flow of the washing water, thereby preventing a decrease in the flow rate of the washing water. When the washing water flowing in the flow path **110***f* inside the duct body **110** flows to the duct bearing **120**, a flow rate of a certain level or higher may be ensured.
[0165] The flow path **120***f* of the duct bearing **120** may have a constant cross-sectional area. In other words, the washing water flowing inside the duct bearing **120** may not have a large change in flow rate. On the other hand, the cross-sectional area of the flow path **211***f* of the nozzle portion **211** may gradually increase as the washing water flows therethrough. In other words, the cross-sectional area of the flow path **211***f* of the nozzle portion **211** may increase as it approaches the base body **220**.
[0166] Accordingly, the flow rate of the washing water flowing through the distribution flow path P may be slowed as it passes through the flow path **120***f* of the duct bearing **120** and through the flow path **211***f* inside the nozzle portion **211**. As the cross-sectional area of the flow path increases, the flow rate decreases, so the flow rate may be slowed as it approaches the base body **220**. For example, the flow rate v**1** in the flow path **120***f* of the duct bearing **120** may be greater than the flow rate v**2** at the downstream side of the nozzle portion.
[0167] As such, the flow rate at the coupling portion of the duct bearing **120** and the nozzle portion **211** may be sufficiently large. Accordingly, leakage through the gap between the coupling portion of the duct bearing **120** and the nozzle portion **211** may be minimized.
[0168] However, some of the washing water may seep between the coupling portion of the duct bearing **120** and the nozzle portion **211**. Although some of the washing water may seep between the coupling portion of the duct bearing **120** and the nozzle portion **211**, it may reduce the frictional force between the duct bearing **120** and the nozzle portion **211**. Accordingly, it may be helpful for the rotation of the spray rotor **200**.
[0169] The nozzle portion **211** may include sealing portions **2111***a* and **2111***b* configured to surround the duct bearing **120** to prevent the washing water from flowing through the gap between the duct bearing **120** and the nozzle portion **211**.
[0170] The sealing portions **2111***a* and **2111***b* may have a size corresponding to an outer diameter of the duct bearing **120** so as to accommodate the duct bearing **120**. Based on the duct bearing **120** being accommodated in the sealing portions **2111***a* and **2111***b*, the washing water passing through the distribution flow path P may be required to pass through the first sealing portion **2111***a* and the second sealing portion **2111***b* in turn. In other words, a labyrinth seal structure that prevents the washing water from flowing out may be formed.
[0171] The sealing portion **2111** of the present disclosure is only an example, and the sealing portion **2111** may be configured such that the washing water passes through more sealing steps.
[0172] The nozzle body **210** may include the upper nozzle forming portion **212** configured to form the upper nozzle **210***a*. The upper nozzle **210***a* may spray the washing water upwardly along the radial direction of the spray rotor **200**. However, the present disclosure is not limited thereto, and the upper nozzle **210***a* may be configured to have various shapes, sizes, and/or positions.

[0173] Since the spraying directions of the upper nozzle **210***a* and the propulsion nozzle **200***a* may be provided differently, the efficiency of washing the dishware may be improved. Furthermore, in addition to the upper nozzle **210***a*, there may be additional nozzles formed on the lower side of the base body **210**. In this case, the spray rotor **200** may spray washing water in more diverse directions.
[0174] In addition, the upper nozzle **210***a* is shown in the drawings as spraying washing water in the same direction as the radial direction of the spray rotor **200**, but is not limited thereto. The upper nozzle **210***a* may also be arranged to form a predetermined angle with the radial direction of the spray rotor **200**, thereby generating a rotational force.
[0175] The spray rotor **200** may spray washing water through the propulsion nozzle **200***a* and/or the upper nozzle **210***a*. The spray rotor **200** may include a guide protrusion **222** for guiding the washing water introduced through the distribution flow path P toward the propulsion nozzle **200***a* and/or the upper nozzle **210***a*.
[0176] The guide protrusion **222** may be formed at a position corresponding to the rotation axis of the spray rotor **200**. Accordingly, the washing water introduced through the distribution flow path P may be uniformly distributed in the radial direction in the spray rotor **200** by the guide protrusion **222**. In other words, since the washing water flows uniformly inside the spray rotor **200**, the spray rotor **200** may rotate stably. In another expression, since the washing water inside the spray rotor **200** is not be moved unevenly, the spray rotor **200** may be prevented from rotating unstably.
[0177] With reference to FIGS. **11** and **12**, a force applied to rotate the spray rotor **200** according to an embodiment of the present disclosure will be described.
[0178] The spray rotor **200** may rotate in a direction opposite to the spraying direction of the washing water. More particularly, the washing water sprayed from the propulsion nozzle **200***a* may be sprayed along the direction in which the propulsion nozzle **200***a* is formed. In other words, the washing water sprayed from the propulsion nozzle **200***a* may form a predetermined angle with the direction of the radius r**1** of the spray rotor **200**.
[0179] The washing water sprayed from the propulsion nozzle **200***a* may generate a propulsion force in the opposite direction of Fr, which is a normal direction component in the direction of the radius r**1** of the spray rotor **200**. In this case, since a distance from the rotation axis of the spray rotor **200** to Fr is as much as the radius r**1** of the spray rotor **200**, the moment caused by the washing water sprayed from the propulsion nozzle **200***a* may be as much as the magnitude of Fr multiplied by the radius r**1** of the spray rotor **200**.
[0180] The spray rotor **200** according to an embodiment of the present disclosure may have a smaller radius than the spray arms **41**, **42** and **43** of the spraying device **40**. Accordingly, the rotational force generated on the spray rotor **200** may be smaller.
[0181] However, by the coupling structure between the duct **100** and the spray rotor **200** according to an embodiment of the present disclosure, the spray rotor **200** may rotate smoothly by reducing the frictional force acting on the spray rotor **200** and the resulting moment.
[0182] The spray rotor **200** may be rotatably supported by the duct bearing **120** and the support bearing **133**.
[0183] The spray rotor **200** may rotate in contact with the support bearing **133**. The support bearing **133** may support the base body **220**. More particularly, the support bearing **133** may support the recessed portion **221** of the base body **220**.
[0184] The support bearing **133** may include the support end **133***a* having a shape in which the cross-sectional area decreases as it approaches the recessed portion **221** of the base body **220**. For rotation of the spray rotor **200**, it may be advantageous for the support bearing **133** to have a smaller contact area with the recessed portion **221**. Accordingly, the cross-sectional area of the support end **133***a* may decrease as it approaches the recessed portion **221**.
[0185] However, the support bearing **133** may be arranged to contact the spray rotor **200** by a predetermined area so that the spray rotor **200** may rotate stably. In other words, the support

bearing **133** may be arranged to be closer to a surface contact than a point contact so that the spray rotor **200** may rotate stably. In the present drawings, the support end **133***a* is shown as having a predetermined radius r**2**.

[0186] In other words, the moment caused by the frictional force generated between the support end **133***a* and the recessed portion **221** may be a value obtained by multiplying the frictional force by the radius r**2** of the support end **133***a*. Since the radius r**2** of the support end **133***a* is formed small, both the frictional force and the resulting moment may be small. Accordingly, the rotation of the spray rotor **200** may be smooth.

[0187] In addition, a frictional force may be applied between the duct bearing **120** and the nozzle portion **211**. The frictional force between the duct bearing **120** and the nozzle portion **211** may occur between the duct bearing **120** and the sealing portion **2111**. Accordingly, the moment due to the frictional force generated on the spray rotor **200** rotating about the duct bearing **120** as an axis may be a value obtained by multiplying the frictional force generated between the duct bearing **120** and the sealing portion **2111** by a distance r**3** to the sealing portion.

[0188] With the duct bearing **120** as the axis, friction between the duct bearing **120** and the sealing portion **2111** may occur during rotation of the spray rotor **200**. However, due to the labyrinth seal structure including the first sealing portion **2111***a* and the second sealing portion **2111***b*, the contact between the duct bearing **120** and the sealing portion **2111** may be minimized. In other words, the frictional force generated between the duct bearing **120** and the sealing portion **2111** may be negligible. Accordingly, the moment due to the frictional force generated between the duct bearing **120** and the sealing portion **2111** may also be minimal.

[0189] As such, although the spray rotor **200** has a smaller size than the spray arms **41**, **42** and **43** (see FIG. **2**), the spray rotor **200** may be rotated smoothly by minimizing the force impeding the rotation of the spray rotor **200**.

[0190] The dishwasher according to an embodiment may include the tub **12**, the basket **50** arrangeable within the tub to receive dishware, the spraying device **40** including the spray rotor **200** rotatable by spraying washing water to wash the dishware, the duct **100** including the duct body **110** configured to allow washing water to flow, the duct bearing **120** configured to rotatably support the spray rotor and supply washing water from the duct body to the spray rotor, and the duct holder **130** configured to rotatably support the spray rotor together with the duct bearing, wherein the spray rotor includes the nozzle body **210** rotatably coupleable to the duct bearing and configured to be supplied with washing water from the duct bearing, and the base body **220** supported by the duct holder and coupleable to the nozzle body enabled to receive the washing water flowing into the nozzle body.

[0191] The duct holder may include the support bearing **133** positioned to face each other in a straight line with the duct bearing and having a section whose cross-sectional area decreases as the support bearing approaches the base body.

[0192] The duct holder may further include the extension portion **131** extending along the protruding direction of the duct bearing from the duct body, and the holder portion **132** bent from the extension portion, and the support bearing may be positioned at the end of the holder portion.

[0193] The spray rotor may include the nozzles **200***a* and **210***a* formed to spray the washing water inside the spray rotor toward the dishware.

[0194] The nozzles may include the propulsion nozzle **200***a* formed on the outer circumferential surface of the spray rotor.

[0195] The nozzles may further include the upper nozzle **210***a* configured to spray washing water in a direction different from a direction in which the propulsion nozzle sprays, the upper nozzle being formed in the nozzle body.

[0196] The nozzle body may include the nozzle portion **211** having the flow path cross-sectional area of a size corresponding to the flow path cross-sectional area of the duct bearing so as to form the distribution flow path P together with the duct bearing.

[0197] The duct body may include the curved portion **114** formed to prevent a decrease in the flow rate of the washing water flowing from the duct body to the flow path of the duct bearing.
[0198] The nozzle portion may be configured such that the cross-sectional area of the flow path increases as the nozzle portion is farther away from the duct bearing.
[0199] The nozzle portion may include the sealing portion **2111** configured to surround the duct bearing to prevent the washing water from flowing out between the nozzle portion and the duct bearing.
[0200] The duct holder may include an elastic material so as to be elastically deformable while the spray rotor is coupled to the duct.
[0201] The basket may include the bottom portion **531** configured to support the dishware, and the duct body may be positioned on the upper side of the bottom portion.
[0202] The bottom portion may include the inclined support portions **5312***a* and **5312***b* configured to support the dishware so as to be inclined downward, and the duct support portion **5313** connected to the inclined support portion and configured to seat the duct body thereon.
[0203] The spray rotor may be disposed on the lower side of the duct body to spray washing water onto the dishware placed on the inclined support portion.
[0204] The duct body may extend along one direction, and the plurality of the duct bearings and the duct holders may be arranged along the one direction at predetermined intervals, and the spraying device may be provided in a plurality to be rotatably coupled to each of the plurality of duct holders and the plurality of duct bearings.
[0205] The dishwasher according to an embodiment may include the basket **50** including the bottom portion **531** for supporting dishware, the duct **100** configured to allow washing water to flow, wherein the duct including the duct body **110** positioned above the bottom portion, the duct bearing **120** protruding from the duct body, and the duct holder **130** including the support bearing arrangeable to face the duct bearing, and the spray rotor **200** configured to receive washing water from the duct bearing and to spray the washing water to wash the dishware, the spray rotor rotatably coupleable between the duct bearing and the support bearing.
[0206] The spray rotor may include the nozzle body **210** rotatably coupled to the duct bearing and configured to be supplied with washing water from the duct bearing, and the base body **220** supported by the duct holder and coupled to the nozzle body enabled to receive the washing water flowing into the nozzle body.
[0207] The support bearing may include the support end **133***a* whose diameter decreases as the support bearing approaches the base body.
[0208] The spray rotor may further include the propulsion nozzle **200***a* formed on the outer circumferential surface of the spray rotor, and the upper nozzle **210***a* configured to spray washing water in a direction different from a direction in which the propulsion nozzle sprays, the upper nozzle formed in the nozzle body.
[0209] The dishwasher according to an embodiment may include the tub **12**, the basket **300** arrangeable within the tub and including a bottom portion for supporting dish ware, the duct **100** in which washing water flows and including the duct body **110** positioned above the bottom portion, the duct bearing **120** protruding from the duct body, and the duct holder **130** including the support bearing **133** arrangeable to face the duct bearing, and the spray rotor **200** configured to receive washing water from the duct bearing to spray the washing water to wash the dishware, the spray rotor **200** rotatably coupleable between the duct bearing and the support bearing, wherein the spray rotor includes the nozzle body **210** rotatably coupleable to the duct bearing and configured to receive washing water from the duct bearing, and the base body **220** configured to be rotatably supported by the support bearing.
[0210] According to various embodiments of the present disclosure, the dishwasher may have improved washing performance.
[0211] According to various embodiments of the present disclosure, the dishwasher may include a

miniaturized spray unit.
[0212] According to various embodiments of the present disclosure, the dishwasher may be capable of reducing friction of the bearing.
[0213] The effects to be obtained from the present disclosure are not limited to those mentioned above, and other effects not mentioned will be apparent to those of skilled in the art to which the present disclosure belongs from the following description.
[0214] While the present disclosure has been particularly described with reference to exemplary embodiments, it should be understood by those of skilled in the art that various changes in form and details may be made without departing from the spirit and scope of the present disclosure.

Claims

1. A dishwasher comprising: a tub; a basket in the tub and configured to receive dishware; a sprayer including a spray rotor, wherein the spray rotor includes: a nozzle body, and a base body coupled to the nozzle body so that the base body and the nozzle body together form a space; and a duct including: a duct body in which washing water is flowable, a duct bearing to which the nozzle body is rotatably coupled, wherein the duct bearing is configured to supply washing water flowing in the duct body from the duct body to the space formed by the base body and the nozzle body, and a duct holder that supports the base body so that the duct holder, together with the duct bearing, rotatably supports the spray rotor, and so that the washing water supplied to the space formed by the base body and the nozzle body is sprayed by the spray rotor toward the basket to wash dishware received in the basket.
2. The dishwasher of claim 1, wherein the duct holder includes a support bearing facing the duct bearing and having a section whose cross-sectional area decreases as the support bearing approaches the base body.
3. The dishwasher of claim 2, wherein the duct holder further includes an extension portion extending along a protruding direction of the duct bearing from the duct body, and a holder portion bent from the extension portion, and the support bearing is at an end of the holder portion.
4. The dishwasher of claim 1, wherein the spray rotor includes a nozzle to spray the washing water in the space formed by the base body and the nozzle body toward the basket to wash dishware received in the basket.
5. The dishwasher of claim 4, wherein the nozzle includes a propulsion nozzle on an outer circumferential surface of the spray rotor.
6. The dishwasher of claim 5, wherein the nozzle further includes an upper nozzle formed in the nozzle body and configured to spray washing water in a direction different from a direction in which washing water is sprayed by the propulsion nozzle.
7. The dishwasher of claim 1, wherein the nozzle body includes a nozzle portion having a flow path with a cross-sectional area of a size corresponding to a cross-sectional area of a flow path of the duct bearing so as to form a distribution flow path together with the duct bearing.
8. The dishwasher of claim 7, wherein the duct body includes a curved portion to prevent a decrease in a flow rate of the washing water flowing from the duct body to a flow path of the duct bearing.
9. The dishwasher of claim 7, wherein the nozzle portion is configured so that the cross-sectional area of the flow path of the nozzle portion increases as the nozzle portion is further away from the duct bearing.
10. The dishwasher of claim 9, wherein the nozzle portion includes a sealing portion surrounding the duct bearing to prevent washing water from flowing out between the nozzle portion and the duct bearing.
11. The dishwasher of claim 1, wherein the duct holder includes an elastic material so as to be elastically deformable while the nozzle body is being coupled to the duct bearing and the base body

is being positioned to be supported by the duct holder.

12. The dishwasher of claim 1, wherein the basket includes a bottom portion configured to support the dishware, and the duct body is on an upper side of the bottom portion.

13. The dishwasher of claim 12, wherein the bottom portion includes: an inclined support portion configured to support the dishware so as to be inclined downwardly, and a duct support portion connected to the inclined support portion and having the duct body seated thereon.

14. The dishwasher of claim 13, wherein the spray rotor is on a lower side of the duct body to spray washing water onto dishware supported on the inclined support portion.

15. The dishwasher of claim 1, wherein the dishwasher includes a plurality of the duct bearings and a plurality of the duct holders arranged at predetermined intervals along a direction along which the duct body longitudinally extends, the dishwasher includes a plurality of the spray rotors, and the duct holders of the plurality of duct holders, together with the duct bearings of the plurality of duct bearings, support spray rotors of the plurality of the spray rotors, respectively.