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(54) **DISPENSING DEVICE FOR DISHWASHER, AND DISHWASHER**

(71) Applicant: **FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.**, Foshan (CN)

(72) Inventors: **Baoping ZENG**, Foshan (CN); **Richao LIU**, Foshan (CN); **Haoping XIONG**, Foshan (CN); **Dapeng SHAO**, Foshan (CN)

(73) Assignee: **FOSHAN SHUNDE MIDEA WASHING APPLIANCES MANUFACTURING CO., LTD.**, Foshan (CN)

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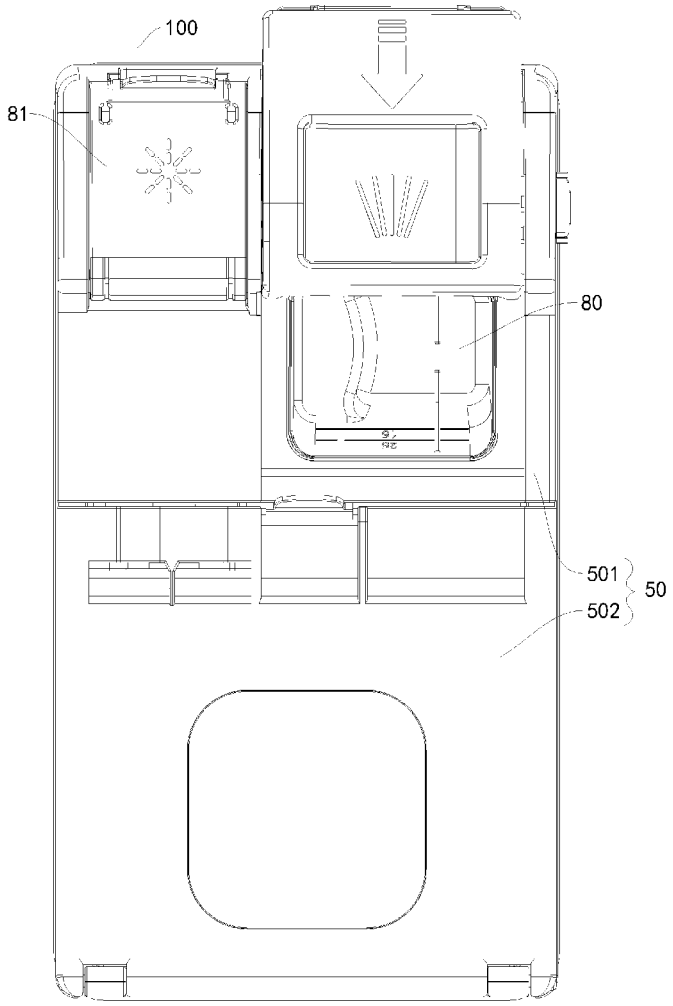
(57) **ABSTRACT**

A dispensing device for a dishwasher and a dishwasher are provided. The dispensing device for the dishwasher has a liquid storage container, a pump body and a driving assembly. The liquid storage container stores liquid detergent. The pump body is mounted on the liquid storage container and has a pump head. The driving assembly operates to drive the pump head to pump the detergent in the liquid storage container into a washing chamber of the dishwasher.



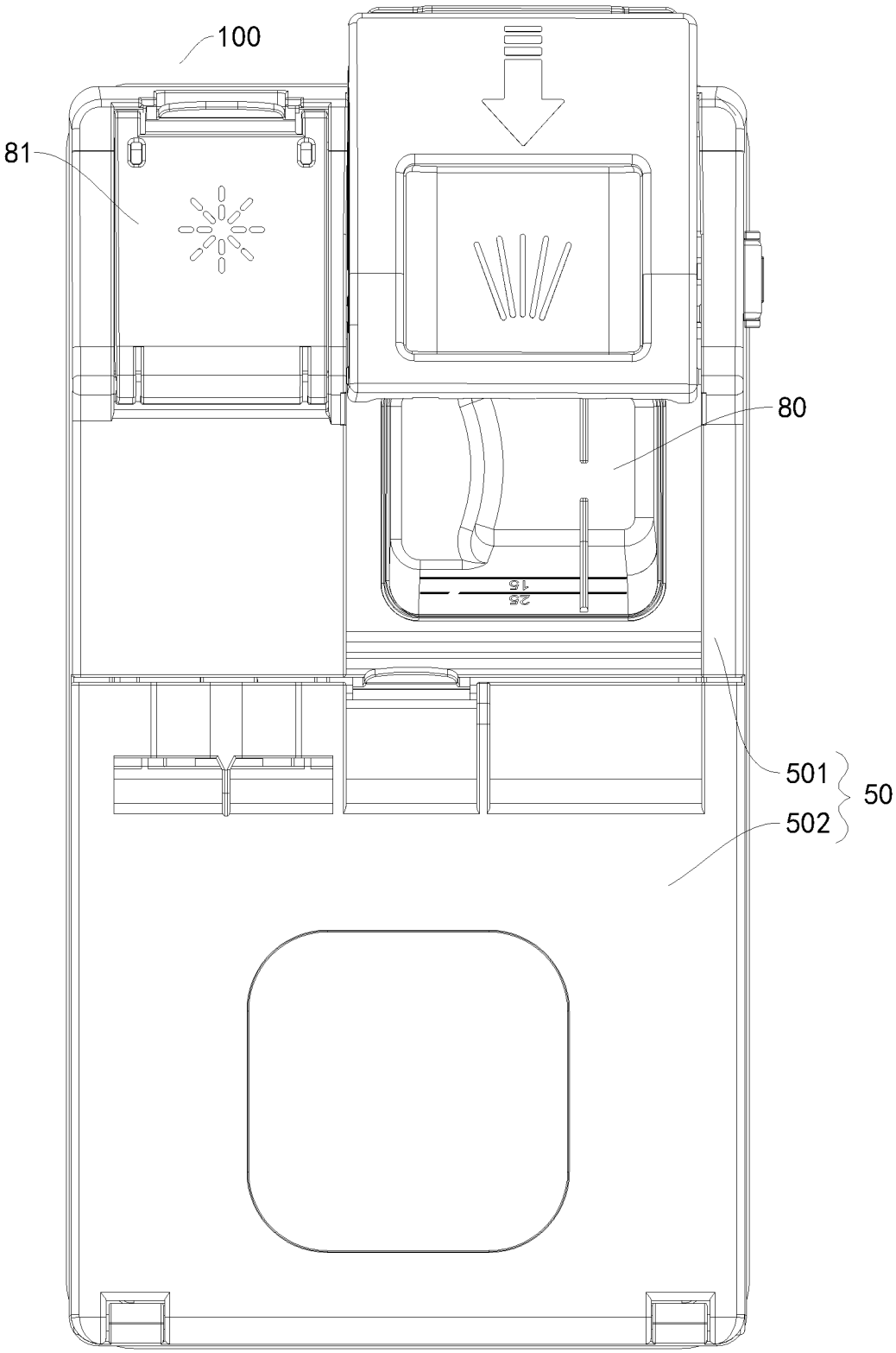


FIG. 1

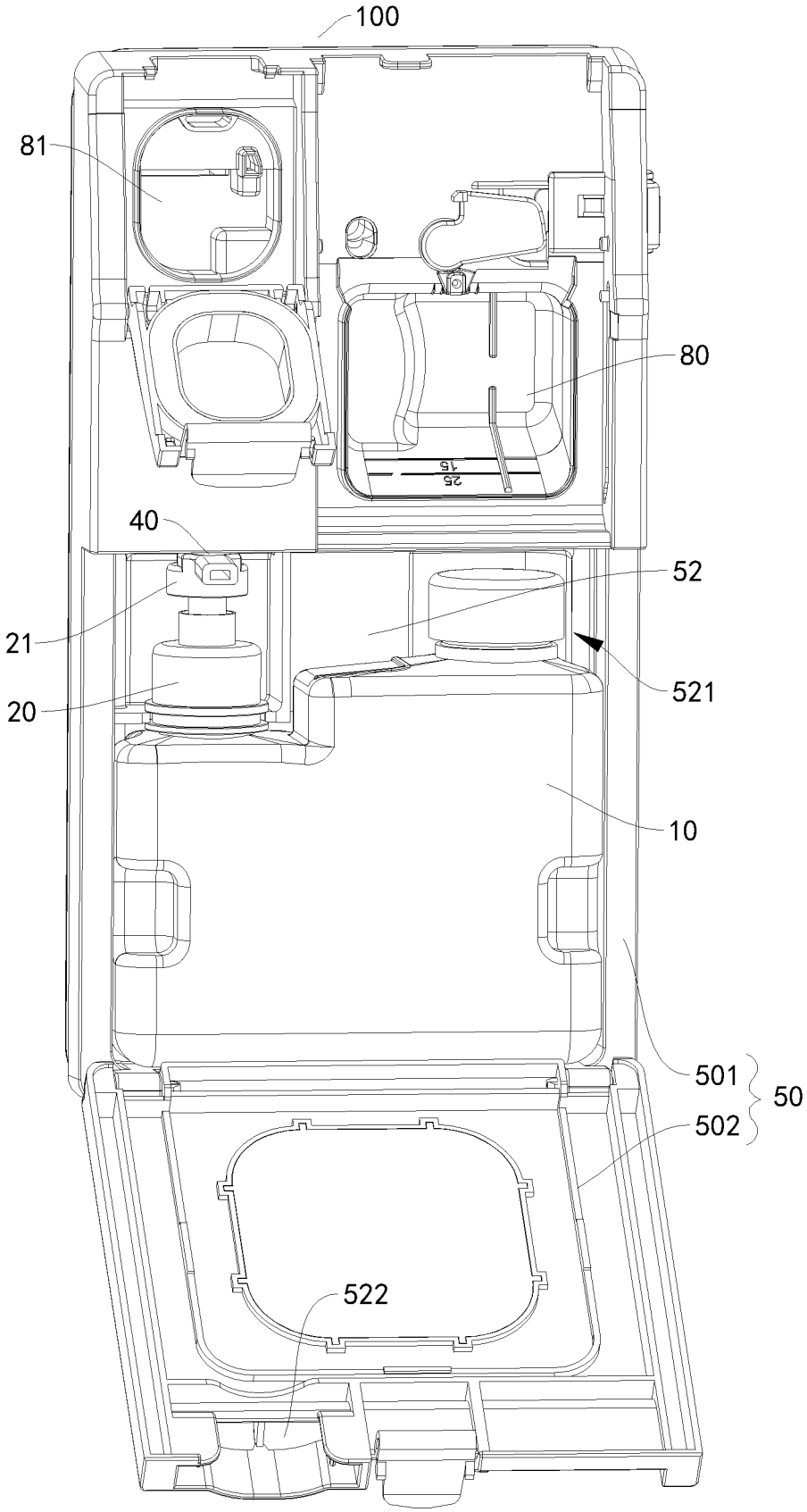


FIG. 2

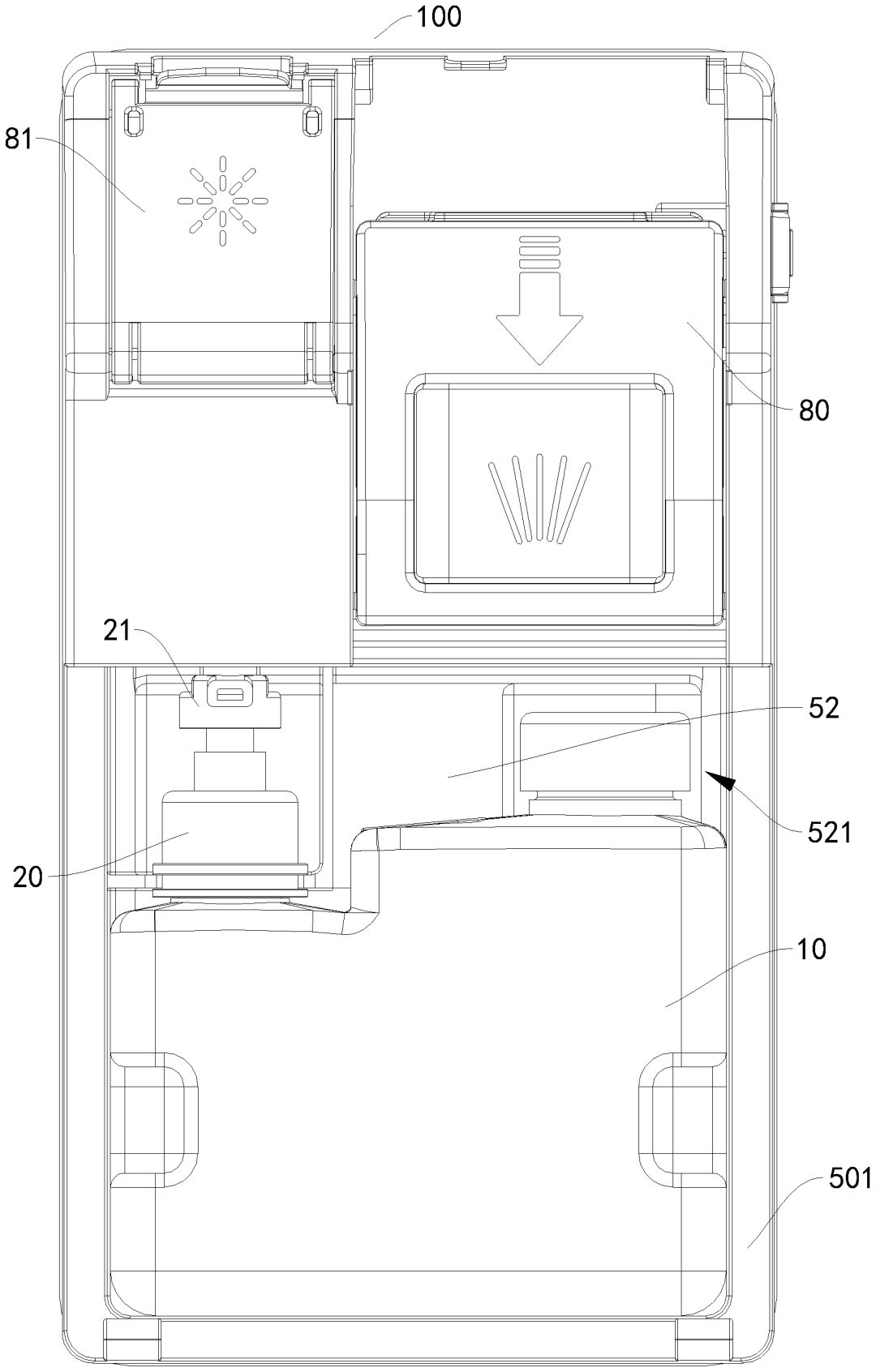


FIG. 3

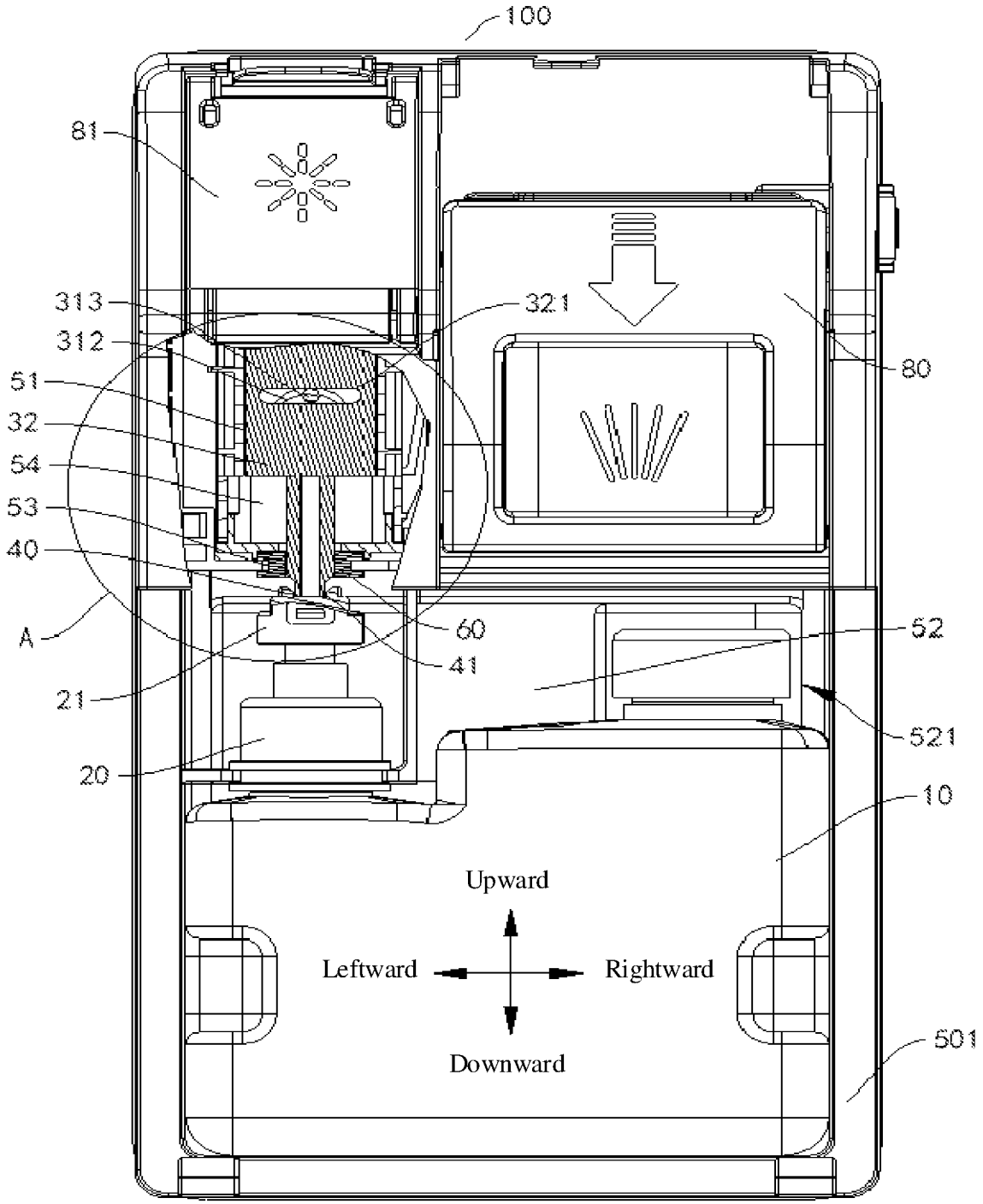

100
81
313
312
51
32
54
53
40
A
21
20
321
80
60
41
52
521
10
Upward
Leftward
Rightward
Downward
501

FIG. 4

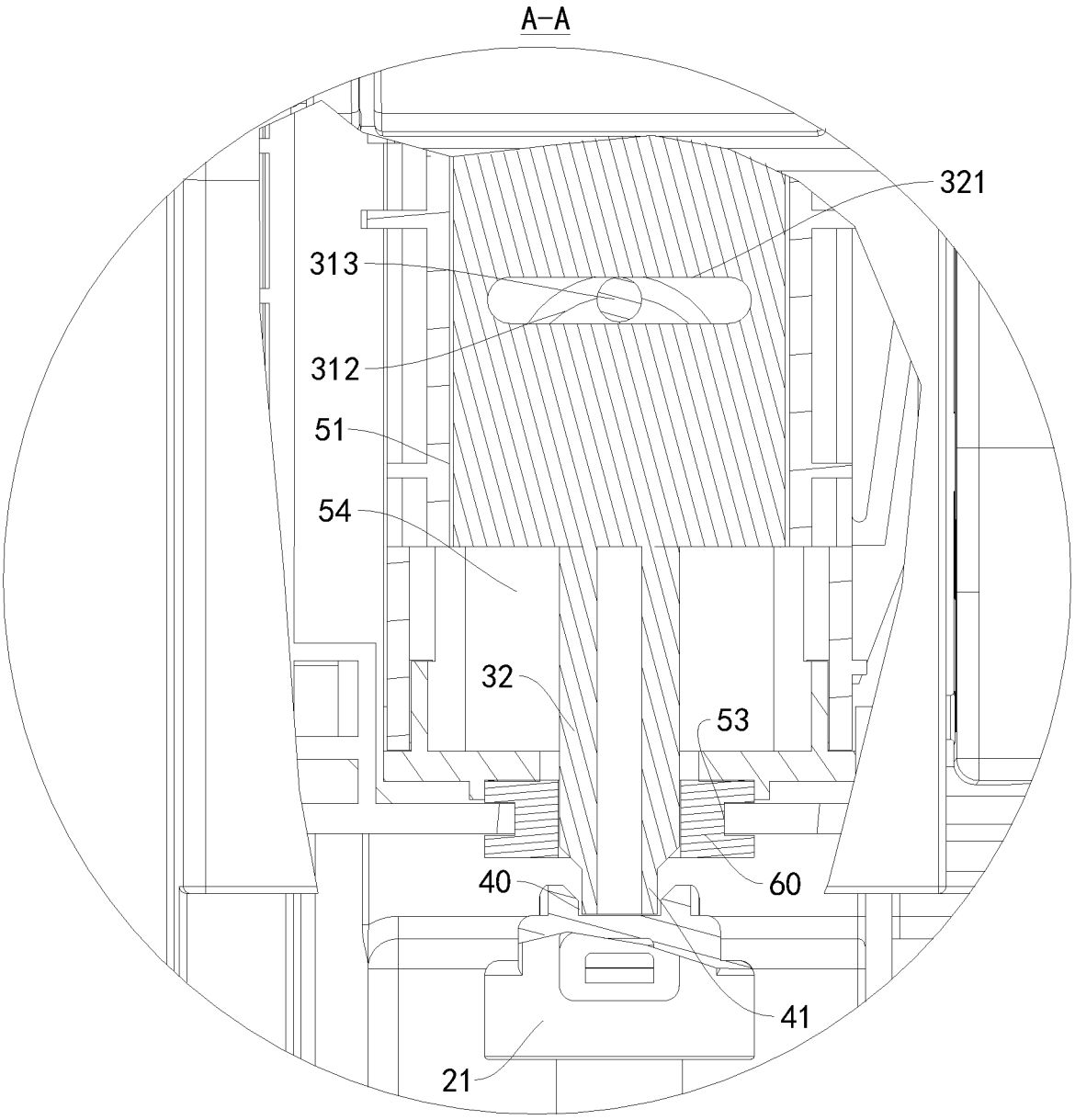


FIG. 5

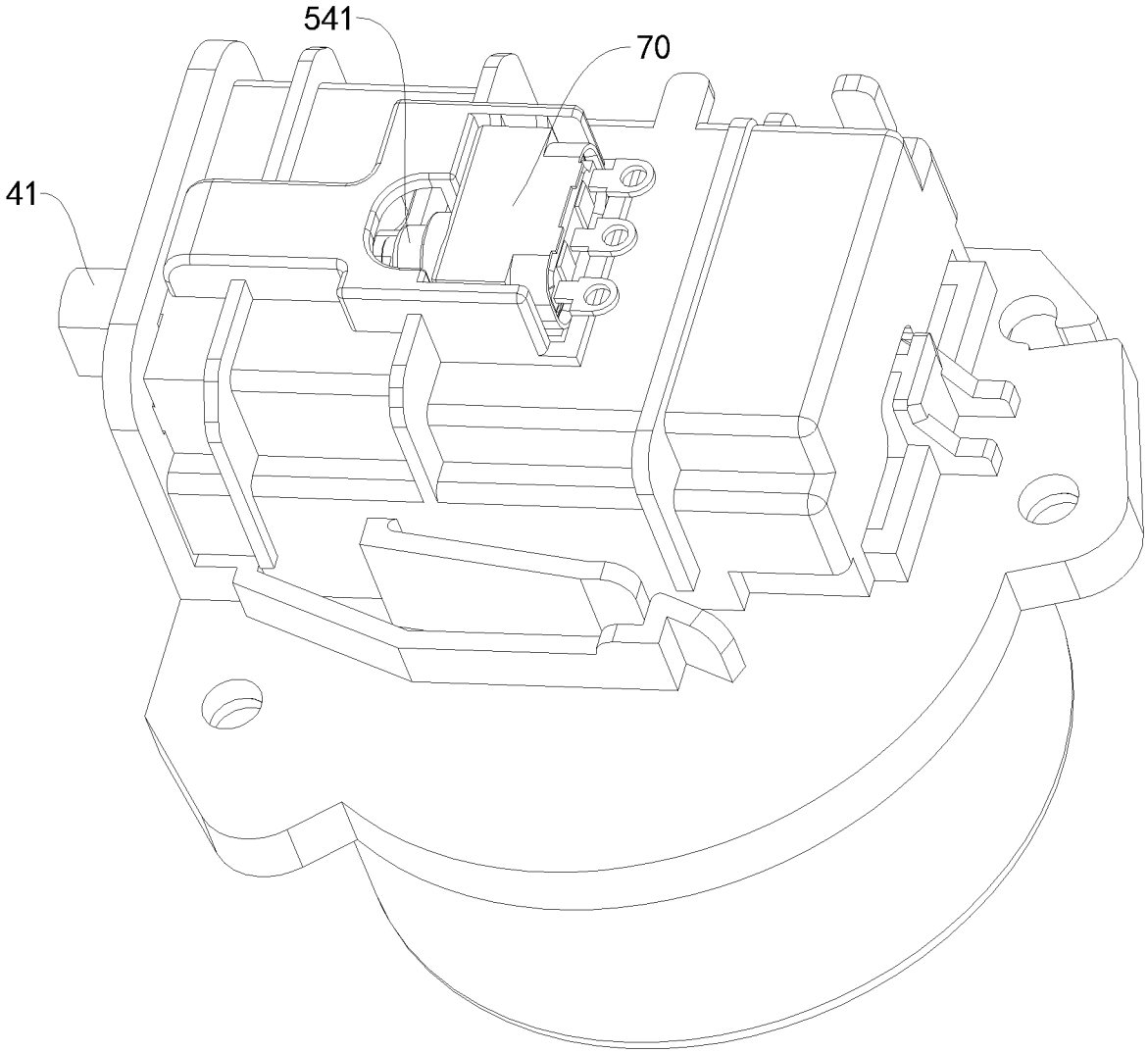


FIG. 6

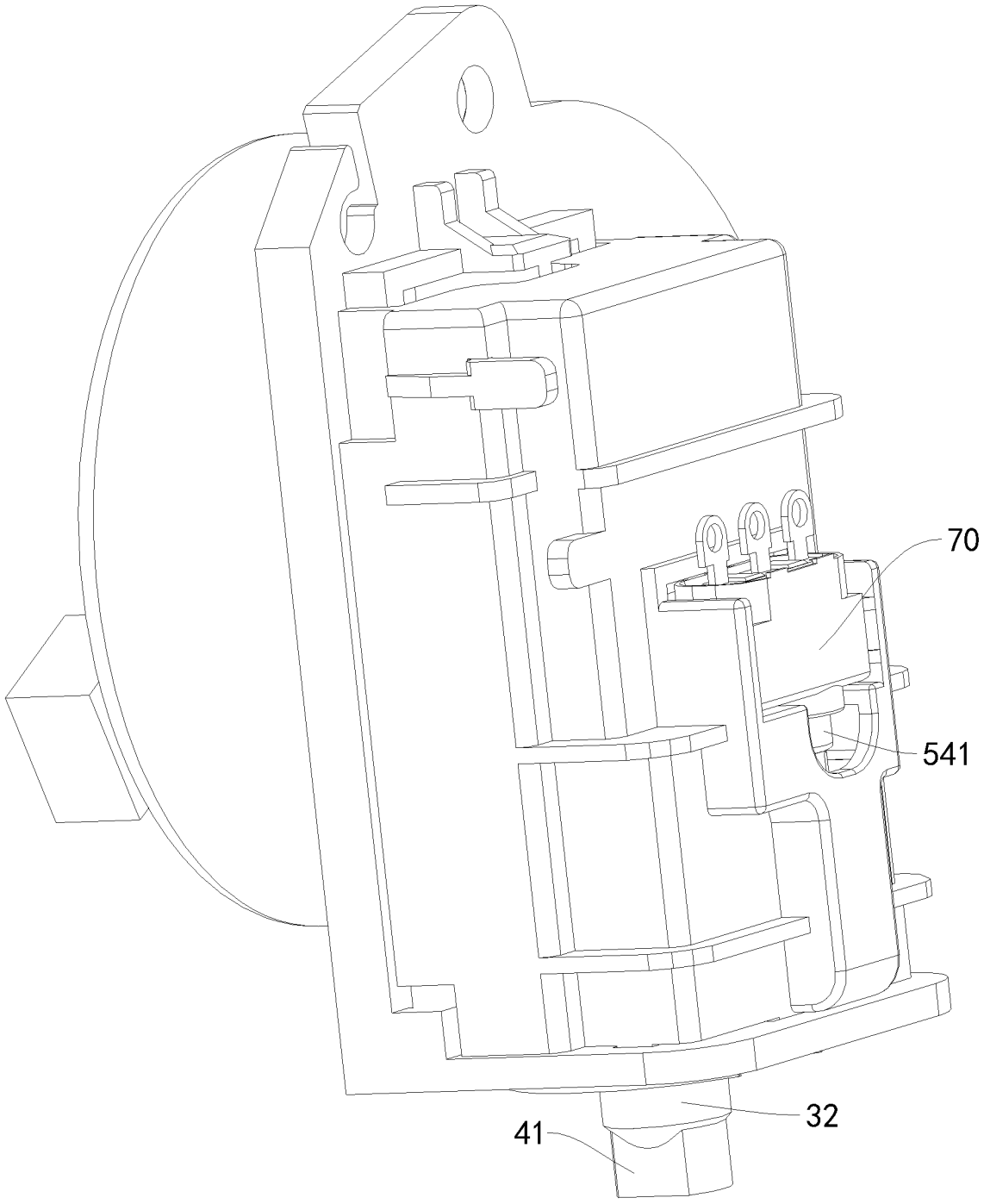


FIG. 7

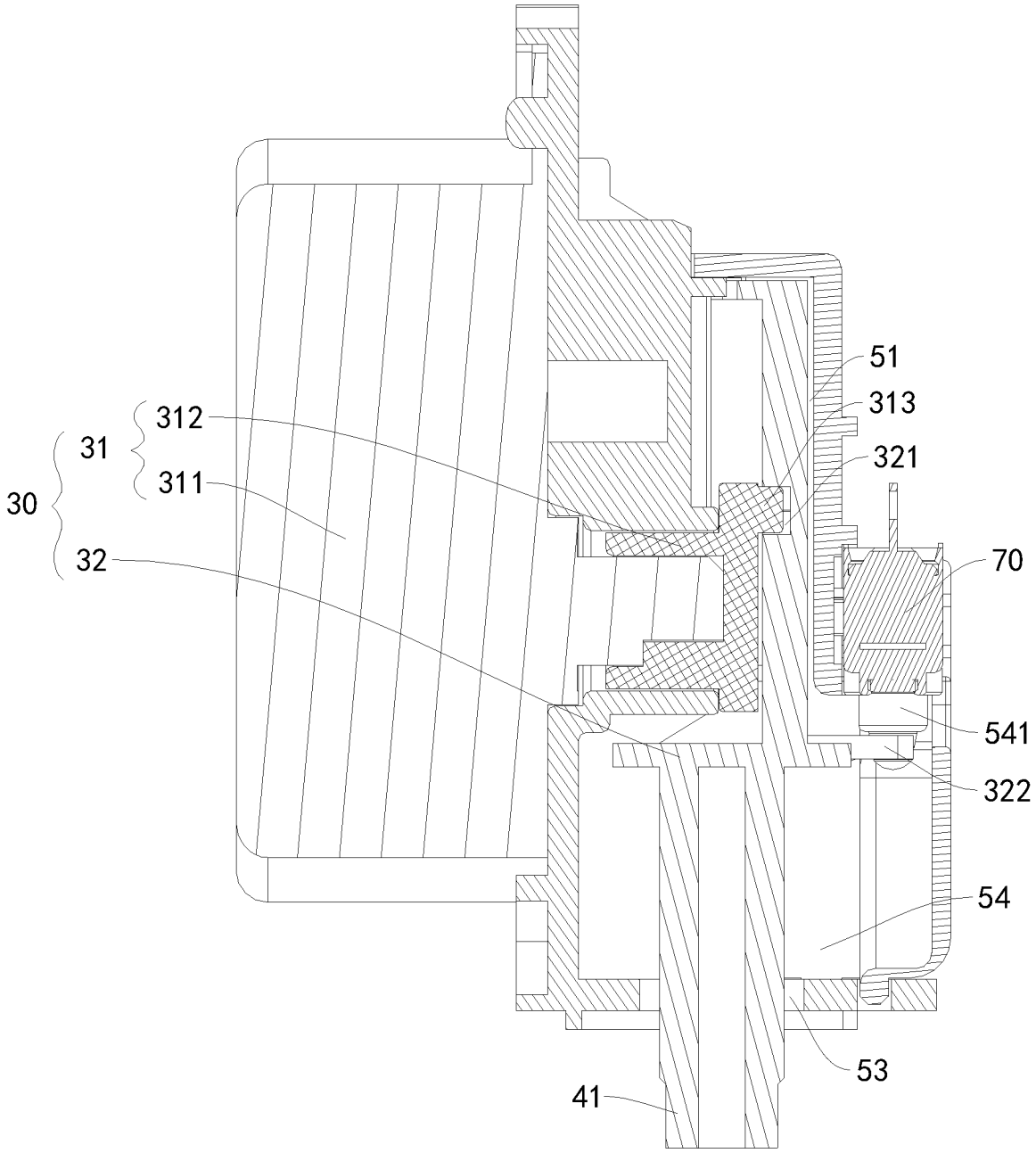


FIG. 8

DISPENSING DEVICE FOR DISHWASHER, AND DISHWASHER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation application of PCT International Application No. PCT/CN2022/070843, filed on Jan. 7, 2022, which claims priority to Chinese Patent Applications Nos. 202110023141.5, 202120052484.X, 202120052544.8, and 202120052543.3, filed on Jan. 8, 2021 and entitled "DISPENSING DEVICE FOR DISHWASHER, AND DISHWASHER", the contents of each of which are incorporated herein by reference in their entirety for all purposes. No new matter has been introduced.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of washing device technologies, and more specifically, to a dispensing device for a dishwasher, and a dishwasher.

BACKGROUND

[0003] In some related art, when dishwashers are used, liquid detergent is manually added into a washing chamber frequently, which may result in inconvenient using of the dishwashers. In some other related arts, for a dishwasher, a dispensing device is controlled by a motor to dispense the liquid detergent, and a dispensing volume of the liquid detergent is controlled based on operating time of the motor. Since a rotational speed of the motor is variable, the dispensing volume of the liquid detergent each time is inconstant. In some other related arts, a dispensing assembly of the dishwasher is less in number, which may allow a user to only make selection among limited types of detergent.

SUMMARY

[0004] The present disclosure aims to solve at least one of the technical problems in the related art. To this end, the present disclosure is to provide a dispensing device for a dishwasher. The dispensing device can realize automatic dispensing of liquid detergent, and it is not necessary for a user to manually add the liquid detergent and frequently dispense the liquid detergent. Therefore, the dishwasher is more conveniently used.

[0005] Another object of the present disclosure is to provide a dishwasher having the dispensing device.

[0006] According to an embodiment of the present disclosure, a dispensing device for a dishwasher includes a liquid storage container configured to store liquid detergent, a pump body mounted on the liquid storage container and having a pump head, and a driving assembly configured to drive the pump head to pump the liquid detergent in the liquid storage container into a washing chamber of the dishwasher.

[0007] With the dispensing device for the dishwasher according to embodiments of the present disclosure, the pump head is driven by the driving assembly to allow, for example, the pump head to move towards the liquid storage container to pump the liquid detergent in the liquid storage container into the washing chamber. Therefore, automatic dispensing of the liquid detergent can be realized. Further, it is not necessary for a user to manually add the liquid detergent and frequently dispense the liquid detergent. Therefore, the dishwasher is more conveniently used. Further, the pumped liquid detergent fully enters the washing chamber, which can avoid residue of the liquid detergent.

[0008] In addition, the dispensing device for the dishwasher according to the embodiments of the present disclosure has the following additional technical features.

[0009] In the dispensing device for the dishwasher according to some embodiments of the present disclosure, the driving assembly abuts against the pump head, and is adapted to drive the pump head to move towards the liquid storage container to pump the liquid detergent in the liquid storage container into the washing chamber of the dishwasher.

[0010] According to some embodiments of the present disclosure, the driving assembly includes a transmission member and a driving member. The driving member is connected to the transmission member, and adapted to drive the transmission member to move towards the liquid storage container along a first straight path to enable the transmission member to abut against the pump head and drive the pump head to move towards the liquid storage container.

[0011] According to some embodiments of the present disclosure, the driving member is further adapted to drive the transmission member to move away from the liquid storage container along the first straight path to reset the driving assembly; and/or the pump body further includes a reset member adapted to drive, in response to the transmission member moving away from the liquid storage container, the pump head to move away from the liquid storage container; and/or one of the pump head and an end of the transmission member has a limiting groove, and the other one of the pump head and the end of the transmission member has a limiting protrusion inserted into the limiting groove.

[0012] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a base having a guide channel extending along the first straight path. The transmission member moves with a guiding of the guide channel.

[0013] According to some embodiments of the present disclosure, the base further has a mounting chamber and a communication port configured to communicate the guide channel with the mounting chamber. The liquid storage container and the pump body are mounted in the mounting chamber, and the transmission member passes through the communication port.

[0014] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a seal configured to seal a gap between the transmission member and an inner peripheral surface of the communication port.

[0015] According to some embodiments of the present disclosure, the driving member includes a driving motor, and a connector connecting the transmission member with an output end of the driving motor. The driving motor is configured to drive the transmission member to move via the connector.

[0016] According to some embodiments of the present disclosure, the connector includes an eccentric wheel configured to be driven by the driving motor to rotate. The eccentric wheel has an engagement protrusion. The transmission member has an engagement groove. The engagement protrusion is movable along the engagement groove to

convert the rotation of the eccentric wheel into the movement of the transmission member.

[0017] According to some embodiments of the present disclosure, the engagement groove extends along a second straight path. Every two of a rotation axis of the eccentric wheel, the first straight path, and the second straight path are perpendicular to one another.

[0018] According to some embodiments of the present disclosure, the transmission member is detachably fitted with the pump head.

[0019] According to some embodiments of the present disclosure, the pump head is configured to directly dispense the liquid detergent into the washing chamber.

[0020] According to some embodiments of the present disclosure, the pump head has a dispensing port configured to be in direct communication with the washing chamber.

[0021] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a base. The pump body is fixedly or detachably arranged on the base.

[0022] According to some embodiments of the present disclosure, the base has a mounting chamber, and a wall of the mounting chamber has a through opening. The pump head protrudes into the washing chamber of the dishwasher through the through opening to facilitate delivery of the liquid detergent in the liquid storage container to the washing chamber.

[0023] According to some embodiments of the present disclosure, the pump body and the liquid storage container are integrally formed, and are detachably mounted or fixedly arranged in the mounting chamber; or the liquid storage container is formed separately from the pump body and detachably mounted on the base. The liquid storage container is connected with the pump body when the liquid storage container is mounted on the base.

[0024] According to some embodiments of the present disclosure, the base includes a base body having the mounting chamber, and a cover body configured to expose or cover the opening. The mounting chamber having an opening.

[0025] According to some embodiments of the present disclosure, the pump body is fixedly or detachably connected to the liquid storage container.

[0026] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a dispensing volume detection mechanism configured to detect a volume of the pumped liquid detergent.

[0027] In the dispensing device for the dishwasher according to some embodiments of the present disclosure, the dispensing volume detection mechanism includes: a position detection assembly configured to detect a position of the pump head; and a control assembly connected to the position detection assembly and the driving assembly. The control assembly is configured to control an operating state of the driving assembly based on the detection from the position detection assembly.

[0028] According to some embodiments of the present disclosure, the control assembly is configured to count in response to detecting by the position detection assembly that the pump head reaches a first predetermined position, to determine a dispensing volume.

[0029] According to some embodiments of the present disclosure, the control assembly is further configured to control, in response to a count value reaching a predetermined threshold, the driving assembly to stop operating.

[0030] According to some embodiments of the present disclosure, the driving assembly includes a transmission member, and a driving member configured to drive the transmission member to move to drive the pump head to move. The position detection assembly is configured to detect a position of the transmission member and/or a position of the pump head to obtain the position of the pump head and determine the volume of the pumped liquid detergent.

[0031] According to some embodiments of the present disclosure, the position detection assembly includes a microswitch connected to the control assembly. The transmission member has a trigger protrusion, the trigger protrusion being configured to trigger the microswitch in response to the transmission member reaching a first predetermined position. The control assembly is further configured to count in response to the microswitch being triggered.

[0032] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a base having an accommodation cavity. The transmission member includes a transmission body, and the transmission body has one end fitted with the driving member and another end fitted with the pump head. The trigger protrusion is arranged on an outer peripheral surface of the transmission body and located in the accommodation cavity. The microswitch is mounted on the base and has a contact extending into the accommodation cavity. The trigger protrusion is adapted to be in contact with the contact to trigger the microswitch.

[0033] According to some embodiments of the present disclosure, the position detection assembly includes a reed switch connected to the control assembly, and a magnetic member disposed on the transmission member. The magnetic member is configured to drive, in response to the transmission member reaching a first predetermined position, the reed switch to be switched on. The control assembly is further configured to count in response to the reed switch being switched on.

[0034] According to some embodiments of the present disclosure, the position detection assembly includes a photoelectric sensor connected to the control assembly. The photoelectric sensor has an emitting end, and a receiving end configured to receive light emitted from the emitting end. The transmission member has a shielding portion configured to shield the light in response to the transmission member reaching a first predetermined position. The control assembly is further configured to count in response to the light being shielded.

[0035] According to some embodiments of the present disclosure, the position detection assembly includes a magnetic member disposed on the transmission member, and a Hall element connected to the control assembly. The Hall element is configured to, in response to the transmission member reaching a first predetermined position, detect the magnetic member and generate a pulse signal. The control assembly is further configured to count in response to the pulse signal being generated by the Hall element.

[0036] According to some embodiments of the present disclosure, the driving assembly includes a driving motor. The control assembly is further configured to cut off, in response to a count value reaching a predetermined threshold, a power of the driving motor.

[0037] According to some embodiments of the present disclosure, the pump head is movable between a first pre-

determined position and a second predetermined position. The pump head is configured to: move towards the liquid storage container when moving from the first predetermined position to the second predetermined position, to pump the liquid detergent in the liquid storage container into the washing chamber; and move away from the liquid storage container to be reset when moving from the second predetermined position to the first predetermined position.

[0038] According to some embodiments of the present disclosure, the pump body further includes a reset member configured to drive the pump head to move from the second predetermined position to the first predetermined position to be reset.

[0039] According to some embodiments of the present disclosure, the dispensing device for the dishwasher further includes a base, a liquid detergent dispensing assembly mounted on the base and configured to dispense the liquid detergent into the washing chamber of the dishwasher, a powder detergent dispensing assembly mounted on the base and configured to dispense a powder detergent into the washing chamber, and a rinse aid dispensing assembly mounted on the base and configured to dispense a rinse aid into the washing chamber.

[0040] In the dispensing device for the dishwasher according to some embodiments of the present disclosure, by arranging the liquid detergent dispensing assembly, the powder detergent dispensing assembly, and the rinse aid dispensing assembly, the user may select among the liquid detergent, the powder detergent, and the rinse aid to further satisfy more use demands of the user on the dishwasher, which has greater practicability.

[0041] In the dispensing device for the dishwasher according to some embodiments of the present disclosure, the base is a door body of the dishwasher or a wall of the washing chamber.

[0042] According to some embodiments of the present disclosure, the base is mounted on a door body of the dishwasher or a wall of the washing chamber.

[0043] According to some embodiments of the present disclosure, the base has a mounting chamber, a wall of the mounting chamber having a through opening. The liquid detergent dispensing assembly includes the liquid storage container mounted in the mounting chamber, and the pump head protruding into the washing chamber through the through opening to deliver the liquid detergent in the liquid storage container to the washing chamber.

[0044] According to some embodiments of the present disclosure, the base includes a base body having the mounting chamber, and a cover body configured to expose or cover the opening. The mounting chamber has an opening, and the through opening is defined in the cover body.

[0045] According to some embodiments of the present disclosure, the cover body is hinged to the base body.

[0046] According to some embodiments of the present disclosure, the base has an accommodation cavity. The liquid detergent dispensing assembly further includes the pump body and the driving assembly. The pump body is connected to the liquid storage container and has the pump head. The pump head is movable relative to the liquid storage container to pump the liquid detergent in the liquid storage container into the washing chamber. The driving assembly is mounted in the accommodation cavity and configured to drive the pump head to move.

[0047] According to some embodiments of the present disclosure, the liquid storage container is detachably mounted in the mounting chamber.

[0048] According to some embodiments of the present disclosure, the pump body is detachably connected to the liquid storage container. The driving assembly is detachably fitted with the pump head.

[0049] According to some embodiment of the present disclosure, a dishwasher includes the dispensing device for the dishwasher according to the embodiments of the present disclosure.

[0050] Additional aspects and advantages of the present disclosure will be provided at least in part in the following description, or will become apparent at least in part from the following description, or can be learned from practicing of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0051] The above and/or additional aspects and advantages of the present disclosure will become more apparent and more understandable from the following description of embodiments taken in conjunction with the accompanying drawings, in which:

[0052] FIG. **1** is a schematic structural view of a dispensing device according to an embodiment of the present disclosure with a cover body closed;

[0053] FIG. **2** is a schematic structural view of a dispensing device according to an embodiment of the present disclosure with a cover body opened;

[0054] FIG. **3** is a schematic structural view of a dispensing device according to an embodiment of the present disclosure with a cover body not shown;

[0055] FIG. **4** is a partial cross-sectional view of a dispensing device according to an embodiment of the present disclosure;

[0056] FIG. **5** is a schematic structural enlarged view of part A shown by a circle in FIG. **4**;

[0057] FIG. **6** is a schematic structural view of an angle between a driving assembly and a position detection assembly according to an embodiment of the present disclosure;

[0058] FIG. **7** is a schematic structural view of another angle between a driving assembly and a position detection assembly according to an embodiment of the present disclosure; and

[0059] FIG. **8** is a cross-sectional view of a driving assembly and a position detection assembly according to an embodiment of the present disclosure.

REFERENCE NUMERALS

[0060] dispensing device **100**; liquid storage container **10**; pump body **20**; pump head **21**; driving assembly **30**; driving member **31**; transmission member **32**; driving motor **311**; connector **312**; engagement protrusion **313**; engagement groove **321**; trigger protrusion **322**; limiting groove **40**; limiting protrusion **41**; base **50**; guide channel **51**; mounting chamber **52**; communication port **53**; accommodation cavity **54**; base body **501**; cover body **502**; opening **521**; through opening **522**; contact **541**; seal **60**; position detection assembly **70**; powder detergent dispensing assembly **80**; rinse aid dispensing assembly **81**.

DETAILED DESCRIPTION

[0061] Embodiments of the present disclosure will be described in detail below with reference to examples thereof as illustrated in the accompanying drawings, throughout which same or similar elements, or elements having same or similar functions, are denoted by same or similar reference numerals. The embodiments described below with reference to the drawings are illustrative only, and are intended to explain, rather than limiting, the present disclosure.

[0062] In the description of the present disclosure, it is to be understood that, terms such as "center", "longitudinal", "lateral", "length", "width", "thickness", "over", "below", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom " , "in", "out", "clockwise", "counterclockwise", "axial", "radial", "circumferential", etc., is based on the orientation or position relationship shown in the drawings, and is only for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the associated device or element must have a specific orientation, or be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation to the present disclosure.

[0063] In the description of the present disclosure, "the first feature" and "the second feature" may include at least one of the features, and "plurality" means at least two. The first feature being "on" or "under" the second feature may include the scenarios that the first feature is in direct contact with the second feature, or the first and second features, instead of being in direct contact with each other, are in contact with each other through another feature therebetween. The first feature being "above" the second feature may indicate that the first feature is directly above or obliquely above the second feature, or simply indicate that the level of the first feature is higher than that of the second feature.

[0064] A dispensing device **100** according to certain embodiments of the present disclosure will be described below with reference to the accompanying drawings.

[0065] Referring to FIG. **1** to FIG. **5** and FIG. **8**, the dispensing device **100** according to the embodiments of the present disclosure may include a liquid storage container **10**, a pump body **20**, and a driving assembly **30**.

[0066] In some embodiments, the liquid storage container **10** is configured to store liquid detergent therein. The pump body **20** is mounted in the liquid storage container **10**, and has a pump head **21**. The pump head **21** is movable relative to the liquid storage container **10** to pump the liquid detergent out of the liquid storage container **10** to realize dispensing of the liquid detergent. Therefore, the liquid detergent is pumped conveniently and quickly, and a volume of the pumped detergent every time is controllable.

[0067] In addition, as illustrated in FIG. **2** to FIG. **4**, the driving assembly **30** is configured to drive the pump head **21** to pump the liquid detergent in the liquid storage container **10** into a washing chamber of a dishwasher. For example, the driving assembly **30** may abut against the pump head **21** and drive the pump head **21** to move towards the liquid storage container **10** to press the pump head **21** to pump the liquid detergent out of the liquid storage container **10**, which enables the liquid detergent to be pumped into the washing chamber of the dishwasher. That is, when the pump head **21** moves towards the liquid storage container **10**, the liquid detergent in the liquid storage container **10** can be pumped into the washing chamber of the dishwasher. Therefore, automatic dispensing of the liquid detergent can be realized. Further, it is not necessary for a user to manually dispense the liquid detergent into the washing chamber each time before washing tableware, which avoids the liquid detergent from being manually added and frequently dispensed by the user. Therefore, the dishwasher is more conveniently used. In addition, it is also possible to avoid washing effect of the tableware from being affected due to the liquid detergent being forgotten to be dispensed by the user.

[0068] In addition, during the driving of the pump head **21** by the driving assembly **30**, the liquid detergent may be directly pumped into the washing chamber without flowing through other pipelines, which can avoid residue of the liquid detergent. Thus, it is possible to prevent the residual liquid detergent from being polluted and deteriorated, which is beneficial to improving sanitary condition of the dishwasher.

[0069] In some embodiments, as illustrated in FIG. **2** to FIG. **5**, the driving assembly **30** may include a driving member **31**, and a transmission member **32** connected to the driving member **31**. The driving member **31** is configured to drive the transmission member **32** to move. The transmission member **32** is configured to cooperate with the pump head **21**, to drive the pump head **21** to move in response to the transmission member **32** moving. For example, the transmission member **32** abuts against the pump head **21** and presses the pump head **21** to pump the liquid detergent out of the liquid storage container **10**.

[0070] In some embodiments, with continued reference to FIG. **2** to FIG. **5**, the driving member **31** is capable of driving the transmission member **32** to move towards the liquid storage container **10** along a first straight path (for example, move downwards in an upward-downward direction shown in FIG. **4**), to allow the transmission member **32** to abut against the pump head **21**. In this way, the pump head **21** is driven by the transmission member **32** to move towards the liquid storage container **10**. Thus, the dispensing of the liquid detergent can be realized.

[0071] In a dispensing process of the liquid detergent, the liquid detergent in the liquid storage container **10** is directly pumped into the washing chamber through the pump head **21** without being in contact with the driving assembly **30**, which effectively reduces a risk of leakage of the liquid detergent. Moreover, the transmission member **32** moves along the first straight path to drive the pump head **21** to move. The transmission resistance is thus relatively smaller. Thus, it is possible to avoid normal dispensing of the liquid detergent from being affected due to failure of the transmission member **32** or the pump head **21**. In addition, the transmission member **32** abuts against the pump head **21**, and when the pump body **20** or the driving assembly **30** is damaged, only the damaged component needs to be replaced, which effectively reduces maintenance costs. In some embodiments where the pump body **20** and the liquid storage container **10** are detachable, the transmission member **32** may be separated from the pump head **21**, which makes disassembly and assembly easier.

[0072] It should be noted that the transmission member **32** may always abut against the pump head **21**, or may abut against the pump head **21** after moving towards the liquid storage container **10** by a predetermined distance. For example, in some embodiments, when the transmission member **32** is in an initial position, the transmission member **32** is separated from the pump head **21**, and may be driven

by the driving member **31** to move downwards by the predetermined distance to abut against the pump head **21**. Then, the transmission member **32** continues to move downwards to drive the pump head **21** to move downwards. In this way, the liquid detergent in the liquid storage container **10** is pumped into the washing chamber. Thus, the automatic dispensing of the liquid detergent can be realized.

[0073] It should be noted that, for ease of description, directions such as "upward-downward direction" and "leftward-rightward direction" in the present disclosure are based on an orientation relationship illustrated in the drawings, and are not limited to the orientation in an actual application.

[0074] With the dispensing device **100** according to the embodiments of the present disclosure, the pump head **21** is driven by the driving assembly **30**. For example, the transmission member **32** is driven by the driving member **31** to move towards the liquid storage container **10** along the first straight path, the pump head **21** is then driven by the transmission member **32** to move towards the liquid storage container **10**. In this way, the liquid detergent in the liquid storage container **10** is pumped into the washing chamber. Thus, the automatic dispensing of the liquid detergent can be realized. Further, it is not necessary for the user to manually add and frequently dispense the liquid detergent, which results in more convenient using of the dishwasher. In addition, the pumped liquid detergent can totally enter the washing chamber to avoid the residue of the liquid detergent, which is beneficial to improving the sanitary condition of the dishwasher. In addition, the transmission member **32** and the pump head **21** move smoothly, and are not prone to failure or resulting in leakage of the liquid detergent, which is convenient to disassemble and assemble, and facilitates reduction of maintenance costs.

[0075] According to some embodiments of the present disclosure, as illustrated in FIG. **4**, the driving member **31** may further configured to drive the transmission member **32** to move away from the liquid storage container **10** along the first straight path. In this way, the transmission member **32** is reset to an initial position, and the driving assembly **30** is reset. Thus, the liquid detergent can be easily dispensed again.

[0076] In some embodiments of the present disclosure, the pump body **20** further includes a reset member (for example, a reset spring). When the driving assembly **30** is reset, i.e., when the driving assembly **30** is located at an initial position at which the pump head **21** is pressed by a minimum pressing force, for example, in an embodiment where the driving assembly **30** includes the transmission member **32**, when the transmission member **32** moves away from the liquid storage container **10** to reset the driving assembly **30**, the reset member can drive the pump head **21** to move away from the liquid storage container **10** to reset the pump head **21** to the initial position. Thus, it is possible for the driving assembly **30** to conveniently press the pump head **21** again. For example, it is possible for the pump head **21** to move towards the liquid storage container **10** again when the transmission member **32** moves towards the liquid storage container **10** along the first straight path again. The pump head **21** reciprocates to realize multi-dispensing of the liquid detergent. Thus, a dispensing volume of the liquid detergent can be ensured, and the dispensing is simple and quick.

[0077] For example, as illustrated in FIG. **4**, the transmission member **32** may move upwards with the driving of the driving member **31** to remove a downward driving force on the pump head **21**. In this way, the pump head **21** is driven by the reset member to move upwards, and the transmission member **32** and the pump head **21** are reset. When the transmission member **32** moves downwards again, the pump head **21** is driven by the transmission member **32** to move downwards to pump the liquid detergent in the liquid storage container **10** into the washing chamber. The above operations are repeated for several times to realize the multi-dispensing of the liquid detergent. Thus, the dispensing volume of the liquid detergent can be ensured.

[0078] The dishwasher may dispense the liquid detergent though controlling the dispensing device by a motor, and control the dispensing volume of the liquid detergent through controlling the motor to operate for a predetermined time. Since a rotational speed of the motor is variable, the dispensing volume of the liquid detergent within the predetermined time is inconstant during each dispensing.

[0079] For example, in some embodiments, the transmission member **32** may be movable between a first predetermined position and a second predetermined position. For example, in an example shown in FIG. **4**, a level at which the transmission member **32** is located at the first predetermined position is higher than a level at which the transmission member **32** is located at the second predetermined position. When the transmission member **32** moves from the first predetermined position to the second predetermined position, the pump head **21** is driven to move towards the liquid storage container **10** to pump the liquid detergent in the liquid storage container **10** into the washing chamber. When the transmission member **32** moves from the second predetermined position to the first predetermined position, the pump head **21** moves away from the liquid storage container **10** to reset the pump head **21**. Through the movement of the transmission member **32** in the upward-downward direction, the liquid detergent may be multi-pumped into the washing chamber. Thus, the dispensing volume of the liquid detergent can be ensured. Moreover, the transmission member **32** and the pump head **21** reciprocate by constant strokes, respectively, and thus the dispensing volume of the liquid detergent can be controlled by controlling the number of times of the reciprocation of the transmission member **32**. Thus, the dispensing volume can be easily controlled.

[0080] According to some embodiments of the present disclosure, the liquid storage container **10** is replaceable, or the liquid detergent in the liquid storage container **10** may be added. Thus, long-term use of the dispensing device **100** can be ensured.

[0081] For example, in some embodiments, the transmission member **32** is detachably fitted with the pump head **21**, which has good reliability, and facilitates access to the pump body **20** and the liquid storage container **10**. Thus, it is possible to facilitate replacement of the pump body **20** and the liquid storage container **10** with a new pump body and a new liquid storage container to ensure that there is enough liquid detergent in the dispensing device **100** to be dispensed into the washing chamber. For example, the pump body **20** and the liquid storage container **10** may be replaced as a consumable material as a whole, and the replacement is convenient.

[0082] For another example, in some embodiments, the pump body **20** is detachably connected to the liquid storage container **10**. When the volume of the liquid detergent is insufficient, the pump body **20** and the liquid storage con-

tainer **10** may be removed by the user to add the liquid detergent into the liquid storage container **10**, or the liquid storage container **10** may be replaced as the consumable material as a whole, which ensures that the liquid storage container **10** has sufficient liquid detergent. Thus, the operation is convenient, and cost is low.

[0083] Further, in some embodiments, the transmission member **32** is detachably fitted with the pump head **21**, and the pump body **20** is detachably connected to the liquid storage container **10**. Therefore, the user may select a manner of adding the liquid detergent as desired to satisfy different demands of the user.

[0084] In the embodiments of the present disclosure, a specific structure in which the transmission member **32** and the pump head **21** are detachably fitted with each other may be flexibly configured as desired. For example, the transmission member **32** and the pump head **21** may be fitted with each other via a snapping connection, a fastener connection, or the like.

[0085] For example, in some embodiments of the present disclosure, as illustrated in FIG. **3** to FIG. **5**, the pump head **21** is provided with a limiting groove **40**. An end of the transmission member **32** is provided with a limiting protrusion **41** inserted into the limiting groove **40**. The limiting groove **40** is configured to limit the limiting protrusion **41**. Thus, it is possible to ensure that the transmission member **32** can accurately exert a force on the pump head **21** without offset when moving downward. Thus, a reliable force can be applied to the pump head **21**. Further, a lower end of the limiting protrusion **41** is in contact with a bottom surface of the limiting groove **40**, which can ensure a reliable contact and a stable force, and thus has a better dispensing volume.

[0086] The limiting groove **40** may also be disposed in the transmission member **32**. In some embodiments, the end of the transmission member **32** is provided with the limiting groove **40**, and the pump head **21** is provided with the limiting protrusion **41** inserted into the limiting groove **40**, which are also within the scope of the present disclosure.

[0087] According to some embodiments of the present disclosure, the pump head **21** is configured to directly dispense the liquid detergent into the washing chamber. That is, the liquid detergent pumped through the pump head **21** can enter the washing chamber without passing through other pipelines. Thus, it is possible to avoid the residue of the liquid detergent due to too long pipeline, which facilitates improving the sanitary condition of the dishwasher.

[0088] In some embodiments, the pump head **21** has a dispensing port. The dispensing port is configured to be in direct communicate with the washing chamber to allow the liquid detergent pumped through the pump head **21** via the dispensing port to be directly dropped into the washing chamber, which has a simple communication structure and can effectively avoid the residue of the liquid detergent.

[0089] According to some embodiments of the present disclosure, as illustrated in FIG. **1** to FIG. **5**, the dispensing device **100** further includes a base **50**. The pump body **20** may be fixedly disposed on the base **50** to stabilize a structure of the pump body **20**, or the pump body **20** may be detachably disposed on the base **50** to facilitate maintenance and replacement of the pump body **20**.

[0090] Here, the pump body **20** and the liquid storage container **10** may be formed separately or integrally formed. That is, the assembled pump body **20** and the liquid storage container **10** may be mounted on the base **50**, or the pump body **20** and the liquid storage container **10** may be mounted on the base **50**, respectively.

[0091] For example, the pump body **20** is mounted on the base **50**. The pump body **20** and the base **50** may be fixedly or detachably connected to each other. When the liquid storage container **10** and the pump body **20** are formed separately, the liquid storage container **10** may be arranged to be detachably mounted on the base **50**. Thus, the liquid storage container **10** can be removed to be fill with the liquid detergent. After the liquid storage container **10** is mounted on the base **50**, the liquid storage container **10** may be connected to the pump body **20**. Thus, the connection between the pump body **20** and the liquid storage container **10** can be realized, which facilitates the pumping of the liquid detergent. In the embodiment, the liquid storage container **10** may also be mounted on the base **50**, and then the pump body **20** is mounted on the base **50**. In addition, the liquid storage container **10** may also be configured to be non-detachably connected to the base **50**, and adding and replacement of the liquid detergent may be done in other manners.

[0092] In addition, the pump body **20** and the liquid storage container **10** may also be assembled together to form an integrated structure, and then the assembled integrated structure is mounted on the base **50**. The pump body **20** and the liquid storage container **10** may be detachably or non-detachably connected to each other.

[0093] In some embodiments of the present disclosure, the pump body **20** and the liquid storage container **10** may be integrated with each other. It should be noted that the pump body **20** and the liquid storage container **10** may be fixedly or detachably connected together to form the integrated structure, and the integrated structure may move together to facilitate the operation. This integrated structure may also reduce a mounting structure of a machine body, which makes the assembly simple, and thus production costs are reduced.

[0094] In some embodiments, the integrated structure may be detachably mounted on the machine body, for example, mounted in a mounting chamber, to facilitate the adding of the liquid detergent. For example, the integrated structure may be removed and then the liquid detergent is added, which makes the operation convenient. In some embodiments, the integrated structure may be fixedly disposed on the machine body, for example, fixedly disposed in the mounting chamber. Thus, the pump body **20** and the liquid storage container **10** are installed stably and not prone to being vibrated or damaged.

[0095] In some embodiments, with continued reference to FIG. **1** to FIG. **5**, the base **50** has a guide channel **51** extending along the first straight path. At least a part of the transmission member **32** is located in the guide channel **51**. Therefore, the transmission member **32** may move with a guiding of the guide channel **51** to ensure that the transmission member **32** moves along the first straight path. Thus, it is possible to ensure that the transmission member **32** is accurately fitted with the pump head **21** during the movement.

[0096] In some embodiments, the base **50** may be a door body of the dishwasher or a wall of the washing chamber. That is, the driving assembly **30** and the liquid storage container **10** are mounted on the door body of the dishwasher or the wall of the washing chamber, which is

beneficial to reducing a number of components and parts and a weight of the dishwasher, thereby achieving lightweight of the dishwasher.

[0097] In some other embodiments, the base **50** may be mounted on the door body of the dishwasher or the wall of the washing chamber. In this way, it is possible to facilitate the disassembly and assembly of the dispensing device **100** and the adding of the liquid detergent.

[0098] In some embodiments, as illustrated in FIG. **4** and FIG. **5**, the base **50** further has a mounting chamber **52** and a communication port **53**. The liquid storage container **10** and the pump body **20** are mounted in the mounting chamber **52**. Thus, the dispensing device **100** has a neat appearance, and it is also beneficial to preventing a fluid from entering the dispensing device **100**. The communication port **53** is configured to communicate the guide channel **51** and the mounting chamber **52**, and the transmission member **32** abut against the pump head **21** through the communication port **53** to allow the transmission member **32** to drive the pump head **21** to move.

[0099] In some embodiments in which the base **50** is included, as illustrated in FIG. **2**, the base **50** has the mounting chamber **52**. A wall of the mounting chamber **52** has a through opening **522**. The pump head **21** may protrude into the washing chamber through the through opening **522**. Therefore, it is beneficial to delivering the liquid detergent in the liquid storage container **10** to the washing chamber to realize the adding of the liquid detergent, which has a simple structure. Further, it is possible to prevent the fluid in the washing chamber from entering the mounting chamber **52** and causing fluid accumulation.

[0100] In some embodiments of the present disclosure, as illustrated in FIG. **4** and FIG. **5**, the dispensing device **100** further includes a seal **60**. The seal **60** is configured to seal a gap between the transmission member **32** and an inner peripheral surface of the communication port **53** to prevent dust, foreign material, washing water, and other substances from entering the guide channel **51** through the communication port **53**. Thus, it is possible to prevent the fluid from entering the driving assembly **30** to damage the driving assembly **30**, which can ensure normal operation of the driving assembly **30**. Moreover, the seal **60** is capable of limiting the movement of the transmission member **32** to ensure that the transmission member **32** moves along the first straight path.

[0101] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the base **50** includes a base body **501** and a cover body **502**. The base body **501** has the mounting chamber **52**. The mounting chamber **52** has an opening **521**. The cover body **502** is configured to expose or cover the opening **521**. The liquid storage container **10** is mounted in the mounting chamber **52** to ensure that the liquid storage container **10** is stably located in the mounting chamber **52**, which avoids normal use of the dishwasher from being affected due to movement or separation of the liquid storage container **10**, and facilitates the adding of the liquid detergent.

[0102] In some embodiments in which the pump body **20** and the liquid storage container **10** are detachably connected to each other, the opening **521** is exposed by the cover body **502**, which is beneficial to taking, placing, disassembling and assembling the liquid storage container **10** to facilitate replacing the liquid storage container **10** with a new liquid storage container or adding the liquid detergent into the liquid storage container **10**.

[0103] In some embodiments, as illustrated in FIG. **2**, the cover body **502** may be hinged to the base body **501** to connect the cover body **502** to the base body **501**, which has good connection effect. Further, the operation of exposing or covering the opening **521** by the cover body **502** is more convenient.

[0104] In some embodiments of the present disclosure, as illustrated in FIG. **8**, the driving member **31** includes a driving motor **311**, and a connector **312** connected to an output end of the driving motor **311**. The transmission member **32** is connected to the connector **312**. Therefore, the driving motor **311** is capable of driving the connector **312** to move, and the transmission member **32** is driven to move by the connector **312**.

[0105] For example, in some embodiments, as illustrated in FIG. **8**, the connector **312** may be an eccentric wheel. The eccentric wheel rotates when driven by the driving motor **311**. The eccentric wheel is provided with an engagement protrusion **313**. The transmission member **32** is provided with an engagement groove **321**. The engagement protrusion **313** is movable along the engagement groove **321** to convert the rotation of the eccentric wheel into the movement of the transmission member **32**. The transmission member **32** may be driven to reciprocate through circular movement or swing of the eccentric wheel, which needs no other reset structures and has a simple structure. Further, a small occupied space is required, and production costs is reduced.

[0106] According to some embodiments of the present disclosure, as illustrated in FIG. **4** and FIG. **8**, the engagement groove **321** extends along a second straight path (such as the leftward-rightward direction shown in FIG. **4**), and every two of a rotation axis of the eccentric wheel, the first straight path, and the second straight path are perpendicular to one another, which maximizes space utilization and reduces the occupied space to reduce an occupying space of the dispensing device **100** in the dishwasher and improve a space of the washing chamber of the dishwasher.

[0107] In some embodiments of the present disclosure, as illustrated in FIG. **6** to FIG. **8**, the dispensing device **100** further includes a dispensing volume detection mechanism. The dispensing volume detection mechanism is configured to detect a volume of the liquid detergent pumped through the pump head **21** to achieve detection for the dispensing volume of the liquid detergent. Therefore, the liquid detergent is automatically dispensed more accurately, and it is possible to avoid unclean washing due to insufficient liquid detergent, excessive rinsing due to excessive liquid detergent, or the like.

[0108] In some embodiments of the present disclosure, the pump head **21** is configured to reciprocate between a first predetermined position and a second predetermined position to dispense the liquid detergent. The dispensing volume detection mechanism can detect the number of times of the reciprocation of the pump head **21** to obtain an volume of pumped liquid detergent. Thus, the control on the dispensing volume of the liquid detergent is more accurate.

[0109] The dispensing volume is detected based on the number of times of the reciprocation of the pump head **21**, rather than controlling the dispensing volume of the liquid detergent based on a time of the reciprocation of the pump head **21**. Therefore, the dispensing volume of the liquid detergent would not be affected by factors such as a speed of the reciprocation of the pump head **21**, and can be

controlled more accurately when the tableware is washed. Thus, the control is convenient.

[0110] In addition, the dispensing volume detection mechanism is further configured to detect whether the pump head **21** is reset. Thus, it is possible to prevent the normal dispensing of the liquid detergent from being affected due to failure of the pump head **21**.

[0111] In some embodiments, as illustrated in FIG. **6** to FIG. **8**, the dispensing volume detection mechanism includes a position detection assembly **70** configured to detect a position of the pump head **21**.

[0112] In this way, the number of times, a displacement, and the like of the reciprocation of the pump head **21** can be determined based on the detection from the position detection assembly **70**, and the dispensing volume of the liquid detergent is further determined. Thus. The control on the dispensing volume of the liquid detergent is more accurate. The dispensing volume is detected based on the position of the pump head **21**, rather than controlling the dispensing volume of the liquid detergent based on an operation time of the pump head **21**. Therefore, the dispensing volume of the liquid detergent would not be affected by factors such as the speed of the reciprocation of the pump head **21**, and can be controlled more accurately when the tableware is washed. Thus, the control is convenient.

[0113] In addition, the position detection assembly **70** is further configured to detect conditions such as a driving condition in which the pump head **21** is driven by the driving assembly **30** to move, whether the pump head **21** is reset. Thus, it is possible to prevent the normal dispensing of the liquid detergent from being affected due to the failure of the driving assembly **30** or the pump head **21**.

[0114] In some embodiments, the dispensing volume detection mechanism further includes a control assembly. The control assembly is connected to the position detection assembly **70** and the driving assembly **30**. The control assembly is configured to control an operation state of the driving assembly **30** based on the detection from the position detection assembly **70**. For example, in response to determining that the dispensing volume of the liquid detergent reaches a desired volume based on the position detection, the driving assembly **30** is controlled to stop operating; or in response to determining that the driving assembly **30** or the pump head **21** is failed based on the position detection, the driving assembly **30** is controlled to stop operating. In this case, the dispensing device **100** may be further controlled to send a fault indication information to indicate the user to perform maintenance.

[0115] In some embodiments, in response to detecting by the position detection assembly **70** that the pump head **21** reaches the first predetermined position, the control assembly counts to determine the dispensing volume. In this way, it is possible to ensure constant and accurate dispensing volume of the liquid detergent in a single reciprocation of the pump head **21**.

[0116] In addition, in response to a count value reaching a predetermined threshold, the driving assembly **30** is controlled to stop operating by the control assembly. The pump head **21** reaching the first predetermined position each time indicates that one complete dispensing is completed, and the dispensing volume of each complete dispensing is constant. By controlling the number of times of the reciprocation of the pump head **21**, a number of times of quantitative dispensing of the liquid detergent is controlled to accurately control the dispensing volume of the liquid detergent in each washing process. Thus, it is possible to ensure dispensing precision of the liquid detergent, which in turn ensures cleaning performance of the dishwasher.

[0117] In some embodiments in which the driving assembly **30** includes the driving motor **311**, in response to the count value reaching the predetermined threshold, the control assembly cuts off a power of the driving motor **311**. In this way, the dispensing of the liquid detergent is stopped, and energy loss can be reduced. Thus, electricity is saved, which facilitates low energy consumption of the dishwasher.

[0118] In addition, in the embodiment where the transmission member **32** has the first predetermined position and the second predetermined position, the control assembly can control the transmission member **32** to be positioned in the first predetermined position. That is, the transmission member **32** is reset to the initial position, which facilitates the user to mount or detach the liquid storage container **10**.

[0119] In some embodiments, the predetermined threshold is greater than or equal to **1**, and a specific value may be set based on actual conditions such as tableware washing effect. For example, the predetermined threshold may be set before leaving the factory or set by the user. In some embodiments, the predetermined threshold may be **1**, **2**, **3**, **4**, **5**, or the like.

[0120] In the embodiment in which the driving assembly **30** includes the driving member **31** and the transmission member **32**, the position detection assembly **70** is further configured to detect a position of the transmission member **32**. In some embodiments, the control assembly is configured to count in response to detecting by the position detection assembly **70** that the transmission member **32** reaches the first predetermined position, and control the driving member **31** to stop operating in response to the count value reaching the predetermined threshold, which is also within the scope of the present disclosure.

[0121] In some embodiments of the present disclosure, the pump head **21** is movable between the first predetermined position and the second predetermined position. The pump head **21** is configured to: pump the liquid detergent in the liquid storage container **10** out of the liquid storage container **10** to dispense the liquid detergent when moving from the first predetermined position to the second predetermined position. Further, when the pump head **21** moves from the second predetermined position to the first predetermined position, the pump head **21** moves away from the liquid storage container **10** to be reset.

[0122] In some embodiments, the pump body **20** may further include a reset member. The reset member is configured to drive the pump head **21** to move from the second predetermined position to the first predetermined position to be reset. In this way, it is possible to ensure that the pump head **21** can smoothly reciprocate. Further, it is also possible to ensure that the pump head **21** can be accurately reset to the first predetermined position each time, which facilitates accurate controlling the dispensing volume of the liquid detergent.

[0123] It should be noted that the position detection assembly may directly or indirectly detect the position of the pump head **21**, which can both determine the dispensing volume of the liquid detergent, and also have a beneficial effect such as accurate dispensing volume control.

[0124] In some embodiments of the present disclosure, as illustrated in FIG. **6** to FIG. **8**, the driving assembly **30** includes the transmission member **32** and the driving mem-

ber **31**. The transmission member **32** is configured to drive the pump head **21** to move, and the driving member **31** is configured to drive the transmission member **32** to move to allow the transmission member **32** to drive the pump head **21** to move. The position detection assembly is configured to detect a position of at least one of the transmission member **32** and the pump head **21** to obtain the position of the pump head **21** and determine an volume of the pumped liquid detergent. In this way, it is possible to ensure position detection accuracy of the pump head **21** and detection accuracy of the dispensing volume of the liquid detergent.

[0125] In some embodiments of the present disclosure, the position detection assembly **70** includes at least one of a microswitch, a Hall element, a reed switch, and a photoelectric sensor, which all can detect the position of the transmission member **32** and have a small size, a light weight, and sensitive detection.

[0126] For example, in a first embodiment, as illustrated in FIG. **6** to FIG. **8**, the position detection assembly **70** may include the microswitch connected to the control assembly. The transmission member **32** has a trigger protrusion **322**. In response to the transmission member **32** moving to the first predetermined position, the microswitch is triggered by the trigger protrusion **322**, and the control assembly counts in response to the microswitch being triggered. Therefore, a number of times the transmission member **32** moves to the first predetermined position can be obtained based on a number of times the microswitch is triggered by the trigger protrusion **322**. Thus, it is possible to obtain the number of times of the reciprocation of the transmission member **32** to control the dispensing volume of the liquid detergent, which has a simple structure and good control effect.

[0127] In some embodiments, as illustrated in FIG. **6** to FIG. **8**, the base **50** has an accommodation cavity **54** for accommodating the transmission member **32**. The transmission member **32** is mounted in the accommodation cavity **54**. The transmission member **32** includes a transmission body. One end of the transmission body is fitted with the driving member **31**, for example, through the engagement groove **321** and the engagement protrusion **313**. Another end of the transmission body is fitted with the pump head **21**, for example, through the limiting groove **40** and the limiting protrusion **41**. The trigger protrusion **322** is disposed on an outer peripheral surface of the transmission body and is located in the accommodation cavity **54**. The microswitch is mounted on the base **50** and has a contact **541**. The contact **541** extends into the accommodation cavity **54** to bring the trigger protrusion **322** into contact with the contact **541** to trigger the microswitch. In this way, the position of the driving member **31** can be detected.

[0128] For example, in a second embodiment, the position detection assembly **70** may include the reed switch connected to the control assembly, and a magnetic member disposed on the transmission member **32**. In response to the transmission member **32** reaching the first predetermined position, the reed switch is driven by the magnetic member to be switched on. In response to the transmission member **32** moving away from the first predetermined position, the reed switch is switched off, and the control assembly counts in response to the reed switch being switched on. Therefore, the number of times the transmission member **32** reaches the first predetermined position can be obtained based on a number of times the reed switch is switched on to obtain the number of times of the reciprocation of the transmission member **32**. In this way, the dispensing volume of the liquid detergent can be controlled, which has a simple structure and good control effect.

[0129] For example, **2**in a third embodiment, the position detection assembly **70** may include the photoelectric sensor connected to the control assembly. The photoelectric sensor has an emitting end and a receiving end. The receiving end is configured to receive light emitted from the emitting end. The transmission member has a shielding portion. The shielding portion is capable of shielding the light in response to the transmission member **32** reaching the first predetermined position. In response to the transmission member **32** moving away from the first predetermined position, the receiving end can receive the light emitted from the emitting end again, and the control assembly counts in response to the light being shielded. Therefore, the number of times the transmission member **32** reaches the first predetermined position can be obtained based on the number of times the receiving end is shielded. Thus, it is possible to obtain the number of times of the reciprocation of the transmission member **32**. In this way, the dispensing volume of the liquid detergent is controlled, which has a simple structure and good control effect.

[0130] For example, in a fourth embodiment, the position detection assembly **70** may include the Hall element connected to the control assembly and the magnetic member disposed on the transmission member **32**. In response to the transmission member **32** reaching the first predetermined position, the magnetic member can be detected by the Hall element, and a pulse signal is generated by the Hall element. When the transmission member **32** moving away from the first predetermined position, the magnetic member cannot be detected by the Hall element, and the control assembly counts in response to the pulse signal being generated by the Hall element. Therefore, the number of times the transmission member **32** reaches the first predetermined position can be obtained based on the number of times the pulse signal is generated by the Hall element. Thus, it is possible to obtain the number of times of the reciprocation of the transmission member **32**. In this way, the dispensing volume of the liquid detergent can be controlled, which has a simple structure and good control effect.

[0131] In some embodiments in which the driving member **31** includes the driving motor **311**, in response to the count value reaching the predetermined threshold, the control assembly cuts off the power of the driving motor **311**. In this way, the dispensing of the liquid detergent is stopped, and energy loss can be reduced. Thus, electricity is saved, which contributes to low energy consumption of the dishwasher.

[0132] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the dispensing device **100** further includes a powder liquid detergent dispensing assembly **80**. The powder liquid detergent dispensing assembly **80** is configured to dispense a powder liquid detergent into the washing chamber. When the tableware is washed, the user may select whether the liquid detergent is dispensed by the dispensing device **100** or the powder liquid detergent is dispensed by the powder liquid detergent dispensing assembly **80** as desired. Thus, more options are provided for the user, and the dishwasher can satisfy more demands of the user.

[0133] In some embodiments of the present disclosure, as illustrated in FIG. **1** to FIG. **4**, the dispensing device **100** may include the base **50** and a dispenser. The dispenser is mounted on the base **50**, and is configured to dispense a

plurality of washing articles. It should be noted that the dispenser may be an integrated or separate member.

[0134] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the dispenser is configured to dispense the liquid detergent and the powder liquid detergent. For example, the dispenser may include the liquid detergent dispensing assembly and the powder liquid detergent dispensing assembly **80**. The liquid detergent dispensing assembly is configured to dispense the liquid detergent. The powder detergent dispensing assembly **80** is configured to dispense the powder detergent into the washing chamber. For example, the liquid detergent dispensing assembly may include the liquid storage container **10**, the pump body **20**, and the driving assembly **30**.

[0135] When the tableware is washed, the user may make the selection whether the liquid detergent is dispended by the dispensing device **100**, or the powder detergent is dispended by the powder detergent dispensing assembly **80**, as desired. Thus, more selections are provided for the user, and the dishwasher can satisfy more use demands of the user.

[0136] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the dispenser may be configured to dispense a rinse aid. For example, the dispenser may include the liquid detergent dispensing assembly and a rinse aid dispensing assembly **81**. The rinse aid dispensing assembly **81** is configured to dispense the rinse aid into the washing chamber to brighten and maintain the washed tableware and remove residues such as water drops and dust spots.

[0137] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the dispenser is configured to dispense the liquid detergent, the powder detergent, and the rinse aid. For example, the dispenser may include the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81** simultaneously. The user may select among the liquid detergent, the powder detergent, and the rinse aid to further satisfy more use demands of the user on the dishwasher, which has greater practicability.

[0138] Referring to FIG. **1** to FIG. **5**, the dispensing device **100** according to the embodiments of the present disclosure may include the base **50**, the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81**.

[0139] In some embodiments, the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81** are mounted on the base **50**, respectively. The liquid detergent dispensing assembly is configured to dispense the liquid detergent into the washing chamber of the dishwasher. The powder detergent dispensing assembly **80** is configured to dispense the powder detergent into the washing chamber. When washing the tableware, the user may make the selection whether the liquid detergent is dispensed through the liquid detergent dispensing assembly, or the powder detergent is dispensed through the powder detergent dispensing assembly **80**, as desired. Thus, more selections are provided for the user, and the dishwasher can satisfy more use demands of the user. In addition, the rinse aid dispensing assembly **81** is configured to dispense the rinse aid into the washing chamber to brighten and maintain the washed tableware and remove residues such as water drops and dust spots. The user may select among the liquid detergent, the powder detergent, and the rinse aid to further satisfy more use demands on the dishwasher, which has greater practicability.

[0140] With the dispensing device **100** according to certain embodiments of the present disclosure, by providing the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81**, the user may select among the liquid detergent, the powder detergent, and the rinse aid to further satisfy more use demands of the user on the dishwasher, which has greater practicability.

[0141] In some embodiments, the base **50** may be the door body of the dishwasher or the wall of the washing chamber. That is, the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81** may be mounted on the door body of the dishwasher or on the wall of the washing chamber, which is beneficial to reducing a number of components and parts and the weight of the dishwasher, and realizing the lightweight of the dishwasher.

[0142] In some other embodiments, the base **50** may be mounted on the door body of the dishwasher or on the wall of the washing chamber, which is beneficial to the assembly or disassembly of the dispensing device **100** and the adding of the liquid detergent, the powder detergent, and the rinse aid.

[0143] According to some embodiments of the present disclosure, as illustrated in FIG. **4** and FIG. **5**, the base **50** has the mounting chamber **52**. The liquid detergent dispensing assembly includes the liquid storage container **10** and the pump body **20**. The liquid storage container **10** is configured to store the liquid detergent therein, and is mounted in the mounting chamber **52**. Thus, the dispensing device **100** has a neat appearance. Further, it is beneficial to preventing the fluid from entering the dispensing device **100**.

[0144] In some embodiments, as illustrated in FIG. **1** to FIG. **4**, the base **50** includes the base body **501** and the cover body **502**. The base body **501** has the mounting chamber **52**. The mounting chamber **52** has the opening **521**. The cover body **502** is configured to expose or cover the opening **521** to ensure that the liquid detergent dispensing assembly is fixedly mounted in the mounting chamber **52**. In this way, it is possible to prevent the normal use of the dishwasher from being affected due to the movement or separation of the liquid detergent dispensing assembly, which facilitates the adding of the liquid detergent.

[0145] In some embodiments, as illustrated in FIG. **4** and FIG. **5**, the liquid detergent dispensing assembly further includes the pump body **20** and the driving assembly **30**. The pump body **20** is mounted within the liquid storage container **10**, and has the pump head **21**. The pump head **21** is movable relative to the liquid storage container **10** to pump liquid detergent out of the liquid storage container **10**. Thus, the liquid detergent is pumped conveniently and quickly, and the volume of the pumped liquid detergent every time is controllable.

[0146] In addition, as illustrated in FIG. **2** to FIG. **4**, the base **50** further has the accommodation cavity **54**. The driving assembly **30** is mounted in accommodation cavity **54**, and is configured to drive the pump head **21** to move towards the liquid storage container **10** to press the pump head **21**. In this way, the liquid detergent in the liquid storage container **10** is pumped into the washing chamber. Thus, the automatic dispensing of the liquid detergent can be realized.

[0147] Further, it is not necessary for the user to manually dispense the liquid detergent into the washing chamber each time before washing the tableware. Thus, it is possible to avoid the manual adding and frequent dispensing of the liquid detergent, which makes the dishwasher more convenient to be used. In addition, it is also possible to avoid the washing effect of the tableware from being affected due to the liquid detergent being forgotten to be dispensed by the user.

[0148] In some embodiments of the present disclosure, as illustrated in FIG. **1** to FIG. **4**, the liquid storage container **10** is detachably mounted in the mounting chamber **52** to facilitate the replacement of the liquid storage container **10** or the adding of the liquid detergent to the liquid storage container **10**. Thus, long-term use of the dispensing device **100** can be ensured.

[0149] In some embodiments in which the base **50** includes the base body **501** and the cover body **502**, it is ensured that the liquid storage container **10** is fixed in the mounting chamber **52** by exposing or covering the opening **521** of the cover body **502**. Thus, it is possible to prevent the normal use of the dishwasher from being affected due to the movement or falling of the liquid storage container **10**, and it is beneficial to taking, placing, assembling, and disassembling the liquid storage container **10** to facilitate replacement of the liquid storage container **10** with a new liquid storage container or the adding of the liquid detergent into the liquid storage container **10**.

[0150] The dispensing device **100** according to an exemplary embodiment of the present disclosure will be described in detail below with reference to the accompanying drawings. It should be understood that the following description is merely exemplary, and should not be understood as a limitation to the present disclosure.

[0151] Referring to FIG. **2**, FIG. **4**, FIG. **5** and FIG. **8**, the dispensing device **100** includes a liquid storage container **10**, a base **50**, a pump body **20**, a driving assembly **30**, a position detection assembly **70**, a control assembly, a seal **60**, a powder detergent dispensing assembly **80**, and a rinse aid dispensing assembly **81**.

[0152] The base **50** includes a base body **501** and a cover body **502** hinged to the base body **501**. The base **50** is mounted on a door body of a dishwasher. The base **50** has a mounting chamber **52**, a communication port **53**, and a guide channel **51** extending in a leftward-rightward direction. The communication port **53** is configured to communicate the guide channel **51** with the mounting chamber **52**. The mounting chamber **52** has an opening **521**. A through opening **522** is formed on a wall of the mounting chamber **52**. The driving assembly **30** includes a driving member **31** and a transmission member **32**. The driving member **31** includes a driving motor **311** and a connector **312**. The connector **312** is an eccentric wheel provided with an engagement protrusion **313**. An engagement groove **321** is formed on an upper part of the transmission member **32**, and extends in the leftward-rightward direction. The eccentric wheel is configured to connect an output end of the driving motor **311** and the transmission member **32**. The transmission member **32** passes through the communication port **53**. The seal **60** is configured to seal a gap between the transmission member **32** and an inner peripheral surface of the communication port **53**. The liquid storage container **10** is configured to store the liquid detergent therein. The pump body **20** is detachably connected to the liquid storage container **10**. The liquid storage container **10** and the pump body **20** are detachably mounted in the mounting chamber **52**. The pump body **20** includes a pump head **21** and a reset member. The pump head **21** is provided with a limiting groove **40**. A limiting protrusion **41** is disposed on a lower part of the transmission member **32**. The transmission member **32** is detachably fitted with the pump head **21**. The pump head **21** protrudes into the washing chamber through the through opening **522**. The position detection assembly **70** includes a microswitch mounted on the base **50**. The control assembly is connected to the microswitch and the driving member **31**. The microswitch has a contact **541**. A trigger protrusion **322** is disposed at the middle of the transmission member **32**, and is located within the accommodation cavity **54**. The contact **541** protrudes into the accommodation cavity **54**.

[0153] Referring to FIG. **4**, FIG. **5** and FIG. **8**, the transmission member **32** is normally located in an initial position, i.e., a first predetermined position. In response to the dispensing device **100** being started, the eccentric wheel is driven by the driving motor **311** to rotate, and the engagement protrusion **313** moves along the engagement groove **321** to convert the rotation of the eccentric wheel into a reciprocation of the transmission member **32** in an upward-downward direction. In this way, the transmission member **32** can reciprocate between the first predetermined position and a second predetermined position. When the transmission member **32** moves from the first predetermined position to the second predetermined position, the transmission member **32** moves downwards, and abuts against the pump head **21**. Further, the limiting protrusion **41** is inserted into the limiting groove **40**, and the pump head **21** is driven by the transmission member **32** to move downwards to pump the liquid detergent in the liquid storage container **10** into the washing chamber. When the transmission member **32** moves from the second predetermined position to the first predetermined position, the transmission member **32** is driven by the driving member **31** to move upwards to be reset to the first predetermined position, and the pump head **21** is driven by the reset member to move upwards to reset the pump head **2**. The above movement is repeated to pump the liquid detergent in the liquid storage container **10** into the washing chamber of the dishwasher in several times. Further, when the transmission member **32** moves to the first predetermined position, the trigger protrusion **322** is in contact with the contact **541** to trigger the microswitch, and the control assembly counts in response to the microswitch being triggered. As the above movement is repeated, the count value increases. In response to the count value reaching a predetermined threshold, the control assembly controls the driving member **31** to stop operating, and cuts off a power of the driving motor **311** to complete an automatic dispensing of the liquid detergent in the washing process.

[0154] A dishwasher according to embodiments of the present disclosure includes the dispensing device **100** for the dishwasher according to the embodiments of the present disclosure. Since the dispensing device **100** according to the embodiments of the present disclosure has the above beneficial technical effects, in the dishwasher according to the embodiments of the present disclosure, by driving the transmission member **32** by the driving member **31** to move towards the liquid storage container **10** along the first straight path to allow the transmission member **32** to drive the pump head **21** to move towards the liquid storage

container **10**, the liquid detergent in the liquid storage container **10** is pumped into the washing chamber. Thus, an automatic dispensing of the liquid detergent can be realized, which avoids manual adding and frequent dispensing of the liquid detergent by the user. In addition, the dishwasher is more conveniently used, and the transmission member **32** and the pump head **21** can move smoothly and are not prone to failure or cause the leakage of the liquid detergent. Thus, it is convenient to disassemble and assemble, and the maintenance costs can be reduced. The control assembly can control the operation state of the driving member **31** based on the detection of the position detection assembly **70**. Thus, it is possible to more accurately control the dispensing volume of the liquid detergent when washing the tableware, and the control is thus convenient.

[0155] With the dispensing device **100** according to the embodiments of the present disclosure, by providing the liquid detergent dispensing assembly, the powder detergent dispensing assembly **80**, and the rinse aid dispensing assembly **81**, the user may select among the liquid detergent, the powder detergent, and the rinse aid to further satisfy more use demands of the user on the dishwasher, which has greater practicability.

[0156] Other arrangements and operations of the dispensing device **100** and the dishwasher according to the embodiments of the present disclosure are known to those of ordinary skill in the art, and the description thereof in detail will omitted herein.

[0157] In the present disclosure, it should be noted that, unless otherwise clearly specified and limited, terms such as "install", "connect", "couple", and the like should be understood in a broad sense. For example, it may be a fixed connection or a detachable connection or connection as one piece; a mechanical connection or an electrical connection; a direct connection or an indirect connection through an intermediate; or internal communication of two components. For those of ordinary skill in the art, the specific meaning of the above terms in the present disclosure should be understood according to specific circumstances.

[0158] In the description of this specification, descriptions with reference to the terms "embodiments", "specific embodiments", "examples", etc., mean that specific features, structure, materials or characteristics described in conjunction with the embodiment or example are included in at least one embodiment or example of the present disclosure. In this specification, the schematic representations of the above terms do not necessarily refer to the same embodiment or example. Moreover, the described specific features, structures, materials or characteristics may be combined in any one or more embodiments or examples in a suitable manner.

[0159] Although embodiments of the present disclosure have been illustrated and described, it is conceivable for those of ordinary skilled in the art that various changes, modifications, replacements, and variations can be made to these embodiments without departing from the principles and spirit of the present disclosure. The scope of the present disclosure shall be defined by the claims as appended and their equivalents.

What is claimed is:

1. A dispensing device for a dishwasher, comprising:
- a liquid storage container configured to store liquid detergent;
- a pump body on the liquid storage container and having a pump head; and
- a driving assembly configured to drive the pump head to pump the liquid detergent in the liquid storage container into a washing chamber of the dishwasher.

2. The dispensing device for the dishwasher according to claim **1**, wherein:
- the driving assembly abuts against the pump head, and
- the driving assembly is configured to drive the pump head to move towards the liquid storage container to pump the liquid detergent in the liquid storage container into the washing chamber of the dishwasher.

3. The dispensing device for the dishwasher according to claim **1**, wherein the driving assembly comprises:
- a transmission member; and
- a driving member connected to the transmission member and configured to drive the transmission member to move towards the liquid storage container along a first straight path to enable the transmission member to abut against the pump head and drive the pump head to move towards the liquid storage container.

4. The dispensing device for the dishwasher according to claim **3**, wherein:
- the driving member is further configured to drive the transmission member to move away from the liquid storage container along the first straight path to reset the driving assembly; and/or
- the pump body further comprises a reset member configured to drive, in response to the transmission member moving away from the liquid storage container, the pump head to move away from the liquid storage container; and/or
- one of the pump head and an end of the transmission member has a limiting groove, and the other one of the pump head and the end of the transmission member has a limiting protrusion insertable into the limiting groove.

5. The dispensing device for the dishwasher according to claim **3**, further comprising:
- a base having a guide channel extending along the first straight path, wherein the transmission member moves as guided by the guide channel.

6. The dispensing device for the dishwasher according to claim **5**, wherein:
- the base further has a mounting chamber and a communication port configured to communicate the guide channel with the mounting chamber,
- the liquid storage container and the pump body are mounted in the mounting chamber, and
- the transmission member passes through the communication port.

7. The dispensing device for the dishwasher according to claim **6**, further comprising a seal configured to seal a gap between the transmission member and an inner peripheral surface of the communication port.

8. The dispensing device for the dishwasher according to claim **3**, wherein the driving member comprises:
- a driving motor; and
- a connector connecting the transmission member with an output end of the driving motor,
- wherein the driving motor is configured to drive the transmission member to move via the connector.

9. The dispensing device for the dishwasher according to claim **8**, wherein:
- the connector comprises an eccentric wheel configured to be driven by the driving motor to rotate;
- the eccentric wheel has an engagement protrusion;

the transmission member has an engagement groove; and

the engagement protrusion is movable along the engagement groove to convert the rotation of the eccentric wheel into the movement of the transmission member.

10. The dispensing device for the dishwasher according to claim **9**, wherein:

the engagement groove extends along a second straight path; and

every two of a rotation axis of the eccentric wheel, the first straight path, and the second straight path are perpendicular to one another.

11. The dispensing device for the dishwasher according to claim **3**, wherein the transmission member is detachably fitted with the pump head.

12. The dispensing device for the dishwasher according to claim **1**, wherein the pump head is configured to directly dispense the liquid detergent into the washing chamber.

13. The dispensing device for the dishwasher according to claim **12**, wherein the pump head has a dispensing port configured to be in direct communication with the washing chamber.

14. The dispensing device for the dishwasher according to claim **12**, further comprising a base, the pump body being fixedly or detachably arranged on the base.

15. The dispensing device for the dishwasher according to claim **14**, wherein:

the base has a mounting chamber, a wall of the mounting chamber having a through opening; and

the pump head protrudes into the washing chamber of the dishwasher through the through opening to facilitate delivery of the liquid detergent in the liquid storage container to the washing chamber.

16. The dispensing device for the dishwasher according to claim **15**, wherein:

the pump body and the liquid storage container are integrally formed, and are detachably mounted or fixedly arranged in the mounting chamber; or

the liquid storage container is formed separately from the pump body and detachably mounted on the base,

wherein the liquid storage container is connected with the pump body when the liquid storage container is mounted on the base.

17. The dispensing device for the dishwasher according to claim **15**, wherein the base comprises:

a base body having the mounting chamber, the mounting chamber having an opening; and

a cover body configured to expose or cover the opening.

18. The dispensing device for the dishwasher according to claim **1**, wherein the pump body is fixedly or detachably connected to the liquid storage container.

19. The dispensing device for the dishwasher according to claim **17**, wherein the through opening is defined in the cover body.

20. A dishwasher comprising the dispensing device for the dishwasher according to claim **1**.

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