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(54) **DISHWASHER**

(57) Provided is a dishwasher. Adjustment of a dish rack (2) between a high position and a low position is completed under an action of a triggering member (5), an adjustment piece (3) and an adjustment support (4). The adjustment support (4) and the disk rack (2) move synchronously, the adjustment support (4) is connected with the triggering member (5), the triggering member (5) plays a role of switching, and the adjustment piece (3) itself is fixed. When the dish rack (2) is located at the high position, the triggering member (5) is propped against a limiting end (31) of the adjustment piece (3); and when the dish rack (2) needs to be lowered from the high position to the low position, the triggering member (5) needs to rotate only. At the moment, the triggering member (5) is departed from the limiting end (31). Since the dish rack (2) is located at a relatively high position, the dish rack (2) drives the adjustment support (4) and trigger member (5) to fall in presence of its own gravity at the moment. The limiting end (31) of the adjustment piece (3) is always embedded into a sliding groove (411), so that movement of the adjustment support (4) in a vertical direction is kept stable, and accordingly the stability of movement of the dish rack (2) is improved. Meanwhile, the adjustment support (4) is easy to manufacture and the sliding groove (411) is disposed thereon, accordingly the adjustment piece (3) is stabilized.

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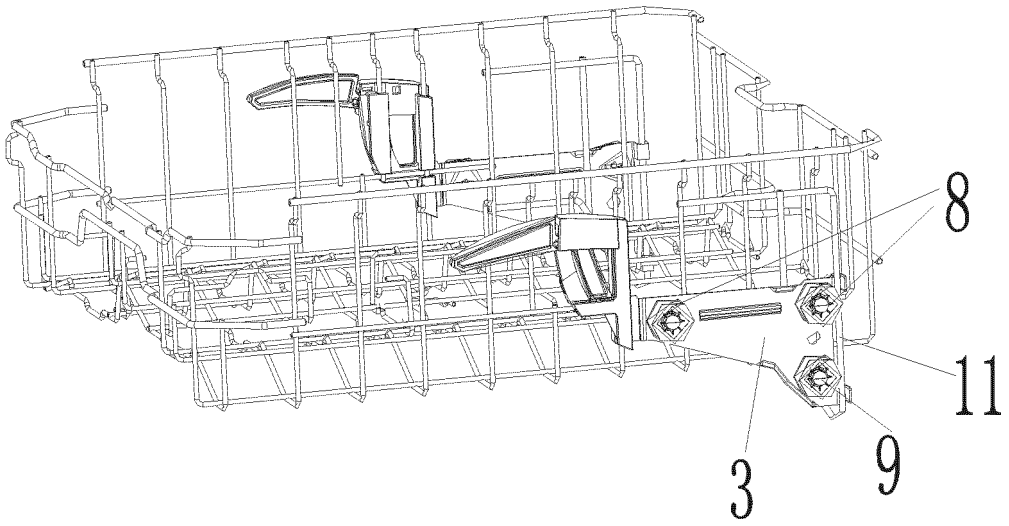

Fig. 4

Description

Cross-reference to Related Applications

[0001] The invention claims priority to Chinese Patent Application No. 201810355837.6, filed on April 19, 2018 and entitled "Dishwasher", the invention of which is hereby incorporated by reference in its entirety.

Technical Field

[0002] The invention relates to a technical field of dishwashers, and in particular to a height adjustment mechanism for the dishwasher and the dishwasher with the height adjustment mechanism.

Background

[0003] A dishwasher is a device of automatically washing a bowl, chopsticks, a plate, a dish, a knife, a fork and other tableware. The dishwasher includes a housing, a inner tub disposed in the housing and a dish rack connected with the inner tub. The used tableware, such as the bowl and the plate, is placed on the dish rack, for washing.

[0004] However, when a user places non-standard big tableware on the dish rack, the big tableware is in contact with a top of the inner tub. At the moment, the dish rack needs to be moved downwards. At the moment, if the dish rack is fixed on the inner tub, it is difficult to clean the big tableware.

[0005] Thus, a Chinese Patent Literature CN106691350A discloses an adjustment structure for a dish rack of a dishwasher. The dish rack is provided with a handle, the handle is provided with a locating member, and an inner wall of a cavity of the dishwasher is connected with a locating screw rod. The locating screw rod is presented as a zigzag. When the dish rack needs to be located at a relatively high position (high position) of the cavity of the dishwasher, the dish rack is pushed to move upwards, the locating screw rod pushes the locating member first to rotate until the locating screw rod rotates to the high position at which the locating screw rod needs to stop. The handle drives the locating member under an action of a spring to rotate toward an inner part of the locating member, and the locating member moves to an inner part of the locating screw rod. At the moment, the locating member supports the locating screw rod, as to prevent the locating screw rod from falling. When the big tableware needs to be placed into the dishwasher, that is, the dish rack is located at a relatively low position (low position) of the cavity of the dishwasher, the user manually rotates the handle. At the moment, the handle drives the locating member to rotate to a position far away from the locating screw rod. Since the locating screw rod is not limited, the dish rack falls in presence of gravity. In this way, movement from the high position to the low position is completed.

[0006] However, in the abovementioned literature, in order to realize location of a right side and a left side with the locating screw rod, the locating screw rod needs to be bent as the zigzag and other shapes, and a machining process is complicated. Meanwhile, when the dish rack moves from the low position to the high position, the locating member is always pushed upwards by the locating screw rod and extruded downwards by the spring. At the moment, the locating member easily moves relative to the locating screw rod. Once the locating member is separated from the locating screw rod, the dish rack does not move to the high position any longer.

Summary

[0007] Therefore, the technical problem to be solved in the invention is to overcome a defect that a height adjustment mechanism of a dish rack in the art known to inventors has complicated machining and is easily trapped in a failure.

[0008] To this end, some embodiments of the invention provide a dishwasher, including an inner tub, a dish rack, an adjustment piece, an adjustment support and a triggering member. The inner tub has an accommodating cavity for containing the dish rack. The dish rack moves between a high position and a low position relative to the inner tub. The adjustment piece is fixed on the inner tub, and the adjustment piece has a limiting end. The adjustment support is fixed on the dish rack, and the adjustment support has a sliding groove allowing the limiting end to be embedded. The sliding groove has a first limiting point corresponding to the high position of the dish rack, and a second limiting point corresponding to the low position of the dish rack. The triggering member is rotatably disposed on the adjustment support. The triggering member has a first status of abutting against a position above the limiting end of the adjustment piece when the adjustment support is located at the first limiting point of the sliding groove, as to keep the dish rack at the high position, and a second status of rotating and departing from the limiting end to make the adjustment support move toward the low position, so that the limiting end is in contact with the second limiting point.

[0009] In some embodiments, the adjustment support includes: a main body and a vertical mounting groove. The vertical mounting groove is connected with the main body, and the vertical mounting groove is arranged to embed into the dish rack. When the triggering member is mounted on the adjustment support, the main body and the vertical mounting groove are disposed on two sides of the triggering member.

[0010] In some embodiments, the main body is provided with a limiting groove for accommodating a rotary shaft. The triggering member is connected with the rotary shaft through a torsional spring. When the dish rack moves to the high position from the low position, the torsional spring is disposed to provide thrust force making the triggering member rotate to the position above the

limiting end.

[0011] In some embodiments, the adjustment support further includes a horizontal mounting groove disposed on the main body. When the adjustment support is mounted on the dish rack, the horizontal mounting groove is embedded into a horizontal position of the dish rack.

[0012] In some embodiments, the horizontal mounting groove and the vertical mounting groove are provided with a reverse buckle respectively. The reverse buckle is arranged to clamp a bracket mounting groove on an iron wire of the dish rack.

[0013] In some embodiments, the triggering member is an adjustment handle, and the handle includes a propping portion that is in contact with the limiting end of the adjustment support, and a pressing portion to which external force is applied.

[0014] In some embodiments, the propping portion is provided with a limiting structure. When the triggering member rotates under an action of the torsional spring, the limiting structure is able to be in contact with the main body of the adjustment support, as to prevent the propping portion from undue rotation.

[0015] In some embodiments, a side of the adjustment piece far away from the limiting end is provided with a plurality of buckles distributed along a vertical direction, and the adjustment piece is connected with the dish rack through the plurality of buckles.

[0016] In some embodiments, a side of the adjustment piece far away from the dish rack is provided with a plurality of rollers. The rollers are divided along a vertical direction, including a first roller group disposed at an upper part and a second roller group disposed at a lower part. Two horizontal beams are oppositely provided on the inner tub. Each of the two horizontal beams is disposed between the first roller group and the second roller group in a clamping manner. The dish rack is able to move horizontally in the accommodating cavity under a limitation of the two horizontal beams.

[0017] The technical solution of some embodiments of the invention has the following advantages.

1. Some embodiments of the invention provide the dishwasher. Adjustment of the dish rack between the high position and the lower position is completed in presence of the triggering member, the adjustment piece and the adjustment support. The adjustment support and the dish rack move synchronously, the adjustment support is connected with the triggering member, the triggering member plays a role of switching, and the adjustment piece itself is fixed. When the dish rack is located at the high position, the triggering member is propped against the limiting end of the adjustment piece. At the moment, the dish rack driven with the adjustment support is located at the high position as well relative to the adjustment piece. When the dish rack needs to be lowered to the low position from the high position, the triggering member needs to rotate only. At the moment, the triggering member is departed from the limiting end. Since the dish rack is located at the relatively high position, the dish rack drives the adjustment support and the triggering member to fall under its own gravity at the moment.

In some embodiments of the invention, the limiting end of the adjustment piece is always embedded into the sliding groove, so that movement of the adjustment support in a vertical direction is kept stable, and accordingly the stability of movement of the dish rack is improved.

Meanwhile, as a transition piece, the adjustment support is simple in structure and easy to manufacture, and the sliding groove is provided on the adjustment support, accordingly the adjustment piece is stabilized.

2. Some embodiments of the invention provide the dishwasher, the two sides of the triggering member are limited, thus such a disposing mode greatly improves the stability of the triggering member during rotation. In this way, the triggering member is effectively prevented from shaking relative to the limiting end of the adjustment piece, and a failure in limitation of the adjustment piece is prevented.

Brief Description of the Drawings

[0018] In order to describe the technical solution in a specific embodiment or the conventional art of the invention more clearly, the drawings required to be used in the specific embodiment or the conventional art will be simply introduced below. It is apparent that the drawings in the following descriptions are only some embodiments of the invention, and those of ordinary skill in the art further obtains other drawings according to these drawings without creative work.

Fig. 1 is a schematic diagram of assembling between a dish rack and a horizontal beam provided by the invention.

Fig. 2 is a schematic diagram of assembling between an adjustment support and a triggering member provided by the invention.

Fig. 3 is a structure diagram of an adjustment piece provided by the invention.

Fig. 4 is a schematic diagram when a dish rack in a dishwasher provided by the invention is located at a high position.

Fig. 5 is a schematic diagram when a dish rack in a dishwasher provided by the invention is located at a lower position.

Description of the following reference numbers:

[0019] 1-Inner tub; 2-Dish rack; 3-Adjustment piece; 31-Limiting end; 32-buckle; 4-Adjustment support; 41-Main body; 411-Sliding groove; 42-Vertical mounting groove; 43-Limiting groove; 44-Horizontal mounting

groove; A-First limiting point; B-Second limiting point; 5-Triggering element; 51-Propping portion; 511-Limiting structure; 52-Pressing portion; 6-Torsional spring; 7-Horizontal beam; 8-First roller group; 9-Second roller group; 10-Reverse buckle; and 11-First iron wire.

Detailed Description of the Embodiments

[0020] The technical solution of the invention will be clearly and completely described below in combination with the drawings. It is apparent that the described embodiments are not all embodiments but part of embodiments of the invention. All other embodiments obtained by those of ordinary skill in the art on the basis of the embodiments in the invention without creative work shall fall within the scope of protection of the invention.

[0021] In the descriptions of the invention, it is to be noted that orientation or position relationships indicated by terms "center", "upper", "lower", "left", "right", "vertical", "horizontal", "inner", "outer" and the like are orientation or position relationships shown in the drawings and are adopted not to indicate or imply that indicated devices or components must be in specific orientations or structured and operated in specific orientations but only to conveniently describe the invention and simplify descriptions and thus should not be understood as limits to the invention. In addition, terms "first", "second" and "third" are only adopted for description and should not be understood to indicate or imply relative importance.

[0022] In the descriptions of the invention, it is to be noted that, unless otherwise definitely specified and limited, terms "mount", "mutually connect" and "connect" should be broadly understood. For example, the terms refer to fixed connection and may also refer to detachable connection or integration. The terms may refer to mechanical connection and may also refer to electrical connection. The terms may refer to direct mutual connection, may also refer to indirect connection through a medium and may refer to communication in two components. For those of ordinary skill in the art, specific meanings of these terms in the invention are understood according to a specific condition.

[0023] In addition, the technical features involved in different embodiments of the invention described below are combined without conflicts.

Embodiment

[0024] Some embodiments provide a dishwasher. As shown in Fig. 1, an inner tub 1 is provided with an accommodating cavity for containing a dish rack, and the dish rack 2 moves between a high position and a low position relative to the inner tub.

[0025] As shown in Fig. 3, an adjustment piece 3 is fixed on the inner tub, and the adjustment piece is provided with a limiting end. An adjustment support 4 is fixed on the dish rack, and the adjustment support has a sliding groove 411 allowing the limiting end to be embedded. As shown in Fig. 2, the sliding groove has a first limiting point A corresponding to the high position of the dish rack and a second limiting point B corresponding to the low position of the dish rack.

[0026] In some embodiments, a triggering member 5 is rotatably disposed on the adjustment support, and the triggering member 5 has a first status (shown in Fig. 4) of propping against a position above the limiting end of the adjustment piece when the adjustment support is located at the first limiting point A of the sliding groove, as to keep the dish rack at the high position, and a second status (shown in Fig. 5) of rotating under an external force and departing from the limiting end to make the adjustment support move toward the low position, so that the limiting end is in contact with the second limiting point B.

[0027] In the embodiment, as shown in Fig. 2, the adjustment support includes: a main body and a vertical mounting groove 42. The vertical mounting groove 42 is connected with the main body, and the bracket mounting groove is disposed to embed into the dish rack. When the triggering member 5 is mounted on the adjustment support, the main body and the bracket mounting groove are disposed on two sides of the triggering member 5. The adjustment support further includes a horizontal mounting groove 44 disposed on the main body. When the adjustment support is mounted on the dish rack, the horizontal mounting groove 44 is embedded into a horizontal position of the dish rack.

[0028] In the embodiments, the dish rack is formed by bending an iron wire. The iron wire, when bent, forms an iron wire extending along a horizontal direction and an iron wire extending along a vertical direction. In some embodiments, the vertical mounting groove 42 will be embedded into the iron wire extending along the vertical direction, and the horizontal mounting groove 44 will be embedded into the iron wire extending along the horizontal direction.

[0029] Meanwhile, in order to realize better fixing effect, the horizontal mounting groove 44 and the vertical mounting groove 42 are provided with reserve buckles, and the reverse buckles are arranged to clamp the bracket mounting groove on the iron wire of the dish rack.

[0030] In the embodiments, since the two sides of the triggering member 5 are limited, and such a disposing mode greatly improves the stability of the triggering member during rotation, so that the triggering member 5 is effectively prevented from shaking relative to the limiting end of the adjustment piece, and a failure in limitation of the adjustment piece is prevented.

[0031] In some embodiments, a side of the adjustment piece far away from the limiting end is provided with a plurality of buckles that are arranged along a vertical direction. As shown in Fig. 4, the buckles are embedded into a first iron wire 11, in this way the adjustment piece is connected with the dish rack.

[0032] In some embodiments, the main body is provided with a limiting groove 43 arranged to accommodate a rotary shaft. The triggering member 5 is connected with

the rotary shaft through a torsional spring 6. When the dish rack moves to the high position from the low position, the torsional spring 6 is disposed to provide thrust force making the triggering member 5 rotate to the position above the limiting end.

[0033] In some embodiments, as shown in Fig. 2, one end of the torsional spring 6 is propped against the main body, and another end is propped against the triggering member 5. When the triggering member 5 rotates, the torsional spring 6 applies certain restoring force to the triggering member 5.

[0034] In some embodiments, the triggering member 5 is an adjustment handle. As shown in Fig. 2, the adjustment handle includes a propping portion that is in contact with the limiting end of the adjustment support and a pressing portion to which external force is applied.

[0035] In some embodiments, when the dish rack is in a status of the high position, a lower end of the propping portion is kept in touch with a top surface of the limiting end.

[0036] In some embodiments, as shown in Fig. 2, the propping portion is provided with a limiting structure. When the triggering member 5 rotates under an action of the torsional spring 6, the limiting structure is in contact with the main body of the adjustment support, as to prevent the propping portion from undue rotation.

[0037] In some embodiments, as shown in Fig. 1, a side of the adjustment piece far away from the dish rack is provided with a plurality of rollers. The rollers are divided along a vertical direction, the rollers includes a first roller group disposed at an upper part and a second roller group disposed at a lower part. Two horizontal beams are oppositely provided on the inner tub. The horizontal beams are disposed between the first roller group and the second roller group in a clamping manner. The dish rack moves horizontally in the accommodating cavity under a limitation of the horizontal beams. In some embodiments, the first roller group and the second roller group extend along an identical straight line respectively.

[0038] In some embodiments, the first roller group and the second roller group are clamped on an upper side and a lower side of each of the horizontal beams. When the dish rack needs to be taken out, the first roller group and the second roller group rotate relative to the each of the horizontal beams.

[0039] It is apparent that the abovementioned embodiments are merely examples listed for clear explanation and not intended to limit the embodiments. Those of ordinary skill in the art may also make other variations and modifications of different forms on the basis of the abovementioned description. All embodiments do not need to be listed one by one and can not be listed one by one herein. Obvious variations or modifications derived herefrom shall still fall within the scope of protection of the invention.

Claims

1. A dishwasher, comprising:

an inner tub (1), having an accommodating cavity;
a dish rack (2), disposed inside the accommodating cavity and capable of moving between a high position and a low position relative to the inner tub (1);
an adjustment piece (3), fixed on the inner tub (1), the adjustment piece (3) having a limiting end (31);
an adjustment support (4), fixed on the dish rack (2), the adjustment support (4) having a sliding groove (411) allowing the limiting end to be embedded, the sliding groove (411) having a first limiting point corresponding to the high position of the dish rack (2) and a second limiting point corresponding to the low position of the dish rack (2); and
a triggering member (5), rotatably disposed on the adjustment support (4), the triggering member (5) having a first status of abutting against a position above the limiting end of the adjustment piece (3) when the adjustment support (4) is located at the first limiting point of the sliding groove (41), as to keep the dish rack (2) at the high position, and a second status of rotating and departing from the limiting end (31) to make the adjustment support (4) move toward the low position, so that the limiting end is in contact with the second limiting point.

2. The dishwasher as claimed in claim 1, wherein, the adjustment support (4) comprises:

a main body (41), the sliding groove (411) being disposed on the main body (41); and
a vertical mounting groove (42), connected with the main body (41), the vertical mounting groove (42) being arranged to embed into the dish rack (2), and when the triggering member (5) is mounted on the adjustment support (4), the main body (41) and the vertical mounting groove (42) being disposed on two sides of the triggering member (5).

3. The dishwasher as claimed in claim 2, wherein, the main body (41) is provided with a limiting groove (43) for accommodating a rotary shaft; the triggering member (5) is connected with the rotary shaft through a torsional spring (6); and when the dish rack (2) moves to the high position from the low position, the torsional spring (6) is disposed to provide thrust force making the triggering member (5) rotate to the position above the limiting end (31).

4. The dishwasher as claimed in claim 2, wherein, the adjustment support (4) further comprises: a horizontal mounting groove (44), disposed on the main body (41); and when the adjustment support (4) is mounted on the dish rack (2), the horizontal mounting groove (44) is embedded into a horizontal position of the dish rack (2).

5. The dishwasher as claimed in claim 4, wherein, the horizontal mounting groove (44) and the vertical mounting groove (42) are provided with a reverse buckle (10) respectively; and the reverse buckle (10) is arranged to clamp a bracket mounting groove on an iron wire of the dish rack (2).

6. The dishwasher as claimed in claim 5, wherein, the triggering member (5) is an adjustment handle, and the adjustment handle comprises a propping portion (51) that is in contact with the limiting end of the adjustment support (4) and a pressing portion (52) to which external force is applied.

7. The dishwasher as claimed in claim 6, wherein, the propping portion (51) is provided with a limiting structure (511); and when the triggering member (5) rotates under an action of the torsional spring (6), the limiting structure (511) is able to be in contact with the main body (41) of the adjustment support (4), as to prevent the propping portion (51) from undue rotation.

8. The dishwasher as claimed in claim 1, wherein, a side of the adjustment piece (3) far away from the limiting end (31) is provided with a plurality of buckles (32) that are distributed along a vertical direction, and the adjustment piece is connected with the dish rack through the plurality of buckles (32).

9. The dishwasher as claimed in any one of claims 1-8, wherein,
a side of the adjustment piece (3) far away from the dish rack (2) is provided with a plurality of rollers; the rollers are divided along a vertical direction, comprising a first roller group (8) disposed at an upper part and a second roller group (9) disposed at a lower part;
two horizontal beams (7) are oppositely provided on the inner tub (1); each of the two horizontal beams is disposed between the first roller group and the second roller group in a clamping manner; and the dish rack (2) is able to move horizontally in the accommodating cavity under a limitation of the two horizontal beams.

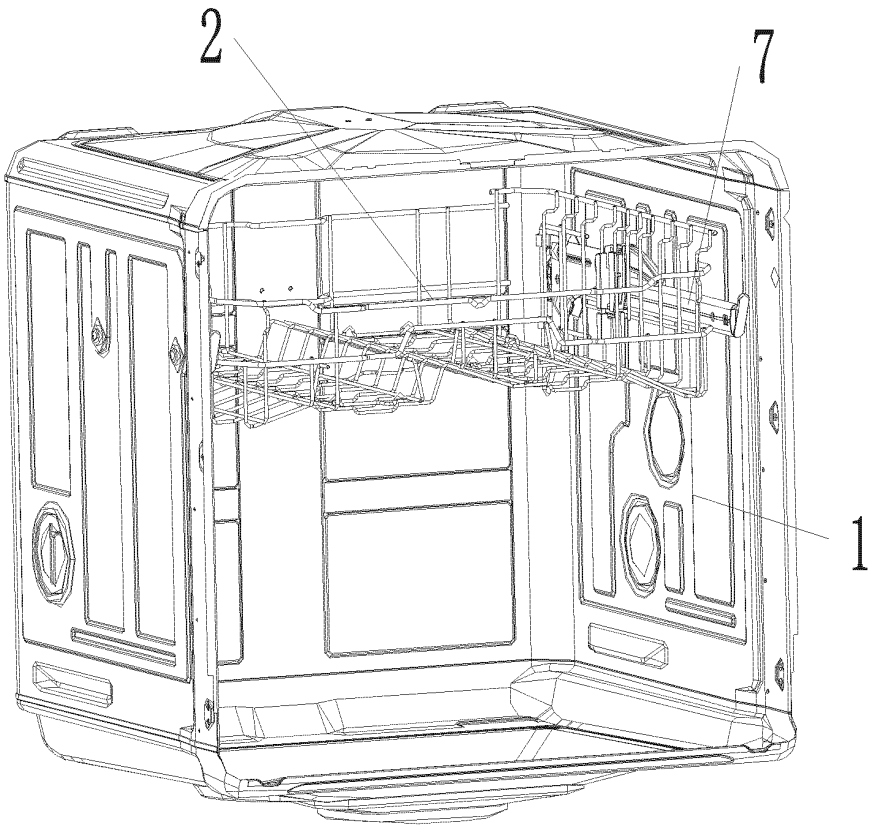

Fig. 1

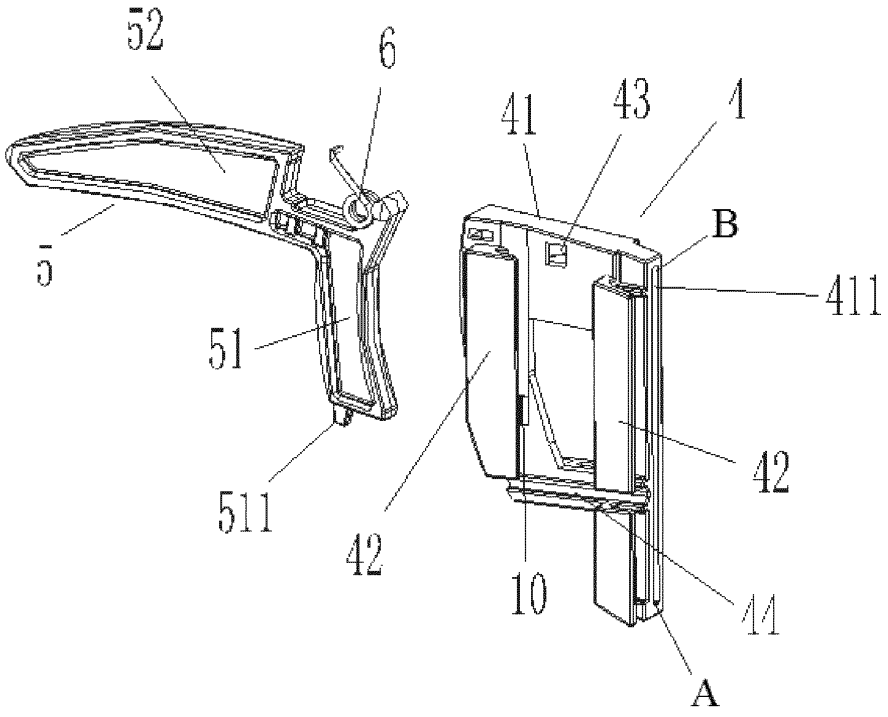

Fig. 2

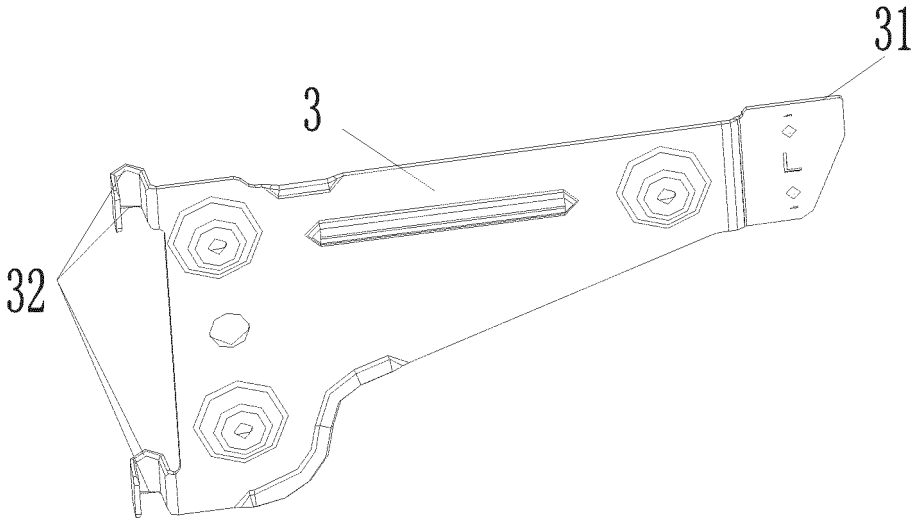

Fig. 3

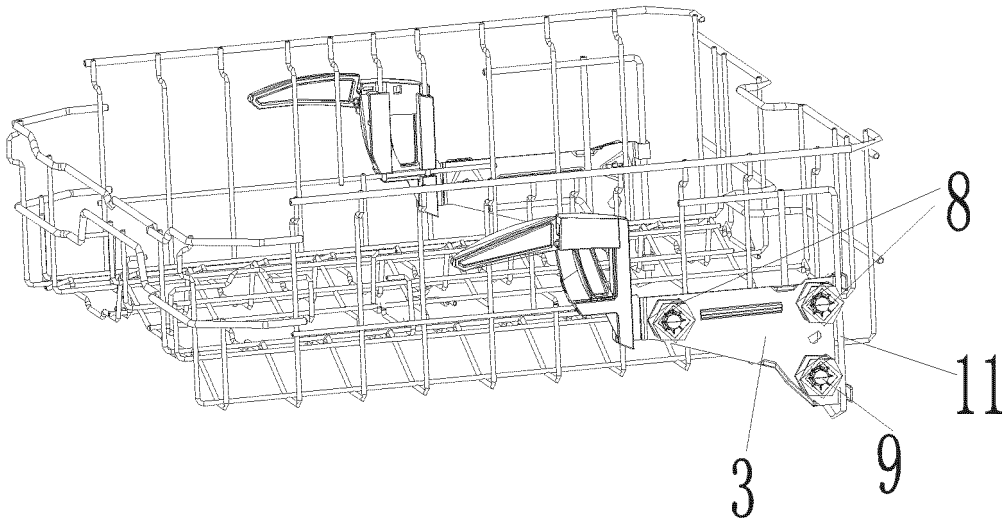

Fig. 4

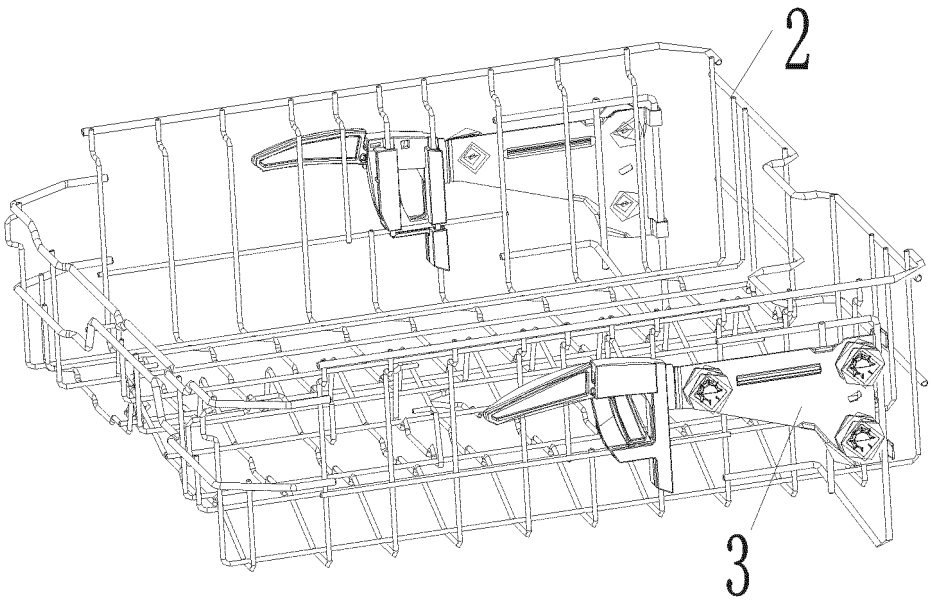

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/113647

A. CLASSIFICATION OF SUBJECT MATTER

A47L 15/50(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT; CNKI; WPI; EPODOC: 洗碗机, 洗碗, 清洁, 碗, 盘, 餐具, 篮, 腔, 调节, 调整, 支架,框架, 高低, 高度, 触发, 滑动, 槽; dish washer, dish, bowl, clean, basket, chamber, ajust, accommodate, bracket, frame, trigger, slide, groove, slot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 108338770 A (ZHUHAI GREE ELECTRIC APPLIANCES INC.) 31 July 2018 (2018-07-31) claims 1-9	1-9
A	CN 106691350 A (QINGDAO HAIER DISHWASHER CO., LTD.) 24 May 2017 (2017-05-24) description, paragraphs [0039]-[0053], and figures 1-5	1-9
A	US 2016331204 A1 (WHIRLPOOL CORPORATION) 17 November 2016 (2016-11-17) entire document	1-9
A	CN 202636870 U (GUANGDONG GALANZ GROUP CO., LTD.) 02 January 2013 (2013-01-02) entire document	1-9
A	CN 205286264 U (QINGDAO HAIER DISHWASHER CO., LTD.) 08 June 2016 (2016-06-08) entire document	1-9

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 January 2019	**31 January 2019**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/113647

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 108338770 A	31 July 2018	None	
CN 106691350 A	24 May 2017	None	
US 2016331204 A1	17 November 2016	US 10022037 B2	17 July 2018
CN 202636870 U	02 January 2013	None	
CN 205286264 U	08 June 2016	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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- CN 106691350 A **[0005]**