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(54) WATER OUTLET MECHANISM AND REFRIGERATOR HAVING WATER OUTLET MECHANISM

(57) The present invention discloses a water outlet mechanism and a refrigerator having the same. In the water outlet mechanism, the support abutting against the sealing ring is disposed; in the case that it is ensured that the check valve can be mounted in the spout inner tube, at least partial space between the sealing ring and the check valve is filled by the support, the area of the supporting surface of the sealing ring is increased, and the sealing ring is not prone to deviate from its fitting position, thereby solving the phenomenon of water overflow caused by incomplete sealing of the sealing ring.

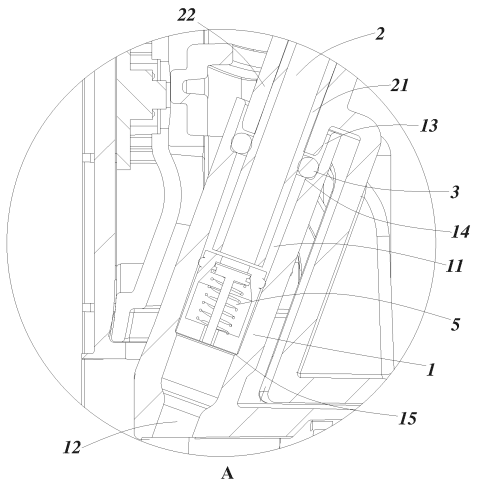

FIG. 4

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of household appliance, to a water outlet mechanism and particularly to a refrigerator having the water outlet mechanism.

BACKGROUND

[0002] A conventional refrigerator has a structural design with a function of providing iced water. As shown in FIG. 1 through FIG. 4, a spout 1 of the structure is generally prevented from water overflow by building a check value 5 in the spout 1 and by fixing a sealing ring 3. The pressure of water in a water tube 2 is controlled by turning on or off a water valve, and the opening and closing of the check valve 5 is controlled through the water pressure to achieve water supply.

[0003] Specifically, in FIG. 4, a first step 14 is formed between a fitting port 13 and a spout inner tube 11, the sealing ring 3 is disposed on a step surface of the first step 14, and the check valve 5 is disposed in the interior of the spout inner tube 11. The sealing ring 3 and other portions of the spout 1 move together from the lower left to the upper right so that the water tube 2 is inserted into the spout inner tube 11. However, since the size and structure of the check valve 5 and the space limitation of the entire spout 1 cause a bearing surface of the sealing ring 3 too small, it is very liable to occur during the mounting of the spout 1 that the water tube 2 drives the sealing ring 3 offset from the fitting position to between the first step 14 and the check valve 5, so that the sealing ring fails to function to seal, and water leakage from the position of the sealing ring 3 might occur during actual use.

SUMMARY

[0004] To solve the problems about water leakage caused by incomplete sealing in the prior art, the present invention provides a water outlet mechanism, and a refrigerator including the water outlet mechanism.

[0005] To achieve one of the above objects of the present invention, an embodiment of the present invention provides a water outlet mechanism, comprising:

a spout having a hollow spout inner tube, a water outlet formed at one end of the spout inner tube, and a fitting port formed at the other end of the spout inner tube;

a check valve which is disposed in the spout inner tube and can disengage from the spout inner tube through the fitting port;

a water tube whose end extends through the fitting port into the spout inner tube;

a sealing ring sealingly sleeved between the outside of the water tube and the inside of the spout;

a support disposed in the spout inner tube, the sealing ring abutting against a side of the support facing away from the check valve, the support extending from an inner wall of the spout inner tube towards a central axis of the spout inner tube.

[0006] As a further improvement of an embodiment of the present invention, the support is configured as a cylindrical shape, and an end of the water tube runs through the support or is located in the support.

[0007] As a further improvement of an embodiment of the present invention, a step is provided on the inner wall of the spout inner tube, and the support is at least partially disposed between the step and the sealing ring.

[0008] As a further improvement of an embodiment of the present invention, the support is configured as a T-shaped cylinder comprising a supporting portion and a flange portion, the flange portion has a circular ring shape, one side of the flange portion abuts against the step, and the other side of the flange portion abuts against the sealing ring, and the supporting portion is connected to the flange portion and extends toward the check valve and assumes a cylindrical structure.

[0009] As a further improvement of an embodiment of the present invention, the support is configured as a circular ring cylinder, one end of the circular ring cylinder abuts against the step, the other end of the circular ring cylinder abuts against the sealing ring, and a width of the circular ring of the circular ring cylinder is greater than the width of the step.

[0010] As a further improvement of an embodiment of the present invention, the support is configured as a hollow sleeve, one end of the hollow sleeve abuts against the check valve, and the other end of the hollow sleeve abuts against the sealing ring.

[0011] As a further improvement of an embodiment of the present invention, in a cross section of the water outlet mechanism, the spout inner tube is circular, an outer surface of the support is circular, and an outer diameter of the support is smaller than or equal to an inner diameter of the spout inner tube.

[0012] As a further improvement of an embodiment of the present invention, the water tube comprises a water tube body defining the end of the water tube, and an assembly terminal sleeved on the outside of the water tube body, and wherein when the end of the water tube extends through the fitting port into the spout inner tube, the assembly terminal limits the sealing ring.

[0013] To achieve one of the above objects of the present invention, an embodiment of the present invention provides a refrigerator comprising the water outlet mechanism.

[0014] As a further improvement of an embodiment of the present invention, the refrigerator comprises a dispenser that comprises the water outlet mechanism.

[0015] As compared with the prior art, the present embodiment has the following advantageous effects: in the water outlet mechanism, the support abutting against the

sealing ring is disposed; in the case that it is ensured that the check valve can be mounted in the spout inner tube, at least partial space between the sealing ring and the check valve is filled by the support, the area of the supporting surface of the sealing ring is increased, and the sealing ring is not prone to deviate from its fitting position due to the assembling of the water tube, thereby solving the phenomenon of water overflow caused by incomplete sealing of the sealing ring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is a schematic structural diagram of a conventional water outlet mechanism;
FIG. 2 is a rear view of the conventional water outlet mechanism;
FIG. 3 is a cross-sectional view of the conventional water outlet mechanism;
FIG. 4 is a partial enlarged view of the conventional water outlet mechanism at position A of FIG. 3;
FIG. 5 is a cross-sectional view of a water outlet mechanism according to Embodiment 1 of the present invention;
FIG. 6 is a partial enlarged view of position B of the water outlet mechanism according to embodiment 1 of the present invention;
FIG. 7 is a cross-sectional view of a support of the water outlet mechanism according to the first embodiment of the present invention;
FIG. 8 is a cross-sectional view of a support of a water outlet mechanism according to Embodiment 2 of the present invention;
FIG. 9 is a cross-sectional view of a support of a water outlet mechanism according to Embodiment 3 of the present invention;

[0017] Wherein: 1. a spout; 11. a spout inner tube; 12. a water outlet; 13. a fitting port; 14. a first step; 15. a second step; 2. a water tube; 21. a water tube body; 22. an assembly terminal; 3. a sealing ring; 4. a support; 4a. a T-shaped cylinder; 411. a flange portion; 412. a supporting portion;4b. a circular ring cylinder; 4c. a hollow sleeve; 5. a check valve; 6. a press button;

DETAILED DESCRIPTION

[0018] The present invention will be described in detail below in conjunction with specific embodiments shown in the figures. However, these embodiments are not intended to limit the present invention. Variations in structures, methods or functions made by those having ordinary skill in the art according to these embodiments are all comprised in the extent of protection of the present invention.

[0019] An embodiment of the present invention provides a water outlet mechanism, which may be applied to a refrigerator, that is, the present embodiment also provides a refrigerator having the water outlet mechanism. Certainly, the present embodiment is not limited thereto.

[0020] In the present embodiment, as shown in FIGS. 1 through 2 and FIGS. 5 through 9, the refrigerator comprises a dispenser, the dispenser comprises the water outlet mechanism, and the water outlet mechanism is used for supplying iced water. An iced water making device is disposed in a refrigerating chamber of the refrigerator and connected to the water outlet mechanism. The iced water making device comprises a water valve for opening/closing the water outlet mechanism.

[0021] Specifically, the water outlet mechanism comprises a spout 1, a water tube 2, a check valve 5 and a sealing ring 3. The spout 1 has a hollow spout inner tube 11, a water outlet 12 formed at one end of the spout inner tube 11, and a fitting port 13 formed at the other end of the spout inner tube 11, an end of the water tube 2 extending from the fitting port 13 through the fitting port 13 into the spout inner tube 11; the check valve 5 is disposed in the spout inner tube 11 and can disengage from the spout inner tube 11 through the fitting port 13, a second step 15 is formed in the spout inner tube 11, one end of the check valve 5 abuts against the second step 15, and the second step 15 restricts the movement of the check valve 5 toward the water outlet 12; the check valve 5 has an open state and a closed state, to control the remaining water in the water tube 2 and the spout inner tube 11 not to flow out.

[0022] The refrigerator is provided with a press button 6 which serves as a switch. The press button 6 is triggered to control the opening and closing of the water valve. The water valve controls water to flow into or out of the water tube 2. When the water valve is opened, the water pressure drives the check valve 5 to open, and water flows out of the water outlet 12 of the spout 1. When the water valve is closed, the water pressure in the water tube 2 weakens and does not suffice to open the check valve 5, the check valve 5 closes the water outlet 12, and the water in the water tube 2 and the spout inner tube 11 remains inside.

[0023] The sealing ring 3 is sealingly sleeved between the outside of the water tube 2 and the inside of the spout 1, and the sealing ring 3 restricts the water in the spout inner tube 11 from overflowing from the fitting port 13; the sealing ring 3 is elastic. While the water tube 2 is inserted through the fitting port 13 into the spout inner tube 11, the sealing ring 3 is pressed by the water tube 2 and the spout 1 to deform elastically to fill a gap between the water tube 2 and the spout inner tube 11. As shown in FIG. 5 or FIG. 6, the spout 1 moves towards the upper right as shown until the water tube 2 is inserted from the lower left into the interior of the spout inner tube 2. A direction in which the water tube 2 moves relative to the spout 1 is set as a first direction, namely, the lower left as shown. The water in the water tube 2 flows towards the lower left. The sealing ring 3 restricts the water from

overflowing towards the fitting port 13 on the upper right.

[0024] As mentioned in the BACKGROUND, it is very liable to occur during the mounting of the spout 1 that the water tube 2 drives the sealing ring 3 offset from the fitting position to between the first step 14 and the check valve 5, so that the sealing ring fails to function to seal, and water leakage from the position of the sealing ring 3 might occur during actual use.

[0025] In the present invention, the water outlet mechanism further comprises a support 4, which supports the sealing ring 3, so that the sealing ring 3 is not prone to misalignment such that water overflow is impossible. The technical solutions of the present invention will be introduced below in conjunction with three specific embodiments of the water outlet mechanism shown in the figures. The extent of protection of the present invention is not limited thereto. All improvements mentioned in the embodiments may be adaptively applied to other water outlet mechanisms.

Embodiment 1

[0026] The water outlet mechanism further comprises: a support 4 disposed in the spout inner tube 11, wherein the sealing ring 3 abuts against a side of the support 4 facing away from the check valve 5, the support 4 extends from the spout 1 towards a central axis of the spout inner tube 11, the movement of the support in the first direction is restricted, and the sealing ring 3 abuts against the support 4.

[0027] The water tube 2 comprises a water tube body 21 defining the end of the water tube 2, and an assembly terminal 22 sleeved on the outside of the water tube 2 body. When the end of the water tube 2 extends through the fitting port 13 into the spout inner tube 11, the assembly terminal 22 abuts against the sealing ring 3, and the assembly terminal 22 prevents the sealing ring 3 from moving in a direction opposite to the first direction.

[0028] The support 4 is configured as a cylindrical shape, the water tube 2 runs through the cylindrical support 4, and the cylindrical structure of the support 4 is adapted for the space in the spout inner tube 11. In general, a cross section of the spout inner tube 11 is circular. The cross-section of a surface adapted for the spout inner tube 11 is also circular. An outer diameter of the spout inner tube 11 is smaller than an inner diameter of the spout inner tube 11. If the cross section of the spout inner tube 11 is set in other shapes, the cross section of the support 4 is also made in the corresponding shapes.

[0029] A step is provided on a side wall of the spout inner tube 11, the support 4 is provided between the step and the sealing ring 3, the step is named the first step 14 in the figures, and the support 4 abuts against the first step 14.

[0030] In the present embodiment, the support 4 is configured as a T-shaped cylinder 4a. As shown in FIG. 6 or FIG. 7, the T-shaped cylinder 4a comprises a supporting portion 412 and a flange portion 411. The flange portion 411 has a circular ring shape. One side of the flange portion 411 abuts against the step, and the other side of the flange portion 411 abuts against the sealing ring 3. The supporting portion 412 is connected to the flange portion 411 and extends out of the cylinder toward the check valve 5. The supporting portion 412 is inserted into the spout inner tube 11 in the first direction until the flange portion 411 abuts the first step 14, and then the sealing ring 3 is mounted into the spout inner cylinder 11 from the fitting port 13 until the sealing ring 3 abuts the other side of the flange portion 411. The water tube 2 is inserted into the flange portion 411 and the supporting portion 412. The first step 14 restricts the movement of the T-shaped cylinder 4a in the first direction.

[0031] The flange portion 411 abuts against the first step 14. The supporting portion 412 reduces the area of the gap in the spout inner tube 11 except for the water tube 2, and restricts the movement of the support 4 in the spout inner tube 11, so that the support 4 supports itself and the sealing ring 3 more stably and meanwhile supports the water tube 2 and prevents water overflow caused by the misalignment of the support 4 and the sealing ring 3 when the water tube 2 is inserted.

[0032] Furthermore, the cross section of the flange portion 411 perpendicular to the first direction is a circular ring. A width of the circular ring of flange portion 411 is greater than a step height of the first step 14 and smaller than the width of the circular ring of the sealing ring 3; As such, the flange portion 411 can provide a larger supporting area relative to the first step 14, so that it supports the sealing ring 3 more stably. Since the sealing ring 3 is in a interference-fitted state between the water tube 2 and the spout 1 to function to support, it achieves the sealing effect. To prevent the flange portion 411 from hindering the sealing of the sealing ring 3, the width of the circular ring of the flange portion 411 is made smaller than the width of the circular ring of the sealing ring 3, which can be better implemented.

[0033] As compared with the prior art, the present embodiment has the following advantageous effects: in the water outlet mechanism, the support 4 abutting against the sealing ring 3 is disposed; in the case that it is ensured that the check valve 5 can be mounted in the spout inner tube 11, at least partial space between the sealing ring 3 and the check valve 5 is filled by the support 4, the area of the supporting surface of the sealing ring 3 is increased, and the sealing ring 3 is not prone to deviate from its fitting position due to the assembling of the water tube 2, thereby solving the phenomenon of water overflow caused by incomplete sealing of the sealing ring 3.

Embodiment 2

[0034] The difference between the present embodiment and Embodiment 1 only lies in the structure of the support 4. The difference will be described in detail below, and other portions that are the same as those in Embodiment 1 will not be detailed any more here.

[0035] In the present embodiment, the support 4 is configured as a circular ring cylinder 4b, an inner wall of the spout inner tube 11 forms the first step 14, and the circular ring tube 4b and the sealing ring 3 are sequentially inserted through the fitting port 13 into the spout inner tube 11 in the first direction until one end of the circular ring cylinder 4b abuts against the first step 14, the other end of the circular ring cylinder 4b abuts against the sealing ring 3, and the water tube 2 runs through the sealing ring 3 and the circular ring cylinder 4b.

[0036] The sealing ring 3 and the first step 14 are separated by the circular ring cylinder 4b. The circular ring cylinder 4b is not prone to deformation. That is, when the water tube 2 presses the sealing ring 3 to thereby exert a pressure on the circular ring cylinder 4b, the circular ring cylinder 4b is not deformed and pressed into between the first step 14 and the check valve 5, thereby restricting the sealing ring 3 from misalignment and thereby avoiding occurrence of the problem about overflow as stated in the BACKGROUND.

[0037] Furthermore, the width of the circular ring of the circular ring cylinder 4b is greater than the step height of the first step 14 and smaller than the width of the circular ring of the sealing ring 3. Since the width of the circular ring of the circular ring cylinder 4b is larger, the circular ring cylinder 4b provides a larger supporting area relative to the first step 14 and supports the sealing ring 3 more stably.

Embodiment 3

[0038] The difference between the present embodiment and Embodiment 1 only lies in the structure of the support 4. The difference will be described in detail below, and other portions that are the same as those in Embodiment 1 will not be detailed any more here.

[0039] In the present embodiment, the support 4 is configured as a hollow sleeve 4c. One end of the hollow sleeve 4c abuts against the check valve 5, and the other end of the hollow sleeve 4c abuts against the sealing ring 3. In the present embodiment, what supports the sealing ring 3 may be the hollow sleeve 4c. At this time, the inner wall of the spout inner tube 11 is a straight wall, the check valve 5 restricts the movement of the hollow sleeve 4c in the first direction, and the gap between the spout inner tube 11 and the water tube 2 is filled by the hollow sleeve 4c.

[0040] Furthermore, the inner wall of the spout inner tube 11 forms the first step 14; one end of the hollow sleeve 4c abutting against the sealing ring 3 is flush with the step surface of the first step 14, that is, the sealing ring 3 is jointly supported by the first step 14 and the hollow sleeve 4c; while the hollow sleeve 4c fills the spout inner tube 11, it also supports the sealing ring 3. The present embodiment has higher requirements for fitting accuracy and can also solve the technical problem to be solved by the present invention.

[0041] The detailed descriptions set forth above are merely specific illustrations of feasible embodiments of the present invention, and are not intended to limit the scope of protection of the present invention. All equivalent embodiments or modifications that do not depart from the art spirit of the present invention should fall within the scope of protection of the present invention.

Claims

1. A water outlet mechanism, wherein the mechanism comprises:

   a spout having a hollow spout inner tube, a water outlet formed at one end of the spout inner tube, and a fitting port formed at the other end of the spout inner tube;
   a check valve which is disposed in the spout inner tube and can disengage from the spout inner tube through the fitting port;
   a water tube whose end extends through the fitting port into the spout inner tube;
   a sealing ring sealingly sleeved between the outside of the water tube and the inside of the spout;
   a support disposed in the spout inner tube, the sealing ring abutting against a side of the support facing away from the check valve, the support extending from an inner wall of the spout inner tube towards a central axis of the spout inner tube.

2. The water outlet mechanism according to claim 1, wherein the support is configured as a cylindrical shape, and an end of the water tube runs through the support or is located in the support.

3. The water outlet mechanism according to claim 2, wherein a step is provided on the inner wall of the spout inner tube, and the support is at least partially disposed between the step and the sealing ring.

4. The water outlet mechanism according to claim 3, wherein the support is configured as a T-shaped cylinder comprising a supporting portion and a flange portion, the flange portion has a circular ring shape, one side of the flange portion abuts against the step, and the other side of the flange portion abuts against the sealing ring, and the supporting portion is connected to the flange portion and extends toward the check valve and assumes a cylindrical structure.

5. The water outlet mechanism according to claim 3, wherein the support is configured as a circular ring cylinder, one end of the circular ring cylinder abuts against the step, the other end of the circular ring cylinder abuts against the sealing ring, and a width of the circular ring of the circular ring cylinder is greater than the width of the step.

6. The water outlet mechanism according to claim 2, wherein the support is configured as a hollow sleeve, one end of the hollow sleeve abuts against the check valve, and the other end of the hollow sleeve abuts against the sealing ring.

7. The water outlet mechanism according to claim 2, wherein in a cross section of the water outlet mechanism, the spout inner tube is circular, an outer surface of the support is circular, and an outer diameter of the support is smaller than or equal to an inner diameter of the spout inner tube.

8. The water outlet mechanism according to claim 1, wherein the water tube comprises a water tube body defining the end of the water tube, and an assembly terminal sleeved on the outside of the water tube body, and wherein when the end of the water tube extends through the fitting port into the spout inner tube, the assembly terminal limits the sealing ring.

9. A refrigerator, wherein the refrigerator comprises the water outlet mechanism according to claim 1.

10. The refrigerator according to claim 9, wherein the refrigerator comprises a dispenser which comprises the water outlet mechanism.

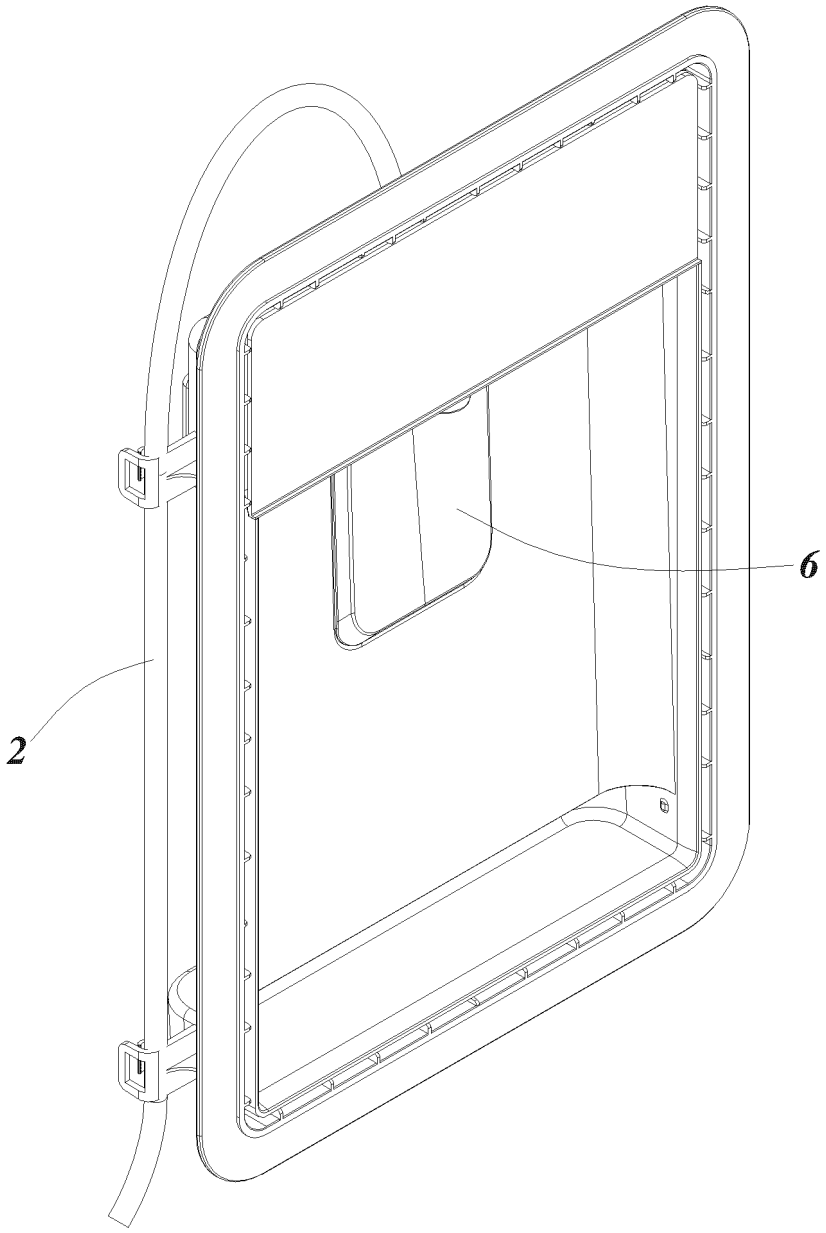


FIG. 1

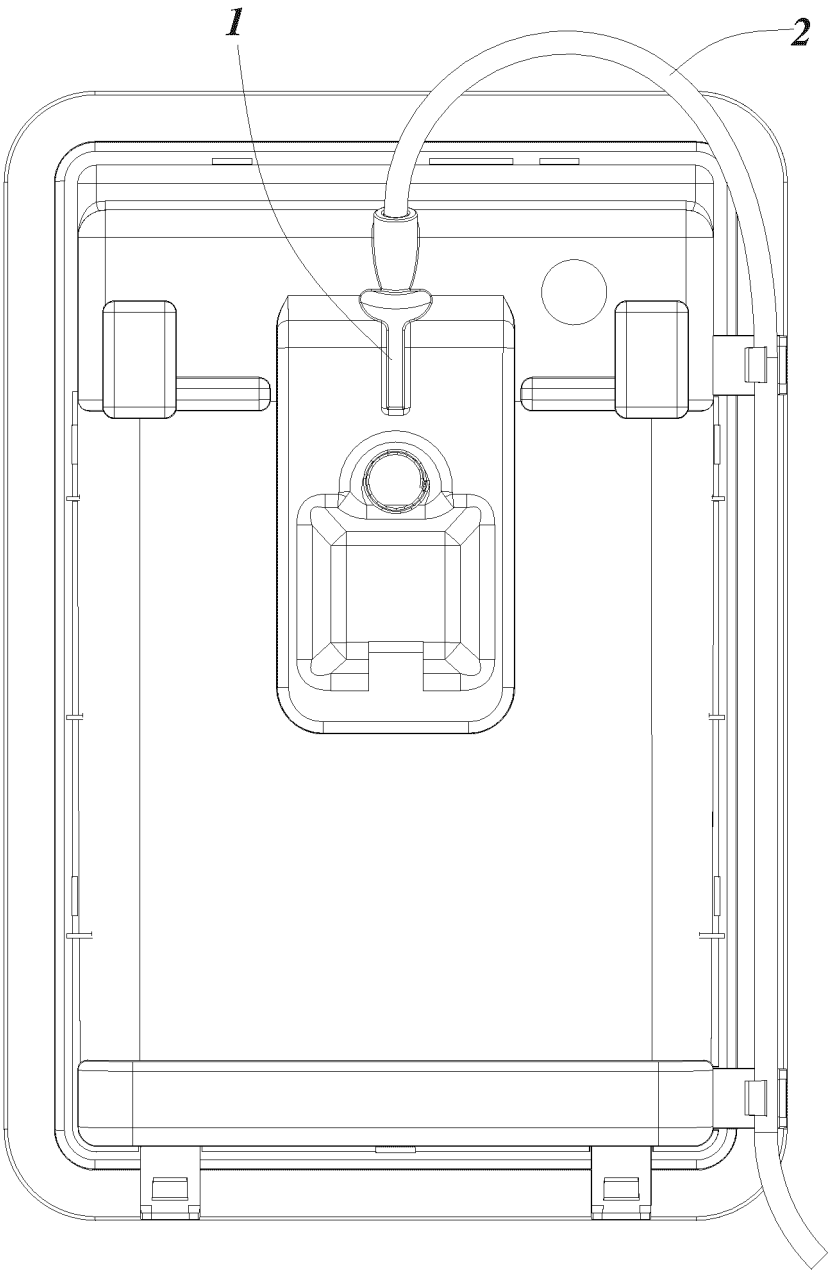


FIG. 2

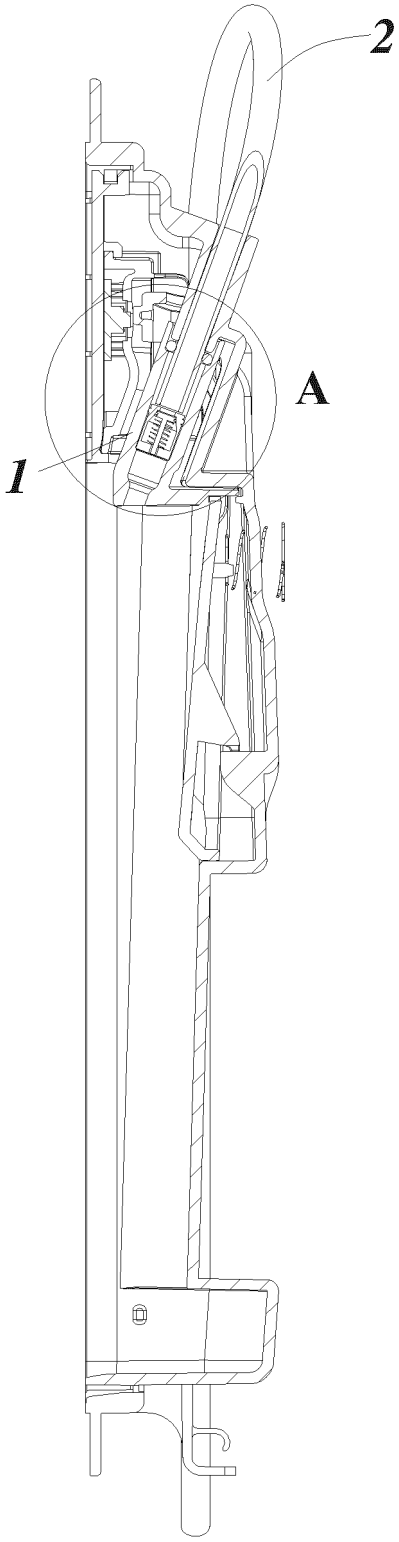


FIG. 3

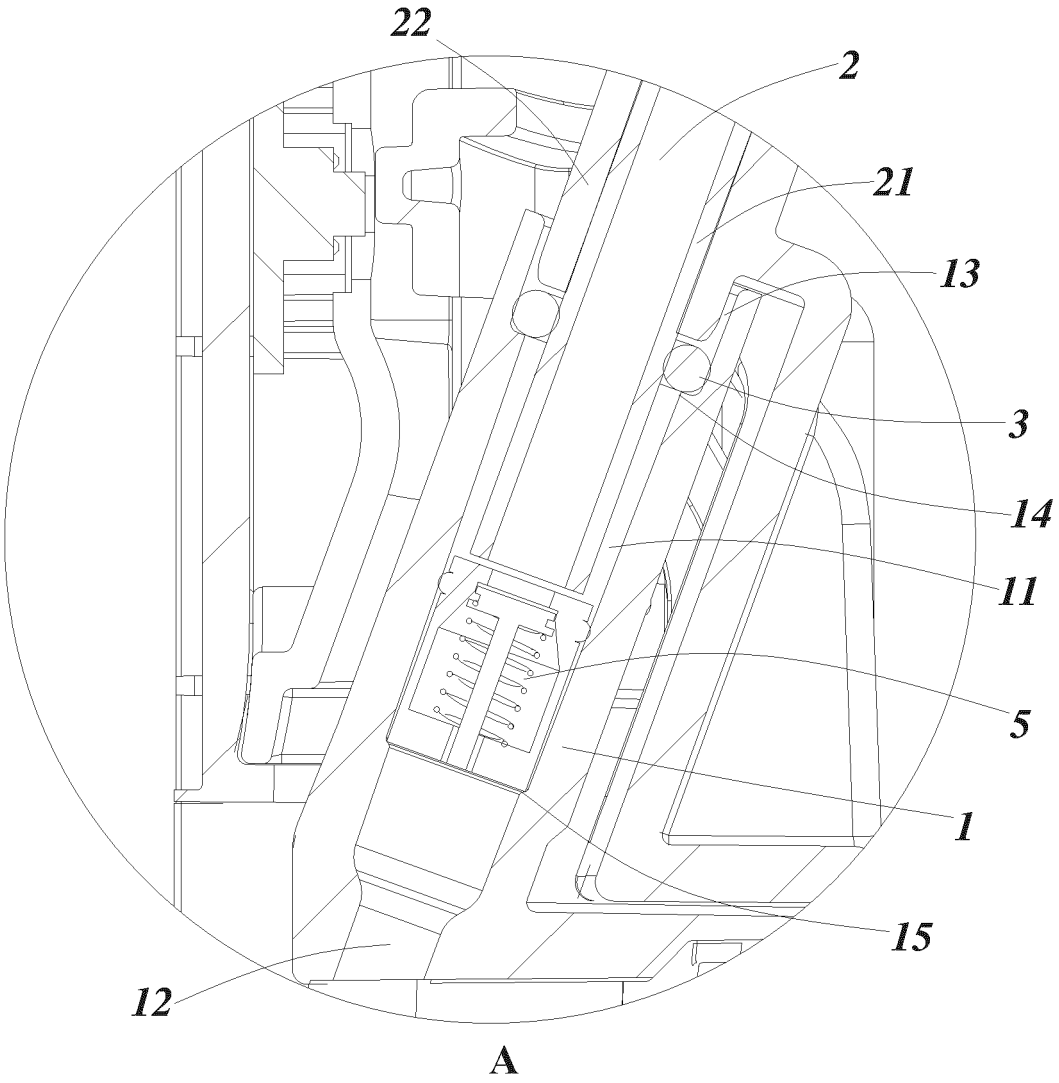


FIG. 4

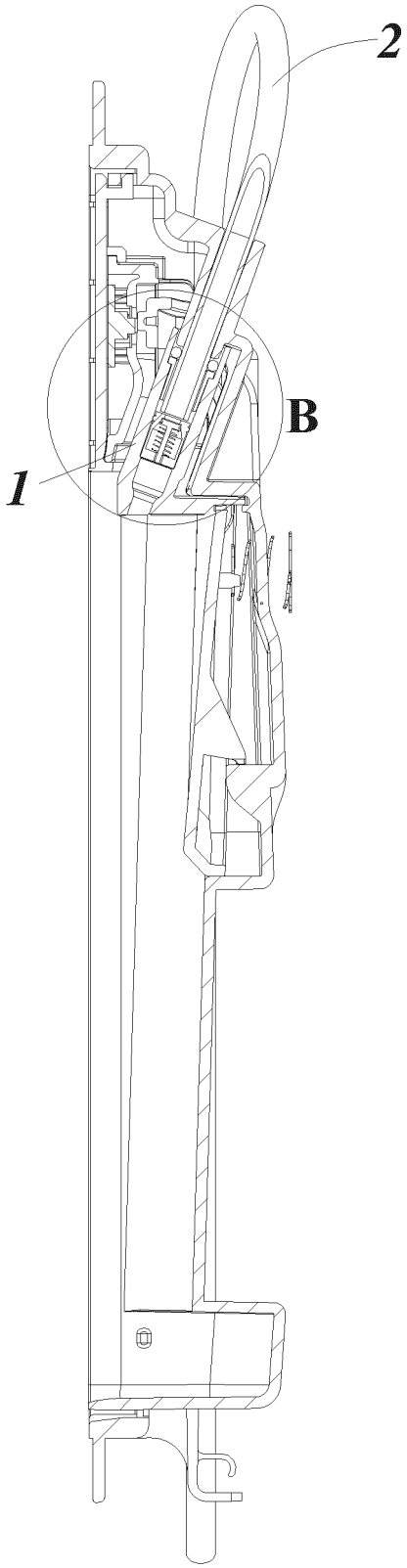


FIG. 5

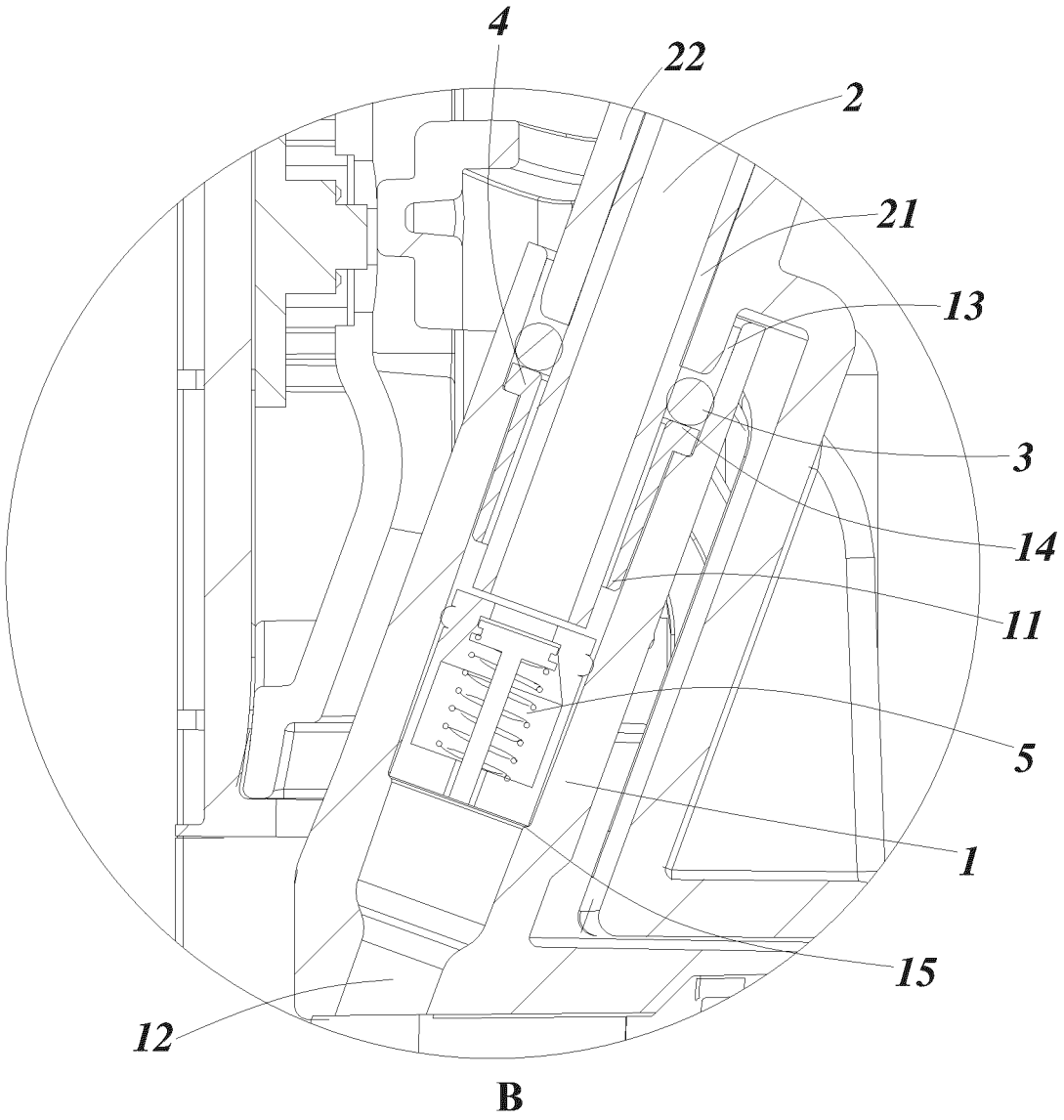
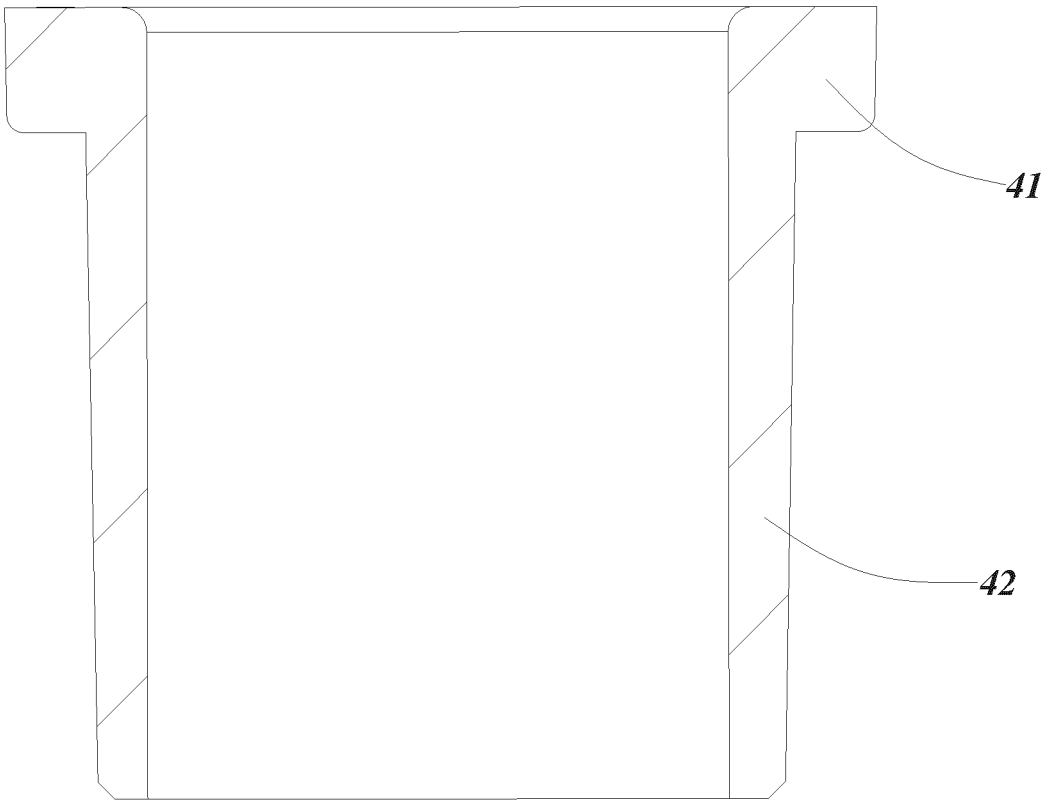
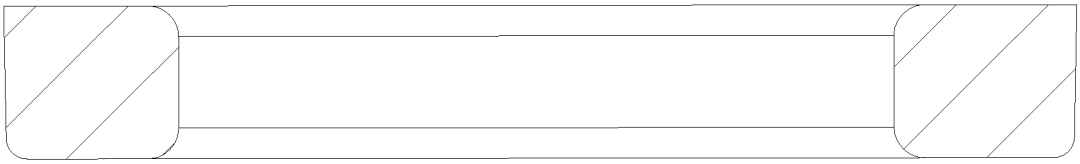


FIG. 6



4a

FIG. 7



4b

FIG. 8

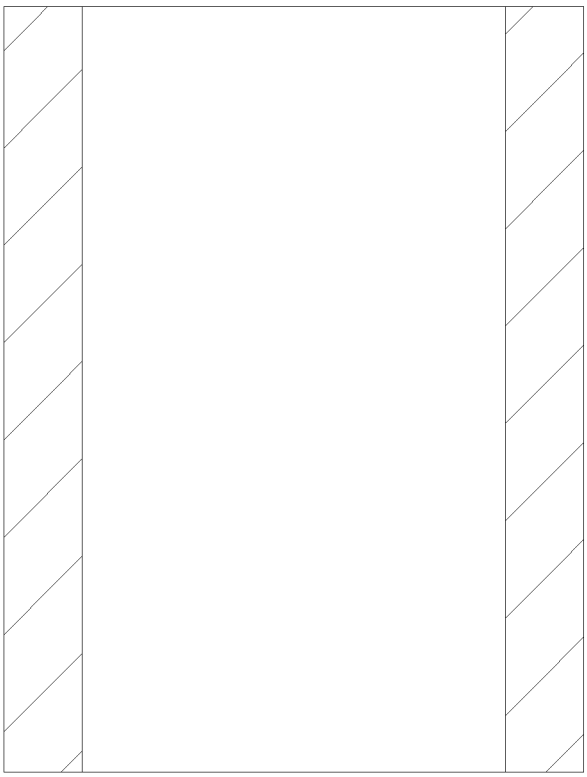


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/111177

A. CLASSIFICATION OF SUBJECT MATTER

F25D 23/12(2006.01)i; F16L 47/04(2006.01)i; F16L 19/075(2006.01)i; A47J 31/46(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)

F25D23 F16L47 F16L19 A47J31

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)

CNABS, CNTXT, CNKI, DWPI, SIPOABS: 分配器, 水嘴, 喷嘴, 接头, 管头, 逆止阀, 单向阀, 密封, dispenser, nozzle, union, joint, pipe, coupling, connection, junction, one-way, seal+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 203555598 U (NINGBO QUANJING ELECTRICAL APPLIANCE TECHNOLOGY CO., LTD.) 23 April 2014 (2014-04-23) description, paragraphs [0024]-[0031], and figures 1-6	1-10
Y	CN 2382935 Y (TIANJIN UNIVERSITY) 14 June 2000 (2000-06-14) description, page 1, and figure 1	1-10
Y	CN 204704507 U (JIN, Shaosheng et al.) 14 October 2015 (2015-10-14) description, page 2, and figures 1-3	1-10
A	WO 2007070034 A2 (CARRIER CORP et al.) 21 June 2007 (2007-06-21) entire document	1-10
A	KR 20150113574 A (LG ELECTRONICS INC.) 08 October 2015 (2015-10-08) entire document	1-10
A	US 2013233888 A1 (KIM JIN WOO et al.) 12 September 2013 (2013-09-12) entire document	1-10

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

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Date of the actual completion of the international search	Date of mailing of the international search report
06 January 2020	**17 January 2020**
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	203555598	U	23 April 2014	None			
CN	2382935	Y	14 June 2000	None			
CN	204704507	U	14 October 2015	None			
WO	2007070034	A2	21 June 2007	US	2008282724	A1	20 November 2008
				CA	2640926	A1	21 June 2007
				HK	1127519	A1	06 August 2010
				EP	1969298	B1	07 February 2018
				CN	101326419	A	17 December 2008
				CN	100585308	C	27 January 2010
				WO	2007070034	A3	06 December 2007
				AU	2005339121	A1	21 June 2007
				EP	1969298	A2	17 September 2008
				US	8973786	B2	10 March 2015
				WO	2007070034	A9	18 October 2007
KR	20150113574	A	08 October 2015	US	9726413	B2	08 August 2017
				US	2015276293	A1	01 October 2015
US	2013233888	A1	12 September 2013	WO	2011115393	A3	12 January 2012
				KR	20110103523	A	21 September 2011
				KR	101733241	B1	08 May 2017
				US	9310122	B2	12 April 2016
				WO	2011115393	A2	22 September 2011

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