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(54) ICE-MAKING ASSEMBLY AND REFRIGERATOR COMPRISING SAME

(57) The present invention provides an ice-making assembly and a refrigerator with the same. The ice-making assembly comprises an ice maker and a water injection pipe for injecting water into the ice maker, wherein the water injection pipe has at least one flow damping member protruding inward from an inner wall. The flow damping member breaks up the water when the water is fed, thereby reducing the water flow speed; and/or, the water injection pipe has at least one buffer portion protruding outward, the water flows into the buffer portion when water is injected, the water pressure is offset, so that water flowing into the ice maker is under a small pressure, and potential safety hazards such as the freezing of water droplets and short circuit caused by water splashing are avoided.

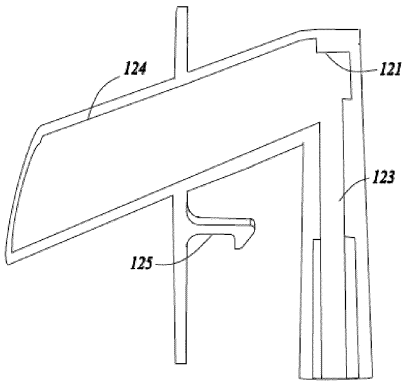


FIG. 4

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of refrigeration devices, and particularly to an ice-making assembly and a refrigerator with the same.

BACKGROUND

[0002] Currently, refrigerators are increasingly intelligent, and conventional refrigerators have functions such as automatic water intake, ice-making and supply of directly-potable water.

[0003] To achieve the above functions, water needs to be introduced from an external water source through a water pipe into a member such as an ice maker in the interior of the refrigerator. At the moment when a water valve is opened, the pressure of water in the water pipe increases suddenly due to a larger pressure of the external water source. When the water is injected into the ice maker, water droplets will splash outward to a member such as the ice maker. After long-term accumulation of water droplets, there will be potential safety hazards such as freezing of water droplets and short circuit.

[0004] Hence, it is necessary to provide an ice-making assembly and a refrigerator that prevent splashing phenomenon of water droplets when water is injected into the ice maker.

SUMMARY

[0005] To solve the above technical problems, the present invention provides an ice-making assembly and a refrigerator with the same.

[0006] The present invention provides the following technical solutions to achieve the above object:

[0007] An ice-making assembly, comprising an ice maker and a water injection pipe for injecting water into the ice maker, wherein the water injection pipe has at least one flow damping member protruding inward from an inner wall, and/or the water injection pipe has at least one buffer portion protruding outwards.

[0008] A refrigerator, wherein the refrigerator comprises the ice-making assembly according to above.

[0009] Advantageous effects of the present invention are as follows: with the flow damping member and/or buffer portion being disposed on the water injection pipe, the flow damping member breaks up the water when the water is fed, thereby reducing the water flow speed and water pressure; and/or, the water first flows into the buffer portion, the water pressure is offset, so that water flowing into the ice maker is under a small pressure, and potential safety hazards such as the freezing of water droplets and short circuit caused by water splashing are avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The following figures are used to provide further understanding of the present application and constitute a portion of the present application. Exemplary embodiments and their depictions of the present application are used to illustrate the present application and not intended for improper limitations of the present application. In the figures:

FIG. 1 is a structural schematic diagram of a refrigerator according to the present invention;

FIG. 2 is a structural schematic diagram of an ice-making assembly in FIG. 1;

FIG. 3 is a structural schematic diagram of a water injection pipe in a first embodiment of the present invention;

FIG. 4 is a cross-sectional view taken along the line A-A' in FIG. 3;

FIG. 5 is a structural schematic diagram of a water injection pipe in a second embodiment of the present invention;

FIG. 6 is a cross-sectional view taken along the line B-B' in FIG. 5;

FIG. 7 is a structural schematic diagram of a water injection pipe in a third embodiment of the present invention;

FIG. 8 is a cross-sectional view taken along the line C-C' in FIG. 7;

FIG. 9 is a structural schematic diagram of a water injection pipe in a fourth embodiment of the present invention;

FIG. 10 is a cross-sectional view taken along the line D-D' in FIG. 9;

FIG. 11 is a structural schematic diagram of a water injection pipe in a fifth embodiment of the present invention;

FIG. 12 is a cross-sectional view taken along the line E-E' in FIG. 11.

[0011] 100--refrigerator, 1--ice-making assembly, 11--ice maker, 12--water injection pipe, 121--flow damping member, 122-buffer portion, 1221--second flow damping member, 123--water inlet section, 124--diversion section, 125--snap, 126--first opening, 127 --first plug, 128--second opening, 129--second plug, 130--third opening, 131--third plug, 14--water pipe bracket, 2--ice-making compartment.

DETAILED DESCRIPTION

[0012] To make the objectives, technical solutions and advantages of the present application more apparent, technical solutions of the present application will be described clearly and completely in conjunction with specific embodiments and corresponding figures of the present application. All other embodiments obtained by those having ordinary skill in the art based on embodi-

ments in the present application without making any inventive efforts fall within the extent of protection of the present application.

[0013] As shown in FIG. 1 through FIG. 12, the present invention provides an ice-making assembly 1 comprising an ice maker 11 and a water injection pipe 12 for injecting water into the ice maker 11.

[0014] The ice maker 11 employs any one type of ice maker in the prior art, and will not be detailed any more.

[0015] The water injection pipe 12 comprises a water inlet section 123 for communicating with a water source, and a diversion section 124 located above the ice maker 11; wherein, the water source may be an external water source or an internal water tank of the refrigerator 100; The water inlet section 123 and the diversion section 124 may be one pipeline formed integrally, or two pipelines arranged separately.

[0016] In the present application, there is no clear boundary between the water inlet section 123 and the diversion section 124. For the convenience of description, the section of pipeline near the water source is referred to as the water inlet section 123, the section near the ice maker 11 is referred to as the diversion section 124, and a position where a total tendency of water flow changes is referred to as a connection of the water inlet section 123 and the diversion section 124.

[0017] In addition, a direction in which the water inlet section 123 extends is a direction in which water flows in the water inlet section 123, and a direction in which the diversion section 124 extends is a direction in which water flows in the diversion section 124.

[0018] In a type of embodiment of the present invention, referring to FIG. 1 through FIG. 8, the water injection pipe 12 further has at least one flow damping member 121 protruding inward from an inner wall. When water is fed, the flow damping member 121 breaks up partial water, and reduces the water flow speed and water pressure, so that water flowing into the ice maker 11 is under a small pressure, and potential safety hazards such as the freezing of water droplets and short circuit caused by water splashing are avoided.

[0019] The flow damping member 121 is disposed on at least one of the water inlet section 123, the connection of the water inlet section 123 and the diversion section 124, and the diversion section 124.

[0020] Specifically, in a first embodiment, as shown in FIG. 3 and FIG. 4, the flow damping member 121 is provided at the connection of the water inlet section 123 and the diversion section 124, and the flow damping member 121 is boss-shaped and breaks up water and meanwhile diverts the flow direction when the water is fed.

[0021] In a second embodiment, as shown in FIG. 5 and FIG. 6, at least two flow damping members 121 are provided at the connection of the water inlet section 123 and the diversion section 124, the at least two flow damping members 121 are wavy or zigzagged, or the at least two flow damping members 121 are disposed apart, and the flow damping members 121 are protrusions which extend away from the extension direction of the water inlet section 123, which means that the extension direction of the flow damping members 121 is substantially consistent with a direction away from the extension direction of the water inlet section 123. The flow damping members change the water flow direction while hindering the water flow and provide a better damping effect.

[0022] Furthermore, the water injection pipe 12 has a first opening 126 and a first plug 127 for sealing the first opening 126. The flow damping members 121 are provided on the first plug 127. During the processing, the water injection pipe 12 is manufactured by injection molding, and the first opening 126 is communicated with the interior and exterior of the water injection pipe 12 at the position where the flow damping members 121 are provided, so that the demolding process is smoother.

[0023] In a third embodiment, as shown in FIG. 7 and FIG. 8, the flow damping member 121 is provided at the water inlet section 123 and/or the diversion section 124. Preferably, the flow damping member 121 is in a spiral shape, buffers the water flow while guiding the water flow, and avoids the impingement noise during the buffering process; alternatively, the flow damping member 121 is in the shape of an inclined plate, which can break up the water, weaken the kinetic energy of the water flow, and play a buffering role; alternatively, the flow damping member 121 is wedge-shaped and can better change the water flow direction; alternatively, the flow damping member 121 is arcuate, can make water flow impinge upon each other and better weaken the energy of the water flow.

[0024] Further, the flow damping member 121 protrudes toward the extension direction of the water inlet section 123 and/or the diversion section 124, and provides a better buffering effect.

[0025] Alternatively, in other embodiments, at least two flow damping members 121 are provided at the water inlet section 123 and/or the diversion section 124, and the at least two flow damping members 121 are distributed offset from each other, and can weaken the kinetic energy of the water flow and function to buffer.

[0026] In another type embodiment of the present invention, referring to FIG. 7 through FIG. 12, the water injection pipe 12 further has at least one buffer portion 122 protruding outwards. When water is injected, part of the water flows into the buffer portion 122, so that most of the water pressure is offset. As such, water flowing into the ice maker 11 is under a small pressure, and potential safety hazards such as the freezing of water droplets and short circuit caused by water splashing are avoided.

[0027] The buffer portion 122 is disposed on at least one of the connection of the diversion section 124 and the water inlet section 123 or the diversion section 124, so that the buffer effect is better.

[0028] Specifically, in a fourth embodiment, as shown in FIG. 9 and FIG. 10, the buffer portion 122 is provided at the connection of the diversion section 124 and the

water inlet section 123. The buffer portion 122 extends in a direction consistent with the extension direction of the water inlet section 123, which means that the buffer portion 122 extends in a direction substantially consistent with the extension direction of the water inlet section 123. As a result, after water flows into the buffer portion 122, most of the water pressure is offset, the water flow direction changes, then water flows out of the buffer portion 122 away from the extension direction of the water inlet section 123 into the diversion section 124, and the water impinges upon the water in the water inlet section 123, thereby further reducing the water pressure.

[0029] Furthermore, an inner diameter of the buffer portion 122 is larger than an inner diameter of the water inlet section 123, so that when water flows from the water inlet section 123 into the buffer portion 122, the water pressure drops; certainly, the inner diameter of the buffer portion 122 may also not be larger than the inner diameter of the water inlet section 123, and it still can offset most of the water pressure, and the object of the present invention can also be achieved.

[0030] Further, the water injection pipe 12 further has a second opening 128 provided on the buffer portion 122 and a second plug 129 for sealing the second opening 128. During the processing, the water injection pipe 12 is processed by injection molding, demolding is not easy to achieve when the inner diameter of the buffer portion 122 is larger than the inner diameter of the water inlet section 123, and the demolding process is made smoother through the second opening 128 and the second plug 129.

[0031] Certainly, when the buffer portion 122 is disposed at the connection of the diversion section 124 and the water inlet section 123, the extension direction of the buffer portion 122 may also be set in a way that the buffer portion 122 extends in the extension direction of the water inlet section 123 as well as the extension direction of the diversion section 124; or in a way that the buffer portion 122 extends in the extension direction of the water inlet section 123 but extends away from the extension direction of the diversion section 124, so that after water flows into the buffer portion 122, most of the water pressure is offset, the water flow direction changes, and then water flows out of the buffer portion 122 into the diversion section 124.

[0032] In a fifth embodiment, referring to FIG. 7 and FIG. 8, at least one said buffer portions 122 is provided at the diversion section 124, and the buffer portion 122 protrudes outward in the extension direction of the diversion section 124 so that after the water flows into the buffer portion 122, most of the water pressure is offset, and then water flows out into the diversion section 124.

[0033] In addition, based on any of the above-mentioned types of buffer portions 122, the inner wall of the buffer portion 122 is provided with at least one inwardly-protruding second flow damping member 1221 which can break up the water, weaken the kinetic energy of the water flow and function to buffer. Reference may be made to, but not limited to FIG. 11 and FIG. 12 for the structure of the second flow damping member 1221 and its connectional relationship with the buffer portion 122.

[0034] In addition, based on any of the above-mentioned types of buffer portions 122, the connection of the buffer portion 122 and the diversion section 124 protrudes inwardly from the inner wall in a wedged shape, and can change the water flow direction to play a buffering role. Reference may be made to, but not limited to FIG. 10 and FIG. 12 for the specific structure of the buffer portion 122.

[0035] In a further type of embodiment of the present invention, referring to FIG. 7 and FIG. 8, the water injection pipe 12 has at least one said flow damping member 121 and at least one said buffer portion 122, and the buffer portion 122 is disposed apart from the flow damping member 121.

[0036] Specifically, the water injection pipe 12 further has a third opening 130 located on the buffer portion 122 and a third plug 131 for sealing the third opening 130. During the processing, the water injection pipe 12 is processed by injection molding; the buffer portion 122 protrudes outward and makes it difficult to demold; therefore, the third opening 130 is communicated with the interior and exterior of the buffer portion 122 so that the demolding process is made smoother.

[0037] The present invention further provides a refrigerator 100 including the ice-making assembly 1 as described above. As shown in FIG. 1 and FIG. 2, the refrigerator 100 comprises an ice-making compartment 2, and the ice-making assembly 1 comprises a water pipe bracket 14 disposed adjacent to the ice-making compartment 2 to prevent a foaming material from entering the ice-making compartment 2 upon foaming.

[0038] The water injection pipe 12 comprises a snap 125 capable of snap-fitting with the water pipe bracket 14 so that the water injection pipe 12 is firmly fixed.

[0039] To conclude, in the ice-making assembly 1 and the refrigerator 100 having the same in the present invention, the water injection pipe 12 has at least one flow damping member 121 protruding inward from the inner wall, and the flow damping member 121 breaks up the water when water is fed; and/or, the water injection pipe 12 has at least one buffer portion 122 protruding outwards. When water is injected, the water first flows into the buffer portion 122, the water pressure is offset, so that water flowing into the ice maker 11 is under a small pressure, and potential safety hazards such as the freezing of water droplets and short circuit caused by water splashing are avoided.

Claims

1. An ice-making assembly , comprising an ice maker and a water injection pipe for injecting water into the ice maker , wherein the water injection pipe has at least one flow damping member protruding inward

from an inner wall, and/or the water injection pipe has at least one buffer portion protruding outwards.

2. The ice-making assembly according to claim 1, wherein the flow damping member is disposed at a connection of the water inlet section and the diversion section, and the flow damping member is boss-shaped.

3. The ice-making assembly according to claim 1, wherein at least two said flow damping members are disposed at the connection of the water inlet section and the diversion section, the at least two said flow damping members are wavy or zigzagged, or the at least two said flow damping members are disposed apart, and the flow damping members are protrusions which extend away from an extension direction of the water inlet section.

4. The ice-making assembly according to claim 3, wherein the water injection pipe has a first opening and a first plug for sealing the first opening at the connection of the water inlet section and the diversion section, and the flow damping member is provided on the first plug.

5. The ice-making assembly according to claim 1, wherein the flow damping member is provided at the water inlet section and/or the diversion section, and the flow damping member is in a spiral shape or an inclined plate shape or an arcuate shape.

6. The ice-making assembly according to claim 1, wherein at least two said flow damping members are provided at the water inlet section and/or the diversion section, and the at least two said flow damping members are distributed offset from each other.

7. The ice-making assembly according to claim 1, wherein the water injection pipe comprises a water inlet section for communicating with a water source, and a diversion section located above the ice maker, the buffer portion is disposed at a connection of the diversion section and the water inlet section, the buffer portion extends in the extension direction of the water inlet section as well as the extension direction of the diversion section; or the buffer portion extends in the extension direction of the water inlet section but extends away from the extension direction of the diversion section, or the buffer portion extends in a direction consistent with the extension direction of the water inlet section.

8. The ice-making assembly according to claim 7, wherein the buffer portion extends in a direction consistent with the extension direction of the water inlet section, and an inner diameter of the buffer portion is larger than an inner diameter of the water inlet section.

9. The ice-making assembly according to claim 8, wherein the water injection pipe is further provided with a second opening disposed on the buffer portion and a second plug for sealing the second opening.

10. The ice-making assembly according to claim 1, wherein the water injection pipe comprises a water inlet section for communicating with a water source, and a diversion section located above the ice maker, at least one said buffer portion is disposed at the diversion section, and the buffer portion extends in the extension direction of the diversion section and protrudes outward.

11. The ice-making assembly according to claim 1, wherein the inner wall of the buffer portion is provided with at least one inwardly-protruding second flow damping member.

12. The ice-making assembly according to claim 1, wherein the connection of the buffer portion and the diversion section protrudes inwardly from the inner wall in a wedged shape.

13. The ice-making assembly according to claim 1, wherein the water injection pipe has at least one said flow damping member and at least one said buffer portion, and the buffer portion is disposed apart from the flow damping member.

14. The ice-making assembly according to claim 13, wherein the water injection pipe has a third opening located at the buffer portion and a third plug for sealing the third opening.

15. A refrigerator, wherein the refrigerator comprises the ice-making assembly according to claim 1.

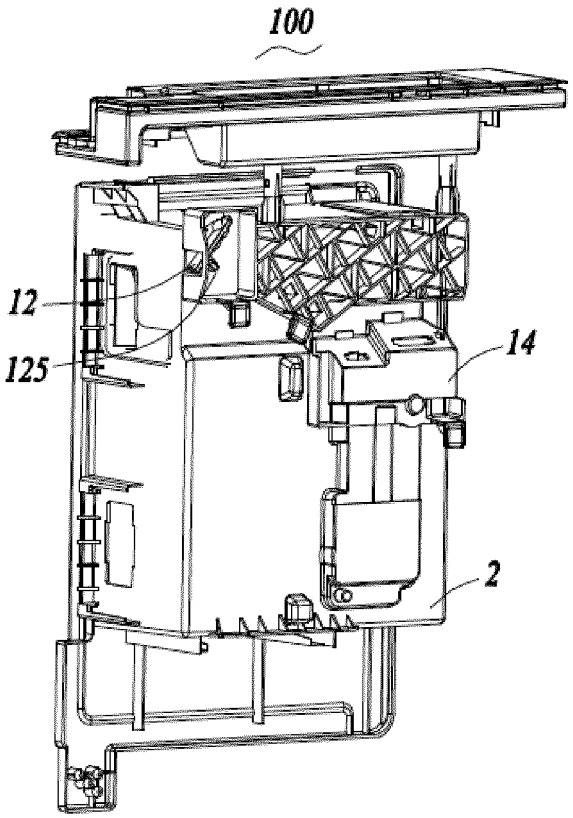


FIG. 1

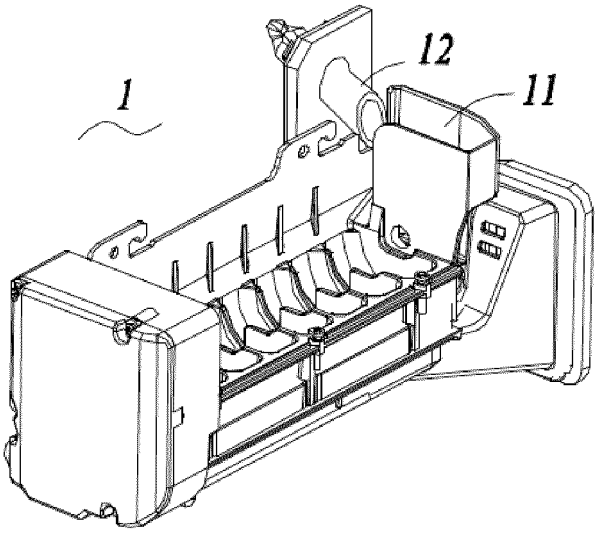


FIG. 2

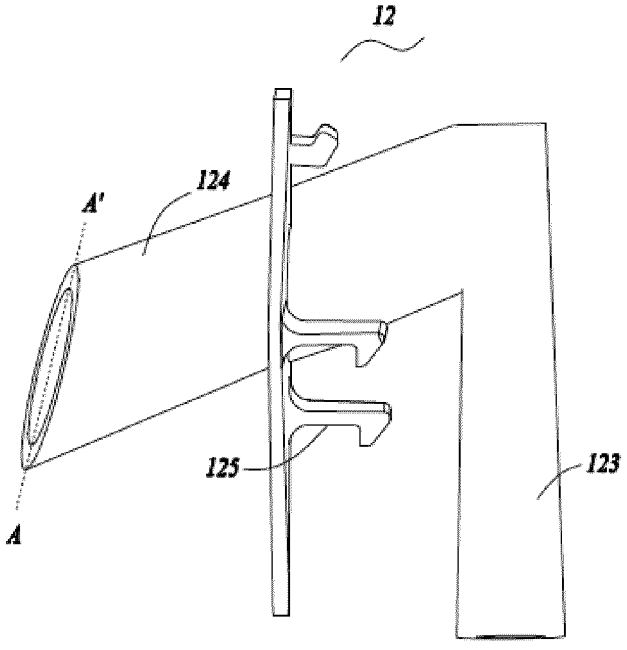


FIG. 3

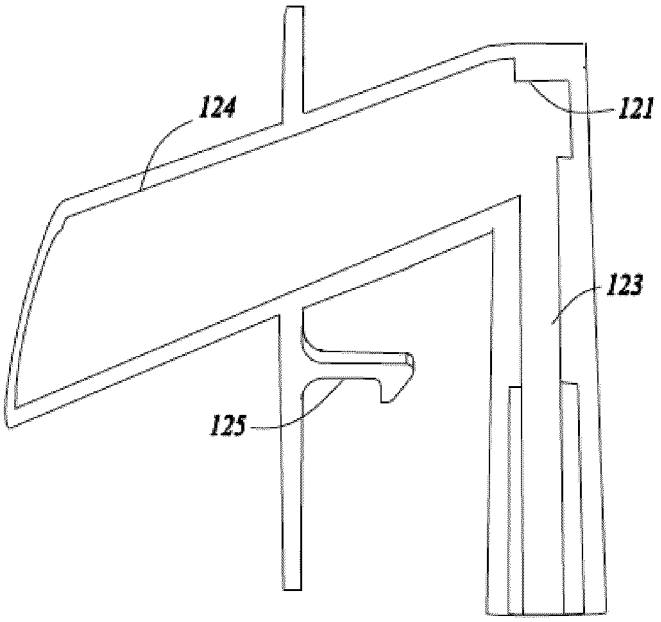


FIG. 4

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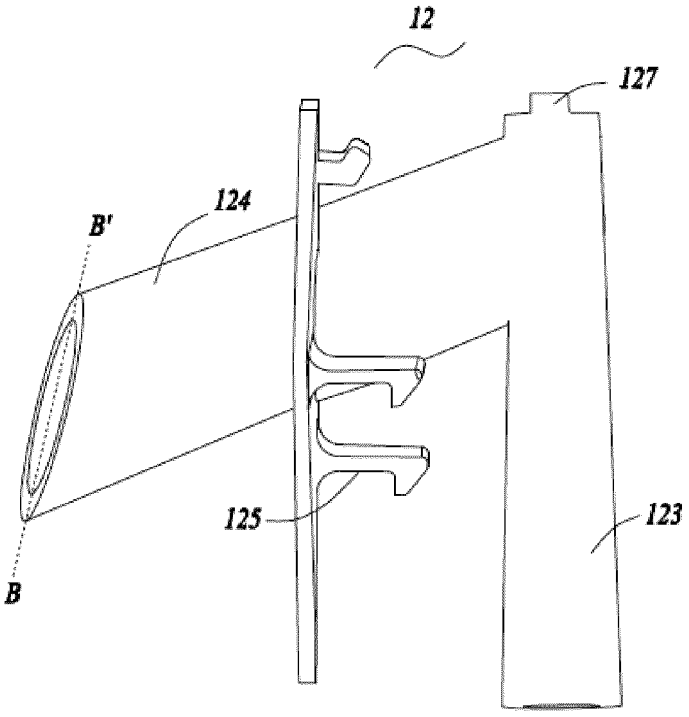


FIG. 5

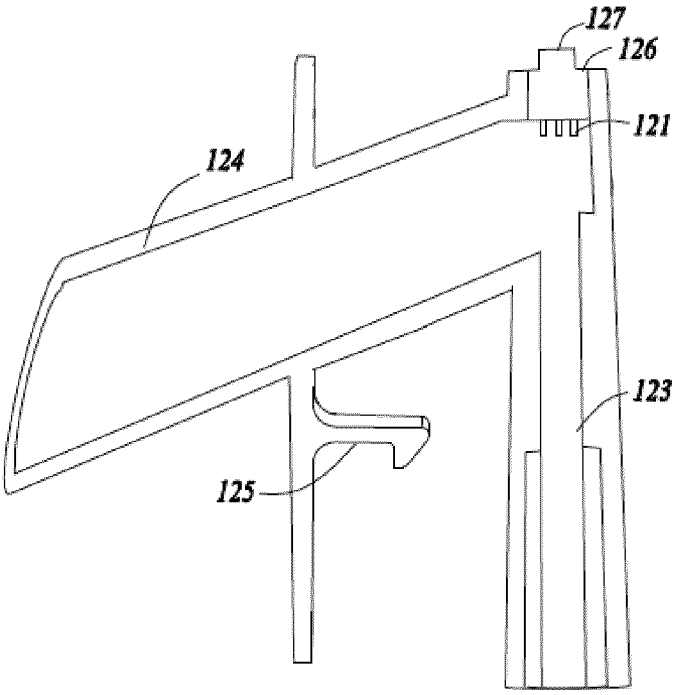


FIG. 6

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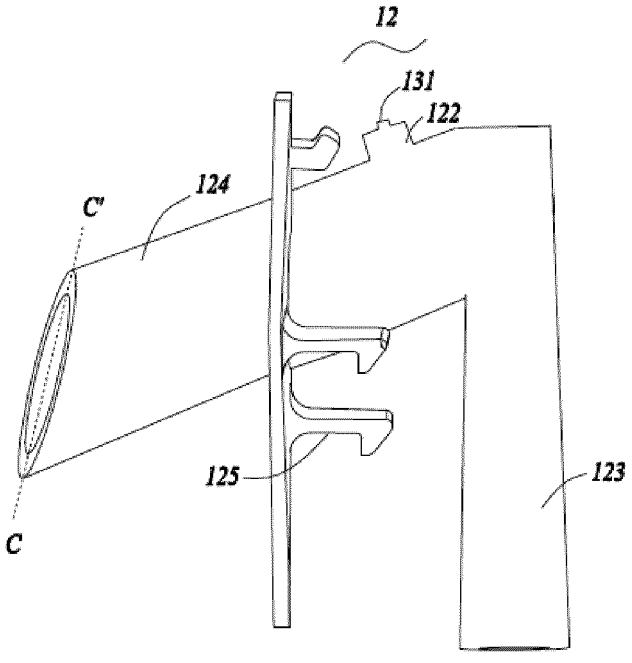


FIG. 7

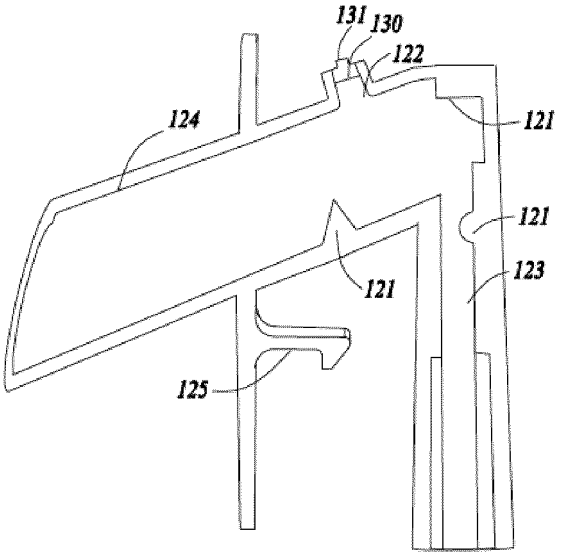


FIG. 8

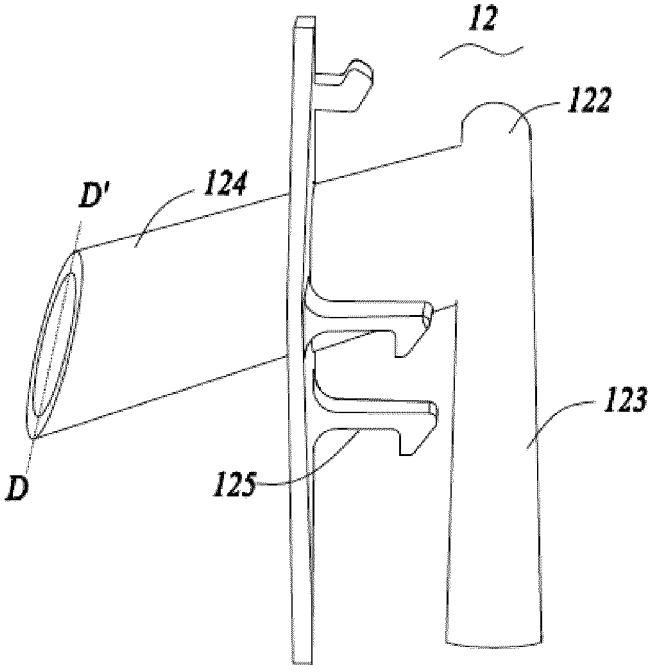


FIG. 9

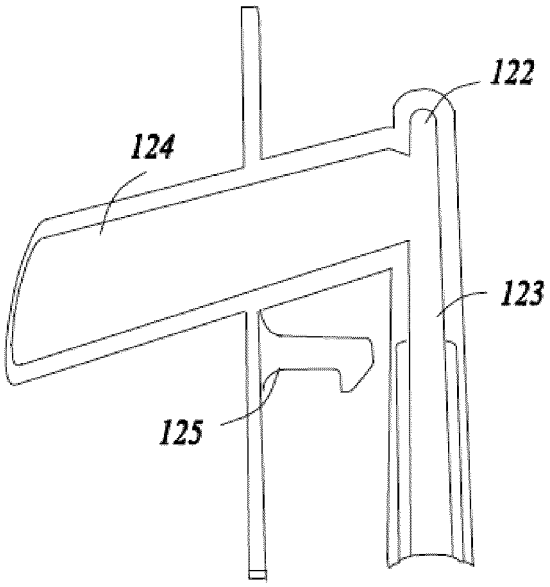


FIG. 10

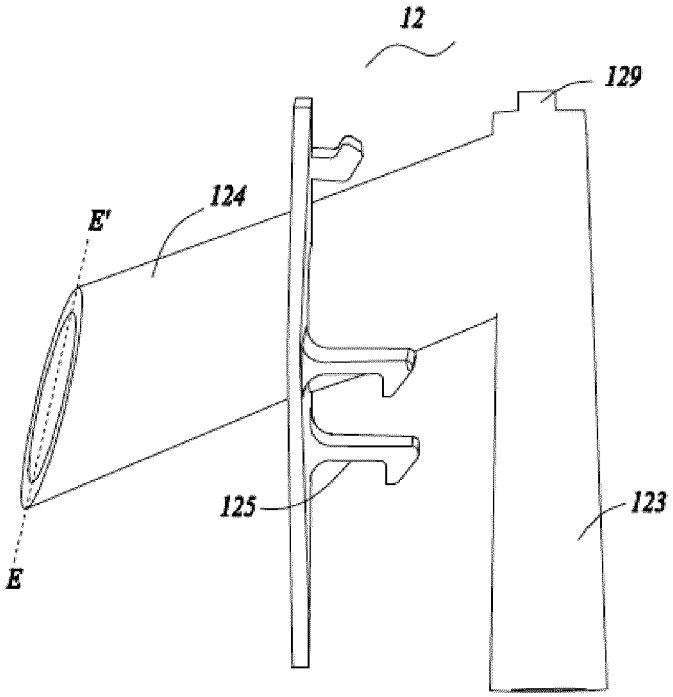


FIG. 11

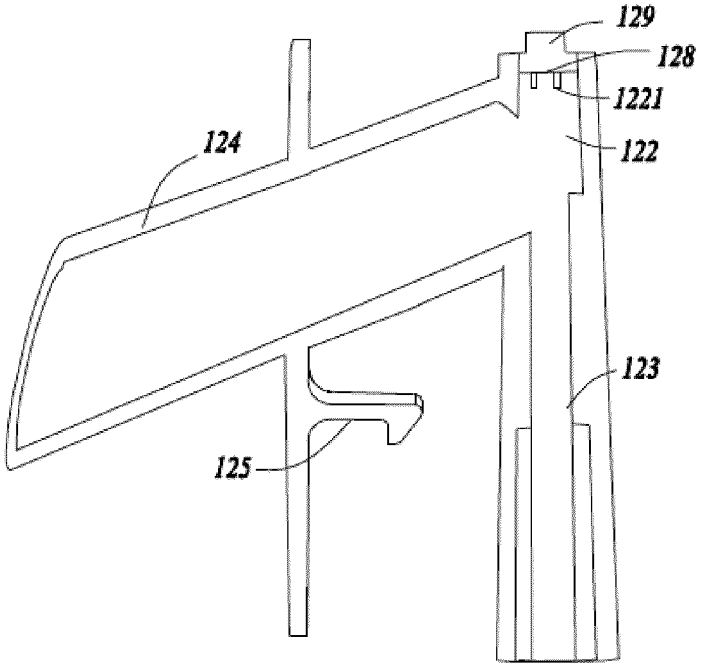


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/111183

A. CLASSIFICATION OF SUBJECT MATTER

F25C 1/22(2018.01)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)

F25C; F25D; F16L

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)

CNTXT, CNABS, CNKI, SIPOABS, DWPI: 制冰机, 注水, 进水, 喷水, 分配, 管, 缓流, 缓冲, 紊流, 压力, 均匀, icemaker, discharge, inlet, spray, inject, distribute, pipe, tube, buffer, turbulence, pressure, uniform

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 1469094 A (SAMSUNG ELECTRONICS CO., LTD.) 21 January 2004 (2004-01-21) description, pages 3-5, and figures 1-4B	1-15
Y	CN 102119309 A (HOSHIZAKI ELECTRIC CO., LTD.) 06 July 2011 (2011-07-06) description, paragraphs [0021]-[0051], and figures 1-7	1-15
A	CN 107830668 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 23 March 2018 (2018-03-23) entire document	1-15
A	CN 105333661 A (MANITOWOC FOODSERVICE COMPANIES LLC.) 17 February 2016 (2016-02-17) entire document	1-15
A	JP 07305928 A (HOSHIZAKI ELECTRIC CO., LTD.) 21 November 1995 (1995-11-21) entire document	1-15
A	US 6470701 B2 (DEKKO HEATING TECHNOLOGIES INC.) 29 October 2002 (2002-10-29) entire document	1-15

☐ 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
"E" earlier application or patent but published on or after the international filing date
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"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
12 December 2019	**20 December 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/111183

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