



(12) **EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**06.04.2022 Bulletin 2022/14**

(51) International Patent Classification (IPC):  
**F25C 1/24** <sup>(2018.01)</sup> **F25C 1/10** <sup>(2006.01)</sup>

(21) Application number: **19931469.1**

(52) Cooperative Patent Classification (CPC):  
**F25C 1/00; F25C 1/10; F25C 1/24; F25D 11/00;  
F25D 23/04; F25D 23/12**

(22) Date of filing: **07.11.2019**

(86) International application number:  
**PCT/CN2019/116170**

(87) International publication number:  
**WO 2020/238032 (03.12.2020 Gazette 2020/49)**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

(72) Inventors:  
• **DU, Qihai**  
**Qingdao, Shandong 266101 (CN)**  
• **ZHANG, Yanqing**  
**Qingdao, Shandong 266101 (CN)**  
• **ZHAO, Zhenyu**  
**Qingdao, Shandong 266101 (CN)**  
• **ZUO, Lihua**  
**Qingdao, Shandong 266101 (CN)**

(30) Priority: **24.05.2019 CN 201910439362**

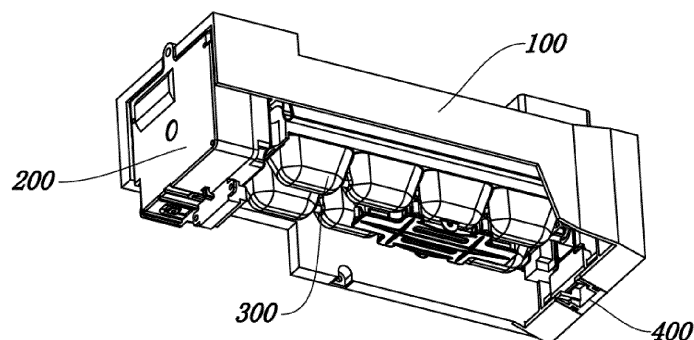
(71) Applicants:  
• **Qingdao Haier Refrigerator Co., Ltd**  
**Qingdao, Shandong 266101 (CN)**  
• **Haier Smart Home Co., Ltd.**  
**Qingdao, Shandong 266101 (CN)**

(74) Representative: **Lavoix**  
**Bayerstraße 83**  
**80335 München (DE)**

(54) **ICE MAKER AND REFRIGERATOR HAVING SAME**

(57) The present invention discloses an ice maker. The ice maker comprises an ice maker bracket (100), a driving device (200) mounted on the ice maker bracket (100), and an ice making tray (300) detachably connected with the driving device (200), wherein the ice maker

further comprises a mounting assembly (400) detachably connected with the ice maker bracket (100); a rotating shaft (310) of the ice making tray (300) is disposed in a rotation groove formed by the mounting assembly (400) and the ice maker bracket (100).



**Fig. 1**

## Description

### TECHNICAL FIELD

[0001] The present invention relates to the field of ice making apparatus and in particular to an ice maker and a refrigerator having the same.

### BACKGROUND

[0002] At present, to facilitate user's use, an automatic ice maker is disposed in many refrigerator products. As the ice makers are used longer and longer, the ice makers are all contaminated more or less, and the ice making trays become dirty. Therefore, the cleaning of the ice making trays becomes rather important. In a solution of conventional ice makers, the ice making trays are mostly not detachable. In another manner, the detachment of the ice making tray is achieved by removing the whole ice maker and then opening a locking mechanism of the ice making tray. This manner is complicated in operation and somewhat inconvenient for users.

### SUMMARY

[0003] An object of the present invention is to provide an ice maker and a refrigerator having the same.

[0004] In order to achieve the above-mentioned object, an embodiment of the present invention provides an ice maker, comprising an ice maker bracket, a driving device mounted on the ice maker bracket, and an ice making tray detachably connected with the driving device, wherein the ice maker further comprises a mounting assembly detachably connected with the ice maker bracket; a rotating shaft of the ice making tray is disposed in a rotation groove formed by the mounting assembly and the ice maker bracket.

[0005] As a further improvement of one embodiment of the present invention, the rotation groove is an annular groove, the rotation groove comprises a first groove provided on the mounting assembly and a second groove provided on the ice maker bracket, the first groove is provided with an opening facing the second groove, and a diameter of the opening is greater than the diameter of the rotating shaft of the ice making tray.

[0006] As a further improvement of one embodiment of the present invention, the mounting assembly comprises a base and a locking member rotatably connected to the base, and the first groove is disposed on the base; the ice maker bracket is provided with a bracket fitting portion, and the locking member is snap-connected with the bracket fitting portion.

[0007] As a further improvement of one embodiment of the present invention, the locking member comprises a hook portion, the bracket fitting portion comprises a first snap slot, and the hook portion is snap-connected with the first snap slot to limit the displacement of the mounting assembly in a vertical direction.

[0008] As a further improvement of one embodiment of the present invention, a second snap slot is provided on the base at a position adjacent to the first snap slot, and the locking member is snap-connected with the second snap slot.

[0009] As a further improvement of one embodiment of the present invention, an extension direction of the rotating shaft of the locking member is defined as a first direction; the locking member is provided with a limiting protrusion on both sides in the first direction, and the ice maker bracket is respectively provided with limiting portions for limiting the displacement of the limiting protrusions in the first direction.

[0010] As a further improvement of one embodiment of the present invention, when the hook portion is snap-connected with the first snap slot, and a slot edge of the first snap slot is sandwiched between the limiting protrusions and the hook portion.

[0011] As a further improvement of one embodiment of the present invention, the hook portion is provided with a recess, the first snap slot is provided with a fitting protrusion extending downward in the vertical direction, and the fitting protrusion snap-fits in the recess when the hook portion is snap-connected with the first snap slot.

[0012] As a further improvement of one embodiment of the present invention, the base is slidably connected with the ice maker bracket; one of the base or ice maker bracket is provided with a guide rail, and the other of the base or the ice maker bracket is provided with a guide bar sliding in the guide rail.

[0013] Another embodiment of the present invention provides a refrigerator, the refrigerator comprises a refrigerating compartment and a door body for opening and closing the refrigerating compartment, the door body being provided with the ice maker as mentioned above.

[0014] As compared with the prior art, in the ice maker disclosed in the present invention, the ice making tray is detachably connected with the driving device, and the rotating shaft of the ice making tray is disposed in the rotation groove formed by the mounting assembly and the ice maker bracket, so that after the mounting assembly is detached from the ice maker bracket, the ice making tray is disconnected from both the ice maker bracket and the driving device such that the user can conveniently remove the ice making tray without detaching the entire ice maker.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a schematic structural view of an ice maker according to an embodiment of the present invention;

FIG. 2 is a schematic structural view of a mounting assembly according to an embodiment of the present invention;

FIG. 3 is an exploded schematic structural view of

an ice maker according to an embodiment of the present invention;

FIG. 4 is a schematic structural view of an ice maker when the mounting assembly is detached from the ice maker according to an embodiment of the present invention;

FIG. 5 is an enlarged view of Portion A of FIG. 4;

FIG. 6 is a schematic structural view of an ice making tray according to an embodiment of the present invention.

## DETAILED DESCRIPTION

**[0016]** The present invention discloses a refrigerator, wherein the refrigerator comprises a refrigerating compartment and a door body for opening and closing the refrigerating compartment, and an ice maker is disposed on the door body.

**[0017]** As shown in FIGS. 1-6, an embodiment of the present invention discloses an ice maker. The ice maker comprises an ice maker bracket 100, a driving device 200 mounted on the ice maker bracket 100, and an ice making tray 300 detachably connected with the driving device 200. The ice maker further comprises a mounting assembly 400 detachably connected with the ice maker bracket 100. A rotating shaft 310 of the ice making tray 300 is disposed in a rotation groove formed by the mounting assembly 400 and the ice maker bracket 100.

**[0018]** In the ice maker disclosed in the present invention, the ice making tray 300 is detachably connected with the driving device 200, and the rotating shaft 310 of the ice making tray 300 is disposed in the rotation groove formed by the mounting assembly 400 and the ice maker bracket 100. In this way, after the mounting assembly 400 is detached from the ice maker bracket 100, the ice tray can be disconnected from both the ice maker bracket 100 and the driving device 200, so that the user may remove the ice making tray 300 conveniently without detaching the entire ice maker.

**[0019]** Specifically, as shown in FIG. 2 and FIG. 3, the rotation groove comprises a first groove 411 provided on the mounting assembly 400 and a second groove 110 provided on the ice maker bracket 100, and the first groove 411 is provided with an opening 4111 facing the second groove 110. Specifically, a diameter of the opening 4111 may be smaller than the diameter of the rotating shaft 310 of the ice making tray 300. At this time, the rotating shaft 310 of the ice making tray 300 is in interference fit with the second groove 110 and will not fall off after the mounting assembly 400 is detached. The rotating shaft 310 may be pulled out of the second groove 110 by applying a force downward.

**[0020]** In the embodiment of the present invention, the diameter of the opening 4111 is larger than the diameter of the rotating shaft 310 of the ice making tray 300. In this way, after the mounting assembly 400 is detached, the rotating shaft 310 may fall down from the second groove 110, and the user may detach the ice making tray

300 from the end where the rotating shaft 320 lies without applying any force.

**[0021]** Specifically, the first groove 411 and the second groove 110 are two semicircular grooves with the same diameter, so the rotation groove is an annular groove formed by a combination of two arcuate grooves. When the mounting assembly 400 is connected with the ice maker bracket 100, the rotating shaft 310 of the ice making tray 300 is sandwiched in the annular groove. Specifically, the diameter of the annular groove is slightly larger than the diameter of the rotating shaft 310 of the ice making tray 300. In this way, the rotating shaft 310 of the ice making tray 300 may freely rotate in the rotation groove, and the rotating motion of the rotating shaft 310 is relatively smooth when the ice maker removes ice.

**[0022]** Furthermore, as shown in FIG. 2, the mounting assembly 400 comprises a base 410 and a locking member 420 rotatably connected to the base 410, and the first groove 411 is disposed on the base 410. The ice maker bracket 100 is provided with a bracket fitting portion, and the locking member 420 is snap-connected with the bracket fitting portion. With the snap connection, the rotating shaft 310 of the ice making tray 300 and the ice maker bracket 100 may be connected through the mounting assembly 400. Furthermore, if necessary, the user may easily disconnect the mounting assembly 400 from the ice maker bracket 100 through the locking member 420, thereby detaching the ice making tray 300.

**[0023]** Preferably, the locking member 420 comprises a hook portion 421, the bracket fitting portion comprises a first snap slot 120, and the hook portion 421 is snap-connected with the first snap slot 120 to limit the displacement of the mounting assembly 400 in a vertical direction. The hook portion 421 is used to limit the displacement of the mounting assembly 400 in the vertical direction, so that the mounting assembly 400 will not disengage from the ice maker bracket 100 freely. The snap connection is structurally simple and convenient for the user to operate.

**[0024]** In the embodiment of the present invention, a second snap slot 412 is provided on the base 410 at a position adjacent to the first snap slot 120, and the hook portion 421 is snap-connected with the second snap slot 412. With the second snap slot 412 being provided on the base 410, the hook portion 421 is snap-connected with the second snap slot 412 while being snap-connected with the first snap slot 120, which improves the reliability of the detachable assembly 400.

**[0025]** Furthermore, the base 410 is further provided with a notch 413, which is convenient for the user to apply a force to the hook portion 421 from the notch 413 to lift the hook portion 421 to disengage the mounting assembly 400 from the ice maker bracket 100.

**[0026]** Further, a rotating shaft 422 is provided on an end of the locking member 420 far away from the hook portion 421, and the locking member 420 is rotatably connected with the base 410 through the rotating shaft 422. With the locking member 420 being rotatably connected

with the base 410, after the user lifts the hook portion 421, the locking member 420 does not need to fully disengage from the base 410, as long as the locking member 420 rotates by a certain angle.

**[0027]** An extension direction of the rotating shaft 422 of the locking member 420 is defined as a first direction. The locking member 420 is provided with a limiting protrusion 423 on both sides in the first direction, and the ice maker bracket 100 is respectively provided with limiting portions 130 for limiting the displacement of the limiting protrusions 423 in the first direction. Specifically, the limiting portions 130 may limit the displacement of the limiting protrusions 423 in the first direction. So far, the locking member 420 has limited and fixed the mounting assembly 400 in both the vertical direction and the first direction, thereby improving the connection strength between the mounting assembly 400 and the ice maker bracket 100, improving the overall strength of the ice maker bracket 100 and preventing the ice maker bracket 100 from deforming.

**[0028]** Further, when the hook portion 421 is snap-connected with the first snap slot 120, a slot edge of the first snap slot 120 is sandwiched between the limiting protrusion 423 and the hook portion 421. With the slot edge of the first snap slot 120 being sandwiched between the limiting protrusion 423 and the hook portion 421, the connection strength between the mounting assembly 400 and the ice maker bracket 100 is further reinforced.

**[0029]** Preferably, the hook portion 421 is provided with a recess 4211, and the first snap slot 120 is provided with a fitting protrusion 121 extending downward in the vertical direction. When the hook portion 120 is snap-connected with the first snap slot 120, the fitting protrusion 121 snap-fits in the recess 4211. The connection strength between the mounting assembly 400 and the ice maker bracket 100 is further improved by making the fitting protrusion 121 in the first snap slot be snap-connected with the recess 4211 of the hook portion 421.

**[0030]** In the embodiment of the present invention, the base 410 is slidably connected with the ice maker bracket 100; one of the base or the bracket is provided with a guide rail, and the other of the base or the bracket is provided with a guide bar sliding in the guide rail.

**[0031]** In the embodiment of the present invention, referring to FIGS. 2-5, the ice maker bracket 100 is provided with a guide bar 140, and the base 410 is provided with a guide rail 414. The size of the guide bar 140 is adapted to the size of the guide rail 414 so that the guide bar 140 may slide in the guide rail 414. Specifically, an inner width of the guide rail 414 may be slightly larger than an outer width of the guide bar 140 so that the guide bar 140 may slide smoothly in the guide rail 414. With the simple mating of the guide bar 140 and the guide rail 414, the mounting assembly 400 may be conveniently slidably connected with the ice maker bracket 100. In another embodiment, the guide bar may be provided on the base and the guide rail be provided on the bracket.

**[0032]** Preferably, specifically, the driving device 200

comprises a driving shaft 210 and a motor connected with the driving shaft 210. After the ice maker completes ice making, the motor may drive the driving shaft 210 to rotate, which in turn drives the ice making tray 300 to rotate. The rotating shaft 310 of the ice making tray 300 does not rotate any more after rotating by a certain angle, so that the ice making tray 300 turns to make ice cubes separate from the ice making tray 300.

**[0033]** The other end of the ice making tray 300 opposite to the rotating shaft 310 of the ice making tray 300 is provided with a fitting portion which is detachably connected with the driving shaft 210. Specifically, as shown in FIG. 6, the fitting portion is an insertion slot 320. When the ice making tray 300 is mounted, the insertion slot 320 is made align with the driving shaft 210 and part of the driving shaft 210 is inserted into the insertion slot 320 so that the ice making tray 300 is sleeved on the driving shaft 210. With the fitting structure being set as the insertion slot 320, the structure for connecting the insertion slot 320 with the driving shaft 210 is simple and the user's operation is also facilitated. In the embodiment of the present invention, the size of the insertion slot 320 is adapted to the size of the driving shaft 210. Specifically, the size of the insertion slot 320 may be larger than the size of the driving shaft 210, which facilitates the user's mounting or detaching operation. After the mounting assembly 400 is disengaged from the ice maker bracket 100, the insertion slot 320 of the ice making tray 300 is disconnected from the driving shaft 210, so that the entire ice making tray 300 may be removed.

**[0034]** The process of mounting the ice making tray 300 on and detaching the ice making tray 300 from the ice maker will be described below in detail. During the mounting of the ice making tray 100, first, the insertion slot 320 of the ice making tray 100 is made align with the driving shaft 210 and the driving shaft 210 is inserted into the insertion slot 320, and then the driving shaft 310 is moved upward to align with the second groove 110 on the ice maker bracket 100. Then, the guide rail 414 on the base 410 in the mounting assembly 400 is made align with the guide bar 140 on the ice maker bracket 100 so that the base 410 and the ice maker bracket 100 are slidably connected until the first groove 411 on the base 410 aligns with the second groove 110, and the rotating shaft 310 of the ice making tray 300 snap-fits into the first groove 411 from the opening 4111. Finally, the hook portion 421 on the locking member 420 is snap-connected with the first snap slot 120 on the ice maker bracket 100 and the second snap slot 412 on the base 410, and the fitting protrusion 121 on the first snap slot 120 snap-fits into the recess 4211 of the hook portion 421. At the same time, the limiting portions 130 are also adjacent to the limiting protrusions 423 and limit the displacement of the limiting protrusions 423 in the first direction. So far, the mounting of the ice making tray 300 is completed. If the user needs to detach the ice making tray 300 for cleaning or replacement, the hook portion 421 may be lifted directly from the notch 413 to disconnect it from the first

snap slot 120 and the second snap slot 412. Next, the base 410 is slid down in the vertical direction to disengage the guide rail 414 of the base 410 from the guide bar 140 on the ice maker bracket 100, so that the mounting assembly 400 is entirely detached. Finally, one end of the ice making tray 300 where the rotating shaft 310 lies is moved downward, the insertion slot 320 at the opposite other end of the ice making tray 100 may also be disconnected from the driving shaft 210, so that the ice making tray 300 may be removed.

**[0035]** In the ice maker disclosed in the present invention, the ice making tray is detachably connected with the driving device, and the rotating shaft of the ice making tray is disposed in the rotation groove formed by the mounting assembly and the ice maker bracket, so that after the mounting assembly is detached from the ice maker bracket, the ice making tray is disconnected from both the ice maker bracket and the driving device such that the user can conveniently remove the ice making tray without detaching the entire ice maker. The rotation groove comprises the first groove provided on the mounting assembly and the second groove provided on the ice maker bracket, the first groove is provided with the opening facing the second groove, and the diameter of the opening is larger than the diameter of the rotating shaft of the ice making tray. As such, after the mounting assembly is detached, the rotating shaft may fall down from the second groove, and the user may detach the ice making tray from the end where the rotating shaft lies without applying a force. The diameter of the rotation groove is slightly larger than the diameter of the rotating shaft of the ice making tray. In this way, the rotating shaft of the ice making tray may freely rotate in the rotation groove, and the rotating motion of the rotating shaft is relatively smooth when the ice maker removes ice. The hook portion is used to limit the displacement of the mounting assembly in the vertical direction, so that the mounting assembly will not disengage from the ice maker bracket freely. The second snap slot is provided on the base so that the hook portion is snap-connected with the second snap slot while being snap-connected with the first snap slot, which improves the reliability of the detachable assembly. The limiting protrusions fit with the limiting portions to limit the displacement of the mounting assembly in the first direction. So far, the locking member has limited and fixed the mounting assembly in both the vertical direction and the first direction, thereby improving the connection strength between the mounting assembly and the ice maker bracket, improving the overall strength of the ice maker bracket and preventing the ice maker bracket from deforming. With the simple mating of the guide bar and the guide rail, the mounting assembly may be conveniently slidably connected with the ice maker bracket. In another embodiment, the guide bar may be provided on the base and the guide rail be provided on the bracket. The insertion slot is provided at the other end of the ice making tray opposite to the rotating shaft of the ice making tray, and the size of the insertion slot

may be larger than the size of the driving shaft, which facilitates the user's mounting or detaching operation. After the mounting assembly is disengaged from the ice maker bracket, the insertion slot of the ice making tray is disconnected from the driving shaft, so that the entire ice making tray may be removed.

## Claims

1. An ice maker, comprising an ice maker bracket, a driving device mounted on the ice maker bracket, and an ice making tray detachably connected with the driving device, wherein the ice maker further comprises a mounting assembly detachably connected with the ice maker bracket; a rotating shaft of the ice making tray is disposed in a rotation groove formed by the mounting assembly and the ice maker bracket.
2. The ice maker according to claim 1, wherein the rotation groove is an annular groove, the rotation groove comprises a first groove provided on the mounting assembly and a second groove provided on the ice maker bracket, the first groove is provided with an opening facing the second groove, and a diameter of the opening is greater than the diameter of the rotating shaft of the ice making tray.
3. The ice maker according to claim 1, wherein the mounting assembly comprises a base and a locking member rotatably connected to the base, and the first groove is disposed on the base; the ice maker bracket is provided with a bracket fitting portion, and the locking member is snap-connected with the bracket fitting portion.
4. The ice maker according to claim 3, wherein the locking member comprises a hook portion, the bracket fitting portion comprises a first snap slot, and the hook portion is snap-connected with the first snap slot to limit the displacement of the mounting assembly in a vertical direction.
5. The ice maker according to claim 3, wherein a second snap slot is provided on the base at a position adjacent to the first snap slot, and the locking member is snap-connected with the second snap slot.
6. The ice maker according to claim 4, wherein an extension direction of the rotating shaft of the locking member is defined as a first direction; the locking member is provided with a limiting protrusion on both sides in the first direction, and the ice maker bracket is respectively provided with limiting portions for limiting the displacement of the limiting protrusions in the first direction.

7. The ice maker according to claim 6, wherein when the hook portion is snap-connected with the first snap slot, and a slot edge of the first snap slot is sandwiched between the limiting protrusions and the hook portion. 5
8. The ice maker according to claim 4, wherein the hook portion is provided with a recess, the first snap slot is provided with a fitting protrusion extending downward in the vertical direction, and the fitting protrusion snap-fits in the recess when the hook portion is snap-connected with the first snap slot. 10
9. The ice maker according to claim 4, wherein the base is slidably connected with the ice maker bracket; one of the base or ice maker bracket is provided with a guide rail, and the other of the base or the ice maker bracket is provided with a guide bar sliding in the guide rail. 15  
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10. A refrigerator, wherein the refrigerator comprises a refrigerating compartment and a door body for opening and closing the refrigerating compartment, the door body being provided with the ice maker according to claim 1. 25

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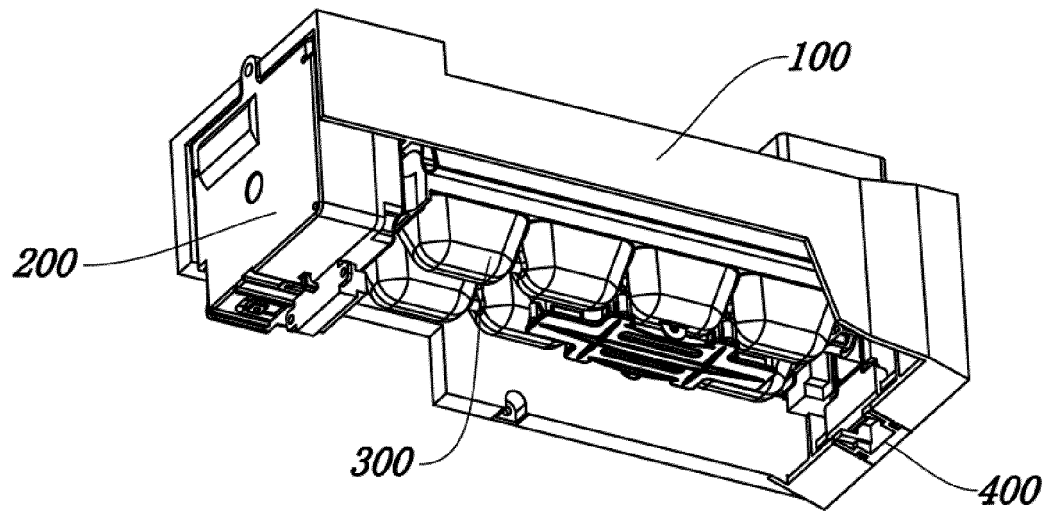


Fig. 1

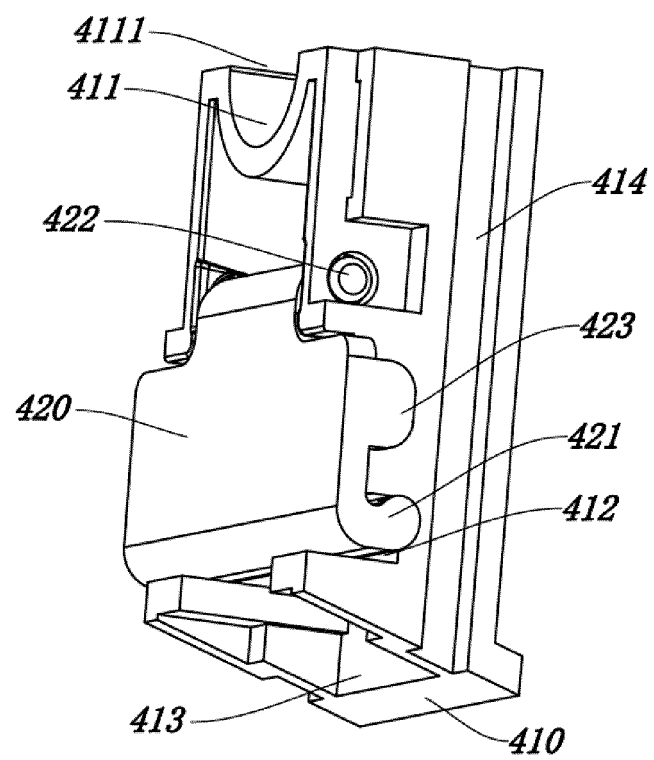


Fig. 2

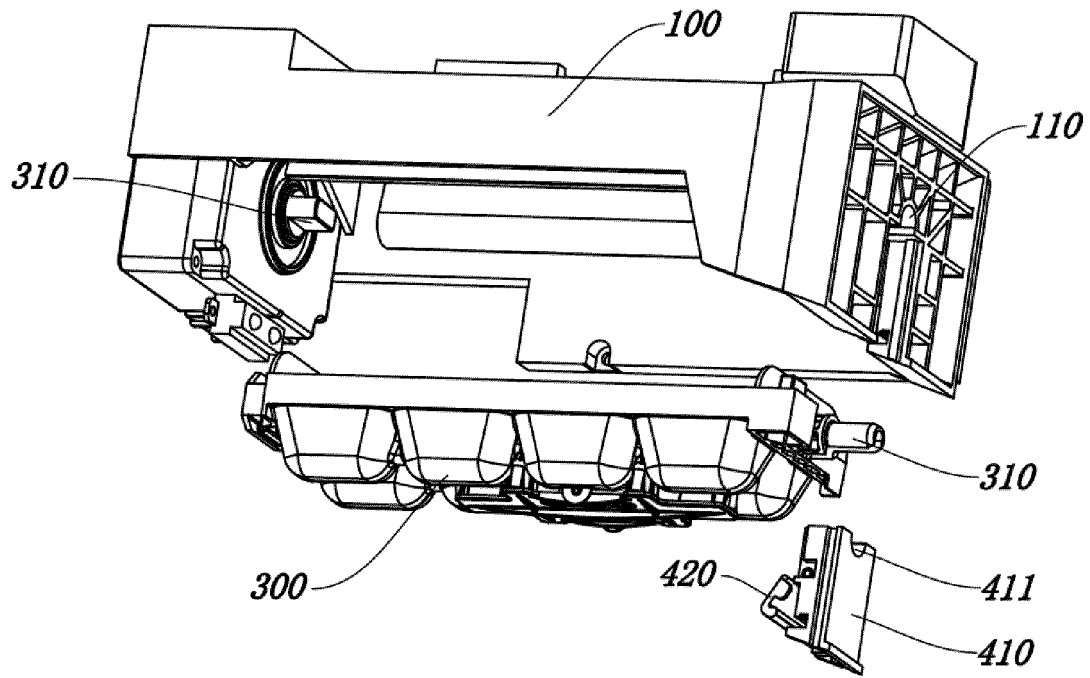


Fig.3

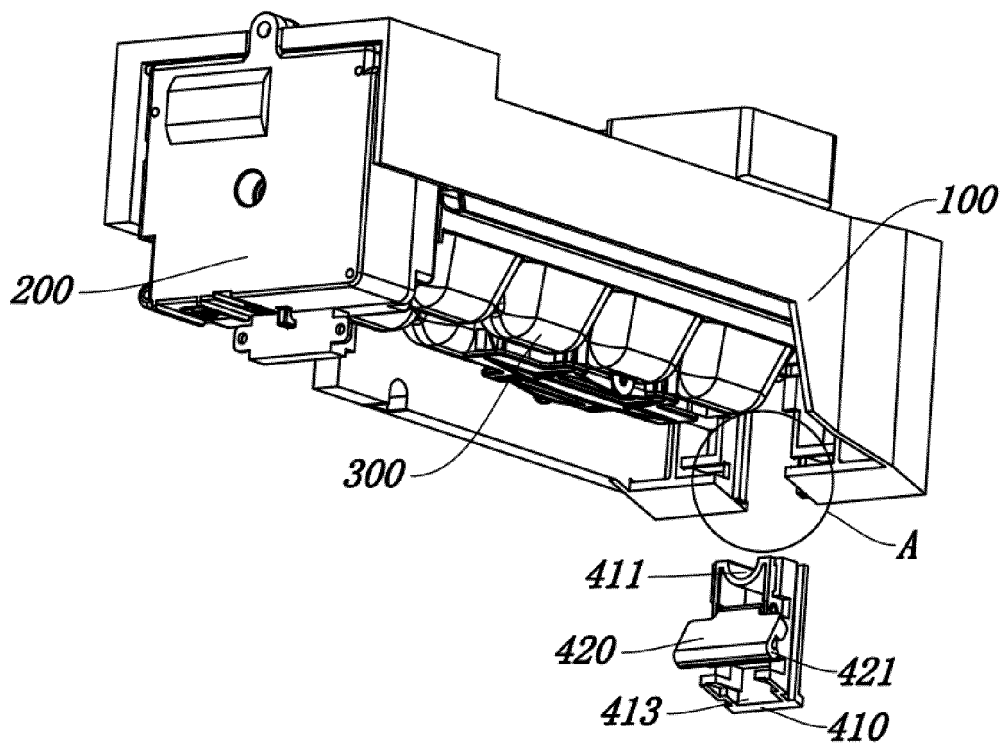


Fig.4



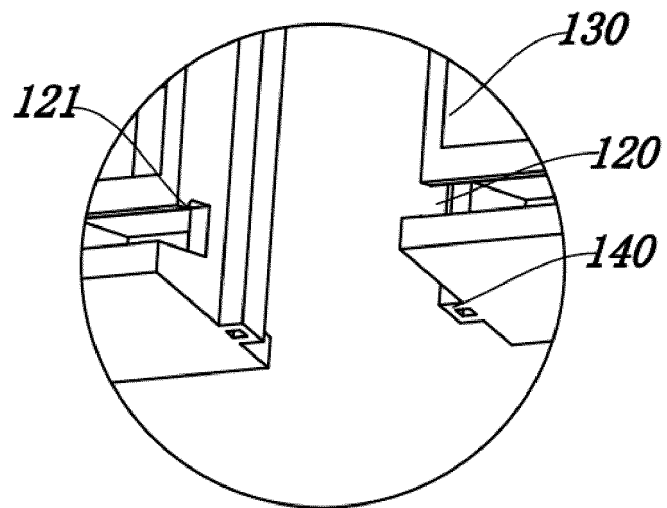


Fig.5

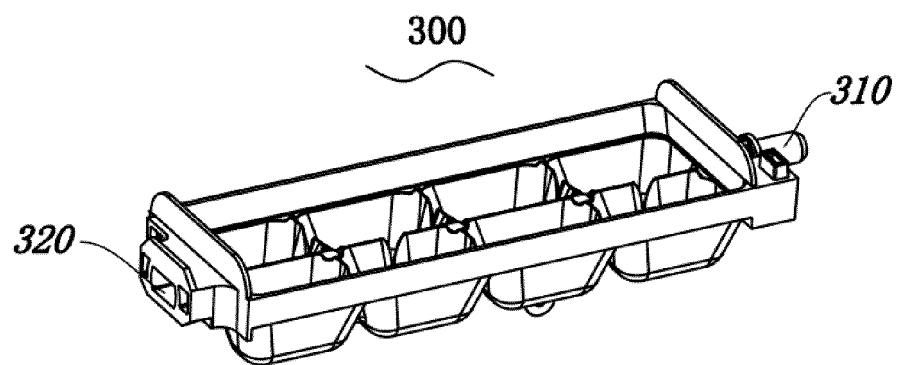


Fig.6

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/116170

**A. CLASSIFICATION OF SUBJECT MATTER**

F25C 1/24(2018.01)i; F25C 1/10(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)

F25C1/24 F25C1/10 F25C1/22 F25C1/00 F25D23/12 F25D23/00

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: 制冰机, 盘, 盒, 格, 拆卸, 拆装, 拆分, 拆下, 卸下, 分离, 分开, 卡接, 卡扣, 扣接, 转轴, 转动轴, 槽, ice-maker, tray, box, container, detach+, remov+, separate+, bayonet, clamp+, shaft, axle, slot

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 204141912 U (HEFEI ROYALSTAR SANYO ELECTRIC APPLIANCE CO., LTD.) 04 February 2015 (2015-02-04) description, paragraphs [0012]-[0015], and figures 1-3	1-4, 9-10
A	CN 104165488 B (HEFEI KINGHOME ELECTRICAL CO., LTD.) 12 September 2017 (2017-09-12) entire document	1-10
A	CN 101886863 A (HEFEI MIDEA-ROYALSTAR REFRIGERATOR CO., LTD. et al.) 17 November 2010 (2010-11-17) entire document	1-10
A	CN 101936632 B (HEFEI MIDEA-ROYALSTAR REFRIGERATOR CO., LTD. et al.) 06 June 2012 (2012-06-06) entire document	1-10
A	US 4680943 A (WHITE CONSOLIDATED IND., INC.) 21 July 1987 (1987-07-21) entire document	1-10
A	JP 2018044727 A (TOSHIBA LIFESTYLE PRODUCTS & SERVICES CORP.) 22 March 2018 (2018-03-22) entire document	1-10

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

* Special categories of cited documents:	"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
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Date of the actual completion of the international search

18 February 2020

Date of mailing of the international search report

26 February 2020

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/116170

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 101628876 B1 (TECH CO LTD DR) 09 June 2016 (2016-06-09) entire document	1-10

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

INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.  
**PCT/CN2019/116170**

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CN 204141912 U	04 February 2015	None	
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