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(54) REFRIGERATOR HAVING ICE MAKER, ICE MAKER MOUNTING METHOD, ICE MAKER ICE-TURNING CONTROL METHOD, AND ICE MAKER WATER-INJECTION CONTROL METHOD

(57) The present disclosure provides a refrigerator with an ice maker, an ice maker ice-overturning control method, and an ice maker water injection control method. The refrigerator in the present disclosure can: perceive whether the ice cube tray is already taken out to avoid continued water injection after the ice cube tray is taken out; and perceive a temperature of ice in the ice cube tray to accurately determine a current situation of ice making so as to perform accurate control for the ice maker, thereby avoiding ice cube lumping due to unsuccessful overturning in the refrigerator, and greatly improving the ice making efficiency. Further, the refrigerator can accurately determine whether the ice tray is mounted to be in place, so as to complete a series of water injection and ice making operation accurately. With fewer interference factors and high reliability, the accurate control of the water injection of the ice maker is improved. Thus, the problem of water in the water supply tube flowing into the refrigerating compartment due to clogging of the water supply tube can be effectively solved, thereby improving overflowing prevention of the water supply tube.

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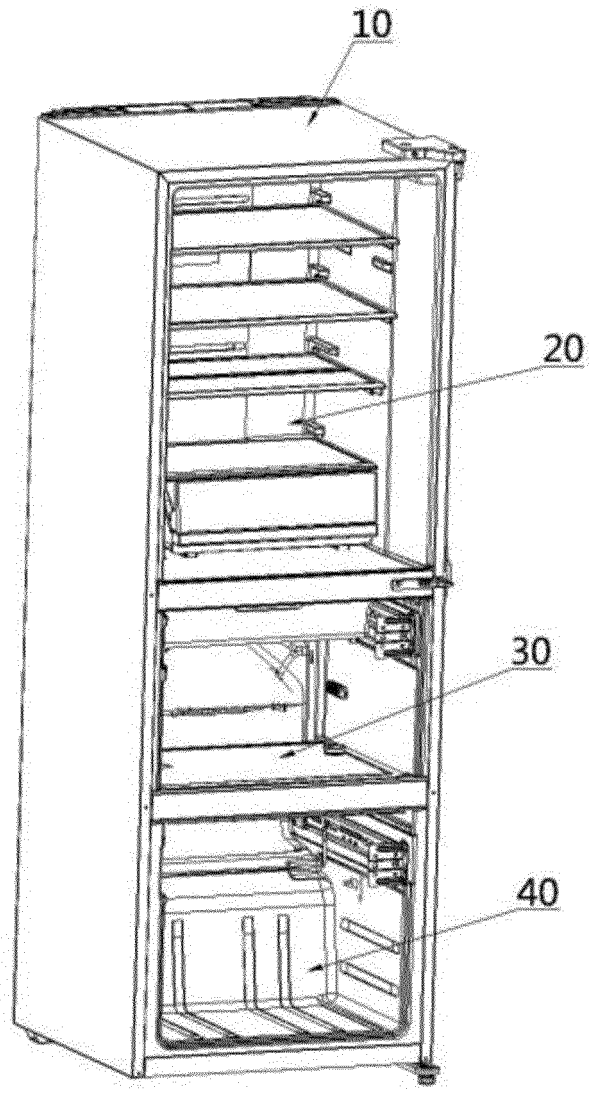


FIG. 1

Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. CN 202010066347.1, titled as REFRIGERATOR WITH ICE MAKER AND ICE MAKER MOUNTING METHOD, filed on January 20, 2020, Chinese Patent Application No.CN 202010067809.1 titled as REFRIGERATOR WITH ICE MAKER AND ICE MAKER ICE-OVERTURNING CONTROL METHOD, filed on January 20, 2020, Chinese Patent Application No.CN202010067823.1 titled as REFRIGERATOR WITH ICE MAKER AND ICE MAKER WATER INJECTION CONTROL METHOD, filed on January 20, 2020, Chinese Patent Application No.CN202010136659.5 titled as REFRIGERATOR WITH ICE MAKER, filed on March 2, 2020, Chinese Patent Application No.CN202010137740.5 titled as REFRIGERATOR WITH ICE MAKER, filed on March 2, 2020, Chinese Patent Application No.CN202020130385.4 titled as REFRIGERATOR WITH ICE MAKER, filed on January 20, 2020, Chinese Patent Application No.CN202020130425.5 titled as REFRIGERATOR WITH ICE MAKER, filed on January 20, 2020, and Chinese Patent Application No.CN202020131640.7 titled as REFRIGERATOR WITH ICE MAKER, filed on January 20, 2020, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of refrigerator technologies, and in particular to a refrigerator with an icemaker, an ice maker mounting method, an ice overturning control method, and a water injection control method.

BACKGROUND

[0003] Along with continuous improvement of living level of people, refrigerators have become a necessary article in lives of people. The refrigerators maintain their interiors at a lower temperature through cooling effect and therefore may not only store foods but also make ice by use of a simple ice making device, which fully meets the requirements of people for ice cubes. An ice making device in the existing refrigerators generally includes a water tank, a water pump, a water guide mechanism, and an ice maker connected sequentially, where the water tank and the water pump are disposed inside a cold storage compartment, the ice maker is disposed inside a freezing compartment, the water guide mechanism communicates the water pump with the ice marker to supply water in the water tank into the ice marker for ice making. The ice maker in the refrigerators on market mostly determines whether ice making is completed by controlling an ice making time during ice making process, that is, the ice marker determines whether an accumulated ice making time from a time for starting injecting water into an ice cube tray to a current time reaches a preset threshold by recording the accumulated ice making time. If the accumulated ice making time reaches the preset threshold, it is determined that the ice making is completed. If the accumulated ice making time does not reach the preset threshold, it is determined that the ice making is not completed. The ice making device applied in the existing refrigerators generally includes a water tank, a water pump, a water guide mechanism, and an ice maker connected sequentially, where the water tank and the water pump are disposed inside a cold storage compartment, the ice maker is disposed inside a freezing compartment, the water guide mechanism communictes the water pump with the ice marker to supply water in the water tank into the ice marker for ice making. The ice making device applied in the existing refrigerators generally includes a water tank, a water pump, a water supply tube, and an ice maker connected sequentially, where the water tank and the water pump are disposed inside a cold storage compartment, the ice maker is disposed inside a freezing compartment, the water supply tube communicates the water pump with the ice marker to supply water in the water tank into the ice marker for ice making.

[0004] However, the ice cube tray in the ice maker needs to be washed frequently to keep clean. At present, most ice cube trays cannot be dismounted, or dismounting is relatively complex. Some ice cube trays may be dismounted only after an ice making drive device is dismounted, resulting in complexity and inconveniences of operation. For a refrigerator with its door opened and closed frequently, a temperature in the refrigerator may be unstable due to frequent opening and closing. In this case, when whether the ice making is completed is determined based on the ice making time, ice cubes in the ice cube tray are sometimes still a mixture of water and ice during ice overturning. Further, after ice overturning, the ice cubes in the refrigerator will lump up, bringing down the ice making efficiency. When a mechanical control manner is adopted for controlling the ice maker, it is easy to cause wearing to parts along with increasing uses or block a part due to freezing in a use process, resulting in water injection control failure. For example, the ice maker does not perceive that an ice tray is already taken out, and hence continues injecting water into an ice storage box, bringing problems to the users. At present, the ice maker usually controls water injection by the mechanical control manner. When the ice tray is mounted to be in place, a water injection switch is driven to be turned on to control water in the water tank to be injected into the ice tray of the ice maker through the water guide mechanism. When the ice tray is taken out, the water injection switch is driven to be turned off to stop injecting water into the ice tray of the ice maker. The ice maker usually has a low internal temperature due to ice making. In this case, the water supply tube supplying water to the ice maker is liable to freezing due to cold air in the ice

maker, further clogging the water supply tube. The system can detect the tube clogging only after next water injection. Due to the tube clogging, water injected at this time will flow out of a vent on the top of the tube, bringing water into the cold storage compartment.

SUMMARY

[0005] The object of the present disclosure is to provide a refrigerator with an ice maker, an ice maker mounting method, an ice maker ice-overturning control method and an ice maker water injection control method.

[0006] According to a first example of the present disclosure, there is provided a refrigerator with an ice maker, including: a refrigerator body, where a cryogenic storage compartment is disposed in the refrigerator body, and the cryogenic storage compartment includes a refrigerating compartment and a freezing compartment; a partition plate disposed in an inner liner of the refrigerator body to partition the cryogenic storage compartment; a water supply assembly disposed in the refrigerating compartment; and an ice maker disposed in the freezing compartment and connected with the water supply assembly; the ice maker including: an ice maker rack disposed on the partition plate; an ice tray rack detachably mounted into the ice maker rack; an ice cube tray fixedly mounted into the ice tray rack; an ice-overturning motor disposed at an end of the ice maker rack to overturn the ice cube tray; an ice storage box disposed below the ice cube tray; a magnet disposed on the ice tray rack; and a magnetism-sensitive switch disposed at the bottom of the partition plate to perceive whether the ice cube tray is already taken out in cooperation with the magnet.

[0007] The ice maker of the refrigerator in the first example further includes an infrared sensor disposed at the bottom of the partition plate to perceive a temperature of ice cubes in the ice cube tray; a handle disposed at an end of the ice tray rack, where the handle and an end surface of the ice maker rack are in a same plane to facilitate taking out the ice cube tray; a knob disposed at an end of the ice maker rack to rotatably lock or unlock the handle and the ice maker rack; and an ice detection rod disposed on the ice-overturning motor to detect whether the ice storage box is full of ice cubes.

[0008] In the refrigerator of the first example, an air supply opening is disposed at a position inside the freezing compartment and close to the ice cube tray to supply cooling capacity to the ice cube tray.

[0009] In the refrigerator of the first example, the water supply assembly includes: a water tank disposed in the cold storage compartment; a filter disposed in the water tank to filter water in the water tank; a water pump connected with a water outlet of the filter; and a water supply tube connected with a water outlet of the water pump to supply water in the water tank to the ice cube tray. A water inlet rubber tube is connected between a water inlet of the water pump and the water outlet of the filter to pump water in the water tank. The water supply tube of the refrigerator includes an water outlet rubber tube connected with the water outlet of the water pump; an water outlet PE tube in communication with the water outlet rubber tube; an water outlet aluminum tube in communication with the water outlet PE tube, where the water outlet aluminum tube is in communication with the ice cube tray; and a connection sealing rubber sleeve connected with the water outlet PE tube and the water outlet aluminum tube respectively.

[0010] In the refrigerator of the first example, the water supply tube is disposed outside of an internal air duct of the box body.

[0011] The present disclosure further provides an ice maker mounting method for the refrigerator with an ice maker provided in the first example, where the method includes: assembling an ice maker rack, an ice tray rack, an ice cube tray, an ice-overturning motor, an ice storage box, a magnet, a handle, a knob, and an ice detection rod into an ice maker by combination; mounting an infrared sensor and a magnetism sensitive switch at the bottom of a partition plate; mounting the ice maker at the bottom of the partition plate; and mounting the assembled partition plate and ice maker together into a freezing compartment of a refrigerator body.

[0012] According to a second example, there is provided a refrigerator with an ice maker, including: a box body, where a cryogenic storage compartment is disposed in the box body; a partition plate disposed on an inner liner of the box body to partition adjacent cryogenic storage compartments; and an ice maker disposed in the cryogenic storage compartment; the ice maker including: an ice maker rack disposed on the partition plate, an ice cube tray detachably mounted in the ice maker rack, an ice-overturning motor disposed at an end of the ice maker rack, and an ice storage box disposed below the ice cube tray; an infrared sensor disposed on the partition plate to detect a temperature of ice cubes in the ice cube tray; a controller connected with the infrared sensor and the ice-overturning motor respectively; where the controller is configured to: obtain a temperature and an ice making time detected by the infrared sensor; and determine whether the ice-overturning motor performs ice overturning operation according to the temperature and the ice making time detected by the infrared sensor.

[0013] In the refrigerator of the second example, the controller is further configured to: determine whether the ice making time exceeds a first preset time; if the ice making time exceeds the first preset time, determine whether the temperature detected by the infrared sensor exceeds a first preset temperature; if the temperature detected by the infrared sensor reaches the first preset temperature, control the ice-overturning motor to perform ice overturning operation.

[0014] In the refrigerator of the second example, the controller is further configured to: after the ice maker starts to make ice, obtain the temperature detected by the infrared sensor; determine whether the temperature detected by the infrared sensor reaches a second preset

temperature; if the temperature detected by the infrared sensor reaches the second preset temperature, start to calculate the ice making time from zero.

[0015] In the refrigerator of the second example, the controller is further configured to: determine whether the temperature detected by the infrared sensor reaches a third preset temperature; if the temperature detected by the infrared sensor reaches the third preset temperature, record a duration of the temperature; determine whether the duration of the temperature reaches a second preset time; if the duration of the temperature reaches the second preset time, control the ice-overturning motor to perform ice overturning operation.

[0016] In the refrigerator of the second example, the controller is further configured to: obtain a temperature of a cryogenic storage compartment where the ice maker is located; determine whether the temperature of the cryogenic storage compartment reaches a fourth preset temperature; if the temperature of the cryogenic storage compartment reaches the fourth preset temperature, record a duration of the temperature; determine whether the duration of the temperature reaches a third preset time; if the duration of the temperature reaches the third preset time, control the ice-overturning motor to perform ice overturning operation.

[0017] In the refrigerator of the second example, a groove is disposed at the bottom of the partition plate, a buckle is disposed in the groove, and the infrared sensor is fixed in the groove through the buckle. A line terminal is disposed in the groove and the infrared sensor is in electrical connection with the line terminal. An infrared probe of the infrared sensor faces the ice cube tray to detect a temperature in the ice cube tray. The present disclosure further provides an ice maker ice-overturning control method, including: detecting a temperature of ice cubes in the ice cube tray by the infrared sensor; obtaining the temperature and an ice making time detected by the infrared sensor; determining whether the ice-overturning motor performs ice-overturning operation according to the temperature and the ice-making time detected by the infrared sensor.

[0018] According to a third example, there is provided a refrigerator with an ice maker, including: a refrigerator body where a cryogenic storage compartment is disposed in the refrigerator body; a partition plate disposed on an inner liner of the refrigerator body to partition the cryogenic storage compartment; an ice maker disposed in the cryogenic storage compartment; the ice maker including: an ice maker rack fixedly mounted on the partition plate; an ice tray detachably mounted on the ice maker rack; a magnet disposed on the ice tray; a magnetism-sensitive switch disposed at the bottom of the partition plate to control whether water is injected into the ice cube tray by means of induction with the magnet.

[0019] In the refrigerator of the third example, a groove is disposed at the bottom of the partition plate, and the magnetism-sensitive switch is fixedly mounted in the groove.

[0020] In the refrigerator of the third example, a water inlet is disposed on the partition plate, the water inlet corresponds to the ice tray, and the groove is close to the water inlet.

[0021] In the refrigerator of the third example, a switch cover plate is disposed on the magnetism-sensitive switch, a first buckling groove and a second buckling groove are disposed on both ends of the switch cover plate respectively, a first buckle and a second buckle are disposed at an opening of the groove respectively, the first buckling groove is fitted with the first buckle, and the second buckling groove is fitted with the second buckle.

[0022] In the refrigerator of the third example, a mounting groove is disposed at a side wall of the ice tray, the mounting groove corresponds to the groove, and the magnet is fixedly fitted into the mounting groove.

[0023] The refrigerator of the third example further includes a controller. The magnetism-sensitive switch perceives the position of the ice tray in cooperation with the magnet so as to send a signal for starting or stopping injecting water to the controller.

[0024] In the refrigerator of the third example, the ice tray includes: an ice tray rack detachably mounted into the ice maker rack; an ice cube tray disposed in the ice tray rack; an ice-overturning motor disposed at a side of the ice tray rack; and an ice detection rod disposed on the ice-overturning motor. The magnet of the refrigerator of the third example is disposed on the ice tray rack.

[0025] The present disclosure further provides an ice maker water injection control method for the refrigerator of the third example, including: monitoring whether the magnetism-sensitive switch disposed on the partition plate senses the magnet on the ice tray; if the magnetism-sensitive switch senses the magnet, controlling the magnetism-sensitive switch to generate a disconnection signal and controlling the ice tray to perform water injection based on the disconnection signal; if the magnetism-sensitive switch does not sense the magnet, controlling the magnetism-sensitive switch to generate a closing signal and controlling the ice tray to stop performing water injection based on the closing signal.

[0026] According to a fourth example, there is provided a refrigerator with an ice maker, including: a refrigerator body, where a cryogenic storage compartment is disposed in the refrigerator body, and the cryogenic storage compartment includes a refrigerating compartment, a green vegetable preservation compartment and a freezing compartment; a partition plate disposed on an inner liner of the refrigerator body to partition the cryogenic storage compartment; a water supply assembly disposed in the refrigerating compartment; an ice maker disposed in the freezing compartment; a water supply tube communicating the water supply assembly with the ice maker; a water storage mechanism in communication with the water supply tube disposed above an water outlet of an end of the water supply tube close to the ice maker to store water flowing out of the water supply tube in case of the water outlet of the tube being frozen up.

[0027] In the refrigerator of the fourth example, the water supply tube includes: a first tube connected with a water outlet of the water supply assembly and penetrated through the partition plate between the cold storage compartment and the wild vegetable compartment; a second tube connected with an upper end of the first tube, where the water storage mechanism is sleeved at an outer side of the second tube and communicates with the second tube; a sealing sleeve connected with the second tube, where a lower end of the second tube is embedded in the sealing sleeve; and a third tube connected with the sealing sleeve, where the outer side of the sealing sleeve is embedded on an upper end of the third tube, and a lower end of the third tube is in communication with the ice maker.

[0028] In the refrigerator of the fourth example, the water storage mechanism includes a water storage tube, where a water storage amount of a water storage zone formed by the water storage tube and the second tube is greater than the water amount of one injection of the ice maker.

[0029] In the refrigerator of the fourth example, the second tube is provided with a water hole through which the water storage tube is in communication with the second tube.

[0030] In the refrigerator of the fourth example, a flow rate of the water hole is greater than a flow rate of the water inlet of the second tube.

[0031] In the refrigerator of the fourth example, a lower end of the water storage tube is funnel-shaped and the water hole is disposed at a tube wall of the second tube close to the funnel.

[0032] In the refrigerator of the fourth example, a plurality of support ribs are disposed between an inner wall of the water storage tube and an outer wall of the second tube.

[0033] In the refrigerator of the fourth example, the water storage tube and the second tube are in one-piece structure.

[0034] In the refrigerator of the fourth example, the water storage tube is close to the lower end of the second tube.

[0035] In the refrigerator of the fourth example, the first tube is a rubber tube, the second tube is a PE tube, and the third tube is an aluminum tube.

[0036] According to a fifth example, there is provided a refrigerator with an ice maker, including: a refrigerator body, where a cryogenic storage compartment is disposed in the refrigerator body, and the cryogenic storage compartment includes a refrigerating compartment, a green vegetable preservation compartment and a freezing compartment; a partition plate disposed at an inner liner of the refrigerator body to partition the cryogenic storage compartment; a water supply assembly disposed in the refrigerating compartment; an ice maker disposed in the freezing compartment; a water supply tube communicating the water supply assembly with the ice maker; a fourth tube communicating the water supply tube with the water supply assembly so that the water supply assembly, the water supply tube and the fourth tube form a circulation passage when a water outlet at an end of the water supply tube close to the ice maker is frozen up.

[0037] In the refrigerator with an ice maker in the fifth example, the water supply tube includes: a first tube connected with the water outlet of the water supply assembly and penetrated through the partition plate between the cold storage compartment and the wild vegetable compartment; a second tube penetrating through the wild vegetable compartment, where an upper end of the second tube is connected with the first tube; a sealing sleeve connected with the second tube, where a lower end of the second tube is embedded in the sealing sleeve; a third tube connected with the sealing sleeve, where an outer side of the sealing sleeve is embedded on an upper end of the third tube, a lower end of the third tube is in communication with the ice maker; and a fourth tube, where one end of the fourth tube is in communication with the first tube and the other end is in communication with the water supply assembly.

[0038] In the refrigerator with an ice maker in the fifth example, an air hole is disposed at an end of the first tube close to the water supply assembly, and the fourth tube communicates with the air hole with the water supply assembly.

[0039] In the refrigerator with an ice maker in the fifth example, an end of the fourth tube is connected with the air hole, and the other of the fourth tube is inserted into the water supply assembly.

[0040] In the refrigerator with an ice maker in the fifth example, the fourth tube is presented as inclined, and both ends of the fourth tube have different inclination degrees.

[0041] In the refrigerator with an ice maker in the fifth example, along a water flowing direction of the fourth tube, a distance between the end of the fourth tube close to the first tube and the first tube is gradually increased, and a distance between the end of the fourth tube close to the water supply assembly and the water supply assembly is gradually reduced.

[0042] In the refrigerator with an ice maker in the fifth example, the fourth tube and the first tube are in one-piece structure.

[0043] In the refrigerator with an ice maker in the fifth example, the water supply assembly includes a water tank, a filter, a water pump, and a water tank end cover, the filter is located inside the water tank, a water outlet of the filter is connected with a water inlet of the water pump, and a water outlet of the water pump is connected with the first tube; the water tank end cover is disposed at an upper opening of the water tank, and a side of the fourth tube away from the first tube penetrates through the water tank end cover.

[0044] In the refrigerator with an ice maker in the fifth example, a limiting rib is disposed at an end of the fourth tube close to the water tank, and the limiting rib is abutted against the water tank end cover.

[0045] In the refrigerator with an ice maker in the fifth example, an end of the fourth tube penetrating through the water tank end cover is located at another side of the filter away from the water pump.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] In order to describe the technical solution of the present disclosure more clearly, the accompanying drawings involved in the examples will be briefly introduced. Apparently, those skilled the art may also obtain other drawings according to these drawings without paying creative work.

FIG. 1 is a schematic diagram of whole structure of a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 2 is a front view of a refrigerator with an ice maker according to some examples of the present-disclosure.
FIG. 3 is a sectional view taken along A-A in FIG. 2.
FIG. 4 is a schematic diagram of assembling of a partition plate and an ice maker in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 5 is an exploded view of a partition plate and an ice maker in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 6 is a structural schematic diagram of a mechanical control structure for water injection of an exemplary ice maker.
FIG. 7 is an illustrative change diagram of a mechanical control structure for water injection of an exemplary ice maker.
FIG. 8 is a structural schematic diagram of a magnetism-sensitive switch control structure for water injection of an exemplary ice maker.
FIG. 9 is an illustrative change diagram of a magnetism-sensitive switch control structure for water injection of an exemplary ice maker.
FIG. 10 is a top view of assembling of a partition plate and an ice maker in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 11 is a sectional view taken along B-B in FIG. 10.
FIG. 12 is a bottom view of a partition plate in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 13 is a sectional view taken along C-C in FIG. 12.
FIG. 14 is an enlarged view of position C in FIG. 13.
FIG. 15 is a schematic diagram of assembling of an ice cube tray and a magnet in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 16 is a top view of assembling of an ice cube tray and a magnet in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 17 is a sectional view taken along E-E in FIG. 16.
FIG. 18 is a structural schematic diagram of a partition plate in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 19 is a structural schematic diagram of an infrared sensor in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 20 is an enlarged view of position B in FIG. 3.
FIG. 21 is a schematic diagram of mounting of an ice maker in a refrigerator with an ice maker according to some examples of the present disclosure.
FIG. 22 is a flowchart of an ice maker ice-overturning control method according to some examples of the present disclosure.
FIG. 23 is a detailed flowchart of S300 in an ice maker ice-overturning control method according to some examples of the present disclosure.
FIG. 24 is another detailed flowchart of S300 in an ice maker ice-overturning control method according to some examples of the present disclosure.
FIG. 25 is yet another detailed flowchart of S300 in an ice maker ice-overturning control method according to some examples of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0047] In order to help those skilled in the art to understand the technical solution of the present disclosure better, the technical solution of the present disclosure will be fully and clearly described below in combination with the accompanying drawings of the examples of the present disclosure. Apparently, the described examples are merely some of the present disclosure rather than all examples. All other examples obtained by those skilled in the art based on these examples of the present disclosure without paying creative work shall fall with the scope of protection of the present disclosure.

[0048] In the description of the present disclosure, it is to be understood that orientations or positional relationships indicated by terms such as "upper" , "lower" , "front" , "back" , "bottom" , "inside" , "outside" , are based on orientations or positional relationships shown in the drawings and are used only for convenience and simplification of descriptions of the present disclosure, rather than indicate or imply that the indicated apparatus or element shall have a specific orientation and be configured or operated in a specific orientation. Thus, the terms shall not be understood as limiting of the present disclosure.

[0049] Further, the terms "first" , "second" are used only for the purpose of descriptions and shall not be understood as indicating or implying relative importance or implicitly indicating the number of the indicated technical features. Thus, a feature defined with "first" and "second" may explicitly or implicitly include one or more of the feature. In addition, it is understood that the terms such as "including" or "having" are used herein and shall be intended to indicate the presence of features, digits, steps,

functions, several assemblies or their combinations disclosed in the present disclosure and also be understood as that more or fewer of the features, digits, steps, functions, several assemblies or their combinations may be used.

[0050] FIG. 1 is a schematic diagram of entire structure of a refrigerator with an ice maker according to some examples of the present disclosure. FIG. 2 is a front view of a refrigerator with an ice maker according to some examples of the present disclosure.

[0051] As shown in FIGS. 1 and 2, in the refrigerator with an ice maker in an example of the present disclosure, the refrigerator may include a refrigerator body with a cryogenic storage compartment and a partition plate for partitioning adjacent cryogenic storage compartments, and the cryogenic storage compartment may include a refrigerating compartment 20, a green vegetable preservation compartment 30, and a freezing compartment 40. The refrigerating compartment 20 may keep foods in a cold storage state, the green vegetable preservation compartment 30 may store foods with green leaves at an applicable temperature, and the freezing compartment 40 may keep foods in a frozen state. The refrigerating compartment 20 may be disposed at an upper side of the green vegetable preservation compartment 30, and the green vegetable preservation compartment 30 may be disposed at an upper side of the freezing compartment 40.

[0052] The partition plates 1 are used to partition the refrigerating compartment 20, the green vegetable preservation compartment 30 and the freezing compartment 40, that is, a partition plate 1 is disposed between the refrigerating compartment 20 and the green vegetable preservation compartment 30, and a partition plate 1 is disposed between the green vegetable preservation compartment 30 and the freezing compartment 40. In this way, food storage is facilitated.

[0053] As shown in FIG. 3, the refrigerator also includes a water supply assembly disposed in the refrigerating compartment 20 and an ice maker 14 disposed in the freezing compartment 40 and connected with the water supply assembly. The water supply assembly is used to supply water to the ice maker 14 so that the ice maker makes water into ice cubes. An air supply opening 13 is disposed at a position in the freezing compartment 40 and close to the ice maker 14 to supply cooling capacity to the ice maker 14. That is, an independent air supply opening is disposed for the ice maker 14 to supply cooling capacity to the ice maker 14, thereby facilitating ice making of the ice maker 14.

[0054] As shown in FIGS. 4 and 5, the ice maker 14 includes an ice maker rack 18, an ice tray and an ice storage box 15. The ice tray includes an ice tray rack 22, an ice cube tray 23, and an ice-overturning motor 19. The ice maker rack 18 is mounted on the partition plate 1 to fix the ice maker 14 onto the partition plate 1. The ice tray rack 22 is detachably mounted in the ice maker rack 18, and the ice cube tray 23 is fixedly mounted in the ice tray rack 22. That is, the ice maker rack 18 is used to carry the ice tray rack 22 and the ice tray rack 22 is used to carry the ice cube tray 23. The ice tray rack 22 and the ice cube tray 23 may move back and forth in the ice maker rack 18. If a user desires to take out the ice cube tray 23, the ice tray rack 22 may be pulled forward and then taken out of the ice maker rack 18, thereby helping the user to clean the ice cube tray 23. If the user desires to put back the ice tray rack 22, the ice tray rack 22 may be pushed backward to be mounted into the ice maker rack 18. After being injected into the ice cube tray 23, water will form into ice cubes under the action of the cooling capacity in the freezing compartment 40.

[0055] It is required to accurately control water injection into the ice cube tray 23 during ice making of the ice cube tray 23. At present, the common control method of the ice maker for controlling water injection into the ice tray includes a mechanical control manner and a magnetism-sensitive switch control manner. As shown in FIGS. 6 and 7, the mechanical control manner is as follows: the ice maker includes a rack 01, a motor 02, an ice detection rod 03, a control card 04, and an ice tray 05; the control card 04 is mounted in the ice tray 05; when the ice tray 05 is mounted to be in place, the control card 04 is driven to be level, the motor 02 disposed on the rack 01 is timed to drive the ice detection rod 03 to normally rotate based on the set degree so as to detect the ice storage in the ice storage box and determine whether to continue water injection and perform overturning for the ice tray; when the ice tray 05 is taken out, the control card 04 will freely rotate down due to no structure limitation of the ice tray 05 to limit the rotational movement of the ice detection rod 03, and a feedback signal indicates no need to continue water injection. But when a rotary shaft of the control card 04 freezes, the control card 04 cannot rotate to be in place by use of gravity after the ice tray 05 is taken out, and thus cannot limit further downward movement of the ice detection rod 03, and the feedback signal indicates water injection can be continued. In this case, water is injected into the ice storage box and frozen, bringing user complaints.

[0056] As shown in FIGS. 8 and 9, the magnetism-sensitive switch control manner is as follows: the ice maker includes a rack 01, a knob 06, an ice detection rod 03, and an ice tray 05; a magnetism-sensitive switch is disposed on the rack 01, and a magnet is disposed on the knob 06; when the ice tray 05 is mounted to be in place, the knob 06 rotates down to be level and the magnetism-sensitive switch senses at the same time, and water injection, ice detection and ice overturning are performed as normal; when the ice tray is taken out, the knob 06 rotates clockwise by 90 degrees, the magnetism-sensitive switch is disconnected, and water injection is no more performed. However, when the ice tray 05 is taken out for cleaning, the knob may be loosened and will not be in the vertical direction and fall to be level due to wearing arising from long-time use, and at this time, water will be injected to the ice storage box and frozen up, bringing

user complaints. In addition, after the ice tray is cleaned, the user forgets to rotate the knob 0 to level, resulting in that the feedback signal indicates that the ice tray is taken out, and therefore normal water injection cannot be performed for ice making. In this example, a new magnetism-sensitive switch mounting manner is designed for the ice maker. As shown in FIGS. 10 and 11, the ice maker further includes a magnet 26 and a magnetism-sensitive switch 17. The magnet 26 is disposed on the ice tray rack 22, and the magnetism-sensitive switch 17 is disposed at the bottom of the partition plate 1. The magnet 26 and magnetism-sensitive switch 17 are in correspondence to realize mutual induction so as to perceive whether the ice tray 23 is taken out cooperatively and determine whether to perform water injection. In this way, a series of water injection and ice making operations are correctly completed with high reliability.

[0057] Specifically, the magnet 26 is disposed on the ice tray rack 22, the magnetism-sensitive switch 17 is fixedly mounted at the bottom of the partition plate 1. The magnetism-sensitive switch 17 and the magnet 26 may cooperatively perceive whether to perform water injection for the ice tray. Specifically, as shown in FIGS. 12, 13 and 14, a first groove 101 is disposed at the bottom of the partition plate 1, a switch cover plate 171 is disposed on the magnetism-sensitive switch 17, a first buckling groove 172 and a second buckling groove 173 are disposed at both ends of the switch cover plate 171 respectively, a first buckle 102 and a second buckle 103 are disposed at an opening of the first groove 101 respectively, the first buckling groove 172 is fitted with the first buckle 102, and the second buckling groove 173 is fitted with the second buckle 103. In this case, the magnetism-sensitive switch 17 is fixedly mounted in the first groove 101 to perceive the position of the magnet 26. Further, the magnetism-sensitive switch is detachable and thus has high repairability.

[0058] As shown in FIGS. 15, 16 and 17, a mounting groove is disposed at a side wall of the ice tray rack 22, the mounting groove corresponds to the first groove 101, and the magnet 26 is fixedly fitted into the mounting groove. Thus, the magnet 26 is fixedly mounted on the ice tray rack 22. In this case, the magnet may be mounted and dismounted along with the ice tray rack 22.

[0059] In some examples, a water inlet is further disposed on the partition plate 1. The water inlet is located above the ice tray, that is, the water inlet corresponds to the ice tray. Water injection is performed for the ice tray through the water inlet, thereby realizing a series of water injection and ice making operations. The first groove 101 where the magnetism-sensitive switch 17 is located is close to the water inlet so that the first groove 101 and the mounting groove are in correspondence up and down, and the magnetism-sensitive switch 17 and the magnet 17 are exactly opposed, thereby ensuring the magnet 26 is exactly opposed to the magnetism-sensitive switch 17 when the ice tray is mounted to be in place.

[0060] In some examples, the ice maker 14 further includes a controller. The magnetism-sensitive switch 17 and the magnet 26 cooperatively perceive the position of the ice tray and feed back a signal for stopping/starting water injection to the controller. When the ice tray is mounted to be in place, the magnet 26 is exactly opposed to the magnetism-sensitive switch 17, the magnetism-sensitive switch 17 is disconnected after sensing the magnet 26 and feeds back a signal for continuing water injection to the controller, and thus water injection, ice making and ice detection can be normally performed. When the ice tray is taken out, the magnet 26 is also taken out, the magnetism-sensitive switch 17 cannot sense the magnet 26 and thus is in a closed state, and feeds back a signal for stopping water injection to the controller so as to stop injecting water to the ice tray.

[0061] In the refrigerator with an ice maker in the present disclosure, the magnetism-sensitive switch 17 is fixedly mounted at the bottom surface of the partition plate 1 and the magnet 26 is mounted at a side wall of the ice tray rack 22, so that the magnet can be mounted or taken out along with the ice tray rack 22. When the ice tray rack 22 is slidably mounted to be in place on the ice maker rack 18, the magnet 26 is exactly opposed to the magnetism-sensitive switch 17, the magnetism-sensitive switch 17 is in a disconnected state after sensing the magnet 26, and feeds back a signal for continuing water injection so as to perform water injection, ice making and ice detection normally. When the ice tray rack 22 is slidably taken out from the ice maker rack 18, the magnet 16 is also taken out, the magnetism-sensitive switch 17 is in a closed state after failing to sensing the magnet 26 and feeds back a signal for stopping water injection so as to immediately stop injecting water to the ice cube tray 23. In this case, whether the ice tray rack 22 and the ice cube tray 23 are mounted to be in place can be determined accurately by use of the magnetism-sensitive switch 17 and the magnet 26 so that a series of water injection and ice making operations are completed accurately, thus avoiding continuing water injection to the ice cube tray 23 after the ice cube tray 23 is taken out. Further, with fewer interference factors and higher reliability, the accurate control of the water injection of the ice maker is greatly improved.

[0062] The ice cube tray 23 includes a plurality of ice-making lattices and various ice-making lattices are in communication with each other. Water supplied by the water supply assembly is injected into one ice-making lattice to fill up the entire ice cube tray through communication openings between various ice-making lattices.

[0063] The ice-overturning motor 19 is disposed at an end of the ice maker rack 18 and connected with the ice cube tray 23 to overturn the ice cube tray 23. After the ice cube tray 23 makes water into ice cubes, the ice-overturning motor 19 overturns the ice cube tray 23 to transfer the ice cubes in the ice cube tray 23 to the ice storage box 15, and then overturns the ice cube tray 23 back to original position to continue ice making. The above operations may be repeated until the ice storage

box 15 is full of ice cubes.

[0064] The ice maker 14 further includes an infrared sensor 16. The infrared sensor 16 is mounted at the bottom of the partition plate 1 to detect a temperature of the ice cubes in the ice cube tray 23 so as to determine whether the ice cubes in the ice cube tray 23 are already made and whether the ice-overturning is to be performed. If the infrared sensor 16 detects the temperature in the ice cube tray 23 is continuously maintained at a low level, it indicates that the ice cubes in the ice cube tray 23 are already made. The ice-overturning motor 19 is controlled to overturn the ice cube tray 23 to transfer the ice cubes in the ice cube tray 23 to the ice storage box 15.

[0065] As shown in FIGS. 18 and 19, a second groove 104 is disposed at the bottom of the partition plate 1, a third buckle 105 is disposed in the second groove 104, and a mounting hole 161 corresponding to the third buckle 105 is disposed on the infrared sensor 16. When the infrared sensor 16 is to be mounted, the infrared sensor 16 is mounted into the second groove 105 and fixed by matching the third buckle 105 with the mounting hole 161.

[0066] A line terminal is further disposed in the second groove 104. The line terminal is connected with the infrared sensor 16 and a line connected with the line terminal is located in the partition plate 1 to supply power to the infrared sensor 16. Further, the infrared probe of the infrared sensor 16 faces the ice cube tray 23 so as to realize accurate detection of temperature of ice or water in the ice cube tray 23.

[0067] The refrigerator further includes a controller. The controller is connected with the infrared sensor 16 and the ice-overturning motor 19 respectively. The controller is configured to: control water injection to the ice cube tray 23; obtain the temperature and the ice making time detected by the infrared sensor, determine whether the ice making is completed based on the temperature and the ice making time detected by the infrared sensor, and control the ice-overturning motor 19 to perform ice-overturning operation if the ice making is completed; and continue performing ice making operation if the ice making is not completed.

[0068] The process of controlling water injection to the ice cube tray by the controller is as follows:

1. No water injection is performed in the first ice making period after being powered on, and in other circumstances, the water pump is powered on to start water injection after the ice overturning process is ended.
2. When the water injection time exceeds 6s, the water pump is powered off to stop water injection and water is evenly distributed (initialization).
3. If the temperature detected by the infrared sensor within four minutes subsequent to water injection is less than 3°C higher than the temperature prior to water injection, it is thought that water injection fails. The water injection failure does not cause alarm but can be queried. The process of controlling, by the controller, ice-overturning based on the temperature and the ice making time detected by the infrared sensor is as follows:

1) When the temperature detected by the infrared sensor is Tice≤-12°C after the ice making time tZB≥80min (water injection failure is 180min), the controller controls the ice-overturning motor to perform ice overturning operation.
2) When the temperature detected by the infrared sensor is Tice≤-20°C and continues for 30 min (water injection failure is 180min), the controller controls the ice-overturning motor to perform ice-overturning operation.
3) When the infrared sensor fails, a temperature in the freezing compartment is detected. When the temperature detected by the sensor in the freezing compartment is Tfe≤-12°C and continues for 200min, the controller controls the ice-overturning motor to perform ice overturning operation.

[0069] By the infrared sensor, the temperature of water or ice in the ice cube tray of the ice maker is directly detected to accurately determine the current situation of the ice making, and the controller then performs determination based on a set program to accurately control the ice maker to perform water injection or ice overturning. The ice maker herein has significant advantages over the existing ice maker with single time control function on the market, preventing ice cube lumping resulting from overturning following unsuccessful ice making in the refrigerator, and greatly improving the ice making efficiency.

[0070] The ice maker further includes a handle 24 and a knob 25. The handle 24 is disposed at an end of the ice tray rack 22 away from the ice-overturning motor 19. Further, the handle 24 and the ice maker rack 18 are in a same plane. A user may take out the ice tray rack 22 by the handle 24, facilitating user operation. Apart from facilitating taking out the ice tray rack 22 by the user, the handle 24 may also prevent the ice tray rack 22 from being squeezed out of the ice maker 14 during ice overturning process.

[0071] The knob 25 is disposed at an end of the ice maker rack 18 to rotatably lock or unlock the handle 24 and the ice maker rack 18. The knob 25 is rotatably mounted on an end surface of the ice maker rack 18. When the user rotates the knob 25, the ice tray rack 22 and the ice maker rack 18 may be locked to further prevent the ice tray rack 22 from being squeezed out of the ice maker during ice overturning process. When the user rotates the knob 25 in another direction, the ice tray rack 22 and the ice maker rack 18 may be unlocked to assist the user in taking out the ice cube tray 23.

[0072] When the user desires to clean the ice cube tray 23, the user may firstly rotate the knob 25 to unlock the ice tray rack 22 and the ice maker rack 18 and then pull

forward the ice tray rack 22 by the handle 24 and then take it out of the ice maker rack 18. The magnet 26 and the magnetism-sensitive switch cooperatively perceive that the ice cube tray 23 is already taken out, and control the water supply assembly to stop supplying water. Then, cleaning may be performed for the ice cube tray 23. After cleaning of the ice cube tray 23, the user may firstly push back the ice tray rack 22 into the ice maker rack 18, and then rotate the knob 25 to lock the ice tray rack 22 and the ice maker rack 18. The magnetism-sensitive switch 17 and the magnet 26 cooperatively perceive that the ice cube tray 23 is placed back, and control the water supply assembly to perform water injection so as to continue ice making.

[0073] The ice maker 14 further includes an ice detection rod 21. The ice detection rod 21 is disposed on the ice-overturning motor 19 to detect whether the ice storage box 15 is full of ice cubes. The ice detection rod 21 detects the ice cubes in the ice storage box 15 by moving down from top under the drive of an ice detection shaft. When the ice storage box 15 is full of ice cubes, a descending angle of the ice detection rod 21 is small. On the other hand, when there is no or no sufficient ice in the ice storage box, the descending angle of the ice detection rod 21 is large. Thus, the amount of ice may be determined according to the change of the descending angle of the ice detection rod 21. If the ice detection rod determines that the ice storage box is full of ice, the water supply assembly is controlled to stop water injection, avoiding overflowing of ice in the ice storage box 15. If the ice detection rod determines that the ice storage box 15 is not full of ice, the water supply assembly is controlled to continue water injection so as to continue ice making and overturning.

[0074] As shown in FIG. 20, the water supply assembly includes a water tank 2, a filter 3, a water pump 7 and a water supply tube. The water tank 2 is disposed in the refrigerating compartment 20, and a water tank cover 5 is disposed at an upper opening of the water tank 2 to cover the water tank 2. The water tank cover 5 is covered on the opening of the water tank 2. When a user needs to add water, the user may simply push back the water tank cover 5 to expose the water inlet of the water tank, facilitating the user operation. Further, a sealing rubber strip 4 is disposed at the opening of the water tank 2 to seal the water tank cover 5 and the water tank 2, thus preventing water tank 2 from leaking water.

[0075] The filter 3 is disposed in the water tank 2 and fitted onto the water tank cover 5 by rotation so as to filter water in the water tank 2. Water in the water tank 2 is filtered by the filter 3 and flows out of the water tank 2 through the water outlet of the filter. The water inlet of the water pump 7 is connected with the water outlet of the filter to pump the filtered water. The water outlet of the water pump 7 is connected with an end of the water supply tube, and the other end of the water supply tube is connected to the ice cube tray 23. Thus, the water pumped by the water pump 7 is delivered to the ice cube tray 23 for ice making through the water supply tube.

[0076] In order to facilitate connection between the water outlet of the filter and the water inlet of the water pump 7, a water inlet rubber tube is connected between the water inlet of the water pump 7 and the water outlet of the filter. The hard water outlet of the filter and the hard water inlet of the water pump are connected by the soft water inlet rubber tube to avoid direct connection of the hard water inlet of the water pump and the hard water outlet of the filter.

[0077] The water supply tube includes a water outlet rubber tube 8, a water outlet PE tube, and a water outlet aluminum tube 12. An end of the water outlet rubber tube 8 is connected with the water outlet of the water pump 7, that is, the soft water outlet rubber tube 8 is connected with the hard water outlet of the water pump 7. The other end of the water outlet rubber tube 8 is connected with an end of the water outlet PE tube 9, the other end of the water outlet PE tube 9 is connected with an end of the water outlet aluminum tube 12, and the other end of the water outlet aluminum tube 12 is connected to the ice cube tray 23. In this way, the water in the water tank 2 is filtered by the filter 3 and then pumped by the water pump 7, and then passed through the water outlet rubber tube 8, the water outlet PE tube 9 and the water outlet aluminum tube 12 into the ice cube tray 23. In addition, a sealing rubber sleeve 11 is disposed between the water outlet PE tube 9 and the water outlet aluminum tube 12 to seal the connection of the water outlet PE tube 9 and the water outlet aluminum tube 12, thereby ensuring unobstructed water flow.

[0078] In this example, the water supply tube passes through the refrigerating compartment 20, the green vegetable preservation compartment 30 and the freezing compartment 40 in sequence, and the water supply tube is located outside of the internal air duct of the refrigerator body 10 to prevent the water in the water supply tube to freeze in a cold environment, thereby ensuring the water in the water tank 2 can be injected smoothly into the ice cube tray 23.

[0079] In the refrigerator of the examples of the present disclosure, the ice-making principle is as follows:

The water tank is disposed in the refrigerating compartment of the refrigerator. When the ice-making function of the refrigerator is enabled, the filtered water is pumped by the water pump from the water tank, and then injected into the ice cube tray through the water supply tube. The water in the ice cube tray is made into ice under the action of the cooling capacity from the air supply opening of the freezing compartment. The infrared sensor on the partition plate determines whether ice is already made or not based on the detected temperature. If the ice making is completed, the ice-overturning motor is controlled to overturn the ice cube tray to transfer the ice cubes in the ice cube tray into the ice storage box, and then overturn the ice cube tray back to continue ice making. After one ice making cycle, it is required to clean the ice cube tray. At this time, the user rotates the knob clockwise by 90

degrees to unlock the ice tray rack and the ice maker rack, and then pull forward the ice tray rack by the handle to take the ice tray rack and the ice cube tray out of the refrigerator for cleaning. When the ice tray rack is pulled forward, the magnet on the ice tray rack and the magnetism-sensitive switch on the partition plate cooperatively perceive that the ice cube tray is already taken out, and then the water supply assembly is controlled to stop supplying water. After the user completes cleaning the ice cube tray, the user may push back the ice tray rack by the handle to mount the ice tray rack into the ice maker rack, and then rotate the knob counterclockwise by 90 degrees to lock the ice tray rack and the ice maker rack. The magnet on the ice tray rack and the magnetism-sensitive switch on the partition plate cooperatively perceive that the ice cube tray is already placed back, and then the water supply assembly is controlled to start supplying water so as to continue ice making.

[0080] In the refrigerator, the ice cube tray can be dismounted by detachable connection of the ice tray rack and the ice maker rack, and thus, the structure is simple and operation is easy to do. In addition, the magnet on the ice tray rack and the magnetism-sensitive switch on the partition plate cooperatively perceive whether the ice cube tray is taken out so as to determine whether to stop water injection, thereby realizing accurate control of water injection, avoiding continued water injection to the ice cube tray after the ice cube tray is taken out, resulting in irregular ice cubes.

[0081] Based on the refrigerator with an ice maker in the above examples of the present disclosure, the examples of the present disclosure further provide an ice maker mounting method.

[0082] As shown in FIG. 21, when an ice maker is mounted in the refrigerator, an ice maker rack 18, an ice tray rack 22, an ice cube tray 23, an ice-overturning motor 19, an ice storage box 15, a magnet 26, a handle 24, a knob 25 and an ice detection rod 21 are firstly assembled into an ice maker 14 by combination; then, a partition plate 1 is inverted, and a magnetism-sensitive switch 17and an infrared sensor 16 are mounted in corresponding grooves at the bottom of the partition plate 1; then the ice maker is mounted at the bottom of the partition plate 1 and connected to the partition plate 1 by a buckle; then after the partition plate 1 and the ice maker 14 are assembled, the assembly is stored for later use; finally, the partition plate 1 and the ice maker 14 are mounted into the refrigerator body together, which specifically includes: supporting the backs of the partition plate 1 and the ice maker 14 on a rear air duct of the freezing compartment 40 and then mounting them rotatably to horizontal along the dotted line with the contact point of the partition plate 1 and the air duct as a support point.

[0083] In the current mounting process of the ice maker, the partition plate 1 is firstly mounted, and then the ice maker is mounted to the partition plate 1 on the production line. Because the freezing compartment 40 is generally is located below, staff is required to crouch down to reach his hand into the refrigerator body 10 for mounting. Because the components of the ice maker are small and there is blind spot, it is difficult to observe and mount them, which thus slows down the mounting speed. Further, these components are possibly not mounted to be in place even with much manpower.

[0084] In some examples of this disclosure, firstly foaming is performed for the partition plate 1 between the green vegetable preservation compartment 30 and the freezing compartment 40, and then the ice maker 14 is mounted onto the partition plate 1, and finally the ice maker 14 and the partition plate 1 already assembled are together mounted into the freezing compartment 40 of the refrigerator on a production line. In this mounting manner, the partition plate 1 and the ice maker 14 are assembled off production line so that the ice maker can be mounted on a stationary production line during the whole mounting process, avoiding the phenomenon of improper mounting caused by limited operation space, inconvenience and limited range of sight in the moving production line and refrigerator body. It is required for the staff to simply mount the integrated partition plate and ice maker into the refrigerator on the production line, simplifying staff operation, reducing problems arising from the mounting process, improving the mounting efficiency of the staff, reducing the blind spot, saving manpower and increasing mounting quality.

[0085] In this example, when the refrigerator with an ice maker is mounted, the water supply assembly is firstly mounted, that is, the water tank 2, the filter 3 and the water tank cover 5 and the like are mounted, where the water supply assembly can be wholly pulled out for adding water or dismounted; then, the water pump 7 is connected to the water inlet rubber tube 6 and the water outlet rubber tube 8, and then mounted to the partition plate between the refrigerating compartment 20 and the green vegetable 30, the water outlet rubber tube 8 is connected to the water outlet PE tube 9, and the sealing rubber sleeve 11 of the water outlet PE tube 9 is connected to the water outlet aluminum tube 12; then, the ice maker is mounted as described in the above examples. In this way, the tedious mounting process of the staff in the production line is simplified, the mounting quality is improved and mounting efficiency is increased.

[0086] After the ice maker is mounted, the examples of the present disclosure further provide an ice maker water injection control method. The ice maker water injection control method includes: mounting the magnetism-sensitive switch 17 at the bottom of the partition plate 1 in the freezing compartment, fixedly mounting the magnet 26 on the side wall of the ice tray rack 22, and ensuring the magnet 26 exactly faces the magnetism-sensitive switch 17 when the ice tray rack 22 and the ice cube tray 23 are mounted to be in place; monitoring, in real time, whether the magnetism-sensitive switch 17 senses the magnet 26; if the magnetism-sensitive switch 17 senses the magnet 26, it indicates that the ice tray is mounted to be in place, the magnetism-sensitive switch 17 is con-

trolled to generate a disconnection signal that is sent to the controller, and the controller controls water injection to be continued for the ice tray according to the disconnection signal, so as to complete a series of water injection and ice making operations. If the magnetism-sensitive switch 17 fails to sense the magnet 26, it indicates that the ice tray is already taken out, the magnetism-sensitive switch 17 is controlled to generate a closing signal that is sent to the controller, and the controller controls the water injection to be discontinued for the ice tray according to the closing signal. In this way, it is avoided that the water injection is still continued after the ice tray is taken out, resulting in ice cube lumping in the ice storage box 15.

[0087] In the present disclosure, whether the ice tray is mounted to be in place can be determined accurately by the magnetism-sensitive switch 17 and the magnet 26 so as to complete a series of water injection and ice making operations, avoiding continued water injection after the ice tray is taken out. Further, interference factors are fewer, reliability is high, thus greatly improving the accurate control of the water injection of the ice maker.

[0088] After the water injection is performed for the ice tray, the water in the ice cube tray 23 will be frozen up under the action of the cooling capacity of the freezing compartment. It is required to perform ice overturning operation after the ice is made. The examples of the present disclosure provide an ice maker ice-overturning control method.

[0089] As shown in FIG. 22, the ice maker ice-overturning control method in the examples of the present disclosure includes the following steps.

[0090] At step S100, a temperature of ice cubes in the ice cube tray is detected by the infrared sensor.

[0091] In this example, the infrared sensor is mounted at the bottom of the partition plate between the green vegetable preservation compartment and the freezing compartment to perceive the temperature of water or ice in the ice cube tray in real time.

[0092] At step S200, the temperature and the ice making time detected by the infrared sensor are obtained.

[0093] After detecting the temperature of water or ice in the ice cube tray, the infrared sensor sends it to the controller, and the controller receives the temperature information; in addition, the controller further obtains the ice making time. The value of the ice making time tZB is obtained based on the following rule:

1) In a defrosting state, the ice making time tZB is not counted.

2) After the ice maker starts to make ice (for example, power on for 10 mins each time), the temperature detected by the infrared sensor is obtained; if the temperature detected by the infrared sensor reaches the second preset temperature (Tice≤-3°C), the ice making time tZB starts to be calculated from zero; if Tice > -1°C, the ice making time tZB is cleared to zero.

3) When the ice maker starts to run and does not expire, if the freezing start or stop point is less than -21°C, the ice making time tZB is controlled based on a set value; otherwise, the ice making time tZB is controlled based on the set value -21°C.

[0094] At step S300, it is determined whether the ice-overturning motor performs ice-overturning operation according to the temperature and the ice-making time detected by the infrared sensor.

[0095] After obtaining the temperature and the ice making time from the infrared sensor, the controller performs determination based on the set procedure to control the ice maker to perform ice-overturning operation. The determination procedure is as shown in FIG. 23:

[0096] At step S301, it is determined whether the ice making time exceeds the first preset time.

[0097] At step S302, if the ice making time exceeds the first preset time, it is determined whether the temperature detected by the infrared sensor reaches the first preset temperature.

[0098] At step S303, the temperature detected by the infrared sensor reaches the first preset temperature, the ice-overturning motor is controlled to perform ice-overturning operation.

[0099] When the ice making time obtained by the controller exceeds the first preset time (for example, 80min, in case of water injection failure time, 180min), the controller obtains the temperature Tice detected by the infrared sensor; if the temperature Tice detected by the infrared sensor reaches the first preset temperature (e.g. -12°C), the controller determines the ice cube in the ice cube tray is already made and may control the ice maker to perform ice-overturning operation.

[0100] The determination procedure may also be as shown in FIG. 24.

[0101] At step S311, it is determined whether the temperature detected by the infrared sensor reaches the third preset temperature.

[0102] At step S312, if the temperature detected by the infrared sensor reaches the third preset temperature, the duration of the temperature is recorded.

[0103] At step S313, it is determined whether the duration of the temperature reaches the second preset time.

[0104] At step S314, if the duration of the temperature reaches the second preset time, the ice-overturning motor is controlled to perform ice-overturning operation.

[0105] When the temperature detected by infrared sensor and obtained by the controller reaches the third preset temperature (e.g. -20°C), the duration of the temperature is started to be recorded, and it is determined whether the duration of the temperature reaches the second preset time (e.g. 30min, in case of water injection failure, 180min); the duration of the temperature reaches the second preset time, it is determined that the ice cubes in the ice cube tray are already made and the ice maker is controlled to perform ice-overturning operation. That is, when the temperature of water or ice in the ice cube

tray reaches a given value and changes little in a very long time, it indicates that the ice cubes in the ice cube tray are already made.

[0106] The determination procedure may also be as shown in FIG. 25:

At step S321, the temperature of the cryogenic storage compartment where the ice maker is located is obtained.

At step S322, it is determined whether the temperature of the cryogenic storage compartment reaches the fourth preset temperature.

At step S323, if the temperature of the cryogenic storage compartment reaches the fourth preset temperature, the duration of the temperature is recorded.

At step S324, it is determined whether the duration of the temperature reaches the third preset time.

At step S325, if the duration of the temperature reaches the third preset temperature, the ice-overturning motor is controlled to perform ice-overturning operation.

[0107] The infrared sensor on the partition plate may fail. When the infrared sensor fails, whether the ice making is completed by the temperature of the freezing compartment where the ice maker is located, that is, by obtaining the temperature of the freezing compartment. If the temperature of the freezing compartment reaches the fourth preset temperature (e.g. 0-12°C), the duration of the temperature of the freezing compartment is started to be recorded, and it is determined whether the duration of the temperature reaches the third preset time (e.g. 20min). If the duration of the temperature reaches the third preset time, it is determined that ice cubes in the ice cube tray are already made, and the ice maker is controlled to perform ice-overturning operation.

[0108] In the ice maker ice-overturning control method of the examples of the present disclosure, the infrared sensor directly senses the temperature of water or ice in the ice cube tray so as to accurately determine the current situation of the ice making based on the temperature. Due to high sensitivity, complete formation of the ice cubes can be guaranteed, so that the ice maker is controlled accurately to perform ice-overturning operation, thereby avoiding ice cube lumping due to unsuccessful overturning in the refrigerator, and greatly improving the ice making efficiency.

[0109] It is noted that in the present disclosure, the terms "including", "containing" and any other variations are intended to encompass non-exclusive inclusion, so that a circuit structure, article or device including a series of elements includes not only those elements but also other elements not listed explicitly or those elements inherent to such a circuit structure, method, article or device. Without more limitations, an element defined by the statement "including a..." shall not be precluded to include additional same elements present in a circuit structure, method, article or device including the elements.

[0110] Other implementations of the present disclosure will be apparent to those skilled in the art from consideration of the specification and practice of the present disclosure herein. The present disclosure is intended to cover any variations, uses, modification or adaptations of the present disclosure that follow the general principles thereof and include common knowledge or conventional technical means in the related art that are not disclosed in the present disclosure. The specification and examples are considered as exemplary only, with a true scope and spirit of the present disclosure being indicated by the following claims.

[0111] The examples of the present disclosure described above do not constitute limitation to the scope of protection of the present disclosure.

Claims

1. A refrigerator with an ice maker, comprising:

a box body, having a cryogenic storage compartment comprising a cold storage compartment and a freezing compartment;

a partition plate, disposed at an inner liner of the box body to partition adjacent cryogenic storage compartments;

a water supply assembly disposed in the cold storage compartment;

an ice maker disposed in the freezing compartment and connected with the water supply assembly; the ice maker comprising:

an ice maker rack, disposed on the partition plate;

an ice tray rack, detachably mounted in the ice maker rack;

an ice cube tray, fixedly mounted in the ice tray rack;

an ice-overturning motor, disposed at an end of the ice maker rack to overturn the ice cube tray;

an ice storage box, disposed under the ice cube tray;

a magnet, disposed on the ice tray rack;

a magnetism-sensitive switch, disposed at the bottom of the partition plate to perceive whether the ice cube tray is taken out in cooperation with the magnet;

2. The refrigerator according to claim 1, wherein the ice maker further comprises: an infrared sensor disposed at the bottom of the partition plate to perceive a temperature of ice cubes in the ice cube tray;

3. The refrigerator according to claim 1, wherein the ice maker further comprises:

a handle, disposed at an end of the ice tray rack, where the handle and an end surface of the ice maker rack are in a same plane to facilitate taking out the ice cube tray;
a knob disposed at an end of the ice maker rack to rotatably lock or unlock the handle and the ice maker rack.

4. The refrigerator according to claim 1, wherein the ice maker further comprises:
an ice detection rod disposed on the ice-overturning motor to detect whether the ice storage box is full of ice cubes.

5. The refrigerator according to claim 1, wherein an air supply opening is disposed at a position inside the freezing compartment and close to the ice cube tray to supply cooling capacity to the ice cube tray.

6. The refrigerator according to claim 1, wherein the water supply assembly comprises:

a water tank disposed in the cold storage compartment;
a filter disposed in the water tank to filter water in the water tank;
a water pump connected with a water outlet of the filter; and
a water supply tube connected with a water outlet of the water pump to supply water in the water tank to the ice cube tray.

7. The refrigerator according to claim 6, wherein a water inlet rubber tube is connected between a water inlet of the water pump and the water outlet of the filter to pump water in the water tank.

8. The refrigerator according to claim 6, wherein the water supply tube comprises:

an water outlet rubber tube connected with the water outlet of the water pump;
an water outlet PE tube in communication with the water outlet rubber tube;
an water outlet aluminum tube in communication with the water outlet PE tube; where the water outlet aluminum tube is in communication with the ice cube tray; and
a connection sealing rubber sleeve connected with the water outlet PE tube and the water outlet aluminum tube respectively.

9. The refrigerator according to claim 8, wherein the water supply tube is disposed outside of an air duct in the box body.

10. An ice maker mounting method, being applied to the refrigerator with an ice maker according to any one of claims 1-9, comprising:

assembling the ice maker rack, the ice tray rack, the ice cube tray, the ice-overturning motor, the ice storage box, the magnet, the handle, the knob and the ice detection rod into an ice maker;
mounting the infrared sensor and the magnetism-sensitive switch at the bottom of the partition plate;
mounting the ice maker at the bottom of the partition plate; and
mounting the assembled partition plate and ice maker together into the freezing compartment of the box body.

11. A refrigerator with an ice maker, comprising:

a box body, having a cryogenic storage compartment;
a partition plate disposed on an inner liner of the box body to partition adjacent cryogenic storage compartments;
an ice maker, disposed in the cryogenic storage compartment; the ice maker comprising an ice maker rack disposed on the partition plate, an ice cube tray detachably mounted in the ice maker rack, an ice-overturning motor disposed at an end of the ice maker rack, and an ice storage box disposed below the ice cube tray;
an infrared sensor disposed on the partition plate to detect a temperature of ice cubes in the ice cube tray;
a controller connected with the infrared sensor and the ice-overturning motor respectively; where the controller is configured to:

obtain a temperature and an ice making time detected by the infrared sensor ; and
determine whether the ice-overturning motor performs ice overturning operation according to the temperature and the ice making time detected by the infrared sensor.

12. The refrigerator according to claim 11, wherein the controller is configured to:

determine whether the ice-making time exceeds a first preset time;
if the ice making time exceeds the first preset time, determine whether the temperature detected by the infrared sensor reaches a first preset temperature;
if the temperature detected by the infrared sensor reaches the first preset temperature, control the ice-overturning motor to perform ice overturning operation.

13. The refrigerator according to claim 12, wherein the

controller is further configured to:

after the ice maker starts to make ice, obtain the temperature detected by the infrared sensor;
determine whether the temperature detected by the infrared sensor reaches a second preset temperature;
if the temperature detected by the infrared sensor reaches the second preset temperature, start to calculate the ice making time from zero.

14. The refrigerator according to claim 11, wherein the controller is further configured to:

determine whether the temperature detected by the infrared sensor reaches a third preset temperature;
if the temperature detected by the infrared sensor reaches the third preset temperature, record a duration of the temperature;
determine whether the duration of the temperature reaches a second preset time;
if the duration of the temperature reaches the second preset time, control the ice-overturning motor to perform ice overturning operation.

15. The refrigerator according to claim 11, wherein the controller is further configured to:

obtain a temperature of the cryogenic storage compartment where the ice maker is located;
determine whether the temperature of the cryogenic storage compartment reaches a fourth preset temperature;
if the temperature of the cryogenic storage compartment reaches the fourth preset temperature, record a duration of the temperature;
determine whether the duration of the temperature reaches a third preset time;
if the duration of the temperature reaches the third preset time, control the ice-overturning motor to perform ice overturning operation.

16. The refrigerator according to claim 11, wherein a groove is disposed at the bottom of the partition plate, a buckle is disposed in the groove, and the infrared sensor is fixed in the groove through the buckle.

17. The refrigerator according to claim 16, wherein a line terminal is disposed in the groove, and the infrared sensor is electrically connected with the line terminal.

18. The refrigerator according to claim 16, wherein an infrared probe of the infrared sensor faces the ice cube tray to detect a temperature in the ice cube tray.

19. An ice maker ice-overturning control method, comprising:

detecting a temperature of ice cubes in an ice cube tray by an infrared sensor;
obtaining a temperature and an ice-making time detected by the infrared sensor;
determining whether the ice-overturning motor performs ice-overturning operation according to the temperature and the ice making time detected by the infrared sensor.

20. A refrigerator with an ice maker, comprising:

a refrigerator body, having a cryogenic storage compartment;
a partition plate, disposed at an inner liner of the refrigerator body to partition the cryogenic storage compartments;
an ice maker disposed in the cryogenic storage compartment; the ice maker comprising:

an ice maker rack, fixedly mounted on the partition plate;
a ice tray rack, detachably mounted in the ice maker rack;
a magnet, disposed on the ice tray rack;
a magnetism-sensitive switch, disposed at the bottom of the partition plate to perceive whether the ice tray is injected with water in cooperation with the magnet.

21. The refrigerator with an ice maker according to claim 20, wherein a groove is disposed at the bottom of the partition plate, and the magnetism-sensitive switch is fixedly mounted in the groove.

22. The refrigerator with an ice maker according to claim 21, wherein,
a water inlet is disposed on the partition plate, the water inlet corresponds to the ice tray, and the groove is close to the water inlet.

23. The refrigerator with an ice maker according to claim 21, wherein a switch cover plate is disposed on the magnetism-sensitive switch, a first buckling groove and a second buckling groove are disposed on both ends of the switch cover plate respectively, a first buckle and a second buckle are disposed at an opening of the groove respectively, the first buckling groove is fitted with the first buckle, and the second buckling groove is fitted with the second buckle.

24. The refrigerator with an ice maker according to claim 21, wherein a mounting groove is disposed at a side wall of the ice tray, the mounting groove corresponds to the groove, and the magnet is clamped into the mounting groove.

25. The refrigerator with an ice maker according to claim 20, wherein the refrigerator further comprises a con-

troller, and the magnetism-sensitive switch perceives a position of the ice tray in cooperation with the magnet to send a signal for starting or stopping water injection to the controller.

26. The refrigerator with an ice maker according to claim 20, wherein the ice tray comprises:

an ice tray rack detachably mounted in the ice maker rack;
an ice cube tray disposed in the ice tray rack;
an ice-overturning motor disposed at a side of the ice tray rack;
an ice detection rod disposed on the ice-overturning motor.

27. The refrigerator with an ice maker according to claim 26, wherein the magnet is disposed on the ice tray rack.

28. An ice maker water injection control method, being applied to the refrigerator with an ice maker according to any one of claims 20-27, comprising:

monitoring whether a magnetism-sensitive on a partition plate senses a magnet on an ice tray;
if the magnetism-sensitive switch senses the magnet, controlling the magnetism-sensitive switch to generate a disconnection signal and controlling the ice tray to perform water injection according to the disconnection signal;
if the magnetism-sensitive switch fails to sense the magnet, controlling the magnetism-sensitive switch to generate a closing signal and controlling the ice tray to stop performing water injection according to the closing signal.

29. A refrigerator with an ice maker, comprising:

a refrigerator body, having a cryogenic storage compartment comprising a refrigerating compartment, a green vegetable preservation compartment and a freezing compartment;
a partition plate, disposed at an inner liner of the refrigerator body to partition cryogenic storage compartments;
a water supply assembly disposed in the refrigerating compartment;
an ice maker disposed in the freezing compartment;
a water supply tube communicating the water supply assembly with the ice maker;
wherein a water storage mechanism in communication with the water supply tube is disposed above a water outlet of an end of the water supply tube close to the ice maker to store water flowing out of the water supply tube in a case of the water outlet of the water supply tube being frozen up.

30. The refrigerator with an ice maker according to claim 29, wherein the water supply tube comprises:

a first tube connected with a water outlet of the water supply assembly and penetrated through the partition plate between the refrigerating compartment and the green vegetable preservation compartment;
a second tube connected with an upper end of the first tube, where the water storage mechanism is sleeved at an outer side of the second tube and communicates with the second tube;
a sealing sleeve connected with the second tube, where a lower end of the second tube is embedded in the sealing sleeve; and
a third tube connected with the sealing sleeve, where an outer side of the sealing sleeve is embedded on an upper end of the third tube, and a lower end of the third tube is in communication with the ice maker.

31. The refrigerator with an ice maker according to claim 30, wherein the water storage mechanism comprises a water storage tube, and a water storage amount of a water storage zone formed by the water storage tube and the second tube is greater than the water amount of one injection of the ice maker.

32. The refrigerator with an ice maker according to claim 31, wherein the second tube is provided with a water hole through which the water storage tube is in communication with the second tube.

33. The refrigerator with an ice maker according to claim 32, wherein a flow rate of the water hole is greater than a flow rate of a water inlet of the second tube.

34. The refrigerator with an ice maker according to claim 32, wherein a lower end of the water storage tube is funnel-shaped and the water hole is disposed at a tube wall of the second tube close to the funnel.

35. The refrigerator with an ice maker according to claim 31,wherein,
a plurality of support ribs are disposed between an inner wall of the water storage tube and an outer wall of the second tube.

36. The refrigerator with an ice maker according to claim 31, wherein the water storage tube and the second tube are in one-piece structure.

37. The refrigerator with an ice maker according to claim 31, wherein the water storage tube is close to the lower end of the second tube.

38. The refrigerator with an ice maker according to claim 30, wherein the first tube is a rubber tube, the second tube is a PE tube, and the third tube is an aluminum tube.

39. A refrigerator with an ice maker, comprising:

a box body, having a cryogenic storage compartment comprising a cold storage compartment, a wild vegetable compartment and a freezing compartment;
a partition plate disposed at an inner liner of the box body to partition adjacent cryogenic storage compartments;
a water supply assembly disposed in the cold storage compartment;
an ice maker disposed in the freezing compartment;
a water supply tube communicating the water supply assembly with the ice maker;
a fourth tube communicating the water supply tube with the water supply assembly so that the water supply assembly, the water supply tube and the fourth tube form a circulation passage when a water outlet at an end of the water supply tube close to the ice maker is frozen up.

40. The refrigerator with an ice maker according to claim 3, wherein the water supply tube comprises:

a first tube connected with the water outlet of the water supply assembly and penetrated through the partition plate between the cold storage compartment and the wild vegetable compartment;
a second tube penetrating through the wild vegetable compartment, where an upper end of the second tube is connected with the first tube;
a sealing sleeve connected with the second tube, where a lower end of the second tube is embedded in the sealing sleeve;
a third tube connected with the sealing sleeve, where an outer side of the sealing sleeve is embedded on an upper end of the third tube, a lower end of the third tube is in communication with the ice maker;
where one end of the fourth tube is in communication with the first tube and the other end is in communication with the water supply assembly.

41. The refrigerator with an ice maker according to claim 40, wherein an air hole is disposed at an end of the first tube close to the water supply assembly, and the fourth tube communicates with the air hole with the water supply assembly.

42. The refrigerator with an ice maker according to claim 41, wherein an end of the fourth tube is connected with the air hole, and the other of the fourth tube is inserted into the water supply assembly.

43. The refrigerator with an ice maker according to claim 40, wherein the fourth tube is presented as inclined, and both ends of the fourth tube have different inclination degrees.

44. The refrigerator with an ice maker according to claim 43, wherein along a water flowing direction of the fourth tube, a distance between the end of the fourth tube close to the first tube and the first tube is gradually increased, and a distance between the end of the fourth tube close to the water supply assembly and the water supply assembly is gradually reduced.

45. The refrigerator with an ice maker according to claim 40, wherein the fourth tube and the first tube are in one-piece structure.

46. The refrigerator with an ice maker according to claim 40, wherein the water supply assembly comprises a water tank, a filter, a water pump, and a water tank end cover, the filter is located inside the water tank, a water outlet of the filter is connected with a water inlet of the water pump, and a water outlet of the water pump is connected with the first tube; the water tank end cover is disposed at an upper opening of the water tank, and a side of the fourth tube away from the first tube penetrates through the water tank end cover.

47. The refrigerator with an ice maker according to claim 46, wherein a limiting rib is disposed at an end of the fourth tube close to the water tank, and the limiting rib is abutted against the water tank end cover.

48. The refrigerator with an ice maker according to claim 47, wherein an end of the fourth tube penetrating through the water tank end cover is located at another side of the filter away from the water pump.

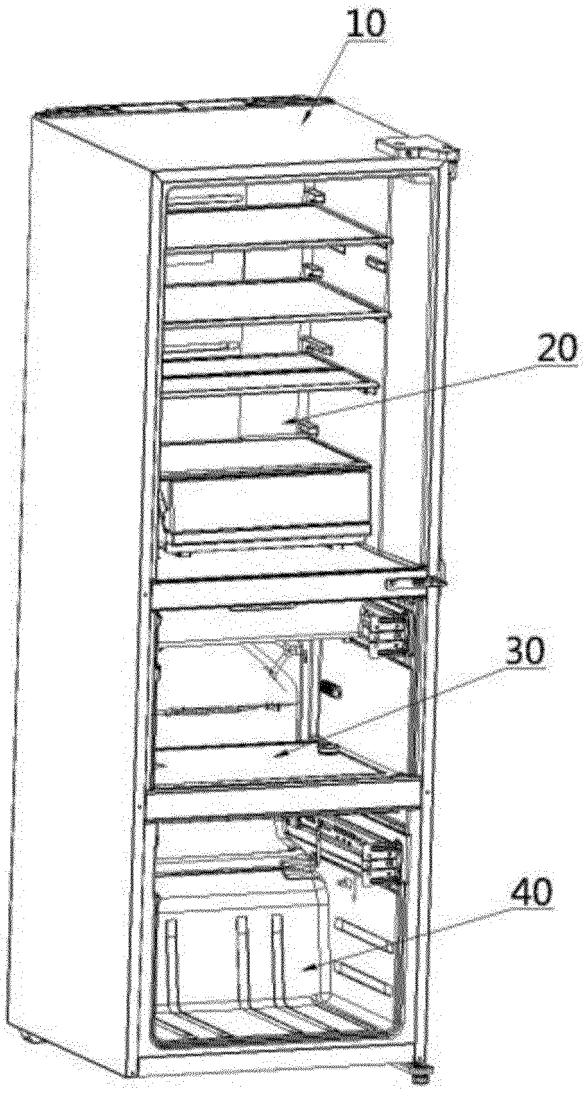


FIG. 1

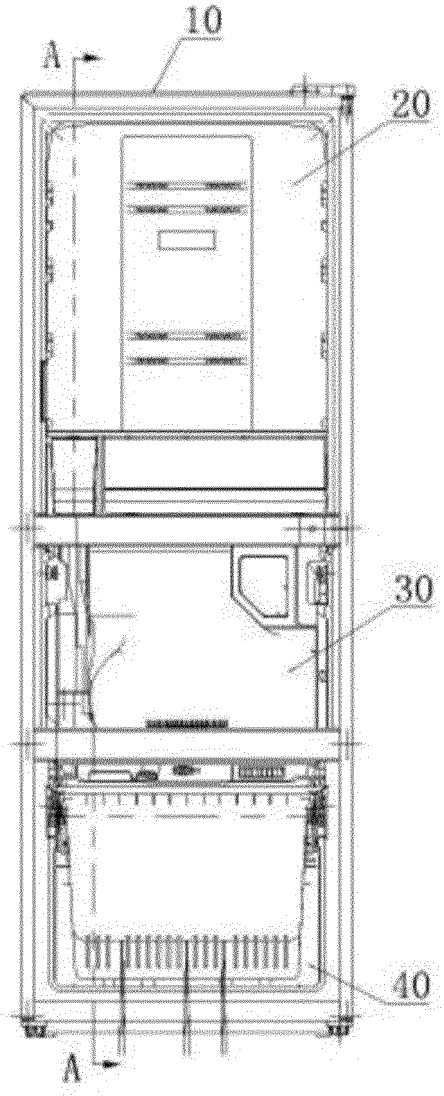


FIG. 2

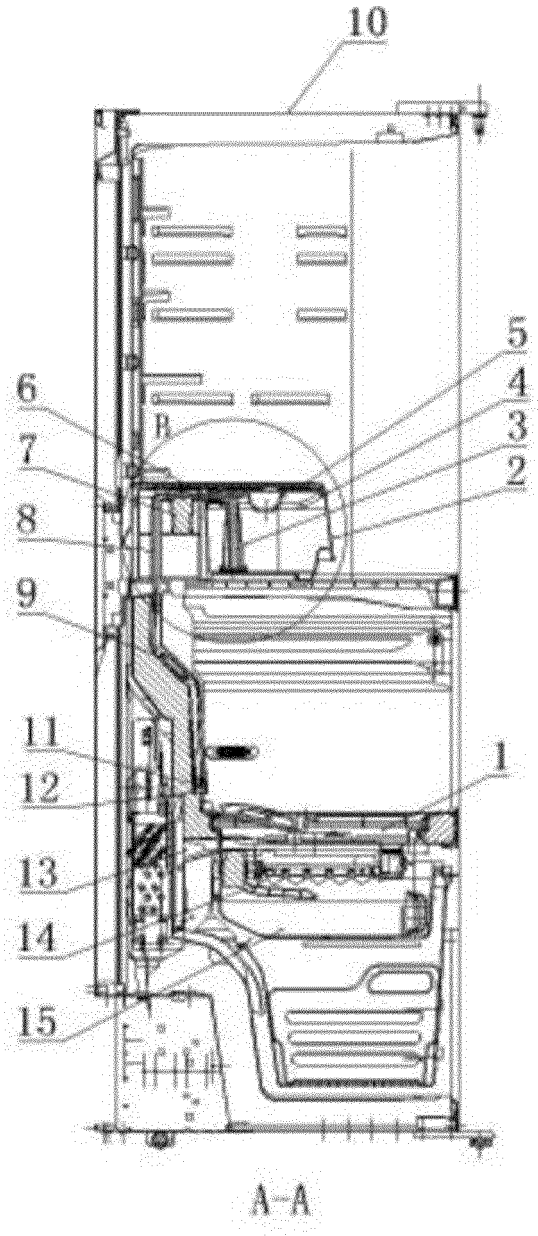


FIG. 3

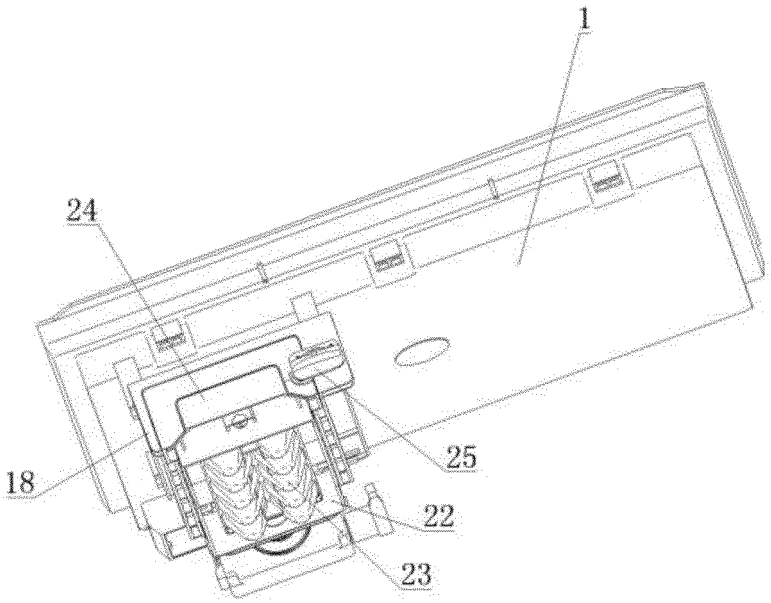


FIG. 4

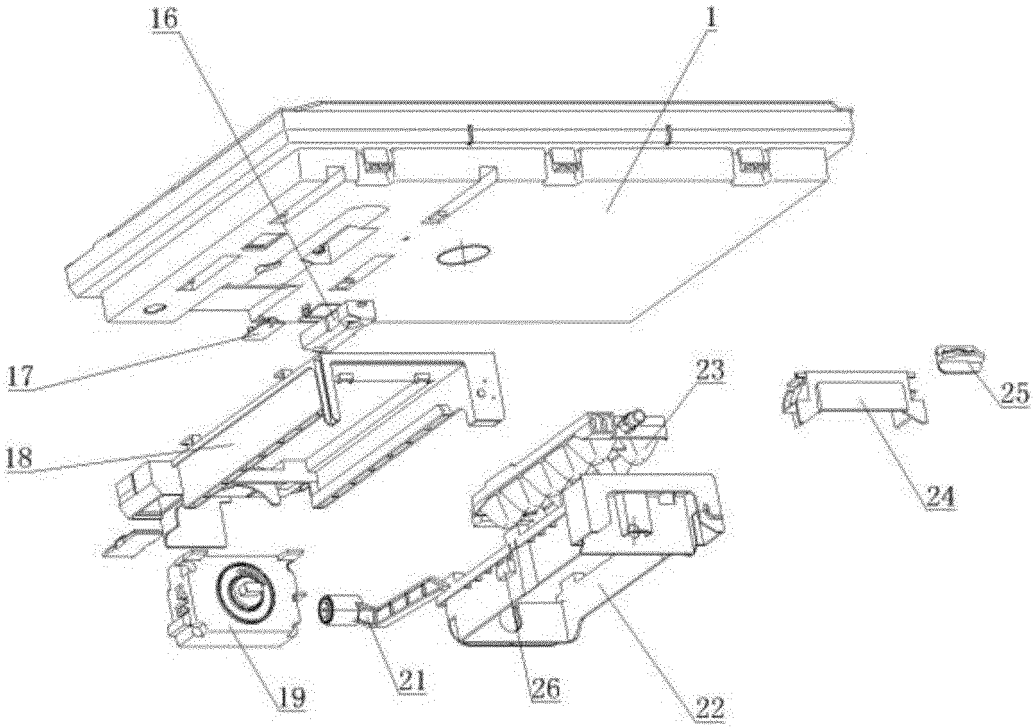


FIG. 5

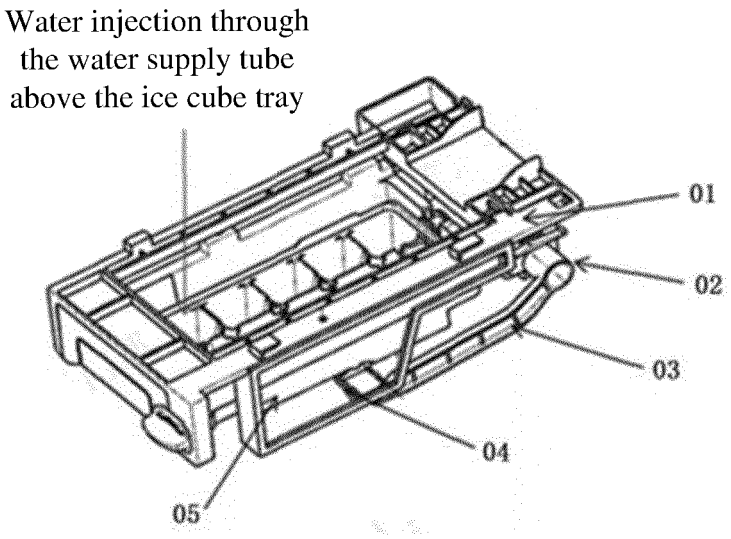

Water injection through the water supply tube above the ice cube tray
01
02
03
04
05

FIG. 6

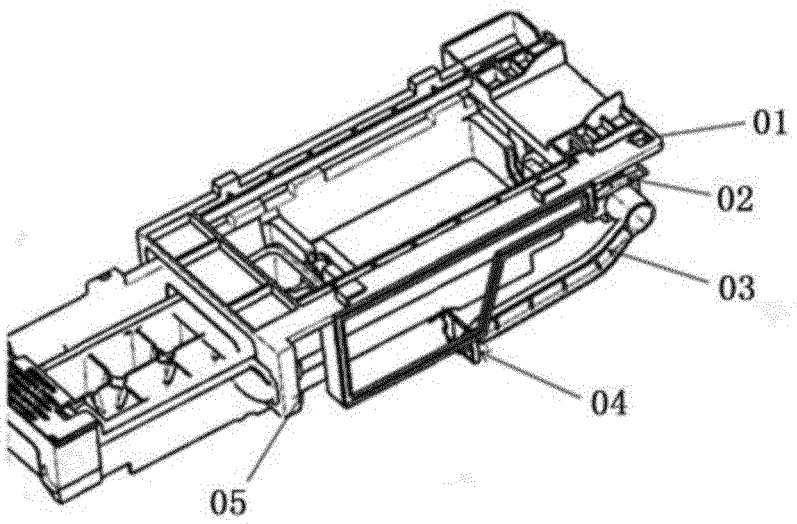

01
02
03
04
05

FIG. 7

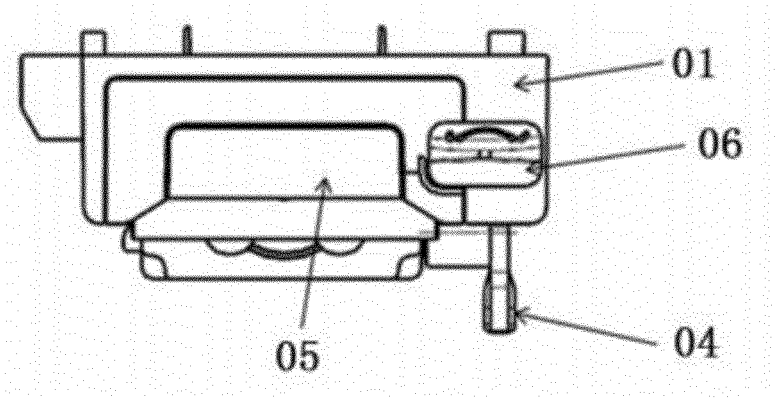


FIG. 8

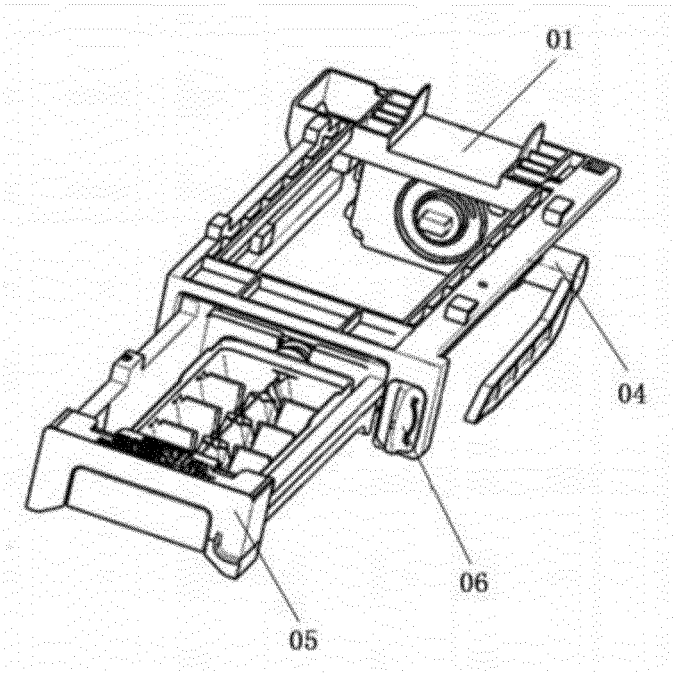


FIG. 9

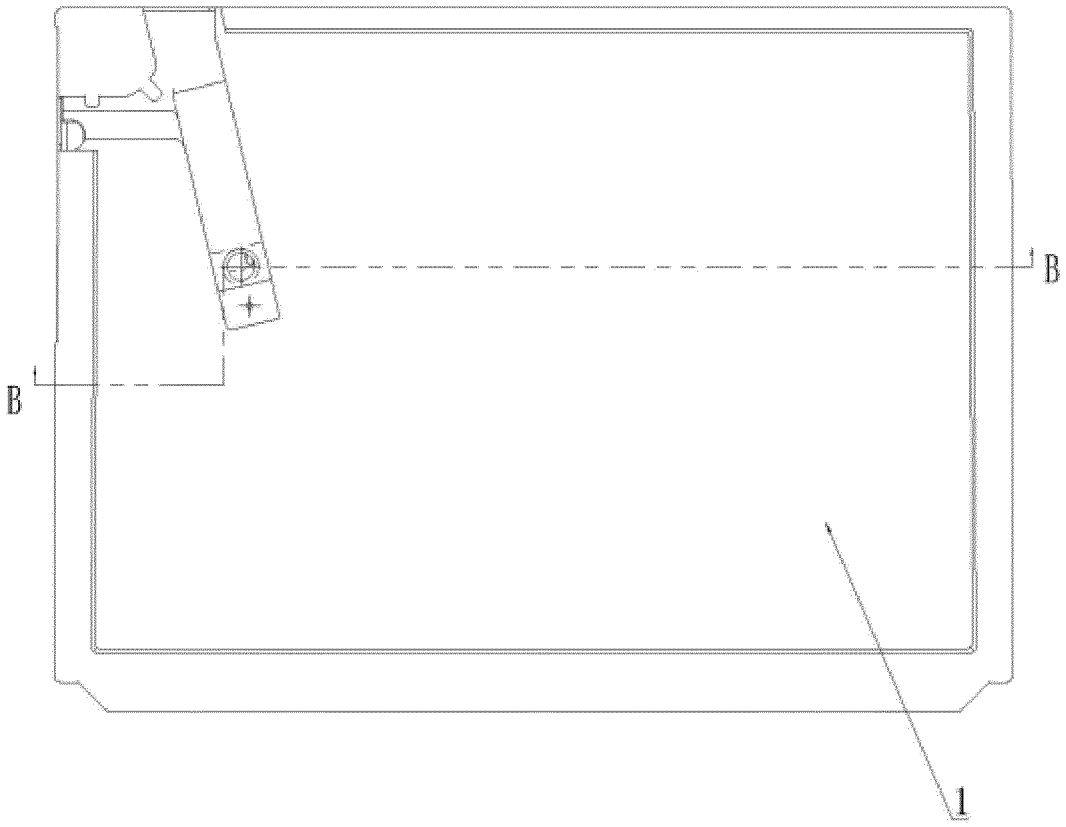


FIG. 10

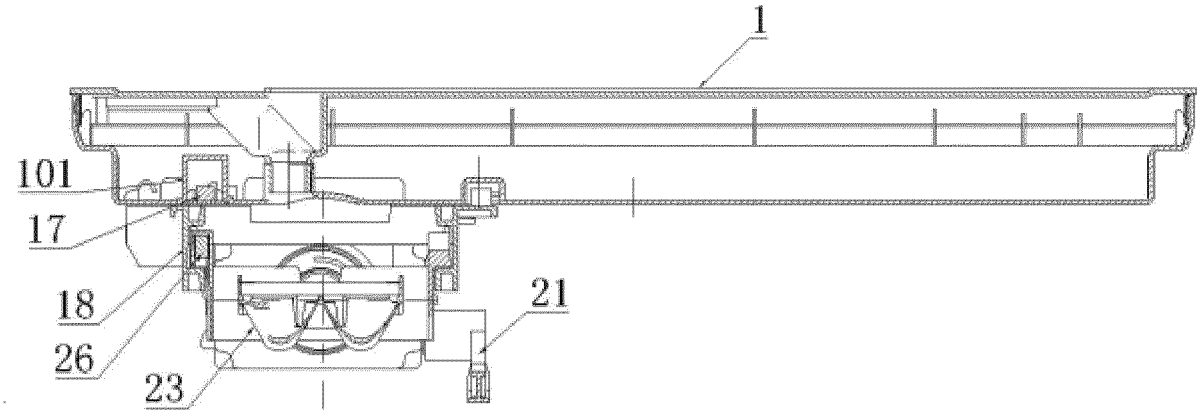


FIG. 11

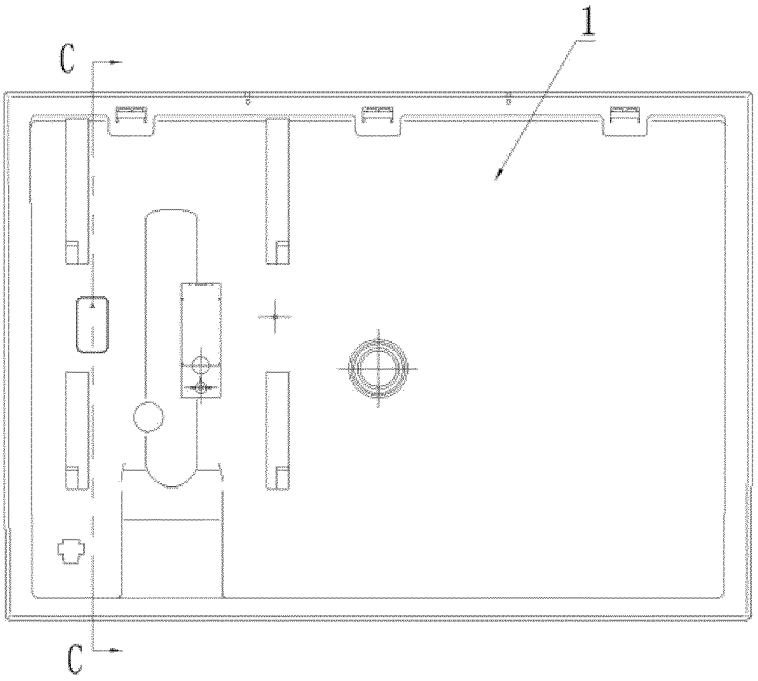


FIG. 12

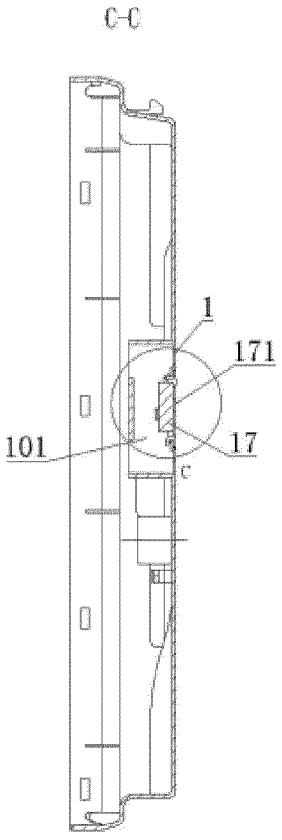
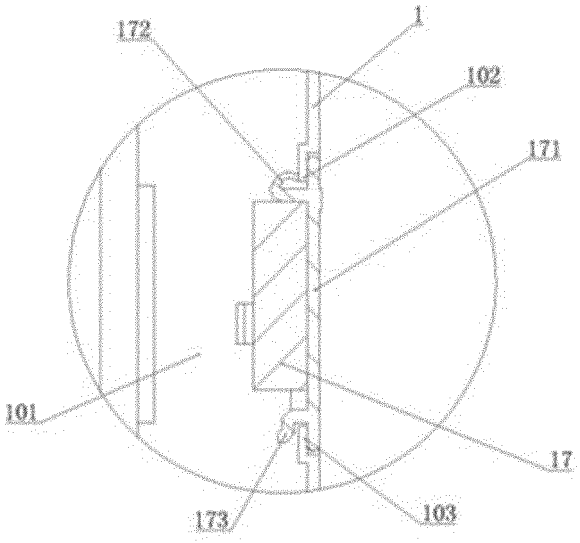


FIG. 13



enlarged view of position C

FIG. 14

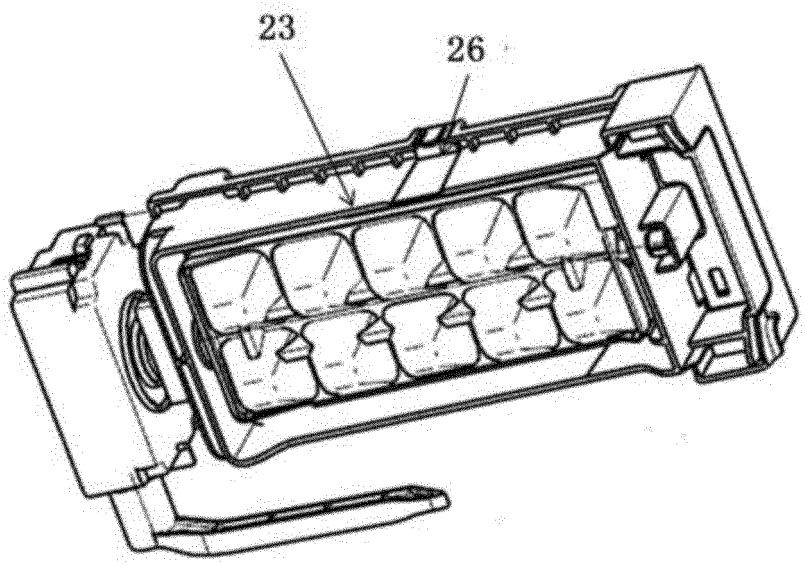


FIG. 15

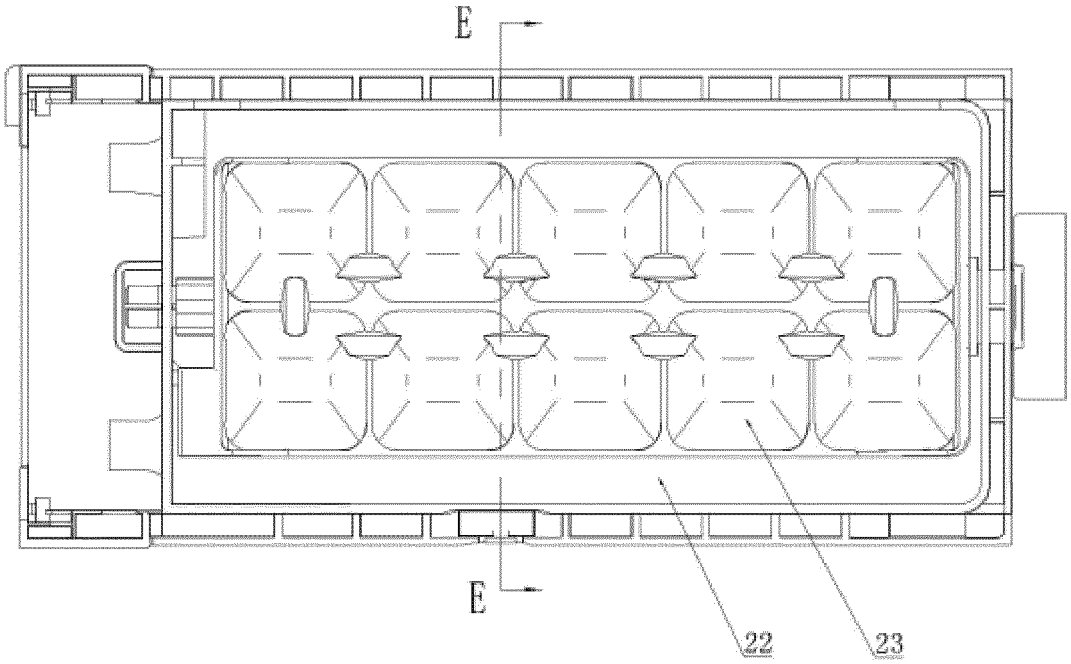


FIG. 16

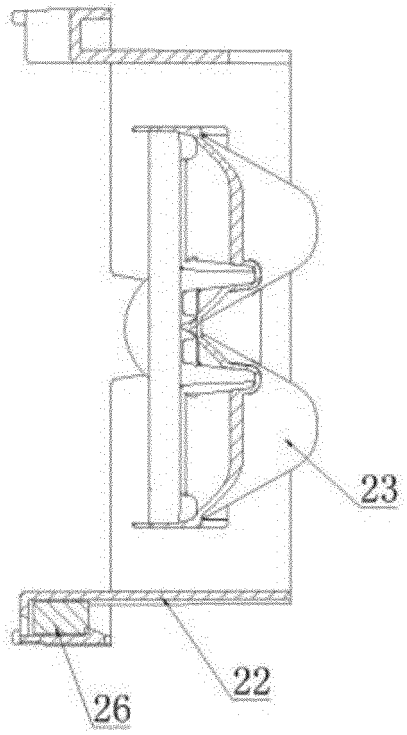


FIG. 17

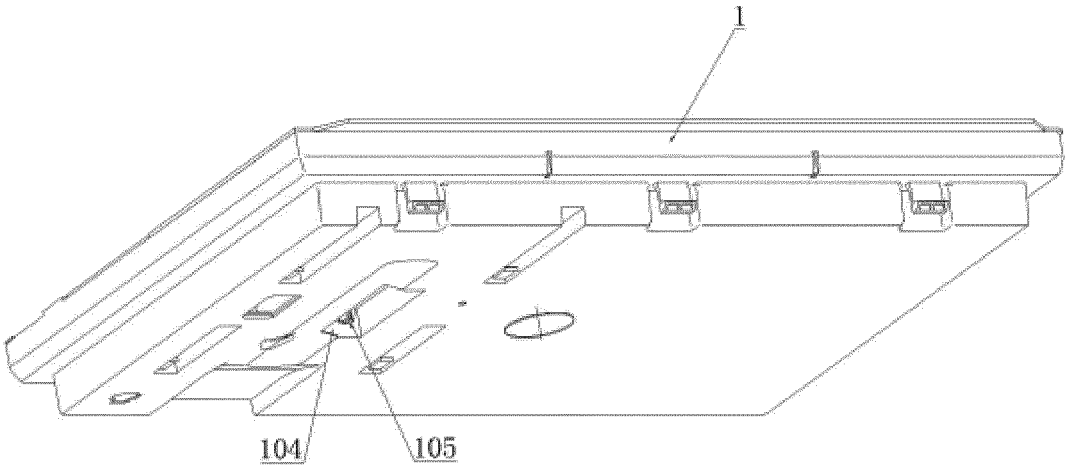


FIG. 18

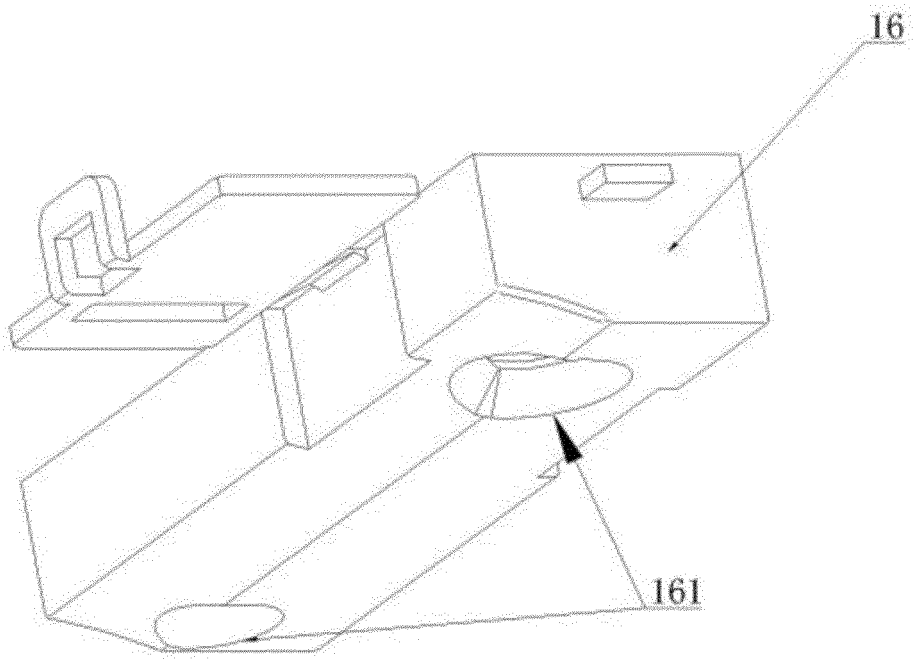
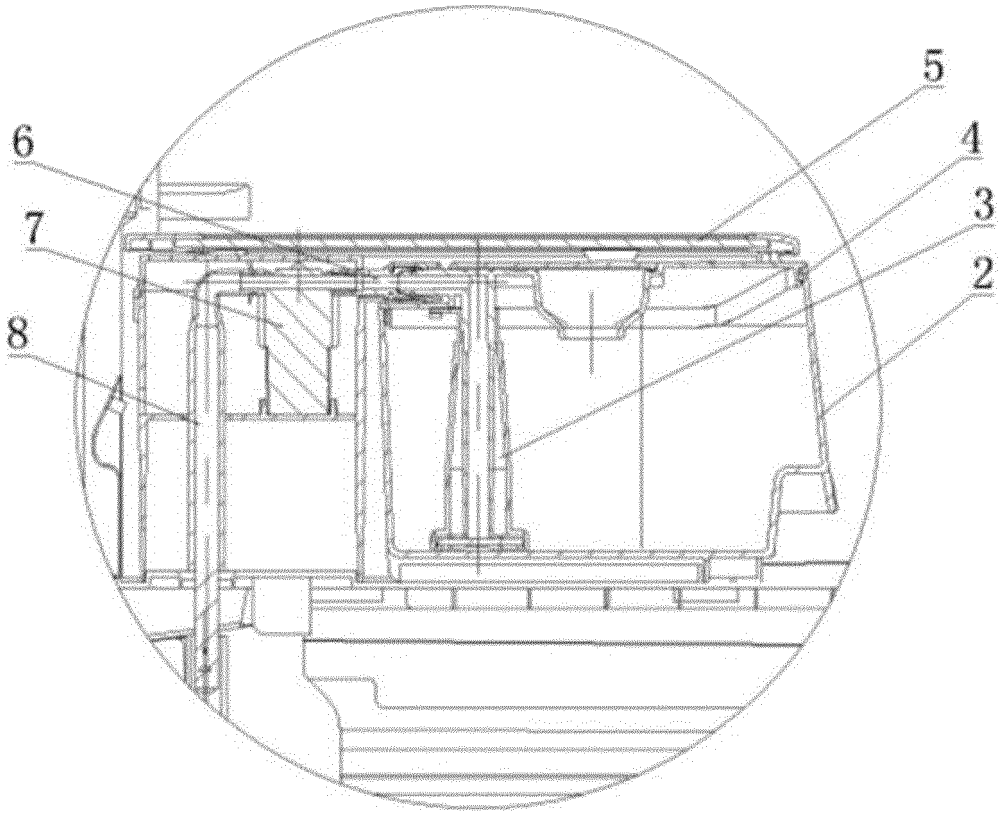


FIG. 19



enlarged view of position B

FIG. 20

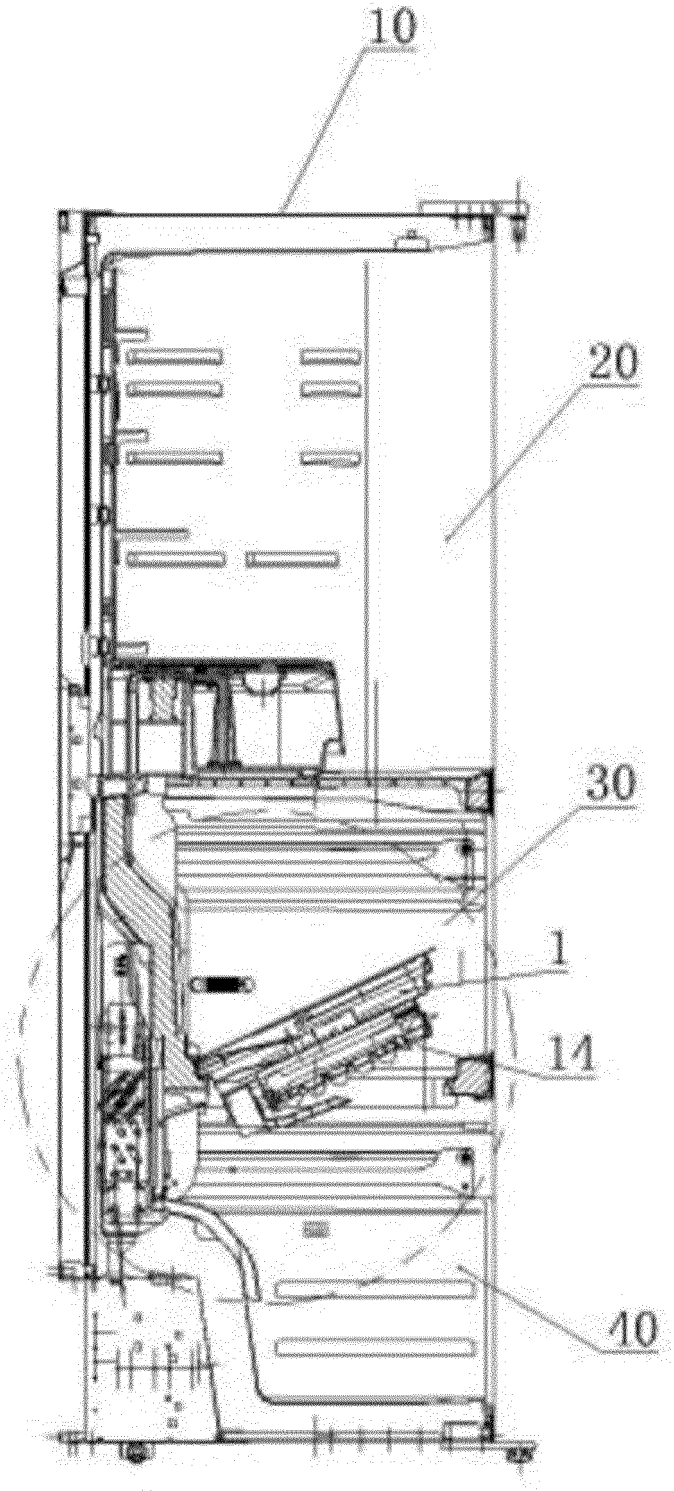


FIG. 21

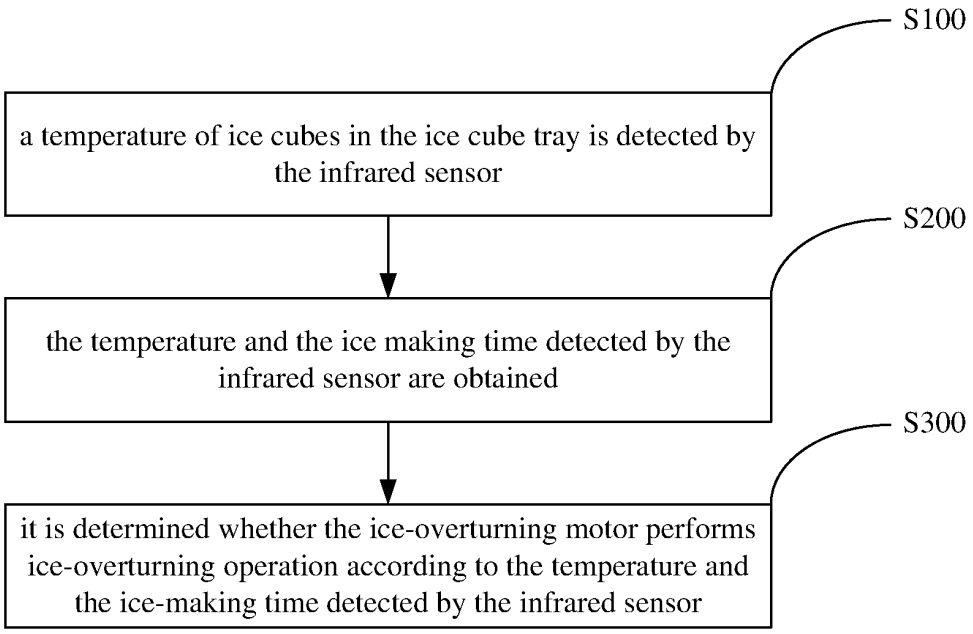

S100
a temperature of ice cubes in the ice cube tray is detected by the infrared sensor
S200
the temperature and the ice making time detected by the infrared sensor are obtained
S300
it is determined whether the ice-overturning motor performs ice-overturning operation according to the temperature and the ice-making time detected by the infrared sensor

FIG. 22

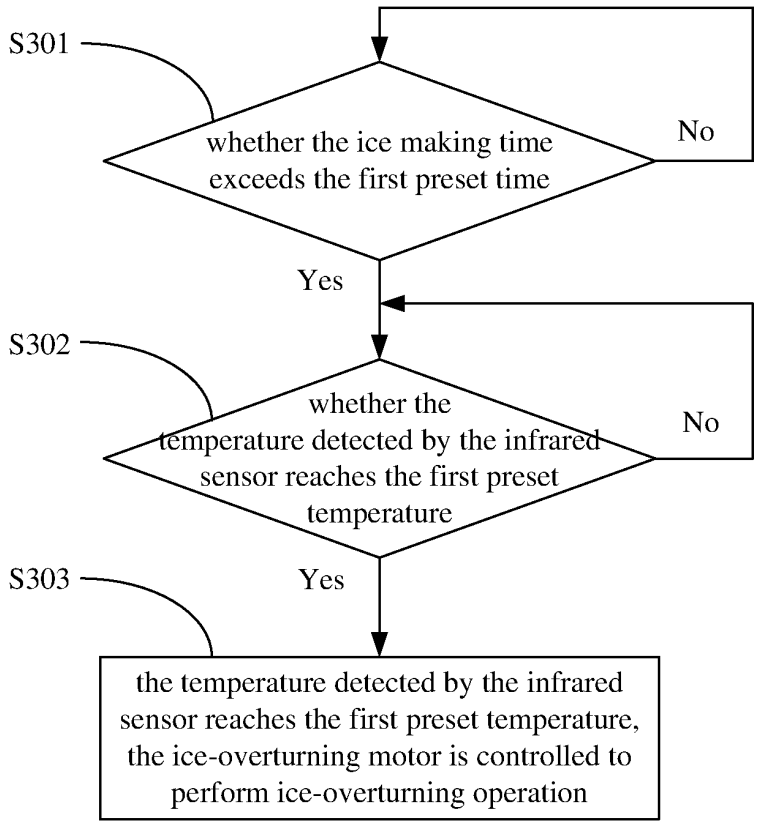

S301
whether the ice making time exceeds the first preset time
No
Yes
S302
whether the temperature detected by the infrared sensor reaches the first preset temperature
No
Yes
S303
the temperature detected by the infrared sensor reaches the first preset temperature, the ice-overturning motor is controlled to perform ice-overturning operation

FIG. 23

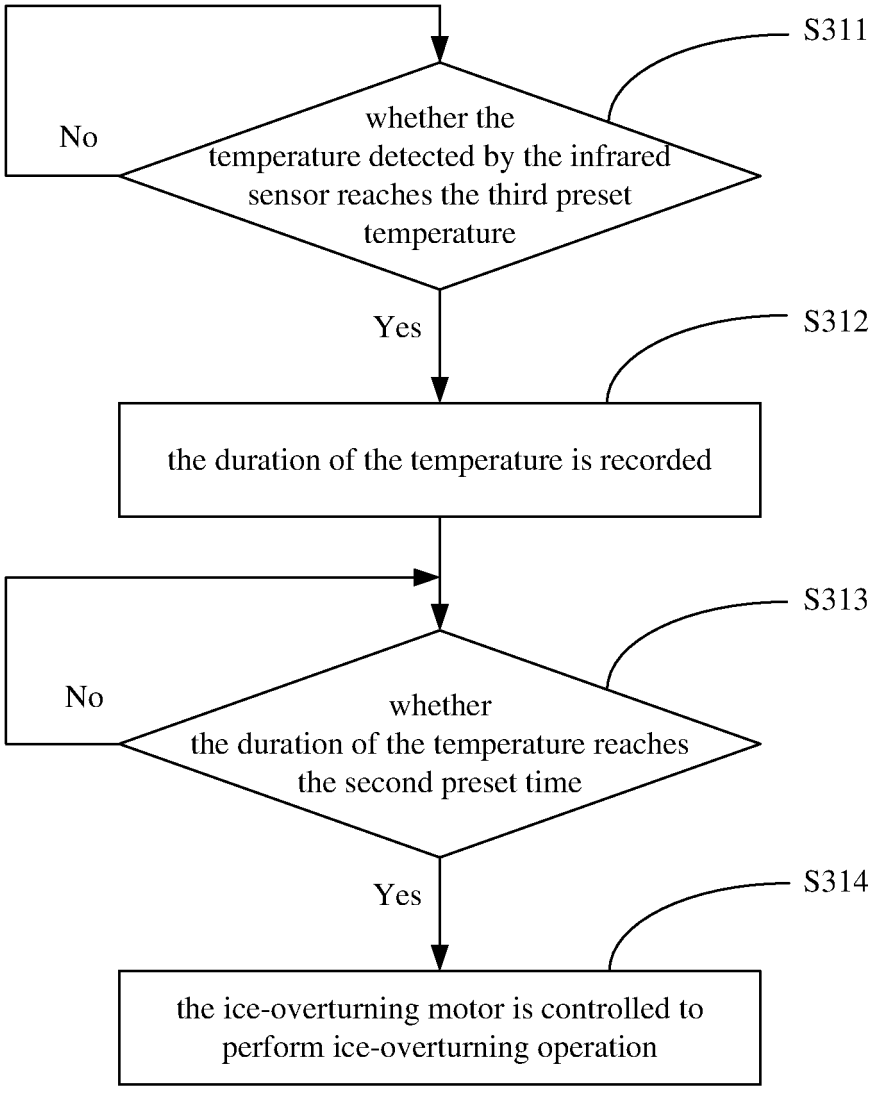

S311
whether the temperature detected by the infrared sensor reaches the third preset temperature
No
Yes
S312
the duration of the temperature is recorded
S313
whether the duration of the temperature reaches the second preset time
No
Yes
S314
the ice-overturning motor is controlled to perform ice-overturning operation

FIG. 24

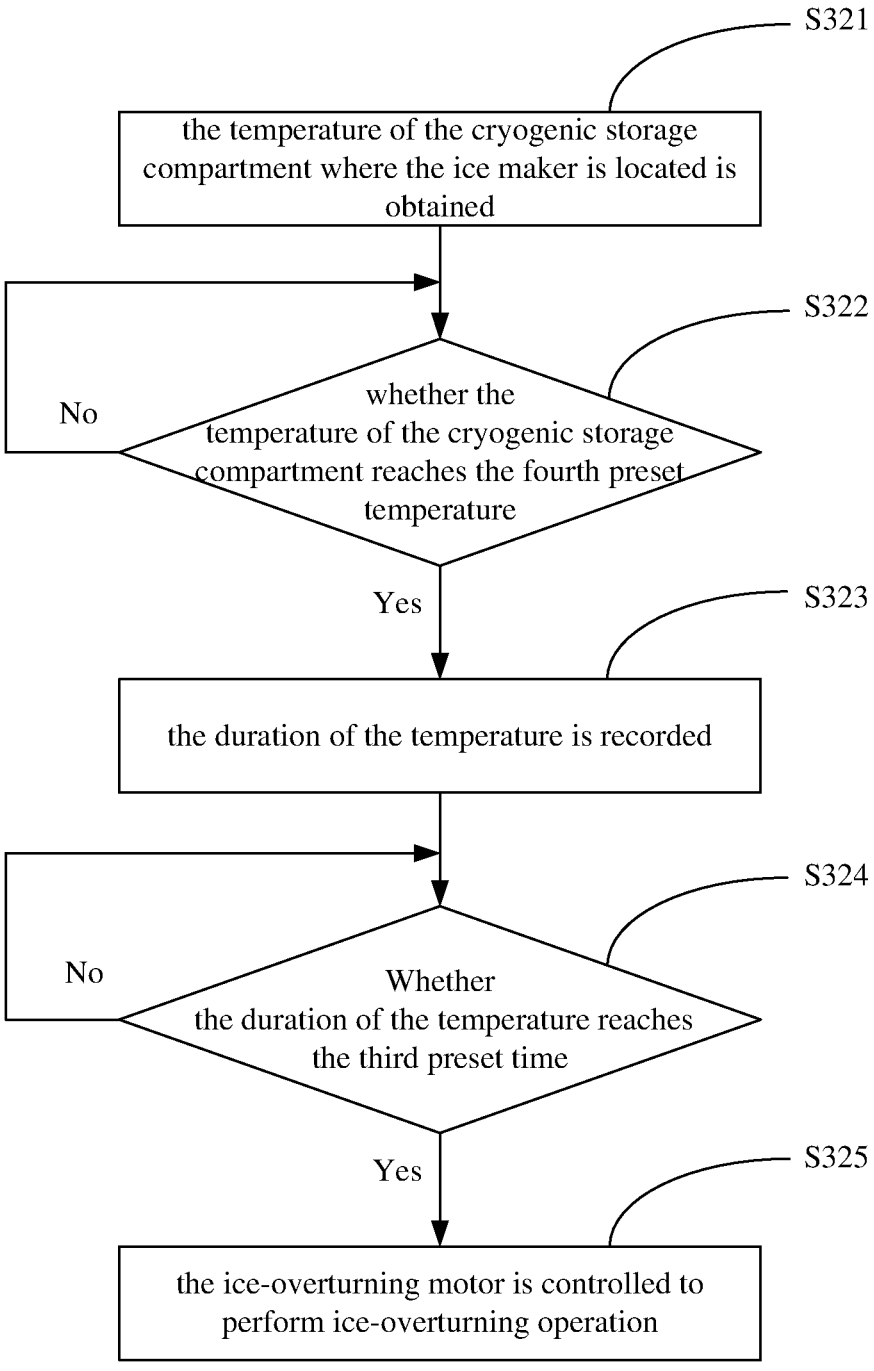

S321
the temperature of the cryogenic storage compartment where the ice maker is located is obtained
S322
whether the temperature of the cryogenic storage compartment reaches the fourth preset temperature
No
Yes
S323
the duration of the temperature is recorded
S324
Whether the duration of the temperature reaches the third preset time
No
Yes
S325
the ice-overturning motor is controlled to perform ice-overturning operation

FIG. 25

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/088736

A. CLASSIFICATION OF SUBJECT MATTER

F25D 23/12(2006.01)i; F25C 5/04(2006.01)i; F25C 1/10(2006.01)i; F25C 1/246(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)

F25D; F25C

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, 隔板, 支架, 马达, 电机, 翻冰, 脱冰, 磁敏, 取出, 红外, 传感器, 可拆, 时间, 温度, 注水, 储水, 溢, refrigerator, separator, support, bracket, motor, magnetic, sensor, detachable, time, temperature, water, injection, storage, overflow

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 104567167 A (QINGDAO HAIER CO., LTD.) 29 April 2015 (2015-04-29) description, paragraphs [0018]-[0036], and figures 1-7	11-18, 29, 39
Y	CN 107763914 A (QINGDAO HAIER CO., LTD.) 06 March 2018 (2018-03-06) description, paragraphs [0019]-[0035], and figures 1 and 2	11-18
X	CN 107763914 A (QINGDAO HAIER CO., LTD.) 06 March 2018 (2018-03-06) description, paragraphs [0019]-[0035], and figures 1 and 2	19
Y	CN 109724340 A (QINGDAO HAIER CO., LTD.) 07 May 2019 (2019-05-07) description, paragraphs [0023]-[0047], and figures 1-5	29
Y	CN 102494448 A (HEFEI MIDEA ROYALSTAR REFRIGERATOR CO., LTD. et al.) 13 June 2012 (2012-06-13) description, paragraphs [0030]-[0043], and figures 1 and 2	39
A	CN 103292535 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 11 September 2013 (2013-09-11) entire document	1-48

☑ 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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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
30 September 2020	**19 October 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** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/088736

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2003134253 A (HITACHI COMMUNICATION TECHNOLOGIES, LTD.) 09 May 2003 (2003-05-09) entire document	1-48

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/088736

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

[1] Independent claim 1 sets forth a refrigerator with an ice machine and independent claim 19 sets forth a method for controlling the turning of ice in an ice machine, which have in common only "an ice machine with an ice compartment", while "an ice machine with an ice compartment" is prior art in the field and cannot constitute a specific technical feature contributing to the invention, and therefore independent claims 1 and 19 do not have the same or corresponding specific technical features between them and do not form a single general inventive concept, and there is an obvious lack of unity of invention therebetween.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☑ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/088736

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 104567167 A	29 April 2015	CN 104567167 B	19 October 2016
CN 107763914 A	06 March 2018	WO 2019042333 A1	07 March 2019
CN 109724340 A	07 May 2019	None	
CN 102494448 A	13 June 2012	CN 102494448 B	12 March 2014
CN 103292535 A	11 September 2013	CN 103292535 B	02 December 2015
JP 2003134253 A	09 May 2003	None	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202010066347 **[0001]**
- CN 202010067809 **[0001]**
- CN 202010067823 **[0001]**
- CN 202010136659 **[0001]**
- CN 202010137740 **[0001]**
- CN 202020130385 **[0001]**
- CN 202020130425 **[0001]**
- CN 202020131640 **[0001]**