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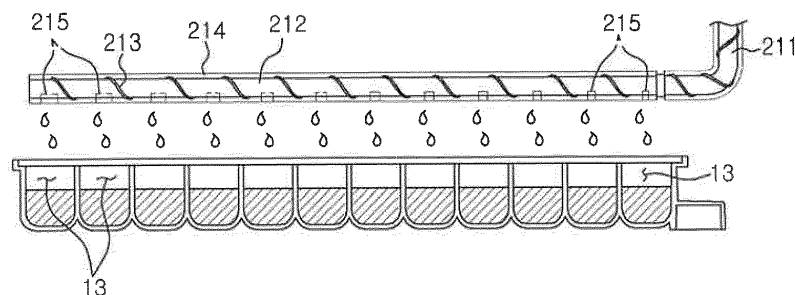
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(54) **ICE TRAY IN AN ICE MAKING DEVICE AND METHOD OF PRODUCING ICE**

(57) A refrigerator including an ice tray, comprising: a main body including a food storage space; a door installed in the main body and configured to open and close the food storage space; and an ice-making device installed in the food storage space, wherein the ice-making device comprises a case including a cooling space defined therein, a cooling unit configured to cool the cooling space, and an ice-making assembly disposed in the cooling space and configured to produce pieces of ice, the ice-making assembly including an ice tray having a plurality of independently-defined ice-making spaces (13) and manufactured by pressing a metal at one time and a water supply unit configured to supply water to the

ice-making spaces, the water supply unit comprises a feeder pipe (211) configured to feed water to the ice-making assembly, and a water supply pipe (212) coupled to the feeder pipe and disposed above the ice tray to extend along a longitudinal direction of the ice tray, and a plurality of water supply holes (215) is formed in the water supply pipe in the positions corresponding to the ice-making spaces so that water is supplied to the respective ice-making spaces through the respective water supply holes. The diameter of the water supply holes grows larger as the water supply holes are positioned farther away from the feeder pipe.

FIG.5



Description

RELATED APPLICATION

[0001] This application is based on and claims priority from Korean Patent Application No. 10-2015-0086165, filed on June 17, 2015, the disclosure of which is incorporated herein in its entirety by reference.

FIELD

[0002] The present disclosure relates to ice trays, refrigerator including the ice trays, and a method of manufacturing the ice trays.

BACKGROUND

[0003] A refrigerator is an apparatus for storing food at a relatively low temperature and may be configured to store food in a frozen state or a refrigerated state. A decision to store food in a frozen state or refrigerated state may depend on the kind of food to be stored.

[0004] The interior of the refrigerator is cooled by supplied cold air, in which the cold air is typically generated by a temperature exchange action of a refrigerant according to a cooling cycle including compression, condensation, expansion and evaporation. The cold air supplied to the inside of the refrigerator can be distributed in the refrigerator by convection. Thus, items within the refrigerator can be stored at a desired temperature.

[0005] A refrigerator typically includes a main body having a rectangular parallelepiped shape with an open front side. A refrigerating compartment (e.g., refrigerating space, portion, room, etc.) and a freezing compartment (e.g., freezing space, portion, room, etc.) may be provided within the main body. A refrigerating compartment door and a freezing compartment door for selectively closing and opening the refrigerator compartment and the freezing compartment may be provided on the front side or surface of the main body. A plurality of drawers, shelves and container boxes for storing different kinds of food in a desired state may be provided in the internal storage spaces of the refrigerating compartment and freezing compartment.

[0006] Conventionally, mainstream refrigerators are top-mount-type refrigerators having a freezing compartment positioned at an upper side or portion of the refrigerator and a refrigerating compartment positioned at the lower side or portion of the refrigerator. There are also commercially available bottom-freeze-type refrigerators. Bottom-freeze-type refrigerators can enhance user convenience in which a more frequently-used refrigerating compartment is positioned at an upper portion of the refrigerator and a less frequently used freezing compartment is positioned at a lower portion of the refrigerator. This provides an advantage in that a user can conveniently use the refrigerating compartment. However, the bottom-freeze-type refrigerators (in which the freezing

compartment is positioned at the lower portion or side) can pose an inconvenience when a user does access the freezing compartment, in that a user typically has to bend at the waist to open the freezing compartment door (e.g., to take out pieces of ice, food, etc.).

[0007] Traditional attempts at solving the above problem in the bottom freeze type refrigerators have included an ice dispenser installed in the refrigerating compartment or refrigerating compartment door in some implementations. In this approach, the refrigerating compartment door or the inside of the refrigerating compartment may be provided with an ice maker which generates ice.

[0008] The ice-making device may include an ice-making assembly provided with an ice tray for producing pieces of ice (e.g., in various shapes including cubes, cylindrical, semi-spherical, etc.), an ice bucket which stores the pieces of ice, and a feeder assembly which feeds the pieces of ice stored in the ice bucket to the dispenser.

[0009] In a conventional ice tray, a plurality of ice-making spaces capable of retaining water are formed on the upper surface of a tray body. A water supply port capable of distributing water to the ice-making spaces is formed on one surface of the tray body. Water distribution grooves are formed between the ice-making spaces. Thus, the ice-making spaces are connected to one another in a manner that allows water to flow between the ice-making spaces. Accordingly water supplied through the water supply port is supplied to one of the ice-making spaces and is distributed to the next ice-making space through each of the water supply grooves. As a result, the ice-making spaces are supplied with water.

[0010] However, in conventional ice trays the water supply grooves are typically provided between the ice-making spaces, as a result some water is typically retained in the water supply grooves. Consequently, pieces of ice produced in the ice tray may have a shape corresponding to both the ice-making spaces and also the water supply grooves. That is to say, there may be a potential problem in that the pieces of ice produced in the conventional ice tray form a single mass having a plurality of ice pieces or cubes connected to one another.

[0011] In order to solve this problem, a cutting unit for cutting the single mass into individual pieces of ice is typically provided in the ice-making device. However, even if the pieces of ice forming a single mass are cut by the cutting unit, the size and shape of the resulting pieces of ice or ice cubes may not be uniform.

[0012] Furthermore, conventional ice trays are typically manufactured by a method of melting and injecting aluminum. In the case of the injection molding method, the strength and mechanical properties of a product can typically only be maintained when the thickness of aluminum is about 2 mm or more. However, if the thickness of the ice tray increases, there is a potential problem in that the heat exchange rate of the ice tray decreases. Furthermore, the aluminum injection molding method suffers from a problem in that the post-processing process is complex and the cleaning is difficult to perform.

SUMMARY

[0013] The present disclosure provides an ice tray capable of producing pieces of ice in the form of a plurality of separated ice pieces or cubes. Furthermore, the present disclosure provides a method which is capable of easily manufacturing an ice tray. In addition, the present disclosure provides a refrigerator including an ice tray, which is capable of uniformly supplying water to the ice tray.

[0014] According to one embodiment, a refrigerator: a main body including a food storage space; a door installed on the main body and configured to open and close the food storage space; and an ice-making device installed in the food storage space. The ice-making device comprises a body or case including a cooling space defined therein, a cooling unit configured to cool the cooling space, and an ice-making assembly disposed in the cooling space and configured to produce pieces of ice. The ice-making assembly includes an ice tray having a plurality of independently-defined ice-making spaces and a water supply unit configured to supply water to the ice-making spaces. The ice tray can be manufactured by pressing a metal at one time. The water supply unit comprises a feeder pipe configured to feed water to the ice-making assembly, and a water supply pipe connected to the feeder pipe and disposed above the ice tray to extend along, the water supply pipe includes a plurality of water supply holes formed in positions corresponding to the ice-making spaces so that water is supplied to the respective ice-making spaces through the respective water supply holes.

[0015] In one embodiment, the diameter of the water supply holes grows larger as the water supply holes are positioned farther away from the feeder pipe. A heater configured to heat the water supply pipe can be provided on the water supply pipe in such a fashion as to surround an outer circumference of the water supply pipe. A heater waterproof member configured to prevent the heater from making contact with water can be provided outside the heater in such a fashion as to surround the heater and the outer circumference of the water supply pipe.

[0016] In one embodiment, the ice tray of an ice-making device can comprise: a tray body configured to provide ice-making spaces that retain water; and a plurality of partition walls extending upward from a bottom surface of the tray body and configured to define the ice-making spaces as a plurality of independent ice-making spaces, wherein the tray body and the partition walls are made of a metallic material and are manufactured by a press work at one time. The tray body and the partition walls can be made of a material selected from a group consisting of stainless steel, copper and copper alloy.

[0017] In one exemplary implementation, a method of producing ice comprises: filling an ice tray with water from a feeder pipe that has holes aligned to ice making spaces of the ice tray; supplying cold air to the ice tray and water; and ejecting resulting pieces of ice from the ice tray. The

method can further comprise supplying the water to the feeder pipe from a water supply pipe. In one embodiment, an amount of water supplied to the ice-making spaces becomes uniform. The method can also include heating the feeder pipe and water supply pipe to prevent ice clogging the respective feeder pipe and water supply pipe. A heater waterproof member can be used to reduce moisture contact with a heater. The ice tray can also be heated to facilitate release of the piece of ice.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

FIG. 1 is a perspective view of an ice tray according to one aspect of the present disclosure.

FIG. 2 is a front view of a refrigerator provided with an ice-making device including the ice tray illustrated in FIG. 1.

FIG. 3 is an exploded perspective view of the ice-making device provided in the refrigerator illustrated in FIG. 2.

FIG. 4 is a side sectional view of the ice-making device illustrated in FIG. 3.

FIG. 5 is a view for explaining a structure by which water is supplied to an ice tray of the ice-making device illustrated in FIG. 4.

FIG. 6 is a flowchart illustrating a method of making ice (e.g., in an ice tray illustrated in FIG. 2, etc.).

DETAILED DESCRIPTION

[0019] Reference will now be made in detail to the preferred embodiments, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the preferred embodiments, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one ordinarily skilled in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the current invention.

[0020] In the following detailed description, reference is made to the accompanying drawings, which form a part hereof. The illustrative embodiments described in the detailed description, drawings, and claims are not meant to be limiting. Other embodiments may be utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented here.

[0021] One or more exemplary embodiments of the present disclosure will be described more fully hereinafter with reference to the accompanying drawings, in which one or more exemplary embodiments of the disclosure can be easily determined by those skilled in the art. As those skilled in the art will realize, the described exemplary embodiments may be modified in various different ways, without departing from the spirit or scope of the present disclosure, which is not limited to the exemplary embodiments described herein.

[0022] It is noted that the drawings are schematic and are not necessarily dimensionally illustrated. Relative sizes and proportions of parts in the drawings may be exaggerated or reduced in their sizes, and a predetermined size is just exemplificative and not limitative. The same reference numerals designate the same structures, elements, or parts illustrated in two or more drawings in order to exhibit similar characteristics.

[0023] The exemplary embodiments of the present disclosure may illustrate example implementations of the present disclosure in more detail. As a result, other implementations with various modifications of the drawings are expected. Accordingly, the exemplary embodiments are not limited to a specific form of the illustrated region, and for example, include a modification of a form by manufacturing.

[0024] FIG. 1 is a perspective view of an ice tray according to one aspect of the present disclosure. Referring to FIG. 1, the ice tray 10 provides ice-making spaces 13 in which water is phase-transformed into pieces of ice. The shape of the pieces of ice produced in the ice-making spaces 13 may correspond to the shape of the ice-making spaces 13. Specifically, the ice tray 10 includes a tray body 11 having an upper surface on which a plurality of ice-making spaces 13 for retaining water are formed, and a plurality of partition walls 12 extending in an up-down direction from a bottom surface of the tray body 11. The partition walls 12 are disposed between the ice-making spaces 13 to define the ice-making spaces 13 as a separate independent spaces. The conventional water supply grooves interconnecting a plurality of ice-making spaces are omitted.

[0025] The ice-making spaces 13 may have variety of different shapes, such as the illustrated shape, a cube, a cylinder, a star shape, a heart shape, and so on.

[0026] As the conductivity of the ice tray 10 grows higher, it becomes possible for the ice tray 10 to improve the heat exchange rate between water and a cold air, whereby the ice tray 10 can serve as one kind of heat exchanger. While not illustrated in the drawings, the ice tray 10 may include cooling ribs for increasing the contact area of the ice tray 10 with the cold air.

[0027] The ice tray 10, namely the tray body 11 and the partition walls 12, may be manufactured by pressing a metal such as stainless steel, copper or copper alloy. Since the ice tray 10 has a simple structure in which the ice-making spaces 13 are formed on the upper surface of the tray body 11, it is possible to manufacture the ice

tray 10 by a press work method. In the case where the ice tray 10 is manufactured by the press work method, it is possible to simplify a manufacturing process and consequently improve productivity while reducing manufacturing cost. Furthermore, the cleaning is easy to perform because the ice tray 10 has a simple structure.

[0028] Unlike an injection molding method in which a product needs to be relatively thick in order to maintain the strength and mechanical properties of the product, the press work method is capable of manufacturing a metal product at a relatively small thickness. Accordingly, the ice tray 10 having a relatively small thickness is capable of rapidly transferring the energy of the cold air to the water in the ice-making spaces 13. Furthermore, since the amount of a metal used to manufacture the ice tray 10 is reduced, it is possible to save on manufacturing cost. If stainless steel, copper or copper alloy having a high elongation is used (instead of difficult-to-process aluminum having a low elongation) it is possible to easily perform the press work.

[0029] Furthermore, if the ice tray 10 is made of stainless steel having a relatively high corrosion resistance or brass having an anti-bacterial effect, the pieces of ice produced by the ice tray 10 is less harmful to a human body than the pieces of ice produced by an ice tray made of aluminum containing a substance harmful to a human body.

[0030] An ice-making device for a refrigerator is described, which includes an ice tray according to one embodiment of the present invention.

[0031] FIG. 2 is a front view of a refrigerator provided with an ice-making device including the ice tray illustrated in FIG. 1. FIG. 3 is an exploded perspective view of the ice-making device provided in the refrigerator illustrated in FIG. 2. FIG. 4 is a side sectional view of the ice-making device illustrated in FIG. 3.

[0032] Referring to FIGS. 2 through 4, the ice-making device 20, including the ice tray 10 according to one embodiment, is capable of uniformly supplying water to the ice-making spaces 13 of the ice tray 10. The ice-making device 20 may include a case 100, a cooling unit (not illustrated) configured to cool the interior of the case 100, an ice-making assembly 200 to which the ice tray 10 can be mounted, an ice bucket 320 in which pieces of ice produced in the ice tray 10 are stored, and a feeder assembly 400 configured to feed the pieces of ice from the ice bucket 320.

[0033] The refrigerator 1 is an example of one embodiment of a refrigerator that includes a main body 2 which constitutes an outer shell, a barrier 4 which divides food storage spaces (e.g., compartments, portions, rooms, etc.) formed within the main body 2. One food storage space includes an upper refrigerating compartment R and another food storage space includes a lower freezing compartment F. Refrigerating compartment doors 3 are provided on the opposite edges of the front surface of the main body 2 and configured to selectively open and close the refrigerating compartment R by the rotational

movement of the refrigerating space doors 3. Freezing compartment door 5 is configured to open and close the front opening portion of the freezing compartment F by the movement of the freezing compartment door 5. In one example implementation, an ice-making device 20 is provided in a region on one side of the upper portion of the refrigerating compartment R. The ice-making device 20 may be installed in other positions of the refrigerating compartment R or in one of the refrigerating compartment doors 3. Alternatively, ice-making device 20 may also be installed in freezing compartment F.

[0034] A cooling space 105 including ice tray 10 in which pieces of ice can be produced is formed within the case 100. The ice-making assembly 200 may be disposed at the upper side within the cooling space 105.

[0035] The cooling unit is used to cool the cooling space 105. The cooling unit can cool the ice tray 10 by generating a cold air and supplying the generated cold air to the ice tray 10, or by bringing a cooling pipe (e.g., which feeds a low-temperature refrigerant) into contact with the lower side of the ice tray 10. The cooling unit may include a compressor, a condenser, an expansion valve and an evaporator, which constitute a cooling cycle. The cold air may be supplied by a blower or the like to the ice tray 10 via an ejection duct 310 and a cold air guide unit 220. In one embodiment, the cold air is supplied to the cooling space 105.

[0036] The ice-making assembly 200 may include an ice tray 10, a water supply unit 210 configured to supply water to the ice tray 10, a cold air guide unit 220 configured to guide the flow of the cold air so that the cold air supplied from the cooling unit moves along the lower surface of the ice tray 10, and a rotary unit 230 configured to drop the pieces of ice produced in the ice tray 10 into the ice bucket 320 disposed below the ice tray 10.

[0037] FIG. 5 illustrates one embodiment of a structure by which water is supplied to the ice tray of the ice-making device illustrated in FIG. 4.

[0038] Referring to FIG. 5, the water supply unit 210 is configured to supply water to the ice tray 10. The water supply unit 210 may include a feeder pipe 211 coupled to water supply pipe 212. The feeder pipe 211 is coupled to a water supply (e.g., supply tank, a tap water pipeline, etc.) and is configured to feed water to the ice-making assembly 200. The water supply pipe 212 is disposed above the ice tray 10 to extend along the longitudinal direction of the ice tray 10. A plurality of water supply holes 215 are formed in the water supply pipe 212 in positions corresponding to the ice-making spaces 13 so that water can be supplied to the ice-making spaces 13 through the water supply holes 215.

[0039] A heater 213 for preventing freeze and rupture of the feeder pipe 211 and the water supply pipe 212 may be coupled to the feeder pipe 211 in such a fashion that the heater 213 surrounds the outer circumference of the feeder pipe 211 and the water supply pipe 212. Furthermore, a heater waterproof member 214 is provided outside the heater 213 in such a fashion as to surround the

outer circumference of the feeder pipe 211 and the water supply pipe 212. This makes it possible to isolate the heater 213 from moisture, thereby preventing an accident such as a short circuit or the like.

[0040] The diameter of the water supply holes 215 may be set to grow larger as the water supply holes 215 are positioned farther away from the feeder pipe 211. Water supplied through the feeder pipe 211 flows along the water supply pipe 212. The water is first supplied to the water supply holes 215 positioned closer to the feeder pipe 211 and is then supplied to the water supply holes 215 positioned farther from the feeder pipe 211. If the water supply holes 215 are equal in diameter to one another, a larger amount of water is supplied to the water supply holes 215 positioned closer to the feeder pipe 211. That is to say, the amount of water supplied to the ice-making spaces 13 of the ice tray 10 may not be uniform.

[0041] On the other hand, if the diameter of the water supply holes 215 is set to grow larger as the water supply holes 215 are positioned farther away from the feeder pipe 211, the amount of water supplied to the ice-making spaces 13 can become uniform. The diameter of the water supply holes 215 may be set in view of the volume of the ice-making spaces 13, the amount and pressure of the water supplied from the feeder pipe 211 and the water supply pipe 212, the length of the water supply pipe 212, etc.

[0042] The cold air guide unit 220 has a function of guiding the cold air supplied from the cooling unit toward the lower side of the ice tray 10. The cold air guide unit 220 may be coupled to the ejection duct 310 which is a path through which the cold air is supplied from the cooling unit. The cold air guide unit 220 may include cold air guide members 221 and 222 which are coupled to at least one surface of the ejection duct 310. As illustrated in FIG. 4, the cold air guide unit 220 may include a first cold air guide member 221 extending from the upper surface of the ejection duct 310 and a second cold air guide member 222 extending from the lower surface of the ejection duct 310.

[0043] The cold air guided by the cold air guide members 221 and 222 can move toward the lower surface of the ice tray 10. As the cold air exchanges heat with the ice tray 10, the water in the ice tray 10 is phase-transformed into pieces of ice.

[0044] The rotary unit 230 may include a motor 232, a rotation shaft 231 coupled to the ice tray 10 and rotated by the motor 232, and a motor housing 233 configured to accommodate the motor 232 therein.

[0045] The pieces of ice thus produced may be dropped by the rotary unit 230 into the ice bucket 320 disposed below the ice tray 10. Specifically, by virtue of the rotation of the rotation shaft 231, the ice tray 10 may be rotated so that the upper surface of the ice tray 10 faces toward the ice bucket 320. If the ice tray 10 is rotated at a specific angle or more, the ice tray 10 is twisted by an interference member (not illustrated). Due to this

twisting action, the pieces of ice accommodated in the ice tray 10 may be dropped into the ice bucket 320.

[0046] Alternatively, a plurality of ejectors (not illustrated) may be provided along the longitudinal direction of the rotation shaft 231. In this case, the ice tray 10 is not rotated and the pieces of ice may be taken out from the ice tray 10 by the rotation of the ejectors of the rotation shaft 231.

[0047] Furthermore, an ice release heater 240 may be provided in the ice tray 10 so that the ice release heater 240 can heat the ice tray 10 during or prior to the rotation of the rotation shaft 231. By the heating action of the ice release heater 240, the surfaces of the pieces of ice accommodated in the ice tray 10 are melted and separated from the ice tray 10.

[0048] The feeder assembly 400 may include an auger 410 and an auger motor 420 which are configured to feed the pieces of ice toward an ejection part 600. The auger 410 may be a rotating member having a screw or a spiral blade. The auger 410 is rotated by the auger motor 420. The auger 410 is disposed within the ice bucket 320. The pieces of ice stacked in the ice bucket 320 may be inserted into the groove defined by the screw or the blade and may be fed toward the ejection part 600. The auger motor 420 may be accommodated within an auger motor housing 430.

[0049] The ejection part 600 may be coupled to a dispenser (not illustrated) provided in one of the refrigerating compartment doors 3. Depending on the user's choice, the pieces of ice fed by the feeder assembly 400 may be dispensed to a user through the dispenser.

[0050] Descriptions will now be made on the actions and effects of the ice-making device of the refrigerator, which includes an ice tray according to one aspect of the present disclosure.

[0051] In one example implementation of the ice-making device 20, water may be uniformly supplied to the ice-making spaces 13 of the ice tray 10 through the water supply unit 210. Specifically, water fed through the feeder pipe 211 is moved along the longitudinal direction of the water supply pipe 212 and is dropped through the water supply holes 215 of the water supply pipe 212 into the ice-making spaces 13 disposed below the water supply pipe 212. The diameter of the water supply holes 215 grows larger as the water supply holes 215 are positioned farther away from the feeder pipe 211. Therefore, the amount of water supplied within a unit time through the water supply holes 215 positioned farther away from the feeder pipe 211 is more than the amount of water supplied within a unit time through the water supply holes 215 positioned closer to the feeder pipe 211. Thus, the amounts of water supplied to the respective ice-making spaces 13 can become uniform.

[0052] The cold air generated by the actions of the compressor, the condenser, the expansion valve and the evaporator is supplied to the cooling space 105 through the ejection duct 310. The supplied cold air may freeze the water contained in the ice tray 10 disposed within the

cooling space 105.

[0053] In one embodiment, the cold air moves along the lower surface of the ice tray 10 and exchanges heat with the lower surface of the ice tray 10, thereby freezing the water in the ice tray 10 into pieces of ice. Since the heater 213 is coupled to the feeder pipe 211 and the water supply pipe 212, it is possible to prevent the feeder pipe 211 and the water supply pipe 212 from being frozen and ruptured by the cold air. Furthermore, the heater waterproof member 214 prevents the heater 213 from making contact with water. It is therefore possible to prevent occurrence of a short circuit accident.

[0054] FIG. 6 is a flowchart illustrating a method of making ice (e.g., in an ice tray illustrated in FIG. 2, etc.). In one exemplary implementation, a method of producing ice comprises: filling an ice tray with water from a feeder pipe that has holes aligned to ice making spaces of the ice tray (e.g., S610); supplying cold air to the ice tray and water (e.g., S620); and ejecting resulting pieces of ice from the ice tray (e.g., S630). The method can further comprise supplying the water to the feeder pipe from a water supply pipe. In one embodiment, an amount of water supplied to the ice-making spaces becomes uniform. The method can also include heating the feeder pipe and water supply pipe to prevent ice clogging the respective feeder pipe and water supply pipe. A heater waterproof member can be used to reduce moisture contact with a heater. The ice tray can also be heated to facilitate release of the piece of ice.

[0055] The pieces of ice in the ice-making spaces 13 independently defined by the partition walls 12 may have the form of individually-separated pieces of ice or cubes. The surfaces of the pieces of ice produced in the ice tray 10 are melted by the heating action of the ice release heater 240. As a result, the pieces of ice are easily separated from the ice tray 10. Thereafter, due to the rotation of the rotation shaft 231, the pieces of ice are dropped down and are stacked in the ice bucket 320.

[0056] In one exemplary implementation, the pieces of ice produced in the ice-making device 20 of the refrigerator including the ice tray 10 according to the present embodiment have an individually-separated form. Thus, it is not necessary to use an additional cutting device. Furthermore, since the shape of the pieces of ice may be completely identical with the shape of the ice-making spaces 13, the outward appearance of the pieces of ice is considered pleasing or beautiful. This makes it possible to produce pieces of ice in different shapes such as a star shape, a heart shape or the like.

[0057] Furthermore, water may be supplied to the respective ice-making spaces 13 by the water supply unit 210. Thus, the amounts of water supplied to the respective ice-making spaces 13 may become uniform.

[0058] Although exemplary embodiments of the refrigerator including an ice tray, the ice tray, and the method of manufacturing an ice tray according to the present disclosure have been described above with reference to the accompanying drawings, those skilled in the art will

understand that the present disclosure may be implemented in various ways without changing the necessary features or the spirit of the present disclosure.

[0059] Therefore, it should be understood that the exemplary embodiments described above are not limiting, but an example in all respects. The scope of the present disclosure is expressed by claims below, not the detailed description, and it should be construed that all changes and modifications achieved from the meanings and scope of claims and equivalent concepts are included in the scope of the present disclosure.

[0060] From the foregoing, it will be appreciated that various embodiments of the present disclosure have been described herein for purposes of illustration, and that various modifications may be made without departing from the scope and spirit of the present disclosure. The exemplary embodiments disclosed in the specification of the present disclosure do not limit the present disclosure. The scope of the present disclosure will be interpreted by the claims below, and it will be construed that all techniques within the scope equivalent thereto belong to the scope of the present disclosure.

[0061] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents. The listing of steps within method claims do not imply any particular order to performing the steps, unless explicitly stated in the claim.

Claims

1. An ice tray of an ice-making device, comprising:

a tray body configured to provide ice-making spaces that retain water; and
a plurality of partition walls extending upward from a bottom surface of the tray body and configured to define the ice-making spaces as a plurality of independent ice-making spaces,
wherein the tray body and the partition walls are made of a metallic material and are manufactured by a press work at one time.

2. The ice tray of claim 1, wherein the tray body and the partition walls are made a material selected from a group consisting of stainless steel, copper and copper alloy.

3. A method of producing ice comprising:

filling an ice tray with water from a feeder pipe that has holes aligned to ice making spaces of the ice tray;
supplying cold air to the ice tray and water; and
ejecting resulting pieces of ice from the ice tray.

4. The method of claim 3 further comprising supplying the water to the feeder pipe from a water supply pipe.

5. The method of claim 4 wherein an amount of water supplied to the ice-making spaces becomes uniform.

6. The method of claim 3 further comprising heating the feeder pipe and water supply pipe to prevent ice clogging the respective feeder pipe and water supply pipe.

7. The method of claim 3 further comprising using a heater waterproof member to reduce moisture contact with a heater.

8. The method of claim 3 further comprising heating the ice tray to facilitate release of the piece of ice.

9. An ice-making device comprising:

a case including a cooling space defined therein, a cooling unit configured to cool the cooling space, and an ice-making assembly disposed in the cooling space and configured to produce pieces of ice, the ice-making assembly including an ice tray having a plurality of independently-defined ice-making spaces; and
a water supply unit configured to supply water to the ice-making spaces, the water supply unit includes:

a feeder pipe configured to feed water to the ice-making assembly; and
a water supply pipe coupled to the feeder pipe and disposed above the ice tray, the water supply pipe includes a plurality of water supply holes formed in positions corresponding to the ice-making spaces so that water is supplied to the respective ice-making spaces through the respective water supply holes.

10. The ice-making device of claim 9, wherein the diameter of the water supply holes grows larger as the water supply holes are positioned farther away from the feeder pipe.

11. The ice making device of claim 9, wherein a heater configured to heat the water supply pipe is provided in the water supply pipe in such a fashion as to sur-

round an outer circumference of the water supply pipe.

12. The ice-making device of claim 11, wherein a heater waterproof member configured to prevent the heater from making contact with water is provided outside the heater in such a fashion as to surround the heater and the outer circumference of the water supply pipe. 5
13. The ice-making device of claim 9, wherein the ice tray include: 10
- a tray body configured with ice-making spaces that retain water; and
- a plurality of partition walls extending upward from a bottom surface of the tray body and configured to define the ice-making spaces as a plurality of independent ice-making spaces. 15
14. The ice-making device of claim 13, wherein the tray body and the partition walls are made of a metallic material and are manufactured by a press work at one time. 20
15. The ice-making device of claim 13, wherein the tray body and the partition walls are made of a material selected from a group consisting of stainless steel, copper and copper alloy. 25

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FIG. 1

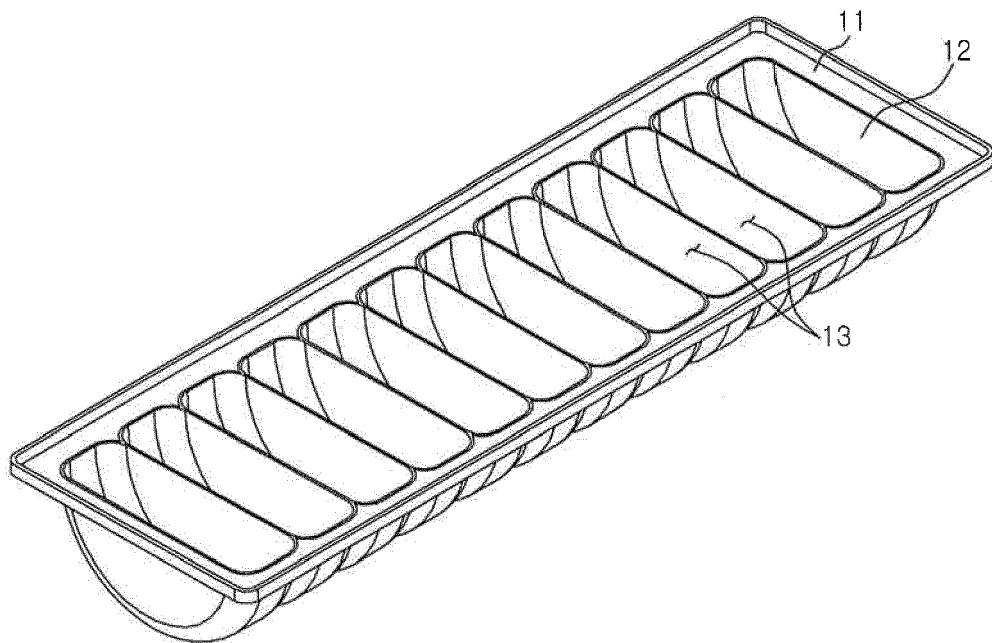


FIG. 2

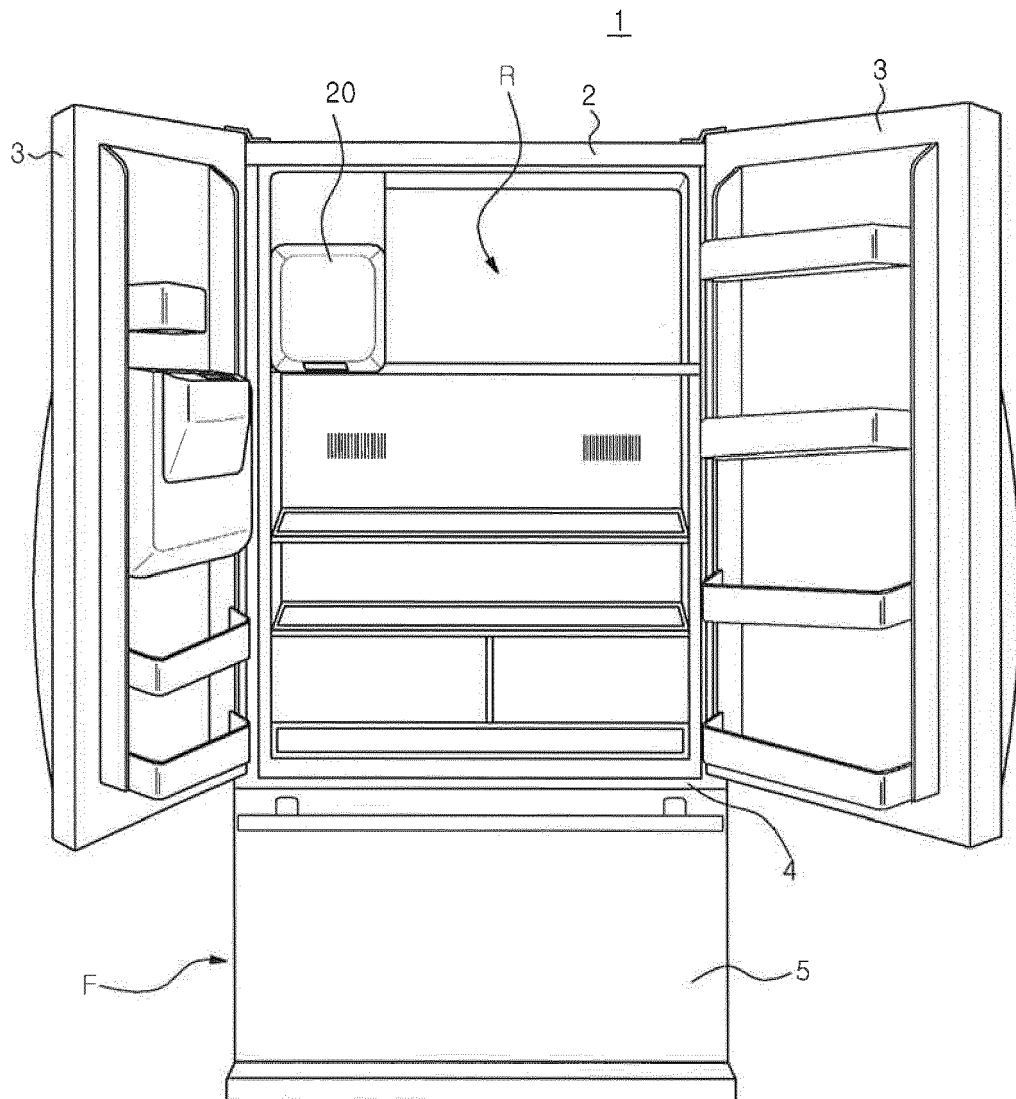


FIG. 3

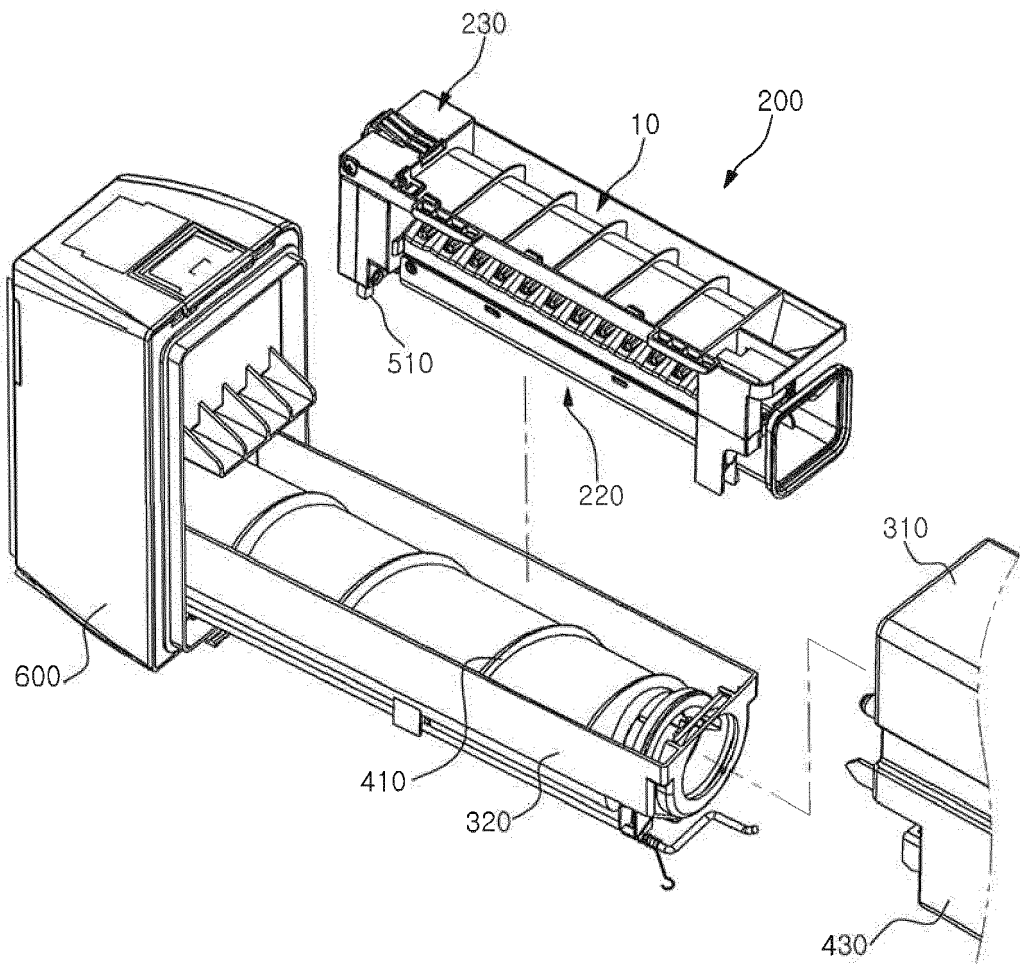


FIG. 4

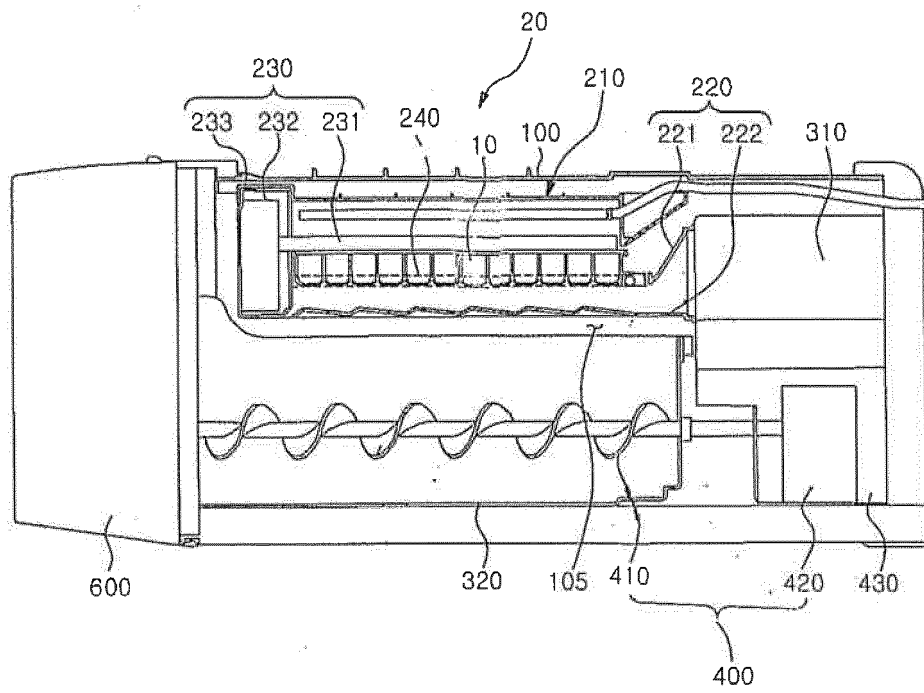


FIG. 5

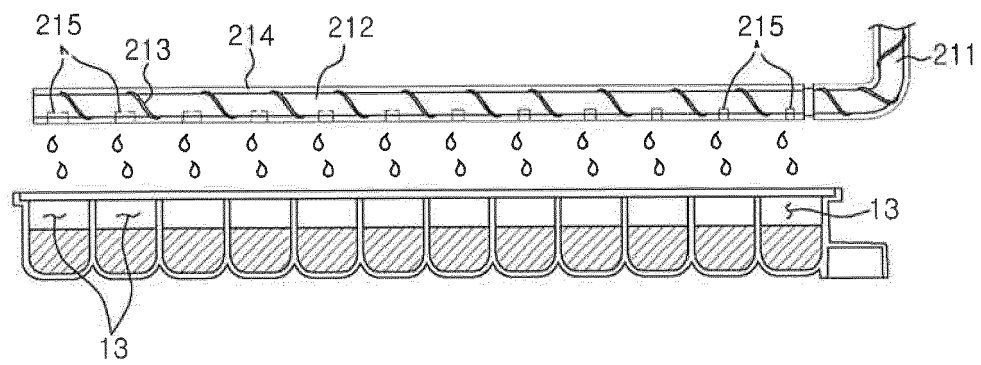
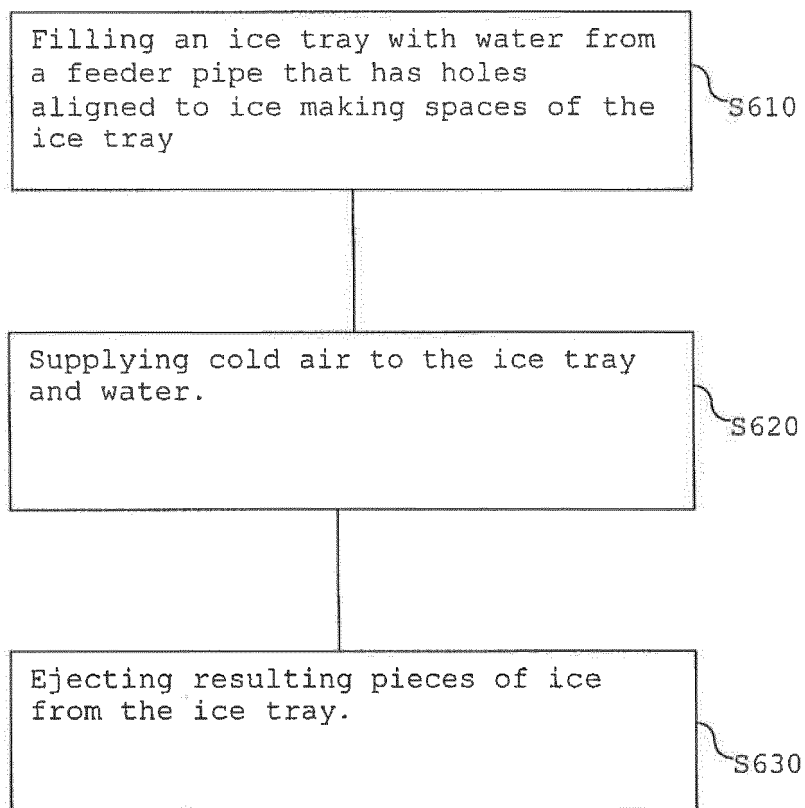


FIG. 6





EUROPEAN SEARCH REPORT

Application Number
EP 15 18 6852

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CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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