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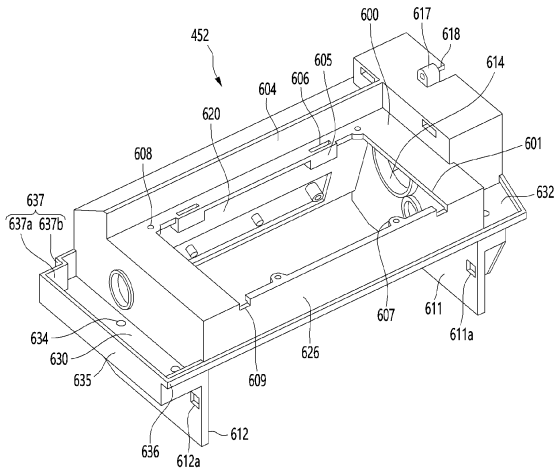
(54) ICEMAKER AND REFRIGERATOR

(57) An icemaker according to the present embodiment may comprise a bracket provided in an ice-making chamber. The icemaker may further comprise a first tray part supported by the bracket. The first tray part can include a tray body forming some of ice-making cells for making ice. The first tray part can further include an extended part, which extends from the tray body and is supported by the bracket. The icemaker may further comprise a second tray part, which forms other ice-making cells, can come in contact with the first tray part during ice-making and is separated from the first tray part during ice-removal.

【Figure 14】



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Description

[Technical Field]

[0001] The present disclosure relates to an ice making device and a refrigerator.

[Background Art]

[0002] In general, a refrigerator is a home appliance for storing food at a low temperature in a storage space that is covered by a refrigerator door. The refrigerator is configured to keep stored food in an optimal state by cooling the inside of the storage space using cold air generated through heat exchange with a refrigerant circulating in a refrigeration cycle.

[0003] The refrigerator may be placed independently in a kitchen or a living room or may be accommodated in a kitchen cabinet.

[0004] The refrigerator is gradually becoming larger and more multi-functional in accordance with the change in dietary life and the trend of higher quality products. Refrigerators including various structures and convenience devices that take user convenience into consideration are being released.

[0005] An automatic ice maker is disclosed in Japanese Registration Patent No. 5687018 that is a prior art document.

[0006] The automatic ice maker includes an ice making chamber for forming ice, an evaporator disposed at an upper side of the ice making chamber, a water tray disposed at a lower side of the ice making chamber and rotatably supported on a support shaft, an ice making water tank assembled at a lower side of the water tray, a supply pump connected to one side of the ice making water tank, a guide member disposed at one side of the ice making water tank and being rotatable, and an ice storage compartment for storing ice.

[0007] In an ice making process, water is supplied from a supply pump while the water tray closes a space of the ice making chamber, and the water supplied to the ice making cell may be cooled by an evaporator.

[0008] In an ice separation process, high-temperature gas is supplied to the evaporator to heat the ice making cell, and at the same time, the water tray is tilted downward, and in a process of tilting the water tray downward, the guide member is rotated to cover an upper side of the water tray.

[0009] As the ice making cell is heated, ice is separated from the ice making cell, falls to an upper side of the guide member, and finally moves to the ice storage compartment.

[0010] However, the prior art does not disclose a bracket on which a driving device for driving the water tray is installed while supporting the ice making chamber.

[0011] Additionally, the prior art does not disclose a technology for supplying water to an upper part of an ice making chamber to improve ice making performance and preventing supplied water from flowing into surrounding structures.

[0012] Additionally, the prior art does not disclose a structure for firmly installing an ice making chamber in a structure made of a different material from the ice making chamber.

[Disclosure] / [Technical Problem]

[0013] The present embodiment provides an ice making device and a refrigerator capable of firmly coupling a bracket and a tray.

[0014] Alternatively or additionally, one embodiment provides an ice making device and a refrigerator in which liquid supplied to a tray is prevented from flowing into a surrounding structure of a bracket.

[0015] Alternatively or additionally, one embodiment provides an ice making device and a refrigerator that allow connection of another tray assembly to a bracket.

[0016] Alternatively or additionally, one embodiment provides an ice making device and a refrigerator that prevent different types of ice from mixing during an ice separation process when generating multiple types of ice.

[Technical Solution]

[0017] In one embodiment, an ice making device may include a bracket provided in an ice making chamber. The ice making device may further include a second one tray supported on the bracket.

[0018] The second one tray may include a sub second one tray that defines a portion of an ice making cell for generating ice.

[0019] The second one tray extends from the sub second one tray and may further include an extension supported by the bracket.

[0020] The bracket may include a through hole. The sub second one tray may pass through the through hole.

[0021] The ice making device may further include a second another tray that defines another portion of the ice making cell. The second another tray may be in contact with the second one tray during an ice making process and may be spaced apart from the second one tray during an ice separation process.

[0022] The bracket may include a first wall on which the through hole is formed and the extension portion is seated. The first wall may be provided with a coupler for coupling the second one tray.

[0023] The coupler may include a first coupler having a coupling groove. The extension may be provided with a coupling protrusion inserted into the coupling groove.

[0024] The first coupler may be extended downward from the first wall to form the coupling groove.

[0025] The coupler may include a second coupler protruding from a surface forming the through hole. The extension may be provided with a coupling hole for coupling to the second coupler by a coupling member.

[0026] The coupler may include a third coupler for coupling the coupling member passing through the extension.

[0027] The ice making device may further include a liquid supply assembly for supplying liquid (e.g., water) to the second one tray during a liquid supply process. The first wall may be provided with a blocking wall to limit a flow of liquid supplied to the second one tray.

[0028] The extension may be provided with a discharge passage for discharging dropped liquid. The first wall may be provided with a receiving groove that receives the discharge passage.

[0029] The extension may be provided with a plurality of hinge portions to which a shaft providing a center of rotation is coupled. When the extension is seated on the first wall, the plurality of hinge portions may pass through the through hole.

[0030] The ice making device may further include a driver that generates a driving force to move the second another tray.

[0031] The bracket may further include a second wall extending from the first wall. The second wall may include an installation wall on which the driver is installed.

[0032] The bracket may further include a third wall extending from the first wall. The third wall may be spaced apart from the second wall.

[0033] The ice making device may further include a partition plate that is coupled to the second wall and the third wall and that restricts movement of ice separated from the ice making cell in one direction.

[0034] The partition plate may include a plurality of extensions having hook. A hole for coupling the hook may be formed in the second wall and the third wall.

[0035] The ice making device may further include a pusher that presses the second another tray so that ice is easily separated from the ice making cell during an ice separation process.

[0036] The bracket may further include a fourth wall extending from the first wall and on which the pusher is installed. The pusher may include a plate. The pusher may include a pushing column extending from the plate.

[0037] The fourth wall may be provided with a seating groove for seating the plate. A coupling protrusion may be formed in the seating groove. A coupling hole through which the coupling protrusion passes may be formed in the plate.

[0038] A coupling boss may be formed in the seating groove. The plate may be provided with a boss coupling portion that receives the coupling boss. A coupling member may be coupled to the boss coupling portion and the coupling boss.

[0039] The ice making device may further include a liquid supply assembly for supplying liquid to the second one tray during a liquid supply process.

[0040] The bracket may further include an extension wall that extends from a position lower than the through hole and that the liquid falls. A liquid through hole through which liquid passes may be formed in the extension wall.

[0041] The bracket may further include a circumferential portion extending from the extension wall. The circumferential portion may include a seating end seated on an adjacent structure.

[0042] The circumferential portion may include a bent wall to prevent interference with an adjacent structure during an installation process of the bracket.

[0043] In another embodiment, an ice making device may include a bracket in which a through hole is formed and provided in an ice making chamber. The ice making device may further include a second one tray that defines a portion of an ice making cell for generating ice and seated on the bracket in a state in which the second one tray passes through the through hole.

[0044] The ice making device may further include an insulation member that surrounds an outer surface of the second one tray and has a first opening through which the second one tray passes.

[0045] The ice making device may further include a second another tray that defines another portion of the ice making cell and may be in contact with the second one tray during an ice making process and may be spaced apart from the second one tray during an ice separation process.

[0046] The second one tray may include a sub second one tray that defines a portion of the ice making cell. The second one tray may further include an extension extending from the sub second one tray.

[0047] The insulation member may surround the sub second one tray and in contact with one surface of the extension.

[0048] The ice making device may further include a supporter having a second opening through which the sub second one tray passes and configured to support the insulation member.

[0049] The bracket may include a coupler to be coupled to the second one tray. The insulation member may be provided with a recessed space in which the coupler is received. The supporter may be provided with a slot where the coupler is located.

[0050] The ice making device may further include a liquid supply assembly for supplying liquid to an upper side of the second one tray during a liquid supply process. The extension may be provided with a discharge passage for discharging dropped liquid. The insulation member may be provided with a recessed space in which the discharge passage is received. The supporter may be provided with a slot where the discharge passage is located.

[0051] In further another embodiment, a refrigerator may include a storage chamber where an item is stored. The refrigerator may further include a cooler for supplying cold to the storage chamber. The refrigerator may further include an ice making device that generates ice by the cold. The ice making device may include some or all of components described above.

[Advantageous Effects]

[0052] According to the present embodiment, the tray can be firmly coupled to a bracket in a state in which the tray is supported by the bracket.

[0053] According to one embodiment, liquid supplied to the tray may be prevented from flowing into a structure around the bracket by a blocking wall.

[0054] According to one embodiment, since a seating end is provided on a circumferential portion of a bracket, and as a seating end is seated on an adjacent tray assembly, there is an advantage that a bracket can be connected to an adjacent tray assembly at the same or similar height.

[0055] According to one embodiment, movement of ice in a specific direction may be restricted by a partition plate. When generating multiple types of ice, different types of ice can be prevented from mixing with each other during an ice separation process.

[Description of Drawings]

[0056]

FIG. 1 is a perspective view of an ice making device according to one embodiment of the present invention.

FIG. 2 is a front view showing a door of an ice making device in an opened state according to one embodiment of the present invention.

FIG. 3 is a cross-sectional view showing an inside of an ice making device according to one embodiment of the present invention.

FIG. 4 is a diagram showing an interior of an ice making device according to one embodiment of the present invention.

FIG. 5 is a refrigerant cycle diagram constituting a cooler according to one embodiment of the present invention.

FIG. 6 is a diagram showing a liquid supply passage in an ice making device according to one embodiment of the present invention.

FIGS. 7 and 8 are perspective views showing liquid being supplied to an ice maker.

FIG. 9 is a perspective view showing an arrangement of a first tray assembly and a second tray assembly according to one embodiment of the present invention.

FIGS. 10 and 11 are perspective views showing an ice maker and a heat exchanger according to one embodiment of the present invention.

FIG. 12 is a bottom view of an ice maker according to one embodiment of the present invention.

FIG. 13 is a cross-sectional view taken along line 13-13 in FIG. 12.

FIGS. 14 and 15 is a perspective view of a bracket according to one embodiment of the present invention.

FIG. 16 is a front view of a bracket according to one embodiment of the present invention.

FIG. 17 is a plan view of a bracket according to one embodiment of the present invention.

FIG. 18 is a bottom view of a bracket according to one embodiment of the present invention.

FIG. 19 is a perspective view showing a state in which a second one tray and a pusher are coupled to a bracket of the present embodiment.

FIG. 20 is a view showing a state before a second one tray is coupled to a bracket of the present embodiment.

FIG. 21 is a view showing a partition plate being coupled to a bracket.

FIG. 22 is a view showing a state in which a case is coupled to a second one tray of the present embodiment.

FIG. 23 is a view showing an insulation member being received in a case of the present embodiment.

FIG. 24 is a view showing a second another tray positioned at one side of a case in the present embodiment.

[Mode for Invention]

[0057] Hereinafter, some embodiments of the present disclosure will be described in detail with reference to the accompanying drawings. It should be noted that when components in the drawings are designated by reference numerals, the same components have the same reference numerals as far as possible even though the components are illustrated in different drawings. Further, in description of embodiments of the present disclosure, when it is determined that detailed descriptions of well-known configurations or functions disturb understanding of the embodiments of the present disclosure, the detailed descriptions will be omitted.

[0058] Also, in the description of the embodiments of the present disclosure, the terms such as first, second, A, B, (a) and (b) may be used. Each of the terms is merely used to distinguish the corresponding component from other components, and does not delimit an essence, an order or a sequence of the corresponding component. It should be understood that when one component is "connected", "coupled", "joined" or "supported" to another component, the former may be directly connected, coupled, jointed or supported to the latter or may be "connected", coupled", "joined" or "supported" to the latter with a third component interposed therebetween.

[0059] The present invention relates to a cooling device. The cooling device may include a refrigerator including at least one refrigerating chamber. The cooling device may include a freezer including at least one freezing chamber. The freezer may include an ice making device. A component or a control method of the ice making device may be applied to the cooling device. The cooling device may include a storage chamber (e.g., main body) in which an item is stored. The cooling

device may include a door that opens and close the storage chamber. The cooling device may include an ice making device. The cooling device may include an ice maker. In this specification, an ice making device may include a tray defining an ice making cell that is a space in which liquid is phase-changed into ice. An ice making device may further include a cooler for supplying cold to the ice making cell. An ice making device may further include a liquid supplier for supplying liquid to the ice making cell. The ice making device may further include a controller.

[0060] The cooling device may include a cooler. The cooler is a source that supplies cold and/or heat, and may be referred to as a cold source and/or a heat source. The cooler may include a heat exchanger. The cooler may cool the ice making chamber. Alternatively, the cooler may cool and heat the ice making chamber. The heat exchanger may include at least one of a pipe to supply the cold and/or heat, a refrigerant pipe through which refrigerant flows, an evaporator refrigerant pipe through which refrigerant flows, or a thermoelectric element to supply the cold and/or heat.

[0061] The ice making device may further include an ice separation assembly.

[0062] The tray may include a first tray. The tray may further include a second tray.

[0063] The first tray and the second tray may generate different types of ice.

[0064] The liquid supplier may independently supply liquid to each of the first tray and the second tray. The liquid supplier may be configured to simultaneously supply liquid to the first tray and the second tray.

[0065] The liquid supplier may include a pump for pumping liquid.

[0066] The cooler may be defined as a means for cooling the ice making cell and including at least one of an evaporator or a thermoelectric element. The evaporator may be located adjacent to or in contact with the tray. Alternatively, cold air cooled by the cooler may be supplied to the tray and liquid is phase-changed into ice in the ice making cell.

[0067] The cooler may cool the first tray. The cooler may cool the second tray. The cooler may cool the first tray and the second tray independently or simultaneously.

[0068] The cooler may optionally include a valve for controlling a flow of refrigerant, a fan for flowing cold air, or a damper for controlling a flow of cold air within the two spaces.

[0069] The controller may adjust a cooling power (or output) of the cooler. The cooling power of the cooler may be an output of a thermoelectric element, an amount of cold supplied to the tray, or a cooling power of the compressor (or output or frequency) or an amount of refrigerant flowing into an evaporator. The cold may include at least cold air.

[0070] The ice separation assembly includes at least one of a heater for heating the tray, a pusher (or ejector) for pressing at least a portion of the tray, a refrigerant pipe through which refrigerant flows to heat the tray, a liquid supply assembly for supplying liquid to an outside of the tray, or a driver for moving at least a portion of the tray.

[0071] The ice separation assembly may separate ice from each of the first tray and the second tray independently or simultaneously separate ice from the first tray and the second tray.

[0072] For example, a power of a driver is transmitted simultaneously to the first tray and the second tray, heat from a heater or a refrigerant pipe is transmitted simultaneously to the first tray and the second tray, or liquid is transmitted simultaneously to the first tray and the second tray.

[0073] FIG. 1 is a perspective view of an ice making device according to the present invention. FIG. 2 is a front view showing a door of an ice making device in an opened state according to the present invention. FIG. 3 is a cross-sectional view showing an inside of an ice making device according to this embodiment. FIG. 4 is a diagram showing an interior of an ice making device according to this embodiment. FIG. 5 is a refrigerant cycle diagram constituting a cooler.

[0074] Referring to FIGS. 1 to 5, an ice making device 1 of this embodiment may be installed independently to generate ice.

[0075] The ice making device 1 may include a cabinet 10 that forms an external shape. The ice making device 1 may further include a door 20 connected to the cabinet 10.

[0076] The cabinet 10 may include an ice making chamber 12 that generates ice. The cabinet 10 may further include a storage chamber 13 where ice is stored.

[0077] The ice making chamber 12 and the storage chamber 13 may be partitioned by a partition member. The ice making chamber 12 and the storage chamber 13 may be communicated through a communication hole in the partition member. Alternatively, the ice making chamber 12 and the storage chamber 13 may be communicated without a partition member.

[0078] Alternatively, the ice making chamber 12 may include the storage chamber 13, or the storage chamber 13 may include the ice making chamber 12.

[0079] The cabinet 10 may include a front opening 102. The door 20 may open and close the front opening 102. For example, the door 20 may open and close the front opening 102 by rotating.

[0080] When the door 20 opens the front opening 102, a user can access the storage chamber 13 through the front opening 102. The user can take out ice stored in the storage chamber 13 to an outside through the front opening 102.

[0081] The ice making device 1 may further include an ice maker 40 located in the ice making chamber 12.

[0082] Ice generated in the ice maker 40 may fall from the ice maker 40 and be stored in the storage chamber 13.

[0083] The cabinet 10 may further include an inner

case 101 defining the ice making chamber 12. The cabinet 10 may further include an outer case 110 disposed outside the inner case 101.

[0084] Although not shown, an insulating material may be provided between the inner case 101 and the outer case 100.

[0085] The inner case 101 may additionally define the storage chamber 13.

[0086] The ice making chamber 12 may be formed at one side of the inner case 101.

[0087] The ice maker 40 may be located close to a rear wall 101a of the inner case 101. When the ice maker 40 is located close to a rear wall 101a of the inner case 101, usability of the storage chamber 13 can be increased.

[0088] To facilitate a user's access to the storage chamber 13, ice generated by the ice maker 40 may fall in a direction closer to the door 20.

[0089] The cabinet 10 may further include a machine room 18 divided from the storage chamber 13. For example, the machine room 18 may be located at one side of the storage chamber 13.

[0090] Although not limited, a portion of the storage chamber 13 may be located between the ice making chamber 12 and the machine room 18. A volume of the storage chamber 13 may be greater than a volume of the ice making chamber 12 and a volume of the machine room 18.

[0091] The machine room 18 may be placed outside the inner case 101.

[0092] The inner case 101 may include a bottom wall 104 that forms a bottom of the storage chamber 13. The machine room 18 may be located at one side of the bottom wall 104.

[0093] The bottom wall 104 may be provided with a drain hole 105 for discharging liquid.

[0094] A portion of a cooler may be located in the machine room 18. For example, the cooler may be a refrigerant cycle for circulating refrigerant.

[0095] The cooler may include a compressor 183, a condenser 184, an expander 186, and a heat exchanger 50. The heat exchanger 50 may be an evaporator through which refrigerant flows.

[0096] In this embodiment, a flow of refrigerant in the refrigerant cycle may be controlled by a valve 188. The refrigerant cycle may include a bypass pipe 187 for bypassing refrigerant discharged from the compressor 183 to an inlet of the heat exchanger 50. The valve 188 may be provided in the bypass pipe 187.

[0097] When the valve 188 is turned off, refrigerant compressed in the compressor 183 may flow directly to the condenser 184. When the valve 188 is turned on, some or all of refrigerant compressed in the compressor 183 may be bypassed through the bypass pipe 187 and flow directly into the heat exchanger 50. Although not limited, refrigerant from the compressor 183 may flow to the evaporator during an ice separation process.

[0098] Refrigerant flowing through the heat exchanger 50 may flow through an accumulator 189 and then into the compressor 183.

[0099] The compressor 183 and the condenser 184 may be located in the machine room 18. The machine room 18 may be provided with a condenser fan 185 to allow air to pass through the condenser 184. For example, the condenser fan 185 may be disposed between the condenser 184 and the compressor 183.

[0100] A front grille 180 in which an air hole 182 is formed may be provided at a front of the cabinet 10. A plurality of air holes 182 may be formed in the front grille 180. The front grille 180 may be located at one side of the front opening 102. When the door 20 closes the front opening 102, the door 20 may cover a portion of the front grille 180.

[0101] The heat exchanger 50 may include refrigerant pipes 510 and 520 through which refrigerant flows. At least a portion of the heat exchanger 50 may be located in the ice making chamber 12.

[0102] At least a portion of the heat exchanger 50 may be in contact with the ice maker 40. That is, liquid supplied to the ice maker 40 may be phase-changed into ice by low-temperature refrigerant flowing through the heat exchanger 50. Alternatively, the heat exchanger 50 may be located adjacent to the ice maker 40.

[0103] A cooling type in which the heat exchanger 50 directly contacts the ice maker 40 to generate ice can be referred to as a direct cooling type.

[0104] As another example, air that has heat-exchanged with the heat exchanger 50 is supplied to the ice maker 40, and liquid in the ice maker 40 can be phase-changed into ice by the cooling air. A cooling type of generating ice by supplying cooling air can be called an indirect cooling type or an air cooling type. In a case of the indirect cooling type, it is possible that the heat exchanger 50 is not located in the ice making chamber 12. However, a guide duct that guides cooling air heat-exchanged with the heat exchanger 50 to the ice making chamber 12 may be additionally provided.

[0105] In this embodiment, the ice maker 40 may generate a single type of ice or at least two different types of ice.

[0106] Hereinafter, it will be described as an example that the ice maker 40 generates at least two different types of ice.

[0107] The ice maker may include a tray assembly. The tray assembly may include a tray that defines a space in which an ice making cell is formed. The tray assembly may include a tray case to which the tray is connected and/or coupled and/or joined and/or supported. In this specification, the present invention describes using a tray. However, the present invention may also include embodiments understood by replacing a tray assembly instead of the tray. The tray case may include a first tray case (e.g., tray cover) connected and/or coupled and/or supported and/or jointed to a first portion of the tray. The tray case may include a second tray case (e.g., tray supporter) connected and/or coupled and/or supported and/or jointed to a second portion of the tray. The ice

maker 40 may include a first tray assembly 410 for generating a first type of first ice I1. The ice maker 40 may further include a second tray assembly 450 for generating a second type of second ice I2 different from the first type.

[0108] Of course, the ice maker 40 may include only one of a first tray assembly 410 and a second tray assembly 450, which will be described later.

[0109] The first ice I1 and the second ice I2 may differ in one or more of shape, size, transparency, etc.

[0110] Hereinafter, it will be described as an example that the first ice I1 is polygonal ice, and the second ice I2 is spherical ice.

[0111] The storage chamber may include a first storage space 132. The storage chamber may further include a second storage space 134.

[0112] Ice generated in the first tray assembly 410 may be stored in the first storage space 132. Ice generated in the second tray assembly 450 may be stored in the second storage space 134.

[0113] Although not limited, the second storage space 134 may be defined by the ice bin 14. That is, an internal space of the ice bin 14 may serve as the second storage space 134. The ice bin 14 may be fixed or detachably coupled to the inner case 101.

[0114] The ice bin 14 may also be referred to as a partition member that divides the storage chamber 13 into the first storage space 132 and the second storage space 134.

[0115] A volume of the first storage space 132 may be greater than a volume of the second storage space 134. Although not limited, a size of the first ice I1 stored in the first storage space 132 may be smaller than a size of the second ice I2 stored in the second storage space 134.

[0116] A front surface of the ice bin 14 may be arranged to be spaced apart from a rear of the front opening 102. A bottom surface of the ice bin 14 may be spaced apart from a bottom wall 104 of the storage chamber 13.

[0117] Accordingly, the first ice I1 may be located at one side of the ice bin 14. The first ice I1 may also be located at another side of the ice bin 14. The first ice I1 stored in the first storage space 132 may surround the ice bin 14.

[0118] A bottom wall 104 of the storage chamber 13 may form a floor of the second storage space 134.

[0119] A bottom wall 104 of the storage chamber 13 may be positioned lower than one end 102a of the front opening 102. A bottom surface of the ice bin 14 may be positioned higher than one end 102a of the front opening 102.

[0120] The ice bin 14 may be located adjacent to one surface (left surface in the drawing) of left and right surfaces of the inner case 101. The second tray assembly 450 may be located adjacent to the one surface. Accordingly, ice separated from the second tray assembly 450 may be stored in the second storage space 134 of the ice bin 14. Ice separated from the first tray assembly 410 may be stored in the first storage space 132 outside the second storage space 134.

[0121] When an amount of first ice stored in the first storage space 132 increases, to prevent the first ice from being unintentionally discharged through the front opening 102 when the door 20 is opened, the cabinet 10 may further include an opening cover 16. The opening cover 16 may be rotatably provided to the inner case 101. The opening cover 16 may cover one side of the front opening 102.

[0122] The opening cover 16 can be received in the storage chamber 13 when the door 20 is closed. When the door 20 is opened, other end of the opening cover 16 may be rotated with respect to one end so that the other end protrudes to an outside of the storage chamber 13.

[0123] The opening cover 16 may be elastically supported by, for example, an elastic member (not shown). When the door 20 is opened, the opening cover 16 can be rotated by the elastic member.

[0124] The opening cover 16 may be formed in a convex shape toward the door 20. Accordingly, although not limited, the first ice may be filled in the first storage space 132 up to one end 16a of the opening cover 16.

[0125] When the opening cover 16 is rotated, a portion of the first ice is drawn out of the storage chamber 13 while being located within the convex portion of the opening cover 16, so that a user can easily obtain the first ice.

[0126] Of course, it is also possible to omit the opening cover 16 by varying a height of one end 102a of the front opening 102.

[0127] The cabinet 10 may further include a guide 70 that guides ice separated from the ice maker 40 to the storage chamber 13.

[0128] The guide 70 may be arranged to be spaced apart from one side of the ice maker 40. The guide 70 may guide a first ice I1 separated from the first tray assembly 410. The guide 70 may guide a second ice I2 separated from the second tray assembly 450.

[0129] For example, the guide 70 may include a first guide 710. The guide 70 may further include a second guide 730.

[0130] The first ice I1 separated from the first tray assembly 410 may fall onto the first guide 710. The first ice I1 may be moved to the first storage space 132 by the first guide 710.

[0131] The second ice I2 separated from the second tray assembly 450 may fall onto the second guide 730. The second ice I2 may be moved to the second storage space 134 by the second guide 730.

[0132] One end of the ice bin 14 may be positioned adjacent to one end of the second guide 730 so that the second ice I2 is moved to the second storage space 134.

[0133] The ice making device 1 may further include a partition plate 80 to prevent the first ice and the second ice that fall onto the guide 70 from being mixed. The partition plate 80 extends in a vertical direction and may be coupled to the guide 70 or the ice maker 40.

[0134] FIG. 6 is a diagram showing a liquid supply

passage in an ice making device according to the present invention. FIGS. 7 and 8 are perspective views showing liquid being supplied to an ice maker.

[0135] Referring to FIGS. 6 to 8, the ice making device 1 may include a liquid supply passage for guiding liquid supplied from a liquid source 302 to the ice maker 40. The liquid source (e.g., water source) may include a faucet or a liquid tank provided at an inside and/or outside of the ice making device.

[0136] The liquid supply passage may include a first passage 303 connected to the liquid source 302. A liquid supply valve 304 may be provided in the first passage 303. By operating the liquid supply valve 304, a supply of liquid from the liquid source 302 to the ice making device 1 can be controlled. A supply flow rate when liquid is supplied to the ice making device 1 can be controlled by operating the liquid supply valve 304.

[0137] The liquid supply passage may further include a second passage 305 connected to the liquid supply valve 304. The second passage 305 may be connected to a filter 306. For example, the filter 306 may be located in the machine room 18.

[0138] The liquid supply passage may further include a third passage 308 that guides liquid that has passed through the filter 306.

[0139] The cooling device may include a supply component to supply liquid to the ice making device. Alternatively, the supply component may include a liquid supply assembly. The supply component may supply liquid to an ice maker (e.g., tray) from a liquid source (e.g., a faucet or a liquid tank provided at an inside and/or outside of an ice making device). The liquid supply assembly may include a pipe through which the liquid flows. For example, liquid supplied from the liquid supply assembly may be supplied to a liquid supplier, which will be described later. The ice making device 1 may further include a liquid supply assembly 320. The liquid supply assembly 320 may be connected to the third passage 308.

[0140] The liquid supply assembly 320 can supply liquid to the ice maker 40 during a liquid supply process.

[0141] Alternatively, the supply component may include a liquid supplier. The supplier may supply liquid supplied from the liquid supply assembly to an ice maker (e.g., tray). The liquid supplier may include a sub liquid supplier. The sub liquid supplier may include a pipe through which the liquid flows. The sub liquid supplier may include a nozzle. The sub liquid supplier may further include a pump. The sub liquid supplier may include a sub_first liquid supplier. The sub liquid supplier may include a sub_second liquid supplier. The ice making device 1 may further include a liquid supplier 330. The liquid supplier 330 may supply liquid to the ice maker 40 during an ice making process. The liquid supplier 330 can store liquid supplied from the liquid supply assembly 320 and supply liquid to the ice maker 40.

[0142] In this embodiment, the liquid supply assembly 320 may be referred to as a first liquid supply assembly. The liquid supplier 330 may be referred to as a second liquid supply assembly.

[0143] The liquid supply assembly 320 may be located at one side of the ice maker 40. Liquid supplied from the liquid supply assembly 320 may fall onto the ice maker 40.

[0144] The liquid supplier 330 may be located at another side of the ice maker 40.

[0145] The liquid supplier 330 may be spaced apart from the liquid supply assembly 320. The liquid supplier 330 can store liquid supplied from the liquid supply assembly 320 and supply liquid to the ice maker 40.

[0146] In FIGS. 6 to 8, a dotted line shows a flow of liquid supplied from the liquid supply assembly 320, and a solid line shows a flow of liquid supplied from the liquid supplier 330.

[0147] The liquid supplier 330 may include a liquid storage 350 in which liquid is stored. The liquid storage may include a wall to form a space to store the liquid. The ice maker 40 may include one or more through holes 426 through which liquid passes. Liquid supplied from the liquid supply assembly 320 and dropped toward the ice maker 40 may be stored in the liquid storage 350 after passing through the through hole 426. The guide 70 may be provided with a plurality of through holes through which liquid passing through the ice maker 40 passes.

[0148] In a state in which the liquid supply valve 304 is turned on, liquid supplied from the liquid supply assembly 320 falls to one side of the ice maker 40, passes through the ice maker 40, and then may be stored in the liquid storage 350.

[0149] The liquid storage 350 may be provided with a liquid level detector 356 that detects a liquid level. When a liquid level of the liquid storage 350 detected by the liquid level detector 356 reaches a reference liquid level, the liquid supply valve 304 may be turned off.

[0150] In this specification, a process from when the liquid supply valve 304 is turned on to when the liquid supply valve 304 is turned off may be referred to as a liquid supply process. For example, the liquid supply valve 304 may be turned off when a liquid level of the liquid storage 350 detected by the liquid level detector 356 reaches a reference liquid level.

[0151] The liquid supplier 330 may further include liquid pumps for pumping liquid stored in the liquid storage 350.

[0152] In this embodiment, in an ice making process, liquid stored in the liquid storage 350 may be pumped by the liquid pumps and supplied to the ice maker 40.

[0153] The liquid pumps may include a first pump 360. The liquid pumps may further include a second pump 362. When the first pump 360 operates, liquid may be supplied to the first tray assembly 410. When the second pump 362 operates, liquid may be supplied to the second tray assembly 450.

[0154] The first pump 360 and the second pump 362 may operate independently. Pumping capacities of the first pump 360 and the second pump 362 may be the

same or different.

[0155] The liquid supplier 330 may further include first connection pipes 352 and 354 connecting each of the pumps 360 and 362 and the liquid storage 350.

[0156] The first connection pipes 352 and 354 may be connected to the liquid storage 350 at the same or similar height to a bottom of the liquid storage 350.

[0157] The liquid supplier 330 may further include a sub_first liquid supplier 380 for supplying liquid pumped by the first pump 360 to the first tray assembly 410.

[0158] The liquid supplier 330 may further include a sub_second liquid supplier 382 for supplying liquid pumped by the second pump 362 to the second tray assembly 450.

[0159] The sub_first liquid supplier 380 may supply liquid to the first tray assembly 410 from one side of the first tray assembly 410.

[0160] The sub second liquid supplier 382 may supply liquid to the second tray assembly 450 from one side of the second tray assembly 450.

[0161] The sub_first liquid supplier 380 and the sub_second liquid supplier 382 may be located at one side of the guide 70.

[0162] The liquid supplier 330 may further include second connection pipes 370 and 372 connecting each of the pumps 360 and 362 and each of the sub liquid suppliers 380 and 382.

[0163] Liquid supplied from the sub_first liquid supplier 380 to the first tray assembly 410 may be used to generate ice. Liquid that falls again from the first tray assembly 410 may be stored in the liquid storage 350 after passing through the guide 70.

[0164] Liquid supplied from the sub _second liquid supplier 382 to the second tray assembly 450 may be used to generate ice. Liquid that falls again from the second tray assembly 450 may be stored in the liquid storage 350 after passing through the guide 70.

[0165] A drain pipe 360 may be connected to the liquid storage 350. The drain pipe 360 may extend through the drain hole 105 into the machine room 18. The machine room 18 may be provided with a drain tube 362 connected to the drain pipe 360. The drain tube 362 can finally discharge liquid to an outside of the ice making device 1.

[0166] Hereinafter, the ice maker 40 will be described in detail.

[0167] FIG. 9 is a perspective view showing an arrangement of a first tray assembly and a second tray assembly according to one embodiment of the present invention. FIGS. 10 and 11 are perspective views showing an ice maker and a heat exchanger according to one embodiment of the present invention.

[0168] FIG. 12 is a bottom view of an ice maker according to one embodiment of the present invention. FIG. 13 is a cross-sectional view taken along line 13-13 in FIG. 12.

[0169] Referring to FIGS. 9 to 13, the heat exchanger 50 may contact the ice maker 40. For example, the heat exchanger 50 may be located at one side of the ice maker 40.

[0170] The ice maker 40 may include a first tray assembly 410 and a second tray assembly 450 as described above.

[0171] The first tray assembly 410 and the second tray assembly 450 may be arranged in a horizontal direction. It is also possible for the first tray assembly 410 and the second tray assembly 450 to be arranged in a vertical direction.

[0172] The first tray assembly 410 and the second tray assembly 450 may be installed in the cabinet 10 while being connected to each other. That is, the first tray assembly 410 and the second tray assembly 450 can be modularized.

[0173] As another example, the first tray assembly 410 and the second tray assembly 450 may be installed in the cabinet 10 in a separated state. The first tray assembly 410 and the second tray assembly 450 may be positioned close to each other in a horizontal direction.

[0174] The first tray assembly 410 may include a first ice making cell 440.

[0175] In this embodiment, an ice making cell refers to a space where ice is generated. One ice may be generated in one ice making cell.

[0176] The first tray assembly 410 may include a first tray. The first tray may include a first one tray 420. The first tray may further include a first another tray 430 coupled to the first one tray 420.

[0177] For example, the first tray may form a plurality of first ice making cells 440. A plurality of first another trays 430 may be coupled to the first one tray 420.

[0178] The first ice making cell 440 may be defined by one cell or by a plurality of cells. For example, the first ice making cell 440 may include a first one cell 441 and a first another cell 442. Although not limited, the first one cell may be one of a first lower cell and a first upper cell. The first another cell may be another one of the first lower cell and the first upper cell. The first one cell may be one of a first left cell or a first right cell. The first another cell may be another one of the first left cell and the first right cell. Although not limited, it is possible that terms of first one cell and first another cell are opposite to each other.

[0179] The first one cell 441 may be formed by the first one tray 420. The first another cell 442 may be formed by the first another tray 430.

[0180] For example, the first one tray 420 may form a plurality of first one cells 441. Each of the plurality of first another trays 430 may form a first another cell 442.

[0181] Accordingly, when the plurality of first another trays 430 are coupled to a single first one tray 420, a plurality of first ice making cells 440 may be formed.

[0182] The first one tray 420 may include a first opening 423. The first opening 423 communicates with the first one cell 441.

[0183] A number of first openings 423 may be equal to a number of first ice making cells 440.

[0184] The first one cell 441 may form another portion of an appearance of the first ice and the first another cell

442 may form a portion of an appearance of the first ice.

[0185] After the first another tray 430 is coupled to the first one tray 420, separation of the first another tray 430 from the first one tray 420 may be restricted.

[0186] Liquid supplied from the sub_first liquid supplier 380 may pass through the first opening 423 and be supplied to the first ice making cell 440. Accordingly, the first opening 423 may serve as a liquid supply opening during an ice making process.

[0187] A portion of liquid supplied to the first ice making cell 440 may fall to a lower part of the first tray assembly 410 through the first opening 423. Accordingly, the first opening 423 may serve as a liquid outlet opening during an ice making process.

[0188] Ice generated in the first ice making cell 440 may be separated from the first tray assembly 410 through the first opening 423 in an ice separation process. Accordingly, the first opening 423 may serve as an ice outlet opening during an ice separation process.

[0189] Each of the first one cell 441 and the first another cell 442 may be formed, for example, in a hexahedral shape. A volume of the first one cell 441 and a volume of the first another cell 442 may be the same or different.

[0190] A horizontal perimeter (or horizontal cross-sectional area) of the first one cell 441 may be greater than a horizontal perimeter (or horizontal cross-sectional area) of the first another cell 442 so that first ice can be discharged through the first opening 423 after the first ice is generated in the first ice making cell 440.

[0191] That is, during a liquid supply process, an ice making process, or an ice separation process, the first another tray 430 and the first one tray 420 are maintained in a coupled state, so that a shape of the first ice making cell 440 can be maintained.

[0192] The heat exchanger 50 may be in contact with the first another tray 430 so that ice is firstly generated in the first another cell 442.

[0193] The first one tray 420 may include through holes 421 and 425 through which liquid passes.

[0194] The second tray assembly 450 may include a second tray forming a second ice making cell 451.

[0195] The second tray may be defined by one tray or by a plurality of trays. For example, the second tray may include a second one tray 460 and a second another tray 470. Although not limited, the second one tray may be an upper tray, or a left tray. The second another tray 470 may be a lower tray, or a right tray. It is also possible that terms of the second one tray 460 and the second another tray 470 are opposite to each other.

[0196] The second ice making cell 451 may be defined by one cell or by a plurality of cells. For example, the second ice making cell 451 may include a second one cell 462 and a second another cell 472.

[0197] The second one tray 460 can form the second one cell 462. The second another tray 470 may form the second another cell 472. For example, each of the second one cell 462 and the second another cell 472 may be formed in a hemispherical shape.

[0198] For example, the second tray may form a plurality of second ice making cells 451. Accordingly, the second one tray 460 can form a plurality of second one cells 462. The second another tray 470 can form a plurality of second another cells 472.

[0199] A portion of the first ice making cell 440 may be located at the same height as the second ice making cell 451. For example, at least a portion of the first ice making cell 440 may be arranged to overlap the second ice making cell 451 in a horizontal direction.

[0200] The second ice making cell 451 may be disposed between a rotation center C1 of the second another tray 470 and the first ice making cell 440. The second another tray 470 may be connected to a driver 690 by a shaft 489. The shaft 489 may provide a rotation center C1 of the second another tray 470.

[0201] A height of one end of the first ice making cell 440 and one end of the second ice making cell 451 may be different. For example, one end of the first ice making cell 440 may be positioned lower than one end of the second ice making cell 451.

[0202] A height of the other end of the first ice making cell 440 and the other end of the second ice making cell 451 may be different. For example, the other end of the first ice making cell 440 may be positioned higher than the other end of the second ice making cell 451.

[0203] A contact surface of the second one tray 460 and the second another tray 470 may have a different height from a coupling portion of the first one tray 420 and the first another tray 430. For example, a contact surface of the second one tray 460 and the second another tray 470 may be positioned higher than a coupling portion of the first one tray 420 and the first another tray 430.

[0204] A height of the first ice making cell 440 and a height of the second ice making cell 451 may be different. For example, a height of the first ice making cell 440 may be less than a height of the second ice making cell 451.

[0205] A maximum horizontal perimeter of the first ice making cell 440 may be different from a maximum horizontal perimeter of the second ice making cell 451. For example, a maximum horizontal perimeter of the first ice making cell 440 may be less than a maximum horizontal perimeter of the second ice making cell 451.

[0206] A number of first ice making cells 440 may be different from a number of second ice making cells 451. For example, a number of first ice making cells 440 may be greater than a number of second ice making cells 451.

[0207] A volume of the first ice making cell 440 may be different from a volume of the second ice making cell 451. A volume of the first ice making cell 440 may be less than a volume of the second ice making cell 451.

[0208] A sum of volumes of the plurality of first ice making cells 440 may be different from a sum of volumes of the plurality of second ice making cells 451. For example, a sum of volumes of the plurality of first ice making cells 440 may be greater than a sum of volumes of the plurality of second ice making cells 451.

[0209] The second another tray 470 may include a

second opening 473.

[0210] A liquid supply process and an ice making process may be performed in a state in which the second one tray 460 and the second another tray 470 are in contact to form the second ice making cell 451.

[0211] Liquid supplied from the sub_second liquid supplier 382 may pass through the second opening 473 and be supplied to the second ice making cell 451. Accordingly, the second opening 473 may serve as a liquid supply opening during an ice making process.

[0212] \A portion of liquid supplied to the second ice making cell 451 may fall to a lower part of the second tray assembly 450 through the second opening 473. Accordingly, the second opening 473 may serve as a liquid outlet opening during an ice making process.

[0213] In an ice separation process, the second another tray 470 may be moved relative to the second one tray 460.

[0214] The first opening 423 and the second opening 473 may be located at different heights. For example, the first opening 423 may be located higher than the second opening 473.

[0215] The second tray assembly 450 may further include a bracket 452 supporting the second one tray 460. The bracket 452 may be fixed in position within the ice making chamber 12.

[0216] The bracket 452 may be supported by a wall forming the ice making chamber 12. For example, the bracket 452 may be supported by the inner case 101.

[0217] The bracket 452 may provide a space to receive at least a portion of the second one tray 460 and the second another tray 470.

[0218] A portion of the second one tray 460 may pass through the bracket 452 and another portion of the second one tray 460 may be seated on the bracket 452.

[0219] A driver 690 for moving the second another tray 470 may be installed on the bracket 452.

[0220] The bracket 452 may include a circumferential portion 635. The circumferential portion 635 may be provided with a seating end 636. The seating end 636 may be seated on the first tray assembly 410. For example, the seating end 636 may be seated on the first one tray 420. When the seating end 636 is seated on the first one tray 420, a portion of the first tray assembly 410 may be positioned at the same height as a portion of the second tray assembly 450.

[0221] The bracket 452 may include a liquid through hole 634 through which liquid passes.

[0222] The second tray assembly 450 may further include a supporter 480 supporting the second another tray 470.

[0223] In a state in which the second another tray 470 is seated on the supporter 480, the supporter 480 and the second another tray 470 may be moved together. For example, the supporter 480 may be movably connected to the second one tray 460.

[0224] The supporter 480 may include a supporter opening 482a through which liquid passes. The supporter opening 482a may be aligned with the second opening 473.

[0225] A diameter of the supporter opening 482a may be greater than a diameter of the second opening 473.

[0226] The first ice may be discharged from the first ice making cell through the first opening 423. On the other hand, the second ice cannot be discharged from the second ice making cell through the second opening 473.

[0227] In a case of the first tray in this embodiment, the first ice may be discharged from the first ice making cell through the first opening 423 during an ice separation, so that the first tray may be called an open type tray.

[0228] In a case of an open type tray, a diameter or size of an opening may be equal to or greater than a diameter or size of the first ice making cell.

[0229] On the other hand, in a case of the second tray, since the second ice cannot be discharged to an outside from the second ice making cell through the second opening 473, the second tray may be called a closed type tray.

[0230] In a case of a closed type tray, in order to separate ice, one or more of the second one tray 460 and the second another tray 470 may be moved or the second one tray 460 and the second another tray 470 may be configured to be separated from each other. In this embodiment, a movement of the second another tray 470 will be described as an example.

[0231] The second tray assembly 450 may further include a pusher 490 for separating ice from the second another tray 470 in an ice separation process. For example, the pusher 490 may be installed on the bracket 452. The pusher 490 may press the second another tray 470 or press the second ice in an ice separation process.

[0232] The pusher 490 may include a pushing column 492. When the second another tray 470 and the supporter 480 are moved in an ice separation process, the pushing column 492 passes through the supporter opening 482a of the supporter 480 to press the second another tray 470 or the second ice.

[0233] When the second another tray 470 is pressed by the pushing column 492, a shape of the second another tray 470 is deformed and the second ice may be separated from the second another tray 470. To enable deformation of the second another tray 470, the second another tray 470 may be formed of a non-metallic material. In terms of ease of deformation, the second another tray 470 may be formed of a flexible material.

[0234] Meanwhile, the heat exchanger 50 may include a first refrigerant pipe 510 that is in contact with or adjacent to the first tray assembly 410.

[0235] The heat exchanger 50 may further include a second refrigerant pipe 520 located adjacent to or in contact with the second tray assembly 450.

[0236] The first refrigerant pipe 510 and the second refrigerant pipe 520 may be connected in series or in parallel.

[0237] The first refrigerant pipe 510 may include a first inlet pipe 511. The first inlet pipe 511 may be located at

one side of the first one tray 420. The first inlet pipe 511 may extend at a position adjacent to the driver 690. The first inlet pipe 511 may extend from one side of the driver 690. That is, the first inlet pipe 511 may extend in a space between the driver 690 and a rear wall 101a of the inner case 101.

[0238] The first refrigerant pipe 510 may further include a first bent pipe 512 extending from the first inlet pipe 511.

[0239] The first refrigerant pipe 510 may further include a first cooling pipe 513 extending from the first bent pipe 512.

[0240] The first cooling pipe 513 may be in contact with one surface of the first another tray 430. Accordingly, the first another tray 430 may be cooled by refrigerant flowing through the first cooling pipe 513.

[0241] The first cooling pipe 513 may include a plurality of straight parts 513a. The first cooling pipe 513 may further include a curved shaped connection part 513b connecting ends of two adjacent straight parts 513a.

[0242] The first inlet pipe 511 may be located adjacent to a boundary portion between the first tray assembly 410 and the second tray assembly 450. The first cooling pipe 513 may extend from the boundary portion in a direction away from the second tray assembly 450.

[0243] One straight part may contact one surface of a plurality of first another trays 430.

[0244] A plurality of straight parts 513a may be arranged at substantially the same height.

[0245] The first refrigerant pipe 510 may further include a first connection pipe 514 extending from an end of the first cooling pipe 513. The first connection pipe 514 may extend to be lower in height than the first cooling pipe 513.

[0246] The first refrigerant pipe 510 may further include a second cooling pipe 515 connected to the first connection pipe 514. The second cooling pipe 515 may be located lower than the first cooling pipe 513.

[0247] The second cooling pipe 515 may contact a side surface of the first another tray 430.

[0248] The second cooling pipe 515 may include a plurality of straight parts 515a and 515b. The second cooling pipe 515 may further include a curved shaped connection portion 515c connecting two adjacent straight parts 515a and 515b.

[0249] A plurality of first another trays 430 may be arranged in a plurality of columns and rows.

[0250] Among a plurality of straight parts 515a and 515b, a portion of straight parts 515a may contact one side of the first another tray 430 in one row. Among the plurality of straight parts 515a and 515b, another straight part 515b may contact the first another trays 430 of two adjacent rows, respectively.

[0251] For example, the portion of the straight part 515a may contact a first surface of second another tray in a first row. For example, another straight part 515b may contact a second surface of a second another tray in a first row and a first surface of a second another tray in a second row.

[0252] The first refrigerant pipe 510 may further include a first discharge pipe 516. The first discharge pipe 516 may extend from an end of the second cooling pipe 515. The first discharge pipe 516 may extend toward the second tray assembly 450. A height of the first discharge pipe 516 may be variable in an extension direction.

[0253] The second refrigerant pipe 520 may receive refrigerant from the first discharge pipe 516. A height of the first discharge pipe 516 may be variable in an extension direction. The second refrigerant pipe 520 may be a pipe formed integrally with the first discharge pipe 516 or may be a pipe coupled to the second discharge pipe 516.

[0254] The second refrigerant pipe 520 may include a second inlet pipe 522 connected to the first discharge pipe 516. The second inlet pipe 522 may be located at an opposite side of the driver 690 in the second tray assembly 450.

[0255] The second refrigerant pipe 520 may further include a third cooling pipe 523. The third cooling pipe 523 may extend from the second inlet pipe 522.

[0256] A portion of the second refrigerant pipe 520 (for example, the third cooling pipe 523) may be positioned higher than one end of the second ice making cell 451.

[0257] The third cooling pipe 523 may contact the second one tray 460. Therefore, the second one tray 460 may be cooled by refrigerant flowing through the third cooling pipe 523. For example, the third cooling pipe 523 may contact an upper surface of the second one tray 460.

[0258] The liquid supply assembly 320 may be positioned higher than the third cooling pipe 523.

[0259] The third cooling pipe 523 may include a plurality of straight parts 523a. The third cooling pipe 523 may further include a curved shaped connection part 523b connecting two adjacent straight parts 523a.

[0260] One or more of a plurality of straight parts 523a may extend in a direction parallel to an arrangement direction of a plurality of second ice making cells 451. A plurality of straight parts 523a may overlap the second ice making cell 451 in a first direction. Some of the plurality of straight parts 523a may overlap the second opening 473 in the first direction. The first direction may be an arrangement direction of second one cell and the second another cell forming the second ice making cell 451.

[0261] The third cooling pipe 523 may be located higher than the first cooling pipe 513. The third cooling pipe 523 may be located higher than the second cooling pipe 515.

[0262] The second refrigerant pipe 520 may further include a second bent pipe 524 extending from an end of the third cooling pipe 523. A portion of the second bent pipe 524 may extend from an end of the third cooling pipe 523 along one side of the driver 690.

[0263] Another portion of the second bent pipe 524 may extend in another direction.

[0264] The second refrigerant pipe 520 may further include a second discharge pipe 525 connected to the second bent pipe 524. At least a portion of the second discharge pipe 525 may extend parallel to the first inlet

pipe 511. The second discharge pipe 525 may be located at one side of the driver 690. That is, the second discharge pipe 525 may extend in a space between the driver 690 and a rear wall 101a of the inner case 101.

[0265] At least a portion of the second discharge pipe 525 and the first inlet pipe 511 may be arranged in the first direction.

[0266] At least a portion of the second discharge pipe 525 may overlap the first inlet pipe 511 in the first direction. At least a portion of the second discharge pipe 525 may be located at one side of the first inlet pipe 511.

[0267] In this embodiment, the liquid supply assembly 320 may supply liquid to the ice maker 40 during a liquid supply process. The liquid supply assembly 320 may supply liquid to the ice maker 40 during an ice separation process.

[0268] When ice making is completed in the ice maker 40, the ice maker 40 may be maintained at a sub-zero temperature. The liquid supply assembly 320 can supply liquid supplied from an external liquid source 302 to the ice maker 40. Since liquid supplied from the external liquid source 302 may be liquid having normal temperature or liquid having a temperature similar to a normal temperature, liquid may be supplied from the liquid supply assembly 320 to the ice maker 40 in an ice separation process to increase a temperature of the ice maker 40.

[0269] FIGS. 14 and 15 is a perspective view of a bracket according to one embodiment of the present invention. FIG. 16 is a front view of a bracket according to one embodiment of the present invention. FIG. 17 is a plan view of a bracket according to one embodiment of the present invention. FIG. 18 is a bottom view of a bracket according to one embodiment of the present invention.

[0270] Referring to FIGS. 14 to 18, the bracket 452 may be coupled to at least one side of the ice making chamber 12 or may be coupled to a separate frame connected to the ice making chamber 12.

[0271] The bracket 452 may include a first wall 600 in which a through hole 601 is formed. At least a portion of the first wall 600 may extend in a horizontal direction.

[0272] The first wall 600 may be provided with a coupler for coupling the second one tray 460.

[0273] The coupler may include a first coupler 605. A portion of the second one tray 460 may be inserted into the first coupler 605. The first coupler 605 may include a coupling groove 606 into which a portion of the second one tray 460 is inserted. To form the coupling groove 606, the first coupler 605 may protrude from the first wall 600 toward one side. In order to firmly couple the second one tray 460, a plurality of first couplers 605 may be arranged to be spaced apart from each other.

[0274] The coupler may further include a second coupler 607. A coupling member passing through the second one tray 460 may be coupled to the second coupler 607. For example, the second coupler 607 may be located at a opposite side of the first coupler 605 based on the through hole 601. The second coupler 607 may protrude inside the through hole 601 on a surface forming the through hole 601. In order to firmly couple the second one tray 460, a plurality of second couplers 605 may be arranged to be spaced apart from each other.

[0275] The coupler may further include a third coupler 608. The third coupler 608 may include a coupling hole to which a coupling member passing through the second one tray 460 is coupled. The coupling hole 608 may be located adjacent to the first coupler 605.

[0276] When the second one tray 460 is coupled to the coupler, the second one tray 460 may pass through the through hole 601.

[0277] When the second one tray 460 is coupled to the coupler, an upper surface of the first wall 600 may support a portion of the second one tray 460.

[0278] The bracket 452 may further include a blocking wall 604 extending from the first wall 600.

[0279] The blocking wall 604 may extend from the first wall 600 in a direction parallel to an arrangement direction of a plurality of second ice making cells 451.

[0280] The blocking wall 604 may be located adjacent to the first coupler 605. The coupling groove 606 may be formed between the blocking wall 604 and the through hole 601. The blocking wall 604 may block liquid that has fallen into the second one tray 460 during a liquid supply process or an ice separation process from flowing toward a surrounding structure of the bracket 452. The blocking wall 604 may guide liquid to flow toward an extension wall 630 and 632, which will be described later.

[0281] The bracket 452 may further include a second wall 611 extending from the first wall 600 in a direction crossing the first wall 600. At least a portion of the second wall 611 may extend in the first direction.

[0282] The second wall 611 may include an installation wall 616 on which the driver 690 is installed. For example, the installation wall 616 may be formed in a square frame shape. The installation wall 616 may extend from the second wall 611 in a direction crossing the second wall 611. For example, a portion of the installation wall 616 may extend from the second wall 611 in a second direction that crosses the first direction.

[0283] The second wall 611 may further include a hole 614 through which a portion of a component which power is transmitted from the driver 690 passes or through which a shaft 489 that provides a rotation center C1 of the second another tray 470 passes.

[0284] The installation wall 616 may form a receiving space in which the driver 690 is received. The installation wall 616 may include a slot 618 in which a portion of the driver is received for coupling to the driver 690. The installation wall 616 may further include a coupling protrusion 617 for coupling with the driver 690 received in the slot 618. For example, the coupling member passes through the coupling protrusion 617 and coupled to the driver 690.

[0285] The bracket 452 may further include a third wall 612 extending from the first wall 600. At least a portion of the third wall 612 may extend in the first direction.

[0286] At least a portion of the third wall 612 may be arranged to face the second wall 611 while being spaced apart from the second wall 611. At least a portion of the second ice making cell 451 may be located between the second wall 611 and the third wall 612.

[0287] The bracket 452 may further include a fourth wall 620 to which the pusher 490 is coupled.

[0288] The fourth wall 620 may extend from the first wall 600. The fourth wall 620 may connect the second wall 611 and the third wall 612.

[0289] The fourth wall 620 may be inclined at a predetermined angle with respect to horizontal and vertical lines. For example, the fourth wall 620 may be inclined away from the through hole 601 from a top side to a bottom side. The fourth wall 620 may extend in a direction away from a vertical center line passing through a center of the second ice making cell 451 from a top side to a bottom side.

[0290] The fourth wall 620 may be provided with a seating groove 621 for seating the pusher 490. The seating groove 621 may be provided with a coupling protrusion 622 for coupling to the pusher 490. The coupling protrusion 622 may protrude from the seating groove 621. Although not limited, the plurality of coupling protrusions 622 may be arranged to be spaced apart from each other in a horizontal direction or a vertical direction.

[0291] The seating groove 621 may be provided with a coupling boss 623 for coupling a coupling member passing through the pusher 490. The coupling boss 623 may protrude from the seating groove 621. Although not limited, a plurality of coupling bosses 623 may be arranged to be spaced apart from each other in a horizontal direction or a vertical direction. The coupling protrusion 622 may be located between the plurality of coupling bosses 623.

[0292] While the second another tray 470 is moved in a state in which the pusher 490 is coupled to the fourth wall 620, the second another tray 470 and the pusher 490 may come into contact. While the pusher 490 presses the second another tray 470, ice may be separated from the second another tray 470.

[0293] In this embodiment, two or more of the first to fourth walls 600, 611, 612, and 620 may define a space for the second another tray 470 to be located.

[0294] The bracket 452 may further include a fifth wall 626 for connecting the second wall 611 and the third wall 612. The fifth wall 626 may extend from the first wall 600 toward one side.

[0295] A receiving groove 609 in which a portion of the second one tray 460 is received is formed at the first wall 600, the fifth wall 626, or a boundary portion between the first wall 600 and 626. The receiving groove 609 may receive a discharge passage 466, which will be described later.

[0296] The fifth wall 626 may be located at a opposite side of the fourth wall 620 with respect to the through hole 601.

[0297] The bracket 452 may further include an extension wall extending in a horizontal direction.

[0298] The extension wall may include a first extension wall 630 extending from the third wall 612. The liquid through hole 634 through which liquid passes may be formed in the first extension wall 630. The circumferential portion 635 may be located along an edge of the first extension wall 630 so that liquid falling into the first extension wall 630 can pass through the liquid through hole 634. The extension wall may further include a second extension wall 632 extending from the second wall 611. The liquid through hole 634 through which liquid passes may also be formed in the second extension wall 632.

[0299] The first and second extension walls 630 and 632 may extend from a position lower than the first wall 600. Accordingly, liquid that falls on the first wall 600 may fall on the first and second extension walls 630 and 632 along the second wall and the third walls 611 and 612.

[0300] The bracket 452 may further include a bent wall 637 to prevent interference with a structure formed on a wall on which the bracket 452 is installed. A bent wall 637 may be formed on the circumferential portion 635, for example.

[0301] The bent wall 637 may include a first wall 637a extending in a first direction. The bent wall 637 may include a second wall 637b that crosses the first wall 637a.

[0302] It should be noted that names of the walls constituting the bracket 452 described above are illustrative and that there are no restrictions on the terms used to distinguish the walls as long as they are distinguished.

[0303] Meanwhile, the partition plate 80 may be coupled to the second wall 611 and the third wall 612. A first coupling hole 611a may be formed in the second wall 611. A second coupling hole 612a may be formed in the third wall 612.

[0304] FIG. 19 is a perspective view showing a state in which a second one tray and a pusher are coupled to a bracket of the present embodiment. FIG. 20 is a view showing a state before a second one tray is coupled to a bracket of the present embodiment. FIG. 21 is a view showing a partition plate being coupled to a bracket.

[0305] Referring to FIGS. 19 to 21, the pusher 490 may include a plate 491 seated on the seating groove 621. The pushing column 492 may extend from the plate 491.

[0306] The plate 491 may be provided with a protrusion hole 495 through which the coupling protrusion 622 passes. Although not limited, the protruding hole 492 may be located between two adjacent pushing columns 492.

[0307] The plate 491 may be provided with a boss coupling portion 496 to which the coupling boss 623 is coupled. The boss coupling portion 493 may protrude from the plate 491. The coupling boss 623 may be inserted into the boss coupling portion 496. In this state, a coupling member can be coupled to the boss coupling portion 496 and the coupling boss 623.

[0308] Meanwhile, the second one tray 460 may in-

clude a sub second one tray 461 forming a second one cell 462.

[0309] For example, the second one cell 462 may be formed by being depressed in a hemispherical shape on one surface 461a of the sub second one tray 461.

[0310] The second one tray 460 may further include an extension 463 extending from the sub second one tray 461 in the second direction. For example, the extension 463 may extend from one end of the sub second one tray 461 in a second direction.

[0311] Explained from another aspect, the second one tray 460 may include an extension 463 disposed in the second direction and a sub second one tray 461 extending from the extension 463.

[0312] The extension 463 may be seated on the bracket 452. For example, the extension 463 may be seated on the first wall 600.

[0313] The extension 463 may be provided with a coupling hole 464 and 464a through which a coupling member for coupling with the bracket 452 passes. The coupling member coupled to one coupling hole 464 may be coupled to the second coupler 607. A coupling member coupled to another coupling hole 464a may be coupled to the third coupler 608.

[0314] The second refrigerant pipe 520 may be in contact with one surface of the second one tray 460. A seating groove 468 in which a straight part 523a of the second refrigerant pipe 520 is seated may be formed on one surface of the second one tray 460.

[0315] Although not limited, a plurality of seating grooves 468 may be arranged to be spaced apart from each other. Each of the seating grooves 468 may extend in a third direction parallel to an arrangement direction of a plurality of second one cells 462. A plurality of seating grooves 468 may be arranged to be spaced apart from each other in a fourth direction that crosses the third direction.

[0316] A plurality of seating grooves 468 may overlap the second one cell 462 in a vertical direction.

[0317] The second one tray 460 may include a plurality of hinge portions 465 extending from one surface of the extension 463. For example, the extension 463 may be provided with a pair of hinge portions 465.

[0318] The pair of hinge portions 465 may be spaced apart from each other in the third direction. Each hinge portion 465 may include a shaft hole 465a.

[0319] The shaft 489 may be connected to the shaft hole 465a of the pair of hinge portions 465.

[0320] When the sub second one tray 461 passes through the through hole 601, the pair of hinge portions 465 may also pass through the through hole 601.

[0321] The second one tray 460 may include a discharge passage 466 through which liquid that has fallen on one side of the second one tray 460 is discharged.

[0322] The discharge passage 466 may be formed by recessing one surface of the extension 463 and a passage wall protruding from the other surface of the extension 463. For example, the discharge passage 466 may extend in the fourth direction. The discharge passage 466 may extend to a side end of the extension 463.

[0323] The discharge passage 466 may be arranged to communicate with any one of a plurality of seating grooves 468. That is, a portion of the second refrigerant pipe 520 may be arranged to overlap the discharge passage 466 in the first direction.

[0324] The second one tray 460 may further include a coupling protrusion 464b inserted into a coupling groove 606 of the first coupler 605. For example, the coupling protrusion 464b may extend from the extension 463. For example, a plurality of coupling protrusions 464b may be arranged to be spaced apart from each other in the second direction.

[0325] Meanwhile, the partition plate 80 may be installed on the bracket 452, for example. The partition plate 80 may be provided with a coupling extension 82. For example, a plurality of coupling extensions 82 may be arranged to be spaced apart from each other in the second direction. The coupling extension 82 may be provided with a hook 84. The coupling extension 82 may extend in a direction crossing the partition plate 80. The hook 84 may extend in a direction crossing the coupling extension 82.

[0326] The partition plate 80 may be disposed on the bracket 452 at a position adjacent to the fifth wall 626. That is, the partition plate 80 may be located on the opposite side of the fourth wall 620. Accordingly, the partition plate 80 may restrict ice separated from the second ice making cell 451 from moving in a direction away from the fourth wall 620 during the ice separation process.

[0327] Although not limited, the plurality of coupling extensions 82 may be coupled to the second wall 611 and the third wall 612.

[0328] The second wall 611 and the third wall 612 may be positioned between the plurality of coupling extensions 82. In this state, a hook 84 of each coupling extension 82 can be coupled to a first coupling hole 611a and a second coupling hole 612a.

[0329] FIG. 22 is a view showing a state in which a case is coupled to a second one tray of the present embodiment. FIG. 23 is a view showing an insulation member being received in a case of the present embodiment. FIG. 24 is a view showing a second another tray positioned at one side of a case in the present embodiment.

[0330] Referring to FIGS. 12 and 22 to 24, the second tray assembly 450 may further include an insulation member 660 surrounding the second one tray 460.

[0331] For example, the insulation member 660 may surround the sub second one tray 461. Although not limited, the second one tray 460 may be made of a metal material, and the insulation member 660 minimizes a transfer of cold or heat supplied to the second one cell 462 to an outside.

[0332] Although not limited, an overall appearance of the insulation member 660 may be formed as a rectangular parallelepiped. The insulation member 660 may

include a first opening 662 through which the sub second one tray 461 passes. A vertical length of the insulation member 660 may be equal to or less than a vertical length of the sub second one tray 461.

[0333] When the sub second one tray 461 passes through the first opening 662, one surface of the insulation member 660 may contact the other surface of the extension 463.

[0334] The insulation member 660 may include a first recessed space 663 where the second coupler 607 is located. The first recessed space 663 may be recessed in one surface of the insulation member 660. Alternatively, the first recessed space 663 may be recessed from a side surface of the insulation member 660 toward the first opening 662.

[0335] In a state in which the second coupler 607 is positioned in the first recessed space 663, the second coupler 607 and the second one tray 460 may be coupled together.

[0336] The insulation member 660 may further include a second recessed space 664 where the discharge passage 466 is located. The second recessed space 664 may be recessed in one surface of the insulation member 660. Alternatively, the second recessed space 664 may be recessed in the second direction from a side surface of the insulation member 660.

[0337] The second tray assembly 450 may further include a supporter 650 that supports the insulation member 660.

[0338] The supporter 650 may include a supporter plate 651 having a second opening 652 through which the sub second one tray 461 passes. The insulation member 660 may be seated on the supporter plate 651.

[0339] The supporter plate 651 may include a receiving hole 657 in which a coupling member S1 for coupling the second another tray 470 and the supporter 480 is received. Accordingly, the coupling member S1 can be prevented from interfering with the supporter 650 while the second one tray 460 and the second another tray 470 are in contact for ice making.

[0340] The supporter 650 may further include a circumferential wall 650 extending from the supporter plate 660. For example, the circumferential wall 650 may extend from an edge of the supporter plate 660.

[0341] The circumferential wall 650 may surround a side surface of the insulation member 660. The circumferential wall 650 and the supporter plate 660 may form a space in which the insulation member 660 is received. The insulation member 660 may be fitted into a space defined by the supporter 650. Since the insulation member 660 is made of a material whose shape is deformable, the insulation member 600 can be fitted into a space defined by the supporter 650. When the insulation member 600 is fitted to the supporter 650, the insulation member 600 can be maintained coupled to the supporter 650 without a separate coupling means.

[0342] Accordingly, the circumferential wall 650 may contact a side surface of the insulation member 660.

[0343] The circumferential wall 650 may include a first slot 654 aligned with the first recessed space 663. The second coupler 407 may be located in the first slot 654.

[0344] The second coupler 407 can be prevented from interfering with the circumferential wall 650 by the first slot 654.

[0345] The circumferential wall 650 may further include a second slot 655 where the discharge passage 466 is located. The discharge passage 466 may be prevented from interfering with the circumferential wall 650 by the second slot 655.

[0346] The supporter 650 may further include an extension 666 extending from the circumferential wall 650 in the second direction. The extension 666 may contact the other surface of the extension 463 of the second one tray 560.

[0347] In a state in which the insulation member 660 surrounds the sub second one tray 461 and the supporter 650 supports the insulation member 666, a portion of the sub second one tray 461 may protrude from the other surface of the supporter plate 651. That is, the other surface 461a of the sub second one tray 461 may be positioned lower than the other surface of the supporter plate 651. Accordingly, the other surface 461a of the sub second one tray 461 may contact the second another tray 470.

[0348] Hereinafter, a series of processes by which ice is generated in an ice maker will be described.

[0349] A process for generating ice may include a liquid supply process. A process for generating ice may further include an ice making process. A process for generating ice may further include an ice separation process.

[0350] When the liquid supply process starts, the liquid supply valve 304 is turned on and liquid supplied from an external liquid source 302 flows along the liquid supply passage. The liquid flowing along the liquid supply passage is supplied to the ice maker 40 through the liquid supply assembly 320.

[0351] The liquid supplied to the ice maker 40 falls downward from the ice maker 40 and is stored in the liquid storage 350. When a liquid level of liquid stored in the liquid storage 350 reaches a reference liquid level, the liquid supply valve 304 is turned off and the liquid supply process is completed.

[0352] After the liquid supply process is completed, an ice making process starts.

[0353] In the ice making process, a cooler operates and low-temperature refrigerant may flow into the heat exchanger 50. For example, the compressor 183 may be turned on. Of course, the condenser fan 185 may also be turned on. Alternatively, the compressor 183 and the condenser fan 185 may be turned on before the ice making process and remain turned on during the ice making process. The valve 188 can be turned off.

[0354] In the ice making process, liquid may be supplied to the ice maker 40 by the liquid supplier 330.

[0355] A controller, not shown, may turn on the pumps 360 and 362 simultaneously or sequentially.

[0356] For example, when the first pump 360 operates, liquid may be supplied to the first tray assembly 410 through the sub_first liquid supplier 380.

[0357] Liquid sprayed from the sub first liquid supplier 380 is supplied to the first ice making cell 440 of the first tray assembly 410.

[0358] Liquid supplied to the first ice making cell 440 flows toward one surface of the first another tray 430. A portion of liquid within the first ice making cell 440 is frozen by the first refrigerant pipe 510. Unfrozen liquid falls downward again through the first opening 423. Liquid that falls downward through the first opening 423 is stored in the liquid storage 350 again.

[0359] During the ice making process, ice is generated at one side of the first ice making cell 440 and grows toward the other side. As liquid is sprayed into the first ice making cell 440, a portion of the liquid is frozen. In a process of spraying the liquid into the first one tray 420 or the first another tray 430, air bubbles in the liquid may be discharged from the liquid.

[0360] When the second pump 362 operates, liquid may be supplied to the second tray assembly 450 through the sub_second liquid supplier 382.

[0361] Liquid sprayed from the sub second liquid supplier 382 is supplied into the second ice making cell 451 through a supporter opening 482a of the supporter 480 and a second opening 473 of the second another tray 470.

[0362] Liquid supplied to the second ice making cell 451 flows toward an inner side of the second one tray 460. Some of the liquid within the second ice making cell 451 may be frozen by the second refrigerant pipe 520. Unfrozen liquid falls downward again through the second opening 473. Liquid that falls downward through the second opening 473 is stored again in the liquid storage 350.

[0363] While performing the ice making process, the controller may determine whether ice making is completed in the tray assembly.

[0364] The ice making process may be determined to be completed when a temperature detected by the temperature sensor for detecting a temperature of each tray assembly reaches an end reference temperature.

[0365] When an ice making process is completed, an ice separation process may be performed.

[0366] When the ice separation process starts, the valve 188 may be turned on. When the valve 188 is turned on, high-temperature refrigerant compressed in the compressor 183 may flow into the heat exchanger 50. High-temperature refrigerant flowing into the heat exchanger 50 may be heat exchanged with the ice maker 40. When high-temperature refrigerant flows into the heat exchanger 50, heat may be transferred to the ice maker 40.

[0367] The first ice I1 may be separated from the first tray assembly 410 by the heat transferred to the ice maker 40. When the first ice I1 is separated from the first tray assembly 410, the first ice I1 may fall onto the guide 70. The first ice I1 that fell onto the guide 70 may be stored in the first storage space 132.

[0368] The second ice I2 may be separated from at least a surface of the second one tray 460 by heat transferred to the ice maker 40.

[0369] As time passes, or when a temperature of each tray assembly reaches a set temperature, a flow of high-temperature refrigerant to the heat exchanger 50 may be blocked.

[0370] Next, the driver 690 may operate to separate the second ice I2 from the second tray assembly 450. By operating the driver 690, the second another tray 470 may be moved in a forward direction (clockwise direction with respect to FIG. 13).

[0371] When the second ice I2 is separated from the second one tray 460 and second another tray 470 by high-temperature refrigerant flowing into the heat exchanger 50, the second another tray 470 may be moved while second ice I2 is supported on the second another tray 470. In this case, when the second another tray 470 moves at an angle of approximately 90 degrees, the second ice I2 may fall from the second another tray 470.

[0372] On the other hand, when the second ice I2 has been separated from the second one tray 460 by the high-temperature refrigerant flowing into the heat exchanger 50 but has not yet been separated from the second another tray 470, the pusher 490 presses the second another tray 470 and the second ice I2 may be separated from the second another tray 470 and falls downward while the second another tray 470 moves to an ice separation angle.

[0373] When the second ice I2 is separated from the second tray assembly 450, the second ice I2 may fall onto the guide 70. The second ice I2 that fell onto the guide 70 may be stored in the second storage space 134.

[0374] After the second another tray 470 is moved in the forward direction, the second another tray 470 is moved in a reverse direction (counterclockwise direction in the drawing) by the driver 690 and in contact with the second one tray 460.

[0375] When an ice separation process is performed once or a set number of times, liquid in the liquid storage 350 may be discharged to an outside through the drain pipe 390 and the drain tube 392 (drain process). That is, the drain valve can be turned on for a certain period of time when the liquid drain condition is satisfied.

[0376] A next liquid supply process may be started after a drain process is performed. When the drain process is performed intermittently, if a drain condition is not satisfied, a liquid supply process may be performed immediately after the ice separation process is performed. If a drain condition is satisfied, a drain process may be performed after the ice separation process is performed, and the liquid supply process may be performed after a drain process is completed.

[0377] Meanwhile, it is also possible to apply technology applied to the ice making device to a refrigerator. That is, the refrigerator may include some or all of the compo-

nents of the ice making device 1.

[0378] First, the ice maker 40 in the ice making device 1 can be applied to the refrigerator. The refrigerator may include a cabinet having a storage chamber, and a door that opens and closes the storage chamber. An ice making chamber may be provided in the cabinet or door.

[0379] An ice maker 40 may be provided in the ice making chamber with the same structure or a similar form as the ice maker 40 of this embodiment.

[0380] In this embodiment, the cooler in the ice making device 1 may be replaced with a cooler or a refrigerant cycle that cools the storage chamber of the refrigerator.

[0381] A guide 70, a liquid supply assembly 320, and a liquid supplier 330 provided in the ice making device 1 may also be applied to the refrigerator or may be modified in shape, size, or location to suit characteristics of the refrigerator.

Claims

1. An ice making device comprising:

a bracket provided in an ice making chamber;
a second one tray including a sub second one tray that defines a portion of an ice making cell for generating ice and an extension that extends from the sub second one tray and supported by the bracket; and
a second another tray that defines another portion of the ice making cell and in contact with the second one tray during an ice making process and spaced apart from the second one tray during an ice separation process.

2. The ice making device of claim 1, wherein the bracket includes a through hole and the sub second one tray passes through the through hole.

3. The ice making device of claim 2, wherein the bracket comprises a first wall on which the through hole is formed and the extension is seated, and wherein the first wall is provided with a coupler for coupling the second one tray.

4. The ice making device of claim 3, wherein the coupler comprises a first coupler having a coupling groove, and wherein the extension is provided with a coupling protrusion inserted into the coupling groove.

5. The ice making device of claim 4, wherein the first coupler extends downward from the first wall to form the coupling groove.

6. The ice making device of claim 3,

wherein the coupler comprises a second coupler protruding from a surface forming the through hole, and
wherein the extension is provided with a coupling hole for coupling to the second coupler by a coupling member.

7. The ice making device of claim 3, wherein the coupler comprises a third coupler for coupling the coupling member passing through the extension.

8. The ice making device of claim 3, further comprising a liquid supply assembly configured to supply liquid to the second one tray during a liquid supply process, and wherein the first wall is provided with a blocking wall to limit a flow of liquid supplied to the second one tray.

9. The ice making device of claim 8, wherein the extension is provided with a discharge passage for discharging dropped liquid, and wherein the first wall is provided with a receiving groove that receives the discharge passage.

10. The ice making device of claim 3, wherein the extension is provided with a plurality of hinge portions to which a shaft providing a center of rotation is coupled, and wherein when the extension is seated on the first wall, the plurality of hinge portions passes through the through hole.

11. The ice making device of claim 3, further comprising a driver that generates a driving force to move the second another tray,
wherein the bracket further comprises a second wall extending from the first wall and having an installation wall on which the driver is installed, and a third wall extending from the first wall and spaced apart from the second wall.

12. The ice making device of claim 11, further comprising a partition plate that is coupled to the second wall and the third wall and that restricts movement of ice separated from the ice making cell in one direction.

13. The ice making device of claim 12, wherein the partition plate comprises a plurality of extensions having a hook, and wherein a hole for coupling the hook is formed in the second wall and the third wall.

14. The ice making device of claim 3, further comprising a pusher configured to press the second another tray so that ice is easily separated from the ice making cell during an ice separation process, and
wherein the bracket further includes a fourth wall extending from the first wall and on which the pusher is installed.

15. The ice making device of claim 14, wherein the

pusher comprises a plate and a pushing column extending from the plate,

wherein the fourth wall is provided with a seating groove for seating the plate,
wherein a coupling protrusion is formed in the seating groove, and
wherein a coupling hole through which the coupling protrusion passes is formed in the plate.

16. The ice making device of claim 15, wherein a coupling boss is formed in the seating groove, the plate is provided with a boss coupling portion that receives the coupling boss, and a coupling member is coupled to the boss coupling portion and the coupling boss.

17. The ice making device of claim 2, further comprising a liquid supply assembly configured to supply liquid to the second one tray during a liquid supply process,

wherein the bracket comprises an extension wall that extends from a position lower than the through hole and that the liquid falls,
wherein a liquid through hole through which liquid passes is formed in the extension wall.

18. The ice making device of claim 17, wherein the bracket further comprises a circumferential portion extending from the extension wall, and
wherein the circumferential portion comprises a seating end seated on an adjacent structure.

19. The ice making device of claim 18, wherein the circumferential portion comprises a bent wall to prevent interference with an adjacent structure during an installation process of the bracket.

20. An ice making device comprising:

a bracket in which a through hole is formed and provided in an ice making chamber;
a second one tray that defines a portion of an ice making cell for generating ice and seated on the bracket in a state in which the second one tray passes through the through hole;
an insulation member that surrounds an outer surface of the second one tray and has a first opening through which the second one tray passes; and
a second another tray that defines another portion of the ice making cell and in contact with the second one tray during an ice making process and spaced apart from the second one tray during an ice separation process.

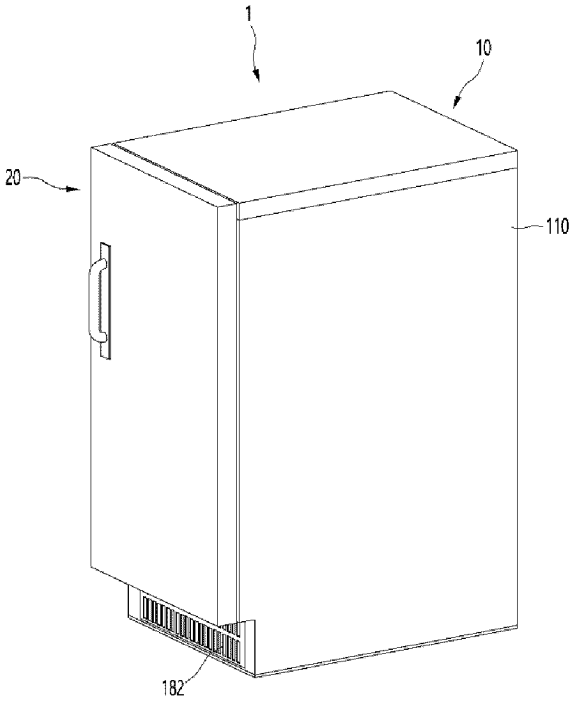
21. The ice making device of claim 20, wherein the second one tray comprises a sub second one tray that defines a portion of the ice making cell and an extension extending from the sub second one tray, and wherein the insulation member surrounds the sub second one tray and in contact with one surface of the extension.

22. The ice making device of claim 21, further comprising a supporter having a second opening through which the sub second one tray passes and configured to support the insulation member.

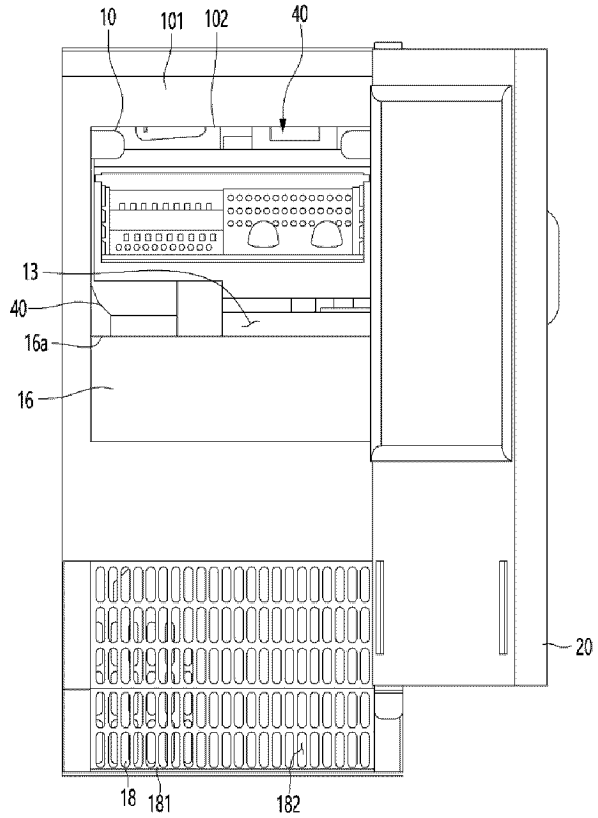
23. The ice making device of claim 22, wherein the bracket comprises a coupler to be coupled to the second one tray, the insulation member is provided with a recessed space in which the coupler is received and the supporter is provided with a slot where the coupler is disposed.

24. The ice making device of claim 22, further comprising a liquid supply assembly configured to supply liquid to an upper side of the second one tray during a liquid supply process, an extension is provided with a discharge passage for discharging dropped liquid, the insulation member is provided with a recessed space in which the discharge passage is received, and the supporter is provided with a slot where the discharge passage is disposed.

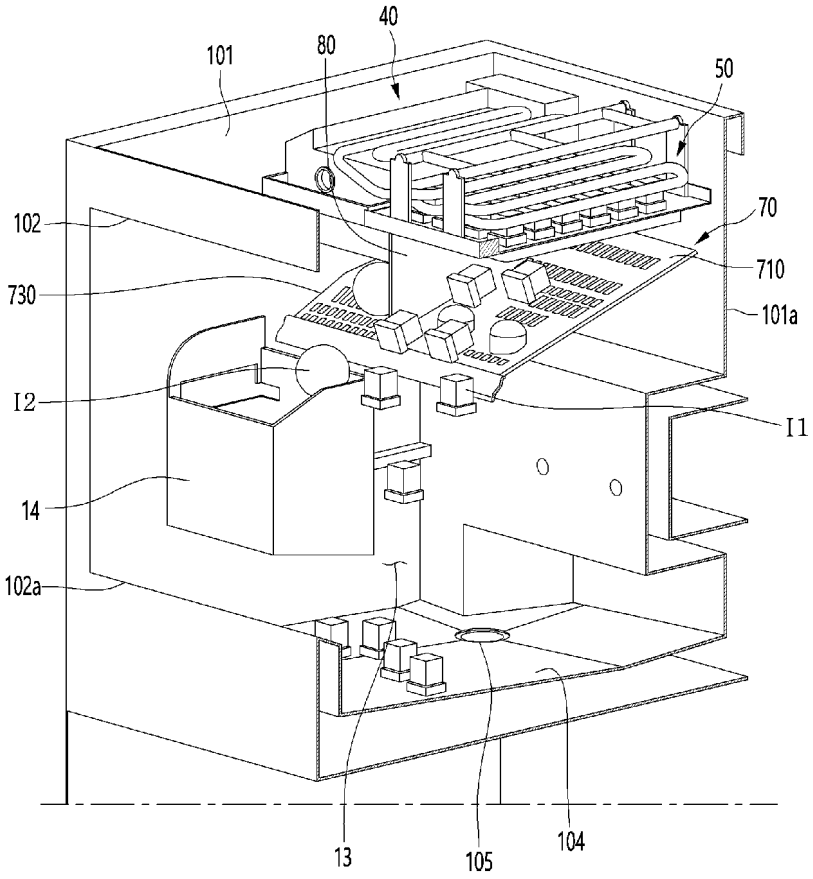
【Figure 1】



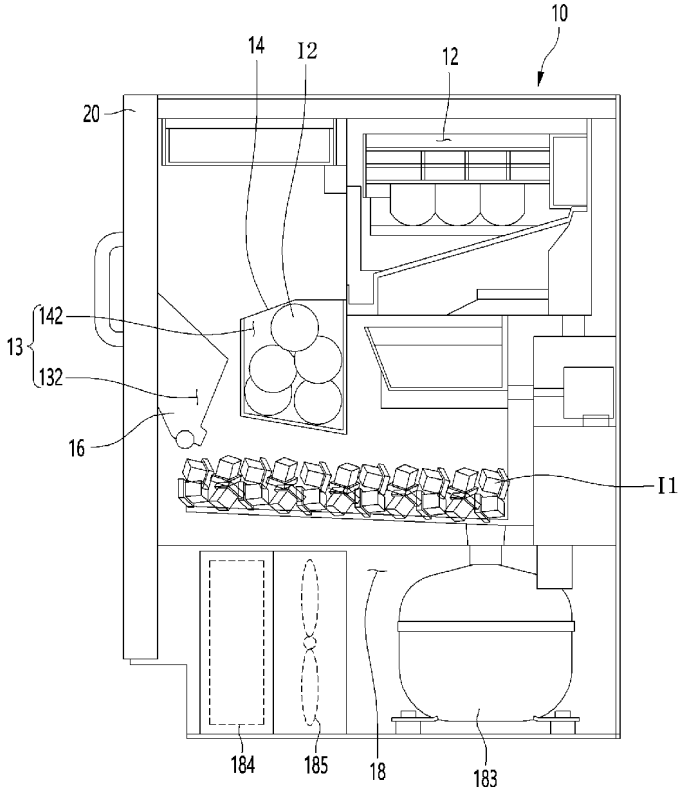
【Figure 2】



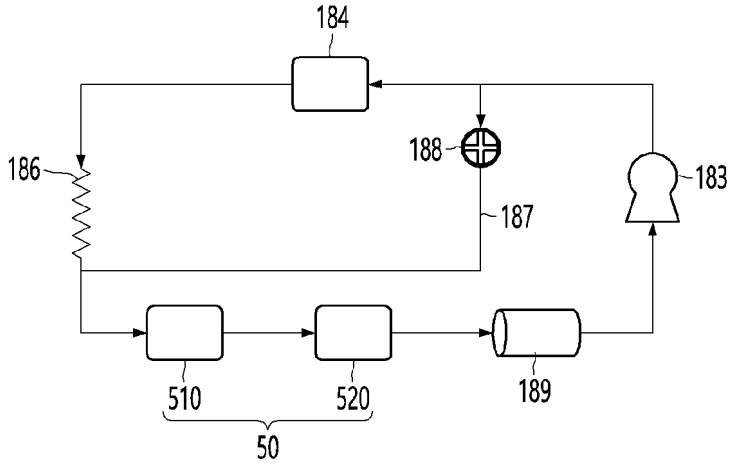
【Figure 3】



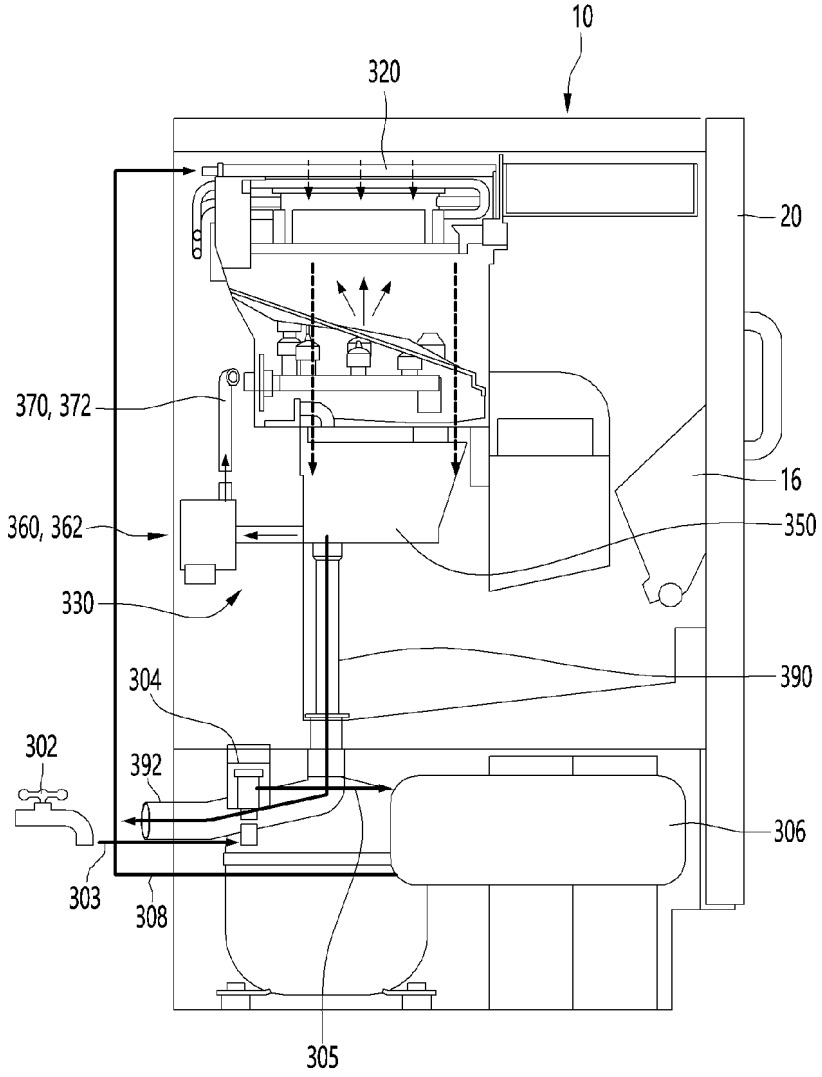
【Figure 4】



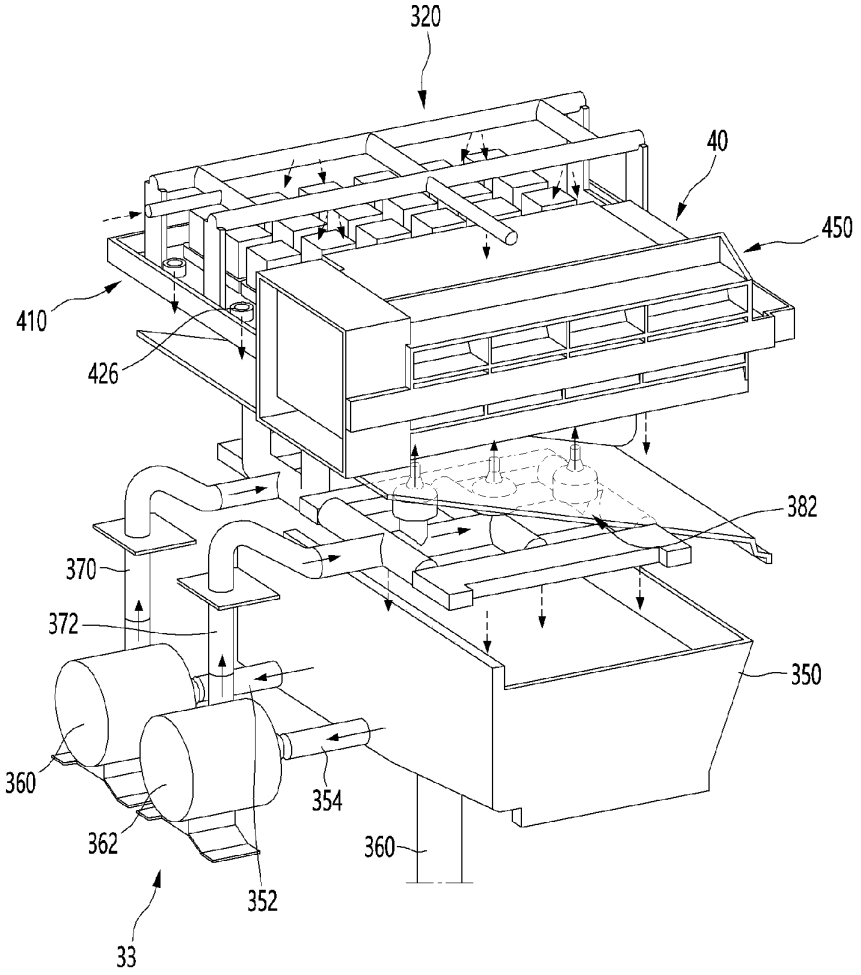
【Figure 5】



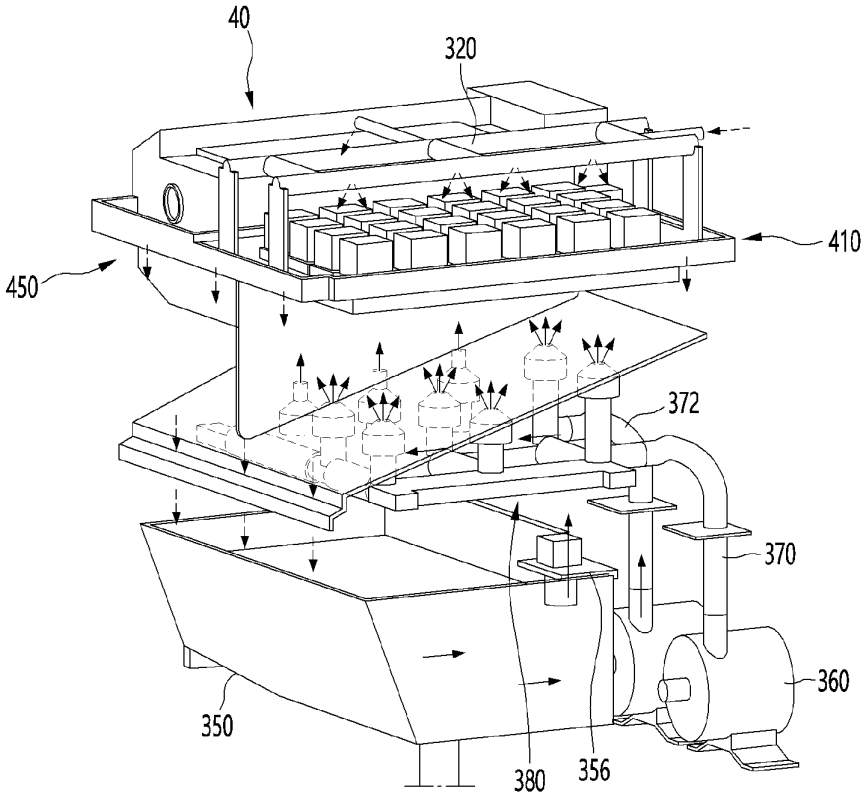
【Figure 6】



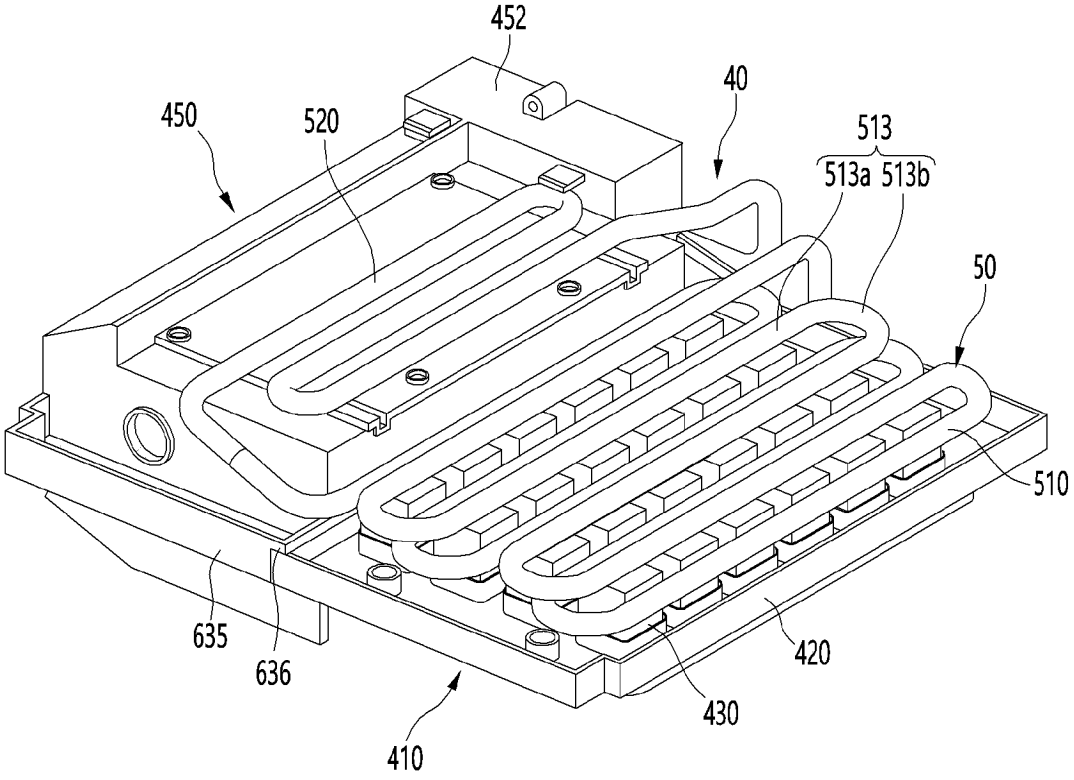
【Figure 7】



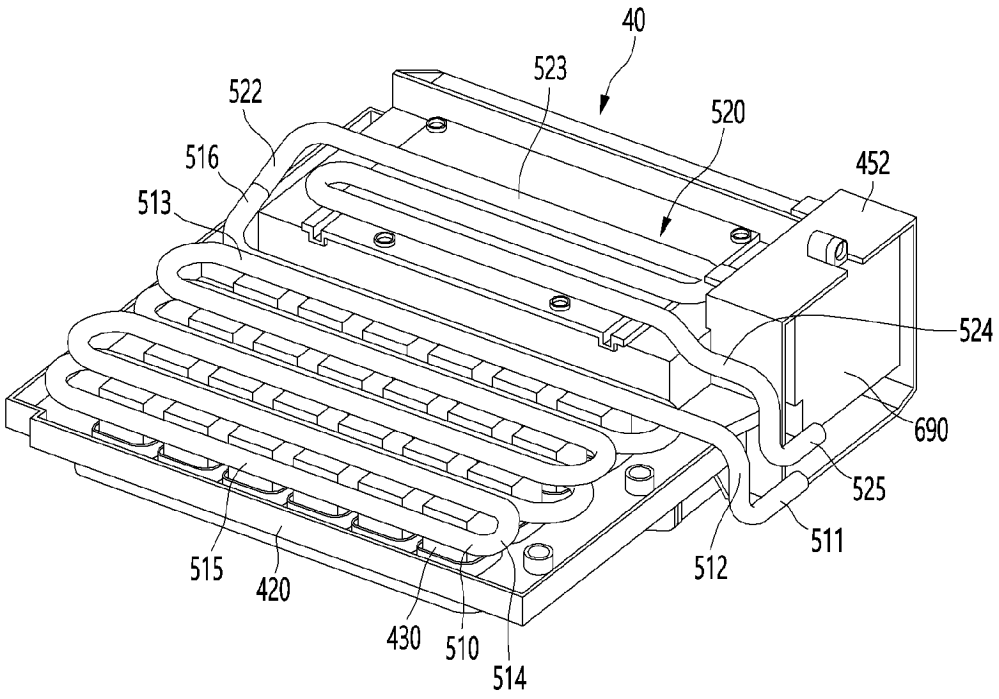
【Figure 8】



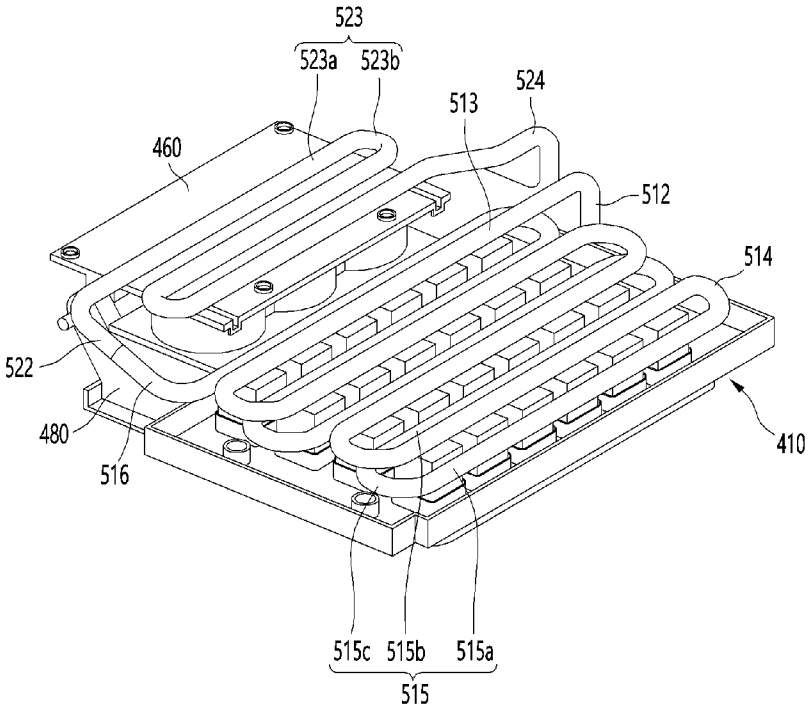
【Figure 9】



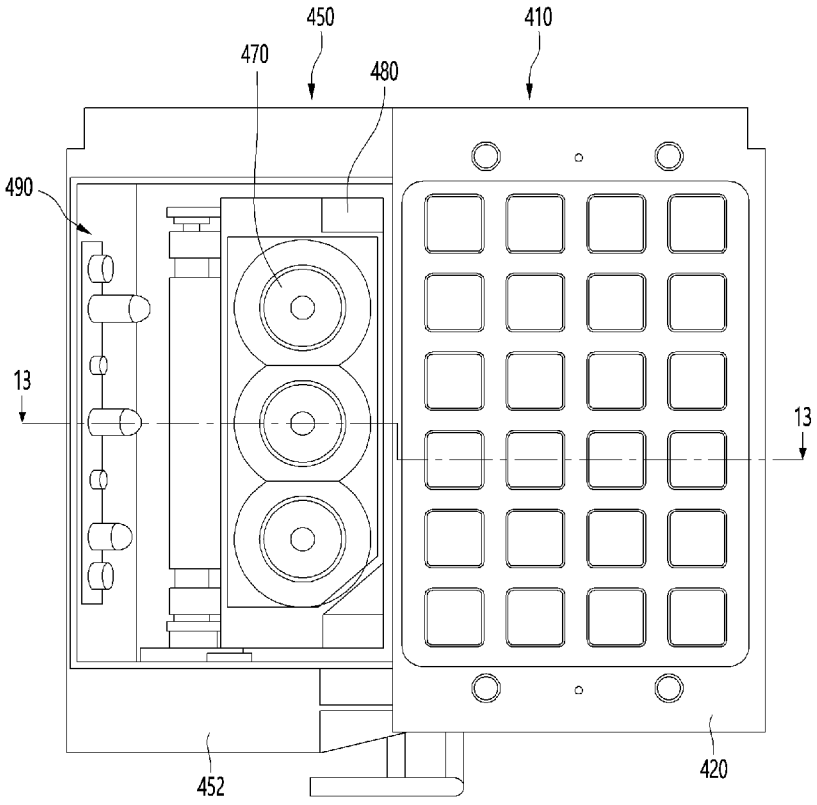
【Figure 10】



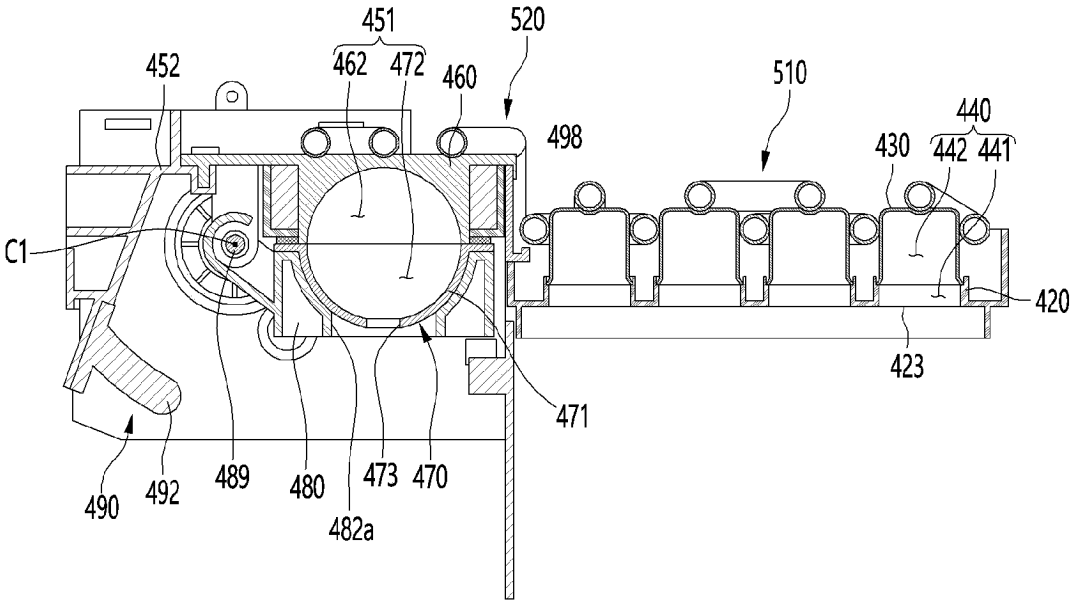
【Figure 11】



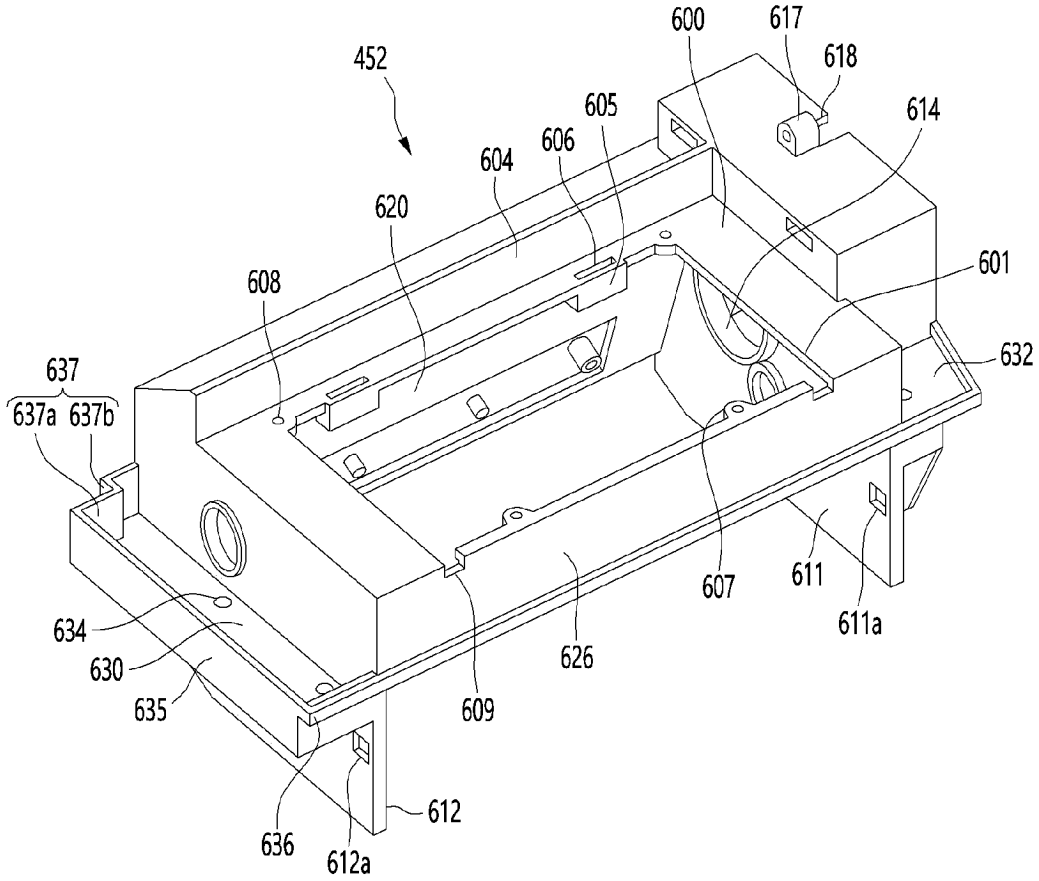
【Figure 12】



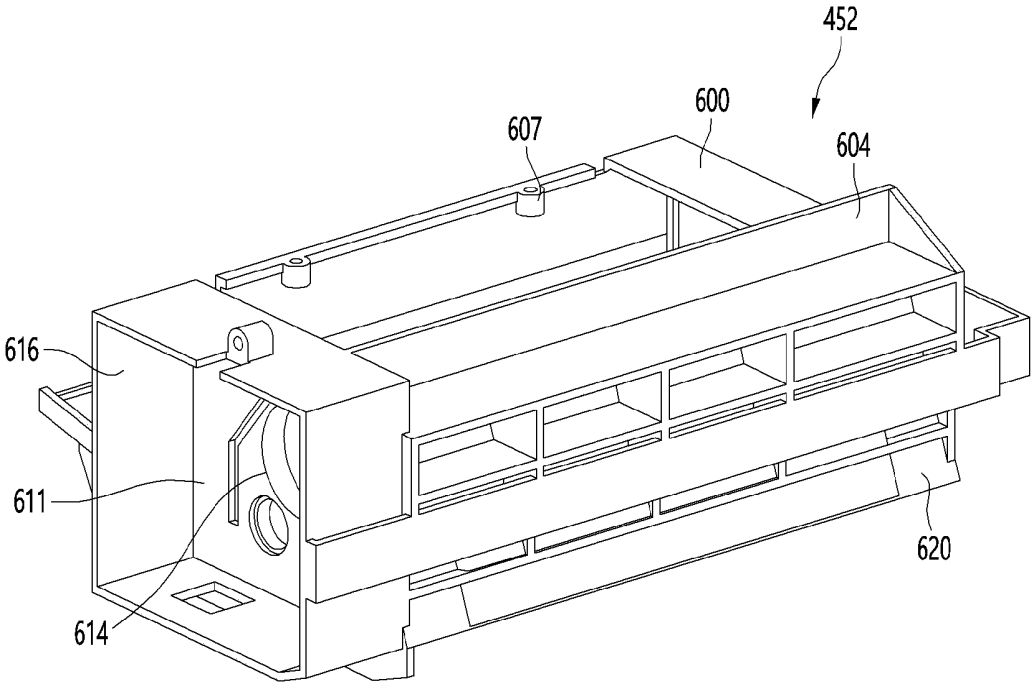
【Figure 13】



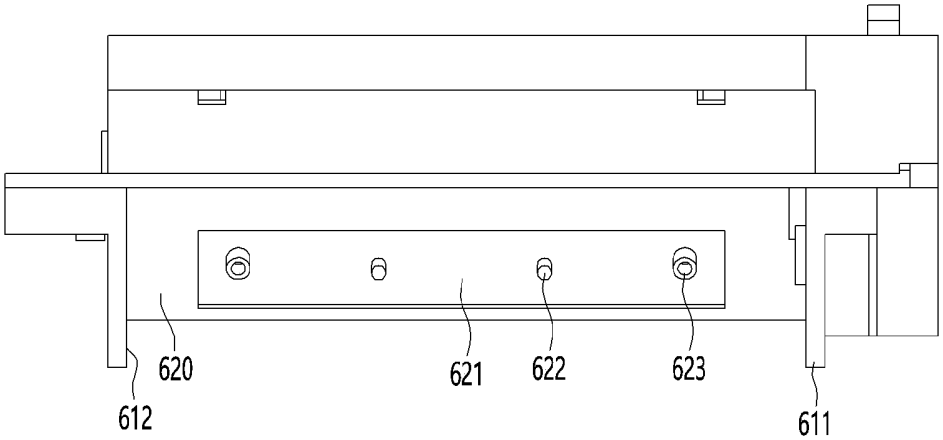
【Figure 14】



【Figure 15】



【Figure 16】



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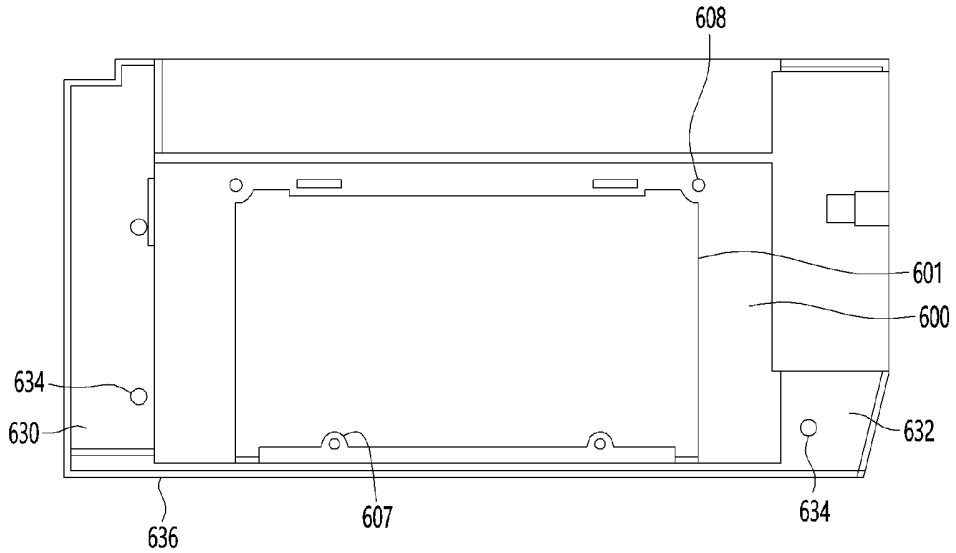

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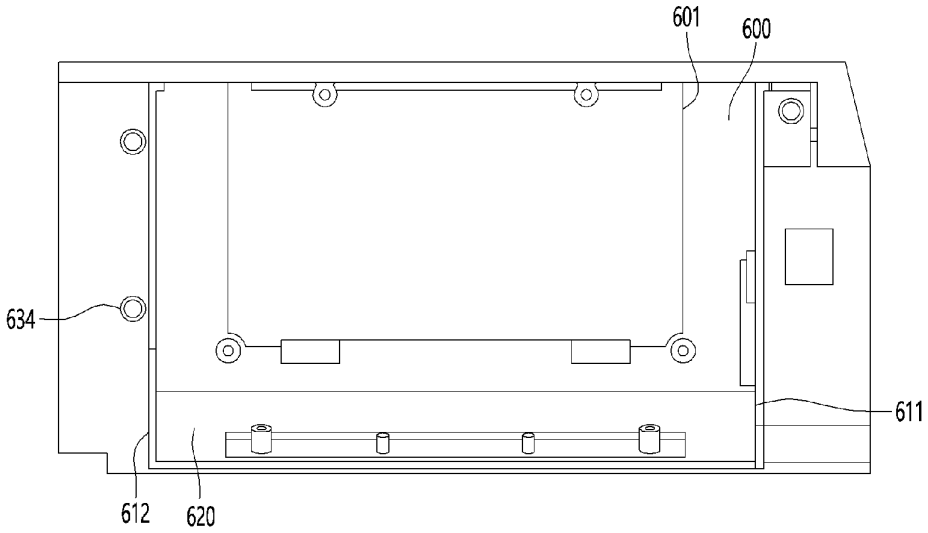

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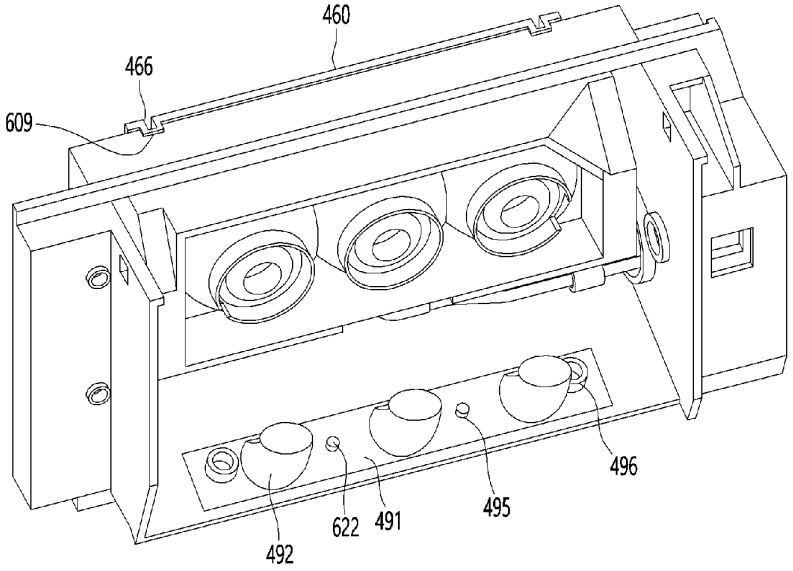
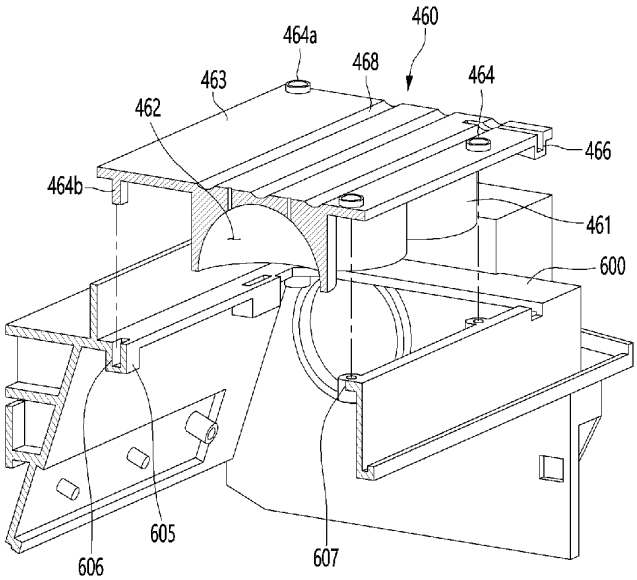


【Figure 20】



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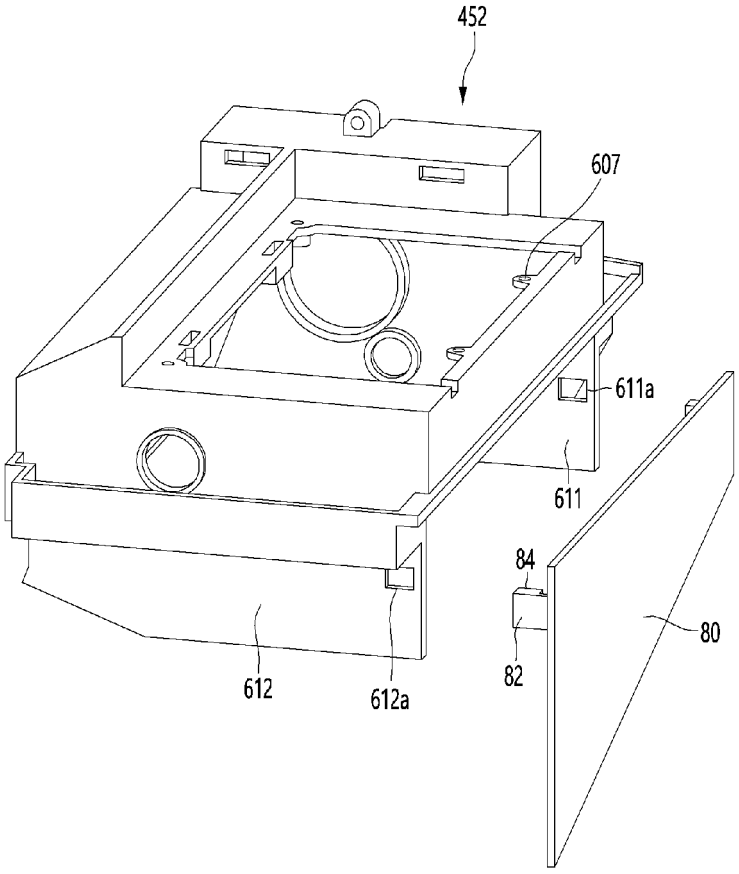

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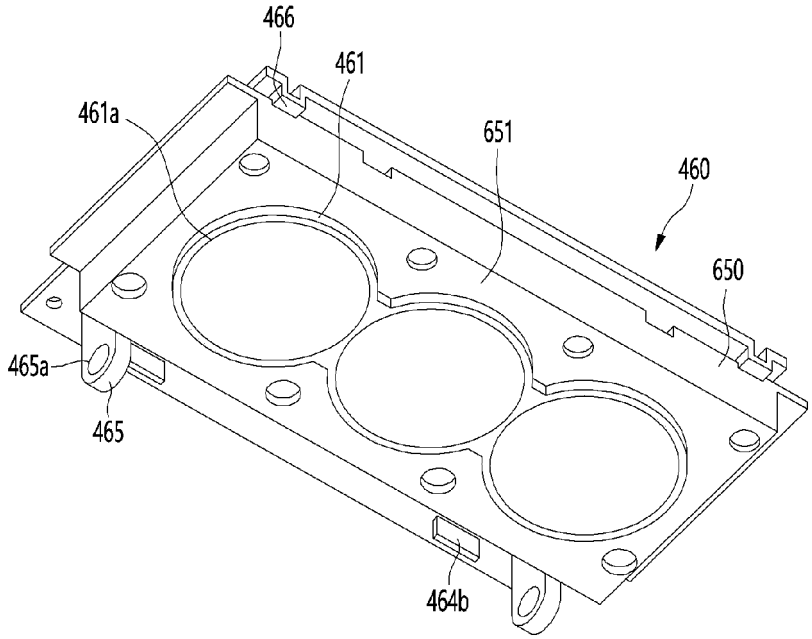

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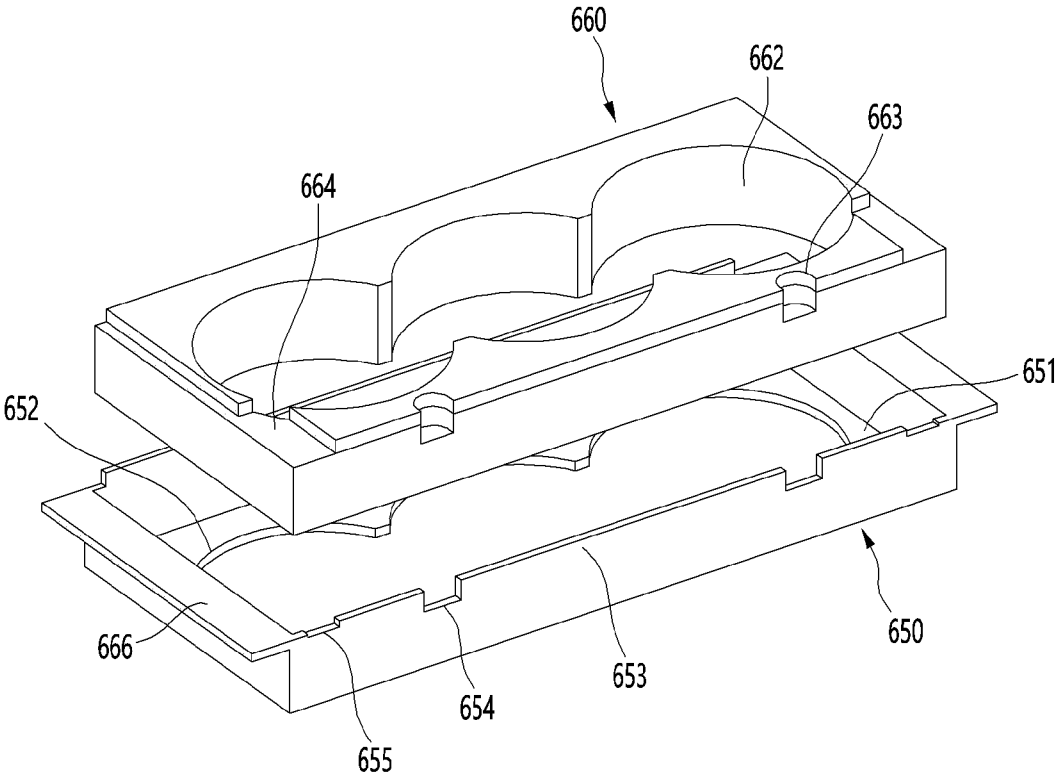
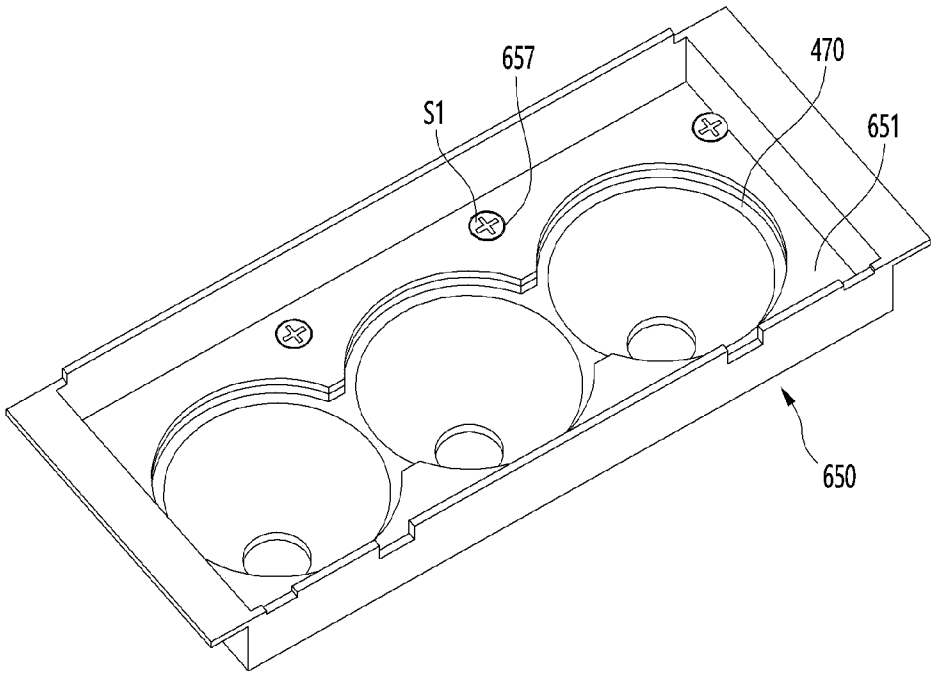


【Figure 24】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002706

A. CLASSIFICATION OF SUBJECT MATTER

F25C 1/24(2006.01)i; **F25C 1/25**(2018.01)i; **F25C 1/12**(2006.01)i; **F25C 5/04**(2006.01)i; **F25C 5/08**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25C 1/24(2006.01); F25C 1/00(2006.01); F25C 1/10(2006.01); F25C 1/12(2006.01); F25C 1/18(2006.01); F25C 1/22(2006.01); F25C 1/25(2018.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 제빙(ice making), 트레이(tray), 브라켓(bracket), 푸셔(pusher), 홈(groove), 돌기(projection), 단열(insulator)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y		20-23
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Date of the actual completion of the international search	Date of mailing of the international search report
24 May 2023	**25 May 2023**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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