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(54) **CLEANING AND DISCHARGING PIPE FOR FREE-STANDING ICE MAKER**

(57) An icemaker appliance includes a cabinet forming an ice storage compartment; an ice maker provided within the cabinet; a first reservoir provided below the ice maker; a second reservoir provided below the ice storage compartment; and a circulation system in fluid communication with the first reservoir and the second reservoir. The circulation system includes a return line conduit; a first pump connected to the return line conduit to pump the liquid from the second reservoir to the first reservoir; and a cleanout line conduit in fluid communication with the first pump, wherein the first pump selectively pumps the liquid from the second reservoir through the cleanout line conduit.

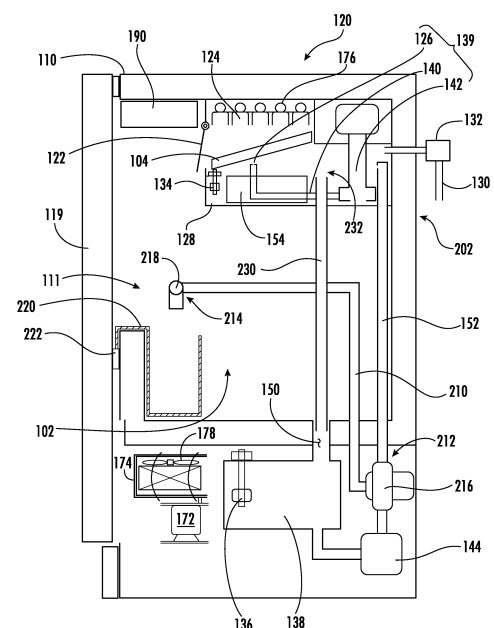


FIG. 3

Description

FIELD OF THE INVENTION

[0001] The present subject matter relates generally to icemaker appliances, and more particularly to drainless stand-alone icemaker appliances.

BACKGROUND OF THE INVENTION

[0002] Icemaker appliances generally include an ice maker that is configured to generate ice. Ice makers within icemaker appliances are plumbed to a water supply, and water from the water supply may flow to the ice maker within the icemaker appliances. Icemaker appliances are frequently cooled by a sealed system, and heat transfer between liquid water in the ice maker and refrigerant of the sealed system generates ice.

[0003] In certain icemaker appliances, stored ice within the icemaker appliances melts over time and generates liquid meltwater. Commonly, the icemaker appliances are plumbed to an external drain (e.g., connected to a municipal water system) to dispose of the liquid meltwater. Moreover, the plumbed drain is used to dispose of cleaning solutions after performing a cleanout operation within the icemaker appliance. While effective for managing the liquid meltwater, external drain lines have drawbacks. For example, external drain lines can be difficult and expensive to install. Additionally, cleaning such icemaker appliances can be burdensome and time consuming.

[0004] Recently, alternatives to plumbed drains have been introduced. However, these alternatives have certain drawbacks. For instance, a location of a manual drain pipe is inconvenient to users, resulting in unpleasant experiences in performing manual drains. Moreover, collection and disposal of cleaning solutions after performing a clean and drain operation is difficult and unwieldy.

[0005] Accordingly, an icemaker appliance that obviates one or more of the above-mentioned drawbacks would be useful. In particular, an icemaker appliance with a more efficient cleanout process would be beneficial.

BRIEF DESCRIPTION OF THE INVENTION

[0006] Aspects and advantages of the invention will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the invention.

[0007] In one exemplary aspect of the present disclosure, an icemaker appliance is provided. The icemaker appliance may include a cabinet forming an ice storage compartment; an ice maker provided within the cabinet; a first reservoir provided below the ice maker and configured for collecting liquid from the ice maker; a second reservoir provided below the ice storage compartment; and a circulation system in fluid communication with the first reservoir and the second reservoir. The circulation

system may include a return line conduit; a first pump connected to the return line conduit to pump the liquid from the second reservoir to the first reservoir; and a cleanout line conduit in fluid communication with the first pump, the cleanout line conduit being provided downstream from the first pump, wherein the first pump selectively pumps the liquid from the second reservoir through the cleanout line conduit.

[0008] In another exemplary aspect of the present disclosure, an icemaker appliance is provided. The icemaker appliance may include a cabinet forming an ice storage compartment; a first reservoir provided within the ice storage compartment, the first reservoir configured to receive a liquid; a removable grate located within the ice storage compartment over the first reservoir; an ice maker provided within the ice storage compartment to produce ice; and a circulation system in fluid communication with the first reservoir. The circulation system may include a supply line conduit; a pump connected to the supply line conduit to pump the liquid from the first reservoir; and a cleanout line conduit in fluid communication with the pump, the cleanout line conduit being provided downstream from the pump, wherein the pump selectively pumps the liquid from the first reservoir through the cleanout line conduit.

[0009] These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures.

FIG. 1 provides a front, perspective view of an icemaker appliance according to an exemplary embodiment of the present subject matter.

FIG. 2 provides a front, perspective view of the exemplary icemaker appliance of FIG. 1 with a door of the example icemaker appliance shown in an open position.

FIG. 3 provides a side schematic view of the exemplary icemaker appliance of FIG. 1 according to a first embodiment.

FIG. 4 provides a side schematic view of the exemplary icemaker appliance of FIG. 1 according to another embodiment.

[0011] Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the

present invention.

DETAILED DESCRIPTION

[0012] Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0013] FIGS. 1 and 2 provide front, perspective views of an icemaker appliance 100 according to an example embodiment of the present subject matter. As discussed in greater detail below, icemaker appliance 100 includes features for generating or producing clear ice. Thus, a user of icemaker appliance 100 may consume clear ice stored within icemaker appliance 100. As may be seen in FIG. 1, icemaker appliance 100 defines a vertical direction V.

[0014] Icemaker appliance 100 includes a cabinet 110. Cabinet 110 may be insulated in order to limit heat transfer between an interior volume 111 (FIG. 2) of cabinet 110 and ambient atmosphere. Cabinet 110 extends between a top portion 112 and a bottom portion 114, e.g., along the vertical direction V. Thus, top and bottom portions 112, 114 of cabinet 110 are spaced apart from each other, e.g., along the vertical direction V. A door 119 is mounted to cabinet 110 at a front portion of cabinet 110. Door 119 permits selective access to interior volume 111 of cabinet 110. For example, door 119 is shown in a closed position in FIG. 1, and door 119 is shown in an open position in FIG. 2. A user may rotate door between the open and closed positions to access interior volume 111 of cabinet 110.

[0015] As may be seen in FIG. 2, various components of icemaker appliance 100 are positioned within interior volume 111 of cabinet 110. In particular, icemaker appliance 100 includes an ice maker 120 disposed within interior volume 111 of cabinet 110, e.g., at top portion 112 of cabinet 110. Ice maker 120 is configured for producing clear ice. Ice maker 120 may be configured for making any suitable type of clear ice. Thus, e.g., ice maker 120 may be a clear cube ice maker, as would be understood.

[0016] Icemaker appliance 100 may also include an ice storage compartment or storage bin 102. Ice storage compartment 102 may be provided within interior volume 111 of cabinet 110. In particular, ice storage compartment 102 may be positioned, e.g., directly, below ice maker 120 along the vertical direction V. Thus, ice storage compartment 102 is positioned for receiving clear ice from ice maker 120 and is configured for storing the

clear ice therein. It will be understood that ice storage compartment 102 may be maintained at a temperature greater than the freezing point of water. Thus, the clear ice within ice storage compartment 102 may melt over time while stored within ice storage compartment 102. Icemaker appliance 100 may include features for recirculating liquid meltwater from ice storage compartment 102 to ice maker 120.

[0017] FIG. 3 provides a schematic view of certain components of icemaker appliance 100. As may be seen in FIG. 3, ice maker 120 may include an ice mold 124 and a nozzle 126. For instance, ice mold 124 may include a plurality of ice molds for forming a plurality of ice cubes at one time. Liquid from nozzle 126 may be dispensed toward ice mold 124. For example, nozzle 126 may be provided below ice mold 124 within a first reservoir 128 and may dispense liquid water upward toward ice mold 124. As discussed in greater detail below, ice mold 124 is cooled by refrigerant. Thus, the liquid water from nozzle 126 flowing across ice mold 124 may freeze on ice mold 124, e.g., in order to form clear ice cubes on ice mold 124.

[0018] To cool ice mold 124, icemaker appliance 100 includes a sealed system 170. Sealed system 170 includes components for executing a known vapor compression cycle for cooling ice maker 120 and/or air. The components include a compressor 172, a condenser 174, an expansion device (not shown), and an evaporator 176 connected in series and charged with a refrigerant. As will be understood by those skilled in the art, sealed system 170 may include additional components, e.g., at least one additional evaporator, compressor, expansion device, and/or condenser. Additionally or alternatively, the placement of the components (e.g., compressor 172, condenser 174, etc.) may be adjusted according to specific embodiments. Thus, sealed system 170 is provided by way of example only. It is within the scope of the present subject matter for other configurations of a sealed system to be used as well.

[0019] Within sealed system 170, refrigerant flows into compressor 172, which operates to increase the pressure of the refrigerant. This compression of the refrigerant raises its temperature, which is lowered by passing the refrigerant through condenser 174. Within condenser 174, heat exchange with ambient air takes place so as to cool the refrigerant. A fan 178 may operate to pull air across condenser 174 so as to provide forced convection for a more rapid and efficient heat exchange between the refrigerant within condenser 174 and the ambient air.

[0020] The expansion device (e.g., a valve, capillary tube, or other restriction device) receives refrigerant from condenser 174. From the expansion device, the refrigerant enters evaporator 176. Upon exiting the expansion device and entering evaporator 176, the refrigerant drops in pressure. Due to the pressure drop and/or phase change of the refrigerant, evaporator 176 is cool, e.g., relative to ambient air and/or liquid water. Evaporator 176 is positioned at and in thermal contact with ice maker 120, e.g., at ice mold 124 of ice maker 120. Thus, ice

maker 120 may be directly cooled with refrigerant at evaporator 176.

[0021] It should be understood that ice maker 120 may be an air-cooled ice maker in alternative example embodiments. Thus, e.g., cooled air from evaporator 176 may refrigerate various components of icemaker appliance 100, such as ice mold 124 of ice maker 120. In such example embodiments, evaporator 176 is a type of heat exchanger which transfers heat from air passing over evaporator 176 to refrigerant flowing through evaporator 176, and fan may circulate chilled air from the evaporator 176 to ice maker 120.

[0022] Icemaker appliance 100 may also include a controller 190 that regulates or operates various components of icemaker appliance 100. Controller 190 may include a memory and one or more microprocessors, CPUs or the like, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with operation of icemaker appliance 100. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor. Alternatively, controller 190 may be constructed without using a microprocessor, e.g., using a combination of discrete analog and/or digital logic circuitry (such as switches, amplifiers, integrators, comparators, flip-flops, AND gates, and the like) to perform control functionality instead of relying upon software. Input/output ("I/O") signals may be routed between controller 190 and various operational components of icemaker appliance 100. As an example, the various operational components of icemaker appliance 100 may be in communication with controller 190 via one or more signal lines or shared communication busses.

[0023] Icemaker appliance 100 may include first reservoir 128. First reservoir 128 may be provided within ice storage compartment 102. For example, first reservoir 128 may be located at or near top portion 112 of interior volume 111 of ice storage compartment 102. First reservoir 128 may define a receiving space that holds liquid (e.g., water) to be formed into ice. For example, an inner volume of first reservoir 128 may be smaller than interior volume 111 of ice storage compartment 102. In some embodiments, first reservoir 128 may hold other liquids, such as cleaning solutions, for example. As will be explained in more detail below, first reservoir 128 may be removable (e.g., from ice storage compartment 102). For instance, first reservoir 128 may include detachable features with respect to cabinet 110, such as drawer slides, magnets, clips, or the like. Accordingly, first reservoir 128 may be removed from interior volume 111 of cabinet 110.

[0024] Ice maker 120 may be provided within first reservoir 128. In detail, evaporator 176 and ice mold 124 may be located within first reservoir 128. In some embodiments, ice maker 120 is provided above first reser-

voir 128 (e.g., along the vertical direction V). First reservoir 128 may extend along the vertical direction V from a bottom end 202 to a top end. Ice maker 120 may be mounted at the top end of the first reservoir 128. For example, evaporator 176 may be mounted to the top end and ice mold 124 may be connected to evaporator 176. In some embodiments, ice mold 124 may be defined by evaporator 176. In other words, evaporator 176 is integral with ice mold 124 such that the clear ice is formed directly on evaporator 176.

[0025] Icemaker appliance 100 may include a circulation system 139. Circulation system 139 may include a first pump 142, a supply conduit 140, and a nozzle 126. First pump 142 may be provided within first reservoir 128. First pump 142 may pump water or liquid stored in first reservoir 128. Supply conduit 140 may be connected to first pump 142 such that the water or liquid pumped by first pump 142 is circulated through supply conduit 140. Supply conduit 140 may include a series of tubes or pipes capable of guiding the water or liquid pumped by first pump 142. Nozzle 126 may be provided at a downstream end of supply conduit 140. Nozzle 126 may dispense the water or liquid stored in first reservoir 128 toward ice maker 120 (i.e., ice mold 124 and/or evaporator 176).

[0026] In one embodiment, nozzle 126 may be located near bottom end 202 of first reservoir 128. As such, the water or liquid may be sprayed in a generally upward direction from nozzle 126 toward ice maker 120. Accordingly, clear ice may be formed on ice maker 120 due to a constant spray of water onto ice maker 120 while ice maker 120 is cooled by a circulation of refrigerant through sealed system 170. In detail, liquid dispensed from nozzle 126 may be directed toward ice mold 124. In some embodiments, a plurality of nozzles 126 may be provided. Each of the plurality of nozzles 126 may be connected to first pump 142 independently (e.g., each nozzle 126 having a dedicated supply conduit 140). Additionally or alternatively, each of the plurality of nozzles 126 may be connected to the first pump 142 via a joint circulation conduit.

[0027] A first liquid level sensor 134 may be provided in first reservoir 128. Generally, the first liquid level sensor 134 may sense a level of liquid contained within first reservoir 128. In some embodiments, first liquid level sensor 134 is in operable communication with controller 190. For instance, first liquid level sensor 134 may communicate with the controller 190 via one or more signals. In certain embodiments, first liquid level sensor 134 includes a predetermined threshold level (e.g., to indicate the need for additional liquid to first reservoir 128). In particular, first liquid level sensor 134 may detect if or when the liquid first reservoir 128 is below the predetermined threshold level. Optionally, first liquid level sensor 134 may be a two-position sensor. In other words, first liquid level sensor 134 may either be "on" or "off," depending on a level of liquid.

[0028] For example, when the liquid level is below the predetermined threshold level, first liquid level sensor

134 is "off," meaning it does not send a signal to first pump 142 via controller 190 to pump liquid from first reservoir 128 through first supply conduit 140 toward first nozzle 126. For another example, when the liquid level is above the predetermined threshold, first liquid level sensor 134 is "on," meaning it sends a signal to first pump 142 via controller 190 to operate first pump 142 to pump liquid through first supply conduit 140 toward first nozzle 126. It should be understood that first liquid level sensor 134 may be any suitable sensor capable of determining a level of liquid within first reservoir 128, and the disclosure is not limited to those examples provided herein.

[0029] Icemaker appliance 100 may also be operated in a cleaning mode, or may perform a cleaning operation to clean the various pieces in icemaker appliance 100 that may become contaminated with foreign debris. For example, in some embodiments, cleaning solution or acid may be pumped through first supply conduit 140 and dispensed by nozzle 126 toward ice maker 120. Accordingly, the cleaning solution or acid may remove the foreign contaminants or debris from, for example, ice mold 124, nozzle 126, first reservoir 128, and supply conduit 140.

[0030] The icemaker appliance 100 may further include a second reservoir 138. The second reservoir 138 may be in fluid communication with the ice storage compartment 102. A drain conduit 150 may connect ice storage compartment 102 with second reservoir 138 such that liquid from ice storage compartment 102 flows into second reservoir 138. In some examples, second reservoir 138 is provided beneath ice storage compartment 102. In other words, second reservoir 138 may be below ice storage compartment 102 in the vertical direction V. Accordingly, liquid from ice storage compartment 102 may easily flow into second reservoir 138 via drain conduit 150. In one example, when ice stored within ice storage compartment 102 melts to water, at least a portion of the melt water may flow from ice storage compartment 102 through drain conduit 150 into second reservoir 138. The second reservoir 138 may also be in fluid communication with the first reservoir 128. In other words, liquid from second reservoir 138 may flow to first reservoir 128. In one example, the second reservoir 138 is connected to the first reservoir 128 via a return line conduit 152. During use, at least a portion of the melt water from second reservoir 138 may be pumped to first reservoir to be recirculated through first supply conduit 140 and redispensed onto ice maker 120.

[0031] A second pump 144 may be provided at or in second reservoir 138. During use, second pump 144 may selectively pump at least a portion of the melt water from second reservoir 138 to first reservoir 128. Generally, second pump 144 may be provided as any suitable fluid pump (e.g., rotary pump, reciprocating pump, peristaltic pump, velocity pump, etc.). Optionally, second pump 144 may be an immersion pump and may be located within second reservoir 138. In detail, second pump 144 may be submersible within second reservoir 138 (i.e., within a volume of liquid stored within second reservoir 138).

Additionally or alternatively, second pump 144 may be located outside of second reservoir 138. In other words, second pump 144 may be outside the confines of second reservoir 138 such that second pump 144 is not in direct contact with liquid stored within second reservoir 138. Advantageously, second pump 144 may assist in recirculating liquid through icemaking appliance 100 to improve performance and reduce the need for cleaning or maintenance.

[0032] A second liquid level sensor 136 may be provided within second reservoir 138 to sense a level of liquid contained within second reservoir 138. Generally, the second liquid level sensor 136 may sense a level of liquid contained within second reservoir 138. In some embodiments, second liquid level sensor 136 is in operable communication with controller 190. For instance, second liquid level sensor 136 may communicate with the controller 190 via one or more signals. In certain embodiments, second liquid level sensor 136 includes a predetermined threshold level (e.g., to indicate the need to drain liquid from second reservoir 138). In particular, second liquid level sensor 136 may detect if or when the liquid in second reservoir 138 is below or above the predetermined threshold level. Optionally, second liquid level sensor 136 may be a two-position sensor. In other words, second liquid level sensor 136 may either be "on" or "off," depending on a level of water.

[0033] For example, when the water level is below the predetermined threshold level, second liquid level sensor 136 is "off," meaning it does not send a signal to second pump 144 via controller 190 to pump water from second reservoir 138. For another example, when the water level is above the predetermined threshold, second liquid level sensor 136 is "on," meaning it sends a signal to second pump 144 via controller 190 to operate second pump 144. It should be understood that second liquid level sensor 136 may be any suitable sensor capable of determining a level of liquid within second reservoir 138.

[0034] Icemaker appliance 100 may include an overflow line conduit 230. Overflow line conduit 230 may fluidly connect first reservoir 128 with second reservoir 138. For instance, overflow line conduit 230 may provide a passageway for fluid or liquid within first reservoir 128 to flow directly into second reservoir 138. A top 232 of overflow line conduit 230 may be provided above a regular liquid level line within first reservoir 128. In detail, as described above, a predetermined amount of liquid may be stored within first reservoir 128 for forming ice. The top 232 of overflow line conduit 230 may be located such that a volume of liquid above the predetermined volume may flow into top 232 of overflow line conduit 230 and thus flow into second reservoir 138. In some embodiments, outlet 234 of overflow line conduit 230 is provided partially within drain conduit 150. As will be explained in more detail below, a cleaning liquid or solution may flow through overflow line conduit 210 from first reservoir 128 to second reservoir 138.

[0035] Icemaker appliance 100 may further include a

cleanout line conduit 210. Cleanout line conduit 210 may define a first end 212 and a second end 214. Each of first end 212 and second end 214 defines a point along the flow path through the cleanout line conduit 210. In one example, first end 212 is connected to return line conduit 152. For instance, first end 212 may define a branch point of cleanout line conduit 210 from return line conduit 152. As described above, return line conduit 152 may be fluidly connected with second reservoir 138. Accordingly, liquid within second reservoir 138 may flow out of second reservoir and selectively flow through cleanout line conduit 210. In some embodiments, the fluid from second reservoir 138 is urged through return line conduit 152 via second pump 144. Accordingly, first end 212 of cleanout line conduit 210 may be provided downstream from second pump 144. The terms "upstream" and "downstream" refer to the relative flow direction with respect to fluid flow in a fluid pathway. For example, "upstream" refers to the flow direction from which the fluid flows, and "downstream" refers to the flow direction to which the fluid flows. Accordingly, second pump 144 may pump fluid toward cleanout line conduit 210.

[0036] Second end 214 may be open to an external area. In other words, second end 214 may be openly exposed (e.g., within or outside of icemaker appliance 100). Liquid flowing through cleanout line conduit 210 may be released from icemaking appliance 100 via second end 214. Second end 214 may be provided, for example, within ice storage compartment 102 (e.g., may be exposed within interior volume 111). Advantageously, each component within icemaking appliance 100 may be easily cleaned by circulating a cleaning fluid therethrough and draining the cleaning fluid through cleanout line conduit 210. Thus, a more thorough cleaning may be performed resulting in cleaner ice, fewer maintenance issues, and overall increase in operability.

[0037] Cleanout line conduit 210 may be in fluid communication with return line conduit 152 via a three-way valve 216. As shown in FIG. 3, three-way valve 216 may fluidly connect first pump 144 with return line conduit 152 and cleanout line conduit 210. Three-way valve 216 may be any suitable type of valve. In at least one example, three-way valve 216 is an electromechanical valve. Three-way valve 216 may communicate with controller 190. For instance, controller 190 may control an operation of three-way valve 216 (e.g., an opening and closing of three-way valve 216). Moreover, controller 190 may control three-way valve 216 and second pump 144 together, e.g., during a cleaning operation or cycle (for instance, according to a user input).

[0038] In detail, three-way valve 216 may selectively allow liquid from second reservoir 138 to flow through one of return line conduit 152 and cleanout line conduit 210. Controller 190 may determine that appliance 100 is in a first mode, such as an ice-making mode. Accordingly, controller 190 may control three-way valve 216 to open return line conduit 152 and close cleanout line conduit 210. Thus, when the pump (e.g., second pump 144) is

activated, the liquid (e.g., meltwater) within second reservoir 138 is pumped through return line conduit 152 to first reservoir 128. Moreover, controller 190 may determine that appliance 100 is in a second mode, such as a cleaning mode or cleanout mode. Controller 190 may thus control three-way valve 216 to open cleanout line conduit 210 and close return line conduit 152.

[0039] Additionally or alternatively, controller 190 may control appliance 100 to perform a cleanout operation, or cleaning operation. According to the cleanout operation, a cleaning liquid (e.g., cleaning acid) supplied to first reservoir 128 may be pumped through supply conduit 140. Accordingly, the cleaning liquid may be supplied to, for instance, ice mold 124 via nozzle 126. During the cleanout operation, ice mold 124 may not be cooled (e.g., refrigerant is not supplied to evaporator 176 via sealed system 170). The cleaning liquid may fall, e.g., due to gravity, from ice mold 124 into first reservoir 128 and/or ice storage bin 102. The cleaning liquid may then flow into second reservoir 138 (e.g., via an overflow tube described below or drain conduit 150).

[0040] The cleanout operation may include a recirculation cycle. During the recirculation cycle, controller 190 may control three-way valve 216 to open return line conduit 152 and close cleanout line conduit 210. Accordingly, the cleaning liquid may be circulated from second reservoir 138 through return line conduit 152 and into first reservoir 128. Thus, each portion of the circulation system receives the cleaning liquid. After performing one or more recirculation cycles, controller 190 may control three-way valve 216 to close return line conduit 152 and open cleanout line conduit 210. Thus, second pump 144 may pump the cleaning liquid from second reservoir 138 out through cleanout line conduit 210.

[0041] Cleanout line conduit 210 may include a cleanout spigot 218. Cleanout spigot 218 may be provided at second end 214 of cleanout line conduit 210. Cleanout spigot 218 may selectively release liquid (e.g., cleaning liquid) from cleanout line conduit 210. For instance, cleanout spigot 218 may selectively open and close second end 214. Cleanout spigot 218 may include a valve. Cleanout spigot 218 may be manually operated (e.g., by twisting, pulling, pushing, rotating, or otherwise manipulating the valve) to selectively open and close second end 214. Thus, a user may release the liquid (e.g., cleaning liquid) from cleanout line conduit 210. However, it should be noted that some embodiments omit spigot 218 altogether. In detail, second end 214 may be an unimpeded opening of cleanout line conduit 210. Accordingly, the release of liquid (e.g., cleaning liquid) from cleanout line conduit 210 may be controlled solely by three-way valve 216.

[0042] Cleanout line conduit 210 may be at least partially arranged within ice storage compartment 102. In detail, upon branching from return line conduit 152 (e.g., via three-way valve 216), cleanout line conduit 210 may extend into ice storage compartment 102. As seen in FIG. 3, a portion of cleanout line conduit 210 may pene-

trate a bottom of ice storage compartment 102. Additionally or alternatively, cleanout line conduit 210 may penetrate a side wall of ice storage compartment 102. It should be noted that a precise placement of cleanout line conduit 210 may vary according to specific embodiments, and the disclosure is not limited to the examples provided herein.

[0043] For instance, cleanout line conduit 210 may extend in the vertical direction V and the transverse direction T (e.g., toward a front of appliance 100). Cleanout spigot 218 may thus be positioned near door 119. Advantageously, a user may easily access cleanout spigot 216 to complete the cleanout cycle. The liquid (e.g., the cleaning liquid) that flows through cleanout line conduit 210 may then be disposed of after being released via cleanout spigot 218 (or through second end 214 when cleanout spigot 216 is omitted).

[0044] In at least one embodiment, a removable container 220 may be selectively placed below second end 214. Removable container 220 may resemble a pitcher, for example. Removable container 220 may be formed so as to removably attach to ice storage bin 102, for example. As seen in FIG. 3, user may open door 119 and position removable container 220 within ice storage bin 102. In some embodiments, removable container 220 includes a support arm 222. Support arm 222 may fit over a front lip of ice storage bin 102. Accordingly, removable container 220 may be stably held in place while liquid is supplied to removable container 220. However, in other embodiments, removable container 220 may be freely positioned within ice storage bin 102. For instance, second end 214 may be selectively positioned within interior volume 111 (e.g., provided on a swivel). Accordingly, the user may position second end 214 in a desirable location and thus position removable container 220 in a corresponding position. Removable container 220 may define a volume capable of holding a predetermined amount of cleaning liquid. In at least one example, removable container 220 holds a volume of liquid required to perform an adequate cleaning operation. Advantageously, the user needs to make only a single removal action to complete the cleaning cycle.

[0045] Generally, controller 190 may determine that removable container 220 is present (e.g., within ice storage compartment 102) before initiating the cleaning cycle. For instance, upon receiving an input signal (e.g., from a user) to initiate the cleaning cycle or operation, the controller may perform one or more pre-cycle or pre-operation checks. According to some embodiments, a sensor or switch may be present within ice storage compartment 102 to sense or acknowledge the presence of removable container 220. The sensor may send a response signal to controller 190 confirming the presence of removable container 220. Controller 190 may then determine that liquid (e.g., cleaning acid, cleaning solution, etc.) is present within first reservoir 128. For instance, controller 190 may receive a signal from first liquid level sensor 134 confirming the presence of liquid within first reservoir 128.

Controller 190 may then commence with performing the cleaning cycle or operation (e.g., activating three-way valve 216, directing second pump 144, etc.)

[0046] According to some embodiments, cleanout spigot 218 may be omitted or modified. For instance, cleanout spigot 216 may be modified to accept a hose or additional conduit thereto. The hose may be connected to cleanout spigot 216 (or second end 214 of cleanout line conduit 210) at a first end thereof and positioned at, in, or near a drain at a second end thereof. Accordingly, removable container 220 may be omitted as well.

[0047] A perforated ramp or series of slats 104 may be provided above the first reservoir 128 (e.g., along the vertical direction V). The ramp 104 may be located beneath the ice maker 120 (e.g., beneath the ice mold 124 or evaporator 176). In other words, ramp 104 may be located under ice maker 120 along the vertical direction V. A top surface of the ramp 104 (or top edges of the series of slats) may be angled. In other words, a first end of ramp 104 may be positioned higher in the vertical direction V than a second end of ramp 104. Thus, when ice is formed on ice maker 120 and harvested, the ice may fall onto ramp 104 and slide into ice storage compartment 102. In one example, as seen in FIG. 3, the ramp 104 is angled downward toward a front of cabinet 110. Accordingly, a passageway or hole may be provided on a side of first reservoir 128 through which the ice cubes may be ejected after sliding down ramp 104. Additionally or alternatively, a flap or swinging door 122 may be pivotally connected with cabinet 110. In detail, when the harvested ice cubes slide down ramp 104, they may pass through the passageway of first reservoir 128 by pressing against and opening flap 122.

[0048] Icemaker appliance 100 may include a water supply conduit 130 and a supply valve 132. Water supply conduit 130 is connectable to an external pressurized water supply, such as a municipal water supply or well. Supply valve 132 may be coupled to water supply conduit 130, and supply valve 132 may be operable (e.g., openable and closable) to regulate liquid water flow through water supply conduit 130 into icemaker appliance 100. In one embodiment, water supply conduit 130 is connected to first reservoir 128. In detail, water supply conduit 130 is in fluid communication with first reservoir 128 to allow external water to be supplied into first reservoir 128 via water supply conduit 130. Thus, e.g., first reservoir 128 may be filled with fresh liquid water from the external pressurized water supply through water supply conduit 130 by opening supply valve 132. Water supply conduit 130 may be connected at a bottom of cabinet 110. In some embodiments, water supply conduit 130 is connected at a top of cabinet 110. According to this embodiment, water introduced through a top of the cabinet may be released over top of ice maker 120 and may assist in a harvesting operation of ice formed on ice mold 124.

[0049] Icemaker appliance 100 may include a filter 154. Filter 154 may be nested within first reservoir 128. For instance, filter 154 may rest within first reservoir 128.

In some embodiments, filter 154 is suspended within first reservoir 128. In detail, a space for receiving liquid having passed through filter 154 may be provided between an underside of filter 154 and a bottom of first reservoir 128. Filter 154 may thus be located beneath ice mold 124. For instance, filter 154 may be positioned such that the liquid dispensed from nozzle 126 that does not freeze on ice mold 124 may fall on top of filter 154. Accordingly, filter 154 may be a gravity style filter. In detail, liquid may fall onto a top of filter 154, seep through filter 154 (e.g., along the vertical direction V), and exit through a bottom of filter 154.

[0050] FIG. 4 provides a side schematic view of an icemaker appliance according to an alternate embodiment. Like reference numerals from the embodiment shown in FIG. 3 apply to like features in the embodiment shown in FIG. 4. As such, a repeat description of like features will be omitted for brevity. According to FIG. 4, first reservoir 128 may be provided below ice storage compartment 102. For instance, first reservoir 128 may be located immediately beneath ice storage compartment 102. A grate 180 may be provided to separate ice storage compartment 102 from first reservoir 128. Grate 180 may be a removable grate. For instance, a user may pull grate 180 out from ice storage compartment 102 to gain access to first reservoir 128. Accordingly, the user may be able to easily remove filter 154 from first reservoir 128. Additionally or alternatively, each of second reservoir 138 and second pump 144 may be omitted. Advantageously, fewer parts may be incorporated and an increase in ice storage space (e.g., a larger ice storage compartment 102) may be realized. According to this embodiment, cleanout line conduit 210 may be in fluid communication with supply conduit 140. In detail, first end 212 of cleanout line conduit 210 may be attached to supply conduit 140 downstream from pump 142. In some embodiments, three-way valve 216 may be provided on supply conduit 140. Accordingly, first end 212 of cleanout line conduit 210 may be in fluid communication with three-way valve 216.

[0051] Further, icemaker appliance 100 according to FIG. 4 may include a collection tray 182. Collection tray 182 may be provided beneath ice mold 124. In detail, collection tray 182 may collect the liquid that drips from ice mold 124 during and after an icemaking operation (e.g., when liquid is dispensed from nozzle 126 toward ice mold 124) or a cleaning operation or cycle (e.g., when cleaning liquid is dispensed from nozzle 126 toward ice mold 124). Additionally or alternatively, a return line 184 may be provided. Return line 184 may be connected to collection tray 182 (e.g., at a bottom of collection tray 182). Return line may extend along the vertical direction V from collection tray 182 toward grate 180. Thus, the liquid collected in collection tray 182 may be returned to first reservoir 128 and resupplied to filter 154 (or pumped out of appliance 100 via cleanout line conduit 210).

[0052] According to the embodiments described herein, an icemaker appliance having a cleanout line is pro-

vided. The described icemaker appliance may not be plumbed directly to a household drain, and thus may be more versatile in placement and use. The icemaker appliance described herein may include a first reservoir that stores liquid (such as water) to be formed into ice on an ice mold. The first reservoir may also selectively store a cleaning liquid or solution, such as a cleaning acid. The liquid stored in first reservoir may be directed toward the ice mold. Excess liquid from the ice mold may return to the first reservoir. In some instances, the excess liquid is delivered to a second reservoir separate from the first reservoir. The second reservoir may resupply the collected liquid to the first reservoir via a return line conduit. The return line conduit may include a three-way valve thereon. Branching from the three-way valve may be a cleanout line conduit. According to specific applications, the three-way valve may selectively supply liquid from the second reservoir to the return line conduit or to the cleanout line conduit. The cleanout line conduit may include a cleanout spigot at a downstream end thereof. Liquid may be selectively released from the cleanout spigot. A removable container may be placed below the cleanout spigot, for instance, within an ice storage compartment of the icemaker appliance. The dispensed liquid, such as the cleaning solution, may then be easily disposed of via the removable container.

[0053] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

Claims

1. An icemaker appliance defining a vertical direction, a lateral direction, and a transverse direction, the icemaker appliance comprising:

a cabinet forming an ice storage compartment;
 an ice maker provided within the cabinet;
 a first reservoir provided below the ice maker and configured for collecting liquid from the ice maker;
 a second reservoir provided below the ice storage compartment; and
 a circulation system in fluid communication with the first reservoir and the second reservoir, the circulation system comprising:

- a return line conduit;
a first pump connected to the return line conduit to pump the liquid from the second reservoir to the first reservoir; and
a cleanout line conduit in fluid communication with the first pump, the cleanout line conduit being provided downstream from the first pump, wherein the first pump selectively pumps the liquid from the second reservoir through the cleanout line conduit.
2. The icemaker appliance of claim 1, wherein the cleanout line conduit is arranged within the ice storage compartment, and wherein the cleanout line conduit comprises:
a cleanout spigot provided at an outlet of the cleanout line conduit.
3. The icemaker appliance of claim 2, further comprising a three-way valve fluidly coupled to the return line conduit and the cleanout line conduit, wherein the three-way valve selectively opens one of the return line conduit or the cleanout line conduit.
4. The icemaker appliance of claim 3, wherein the three-way valve is an electromechanical valve.
5. The icemaker appliance of claim 3, further comprising:
a controller provided within the cabinet, the controller being operatively connected with the first pump and the three-way valve, wherein the controller selectively operates the first pump and the three-way valve according to a user input.
6. The icemaker appliance of claim 1, further comprising:
an overflow line conduit fluidly connecting the first reservoir to the second reservoir, wherein fluid stored in the first reservoir is transferred from the first reservoir to the second reservoir via the overflow line conduit.
7. The icemaker appliance of claim 1, further comprising:
a removable container selectively provided within the ice storage compartment, the removable container being located under an outlet of the cleanout line conduit when in an installed position.
8. The icemaker appliance of claim 1, wherein the ice maker comprises:

an ice mold located above the first reservoir;
a supply conduit provided within the first reservoir, the supply conduit comprising a nozzle through which liquid stored within the first reservoir is selectively dispensed toward the ice
- mold; and
a second pump provided within the first reservoir and connected to the supply conduit, the second pump configured to pump the liquid stored within the first reservoir through the supply conduit.
9. The icemaker appliance of claim 8, further comprising a sealed cooling system, the sealed cooling system having an evaporator positioned at the ice mold.
10. The icemaker appliance of claim 9, wherein the first reservoir is removable and extends along the vertical direction from a bottom end to a top end, and wherein the evaporator is mounted at the top end.
11. The icemaker appliance of claim 1, further comprising a water supply conduit and a supply valve, the water supply conduit connectable to an external water supply, the supply valve connected to the water supply conduit to regulate liquid water flow through the water supply conduit into the icemaking appliance.
12. The icemaker appliance of claim 1, further comprising a filter provided within the first reservoir.
13. The icemaker appliance of claim 12, wherein the filter is a gravity deionization filter through which the liquid is filtered along the vertical direction from a top to a bottom.
14. An icemaker appliance defining a vertical direction, a lateral direction, and a transverse direction, the icemaker appliance comprising:

a cabinet forming an ice storage compartment;
a first reservoir provided within the ice storage compartment, the first reservoir configured to receive a liquid;
a removable grate located within the ice storage compartment over the first reservoir;
an ice maker provided within the ice storage compartment to produce ice; and
a circulation system in fluid communication with the first reservoir, the circulation system comprising:

a supply line conduit;
a pump connected to the supply line conduit to pump the liquid from the first reservoir; and
a cleanout line conduit in fluid communication with the pump, the cleanout line conduit being provided downstream from the pump, wherein the pump selectively pumps the liquid from the first reservoir through the cleanout line conduit.

15. The icemaker appliance of claim 14, wherein the cleanout line conduit is arranged within the ice storage compartment, and wherein the cleanout line conduit comprises:
a cleanout spigot provided at an outlet of the cleanout line conduit. 5
16. The icemaker appliance of claim 15, further comprising a three-way valve fluidly coupled to the supply line conduit and the cleanout line conduit, wherein the three-way valve selectively opens one of the supply line conduit or the cleanout line conduit. 10
17. The icemaker appliance of claim 16, wherein the three-way valve is an electromechanical valve. 15
18. The icemaker appliance of claim 16, further comprising:
a controller provided within the cabinet, the controller being operatively connected with the pump and the three-way valve, wherein the controller selectively operates the pump and the three-way valve according to a user input. 20
19. The icemaker appliance of claim 14, further comprising:
a removable container selectively provided within the ice storage compartment, the removable container being located under an outlet of the cleanout line conduit when in an installed position. 25 30
20. The icemaker appliance of claim 14, further comprising a water supply conduit and a supply valve, the water supply conduit connectable to an external water supply, the supply valve connected to the water supply conduit to regulate liquid water flow through the water supply conduit into the icemaking appliance. 35

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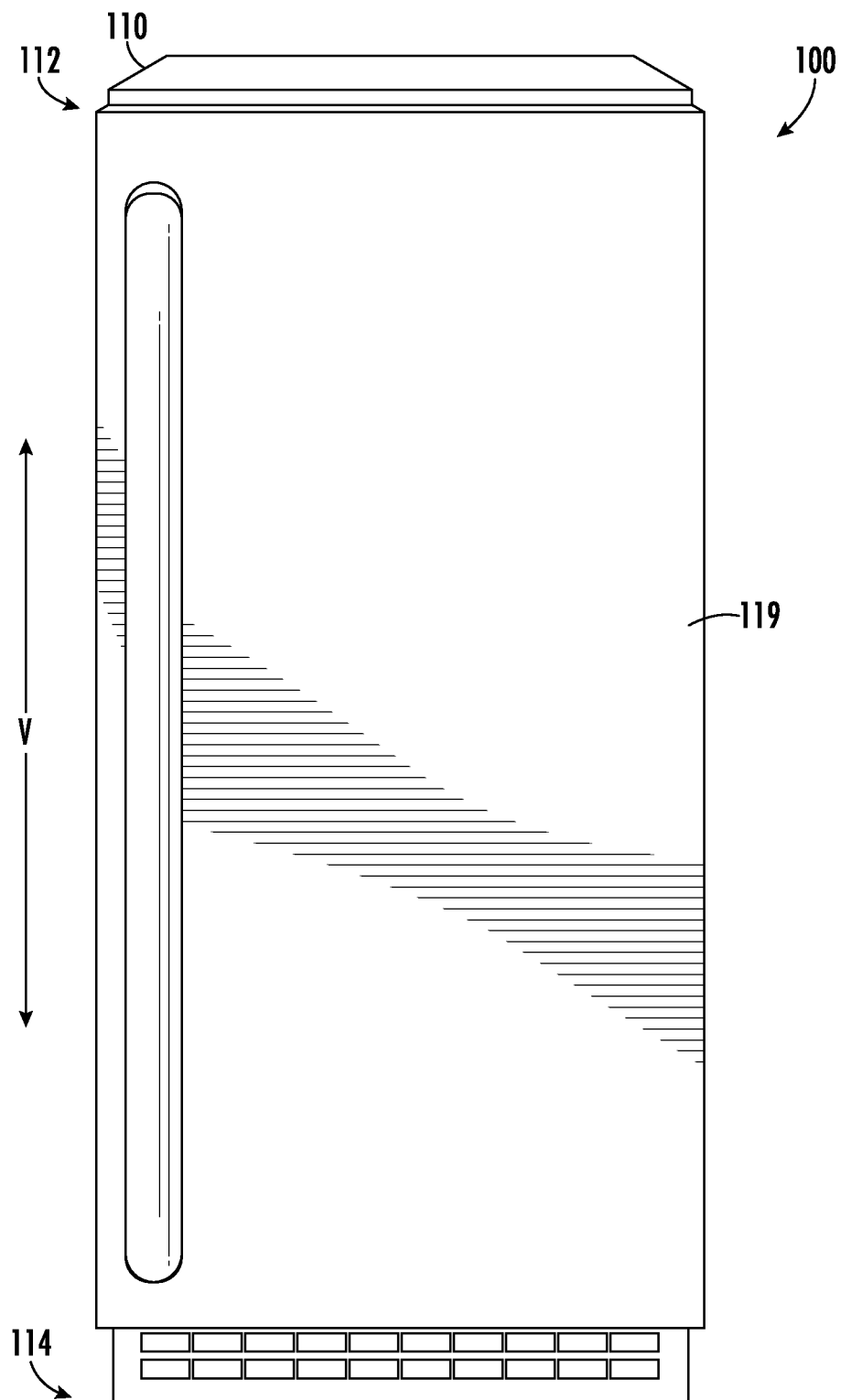


FIG. 1

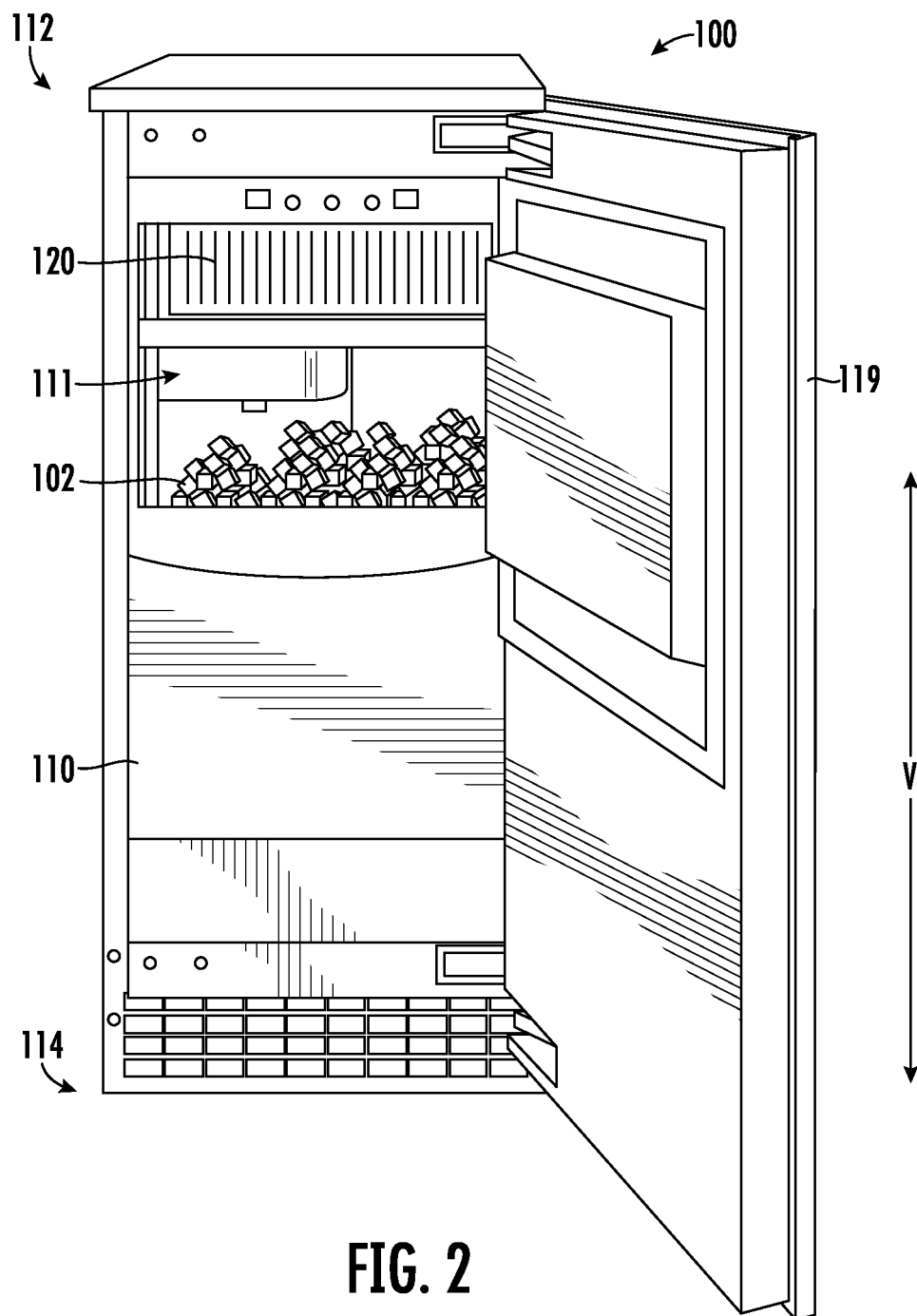


FIG. 2

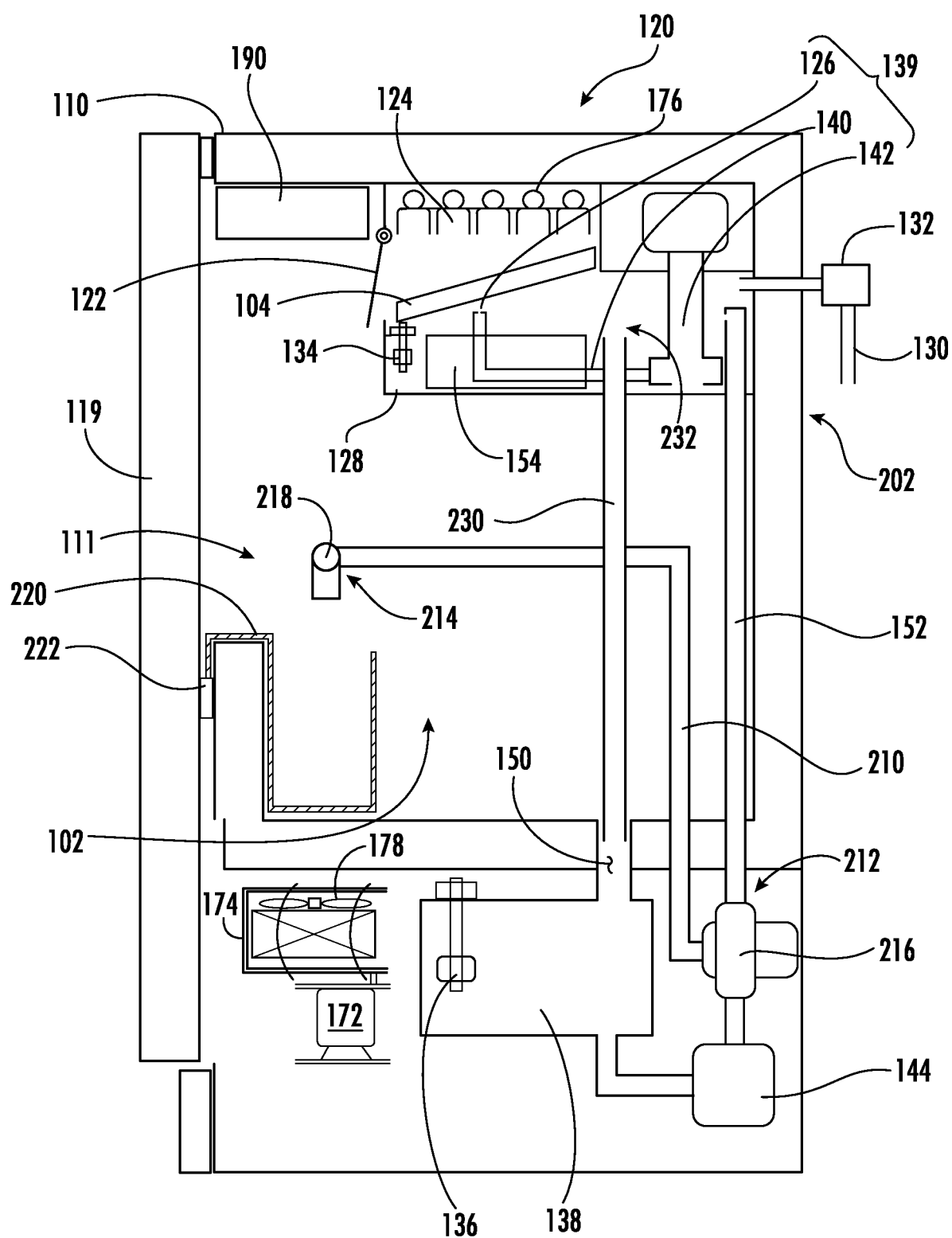


FIG. 3

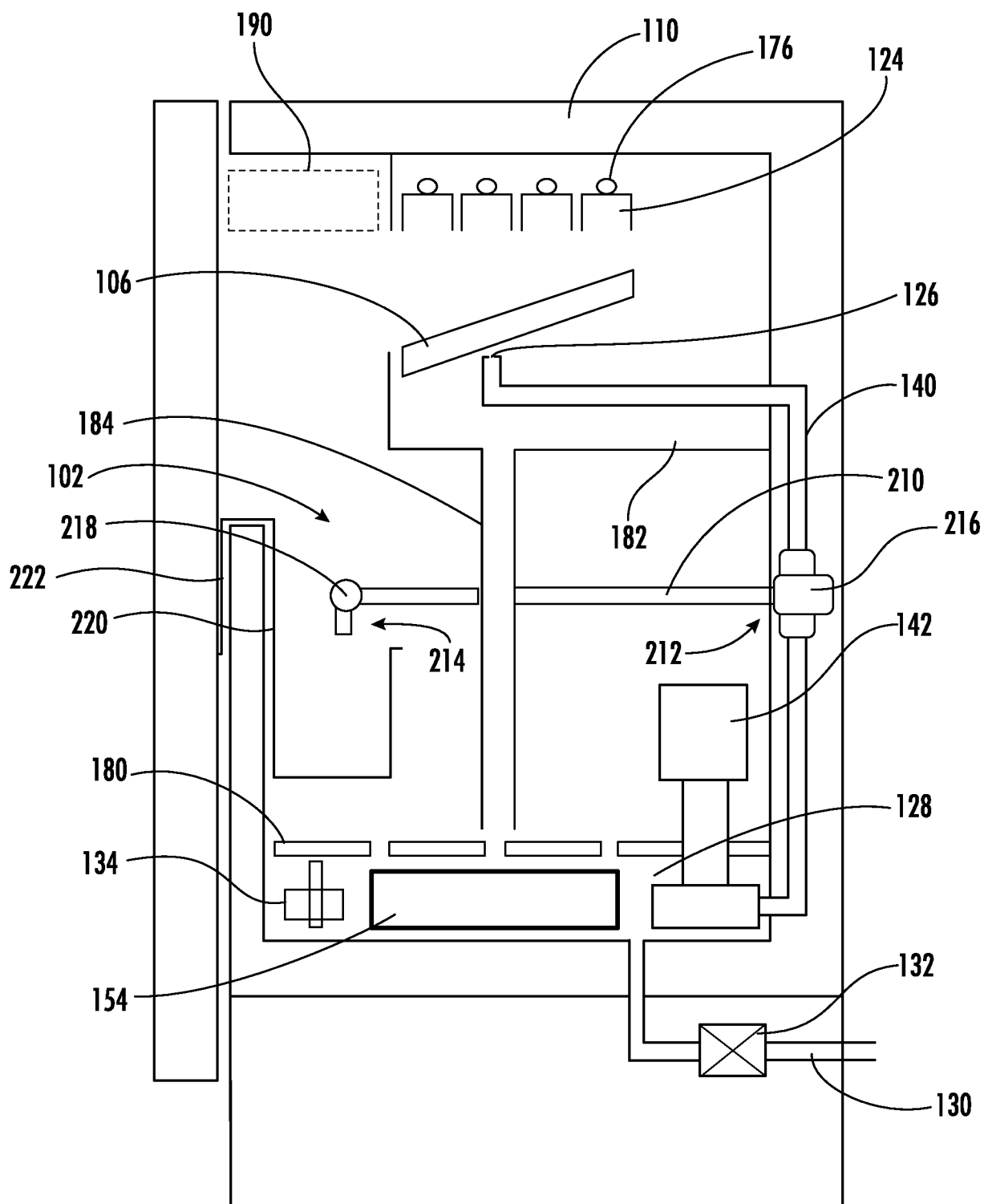


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/133752

A. CLASSIFICATION OF SUBJECT MATTER

F25C1/00(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)

IPC:F25C,F25D

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

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

CNTXT, CNABS, CNKI, SIPOABS, DWPI: 制冰, 回流, 清洗, 清洁, 冲洗, 喷嘴, 泵, 储水, 蓄水, 溢流, 格栅, 隔板, ice maker, reflux, clean, flushing, injector, pump, tank, storage, overflow, grating, partition

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20100082190 A (NEOT CO., LTD.) 16 July 2010 (2010-07-16) description, paragraphs [0015]-[0033], and figures 1-7	1-20
A	CN 108800691 A (SHANGHAI DIANJI UNIVERSITY) 13 November 2018 (2018-11-13) entire document	1-20
A	CN 2844803 Y (GUAN HONGYING) 06 December 2006 (2006-12-06) entire document	1-20
A	CN 112432407 A (SHANGHAI DIANFAN BRAND MANAGEMENT CO., LTD.) 02 March 2021 (2021-03-02) entire document	1-20
A	US 2003010054 A1 (THE COCA-COLA CO.) 16 January 2003 (2003-01-16) entire document	1-20
A	US 2021148622 A1 (YANTAI UNITED OZONETEC CORP.) 20 May 2021 (2021-05-20) entire document	1-20

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

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D" document cited by the applicant in the international application	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/133752

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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US 2021148622 A1	20 May 2021	None	

Form PCT/ISA/210 (patent family annex) (July 2022)