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(19) **United States**(12) **Patent Application Publication**
MATTSON, JR. et al.(10) **Pub. No.: US 2023/0057956 A1**(43) **Pub. Date: Feb. 23, 2023**(54) **ICE CUBE MAKER AND METHOD FOR
MAKING HIGH QUALITY TRANSPARENT
ICE CUBES**(60) Provisional application No. 63/102,512, filed on Jun.
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Longmont, CO (US)(21) Appl. No.: **17/969,980**(22) Filed: **Oct. 20, 2022****Related U.S. Application Data**(63) Continuation of application No. 17/741,846, filed on
May 11, 2022, which is a continuation-in-part of
application No. 16/974,284, filed on Dec. 16, 2020,
now abandoned.**Publication Classification**(51) **Int. Cl.**
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F25C 1/10 (2006.01)
(52) **U.S. Cl.**
CPC . **F25C 1/20** (2013.01); **F25C 1/10** (2013.01)(57) **ABSTRACT**

An embodiment of the present invention is a transparent ice cube maker configured to mass produce transparent ice cubes comprising various water movement systems and various refrigeration systems utilizing at least substantially one directional freezing of the water through a wall of an ice mold to make an ice cube having a center that is void of visible crystallization and void of a visible bubble.

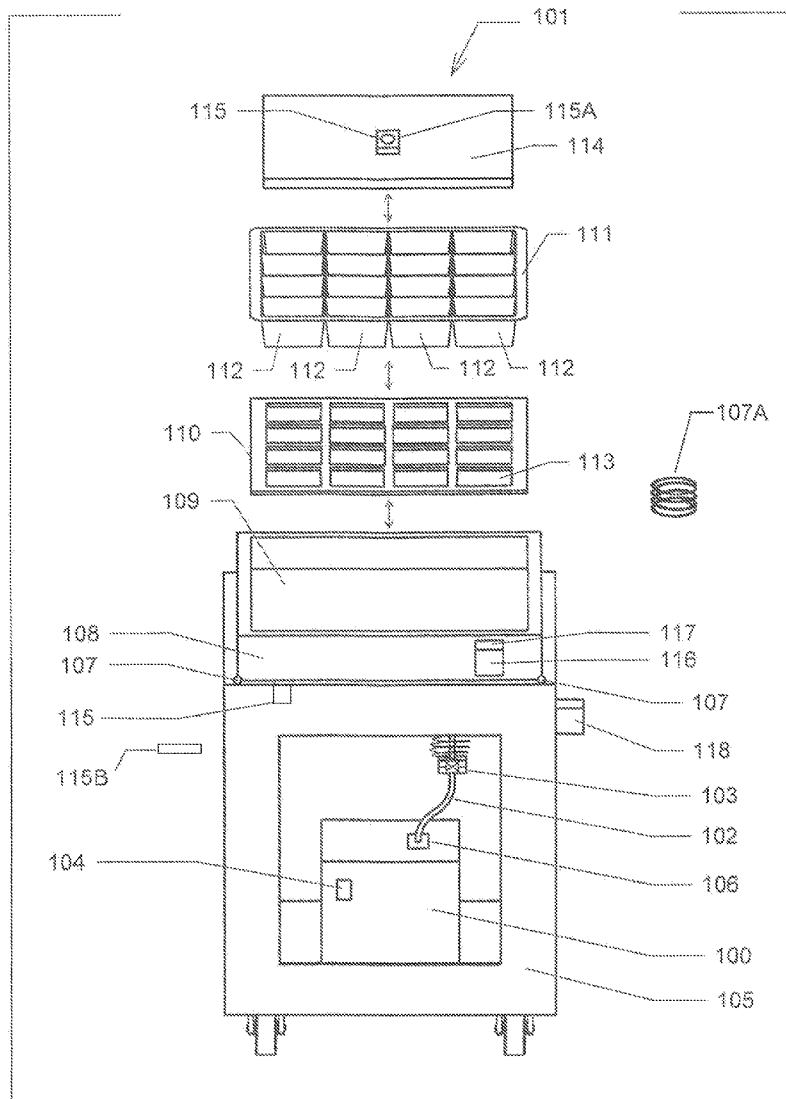


Fig. 1

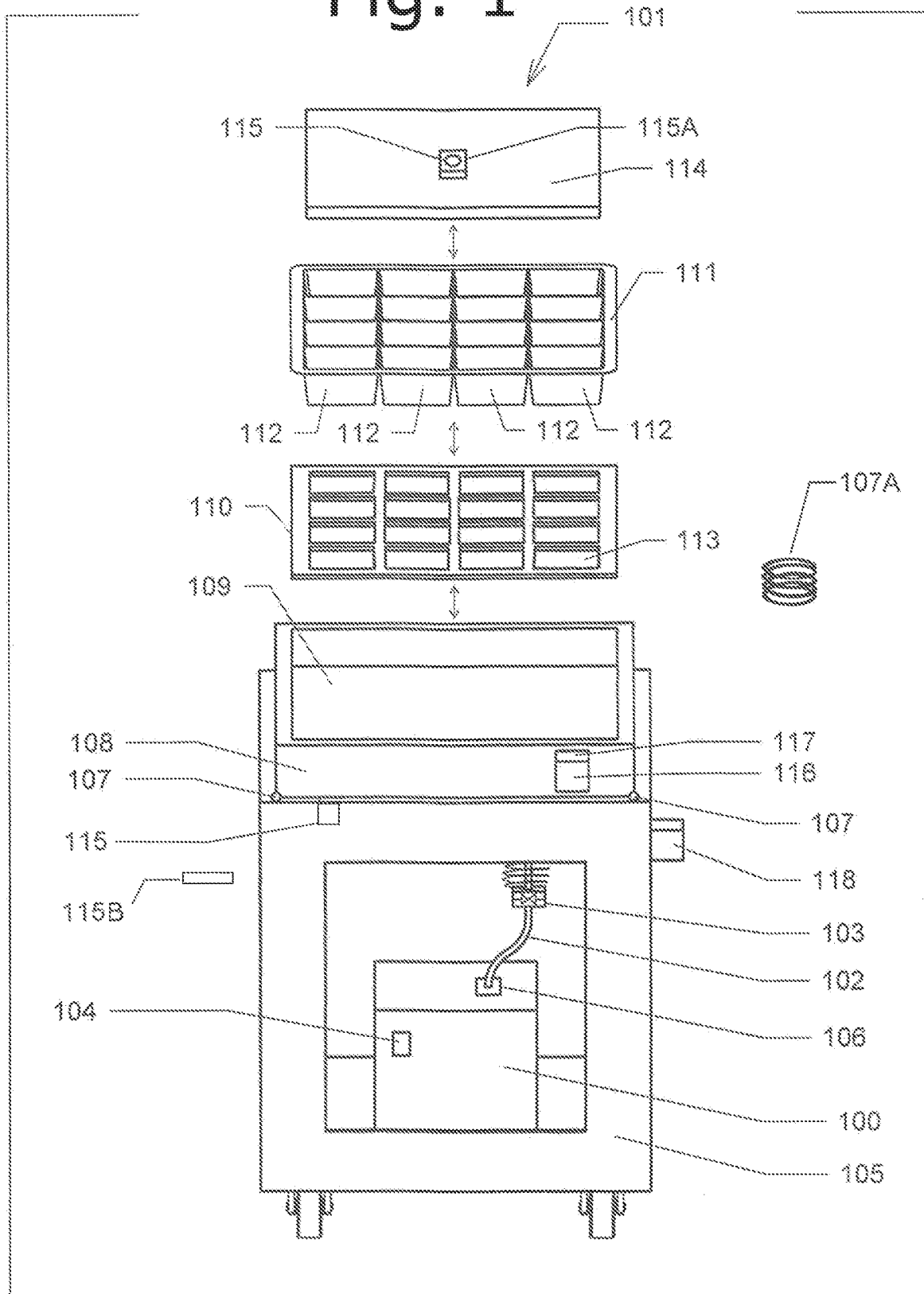


Fig. 2

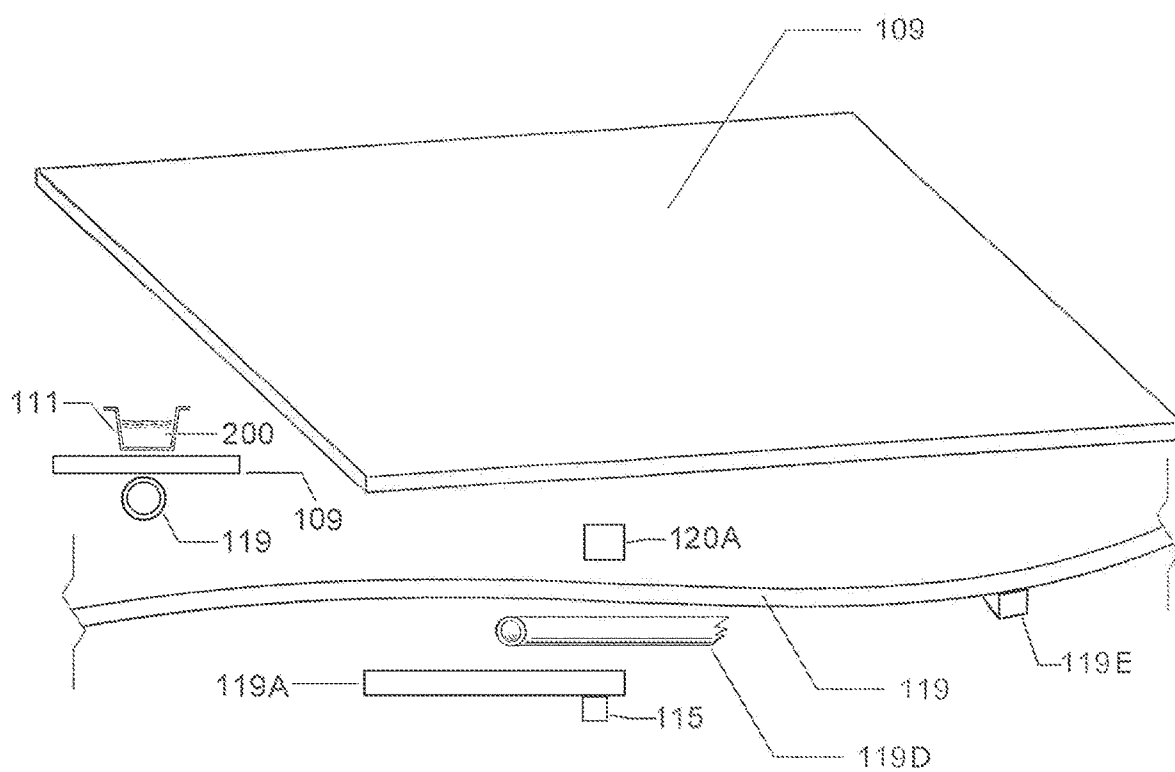


Fig. 3

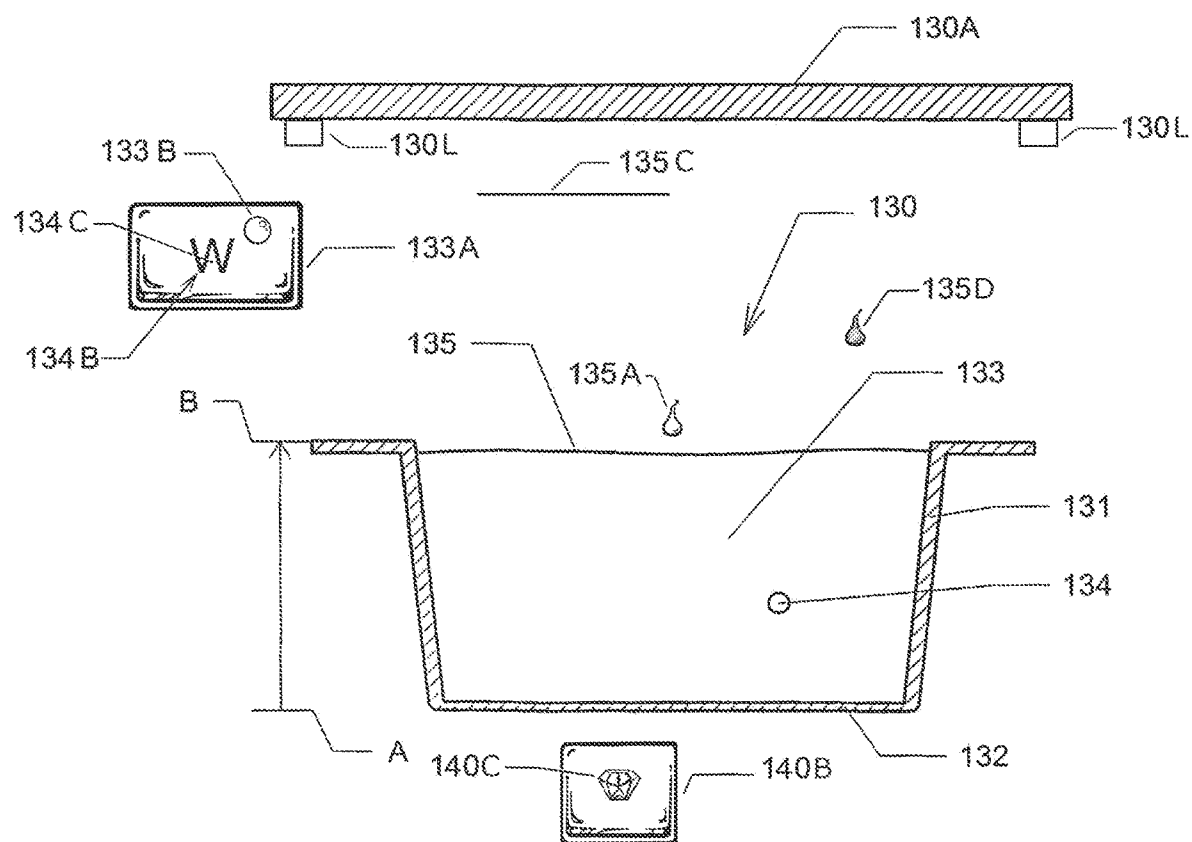


Fig. 4

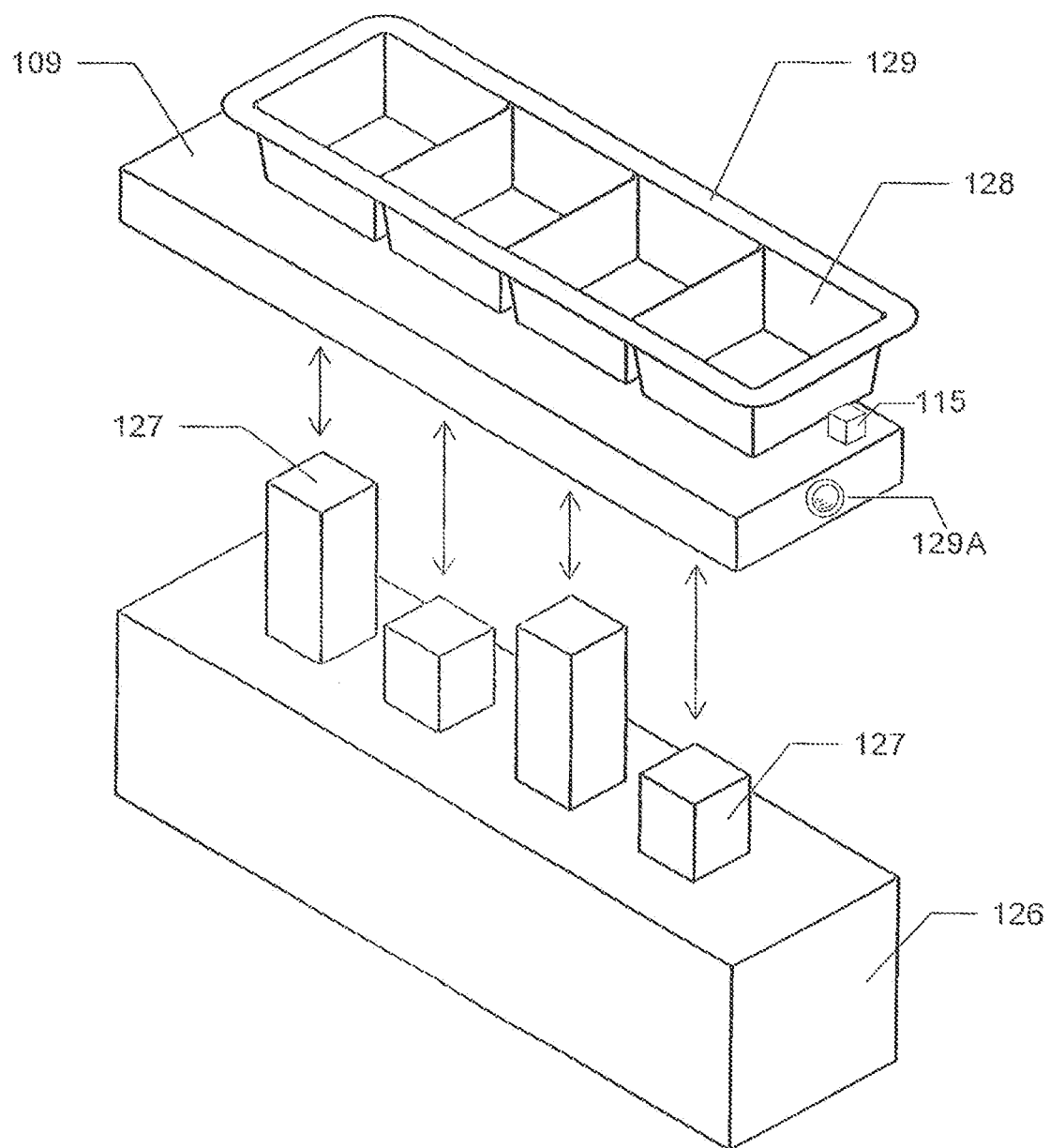


Fig. 5

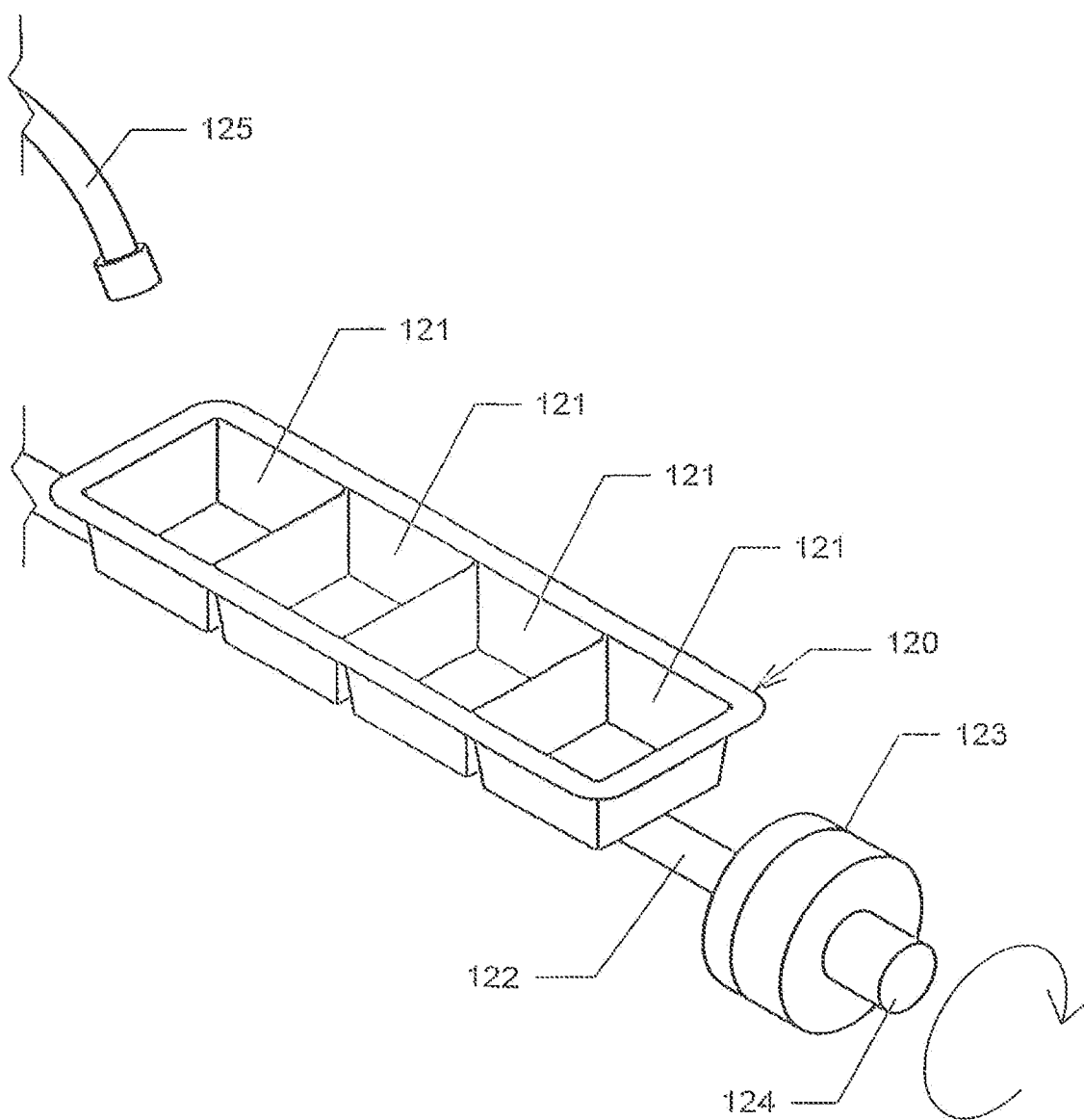


Fig. 6

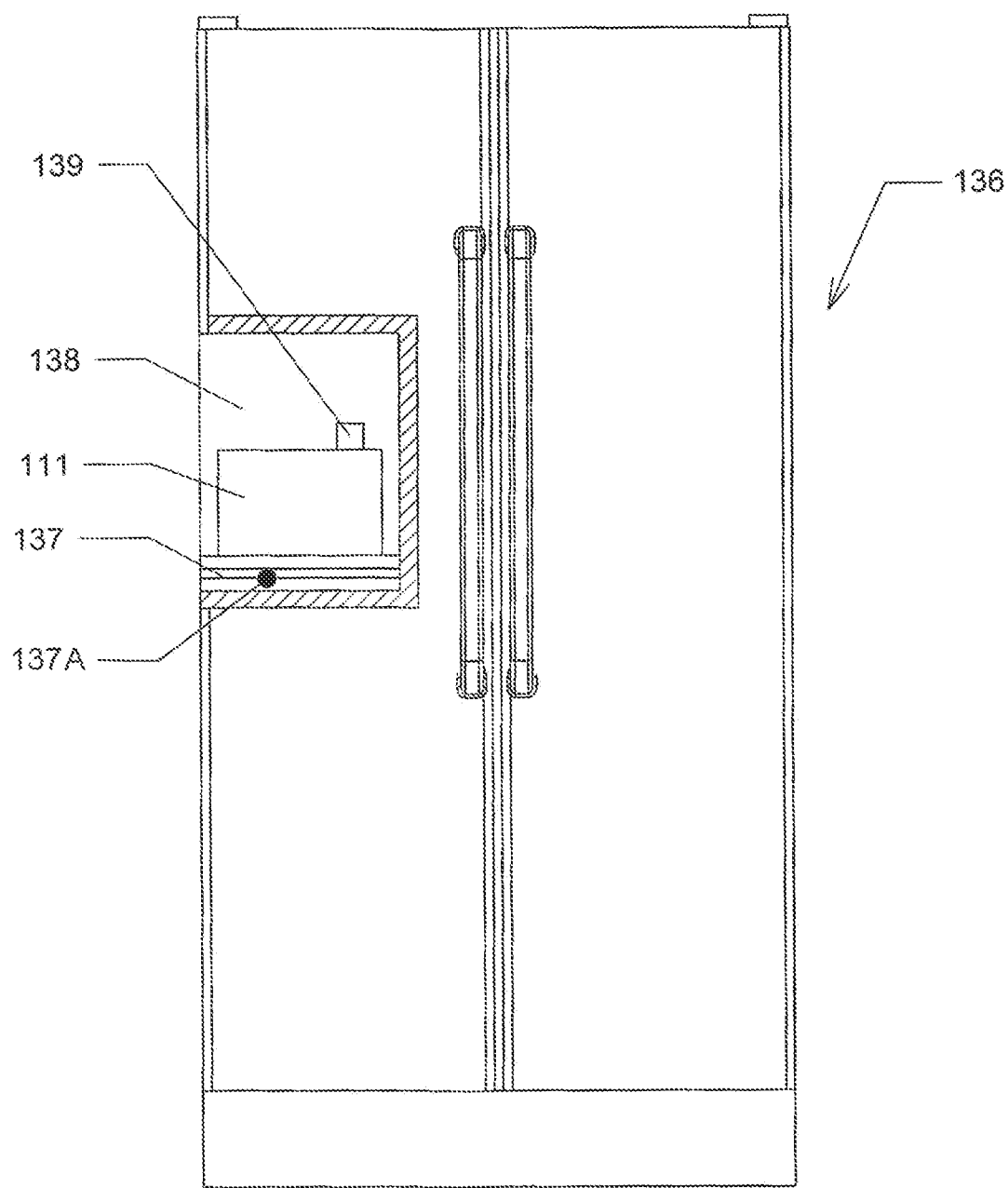


Fig. 7

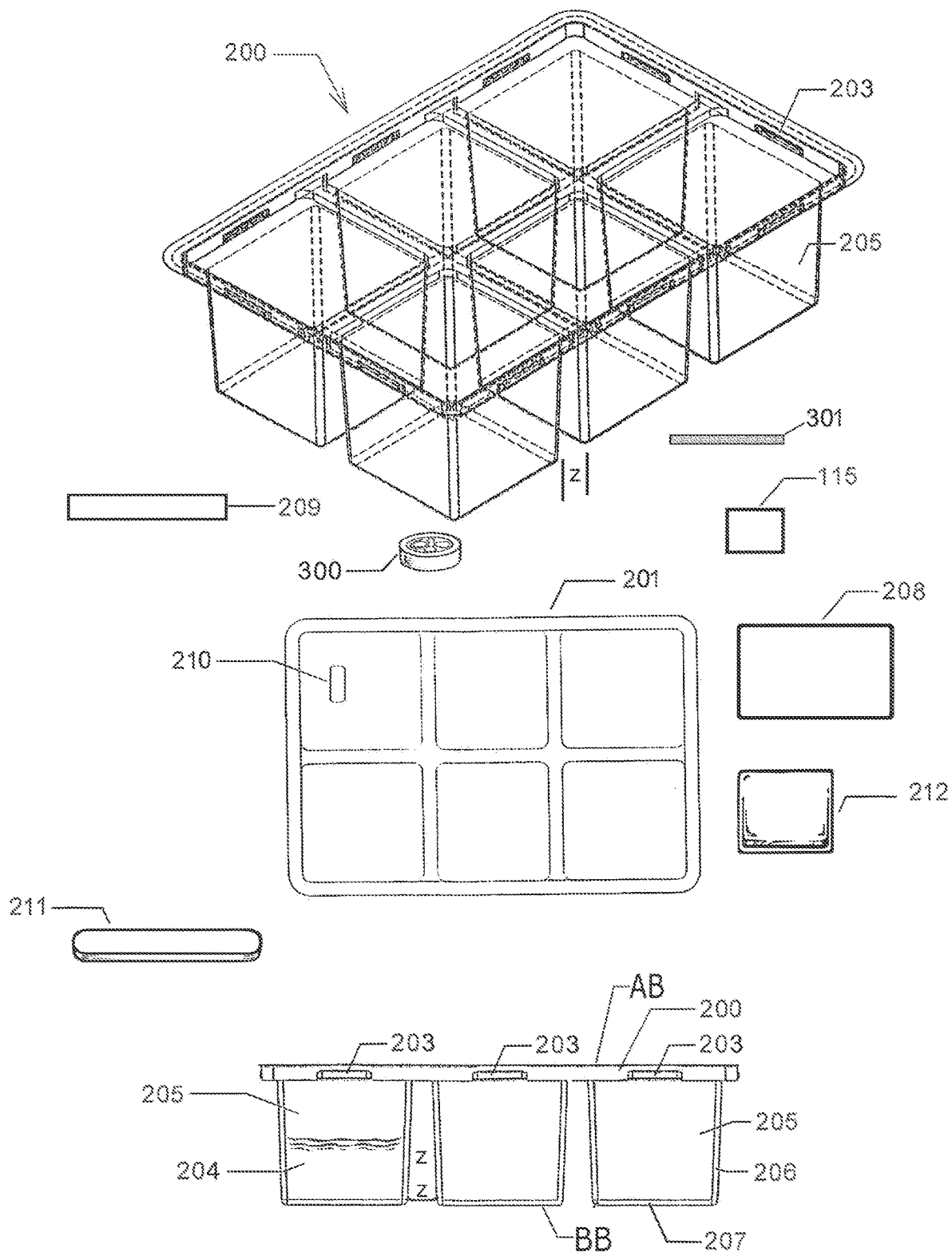


Fig. 8

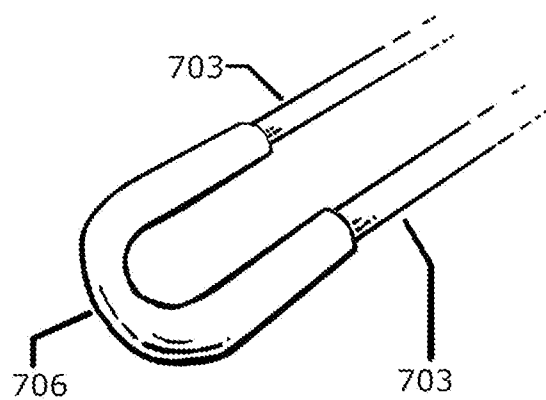
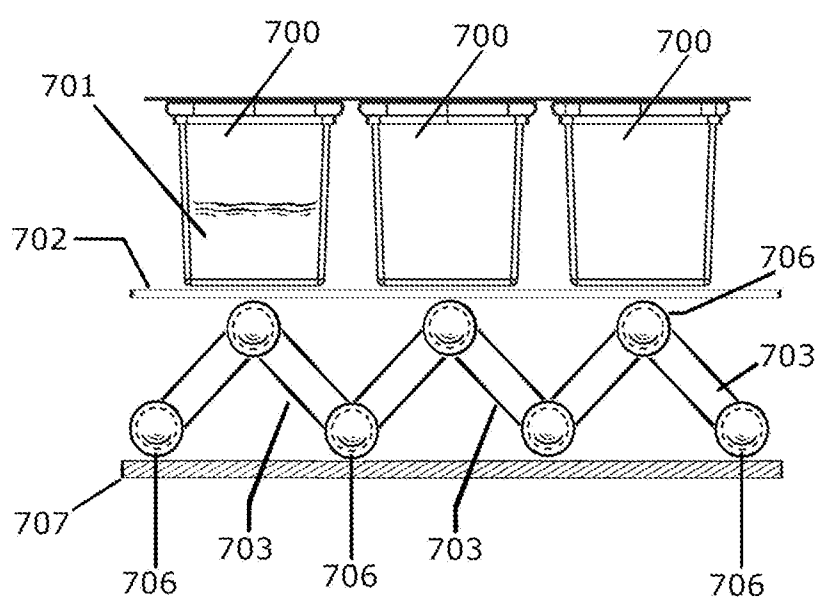


Fig. 9

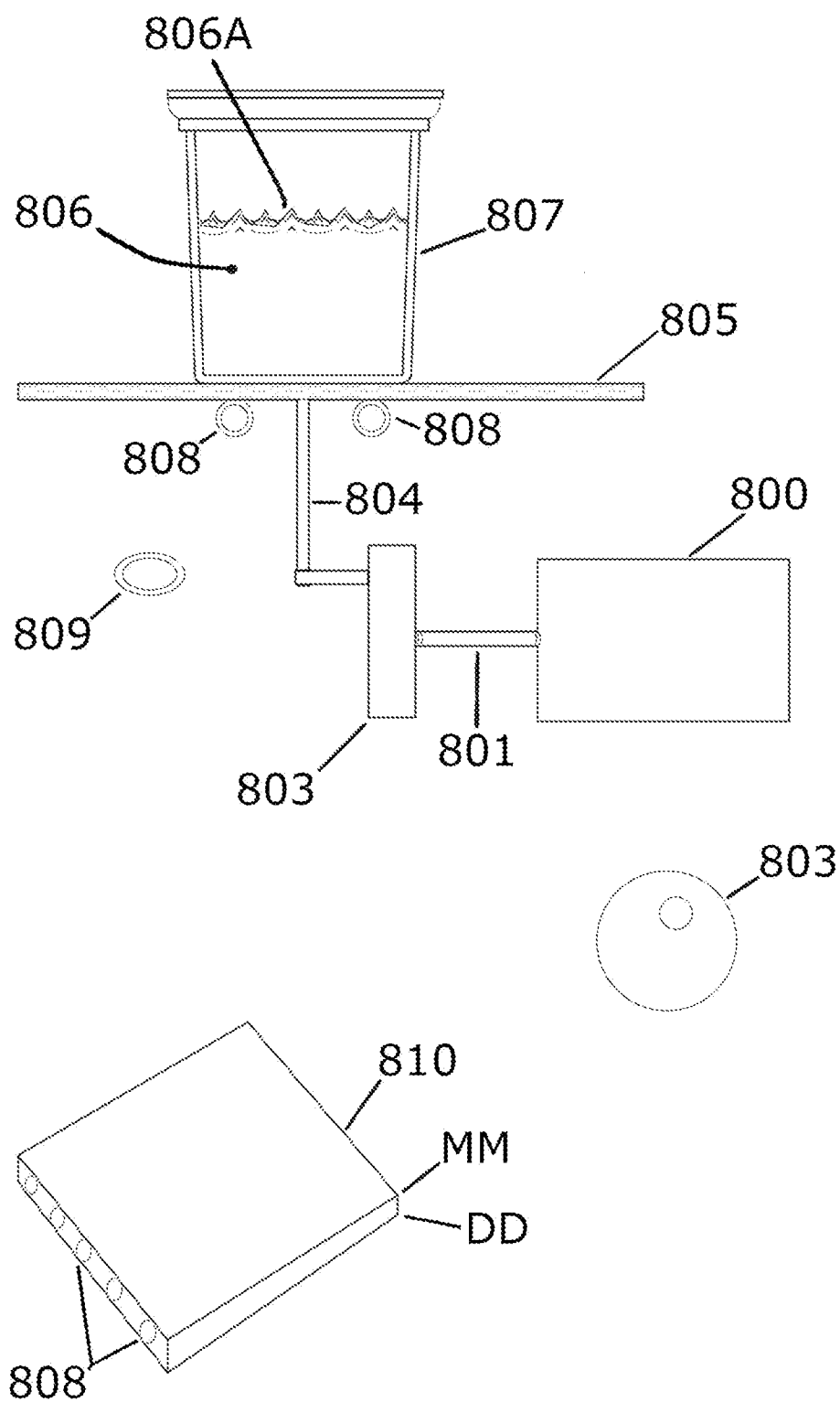


Fig. 10

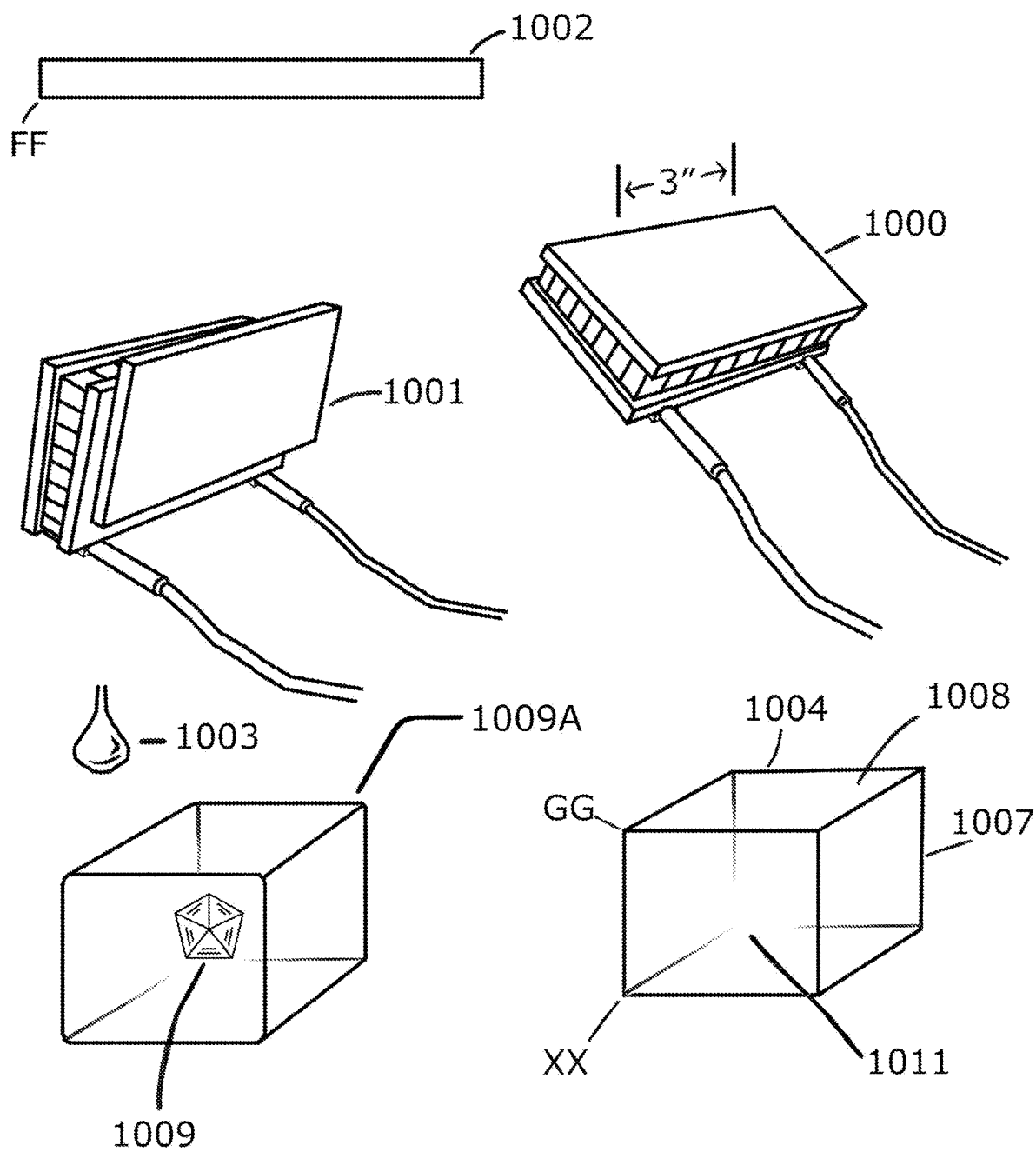


Fig. 11

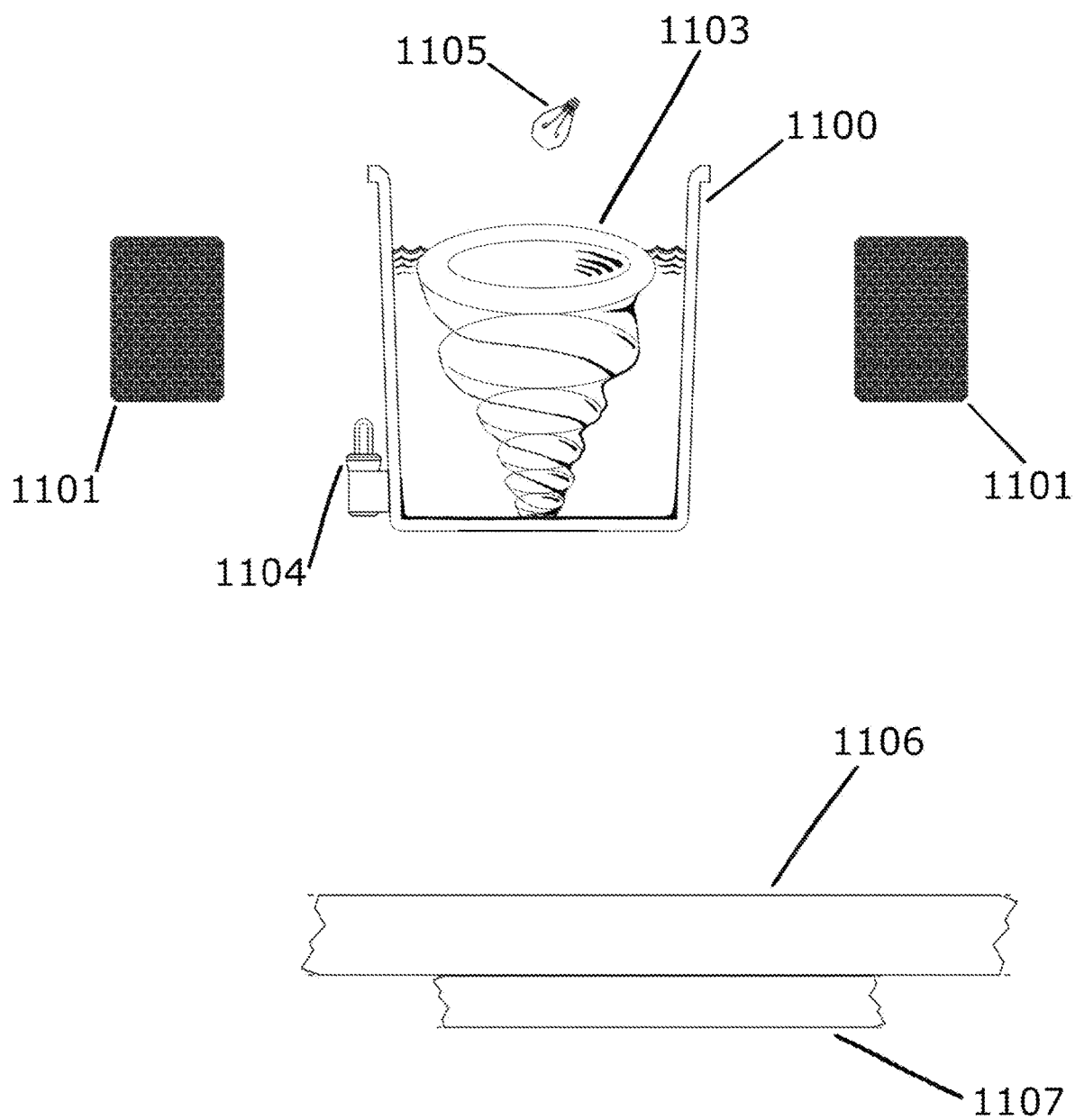


Fig. 12

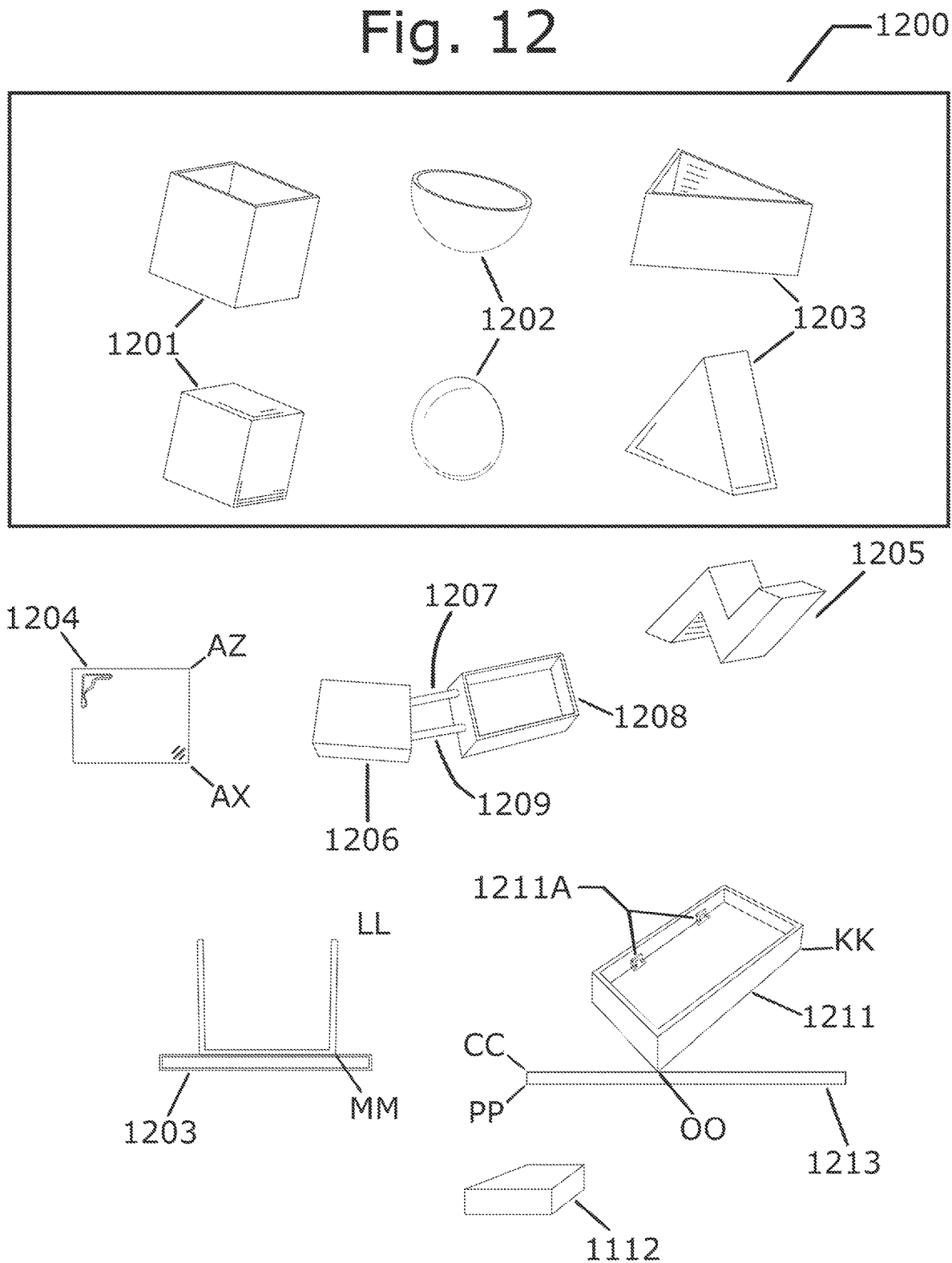


Fig. 13

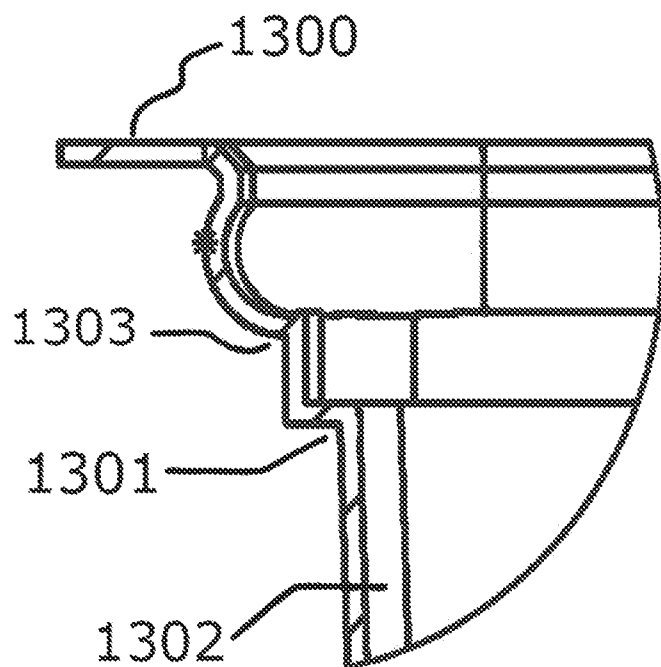


Fig. 14

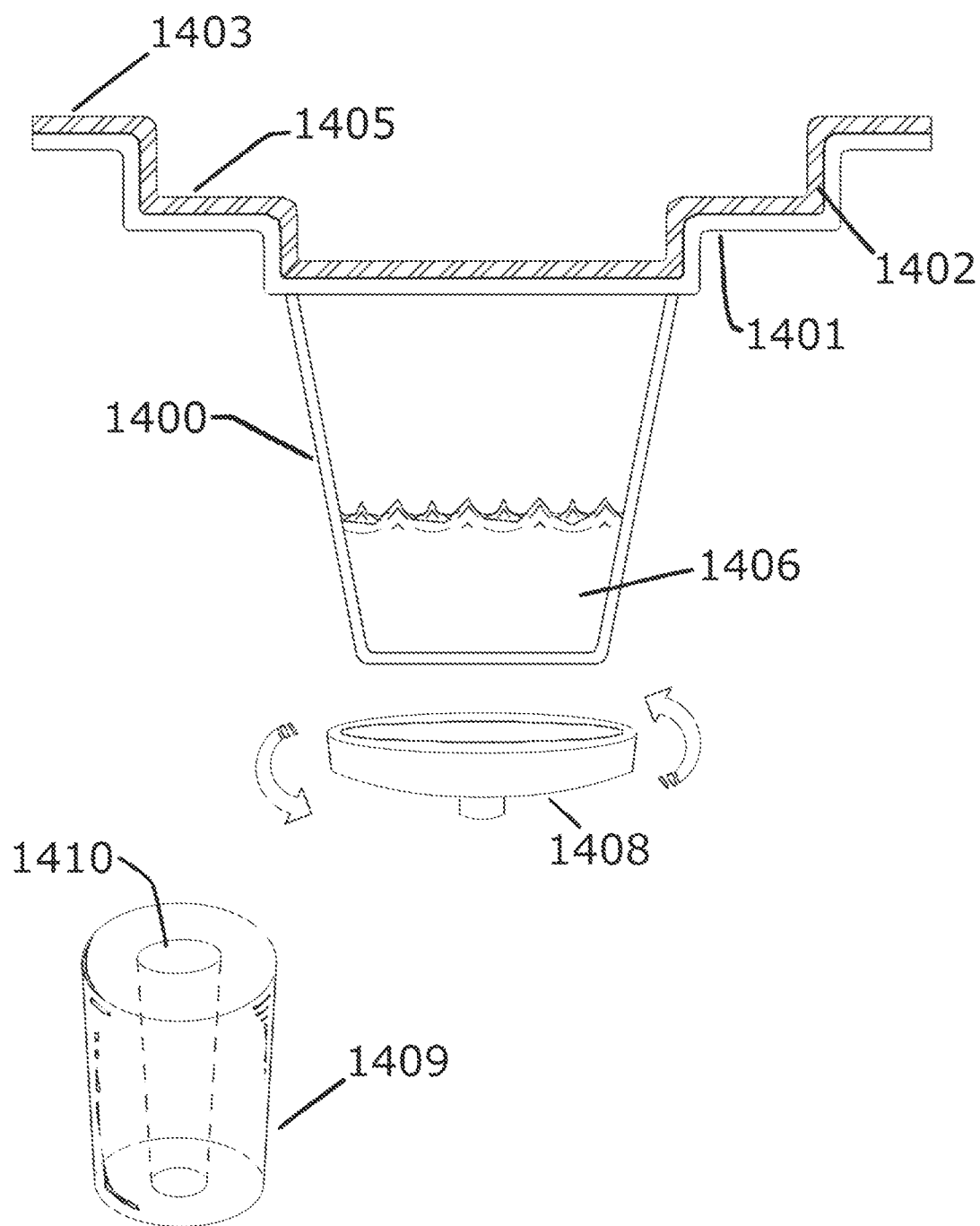


Fig. 15

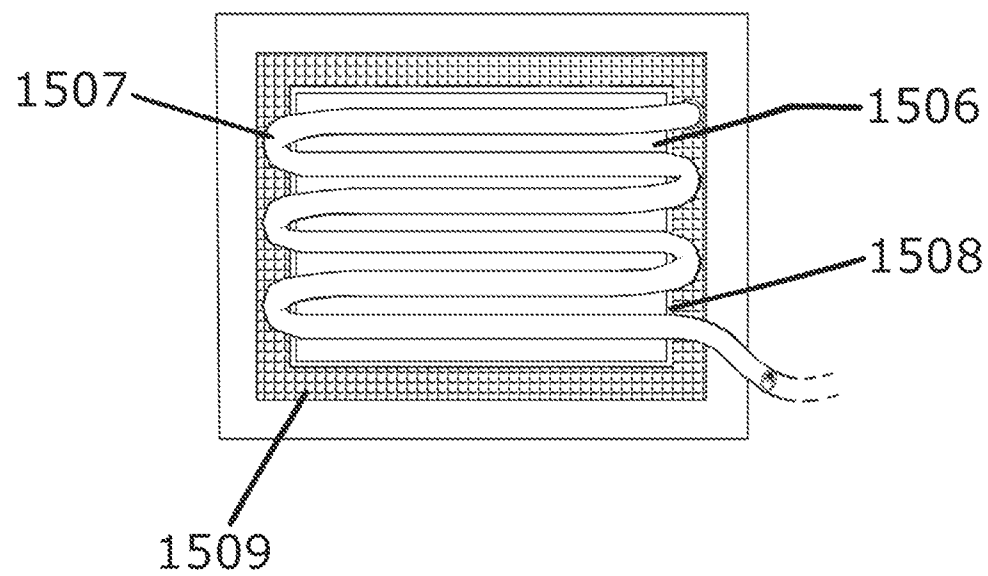
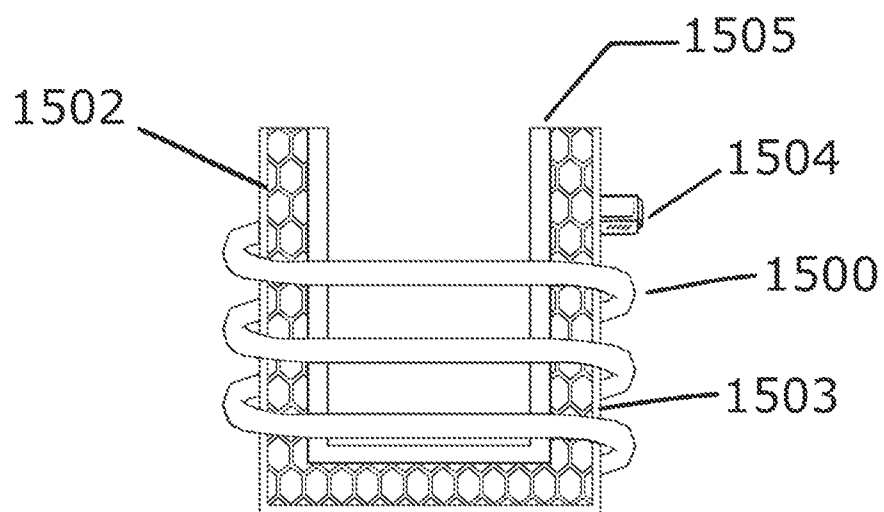


Fig. 16

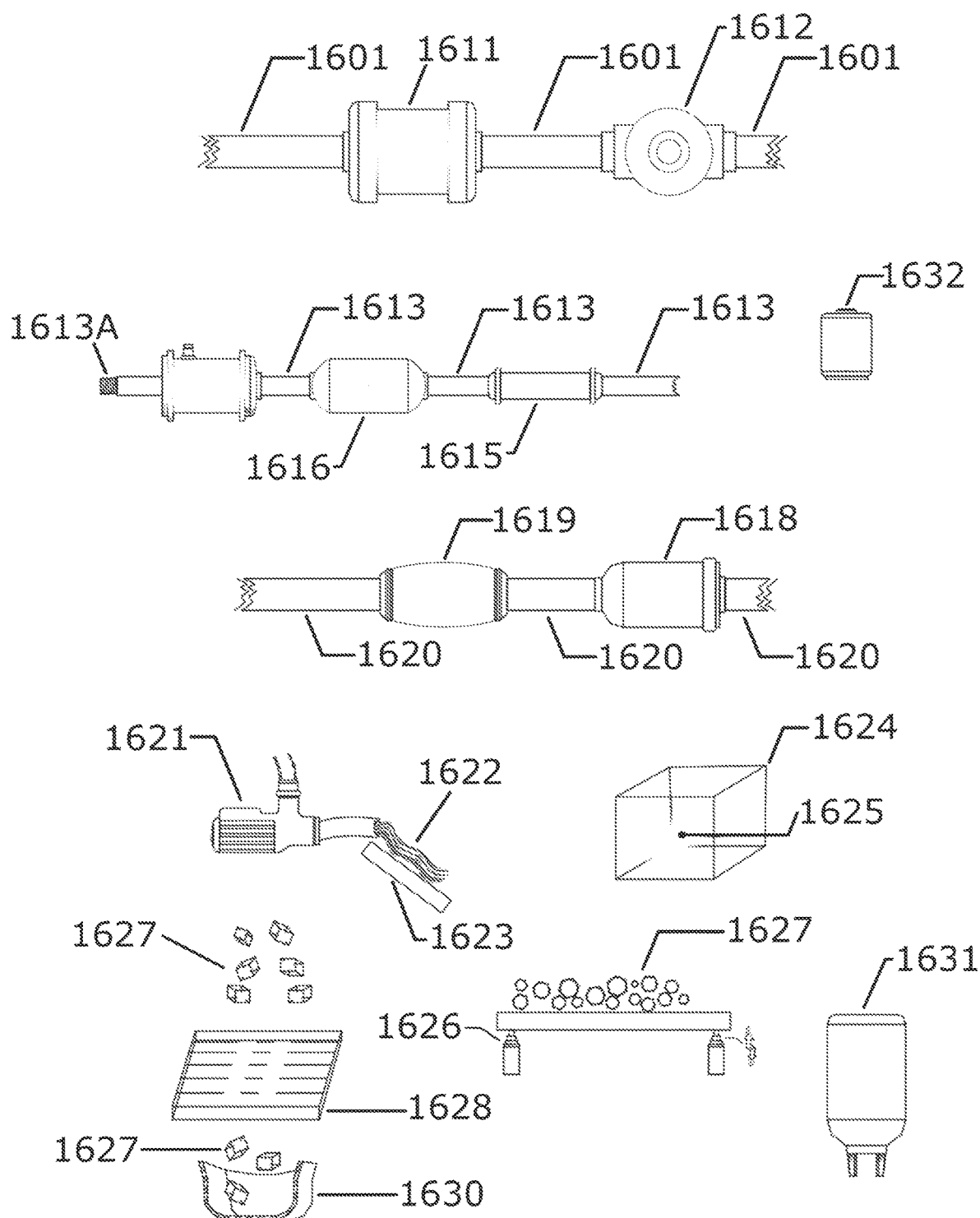


Fig. 17

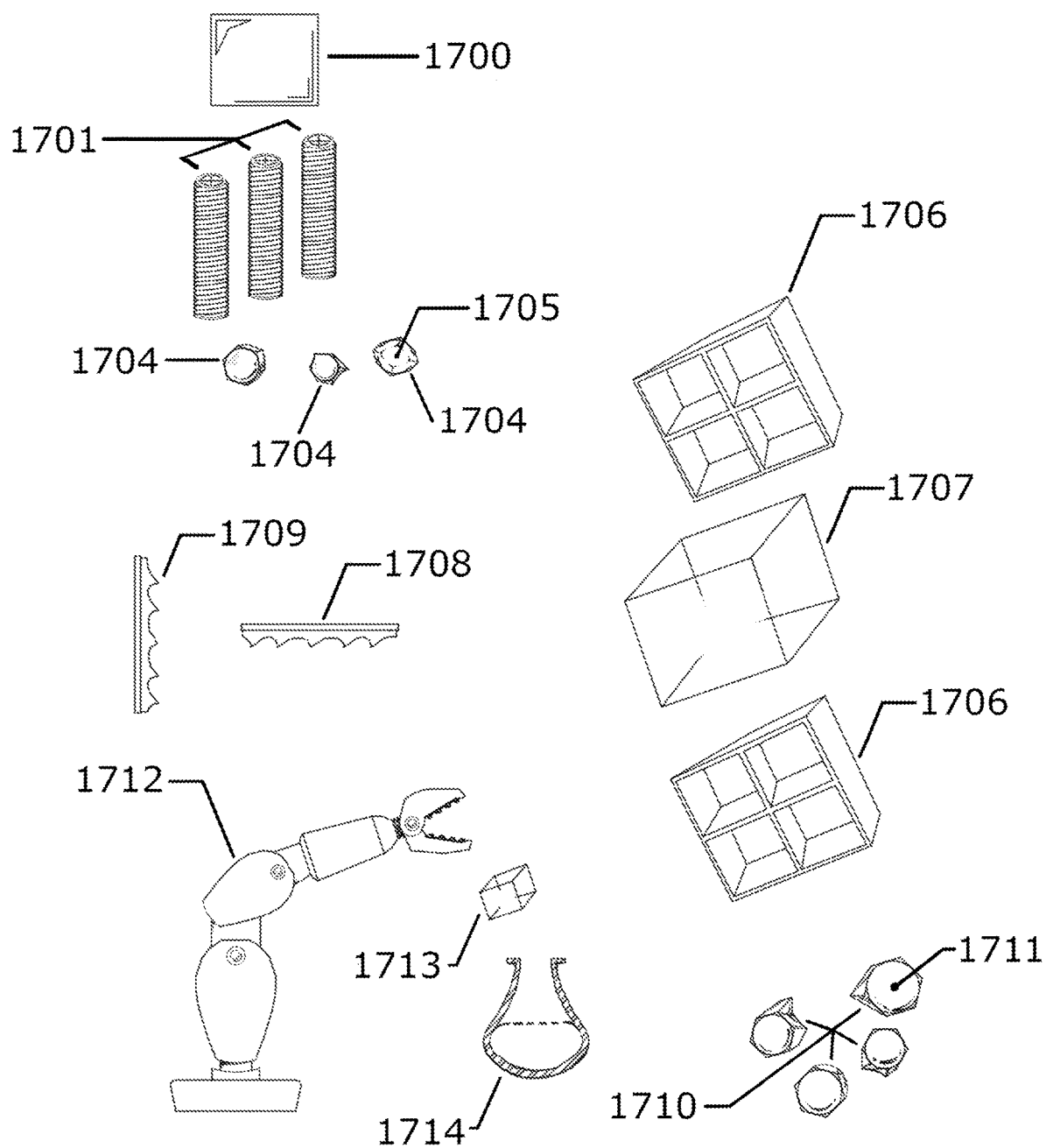
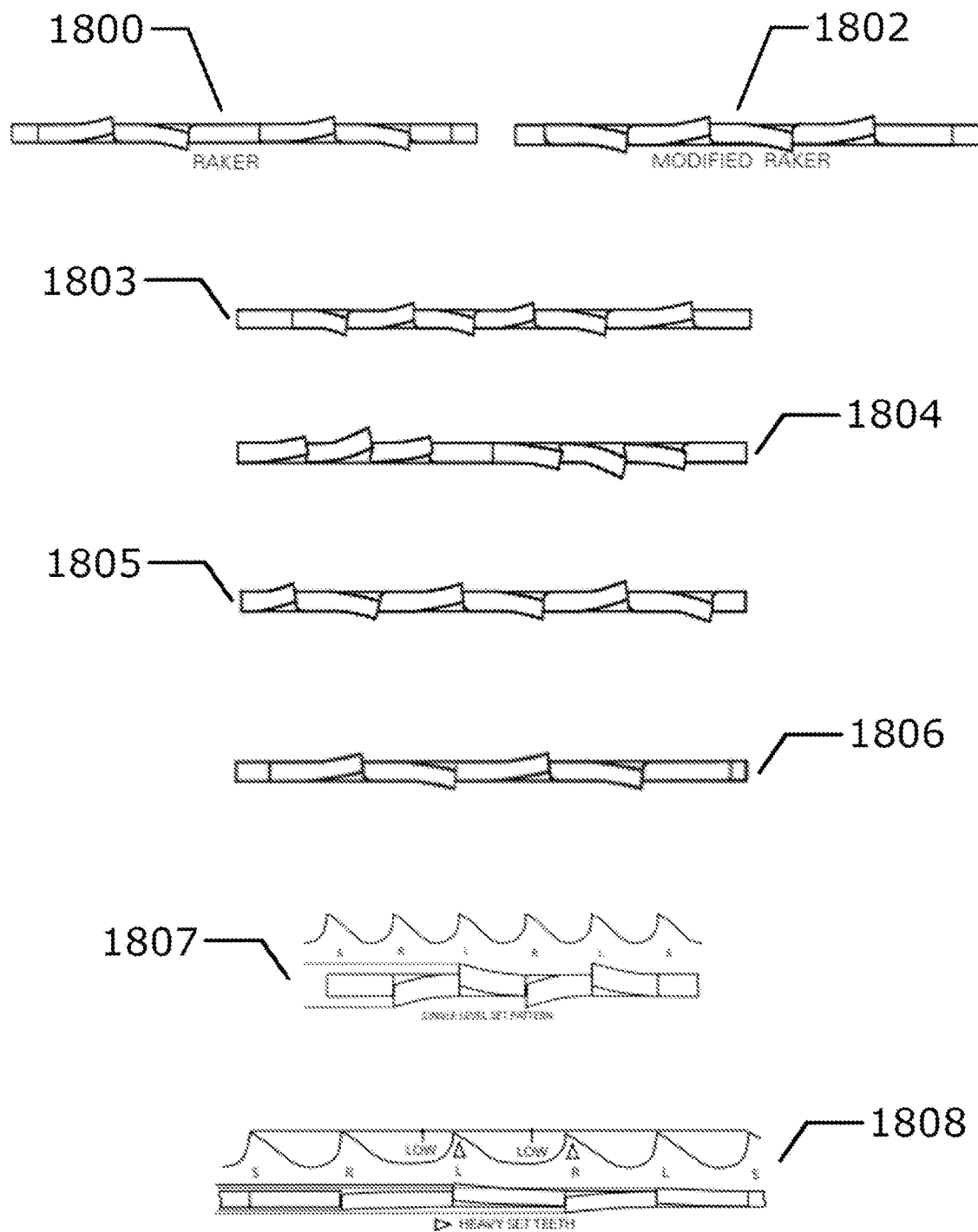
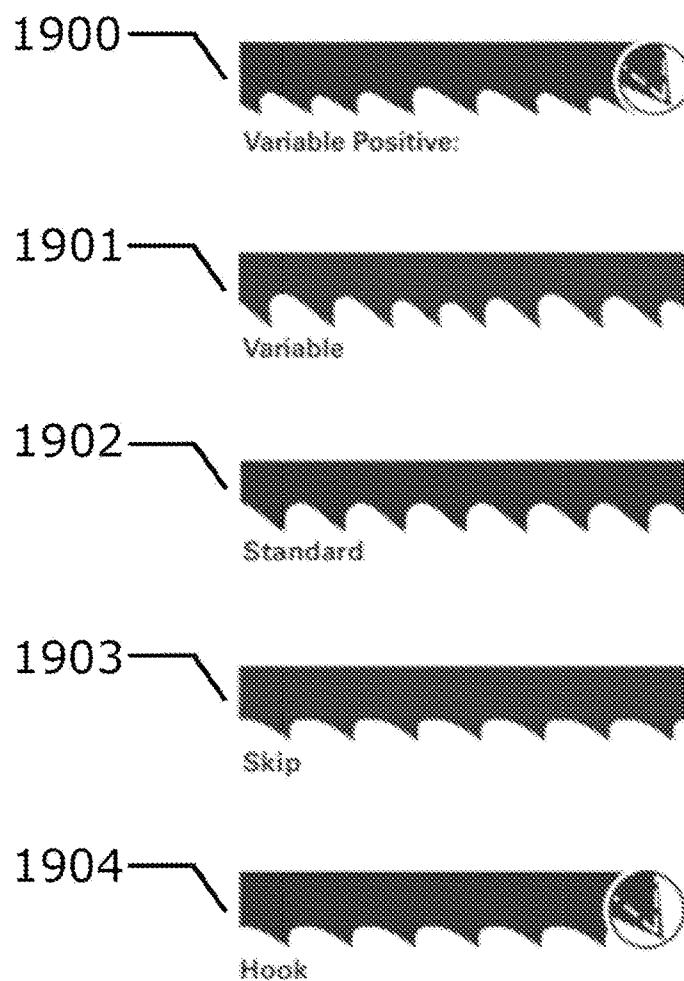


Fig. 18



(Prior Art)

Fig. 19



(Prior Art)

Fig. 20

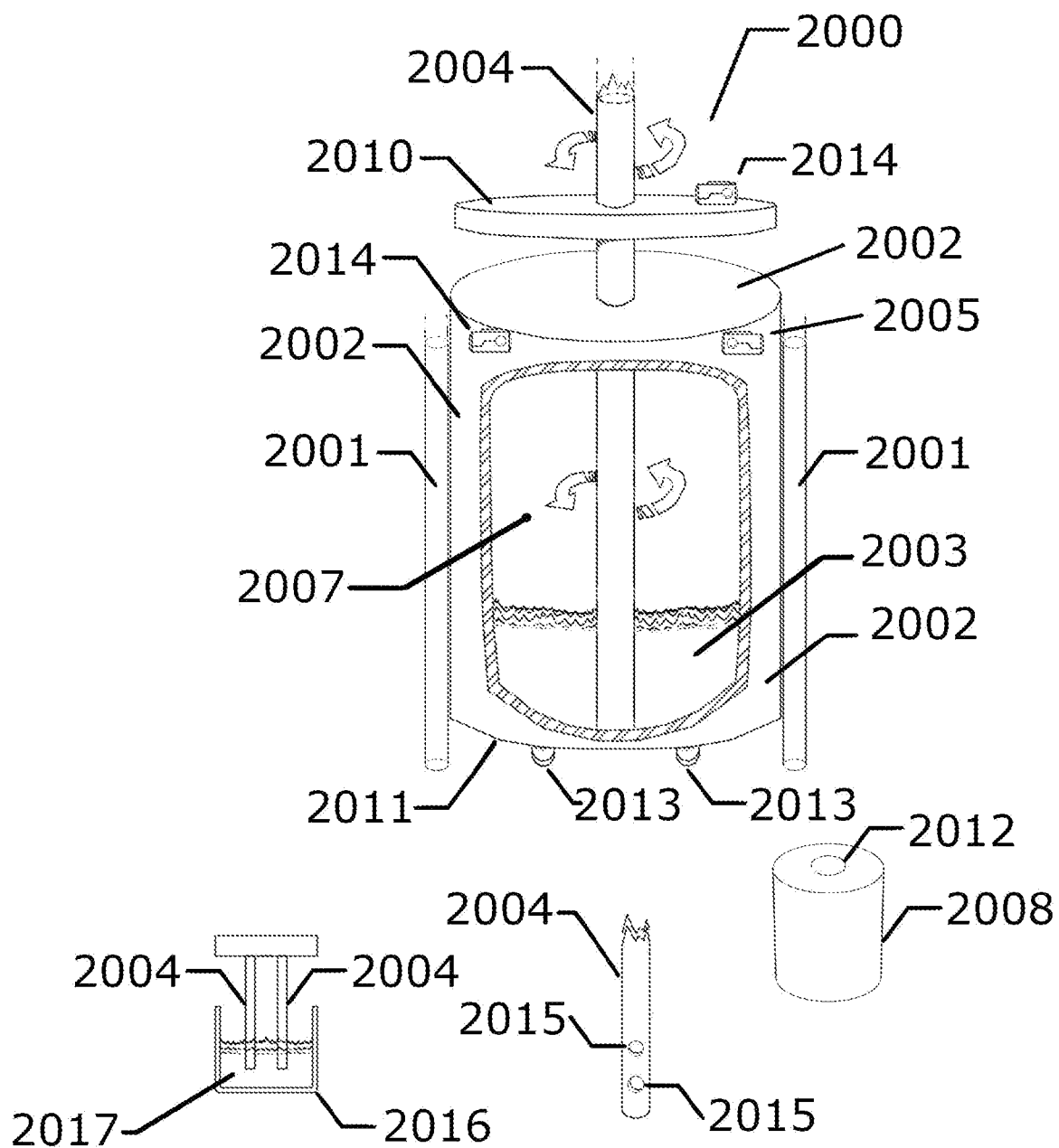


Fig. 21

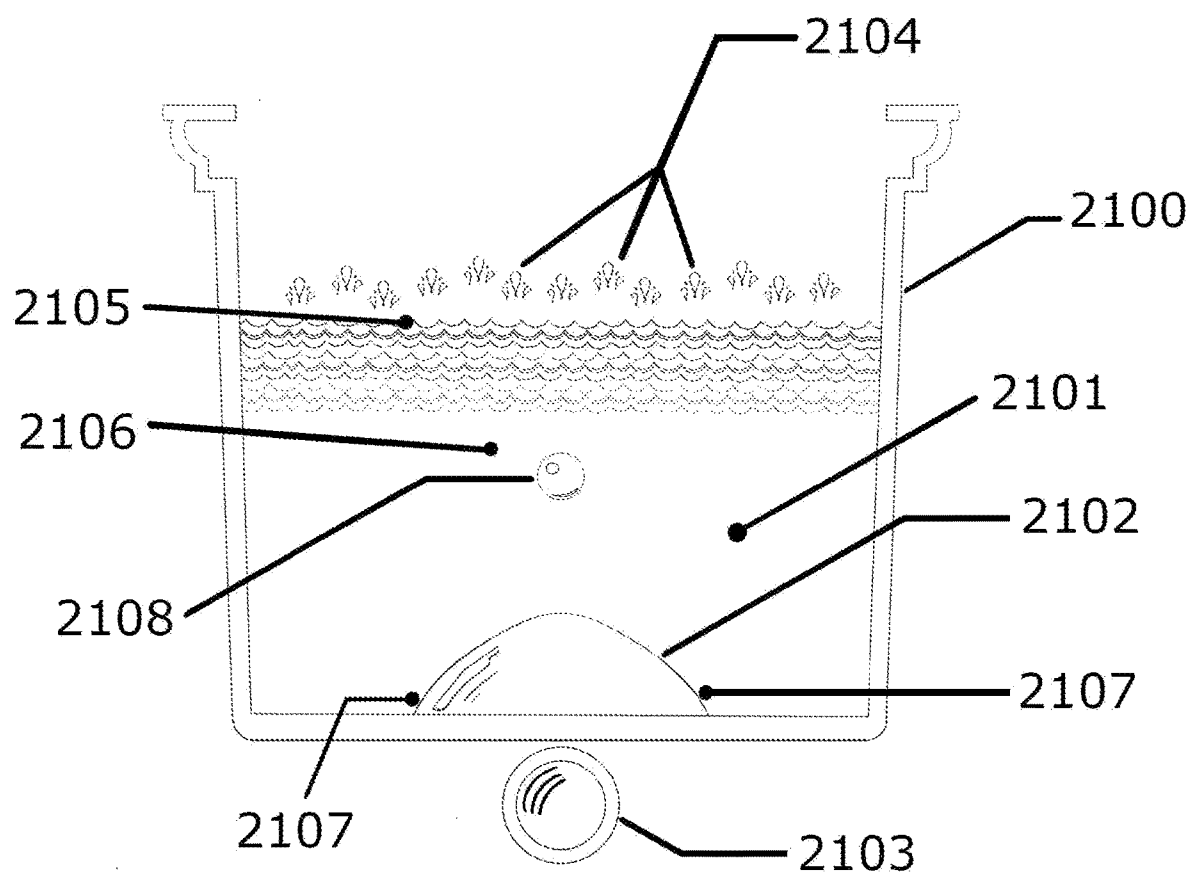


Fig. 22

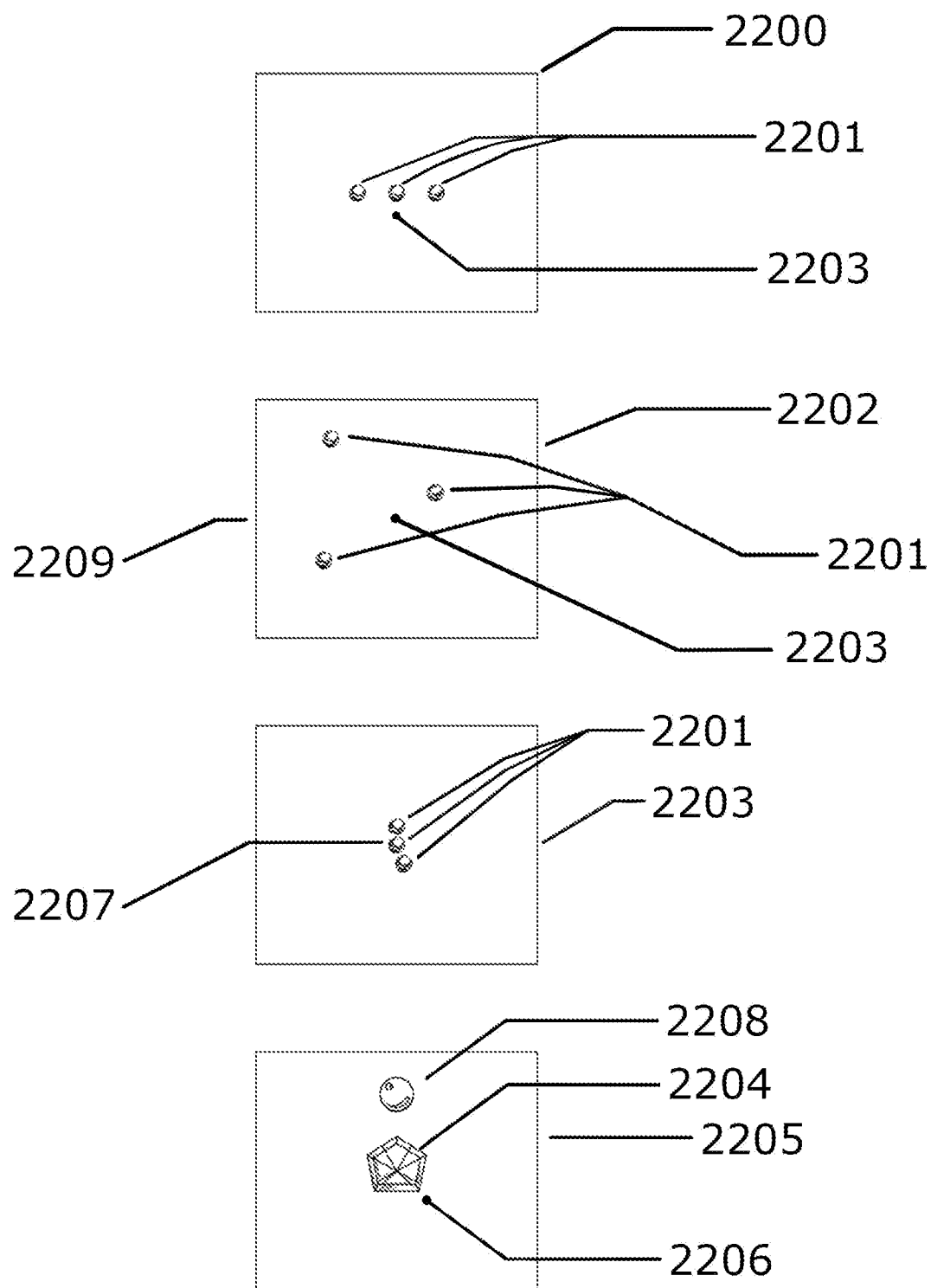
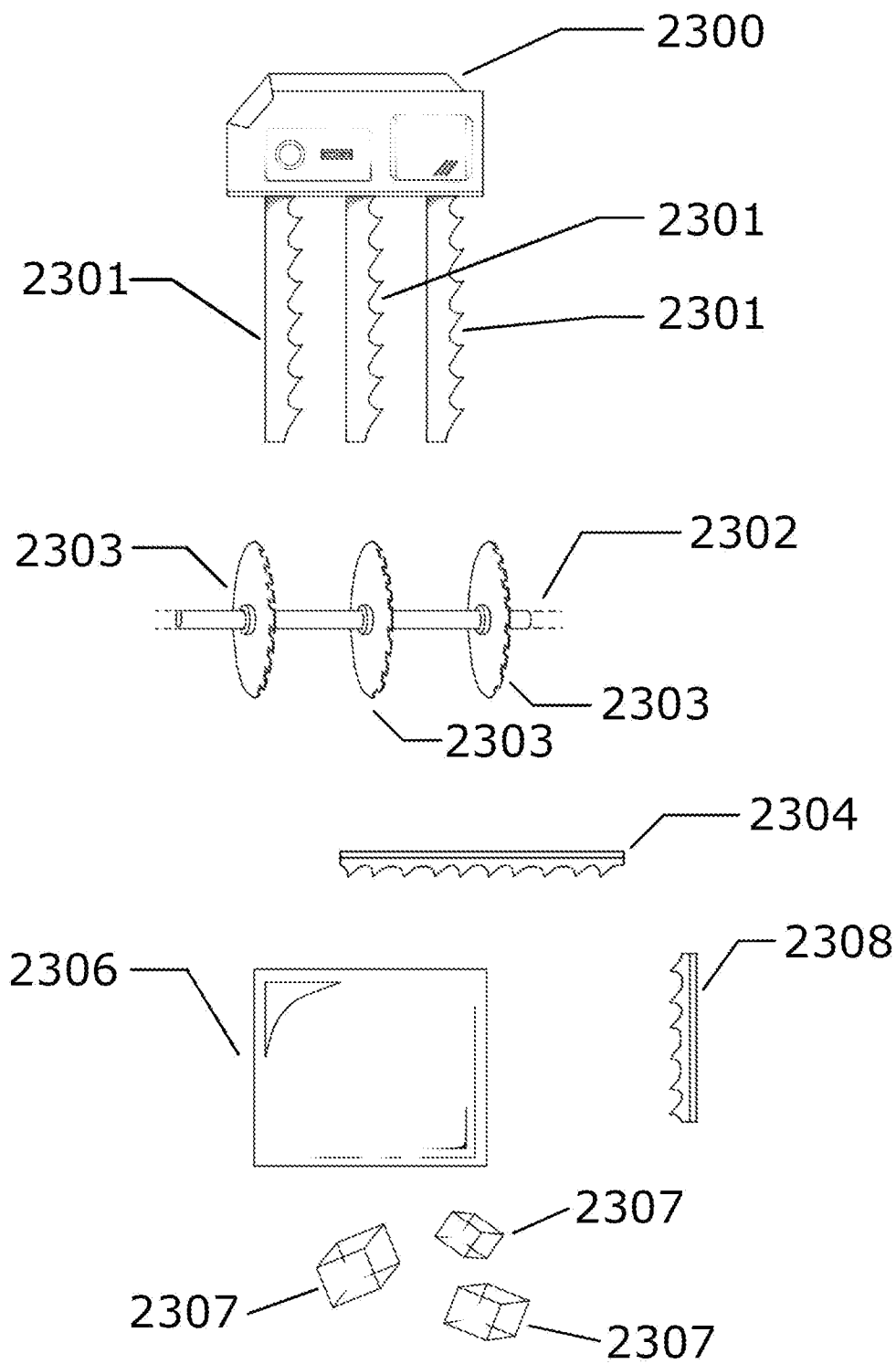


Fig. 23



ICE CUBE MAKER AND METHOD FOR MAKING HIGH QUALITY TRANSPARENT ICE CUBES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims the benefits of patent application Ser. No. 17/741,846 for An Energy Efficient Transparent Ice Cube Maker, filed May 11, 2022, which claims the benefits of patent application Ser. No. 16/974,284, for Clear Ice Cube Making Device, filed December 16, 2020, which is abandoned and claimed the benefits of provisional patent application Ser. No. 63/102,512 for Pop-sicle Device, filed Jun. 19, 2020, all of which are incorporated herein by reference in their entireties.

FIELD OF THE INVENTION

[0002] The present invention generally relates to an ice-maker for making ice cubes that are transparent.

BACKGROUND OF THE INVENTION

[0003] There have been several attempts to manufacture transparent ice cubes of high quality by agitating water in ice cube trays during the freezing process. There are two separate and equally important aspects that determines the quality of a transparent ice cube, non-visible bubbles, and non-visible crystallization in the ice cube. The present invention addresses those two separate issues.

DESCRIPTION OF RELATED ART

[0004] One of ordinary skill in the art knows there are different degrees of clarity in “clear ice cubes.” Even an ice cube made without one directional freezing in the home freezer that has visible crystallization has parts that are clear. The degree of clarity is paramount for transparent ice cubes for the degree of clarity determines their commercial value over much less expensive and generally smaller cloudy ice cubes. Does one visible bubble constitute clear? Does one visible crystal constitute clear? To the extent the broadest reasonable interpretation of the word “clear” is used, then are they clear of all bubbles, and all debris, and all crystallization, under magnification? See citation Slide of Microscopic Bubbles in Water. The terminology “clear” is ambiguous with respect to transparent ice cubes unless “clear” is described by text related to a specific drawing (s) pointing out the clarity and concisely expressing how the ice cube is to be viewed. Creating a center of an ice cube that is void of visible crystallization and is void of a visible air bubble creates a high-quality transparent ice cube. Disclosures that infer to not trap air in “clear ice” may teach away from the present invention as the present invention creates a transparent ice cube with air molecules in the center of the ice cube and the center is void of a visible air bubble and void of visible crystallization.

SUMMARY

[0005] The terminology “visible” herein means what a human having 20/20 vision in both eyes sees without visual enhancement in the sunlight. The terminology “ice cube” or “cube” herein is not limited to a size or shape and means any shaped or sized ice. The terminologies “includes” and “including” are intended to be inclusive in a manner similar

to the terminology “comprising.” Similarly, the terminology “or” is generally intended to be inclusive (i.e., “A or B” is intended to mean “A or B or both”). Approximating language, as used herein throughout the specification and claims, is applied to modify any quantitative representation that could permissibly vary without resulting in a change in the basic function to which it is related. Accordingly, a value modified by a terminology, such as “about,” “approximately,” and “substantially,” are not to be limited to the precise value specified. In at least some instances, the approximating language may correspond to the precision of an instrument for measuring the value. For example, the approximating language may refer to being within a ten percent margin. The terminology “motor” herein may refer to any suitable drive motor and/or transmission assembly. The term “ice mold” means any structure that water is frozen in. Work of Applicant’s to the extent it is described in this disclosure, as well as aspects of the description that may not otherwise qualify as prior art at the time of filing, are neither expressly nor impliedly admitted as prior art against the present disclosure. The present invention incorporates herein all related art submitted in the Information Disclosure Statements in their entireties.

[0006] An aspect of one embodiment of the present invention is having the right combination of proper water movement, a properly configured ice mold and properly configured refrigeration setup to make a transparent ice cube with a center void of visible crystallization and the center is void of a visible bubble. The releasing of bubbles is not the science behind making a transparent ice cube but a result of the process. As an example, take a short glass and fill it half full of water that has no visible bubbles. Stick your finger in the water and stir. You will see your finger movement creates visible bubbles such as any agitation means would. All bubbles can never be eliminated no matter how long you agitate the water.

[0007] An aspect of one embodiment of the present invention discloses a proper frequency and amplitude combination to make a transparent ice cube utilizing a vibration or oscillating system so a person with or without a scientific instrument can do so. Amplitude is the intensity of the water movement while frequency is the rate of the movement. Embodiments of the present invention using either vibration or oscillation, a proper amplitude intensity is achieved when water droplets jump above the water surface and most preferably jumps over one eighth of an inch above the water’s surface. The amplitude can be too high. As an example and not limitation, when an ice mold is filled with water and a maximum amplitude for a high frequency is applied all the water may either jump out of the mold, or super cold droplets from the bottom of the water may come to the surface and may freeze the surface water if the mold has a lid and that may result in the surface becoming slushy and milky looking. Further the high amplitude may create an uneven freezing of the water to the degree it creates a cloudy cube because it adversely affects the pressure in the water. If either of these events happen the amplitude is adjusted downward. As an example, and not limitation to increase amplitude in one embodiment of the present invention, from a system using an eccentric vibrator, weights are adjusted or added or subtracted to increase or decrease amplitude. In one embodiment, the disclosed amplitude creates a high-pressure region and a low-pressure region in water within the ice mold and at a point where the water turns into ice the

pressure is such that air molecules are at that point and frozen while above that point the pressure is such that air is visible to unaided eye as it rises to the surface as a visible bubble. Therefore, an air molecule is in the center of the ice cube of the present invention and a visible bubble is not frozen in a center of the ice cube.

[0008] In one embodiment of the present invention, a proper frequency is achieved when the frequency is adjusted for the total mass moved until the amplitude is such that water droplets jump above the top surface of the water in multiple ice molds.

[0009] The creation of high- and low-pressure regions within water in an ice mold is described and shown herein by way of example and not limitations as the present invention contemplates all ways to create the proper pressure regions in all devices disclosed herein to make an ice cube having a center void of a visible bubble and void of visible crystallization and all ways fall into the scope of the present invention. The amplitude described and shown herein is by way of example and not limitation as the present invention contemplates all ways to create the proper pressure differences in water so at the point the water turns to ice visible bubbles are not frozen in the center of an ice cube. The adjustment of amplitude in a vibrator is described by way of example and not limitation as the present inventions contemplates all ways to provide a proper amplitude and/or pressure regions in all devices disclosed herein to make an ice cube having a center void of a visible bubble and void of visible crystallization and all ways fall into the scope of the present invention. An ice cube can be crystal clear and still have numerous bubbles.

[0010] Another aspect of the one embodiment of the present invention is preventing visible crystallization in the center of a transparent ice cube. Atmospheric gases such as nitrogen and oxygen can dissolve in water. The amount of gas dissolved depends on the temperature of the water and the atmospheric pressure at the air/water interface. Colder water and higher pressure allow more gas to dissolve; conversely, warmer water and lower pressure allow less gas to dissolve. Air has atoms in the form of molecules, herein referred to as air molecules, or noble gases, herein referred to as gases. When water freezes it usually passes from the liquid to the solid state. As a liquid, water molecules are in constant motion, bumping and jostling each other and never staying in one place for long. When water freezes, the molecules slow and settle into place, lining up in regular formations you see as crystals. One embodiment of the present invention provides a proper water movement pressure inside a properly configured ice mold, so the molecules do not line up to the degree they cause visible crystallization in the center of an ice cube. Crystallization can form in ice without visible bubbles in water. Take a metal cup and fill with water. Be sure there is no visible bubbles in the water. Freeze the water and it will crystalize.

[0011] Another aspect of one embodiment of the present invention is to provide a proper refrigerant and superheat for a piped system and an ice mold combination to make a high-quality transparent ice cube having a center void of visible crystallization and void of a visible bubble by using one directional freezing or substantially one directional freezing through a wall of an ice mold. "Ice machines generally use low superheat valves (values) around 2 F to 4 F." See citation Ice Machine Service Fundamentals, by Danny Moore director of technical support at Hoshizaki

America, Inc. One embodiment of the present invention uses a much higher superheat. Superheat is a calculated value by taking the difference between two temperatures. First you find the actual temperature of the refrigerant vapor and then you need the saturation or boiling point of that same refrigerant. The temperature that you measure on the refrigerant should be higher than what your boiling point/saturation point is on the refrigerant. If it is not, then you have no superheat. Superheat can be determined by subtracting the boiling point/saturation point of the refrigerant from the actual temperature of the refrigerant vapor. As an example, and not limitation, if you have a forty-five degrees boiling point and your actual refrigerant temperature is at fifty degrees then you have a superheat of ten degrees. To saturation or boiling point temperature you will need to use the low side on refrigeration gauges set to measure the pressure of the evaporator. Once you have this pressure you can then convert it to a temperature either using a gauge or a PT conversion table. One embodiment of the present invention uses a superheat of between ten degrees Fahrenheit and fifty degrees Fahrenheit and more preferably about thirty degrees Fahrenheit. One embodiment of the present invention uses a refrigerant having a boiling point of less than minus twenty degrees Fahrenheit and more preferably a boiling point less than minus forty degrees Fahrenheit. Home refrigerators having a freezer compartment are generally configured to use a refrigerant having a boiling point temperature of only about minus fifteen-point four degrees F. R-134a is currently the prime example. See related art citation entitled Freon. Using the preferred superheat, an ice mold is made from either a inorganic polymer having a bottom wall thickness of less than about three quarters of an inch and more preferably less than about 0.126 inches thick, or a thermoplastic polymer having a bottom wall and sidewalls with a thermal conductivity of less than 0.055 watts per meter-Kelvin and a thickness of less than 0.090 inches and more preferably less than 0.070 inches thick and most preferably less than 0.040 inches thick, or has a bottom wall made of a material having a thermal conductivity over ten watts per meter-Kelvin and more preferable over two hundred watts per meter-Kelvin and sidewalls made from of a polymer. In one embodiment, the thermal conductivities are measured at an ambient temperature of between about zero degrees Celsius and twenty degrees Celsius.

[0012] Another aspect of one embodiment of the present invention is configuring the system to purposely move the refrigeration piping. It is known by one of ordinary skill in the art that purposely oscillating, vibrating or in general moving the refrigeration piping is not recommended as it may decrease the life of the refrigeration components including possible leakage of the refrigeration pipe at the pipe joints. For this reason, ice cube machines are generally not engineered to purposely vibrate the refrigeration pipe. The present invention provides features to mitigate this issue such as but not limited to a vibration isolator as the present invention contemplates all ways to mitigate the damage to a refrigeration pipe by movement of the pipe and all ways fall into the scope of the present invention.

[0013] Another aspect of one embodiment of the present invention is a high-volume transparent ice cube machine for bulk ice cube sales. This embodiment inserts a small spinning mechanism into water in an ice mold. It spins water against a cylinder-shaped freezing surface that most efficiently provides one directional freezing of the water inward

from all sides towards the spinning device. In one embodiment, the spinning device is heated to regulate freezing time and help regulate the quality of the transparent ice cube and the diameter of the heated spinning device is one way to determine the cubes size. After the water is frozen the spinning device is removed from the mold automatically ejecting the ice cube which is substantially round in shape. The present invention contemplates hundreds of these devices hooked up in tandem in a grid freezing format used by bulk producers of cloudy ice cubes. An embodiment of the present invention meets the energy standards set forth in the Federal Code For Automatic Ice Makers Title Ten, chapter two, circa 2022. A goal of one embodiment of the present invention is to reduce the cost of making transparent ice cubes near to the cost of cloudy bagged ice cubes in the hope that transparent cubes will be used for all beverages.

[0014] Another aspect of one embodiment of the present invention is transforming a larger transparent ice cube produced by Applicant's invention having a center void of visible crystallization and void of a visible bubble into smaller ice cubes. In one embodiment, this goal is accomplished through specially configured saws to efficiently cut larger cubes into small cubes of less than six ounces each. One embodiment uses a concentrated stream of air, or a concentrated stream of water, or heat such as but not limited to a heated grid, or laser, or steam to cut ice cubes. In one embodiment, the saw has a speed of 1,000 to 8,000 surface feet per minute and more preferably 1,500 to 2,500 surface feet per minute and two to ten teeth per inch and more ideally about four teeth per inch to turn larger ice cubes into smaller ice cubes of less than six ounces reducing the chance of the ice cube chipping when cut. Further disclosed are various ways to break up the larger ice cubes without crushing or otherwise destroying them. The resulting ice has a top surface that is substantially level requiring no vacuuming of water. When using heat, air, or water to cut the ice it is preferable that the ice measures about two inches thick.

[0015] Another aspect of one embodiment of the present invention is to provide an evaporator (freezing surface) that helps distribute a proper amplitude to water in each ice mold. Essentially, metal is elastic and transmits vibrations easily while plastic is viscoelastic and does not transmit vibrations nearly as well. The present invention contemplates all metals having a well-organized crystalline lattice structure and all material having a well-organized crystalline lattice structure fall into the scope of the present invention. The method for obtaining the frequencies and orthogonality relation for combined dynamical systems in which the Green Functions of the vibrating subsystems are used is applied to a thick plate carrying concentrated masses. The effects of transverse shear and rotary inertia of each mass is accounted for. It is demonstrated that as the plate thickness goes to zero the results of thin plate analysis are obtained. The Green Functions for both thin and thick vibrating plates are derived by modal analysis in the form of infinite series. Physically, the Green's Functions of the steady-state vibration equations are the deflection of its steady-state response due to a unit concentrated harmonic stimulus acting at an arbitrary position. With respect to one embodiment of the present invention when using Greens Functions the optimal metal thickness range to help distribute the amplitude to each ice mold is between one sixtieth of an inch and three eighths of an inch thick. Further the footprint size of the freezing surface under the ice mold extends to the size or larger than the size of the

footprint of the ice mold. As an example, and not limitation when the ice mold is ten inches by ten inches the freezing surface will be at least ten inches by ten inches.

[0016] Another aspect of one embodiment of the present invention is meeting various USA and Canadian standards. One embodiment of the present invention meets the standards set forth in NSF/ANSI 2 Food Equipment, NSF/ANSI 7, Commercial Refrigerators and Freezers, NSF/ANSI 8, Commercial Powered Food Preparation Equipment and NSF/ANSI 12, Automatic Ice Making Equipment, all circa 2022. Further one embodiment meets Canadian CSA C742-15, circa 2022.

[0017] Another aspect of one embodiment the present invention is to allow a user to change the ice molds so the system can make a variety of different shaped and sized transparent ice without needing a tool to remove the ice tray from a freezer compartment of a refrigerator and without removing the oscillation system from a freezer compartment. Most automatic ice makers are presently configured so only the manufacturer can change the ice cube mold. The removal of the ice cube tray the ice is made in is not part of the normal operation of these automatic ice makers. One embodiment of the present invention is configured so only the ice mold is removable from the transparent ice machine without having to remove a segment of the water movement system from a freezer compartment of a refrigerator.

[0018] Another aspect of the present invention is to provide a corrosive resistant evaporator or freezing surface having a corrosive penetration rate less than five mils per year where the freezing surface also has a heat conductivity higher than fifteen watts per meter-Kelvin and the freezing surface provides a proper attenuation to help distribute a specified frequency and amplitude combination to multiple ice molds. As an example, and not limitation one embodiment of the present invention accomplishes this goal by using ceramic. To calculate the corrosion rate is assuming uniform corrosion over the entire surface of the coupon.
$$\text{mpy} = (\text{weight loss in grams}) * (22,300) / (\text{Adt})$$
 mpy=corrosion rate (mils per year penetration) A=area of coupon (sq. in.) d=metal density of coupon (g/cm³) t=time of exposure in corrosive environment (days).

[0019] Another aspect of one embodiment of the present invention is to provide an ice tray the ice cubes are made in used as end user packaging eliminating the cost of repackaging associated with bulk ice cube sales. There is no related art for transparent ice cubes sold in the ice tray the ice cubes were made in except for one embodiment of the present invention.

[0020] Another aspect of one embodiment of the present invention is to add a flavor to the water and a handle creating an ice treat that is substantially void of visible crystallization. Freezing of water requires at least a certain concentration of flavor so the flavor can be tasted after the ice is frozen. In other words, water having one concentration of a flavor may taste less flavorful after freezing. In one embodiment of the present invention, the flavor added to water is about 0.2 percent by volume or more. The present invention contemplates all ways to make an ice cube that is substantially void of visible crystallization in the center and void of a visible air bubble in the center made from a variety of ingredients, including but not limited to natural flavors non-oil-based flavors, minerals, vitamins, amino acids, medicine, sweeteners, or fruit.

[0021] Another aspect of one embodiment of the present invention is to provide an ice mold lid that compensates for the opposing BTUs freezing the water. In one embodiment of the present invention, a lid covering the ice molds is calibrated to the BTU output of the refrigeration system piping under the molds to allow warm room temperature air above the lid to go through the lid to counter the BTUs in a refrigeration pipe under the mold to prevent the top surface of the water from freezing before the water under the surface yet allows all of the water to eventually freeze in the molds. As an example and not limitation one embodiment of the present invention accomplish this goal is by using a refrigeration system rated to deliver twenty-four hundred BTUs and rated with a room air temperature of seventy degrees Fahrenheit subjected to the top of the lid and the lid having a thickness of less than 0.016 inches. The present invention contemplates all ways to provide a lid that compensates for the BTU output and all ways fall into the scope of the present invention.

[0022] One embodiment of the present invention utilizes a water movement system comprising either an eccentric weight vibrator or a voice coil, or a stepper motor, or a servo motor or an impact vibrator or a magnetic force. In one embodiment of the present invention, the water weight, refrigeration piping weight if it is to be moved, the bin weight if it is to be moved, etc., are added up and then the water movement system is configured and calibrated to provide over one-half pound of force for each pound of the total weight and more preferably over one and a half pounds of force for each pound.

[0023] This Summary of the Invention is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is an exploded view of one embodiment the present invention.

[0025] FIG. 2 is a view of the freezing plate with a refrigerant piping system.

[0026] FIG. 3 is a view of a transparent ice cube mold and showing a transparent ice cube and a standard cloudy ice cube.

[0027] FIG. 4 is a view of a vibration system that uniformly delivers vibration to multiple mold cavities.

[0028] FIG. 5 is a view of a mechanism that goes into an ice maker to make it automatic.

[0029] FIG. 6 is a view of a combination transparent ice maker and refrigerator.

[0030] FIG. 7 is a view of an ice tray and vibrator.

[0031] FIG. 8 is a view of configurations of a piping system.

[0032] FIG. 9 shows an electric motor cam configuration of a water movement system.

[0033] FIG. 10 shows different thermoelectric configurations.

[0034] FIG. 11 shows magnets creating a vortex in water.

[0035] FIG. 12 is an ice mold having different shaped cavities.

[0036] FIG. 13 is a section of an ice tray showing an undercut.

[0037] FIG. 14 shows a stepped embodiment of an ice mold having a lid.

[0038] FIG. 15 shows different piping configurations.

[0039] FIG. 16 shows different refrigeration configurations and transparent ice cube configurations.

[0040] FIG. 17 shows different ways to transform a transparent ice cube into smaller pieces.

[0041] FIG. 18 shows different tooth saw configurations.

[0042] FIG. 19 shows different saw tooth forms.

[0043] FIG. 20 shows how to make a round transparent ice cube with a hole in the center through the spinning of the water.

[0044] FIG. 21 shows different pressure regions created in water.

[0045] FIG. 22 shows molecule alignment in an ice cube.

[0046] FIG. 23 shows different configurations of cutting apparatuses.

DETAILED BRIEF OF THE PREFERRED EMBODIMENTS

[0047] FIG. 1 shows transparent ice cube maker 101 having, refrigeration pipe 102 and compressor assembly 100 and combination expansion valve capillary tube 103 and high pressure/low pressure cut in—cut out in control 106 and air moisture drier 104 that reduces or more preferably eliminates moisture in refrigeration pipe 102. The expansion valve 103 is either a thermal expansion valve, manual valve, automatic expansion valve, electronic expansion valve, low-pressure float valve, or a high-pressure float valve. In one embodiment of the present invention, freezing surface plate 109 is an evaporator segment of transparent ice maker 101. In one embodiment, the thermal conductivity of plate 109 is over 15 watts per meter-Kelvin and more preferable over two hundred and fifty watts per meter-Kelvin. In one embodiment, compressor 100 is a reciprocating compressor or a V belt compressor.

[0048] Cart 105 has vibration adjusters 107 (also known as vibration isolators or vibration dampeners), is shown in one embodiment of the present invention between cart 105 and bin 108. Vibration adjusters 107 are attached to any segment of transparent ice cube maker 101 including various places on mold 111 and number between one, two, three, four or more. Vibration adjusters 107 are shown by way of example and not limitation. The present invention contemplates all configurations of vibration adjusters 107 and all configurations and materials fall into the scope of the present invention. In one embodiment of the present invention, expansion valve 103 is configured with compressor 100 to provide a superheat of between ten- and fifty-degrees Fahrenheit and most preferable about thirty-five degrees Fahrenheit. In one embodiment of the present invention, the height of ice mold 111 is such that when an amplitude is subjected to water therein (not shown), water does not splash outside mold 111. In one embodiment of the present invention, vibrator 115 is attached to insulating cover 114 and insulating cover 114 goes over mold 111 to vibrate mold 111. In one embodiment of the present invention, cover 114 is heated to heat the top surface of water (not shown) in mold 111. In one embodiment, mold 111 is made from a plastic that is free from bisphenol A. In one embodiment of the present invention, vibrator 115 is located under freezing surface 109 and freezing surface 109 is made from corrosive resistant material. In one embodiment of the present invention, cavities 112 are made from either a thermoplastic polymer or an inorganic polymer. One embodiment of the present invention provides that cavities 112 are flexible. In one embodiment of the present invention, mold receiver 110 sits atop

freezing surface 109. Mold receiver 110 provides insulation to the cavities 112 as cavities 112 insert into mold receiver 110 so that when water (not shown) is put in the cavities 112 the cavities 112 touch a segment of the mold receiver 110 sidewalls 113. The mold receiver thus provides one directional freezing of water. The mold receiver 110 is shown by way of example and not limitation as the present invention contemplates all ways to provide one directional freezing of water and all ways fall into the scope of the present invention.

[0049] In one embodiment of the present invention, vibrator 115 is attached first to rigid metal plate 115B and then the rigid plate 115B is attached in various ways to the transparent ice maker 101. Nob 115A allows a user to increase or decrease the frequency and amplitude.

[0050] FIG. 2 shows freezing surface 109 having refrigeration pipe 119. In one embodiment of the present invention, vibrator 115 is located under member plate 119A. Member plate 119A is made of plastic, rigid foam, metal, wood, or another material and is in a variety of shapes and sizes. In one embodiment of the present invention, member 119A is an insulator having a thermal conductivity of less than 0.55 watts per meter-Kelvin. Pipe 119 is a freezing surface. In one embodiment of the present invention, member plate 119A is a means to hold refrigeration pipe against freezing surface 109 or a certain distance from freezing surface 109. In one embodiment of the present invention, vibrator 115 oscillates refrigeration pipe 119.

[0051] Member plate 119A is located under refrigeration pipe 119 and therefore refrigeration pipe 119 is located between member 119A and freezing surface 109. Vibrator 115 is shown under member 119A which vibrates refrigeration pipe 119, a refrigerant (not shown) inside refrigeration pipe 119 and surface 109 simultaneously. In one embodiment of the present invention, water 200 is flavored.

[0052] In one embodiment of the present invention, refrigeration pipe 119 has a heater 120A to heat a refrigerant (not shown) in refrigeration pipe 119. In one embodiment of the present invention, liquid refrigeration line 119D has a warm liquid or warm gas inside (not shown) so when refrigeration line 119D is placed in close proximity to refrigeration pipe 119 it heats a cold refrigerant (not shown) inside refrigeration pipe 119 to the degree it does not flow back to and freeze compressor 100 in FIG. 1 and damage the compressor. In one embodiment of the present invention, a segment of refrigeration pipe 119 is heated with electric heater 119E. In one embodiment of the present invention, heater 119E is a heat warp and pulls less than six ampere.

[0053] FIG. 3 shows transparent ice cube mold 130 made from an inorganic polymer or a thermoplastic polymer having sidewalls 131 and bottom wall 132 having a thickness of less than 0.090 inches or more preferable less than 0.070 inches and most preferably less than 0.040 inches when made with thermoplastic. When made with an inorganic polymer the bottom wall 132 has a thickness of less than three quarters of an inch and more preferable less than about 1.26 inches. Bottom wall 132 is substantially smooth without creases. In one embodiment of the present invention, the polymer is configured to be flexible so sidewalls 131 flex when filled with water 133 when ice cube mold 130 is outside of machine 101 in FIG. 1 Bottom wall 132, also known in one embodiment as a freezing surface when it is made from a metal material having a chromium content over fourteen percent or copper. Cold goes through bottom wall

132 and phase-transforms water 133 from the bottom position A to top position B of mold 130. Lid 130A covers transparent ice cube mold 130 to form a seal. In one embodiment of the present invention, the depth of mold 130 is sufficient so when the stated amplitude is achieved water 133 will not jump outside mold 130 when mold 130 is oscillated and mold 130 is not covered by lid 130A. In one embodiment of the present invention, water droplet 135A jumps at least one eighth an inch in the air above a top water surface 135 when a proper amplitude is applied to water 133. Transparent ice cube 133A has air bubble molecule 133B which is actually microscopic so it cannot be seen but blown up to see for this disclosure, and center 134C. Text W 134D is behind transparent ice cube 133A and is clearly visibly void of visible crystallization in the center 134C and center 134C is void of a visible bubble. Handle 135C goes into water 133 as water 133 phase-transforms or is attached to water 133 after it phase-transforms into ice 133A. 135D is a flavor added to water 133. Standard ice cube 140B has crystallization 140C in its center portion. This represents the crystallization found in an ice cube made without one directional freezing. In one embodiment, lid 130A is calibrated to compensate for opposing BTUs and the thickness of the lid is less than 0.040 inches and more preferably less than 0.020 inches where the lid is made from a thermoplastic polymer having a thermal conductivity less than 0.055 watts per meter-Kelvin. This allows heat to go through the lid keeping a top surface of the water from freezing before water under the top surface freezes.

[0054] FIG. 4 shows impact vibrator 126 having pistons 127. In one embodiment of the present invention, the number of pistons 127 equal the number of cavities 128 having water therein (not shown) in ice mold 129. In other words, if there are 100 cavities 128, there are 100 pistons, 127. In one embodiment of the present invention, freezing surface 109 is located between transparent ice mold 129 and pistons 127. Pistons 127 are configured to hit freezing surface 109 at the exact spot cavities 128 are located above at the exact same time or at different times or to directly impact the bottom of a mold disclosed herein. This provides that the amplitude is delivered to each of the multiple cavities 128 about uniformly. Opening 129A receives freezing pipe 119 in FIG. 2 or a refrigerant (not shown). In one embodiment, vibrator 115 is shown attached to freezing surface 109. In one embodiment, pistons 127 are controlled by a microprocess (not shown) so all the pistons 127 fire at different times. The present invention contemplates all ways to fire pistons 127 at different times or at different forces and all ways fall into the scope of the present invention.

[0055] FIG. 5 shows mold 120 has cavities 121. Fill source 121 may be configured to add water (not shown) to cavities 121 in a metered dose. In one embodiment of the present invention, the water is metered a little at a time into cavities 121 as the water oscillates or vibrates. Refrigeration pipe 122 is oscillated with cam mechanism 123 and water movement device 124 that simultaneously moves refrigeration pipe 122 and cavities 121. In one embodiment of the present invention, refrigeration pipe 122 is shown under each cavity 121. If the refrigeration pipe 121 were only directly under some of cavities 121 the water (not shown) in each of the cavities 121 would phase-transform at a different rate.

[0056] FIG. 6 shows combination ice cube maker and refrigerator 136 having freezing surface 137 that in one

embodiment of the present invention, mold **111** sits atop or in close proximity of two inches or closer. Mold **111** is vented to room temperature where the room temperature is above freezing or vented inside an area of refrigerator **136** that is above freezing. In one embodiment of the present invention, freezer compartment **138** is shown vented to room temperature which allows above freezing air from outside of refrigerator **136** to keep the temperature above mold **111** warm enough so the water does not phase-transform from the top of mold **111** by cold air above mold **111**. Vibration Isolator **137A** aids in the distribution of vibrations or oscillations to mold **111**.

[0057] FIG. 7 shows ice tray **200** having lid **201** that snaps into inserts **203** to provide a seal to reduce the chance of water **204** splashing outside cavities **205** when the water **204** is vibrated or oscillated.

[0058] In one embodiment of the present invention, ice tray **200** is made of plastic and has a bottom wall **207** having a thickness of 0.040 inches or less. In one embodiment of the present invention, bottom wall **207** is made of metal having a chromium content of over fourteen percent or copper and sidewalls **206** are made of a polymer. In one embodiment of the present invention, from position top AB to position bottom BB there is at least a one-degree taper and most preferably two degrees taper but less than four degrees taper. In one embodiment of the present invention, the distance between AB to BB is calibrated to an amplitude so water droplets do not jump outside ice tray **200** when vibrated or oscillated. As an example, and not limitation, if a water droplet jumps four inches the depth from position AB to position BB is over four inches deep. When describing the height of the ice cubes in certain embodiments of the present invention the height of the cubes is measured from freezing an ice cube from a bottom position BB to a top position AB within an ice mold such as but not limited to ice mold tray **200**.

[0059] In one embodiment of the present invention, ice tray **200** is configured to mold receiver **110** in FIG. 1 so the cavities **205** fit snugly into mold receiver **110**.

[0060] In one embodiment of the present invention, vibrator **115** is attached to ice tray **200**. Label **208** has the name (not shown) of the entity that makes the transparent ice cubes (not shown). In a novel approach the ice cubes (not shown) made in tray **200** are made in the same ice tray **200** to the end user. Most commercial producers of ice cubes remove the ice cubes from an ice maker and repackage them. In one embodiment of the present invention, a non-alcoholic flavor **209** is provided to water **204**.

[0061] In one embodiment of the present invention, handle **211** is attached to transparent ice treat **212**. Handel **211** is made of a variety of material in a variety of configurations and most preferably made from a transparent material. In one embodiment of the present invention, handle **211** is placed in opening **210** so when water **204** phase-transforms, handle **211** attaches to the ice treat **212**. The attachment of the handle is an illustration and not limitation and there are various ways to attach. One of ordinary skill in the art knows how to attach a handle **211** to ice treat **212**. In one embodiment of the present invention, sidewalls **206** are configured to have a thickness of plastic to provide heat conductivity of less than 0.55 watts per meter-Kelvin (W/m-K). In one embodiment of the present invention, opening **210** allows

heat to go through lid **201**. Opening **210** is small enough to reduce the chance of a droplet from jumping outside cavities **205**.

[0062] In one embodiment of the present invention, metal plate **301** goes between bottom wall **207** and fan **300** and bottom wall **207** contacts metal plate **301**. Fan **300** wicks away air under cavities **205** that has been warmed by water **204** in cavities **205**. Fan **300** has batteries or operated on a direct current or alternating current. In one embodiment of the present invention, fan **300** is configured to provide different fan speeds. In one embodiment of the present invention, ice tray **200** is configured to be crushable or compressible or flexible using one quarter pound per square inch of pressure or placing a one-pound weight on the bottom wall of tray **200**. In one embodiment of the present invention, sidewalls **206** are thicker than bottom wall **207**. In one embodiment, sidewalls **206** flex when water is added. The present invention contemplates all configurations and materials of ice tray **200** and all configurations and materials of ice tray **200** fall into the scope of the present invention.

[0063] FIG. 8 shows Ice molds **700** having water **701** inside. In one embodiment, the ice molds **700** sit atop freezing surface **702** and in one embodiment, ice molds **700** are within one half of one inch from freezing surface **702**. Refrigeration pipe **703** has an angle over two degrees to elbow **704** which allows refrigeration pipe **705** to angle over two degrees and more preferably about forty-five degrees up or down to elbow **706**. Applicant calls this a W refrigeration pipe pattern. This embodiment of a refrigeration piping arrangement allows more equivalent length of piping to be placed between a freezing surface **702** and bottom structure **707**. In one embodiment, refrigeration pipe **704** is located directly under water **701** in ice mold **700**.

[0064] FIG. 9 shows electric motor **800** having arm **801** attached to cam **803** which when arm **801** spins cam **803** moves arm **804** which moves freezing surface **805** up and down agitating water **806** in ice mold **807**. Chop **806A** is shown on surface of water **806**. When the amplitude is increasing a water droplet (not shown) jumps above the top surface **805**. In one embodiment, there are two segments of refrigeration pipe **808** under the water **806** in ice mold **807** and this provides more BTUs or a more uniform freezing of water **806** in mold **807**. **809** is an oval shape refrigeration pipe **808**. In one embodiment of the present invention, freezing surface **810** has opening **811** where a refrigerant (not shown) flows inside freezing surface **810**. In one embodiment, the distance between mm and dd is less than five eighths of an inch and over one quarter of an inch. Openings **811** are considered a refrigeration pipe bored into freezing surface **810**.

[0065] FIG. 10 shows thermoelectric pad **1000**. In one embodiment of the present invention, thermoelectric pad **1000** is placed on top of thermoelectric pad **1001**. In one embodiment of the present invention, a thermo-conductive paste **1003** is applied to the top surface of pad **1000** or the underside FF of freezing surface **1002**. Transparent ice cube **1004** has a weight of less than six ounces. Cube **1007** has a draft of less than ten percent and more preferably less than five percent and more preferably a draft of less than three percent from top position GG to bottom position XX. In one embodiment of the present invention, the top portion **1008** has a draft of less than five percent and more preferably less than three percent from top position FO to top position FT. Ice cube **1009A** represents a standard nontransparent ice

cube made without one directional freezing with crystallization **1009**. An ice cube produced by the present invention is void of visible crystallization **1009** at the center as shown by center portion **1011** of ice cube **1007** and void of a visible bubble.

[0066] FIG. 11 shows in one embodiment, mold **1100** having magnet **1102** on either side of mold **1100** which creates a vortex in water **1103** inside mold **1100** when a metal object (not shown) is placed in water. In one embodiment, ultraviolet light **1104** is positioned to provide ultraviolet light to water **1103** or water in any molds disclosed herein. In one embodiment, light source **1105** heats the top surface of water **1103**. In one embodiment of the present invention, light source **1105** provides an infrared light. In one embodiment, light source **1105** provides a concentrated light beam to cut an ice cube shown herein.

[0067] FIG. 12 shows ice tray **1200** having square shaped cavity **1201** and round shaped cavity **1202** and triangle shaped cavity **1203**. Ice tray **1200** is shown by way of example and not limitation as ice tray **1200** contemplates all combinations of shapes and sized cavities in one ice tray. Transparent ice cube **1204** has a draft of less than five percent and more preferably less than three percent and most preferably less than two percent, from top position AZ to bottom position AX and transparent ice cube **1204** measures over one and one quarter inch tall. Transparent ice cube **1205** is in the shape of an initial N. The present invention makes all shaped and sized initials and nonagon, octagon, heptagon, triangle, scalene triangle, right triangle, parallelogram, rhombus, square, pentagon, circle, oval, heart, cross, arrow, cube, cylinder, star, crescent and various animal and other shapes. In one embodiment, water submersible pump **1206** moves water in bin **1208** with inlet pipe **1207** and outlet pipe **1209** to form ice cube **1008**. A hinge **1211A** opens bin **1208**. In one embodiment, bin **1208** is configured to tilt so ice slides out. Hinge **1211A** is shown by way of example and not limitation as the present invention contemplates all ways to open bin **1208** and all ways fall into the scope of the present invention.

[0068] The present inventions ice cube heights or how tall they are is the height an ice cube produced in an ice mold **1210** from one directional freezing and is measured from the one direction. As an example, it is from position LL to position MM of ice mold **1210** when a freezing source **1213** is under bin **1210**. Ice cube **1112** made in a bin **1211** that has been frozen using one directional freezing by the freezing surface **1213** under bin **1211**. As an example the height is only one half of an inch from position CC to position PP that phase-transforms water from this position yet has a length of four inches from position KK to position OO and then the short ice cube is turned on its side to claim it is four inches tall.

[0069] FIG. 13 shows a lip segment **1300** of an ice mold. The lid **1301** is secured to mold body with undercut **1303**.

[0070] FIG. 14 shows mold **1403** having a first step **1405** and a second step **1402** and a lid **1403** that has a first step **1404** and a second step **1405** so when lid **1403** covers mold **1403** to help reduce the chance of water **1406** splashing outside mold **1403** when water **1406** is vibrated, or agitated or oscillated, or moved and more preferably prevents water **1406** from splashing outside mold **1403**. In one embodiment, spinning mechanism **1408** spins mold **1403**. Spinning mechanism **1408** is shown by way of example and not limitation. The present invention contemplates all ways to

spin a mold as the water therein freezes and all ways fall into the scope of the present invention.

[0071] FIG. 15 shows refrigeration pipe **1500** wrapped or coiled around sidewall **1503** which is also a freezing surface. In one embodiment, thermoelectric cooler **1504** is attached to a sidewall **1503** of freezing surface **1502**. In one embodiment, an ice mold **1505** is inside freezing surface **1502** and in this embodiment water (not shown) is only in ice mold **1505**. The embodiment is shown having three coils around freezing surface **1502** and other embodiments have more than three coils. The coil location is shown my way of example and not limitation. The coils or wrapping of the refrigeration pipe **1500** is in other locations on ice maker **101** in FIG. 1. Sidewall **1508** shows underside of freezing surface **1506**. In one embodiment, there is insulation **1509** between refrigeration pipe **1507** and sidewall **1508**. See through ice mold **1510** has refrigeration pipe **1511** under bottom surface **1512** and phase-transforms water **1513**.

[0072] FIG. 16. Liquid refrigeration pipe **1601** has liquid drier **1611** and moisture liquid indicator **1612**. Suction pipe **1613** has threaded end **1613A** and has suction moisture drier **1616** and oil pressure control heat exchange suction accumulator **1615**. In one embodiment, water **1622** flows over freezing surface **1623**. One embodiment has high low cut in cut off device **1632**. After transparent ice cube **1624** is produced having a center **1625** void of visible crystallization and void of visible bubbles, it is placed on jarring machine **1626** that moves up and down and forced to break apart ice cube **1624** into smaller ice pieces **1627**. The present invention does not crush the ice cubes for crushing leaves visible fractures in the ice. In one embodiment, ice pieces **1627** are sorted through ice sifter **1628** so only a selected number of pieces **1627** are packaged in package **1630**. Pieces **1627** are not all the same shape and have a center void of a visible bubble and void of visible crystallization. One embodiment has an accumulator tank **1631**. In one embodiment, vibrator **115** in FIG. 1 or an oscillator shown in FIG. 9 moves a segment of jarring machine **1626** to break apart ice cube **1624**. In one embodiment, pump **1621** is configured as a glycol pump. Breaking ice cube **1624** is jarring machine **1626** which reduces the chance of ice cube fracture that striking said ice cube causes. Jarring machine **1626** is shown by way of example and not limitation as the present invention contemplates all ways to break apart and ice cube without crushing it and all ways fall into the scope of the present invention. Jarring machine **1626** may operate with hydraulics, vibrator **115** (not shown), oscillation in FIG. 9, or other means and the present invention contemplates all embodiments of jarring machine **1626** and all embodiments fall into the scope of the present invention. Sifter **1628** is shown by way of example and not limitation. The present invention contemplates all ways to take a percentage of said smaller ice cubes and package them and take a percentage of said smaller ice cubes and discard them and all ways fall into the scope of the present invention.

[0073] FIG. 17 shows transparent ice cube **1700** going through rotating mechanisms **1701** that breaks ice cube **1700** into smaller ice pieces **1704** having center **1705** that is void of visible crystallization and void of a visible bubble. In one embodiment, heated grid **1706** comes down over transparent ice cube **1707** without a sawing motion into smaller pieces. In one embodiment, mechanism **1701** is heated. One embodiment of the present invention saw **1709** is positioned substantially horizontal to cut ice cube **1707** and saw **1709**

is positioned substantially vertical to cut ice cube 1707. The transparent ice cube pieces 1710 have a center portion 1711 that is void of visible crystallization and void of visible bubbles. Robot 1712 automatically moves ice cube 1713 to saws 1709 and 1708 and also performs various other automated functions to make ice cube 1713. In one embodiment, robot 1712 automatically places ice cube 1713 in package 1714. Robot 1712 is shown by way of example and not limitation. The present invention contemplates all ways to automate making transparent ice cubes and all ways fall into the scope of the present invention. The saw is made out of about 0.05 up to 2.1 percent carbon, or comprised of either molybdenum, or nickel, or over fourteen percent chromium. In one embodiment, grid 1706 is heated and made having over fourteen percent chromium or carbon. In one embodiment, grid 1706 has a chromium content of over fourteen percent. Saw 1709 is shown by way of example and not limitation. Grid 1706 is shown by way of example and not limitation. The present invention contemplates all ways to transform ice cube 1713 into smaller ice cubes from heat and other means and all ways fall into the scope of the present invention. In one embodiment, grid 1706 is configured to provide a high concentration of water (water jet) or air to transform ice cube 1713 into smaller ice cubes 1710. In one embodiment, the smaller ice cubes 1710 are less than six ounces each.

[0074] FIG. 18 (prior art) shows tooth set raker 1800 with 3 tooth sequence with a uniform set angle (Left, Right, Straight). Modified raker 1802 has 5 or 7 tooth sequence with a uniform set angle (Left, Right, Left, Right, Straight). Variable Raker 1803 has a tooth sequence independent on the tooth pitch and product family. Alternate 1804 shows every tooth is set in an alternating sequence. Wavy 1805 has groups of teeth set to each side within the overall set pattern. The teeth have varying amounts of set in a controlled pattern. Variable set 1806 shows the tooth height/set pattern varies with product family and pitch. Single Level Set 1807 has a blade geometry with a single tooth height dimension. Setting this geometry requires bending each tooth at the same position with the same amount of bend on each tooth. Dual Level Set 1808 blade geometry has variable tooth height dimensions. Setting this product requires bending each tooth to variable heights and set magnitudes in order to achieve multiple cutting planes.

[0075] FIG. 19 (prior art) shows variable positive teeth 1900, variable teeth 1901, standard teeth 1902, skip teeth 1903 and hook teeth 1904. A preferred embodiment uses skip teeth 1902 and more preferable standard teeth 1902 and more preferable veritable teeth 1901 and most preferably positive teeth 1900.

[0076] FIG. 20 shows ice maker 2000 having a cylinder-shaped freezing surface 2002 and a removable wall 2010 prevents water 2003 from splashing outside cavity 2007 when device 2004 spins water 2003 against freezing surface 2002. In one embodiment, spinning device 2004 is heated. It is preferable that the diameter of device 2004 is between one sixtieth of an inch and one half of an inch and the diameter can be any size. Refrigeration pipe 2001 is secured to the backside of freezing surface 2002. In one embodiment, heater 2014 heats the underside of bottom wall 2011. In one embodiment, heater 2014 heats lid 2010 or the backside of freezing surface 2002. In one embodiment, heater 2005 heats the backside of freezing surface 2002 to release an ice cube 2008. The heater to release and ice cube

is shown by way of example and not limitation. The present invention contemplates all ways to release an ice cube from a mold and all ways fall into the scope of the present invention. Ice maker 2000 provides substantially one directional freezing and more preferably one directional freezing of water 2003 from freezing surface 2002 towards device 2004. In one embodiment, robot 1712 in FIG. 17 is configured to mechanically insert device 2004 into water 2003 and mechanically remove device 2004 from water 2003 in steps upwards as the water freezes. The present invention contemplates all ways to insert device 2004 into water and all ways fall into the scope of the present invention. Device 2004 has one or more openings 2015 to either circulate water in an ice mold disclosed within this disclosure or inject air into an ice mold within this disclosure. In one embodiment, cavity 2007 is pressurized so water 2003 is pressurized when vibrated, oscillated, or spun. In one embodiment, two devices 2004 are inserted into ice mold 2016 and water 2017 is circulated in ice mold 2016. As the water 2003 freezes, robot 1712 in FIG. 17 moves device 2004 in and out of ice mold 2016. In one embodiment, openings 2015 provide a concentrated water steam or concentrated air steam to transform ice cube 2008 into smaller ice cubes (not shown). In one embodiment, an ice cube 2008 is placed in ice maker 2000 to tumble said ice cube to make into smaller ice cubes.

[0077] FIG. 21 shows ice mold 2100 having water 2101 and ice formation 2102 as refrigeration pipe 2103 freezes water 2101. In one embodiment, water 2103 is vibrated or oscillated so water droplets 2104 jump above surface 2105. In one embodiment, water 2203 is vibrated or oscillated to create pressure region 2106 and pressure region 2107. The pressure at pressure region 2107 is such that it will not freeze a visible air bubble 2108 at pressure region 2107. In one embodiment of the present invention, a layer of ice is formed in the tray prior to vibration, oscillation, or air injection. An initial layer of ice to form prior to initiating vibration or oscillation prevents flash freezing of the ice or formation of a slurry.

[0078] FIG. 22 shows Ice cube 2200 having air molecules 2201 in alignment which causes crystallization 2204 in center 2203. The present invention is configured to disrupt the alignment as shown in ice cube 2202 to prevent crystallization 2204 in center 2206 of ice cube 2205 so only air molecules 2201 are in center 2207 of ice cube 2203 which is void of visible crystallization 2204 and void of visible air bubble 2208. Sidewall 2209 is substantially straight from top to bottom as is the top of the ice cube. Ice cube 2200 is frozen to height without having to vacuum water from the top of an uneven ice block. See citation CB300X2 Manual “excess water and impurities are removed from the top of the block . . .” and US Patent Publication No. 2022/0243971 to Harrell, “suitable devices to remove the excess water from the mold.”

[0079] FIG. 23 shows gang saw 2300 having blades 2301 that have over fourteen percent chromium or a high carbon content or made of a polymer. Blade 2304 is substantially horizontal and blade 2305 is substantially vertical to cut ice cube 2306 into pieces 2307 having a center that is void of visible crystallization and void of a freeze a visible bubble 2108 at point. Gangsaw 2302 has circular saws 2303. In one embodiment, Gangsaw 2300 is configured as a bandsaw. All saws are shown by way of example and not limitation as the present invention contemplates ways to cut small ice cubes

smoothly and all such saws fall into the scope of the present invention. Blade **2308** is configured substantially vertically.

[0080] All embodiment components in one figure herein are exchangeable with other embodiment components in another figure herein to form a separate embodiment. The present invention contemplates all ways to automate making transparent ice cubes, including but limited to conveyors, microprocessors, artificial intelligent, and all fall into the scope of the present invention.

[0081] This Detailed Brief of the Preferred Embodiments is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims or any part of the present inventions multiple embodiments disclosed or not disclosed.

What is claimed is:

1. A transparent ice cube making apparatus, comprising: a substantially round freezing surface; a cavity having water therein; a heated device inserted into said water; wherein said device is configured to spin said water in a circular motion against said freezing surface; wherein a superheat is configured between 10 degrees Fahrenheit and 40 degrees Fahrenheit; and said apparatus is further configured so an ice cube produced has a center that is void of visible crystallization and void of a visible air bubble.
2. A method to make a transparent ice cube, comprising the following steps in any order: providing a refrigeration system; setting a superheat between ten degrees Fahrenheit and forty degrees Fahrenheit; providing a mold having a sidewall made from a polymer where said polymer has a thermal conductivity of less than 1.2 watts per meter-kelvin; filling said mold with water; providing a vibrator or an oscillator; positioning said vibrator or said oscillator to vibrate or oscillate a refrigeration pipe where an amplitude intensity to water in said mold is such that a water droplet jumps above a top surface of said water to make a transparent ice cube having a center that is void of visible crystallization and that is void of a visible bubble.
3. The method of claim 2, further providing a lid to cover said mold where said lid is calibrated so heat goes through said lid to warm said top surface so said top surface does not freeze before water under said top surface freezes.
4. A transparent ice cube making apparatus, comprising: a refrigeration system having a refrigeration pipe, a moisture dryer, and an expansion valve; an ice mold configured to have four defined sidewalls; a vibration system or an oscillation system; wherein said apparatus is configured to provide substantially one directional freezing of water in said ice mold from a bottom position of said ice mold to a top position of said ice mold through a bottom wall of said ice mold; wherein said apparatus is configured to simultaneously vibrate or oscillate a segment of said refrigeration pipe and said ice mold and said water; and wherein a superheat is configured between 10 degrees Fahrenheit and 40 degrees Fahrenheit; and wherein said apparatus is further configured to make an ice cube that has a solid center comprised of an air molecule and said solid center is void of visible crystallization and void of a visible air bubble.
5. The apparatus of claim 4, further having a lid that covers said ice mold and said lid is configured to oppose the

output BTUs of said refrigeration system to allow heat to go through said lid to prevent a top surface of said water from freezing before water under said surface freezes.

6. The apparatus of claim 4, wherein said apparatus is further configured to provide over one-half pound of force for each pound of the total weight vibrated or oscillated.

7. The apparatus of claim 4, wherein said apparatus is further configured to provide an amplitude intensity to said water so water droplets jump at least one eighth of an inch above a top surface of said water and said amplitude intensity is low enough such that said top surface of said water does not freeze before water below said top surface freezes.

8. A transparent ice cube making apparatus, comprising: a refrigeration module configured to utilize a refrigerant having a boiling point of less than minus twenty degrees Fahrenheit and a superheat set between ten degrees Fahrenheit and forty-five degrees Fahrenheit; a refrigeration pipe secured between an upper plate and a lower plate where said upper plate has a thermal conductivity of over fifteen watts per meter-Kelvin; an ice mold;

a feature to move water in said ice mold;

wherein said apparatus is further configured to make an ice cube that has a solid center wherein said center is comprised of an air molecule and said center is void of visible crystallization and void of a visible air bubble; and a module configured having one or more gangsaws with a blade comprised of over fourteen percent chromium content to turn said ice cube into smaller ice cubes where said smaller ice cubes have a center void of visible crystallization and said center is further void of a visible air bubble.

9. The apparatus of claim 8, wherein said ice mold is made from a polymer comprised of less than three percent bisphenol A.

10. The apparatus of claim 8, wherein said blades are configured to have a speed between one thousand surface feet per minute and eight thousand surface feet per minute and further has two to six teeth per inch.

11. The apparatus of claim 8, further comprising a module configured having a blade positioned substantially horizontal and said blade is further configured to have over fourteen percent chromium content.

12. The apparatus of claim 8, wherein said ice mold is configured having four defined sidewalls made out of a thermoplastic polymer configured having a thermal conductivity of less than 0.55 watts per meter-Kelvin and a flexible bottom wall is configured to measure less than 0.070 inches thick.

13. The apparatus of claim 8, wherein said ice mold is configured to have four defined sidewalls made out of an inorganic polymer having a thermal conductivity of over 140 watts per meter-kelvin and said bottom wall is configured to flex and is configured to measure less than three quarters of an inch thick.

14. The apparatus of claim 8, wherein said ice mold is configured having a bottom wall made from a material having a thermal conductivity of over 200 watts per meter-Kelvin or from a material having over fourteen percent chromium and said ice mold further has sidewalls made from a polymer.

15. The apparatus of claim 8, further comprising a bin having four defined sidewalls where one of said sidewalls is configured to open to removed said ice cube.

16. The apparatus of claim 8, wherein said ice mold has a substantially level bottom wall where said wall is without creases and has a thickness of less than 0.070 inches.

17. The apparatus of claim 8, wherein said superheat is set between twenty-one degrees Fahrenheit and forty degrees Fahrenheit.

18. A method to make transparent ice cubes, comprising the following steps in any order:

- providing a refrigeration system configured to use a refrigerant having a boiling point of less than minus twenty degrees Fahrenheit;

- setting a superheat on said refrigeration system between fifteen degrees Fahrenheit and forty-five degrees Fahrenheit;

- providing a mold having a bottom wall made of either an inorganic polymer having a thermal conductivity over one 140 watts per meter-Kelvin and a thickness of less than three quarters of an inch or a mold made of a thermoplastic polymer having a thermal conductivity less than 0.55 watts per meter-kelvin and a thickness of less than 0.070 of an inch;

- providing a water movement system;

- configuring said mold and said refrigeration system and said water movement system so said water freezes substantially in one directional through said bottom wall of said mold to produce a large ice cube that has a center that is void of visible crystallization and said center is void of a visible bubble;

- providing a gangsaw having a blade with a chromium content of over fourteen percent and a tooth count of two to ten teeth per inch;

- cutting said large ice cube into smaller ice cubes where said smaller ice cubes have a center that is void of visible crystallization and said center is void of a visible bubble.

19. The method of claim 18, wherein said mold provided has four defined sidewalls.

20. A method to make transparent ice cubes, comprising the following steps in any order:

- providing a refrigeration system configured to use a refrigerant having a boiling point of less than minus twenty degrees Fahrenheit;

- setting a superheat on said refrigeration system between fifteen degrees Fahrenheit and forty-five degrees Fahrenheit;

- providing a mold having a bottom wall made of either an inorganic polymer having a thermal conductivity over one 140 watts per meter-Kelvin and a thickness of less than three quarters of an inch or a mold made of a thermoplastic polymer having a thermal conductivity less than 0.55 watts per meter-kelvin and a thickness of less than 0.070 of an inch;

- providing a water movement system;

- configuring said mold and said refrigeration system and said water movement system so water freezes substantially in one directional through said bottom wall of said mold to produce a large ice cube that has a center that is void of visible crystallization and said center is void of a visible bubble;

- providing either a concentrated air stream, or providing a concentrated water stream, or providing a tumbling device without cutting blades, or providing a jarring device, or providing a heated grid, to either cut said larger ice cube into smaller ice cubes or break said larger ice cube into smaller ice cubes without crushing said larger ice cube, where said smaller ice cubes have a center that is void of visible crystallization and said center is void of a visible bubble.

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