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2,545,558

ICE MAKING MACHINE

Filed June 26, 1947

2 Sheets-Sheet 1

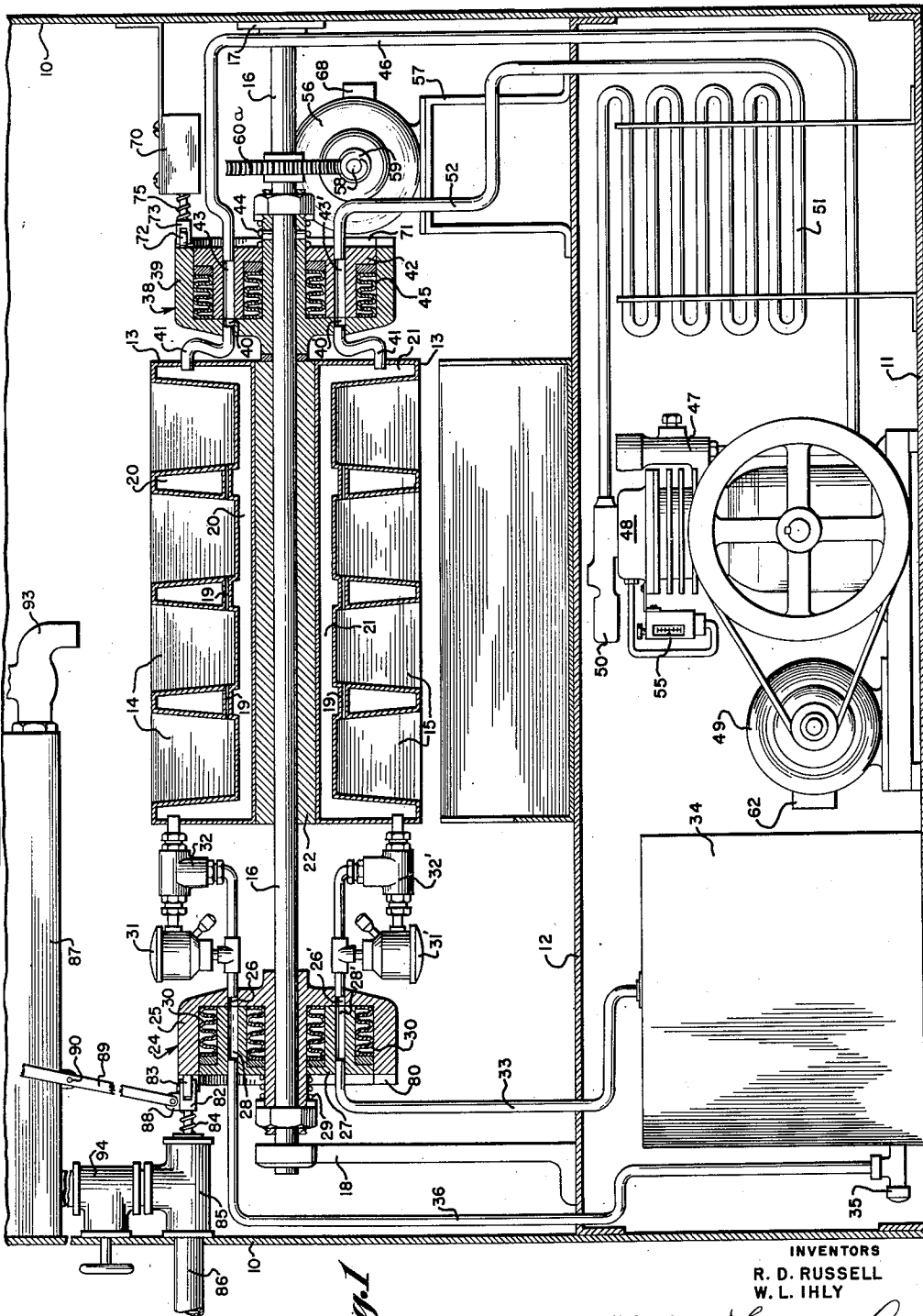


Fig. 1

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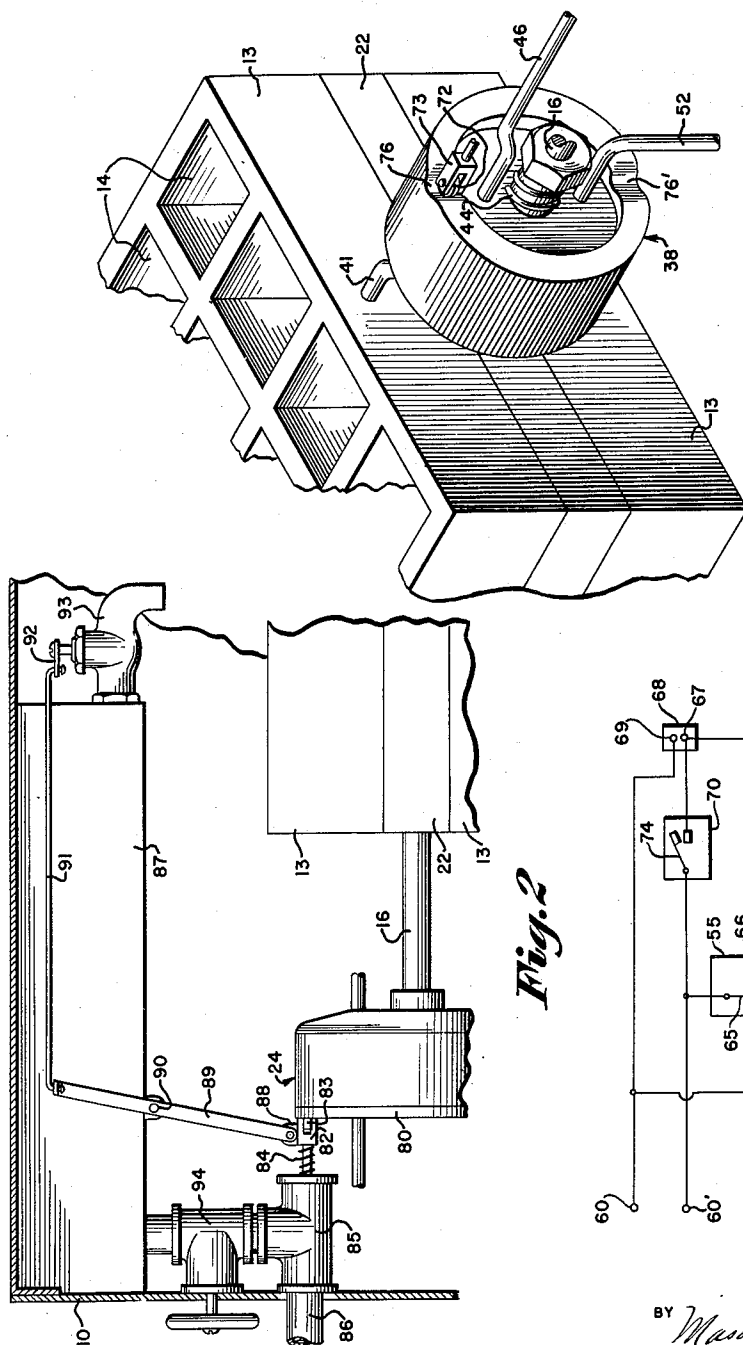


Fig. 2

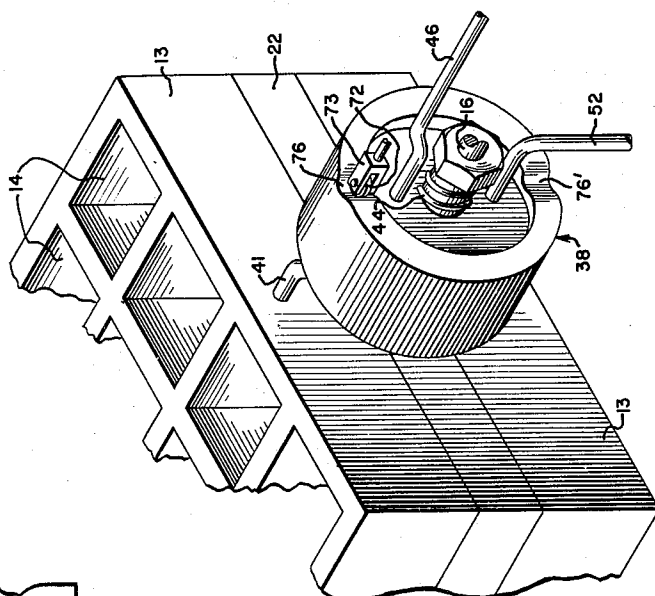


Fig. 3

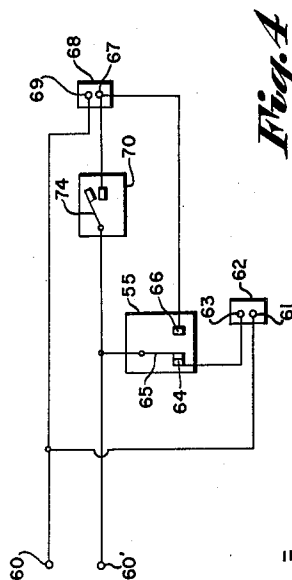


Fig. 4

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ICE MAKING MACHINE

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7 Claims. (Cl. 62—2)

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The present invention relates in general to automatic ice making machines, and more particularly to ice making machines of the type adapted to continuously produce and discharge ice cubes.

An object of the present invention is the provision of a novel device capable of producing ice cubes of desired size and shape continuously.

Another object of the present invention is the provision of a novel device capable of continuously producing ice cubes and automatically discharging the ice cubes when frozen.

Another object of the present invention is the provision of a novel automatic ice making machine characterized by greater economy of operation and fully automatic control of the functioning cycle.

Other objects, advantages and capabilities of the invention will become apparent from the following description, taken in conjunction with the accompanying drawings showing only a preferred embodiment of the invention, in which:

Figure 1 is a side elevation of an ice making machine embodying the present invention, shown partially in section and partially in elevation;

Figure 2 is a detail elevation of the control mechanism automatically effecting the refilling of the water receptacles;

Figure 3 is a perspective view of the centering disk and associated following mechanism controlling refilling of the receptacles and inversion of the receptacle housing member;

Figure 4 is a schematic diagram of the electrical control circuit for controlling the continuous automatic operation of the device.

The invention in general comprises a receptacle housing member mounted for movement about a horizontal axis through its center, a plurality of water receptacles disposed in the upper and lower surfaces of the receptacle housing member and opening in opposite directions, separate means associated with the receptacles in the upper and lower surfaces of the housing member for circulating a refrigerant about the receptacles, a conventional refrigerant compressor and condenser means supplying condensed refrigerant to the circulating means associated with the lower receptacles, the refrigerant in this circulating means being cooled by ice disposed in the lower receptacles while defrosting the receptacles sufficient to permit the ice to drop out of these receptacles, means conveying the refrigerant from the circulating means associated with the lower receptacles through expansion means into the circulating means associated with the upper receptacles, effecting freezing of water in the upper receptacles, and means conveying the refrigerant from the circulating means associated with the upper receptacles back to the compressor. Pressure control means are associated with the

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compressor and with drive means coupled to the receptacle housing member operative to invert the housing member when sufficient refrigerant has been circulated through the system to freeze the water in the upper receptacles, and reverse the coupling of the refrigerant to and from the housing, to convey the refrigerant from the condenser to the circulating means associated with the receptacles newly positioned in lower position and the expanded refrigerant to the upper receptacles. Means for controlling a source of water is likewise provided to refill the upper receptacles immediately upon inversion of the housing. By these means, water is continuously being frozen into ice cubes in the upper receptacles and ice cubes frozen during the previous cycle of operation are being defrosted in the downwardly opening lower receptacles to permit these cubes to free them selves from the receptacles.

The invention will be more fully understood from the following detail description of the embodiment of the invention shown in the drawings, in which like reference characters refer to corresponding parts throughout the drawings. Referring particularly to Figure 1 showing a side elevation of the ice making machine, a housing 10 is provided with a base 11 and a horizontal supporting plate 12 disposed above the base 11. A receptacle housing member 13, provided with a plurality of ice forming water receptacles 14 in one surface thereof and a second group of receptacles 15 mounted in the opposite surface of the housing member 13 and opening in the opposite direction, is mounted on a horizontal shaft 16 journaled at one end 17 in a side of the housing 10 and at the other in a supporting arm 18 mounted on supporting plate 12, such that the two groups of receptacles 14 and 15 are diametrically disposed relative to the shaft 16. The shaft 16 is mounted for rotation through progressive half-cycles to position the groups of receptacles 14 and 15 alternately in an upwardly opening position, by means later to be described. The receptacles of each group, as the receptacles 14, are intercoupled for the conveyance of water from each of the receptacles into its adjacent receptacle by a plurality of tubular channels 19 of relatively small diameter with their axes disposed mutually parallel in a horizontal plane. Associated with the groups of receptacles 14 and 15 are chambers 20 and 21, respectively, adapted to circulate a liquid refrigerant coupled thereto about the walls of the receptacles to effect cooling or defrosting of the water or ice in the receptacles. Insulation 22 is provided in the receptacle housing disposed between the inner walls of the circulating chambers 20, 21 and the shaft 16 and surrounding the shaft to prevent heat losses from the refrigerant to the shaft 16.

Laterally disposed from the receptacle housing

13 in coaxial relation with the shaft 16 is a double port reversible coupling means 24 comprising a substantially cylindrical shaped member 25 fixed to the shaft 16 to rotate in conjunction with the receptacle housing 13 and having a pair of diametrically opposed ports 26, 26' therein each associated with one group of receptacles 14, 15. Coaxially disposed within the recess formed by the cylindrical member 25 is a stationary substantially ring shaped member 27 having a pair of diametrically opposed apertures or ducts 28, 28' formed therein, the apertures 28, 28' being positioned to communicate alternately with the openings 26, 26' in the member 25 on rotation of the member 25 with the receptacle housing 13. Resilient means such as spring 29 is disposed against a surface of the stationary ring shaped member 27 to continuously urge the mouth of the apertures 28, 28' against the adjacent mouth of the ports 26, 26', and bellows-type sealing means 30 disposed between the adjacent sides of the ring member 27 and cylindrical member 25, to prevent escape of fluid from the coupling means.

The arrangement described above gives plate 27 somewhat of a floating action, the spring 29 yieldingly holding the plate against the member 25. If, particularly during the rotation of the receptacle housing 13 between freezing cycles, the pressure differential between input and outlet lines becomes too great, the plate will yield, compressing spring 29 and permit an equalization of pressures, the refrigerant passing from one line to the other through the annular passageway between the sealing bellows 30. Immediately upon lowering the differential pressures the spring will force the plate back upon its seat on the member 25.

Coupled between each of the ports 26, 26' in the cylindrical member 25 and the circulating chamber adjacent the group of receptacles, with which the port is associated, for example port 26 and circulating chamber 20 associated with receptacles 14, are expansion valves or capillary tubes 31, 31' of conventional type employed in refrigeration units, and by-pass or check valves 32, 32' adapted to by-pass the refrigerant past the expansion valves 31, 31' when the direction of flow of the refrigerant is from the circulating chamber 20, 21 to the coupling means 24. The apertures 28, 28' are coupled together through a pipe 33 coupling aperture 28' to a refrigerant collecting receptacle 34 mounted on the base 11, a receiver valve 35 and feed line 36 coupled to aperture 28, the receiver valve 35 being employed to control the flow of refrigerant through the system.

Positioned coaxially on the shaft 16 and laterally disposed from the receptacle housing 13 opposite the coupling means 24 is a second double port reversible coupling means 38 of identical construction to the coupling member 24, comprising a rotatable cylindrical shaped member 39 having a pair of diametrically opposed ports 40, 40' therein, each coupled through a pipe 41 to the circulating chamber 20, 21 adjacent its associated group of receptacles 14, 15, a stationary ring shaped member 42 having a diametrically opposed pair of apertures or ducts 43, 43' positioned to be reversibly coupled with the ports 40, 40' in cylindrical member 39, and spring 44 and bellows-type sealing means 45 disposed to insure sealing of the openings surrounding the adjacent portions of the ports 40, 40' and apertures 43, 43' to prevent leakage of refrigerant therefrom.

The upper aperture 43 in ring shaped member

42 is coupled through a suction line 46 and stop valve 47 to a reciprocating compressor 48 driven by an electric motor 49, both being mounted on the base 11. The compressed refrigerant is coupled from the cylinder of the compressor 48 through a compressor discharge stop valve 50, condenser coils 51, adapted to be cooled by either water or air, and discharge line 52 to the lower aperture 43' in the ring shaped coupling element 42. The compressor 48, stop valves 47 and 50, and condenser coils 51 may be of the type conventionally employed in domestic refrigerating units.

The path of the refrigerant through the above-described system is as follows. Starting from the collecting receptacle 34 containing a sufficient quantity of condensed and cooled liquid refrigerant to continuously supply the system, liquid refrigerant is forced, during operation of the compressor 48, through a receiver valve 35, known commercially as a "King" valve and controlling or regulating the normal rate of flow of refrigerant from the receptacle 34, into feed line 36 through which the refrigerant is conveyed into the upper aperture 28 of ring shaped element 27 of the reversible coupling means 24. The liquid refrigerant supplied to the upper aperture 28 is then coupled through the port 26 in cylindrical rotatable element 25 of reversible coupling means 24, when the receptacle housing 13 and associated reversible coupling means 24 and 38 are in the position shown in Figure 1, and expansion valve 31 associated therewith, by by-pass valve 32 and into the circulating chamber 20 adjacent the upwardly disposed receptacles 14, the expansion valve 31 being operative to check the flow of refrigerant through the feed line 36 sufficient to enable the compressor pump 48 to maintain sufficient pressure in the refrigerating system to keep the refrigerant in liquid form on the way to the expansion valve 31 and to produce expansion of the refrigerant as it is introduced into the circulating chamber 20 to absorb the large quantity of heat from the water in the receptacles 14 proportional to the heat of vaporization of the refrigerant employed. The expanded refrigerant in the circulating chamber 20, now substantially in gaseous state, is drawn through the suction line 41 and port 40 of cylindrical element 39 in reversible coupling means 38, aperture 43 of ring shaped element 42 aligned with the port 40, and into suction line 46 through which the refrigerant is conveyed into the cylinder of the compressor 48 through suction line stop valve 47. The relatively warm and gaseous refrigerant is compressed by the compressor 48 and pumped through compressor discharge stop valve 50 into condenser coils 51, the refrigerant being converted again into liquid state by the combined action of the compressor 48 and condenser 51. The liquid refrigerant is then conveyed from the condenser coils 51 through pipe 52 and associated lower aperture 43' in the ring shaped element 42 of coupling means 38, the port 40' aligned therewith, and coupling line 41 secured to the port 40', into the circulating chamber 21 adjacent the downwardly disposed receptacles 15. After the first half cycle, the downwardly disposed receptacles 15 immediately after inversion of the receptacle housing member 13, contain freshly frozen ice cubes, and passing the condensed liquid refrigerant through the circulating chamber 21 adjacent the ice cubes serves to defrost the receptacles 15 and ice cubes therein sufficient to permit the ice cubes to drop

out of the downwardly disposed receptacles from their own weight, the liquid refrigerant being operative, in the absence of expansion of the refrigerant into the circulating chamber through an expansion valve, to impart sufficient heat to the receptacles 15 to release the ice therefrom, and the refrigerant being further cooled by the ice in the receptacles 15. This cooled liquid refrigerant is conveyed from the lower circulating chamber through the by-pass valve 32' associated therewith to the port 26' of reversible coupling means 24, the by-pass valves 32, 32' as before described, being operative to convey the refrigerant past the expansion valves 31, 31' when the direction of flow of the refrigerant through this section is from the circulating chamber to the reversible coupling means. From the port 26' the refrigerant is conveyed through the aperture 28' of coupling means 24 aligned therewith and pipe 33 back to the collecting receptacle 34, thus completing the cycle of the refrigerant through the system.

Means are provided, controlled by a low pressure control switch 55 coupled to the compressor 48 and actuated by reduction of pressure in the return line 46 after sufficient refrigerant has been forced through the upper circulating chamber 20 to freeze the water in the upwardly disposed receptacles 14, to invert the receptacle housing member 13 and the rotatable cylindrical elements 25 and 39 of the reversible coupling means 24 and 38, and dispose the receptacles 14 containing the newly frozen ice cubes in a downwardly disposed relation, while the receptacles 15 from which the ice cubes frozen on the previous half-cycle have been released are disposed upwardly. This means comprises an electric motor 56 mounted on a supporting stand 57 on the supporting plate 12, the shaft 58 of the electric motor 56 having a worm 59 thereon engaging a worm gear 60a secured to the shaft 16 to drive the shaft 16 and the rotatable elements of the coupling means 24 and 38 and the receptacle housing member 13 through a half-cycle of rotation, on energizing of the electric control circuit shown in Figure 4 by the pressure control switch 55.

The preferred arrangement of the electric control circuit and ancillary control devices is shown in Figure 4, to which reference will be had together with Figure 1, in the following description. Terminals 60 and 60', coupled to a source of alternating current voltage, are provided, one of the terminals 60 being coupled directly to a terminal 61 on the control box 62 of compressor driving motor 49. The other terminal 63 of the control box 62 of compressor driving motor 49 is coupled to a contact 64 of the pressure control switch 55 on the compressor 48. The contact arm 65 of the switch 55 is electrically coupled with the other terminal 60' of the alternating current voltage source, and is normally maintained by the pressure at the low side of the compressor 48 in electrical contact with the contact 64 during freezing of the water in upper receptacles 14 to energize the motor 49 and drive the compressor 48. The control switch 55 is of the conventional low pressure type having a resiliently biased contact arm and means coupled from a diaphragm having one side exposed to vacuum and the other side to the pressure under test opposing the force of the biasing means, in this instance the contact arm 65 being normally biased into electrical contact with the contact 64 and the biasing force being overcome by normal pres-

ures in the return line 46 until the pressure drops due to decreased rate of evaporation of the refrigerant when the water in the upper receptacles becomes frozen. Contact 66 of the pressure control switch 55 is coupled to terminal 67 on control box 68 of electric motor 56 controlling the rotation of the shaft 16, while the other terminal 69 of the control box 68 is coupled directly to the terminal 60 of the alternating current voltage source. The terminal 67 of the control box 68 for electric motor 56 is also coupled to the terminal 60' of the voltage source through a centering switch 70 of the micro switch type, the switch 70 being normally maintained in open position. This is effected by means of a cam centering ring 71 mounted on the rotatable cylindrical element 39 of the reversible coupling means 38, shown in detail in Figure 3, and a cam follower, such as roller 72 mounted on a plunger 73 mechanically coupled to the contact arm 74 of the centering switch 70, the plunger being resiliently urged into extended position by suitable resilient means, such as coil spring 75. The centering ring 71 is provided with a pair of diametrically opposed recesses 75, 76' disposed so as to permit the plunger 73 to be urged outwardly of the switch 70 when the ports in the rotatable elements of the reversible coupling means 24 and 38 are accurately aligned with the apertures in the stationary elements of the coupling means 24 and 38, thus opening the switch 70.

Operation of the electrical control circuit is as follows: Assuming water in the upper receptacles 14 is in process of being frozen, thus that the pressure switch 55 is maintained in position with the contact arm 65 engaging contact 64, current from the terminals 60, 60' of the voltage source is supplied to the terminals 61 and 63 of electric motor 49, driving the compressor 48 and forcing the refrigerant through the system. The contact 66 of pressure switch 55 being open, and the centering switch 70 in open position with the plunger 73 in extended position in the recess 76 of the centering ring 71, no current is supplied the terminal 67 of the electric motor 56 and the receptacle housing 13 is maintained in one of its two alternative positions of orientation, with one group of the receptacles disposed in horizontal position. When the water in the upper receptacles freezes, the pressure in the return line 46 and at the low side of the compressor 48 is reduced due to the reduced evaporation of refrigerant and the contact arm 65 of the switch is moved into its normally biased position in contact with the contact 66 by the resilient means therein overcoming the refrigerant pressure coupled thereto, breaking the supply circuit to the compressor driving motor 49 and energizing the motor 56, to begin driving the shaft 16 and rotating the rotatable elements of the reversible coupling means 24 and 38 and the receptacle housing 13 through 180°, bringing the receptacles 15 in upwardly disposed position, and coupling circulating chamber 21 with the feed line 36 and suction line 46 previously coupled to the circulating chamber 20. To insure proper centering of the ports and apertures, since the pressure control switch 55 may be shifted prematurely and break the supply circuit of the shaft driving motor 56, the raised portion of centering ring 71 cams the plunger 73 of the micro switch 70 inwardly, closing the micro switch 70 and thus the by-pass circuit therethrough to the supply source terminal 60', by-passing the switch 55 and insuring that the supply circuit to the motor 56 is main-

tained closed until the ports and apertures in the coupling means 24 and 38 are properly aligned, as determined by the position of the recesses 76, 76' in the centering ring 71. During this inversion of the receptacle housing 13, the pressure at the low side of the compressor 48 again increases sufficiently for the contact arm 65 to overcome the bias normally urging it into contact with the contact 66, and again engages contact 64 to reenergize the compressor motor 49 to start another cycle of operation.

Referring now to Figures 1 and 2, means are provided to refill the upwardly disposed receptacles immediately upon inversion of the receptacle housing 13, comprising, a cam centering ring 80 mounted on the rotatable cylindrical element of the reversible coupling means 24, substantially identical to the centering ring 71 on coupling means 38, having a pair of recesses 81, 81' correspondingly positioned in the centering ring 80. A plunger 82 having a follower roller 83 riding on the centering ring 80, and resiliently urged thereagainst by spring 84, controls a valve 85 in the water supply line 86 coupled to a suitable supply of water and a receptacle tank 87 disposed on a side of the housing 10 and above the receptacle housing 13, the plunger 82 being operative on being cammed inwardly toward the valve 85 by the raised portion of the centering ring 80 during rotation of the shaft 16 in inverting the receptacle housing 13 to open the valve 85. Pivoted to a lug 88 on the plunger 82 is one end of a lever member 89, pivoted intermediate of its length to the tank 87, as at 90, and at its other end to a wire link 91, the wire link 91 being loosely secured to lever member 89 to provide some freedom of movement of the wire link 91 vertically as well as complete freedom of rotation of the wire link 91 in the horizontal plane. The other end of the wire link 91 is secured to an arm 92 controlling opening and closing of the valve of a faucet 93 mounted on the tank 87 and disposed above the receptacle housing 13 to direct water into one of the receptacles 14, 15 when disposed upwardly. The faucet valve and link are so related as to effect opening of the valve of the faucet 93 when the wire link 91 is drawn to the left, as shown in Figure 2, by counterclockwise rotation of the lever 89 on projection of the plunger 82 into one of the recesses 81, 81'. Thus, during rotation of the shaft 16, the plunger is cammed inwardly of the valve by the raised portion of the centering ring 80, opening the valve 85 in the water supply line 86 to admit a suitable quantity of water to the tank 87, the amount admitted being adjusted by a manual control valve 94 inserted in the supply line 86 between the valve 85 and tank 87 to just fill the upwardly disposed group of receptacles 14, 15. This movement of the plunger likewise pivots the lever 89 to close the valve on the faucet 93 through link 91 and arm 92, and prevent escape of water through the faucet 93 during rotation of the shaft 16. When the plunger 82 enters the recess 81, 81' on centering ring 80 on proper positioning of the receptacle housing 13, the valve 85 in the supply line 86 is again closed, and the valve of faucet 93 opened to direct the water metered into the tank 87 during rotation of the shaft 16 into the receptacle in receptacle housing 13 disposed therebelow.

In the cyclic operation of the device, starting from a point in time at which the group of receptacles 14 have just been brought into the upwardly disposed position shown in Figure 1 by rotation of the shaft 16 by the motor 56, the fau-

cet valve at 93 is opened by the plunger 83 entering one of the recesses 81, 81' in the centering ring 80, allowing the water metered into the tank 87 through valves 85 and 94 to flow into one of the receptacles 14 and through the interconnecting channels 19 into the other receptacles 14. At the same time, the motor 49 for the compressor 48 is re-energized, driving the compressor and forcing refrigerant through the circulating channel 21, where the ice cubes in the receptacles 15 frozen on the previous cycle are released from the receptacles 15 by the defrosting action of the refrigerant, while the refrigerant is cooled by the ice. The cooled refrigerant is conveyed through the collecting receptacle 34, receiver valve 35 and feed line 36 to the expansion valve 31, 31' coupled to the upper aperture 28 in the stationary ring element 27 of the double port coupling means 24, where the refrigerant is expanded through the circulating chamber 20 adjacent the receptacles 14 for a sufficient time to freeze the water in the receptacles 14, from whence it is conveyed through the suction line 46 back to the compressor 48. When the water in the receptacles 14 is frozen, the pressure control switch 55 coupled to the compressor is actuated, opening the supply circuit to the compressor driving motor 49, as above described, and closing the supply circuit to the shaft driving motor 56, energizing the shaft driving motor 56 to rotate the shaft 16 through 180°, this through the camming of the plunger 82 coupled to the contact arm 74 of the micro switch 70 by-passing the switch 55 closing the supply circuit of the motor 56 until the plunger 82 again contacts a recess 76, 76' in the centering ring 71, again opening the supply circuit to the motor 56. In the meantime, pressure control switch 55 has again been actuated to re-energize the compressor motor 49 and begin pumping the refrigerant through the refrigerating system. During the rotation of the shaft, the valve 85 in the water supply line 86 is opened by the camming of the plunger 82 by centering ring 80, permitting a metered amount of water to flow into the tank 87 sufficient to fill the receptacles 15 when brought into upwardly disposed position.

From the foregoing description, it will be apparent that a novel ice making machine has been provided which is fully automatic in operation, capable of continuously producing ice cubes of desired size and shape, and characterized by very economical operation by producing a marked cooling of the compressed and condensed refrigerant in passing the refrigerant past the receptacles in which ice remains from the previous cycle of operation, and by the same operation defrosting the downwardly disposed receptacles containing ice sufficient to release the ice cubes therefrom.

While I have particularly shown and described one particular embodiment of the invention, it is distinctly understood that the invention is not limited thereto, but that various modifications may be made therein without departing from the spirit and scope thereof, and it is desired, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and are set forth in the appended claims.

70 What is claimed is:

1. An automatic ice making machine comprising, a rotatable support provided with a plurality of circulation chambers, ice cube forming cells in heat exchange relation with each of said circulation chambers, the cells being arranged in

oppositely opening pairs relative to the axis of rotation of said support, means for rotating said support to bring said cells into upwardly opening position, refrigeration means, means for coupling warm liquid refrigerant therefrom to each chamber when the cells in heat exchange relation therewith open downwardly, means for conducting refrigerant from the chamber associated with the downwardly opening ice cube cells through expansion means to the chamber associated with upwardly opening cells.

2. An automatic ice making machine comprising, a rotatable support provided with a pair of chambers, an independent set of ice cube forming cells in heat exchange relation with each of said chambers, the cells of the first set opening in one direction and the cells of the other set opening in an opposite direction, means for rotating said support to dispose said sets of cells successively in upwardly opening position, means for coupling warm liquid refrigerant to each chamber when the cells in heat exchange relation therewith open downwardly, means for conducting refrigerant from the chamber associated with the downwardly opening ice cube cells through expansion means to the chamber associated with upwardly opening cells.

3. An automatic ice making machine comprising, a rotatable support provided with a pair of chambers, an independent set of ice cube forming cells in heat exchange relation with each of said chambers, the cells of the first set opening in one direction and the cells of the other set opening in an opposite direction, means for rotating said support to dispose said sets of cells successively in upwardly opening position, water supplying means overlying said support and means intercoupled therebetween to actuate said water supplying means upon rotation of a set of cells into upwardly opening position, refrigeration means, means for coupling warm liquid refrigerant therefrom to each chamber when the cells in heat exchange relation therewith open downwardly, means for conducting refrigerant from the chamber associated with the downwardly opening ice cube cells through expansion means to the chamber associated with upwardly opening cells.

4. An automatic ice making machine comprising, a rotatable support provided with a pair of chambers, an independent set of ice cube forming cells in heat exchange relation with each of said chambers, the cells of the first set opening in one direction and the cells of the other set opening in an opposite direction, means for rotating said support to dispose said sets of cells successively in upwardly opening position, water supplying means overlying said support and means intercoupled therebetween to actuate said water supplying means upon rotation of a set of cells into upwardly opening position, a refrigeration circuit comprising a refrigerant liquefying unit, means for conducting warm liquid refrigerant therefrom to each chamber when the cells in heat exchange relationship therewith open downwardly, refrigerant expansion means, means to conduct refrigerant from the chamber associated with the downwardly opening ice cube cells, through the expansion means to the other chamber and a suction line for returning expanded refrigerant to the liquefying means.

5. An automatic ice making machine comprising, a rotatable support mounted for rotation

about a horizontal axis and provided with a pair of chambers, an independent set of ice cube forming cells in heat exchange relation with each of said chambers, the cells of the first set opening in one direction and the cells of the other set opening in an opposite direction, means for rotating said support to dispose each of said sets of cells in upwardly open position, reversible double-port coupling means coupled with said support rotating means operative to supply a liquid refrigerant to the chamber in heat exchange relationship with downwardly opening cells to defrost the cells and release ice therefrom, second reversible port coupling means coupled with said support rotating means operative to circulate refrigerant from the chamber associated with downwardly opening cells through expansion means and into the chamber in heat exchange relationship with upwardly opening cells, said support rotating means having means responsive to refrigerant pressure to rotate said rotatable support and said reversible coupling means through a half cycle when sufficient refrigerant has been supplied the upwardly disposed cell to freeze water therein, and water supplying means overlying cells disposed in upwardly opening position and actuated by said rotating means to refill the upwardly open cells with water immediately upon disposition of a set of cells in upwardly open relation.

6. In an automatic ice making machine, the combination recited in claim 5, wherein the reversible double port coupling means supplying said refrigerant comprises a stationary, vertically disposed pair of refrigerant conveying ducts, the lower of which is coupled to a source of liquid refrigerant and the upper to a refrigerant suction line, and a rotatable pair of vertically spaced ports each coupled with one of the chambers in heat exchange relation with a set of cells and rotated in conjunction with said support to be aligned with the stationary ducts.

7. In an automatic ice making machine, the combination recited in claim 5 wherein the second reversible double port coupling means comprises a stationary, vertically disposed pair of refrigerant conveying ducts coupled together through refrigerant collecting means and flow regulation means, and a rotatable pair of vertically spaced ports each coupled with one of said chambers associated with said cells through expansion means and means operative to conduct refrigerant around said expansion means when the direction of flow of the refrigerant is away from said chambers, and means coupled between said rotatable ports and said rotating means to rotate said ports in conjunction with said support and align said ports with said stationary ducts.

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