July 29, 1941. W. H. KITTO 2,250,960

REFRIGERATION

Filed July 20, 1938 2 Sheets-Sheet 1

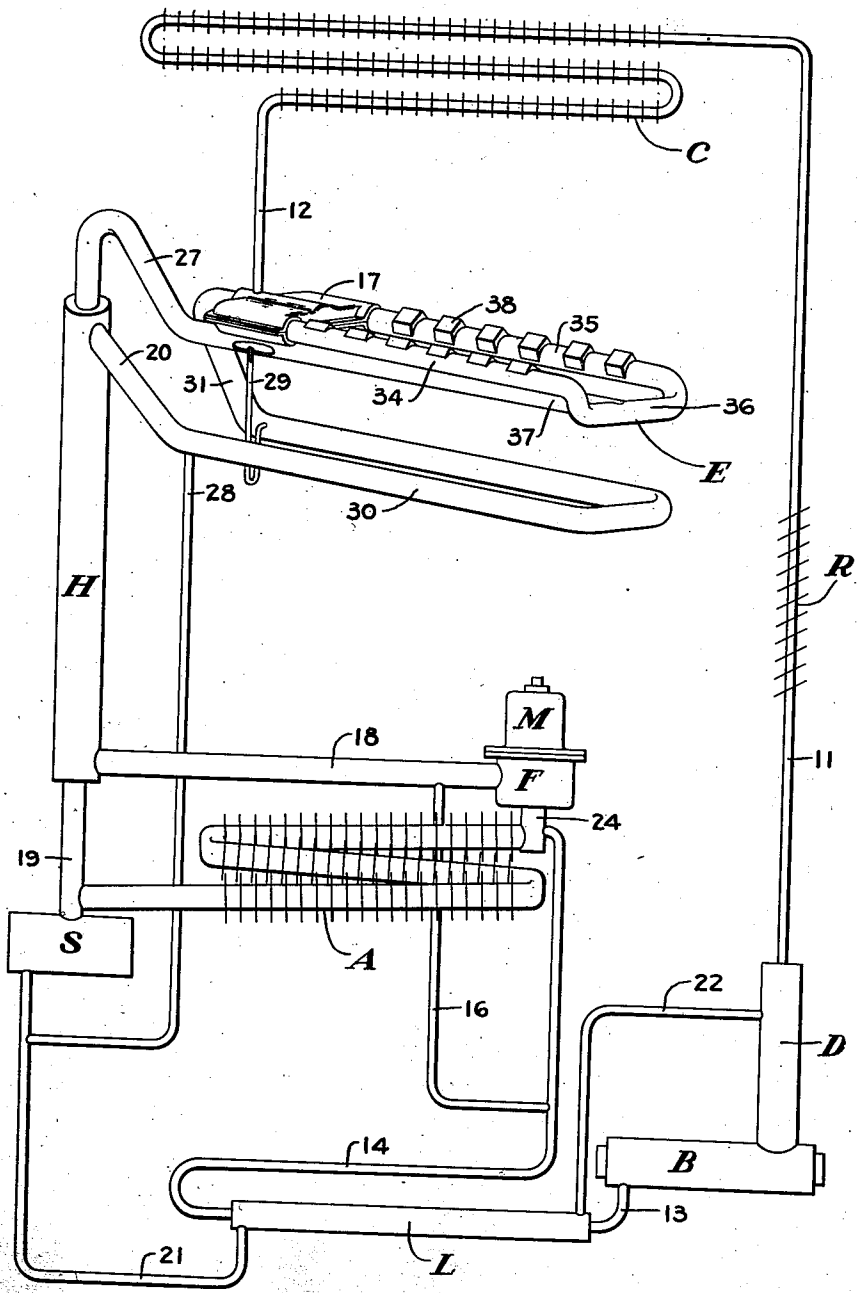


Fig. 1

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REFRIGERATION

Filed July 20, 1938 2 Sheets-Sheet 2

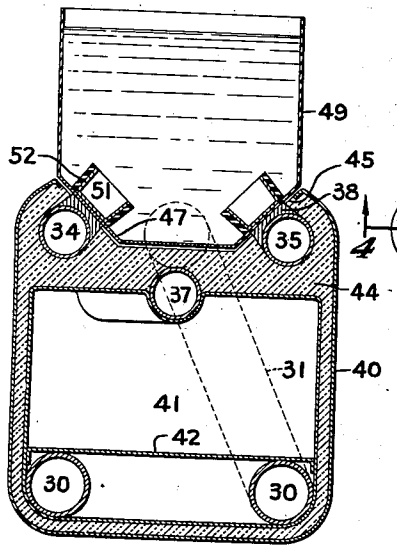


Fig. 2

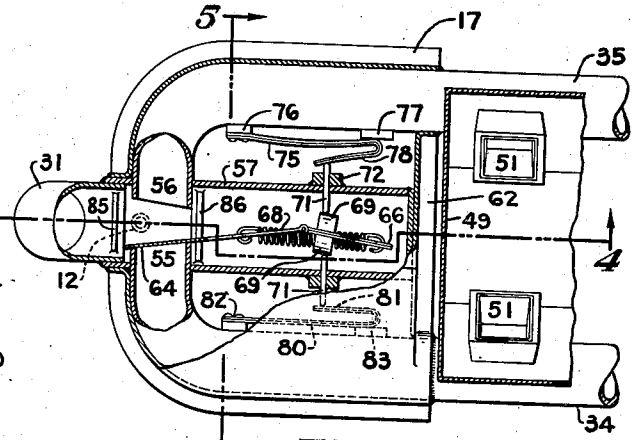


Fig. 3

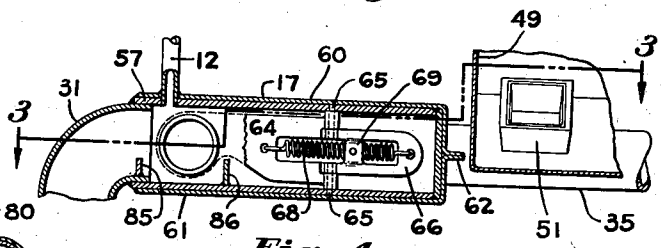


Fig. 4

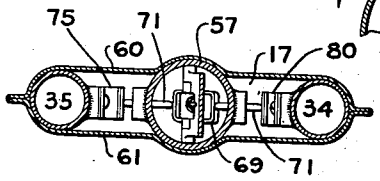


Fig. 5

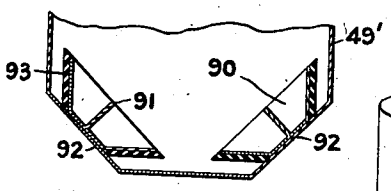


Fig. 6

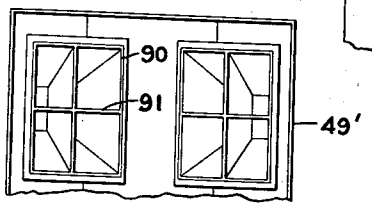


Fig. 7

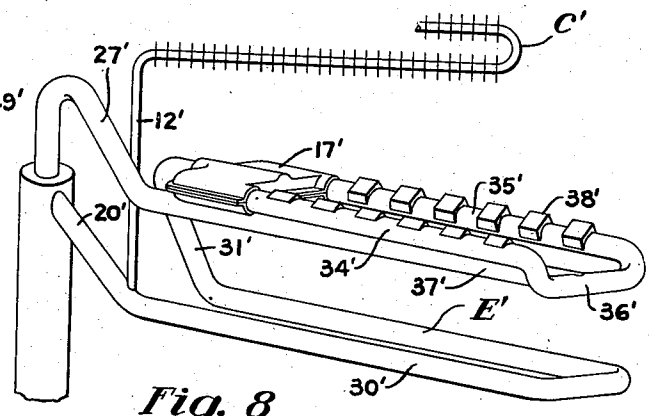


Fig. 8

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UNITED STATES PATENT OFFICE

2,250,960

REFRIGERATION

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Application July 20, 1938, Serial No. 220,193

15 Claims. (Cl. 62—5)

This invention relates to the art of refrigeration and more particularly to a novel control mechanism for a refrigerating system which will simultaneously control the path of flow of a plurality of fluids within the system to alter the refrigerating effect.

According to the invention there is provided a sealed high pressure refrigerating system including a plurality of evaporating sections and a diversion mechanism within the system which is operated automatically to cause refrigeration to be produced selectively in the various evaporator sections thereof.

It is a further object of the invention to provide a refrigerating system in which ice is continuously formed in portions of a tank of water which are in heat exchange relationship with various parts of the system. More specifically, it is an object of the invention to provide a system of the character above described in which ice blocks of a conventional size and shape are formed in the water compartment by isolating low temperature portions of such water and freezing such low temperature isolated portions of the water in a mould of a particular form.

It is a more specific object of the invention to provide a continuous three-fluid absorption refrigerating system with a plurality of evaporator conduits and a control mechanism housed within such evaporator which will automatically shift the supply of liquid refrigerant and the flow of pressure equalizing medium selectively to a particular part of the evaporator.

It is a further object of the invention to provide a refrigerating system of the type utilizing an inert pressure equalizing medium which includes a means sealed entirely within the system which is operative automatically to divert the path of flow of the liquid refrigerant and the inert gas in accordance with a predetermined condition existing outside said system without passing any element through the walls of such system.

Other objects and advantages of the invention will become apparent as the description proceeds when taken in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic representation of the invention illustrating the manner in which it is applied to a continuous three-fluid absorption refrigerating system.

Figure 2 is a sectional elevational view illustrating the evaporator and freezing tank in detail.

Figure 3 is a plan view, partly in section taken on the line 3—3 of Figure 4, illustrating the evaporator control mechanism.

Figure 4 is a sectional elevational view of Figure 3 taken along the lines 4—4 thereof.

Figure 5 is a transverse sectional elevation taken along the lines 5—5 of Figure 3.

Figure 6 is a sectional elevational view of a modified water tank structure.

Figure 7 is a plan view of the apparatus illustrated in Figure 6.

Figure 8 illustrates a modified evaporator structure.

The invention has been particularly designed for application to a continuous three-fluid absorption refrigerating system and it has been so illustrated, but the invention is not limited to the particular type of system disclosed as it may be applied to other types of systems.

Referring now to the drawings, and particularly to Figure 1 thereof, the refrigerating system comprises a boiler B, an analyzer D, an air-cooled rectifier R, an air-cooled condenser C, an evaporator E, a gas heat exchanger H, a tubular air-cooled absorber A, a solution reservoir S, a liquid heat exchanger L, and a circulating fan F which is driven by an electrical motor M. The above described elements are connected by a plurality of conduits to form a complete refrigerating system including a number of gas and liquid circuits to which reference will be made in more detail hereinafter.

The above described refrigerating system will be charged with a suitable refrigerant, such as ammonia, a suitable absorbent, such as water, and a suitable inert pressure equalizing medium, such as nitrogen.

The boiler B may be heated in any suitable manner as by a gas burner or an electrical cartridge heater. The circulating motor M and the heater for the burner may be controlled in any suitable or desired manner in order to maintain the refrigerating system within the desired temperature limits.

The application of heat to the boiler B liberates refrigerant vapor from the refrigerant absorption solution therein contained. The refrigerant vapor so liberated passes upwardly through the analyzer D in counterflow relationship to strong solution flowing downwardly therethrough. Further refrigerant vapor is generated in the analyzer, the heat of vaporization being supplied by the heat of condensation of absorption solution vapor which finds its way from the boiler into the analyzer. The refrigerant vapor is conducted from the upper portion of the analyzer D to the

upper portion of the tubular air-cooled condenser C by a conduit 11 which includes the air-cooled rectifier R. The rectifier causes condensation of any vapor of absorption solution which may pass through the analyzer. In the condenser C the refrigerant vapor is liquefied by heat exchange with cooling air. The refrigerant so liquefied is conveyed from the condenser through a conduit 12 into the diversion chamber 17 of the evaporator E, which will be described more fully hereinafter.

The weak solution formed in the boiler is conveyed therefrom through the conduit 13, the liquid heat exchanger L, and the conduit 14 to the upper portion of the inclined absorber A. It is apparent that the upper portion of the absorber is above the liquid level normally prevailing in the boiler-analyzer system wherefore some means must be utilized in order to elevate the liquid upwardly to the absorber. For this purpose a small bleed conduit 16 is connected between the discharge conduit 18 of the circulating fan F and the conduit 14 below the liquid level normally prevailing in the boiler-analyzer system, whereby the weak solution is elevated into the absorber by gas lift action. In the absorber the weak solution flows downwardly in counterflow relationship to an inert gas pressure equalizing medium flowing upwardly therethrough. The absorption solution absorbs the refrigerant vapor content of the mixture and the heat of absorption is rejected to the air flowing over the exterior of the absorber by the fins attached thereto. Strong solution is formed in the absorber by the absorption of refrigerant vapor. The strong solution is discharged into the bottom portion of a rich gas conduit 19 which communicates with the bottom portion of the absorber and opens into the solution reservoir S. From the solution reservoir S the rich solution is conveyed by a conduit 21, the liquid heat exchanger L, and a conduit 22 into the upper portion of the analyzer D, thus completing the absorption solution circuit.

The lean pressure equalizing medium formed in the absorber is conveyed from the upper end thereof to the suction inlet of the circulating fan F by a conduit 24. The inert gas is placed under pressure by the circulating fan and is conveyed through the conduit 18, the outer path of the gas heat exchanger H and a conduit 20 into the bottom portion of the evaporator E which will be described more fully hereinafter. For the present it is sufficient to note that the pressure equalizing medium flows through the evaporator in which it is brought into contact with liquid refrigerant discharged from the condenser. The liquid refrigerant evaporates into the pressure equalizing medium to produce refrigeration and the resulting strong rich mixture of pressure equalizing medium in refrigerant vapor is conveyed from the upper end of the evaporator through a conduit 27 into the gas heat exchanger H from which the rich gas is conveyed through the conduit 19 to the bottom portion of the absorber A. The rich mixture flows upwardly through the absorber A in counterflow relationship to the absorption solution in the manner described heretofore.

The chamber refrigerating coil 30 of the evaporator is drained into the strong solution return conduit 21 through a small drain conduit 28.

Referring now to Figures 1 and 2, the evaporator will be defined specifically. The lean gas inlet conduit 20 communicates with one end of a U-shaped fast-freezing coil 30 and the other end of the coil 30 communicates with an inclined rising conduit 31 which opens into the rear portion of the diversion chamber 17. The diversion chamber 17 communicates with a pair of spaced evaporator conduits 34 and 35 which are joined at their free ends by a cross connecting conduit 36. The conduit 36 communicates with a lower rearwardly extending conduit 37 which opens into the rich gas discharge conduit 27. The conduits 34 and 35 are each provided with a plurality of heat conducting freezing pads 38 formed on the upper inner surface thereof. It will be noted that the conduit 36 extends downwardly from the ends of the conduits 34 and 35 to the level of the conduit 37 and then across the front of the evaporator where the conduit 37 connects to its mid portion. The purpose of this will be explained hereinafter.

It is apparent from Figure 2 that the entire evaporator conduit structure is encased within an insulated housing 40 which includes an interior insulated freezing chamber 41. The U-shaped conduit 30 lies in the bottom portion of the chamber 41 and carries a shelf 42 which forms the bottom wall of the chamber 41. The conduit 37 extends along the top portion of the chamber 41 with which it is in heat transfer relationship. The conduits 34 and 35 are embedded in the insulation 44 in the top portion of the casing 40 with the freezing pads 38 extending slightly beyond the inclined sides of a trough-shaped channel 45 formed in the top portion of the insulation 44. The trough-shaped channel 45 is adapted to receive a similarly shaped bottom portion 47 of a water tank 49 which rests in the channel 45 against the projecting portions of the freezing pads 38. The water tank may be removed from the pads 38 by lifting the same upwardly therefrom or by sliding the same forwardly thereof, which is permitted by reason of the fact that the conduit 36 is bent downwardly so as not to interfere with forward movement of the tank 49.

Those portions of the tank 49 immediately in contact with the freezing pads 38 are provided interiorly thereof with heat conducting metallic cup shaped elements 51 having outwardly tapered side walls which form moulds for freezing ice cubes. The cups 51 are attached to the tank 49 in any manner which will provide a good thermal bond therebetween such as by welding or brazing. In order to prevent heat transfer between the cups 51 and the surrounding water, a body of insulating material 52, such as rubber, is fastened to the exterior surfaces of the side walls of the cups.

The rear or left hand ends, as viewed in Figure 3, of the conduits 34 and 35 turn inwardly and terminate in slightly tapered spaced inlets 55 and 56, respectively. A cylindrical valve housing 57 receives the end portions of the conduits 31, 34 and 35 and completely encases the inlets 55 and 56. The valve housing 57 and the end portions of the conduits 34 and 35 are encased within the diversion housing 17 which is constructed of a pair of complementary plate elements 60 and 61. The plates 60 and 61 entirely surround the end portions of the conduits 31, 34 and 35 and the valve chamber 57 and are welded or secured in any other suitable manner at their meeting edges. The forward edge 62 of the plates 60 and 61 forms a rear stop abutment for the tank 49 to insure that the cup elements 51 will all be positioned above the co-

operating freezing plugs 38 on the conduits 34 and 35.

A valve plate member 64 is pivotally mounted on a pair of stub pintles 65 which are secured in opposite sides of the valve chamber 57 and terminate in spaced relationship. The end portion of the valve plate 64 is rounded as illustrated and is adapted to seal the outlet portions of either of the conduits 34 and 35. A U-shaped actuating plate 66 is also mounted on the pintles 65 in the forward portion of the valve chamber 57. The plates 64 and 66 are each centrally cut out to form a receiving slot for a snap actuating spring 68 which is suitably attached to each of the elements 64 and 66. U-shaped strap elements 69 are mounted on each side of the plate 66 bridging the spring receiving slot therein. The elements 69 extend out a sufficient distance on each side of the plate 66 so as not to interfere with the spring 68 in any position thereof. The strap elements 69 each abut small pins 71 which are slidably mounted in opposite sides of the valve chamber 57. Small plugs 72 are suitably secured to the opposite side walls of the chamber 57 in order to provide bearing support for the pins 71.

A bi-metallic thermostatic element 75 is rigidly secured at 76 in any suitable manner to that portion of the conduit 35 mounted within the chamber 17 and rests against a heat conducting plug 77 on that portion of the conduit nearest the tank supporting part thereof. The bi-metallic thermostat 75 has a return bend portion 78 which abuts the free end of an associated pin 71. Similarly, a bi-metallic element 80 provided with a free end portion 81 abuts the end portion of its associated pin 71 and is rigidly attached to the conduit 34 at 82. The thermostat 80 abuts a heat conducting plug 83 which is attached to the conduit 34 adjacent the tank supporting portion thereof.

The liquid refrigerant supply conduit 12 opens into the chamber 17 between and above the end portions 55 and 56 of the conduits 34 and 35 and directly in front of the point of connection between the chamber 17 and the riser conduit 31. In order to prevent liquid refrigerant discharged through the conduit 12 from flowing downwardly through the conduit 31, a small dam 85 is mounted in the bottom portion thereof. Similarly, in order to prevent liquid refrigerant from flowing into that portion of the valve chamber 57 which houses the snap acting mechanism, a small dam 86 is erected across the entrance thereof. The height of the dams 85 and 86 is such that their upper portions extend above the bottom portion of the ends 55 and 56 of the evaporator conduits, thereby to insure that all liquid refrigerant discharged into the chamber 17 will flow into one or the other of these conduits. The valve plate 64 is cut away (Fig. 4) in order that it may freely ride over the upper portion of the dam 86.

The operation of this form of the invention will now be described. When the refrigerating system is energized, liquid refrigerant will discharge through the conduit 12 into the diversion chamber 17. Let it be assumed that the apparatus has just been placed in operation, wherefore both thermostatic elements 75 and 80 will be deformed to the position in which the thermostat 75 is illustrated in Figure 3, evidencing a demand for refrigeration. Under these conditions, both thermostatic elements are opposing each other wherefore the snap acting mechanism will be in one position or the other and the bias of spring 68 will be the only overbalancing force in the system. Assuming that the apparatus is in the position shown in Figure 3, the liquid refrigerant and inert gas will be unable to enter the end 55 of the conduit 34 for the reason that the same is blocked by the valve 64. Therefore, the liquid and gas flow only into the end 56 of the conduit 35. As the gas flows through this conduit in contact with the liquid, a portion of the liquid evaporates to produce refrigeration within the conduit 35. Refrigeration so produced rapidly lowers the temperature of that body of water encased within the cups 51 which are in heat transfer relationship with the pads 38 on the conduit 35.

The above described operation continues until such time as the cup 51 shall be substantially filled with ice whereupon the resistance to heat flow from the water tank 49 to the conduit 35 will have reached a high value and the temperature within the conduit 35 will drop to a very low value. When this low temperature value is reached, the thermostat 75 will straighten out and assume a position such as that in which the thermostat 80 is illustrated in Fig. 3. When this occurs, the already expanded thermostat 80 will actuate the valve 64 to position to close off the inlet end of the conduit 35 and to open the end of the conduit 34 to liquid and gas supply. The refrigerating effect will now be shifted to the conduit 34 and refrigeration will be produced therein and will freeze ice cubes in exactly the manner described in connection with the conduit 35. While ice is being produced in the cup 51 in heat transfer relationship with the conduit 34, the previously frozen ice cubes in the cup 51 in heat transfer relationship with the conduit 35 slowly melt free thereof and float to the surface of the water contained in the tank 49. This continues until the temperature of the conduit 35 has raised sufficiently high to cause the thermostat 75 again to flex substantially to the position shown in Figure 3. This flexing of the thermostat 75 will have no effect on the snap-acting mechanism if the thermostat 80 is also in its flexed condition, indicating that ice blocks of the predetermined size have not yet been formed in those portions of the tank 51 in heat transfer relationship with the conduit 34. However, when the ice blocks of the predetermined size have been formed in those portions of the tank 49 in heat transfer relationship with the conduit 34, the thermostat 80 will straighten to the position indicated in Figure 3 and the snap-acting mechanism will again be actuated to snap the valve 64 into the position shown in Figure 3 to again produce refrigeration in the conduit 35. This alternate production of refrigeration in the conduits 34 and 35 continues as long as the refrigerating system is operated.

Any liquid refrigerant not evaporated in the conduits 34 and 35 is drained therefrom into the conduit 37 and flows through that conduit to the rear end thereof. Some refrigeration is produced within the conduit 37 and is utilized to refrigerate the chamber 41 which is in heat exchange relationship with the conduit 37. The balance of the liquid refrigerant is drained from the gas outlet portion of the conduit 37 to the gas outlet portion of the fast-freezing conduit 30 through the drain 29. The liquid discharged into the conduit 30 flows therethrough by gravity counter to the inert gas stream flowing therethrough to produce refrigeration which will fur-

ther serve to refrigerate the low temperature storage and fast-freezing compartment 41. The low temperature of this compartment is assured by reason of the fact that the leanest gas is supplied thereto and also by reason of the fact that it is completely insulated.

The refrigerating compartment is cooled by the exposed walls of the tank 49 which have an extensive surface but which operate at a temperature above the freezing point of water. The air in the refrigerating compartment never contacts the evaporator which operates at a low temperature. By reason of this construction the refrigerating compartment is properly cooled but the humidity in that compartment is maintained at a reasonably high value to prevent objectionable de-hydration of foodstuffs stored therein.

If desired a suitable cover may be provided for the tank 49.

In Figures 6 and 7 there is illustrated a modification of the water tank structure. In this modification the water tank 49' is shaped exactly as before, but the cup elements 51 are replaced by ice freezing cups 90 which are interiorly divided by integral or thermally bonded cruciform grids 91 to form four ice mould compartments. The cups 90 and the grids 91 are preferably constructed from heat conducting material. The cruciform elements 91 are normal to the surface of the inclined portions 92 of the bottom of the tank 49'. The outer walls of the cup elements 90 taper outwardly from the facing walls of the cruciform grids 91. By reason of this construction each freezing cup forms four ice blocks and the tapered walls of each ice block permits the same to float freely away from the heat conducting walls of the ice mould when it has melted free thereof. The cup elements 90 are attached to the walls 92 with a good thermal bond similar to that mentioned in connection with the cups 51 in order that heat may be abstracted from the water contained within these cup elements through the cruciform grids 91 and through all walls of the cups 90. The exterior walls of the cups 90 are surrounded by a body of insulating material 93; for example, rubber. This tank is utilized exactly as is the tank 49 previously described. Though four ice compartments are illustrated in the cups 90, it is within the purview of the invention to alter the design of these cups to produce other numbers and shapes of ice blocks.

In Figure 8 there is illustrated a modified form of the evaporator. Those portions thereof which are identical with previously described elements are given the same reference characters primed. This evaporator is designed and intended to be utilized in the refrigerating system disclosed in Figure 1. This evaporator differs from the previously described evaporator principally because of the fact that the condenser C' discharges through the conduit 12' into the gas inlet conduit 20' of the evaporator. The evaporator conduits utilized to form the evaporator E' are much smaller in diameter than those utilized to form the evaporator E. By reason of this factor, the inert gas is propelled through the evaporator E' with a velocity very much greater than that prevailing in the evaporator E and the liquid refrigerant is swept through the evaporator conduit by the inert gas as it is evaporating thereinto. The path of the liquid refrigerant is as follows: Conduit 20', U-shaped conduit 30', riser conduit 31', diversion element 17', conduits 34' or 35' depending upon the action of the diverter 17', conduit 36', conduit 37'. Any liquid refrigerant not evaporated in the various evaporator conduits and any foreign matter which may find its way into the evaporator is simply swept therethrough, through the conduit 27' and through the gas heat exchanger into the strong absorption solution. A full explanation of the phenomena occurring in the evaporator E' will be found in the co-pending application of Curtis C. Coons and William H. Kitto. Serial No. 220,189 filed July 20, 1938. Due to the fact that the liquid refrigerant is led into the lowest portion of the evaporator, the condenser may extend substantially to the level thereof. This facilitates proper positioning of the evaporator in the cabinet and of the condenser in the usual cooling air flue.

The evaporator described in Figure 8 operates to produce refrigeration exactly as that described in connection with Figure 1 with the following exceptions: The evaporator of Figure 8 lowers the temperature of the fast-freezing compartment before any refrigeration is produced in the conduits 34' and 35'. In this modification the temperature within the insulated chamber 41 is very quickly reduced to a low value after which only sufficient liquid evaporates in the conduit 30' to supply the heat loss to the chamber 40, and the remainder of the liquid is swept up into the conduits 34' or 35', as the case may be, in which it then evaporates to freeze ice cubes in the moulds mounted in the water tank.

The above disclosed apparatus provides a refrigerating system adapted to produce ice in a selected one of a plurality of refrigerating zones under the control of a thermostatic mechanism which is completely sealed within the refrigerating system and responds accurately to thermal conditions and refrigeration demands prevailing outside the system. This mechanism operates equally well whether the evaporator be of the gravity type, in which event the liquid and gas flow counter to each other in certain portions of the evaporator and the liquid flows entirely by gravity, or of the type in which the liquid refrigerant is propelled through the evaporator by the inert gas stream.

In addition to the advantageous features above noted, the present system provides refrigeration for the food storage compartment under conditions which insure safe refrigeration of that compartment while maintaining the humidity thereof at a value sufficiently high to prevent objectionable dehydration of foodstuffs placed in the refrigerating compartment for preservation.

A particularly advantageous feature of the invention results from the fact that all portions of the evaporator are either encased in the insulation for the compartment 40 or are positioned within that compartment which is sealed from the air within the refrigerating compartment whereby it is impossible for the air within the refrigerating compartment to contact the low temperature evaporating elements and to deposit frost thereon. The combination of this feature and a high temperature box-cooling water tank completely eliminates the frost problem.

Ice is formed in the bottom portion of a body of water by surrounding a portion of such body of water of a predetermined shape with heat conducting walls which are in heat transfer relationship with a heat abstracting element and which are thermally insulated from the water not included within the surrounded body of water. This device provides a very convenient and effi-

cient method of forming ice blocks of a predetermined configuration within a large body of water. Additionally, the freezing process is accelerated by reason of the fact that there are large heat transfer surfaces in contact with the body of water to be frozen and an excellent heat transfer path is formed between large portions of the body of water to be frozen and the heat abstracting element. The arrangement of the freezing cups in the bottom of the tank 49 is advantageous because the cold water in the cups tends to sink thereinto whereby the water in contact with the ice freezing portions of the tank 49 does not flow away therefrom when chilled.

The capacity of the above described refrigerating system will normally be a function of the refrigerating demand. This results from the fact that the refrigerating system will be controlled in accordance with the temperature of the refrigerating compartment, but the frequency of cycling will increase during periods of warm weather and will decrease during periods of cool weather, wherefore the quantity of ice produced at any given time is a function of weather conditions. This is an advantageous regulating feature because it causes the machine automatically to produce a greater quantity of ice during seasons of the year when ice demand is highest.

While the invention has been illustrated and described in detail, it is not to be limited thereto but it may be embodied in other constructional forms and variations without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. Refrigerating apparatus comprising a plurality of evaporator sections, means for supplying liquid refrigerant and a pressure equalizing medium to said evaporator sections, and refrigeration demand responsive means for diverting the liquid refrigerant and pressure equalizing medium into a selected evaporator section.

2. Refrigerating apparatus comprising a plurality of evaporator sections, means for supplying liquid refrigerant and a pressure equalizing medium to said evaporator sections, and refrigeration demand responsive means for diverting the pressure equalizing medium into a selected evaporator section.

3. Refrigerating apparatus comprising a cooling medium supply means, a plurality of cooling units, a diversion element constructed and arranged to divert liquid refrigerant into a selected one of said cooling units, said diversion element being hermetically sealed within said refrigerating apparatus, and thermostatic means hermetically sealed within said apparatus for operating said diversion means.

4. An absorption refrigerating system of the type utilizing an inert pressure equalizing medium comprising means for supplying a liquid refrigerant, a plurality of evaporating elements in said refrigerating system, means for propelling an inert pressure equalizing medium through said evaporating elements, and means sealed within such system for diverting inert gas and liquid refrigerant into a selected one of said evaporating elements.

5. An evaporator comprising a plurality of spaced evaporating elements, a control chamber connected to each of said elements, means sealed within said chamber for controlling the operation of each of said elements, and means for supplying inert gas and liquid refrigerant to said chamber, said control means including thermostatic valve means for directing the flow of refrigerant liquid and inert gas to a selected evaporating element.

6. Absorption refrigerating apparatus comprising a solution circuit including a boiler and an absorber, a pressure equalizing medium circuit including an evaporator and said absorber, means for liquefying refrigerant vapor generated in said boiler and for supplying the refrigerant liquid to said evaporator, a water tank in heat exchange relationship with said evaporator at a plurality of points, and thermostatic control means sealed within said system for regulating the path of flow of inert gas and refrigerant liquid through said evaporator to restrict the production of refrigeration to selected portions of said tank in accordance with refrigeration demands.

7. Absorption refrigerating apparatus comprising a solution circuit including a boiler and an absorber, a pressure equalizing medium circuit including an evaporator and said absorber, said evaporator including a lower chamber refrigerating portion and an upper ice freezing portion, means for circulating pressure equalizing medium upwardly through said evaporator, means for condensing refrigerant vapor generated in said boiler to the liquid state and for supplying the liquid to the pressure equalizing medium inlet portion of said evaporator to be swept therethrough by said pressure equalizing medium as it is evaporating thereinto, and thermostatic control means sealed within said system for regulating the path of flow of inert gas and refrigerant liquid through said evaporator to restrict the production of refrigeration to selected portions of said tank in accordance with refrigeration demands.

8. An evaporator comprising a U-shaped conduit, heat conducting projections formed on both legs of said conduit, a housing encasing the free ends of said U-shaped conduit, means for supplying a pressure equalizing medium and refrigerant to said housing, valve means in said housing constructed and arranged to direct the pressure equalizing medium and refrigerant liquid into a selected leg of said U-shaped conduit, and a thermostat arranged to be actuated in response to the thermal condition of each leg of said U-shaped conduit for operating said valve means.

9. An evaporator comprising a U-shaped conduit, heat conducting projections formed on both legs of said conduit, a housing encasing the free ends of said U-shaped conduit, means for supplying a pressure equalizing medium and refrigerant to said housing, valve means in said housing constructed and arranged to direct the pressure equalizing medium and refrigerant liquid into a selected leg of said U-shaped conduit, and a pair of thermostats mounted within said housing for operating said valve means, each of said thermostats being arranged to be actuated in response to the thermal condition of an associated leg of said U-shaped conduit.

10. Refrigerating apparatus comprising a freezing chamber cooling unit, a pair of ice freezing cooling units serially connected to said freezing chamber cooling unit, means for propelling a pressure equalizing medium through said cooling units, means for supplying a cooling medium to said freezing chamber cooling unit, a control mechanism constructed and arranged to divert pressure equalizing medium and cooling medium into a selected ice freezing cooling unit, and means for draining cooling medium from each of

said ice freezing cooling units into said freezing chamber cooling unit.

11. Refrigerating apparatus comprising an evaporator including a space cooling section and a plurality of freezing sections each of which is connected to said space cooling section, a source of refrigerant including means for supplying refrigerant to said space cooling evaporator section, means for propelling an inert gas through said space cooling and freezing sections with a velocity sufficient to propel the refrigerant therethrough, and control means for preventing the inert gas and refrigerant from flowing through any but a selected one of said freezing sections.

12. In a device of the character described a container for water constructed of heat conducting material having a lower wall and an upstanding peripheral wall, a wall element projecting inwardly of one of the walls of said container and terminating below the top of said container to form the peripheral boundary of an ice moulding space included within the said container, and a layer of heat insulating material on the exterior face of said inwardly projecting wall element.

13. In combination a heat abstracting element, a container element for water constructed of heat conducting material having a lower wall and an upstanding peripheral wall, said elements being in heat exchange relationship and being so constructed and arranged as to cause the freezing effect to be localized at a predetermined area of one of said walls, a wall element projecting inwardly of the said predetermined area of said one wall to form the peripheral boundary of an ice moulding space included within said container element, the distance between the upper edge of said container and the upper edge of said inwardly projecting wall being sufficient to allow ice blocks frozen in said space to float freely in said container and free of said inwardly projecting wall when such ice blocks are melted free of the boundaries of said space.

14. An ice making device comprising a container for water constructed of heat conducting material having a lower wall and an upstanding peripheral wall, and a wall element projecting inwardly of one of the walls of said container and terminating below the top of said container to form the peripheral boundary of an ice moulding space included within the said container, said wall element and said plate element terminating below the top of said container a distance sufficient to allow ice frozen within said ice moulding space to float out of said space when such ice has melted free of the walls thereof.

15. An ice making device comprising a container for water constructed of heat conducting material having a lower wall and an upstanding peripheral wall, a wall element projecting inwardly of one of the walls of said container and terminating below the top of said container to form the peripheral boundary of an ice moulding space included within the said container, said wall element and said plate element terminating below the top of said container a distance sufficient to allow ice frozen within said ice moulds to float out of said moulds when such ice has melted free of the walls thereof.

WILLIAM H. KITTO.