

May 22, 1956

A. M. GALLO
ICE MAKING MACHINE

2,746,262

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2 Sheets-Sheet 1

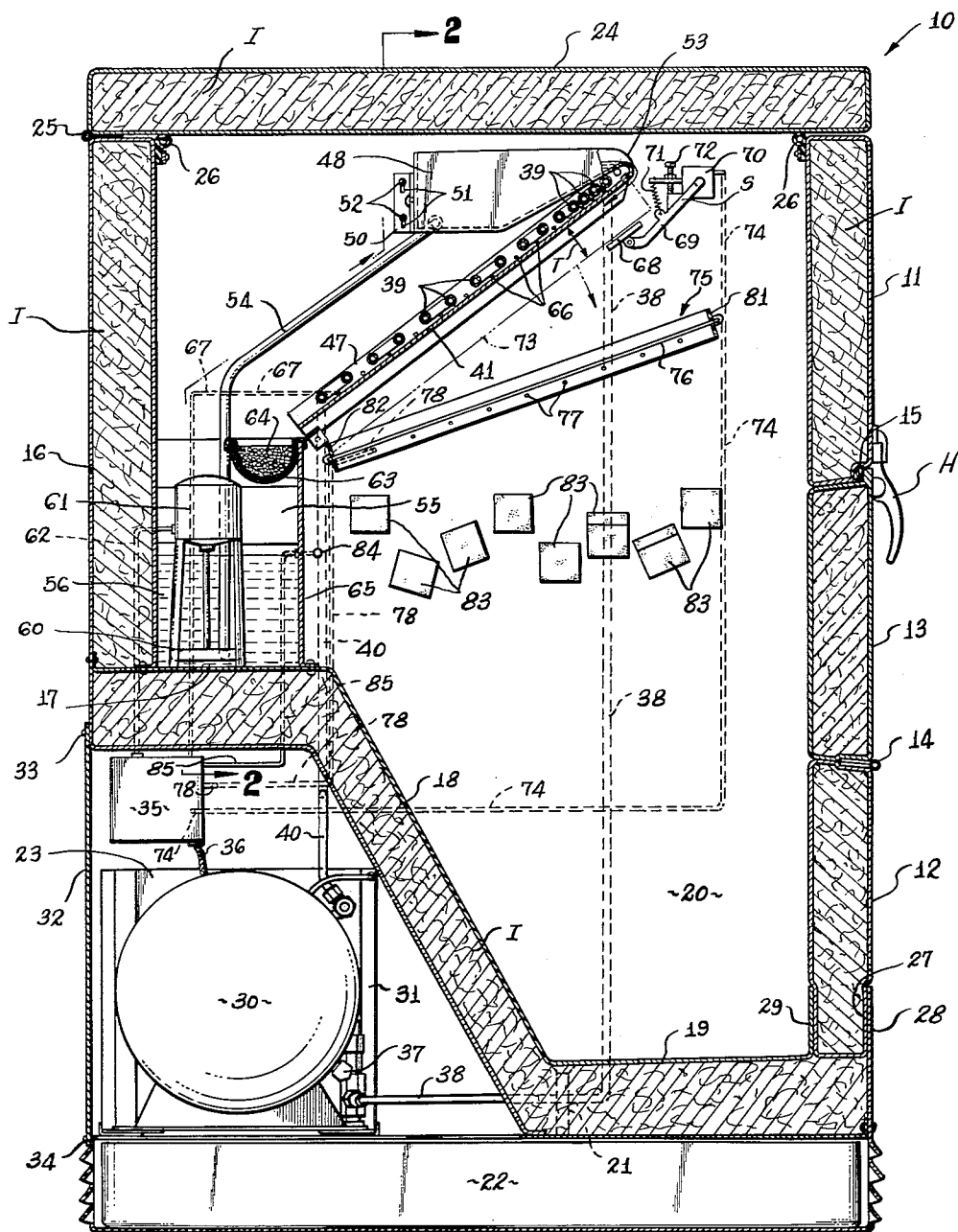


Fig. 1

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2 Sheets-Sheet 2

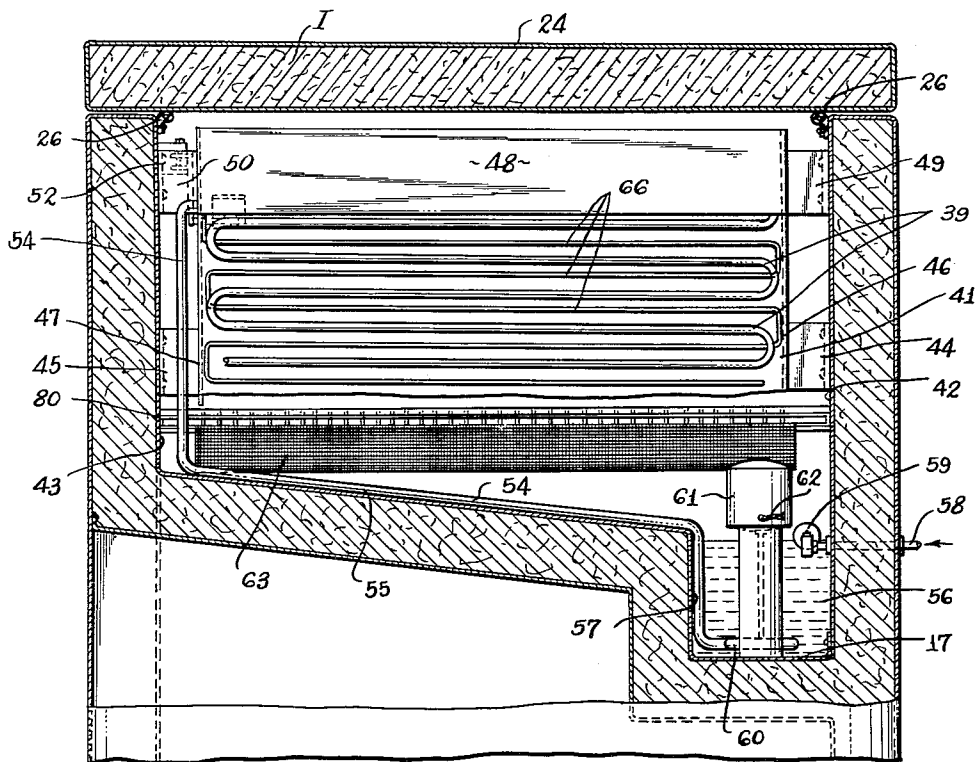


Fig. 2

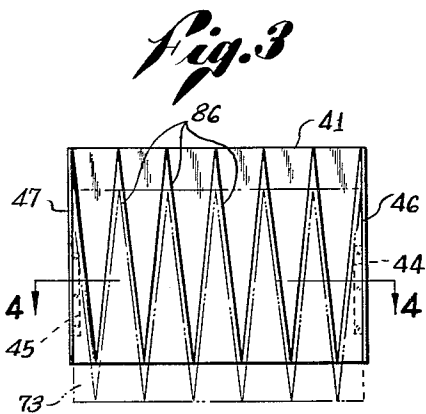


Fig. 3

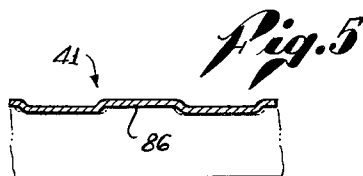


Fig. 5

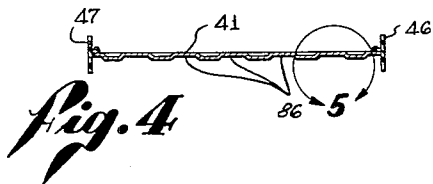


Fig. 4

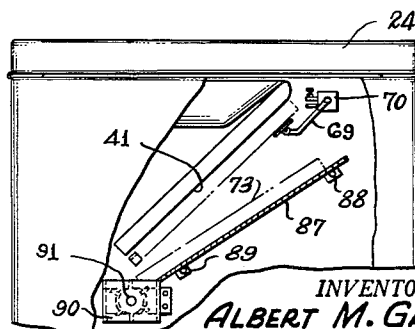


Fig. 6

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2,746,262

ICE MAKING MACHINE

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17 Claims. (Cl. 62—7)

This invention relates generally to apparatus for making ice cubes or chips and is particularly directed to an improved ice making machine for producing ice of great clarity and purity at low cost.

The use of ice cubes in beverages of various kinds has become so customary that substantially all purveyors of such beverages are obliged to serve the beverages iced in this fashion. The purchase and storage of ice cubes is an item of considerable expense, and for that reason, there has been developed a machine for making and storing ice cubes so that a purveyor of iced beverages may have a continuous and adequate supply of ice cubes without the necessity of arranging for the purchase and periodic delivery of such cubes. The use and operation of such machines, however, is attended by certain disadvantages.

In the first place, many of the present day icemaking machines do not always produce a uniform and clear ice cube. One of the reasons for this lack of uniformity and clarity is that small impurities in the water tend to become trapped in the ice during the freezing process. This deficiency may be partially overcome by avoiding the use of recirculating methods and continuously supplying only fresh water. Operating in this manner, however, is not only inefficient since the fresh water must be constantly refrigerated from an ambient temperature, but additionally, the amount of ice formed for the volume of water employed is small, and much of the water is therefore wasted. This latter problem becomes serious in areas where water is not readily available.

In the second place, such present day icemaking machines are usually bulky and expensive. Their use has thus been limited to relatively large establishments in which several hundred pounds of ice chips or cubes are required daily. In view of this required volume, the initial and routine maintenance expenses for such machines is easily justified. On the other hand, most of the smaller commercial enterprises do not require, nor do their operations warrant the expense of these machines, and oftentimes they lack the space required by such machines. In the past the smaller operators have been required either to purchase ice in the form of cakes and manually chip or chop ice as the need arises, or to pay a premium for ice cubes or cracked ice purchased from a manufacturer thereof.

While the invention is best suited for use in relatively small restaurants, motels, drug stores and the like, and has been designed primarily with these uses in mind, it is to be understood that certain novel features are applicable to any size of machine.

A general object of the present invention, accordingly, is the provision of a relatively small sized and inexpensive icemaking machine for making ice cubes and cracked ice.

In this connection, a further object is to provide a high efficiency machine requiring a minimum amount of space and maintenance, but of such design that all working parts

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thereof are easily accessible in the event repairs are necessary.

A more particular object of the present invention is to provide an icemaking machine of the character set forth hereinabove which incorporates in combination with a recirculating water system certain novel features resulting in more uniform and clearer ice cubes or chips than have heretofore been available, and in which substantially all water used by the machine is converted into pure ice.

Briefly, these and additional objects and advantages of the present invention are attained by providing a cabinet including an insulated housing with a centrally located door in its front wall. The lower front wall panelling is manually removable to provide additional access to the lower ice storing region or bin in the interior of the housing. In the upper region of the housing there is provided a large ice forming plate member supported at an inclination to the vertical between the opposite side walls of the housing. The top of the housing is preferably hinged at its rear edge to provide easy access to this structure. Distributed over the top side of the ice forming plate are a plurality of evaporator coils forming part of a conventional expansion type refrigerating apparatus, the bulk of which is disposed in the lower rear region of the cabinet outside the housing behind the storage bin.

Rear and floor portions of the insulated housing are formed with sloping walls and small horizontal and vertical sections to accommodate within the cabinet the refrigerating apparatus. A removable lower rear wall panel section provides easy access to this space. The sloping wall and floor arrangement also serves to define a water reservoir in the housing adjacent the lower edge of the inclined ice forming plate.

In accordance with an important feature of the invention, water is pumped from the reservoir to a trough structure adjacent the top edge of the inclined plate and is caused to flow in a thin film down the underside surface thereof, this film building up into an ice slab. A filter is positioned between the lower plate edge and reservoir for removing impurities from excess water flow before the water is recirculated to the trough. A float control valve maintains a substantially constant water level in the reservoir.

Beneath the ice forming plate member there is provided a grid of heated wires dimensioned to receive the slab and cut the same into cubes which drop into the storage bin. Alternatively, a comminuting mechanism may be employed to crush or crack the ice into small chips which collect in the same bin. Suitable means automatically responsive to the quantity of ice formed on the plate is provided for releasing the slab and permitting it to fall on the grid or comminuting mechanism as the case may be. Further means automatically responsive to the amount of ice in the storage bin is also incorporated for shutting down the complete system when this amount has reached a predetermined value.

A better understanding of the invention and its various advantages and features will be had by referring to the following detailed description and accompanying drawings, wherein:

Figure 1 is a view in vertical longitudinal section of one embodiment of the icemaking machine of the present invention;

Figure 2 is a cross-section of the upper region of the machine taken in the direction of the arrows 2—2 of Figure 1;

Figure 3 is a plan view illustrating on a reduced scale the ice forming plate used in the machine of Figures 1 and 2;

Figure 4 is a cross-section of the plate taken in the direction of the arrows 4—4 of Figure 3;

Figure 5 is an enlarged view of that portion of the plate enclosed by the circular arrow 5 of Figure 4; and

Figure 6 illustrates a modified form of the invention which includes a comminuting apparatus instead of the cube forming grid employed in the embodiment of Figures 1 and 2.

Referring to Figure 1, the icemaking machine is designated generally by the numeral 10 and is preferably constructed in the form of a cabinet of suitable size to fit conveniently in a small kitchen or under a service counter. As shown, the main portion of the cabinet comprises an insulated housing having an upper front wall section 11, lower front wall section 12, and a centrally located door 13. Door 13 is preferably hinged to the upper edge of the lower wall section 12 as at 14 so that it may swing downwardly about a horizontal axis. A handle latch mechanism H and sealing gasket 15 about the periphery of the door opening maintain an insulated seal when the door is in closed position.

The back of the insulated housing is closed by a rear half wall section 16, an inwardly extending horizontal wall section 17, inwardly and downwardly sloping section 18, and floor section 19. The sloping section 18 and floor section 19 together with the lower front wall section 12 define an ice storage bin 20. A drain or outlet pipe 21 leads through a bottom compartment housing a drip pan 22.

The top of the insulated housing is closed by an insulated cover section 24 hinged to the rear wall section 16 as at 25 and suitably sealed in closed position by annular sealing gasket 26. The various wall sections described thus far are preferably of double panel construction incorporating insulating material I between the panels. Preferably, the lower front wall section 12 is provided with a narrowed thickness at its lower end as at 27, and is adapted to telescope between panel walls 28 and 29 extending upwardly from the front end of the floor section 19. This arrangement permits the entire lower front wall portion of the insulated housing to be removed, if desired, by simply opening the door 13 and lifting out the wall section 12. Ordinarily, sufficient access to the bin is afforded by the door 13.

Within the cabinet, but below and to the rear of the insulated housing wall sections 17 and 18, there is mounted a refrigeration unit 30 including a condenser 23 forming part of a conventional gas expansion type refrigerating apparatus 31. Access to this apparatus is had through a removable lower rear panel 32 normally secured in position by screws 33 and 34. Also housed within this space is a control box 35 operatively connected to the unit 30 through a cable 36, and serving to control the functioning of the apparatus as hereinafter described.

Refrigerant in the gaseous phase is compressed by the unit 30 and passed to the condenser 23 through a conduit 37. The compressed gas is then cooled by air circulation and thus liquefied passes through condenser outlet tube 38 to the upper region of the insulated housing terminating in a suitable expansion valve (not shown) feeding into a plurality of evaporatory coils 39. In place of an expansion valve, a capillary tube type refrigerating apparatus may be employed. From coils 38 the refrigerant is returned to unit 30 through a return conduit 40, all as is well known in the art.

In accordance with an important feature of the invention, the evaporator coils are distributed adjacent the top side of an ice forming plate member 41 to cool the plate 41 sufficiently to freeze any water brought into contact with the plate. As shown clearly in Figure 1, plate member 41 is inclined with respect to the vertical and, if desired, the distribution of the evaporator coils may be more dense towards the upper end of the top side of the plate than the lower. The purpose for this uneven arrangement of coils will become clearer as the description proceeds.

Referring to Figure 2, it will be seen that plate member

41 extends substantially completely across the upper region of the insulated housing and is adequately supported between the opposite side walls 42 and 43 thereof by means of brackets 44 and 45, respectively. Plate member 41 is preferably provided with plastic side flanges 46 and 47 to which the brackets may be secured. These side flanges also serve as a guide for the ice slab which is formed on the underside of the plate as explained hereinafter.

Adjacent the upper edge of the plate member 41, there is provided an elongated overflow trough 48 secured in position to the side walls 42 and 43 by brackets 49 and 50. Referring again to Figure 1, the bracket 50 is provided with elongated securing slots for receiving screws 52 whereby the vertical position of the bracket may be adjusted. This arrangement permits proper leveling of the overflow trough. The front edge of the overflow trough terminates in a front spill lip 53, curved over to meet the upper edge of the underside of plate member 41 tangentially.

Water is supplied to the overflow trough through a pipe 54 extending from the side of the trough adjacent side wall 43 (Figure 2) and passing down a sloping wall section 55 into a water reservoir 56. The reservoir 56 is defined in part by a short vertical wall section 57 forming a continuance of wall 55, the horizontal wall portion 17, a portion of the side wall 42, and a portion of the rear wall 16. The water in reservoir 56 is maintained at a substantially constant level by an inlet water supply pipe 58 and a float controlled valve 59. Water is pumped up to the overflow trough through pipe 54 by means of a suitable pump 60 driven by a motor 61 connected to the control box 35 through cable connection 62.

The physical arrangement described thus far is such that the top of the water reservoir 56 is disposed adjacent the lower edge of the inclined plate member 41. Between this lower edge and the reservoir there is positioned an elongated filter comprising a suitable trough shaped screen 63 filled with water treating material and filtering gravel 64 for removing impurities from the water passing there-through. This filter may be removably supported by a front panel wall 65 of the reservoir.

When the pump 60 is operated, the trough 48 is filled to overflowing and the water circulated by the pump flows over the surface of the spill lip 53 as a thin film. This film of water flows forwardly and downwardly and then rearwardly and downwardly along the surface of the spill lip 53 and along the under surface of the freezing plate 41, the small thickness of the film and the surface tension effects causing the water to follow the course described. As the water flows along the under surface of the plate 41, it is cooled thereby and a part of the water congeals and adheres to the plate as a film of ice. As the operation proceeds, this film of ice grows in thickness until a slab of ice of substantial thickness is formed.

Normally, a slab of uniform thickness will build up on the plate. In the event, however, that the thickness is not uniform, it may be desirable to employ an uneven distribution of coils as previously mentioned. This uneven distribution will cause the upper portion of the ice forming under surface of the plate to be colder than the lower portion. Water overflowing from the spill lip 53 and running down the underside of the plate will accordingly be subjected to a greater degree of refrigeration during its initial course of travel than subsequently. But by the time the water film has reached the lower regions of the under surface, it has already been cooled to the extent that very little additional refrigeration is necessary to freeze it. The temperature gradient produced by this particular coil distribution is such that a slab of ice of substantially uniform thickness will build up on the underside of the plate. It is found in normal circumstances, however, that a uniform coil distribution and thus uniform refrigeration of the plate results in a substantially uniform ice slab thickness notwithstanding the above.

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This is because the water film is so thin that it is frozen extremely quickly, additional water rolling over the frozen portion.

When the ice slab on plate 41 has attained a given predetermined thickness, it may be released therefrom by shutting off the refrigerating apparatus, the weight of the slab being sufficient to separate it from the plate. Another method is by temporarily heating the under surface of the plate. In this latter method such heating may be accomplished by means of heating wires or coils 66 distributed immediately adjacent the top side of the plate. These wires are connected to a suitable source of power through leads 67 running to the control box 35, as shown in Figure 1.

Energization of wires 66 is controlled by a temperature responsive element 68 normally positioned adjacent the front upper portion of the ice forming plate 41. This element is mounted on an arm 69 pivotally supported by a bracket 70 and biased against a shoulder stop S by means of a spring 71 and is connected to the control box 35 by leads 74. The position of the stop S may be adjusted by the adjustable mounting screw 72 to dispose the thermal element 68 a predetermined distance from the front under surface of the ice forming plate 41. When a slab of ice 73 has been built up to the desired thickness T, its proximity to the thermal element 68 will actuate the same to thereby energize the heating coil 66 through leads 67 connected between the control box 35 and the heating coil 66. Heating of the plate 41 melts the inner surface of the ice slab 73 and permits the slab to separate from this surface.

Normally the weight of the slab is sufficient to separate it from the plate. In the event that the ice slab 73 adheres to the underside of the plate member 41 as a result of atmospheric pressure, however, the air seal between the slab and this under surface may effectively be broken by providing the under surface with a plurality of suitably shaped shallow channels 86 (Figure 3). These channels increase in width from the top towards the bottom as shown. If desired, the shallow channels may be formed by suitable shaping of the plate itself by means of a stamping operation imparting to the plate a series of angulated bends as illustrated in the cross-sectional views of Figures 4 and 5.

When the slab of ice 73 is freed from the plate by the heating thereof, the slab will tend to slide down the under surface as indicated in phantom lines in Figure 3. This sliding under its own weight separates the top edge of the inner surface of the slab from the mating apex portions of the channels 86, thereby breaking the air seal and permitting the slab to fall.

The pivotal support for the thermal element 68 afforded by the arm 69 allows the element 68 to be pushed aside by the falling slab 73. After the slab 73 has passed, the spring 71 swings the arm 69 up to the normal operative position shown in Figure 1. The resulting relative proximity of the element 68 to the relatively warm plate 41 causes immediate actuation of the thermal element 68 to de-energize the heating coils 66 through conduit 74 and restore the normal icemaking conditions of operation.

When the slab 73 falls as described, it is caught by a grid structure, designated generally by the numeral 75, positioned beneath the inclined plate 41 as illustrated in Figure 1. This grid comprises two spaced groups of parallel wires 76 and 77, preferably arranged at right angles to each other to form an array of small squares when viewed normally. The grid wires themselves are preferably maintained continuously in a heated condition through leads 78 connected in the control box 35 to a suitable source of electrical energy. As shown in Figure 2, the sides of the grid structure are provided with suitable flanges 79 and 80 secured to the side walls 42 and 43 of the insulated housing, respectively. These side flanges are connected by front and rear flanges 81 and 82 (Figure 1) whereby a rectangular box-like cavity is defined for

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receiving the ice slab 73 and properly guiding the same as it is cut into small cubes 83 on passing through the grid.

At a specified level above the floor of the ice cube receiving bin 20 there is provided a second thermally responsive element 84. In Figure 1, this element is positioned in the front reservoir panel 65 and is operatively connected to control box 35 through leads 85. When the bin 20 is filled up to a level approaching the position of thermal element 84, the proximity of the ice will actuate this element to shut off the refrigerating apparatus.

In Figure 6 there is shown an alternative structure which may be used instead of the grid structure 75 of Figure 1. This embodiment of the invention is useful when it is desired to form ice chips rather than cubes. As shown in Figure 6, there is provided an ice slab receiving tray 87 secured to opposite inner walls of the insulated housing as at 88 and 89. This tray is inclined to guide the ice slab 73 into a comminuting hopper 90 in which a chopper or grinder structure 91 is continuously rotated for breaking the slab into chips. The comminuting mechanism may be energized and controlled from suitable leads connected to the control box 35 in the same manner that energy is supplied and controlled to the grid wires 76 and 77 through leads 78 in Figure 1.

The operation of the ice-making machine will be clear from the above description. Water in the reservoir 56 is maintained at a substantially constant level by supply inlet 58 and the float controlled valve 59. This water is pumped into the overflow trough 48 through conduit 54 at a substantially constant rate by the pump 61. The water will thus spill over the front spill lip 53 in a constant flow, and due to the smoothly curved surface of this lip and the level positioning of the trough, will run down the underside of the plate 41 in a smooth film of uniform thickness. This film adheres to the under surface of the plate by surface tension. The side guide flanges 46 and 47 of the plate, however, are preferably of a plastic material and have no cohesive attraction to the water. Thus, the edges of the water film are smoothly guided throughout the distance of the plate from top to bottom.

The refrigerating apparatus is operated simultaneously with the pump, and serves to maintain the interior of the insulated housing at a temperature well below freezing. Although the water entering the reservoir is at an outside ambient temperature, it enters relatively slowly and is mixed with a relatively large volume of water which has been cooled substantially to the freezing point by circulation over the plate 41. Thus, in normal operation, the water which flows down the underside of the plate 41 has been cooled to substantially freezing temperature and all that remains is to remove the latent heat of solidification. This is accomplished by the evaporator coils adjacent the plate member. As pointed out above, the distribution of these coils may be such that the upper portion of the plate is colder than the lower portion.

After the ice slab has built up to the desired thickness T, its outer front surface is sufficiently proximate to the thermal responsive element 68 to actuate the element to thereby energize the heating coil 66. Heating of these coils will heat the under surface of the plate to melt the initial ice film between this surface and the slab. Due to the weight of the slab, it will normally separate. In the event the atmospheric seal holds the slab, however, the provision of the channels will break this seal as explained above. The plastic guide flanges 46 and 47 guide this movement and insure that the slab will be properly received by the grid structure 75.

In the meantime, the hot grid wires in the grid structure 75 cut through the ice by a melting action, the ice slab itself passing through the grid under its own weight. The grid structure of small squares results in the formation of ice cubes, the spacing between the grid wires being approximately equal to the thickness T of the slab.

These ice cubes accumulate in the bin 20 until they attain a level approaching that of the thermal responsive

element 84 at which time this element is actuated to shut down the entire apparatus as explained previously. When some of the ice in the bin has been used up, its level drops and the element 84 will then turn on the apparatus to make more ice.

Ready access to the bin is had by the door 13. In the event it is desired to clean out the bin or inspect the interior, the lower panel section 12 may be removed with the door to provide a large opening. Access to the overflow trough and filter for maintenance purposes is easily had through the top hinged cover 24.

The apparatus described herein provides certain advantages which result from the above-described structural arrangement. Because of the fact that the underside of the inclined plate 41 is employed for building up the ice slab, small particles or impurities in the water will tend to fall away from the ice forming surface; that is, they will tend to migrate by gravity to the surface of the water film remote from the plate. This migration will continue as the slab is built up, and most of the foreign particles and impurities will be carried off with the excess water flow from the exposed surface of the slab into the filter 64 where they are trapped. The filtered excess water passes to the reservoir as the ice formation continuously takes place. If the ice slab were formed on the top side of the inclined plate, such impurities and particles would, by gravity, tend to settle towards the surface of the ice formed on the plate and become trapped in the freezing process. Employing the underside of the inclined plate results in far clearer ice than has heretofore been possible in machines of this general class.

It will be readily appreciated from the above description that recirculated water from the plate 41 is continuously filtered by the filter 63 and 64 and this, in conjunction with the disposition of the ice forming surface of the plate, results in pure and clear ice cubes, substantially all water supplied to the system being eventually converted into ice. Further, the machine is simple to maintain and is fully automatic in operation. In the event ice chips are desired in place of cubes, the modification employing the comminuting mechanism shown in Figure 6 is used.

Various modifications incorporating the spirit of the present invention will occur to those skilled in the art. For example, instead of a thermally responsive element for determining the thickness of the slab of ice formed, timer means for operating the heating coils may be employed. Further, where a capillary type refrigeration apparatus is used, turning off of the same will stop further refrigeration by the coils relatively quickly, and the ice slab will separate from the plate without the need of auxiliary heating wires. Thus, either the thermal element or timer means may be connected to turn off the refrigerating apparatus rather than energize heating wires.

It is also to be noted that while an uneven distribution of coils is illustrated, a uniform distribution may be employed, and similarly, while channels have been shown on the ice forming surface, these channels are not essential, the weight of the slab generally being sufficient to break any atmospheric seal.

The ice-making machine is therefore not to be thought of as limited to the precise embodiments chosen for illustrative purposes, and the invention is not to be limited to the details illustrated and described herein, except as defined in the appended claims.

I claim:

1. In an ice-making machine, the combination of: a cabinet; an insulated housing forming a part of said cabinet including a floor, a rear wall section sloping upwardly and rearwardly from said floor, a removable front wall section, and side wall sections defining with said sloping rear wall section and said removable front wall section an ice receiving bin in the lower region of said housing; refrigerating apparatus in the lower rear portion of said cabinet under and behind said sloping wall section, said cabinet including a removable rear

panel enclosing the back side of the refrigerating apparatus; an ice forming plate member supported in the upper region of said insulated housing between said side walls; evaporator means for the refrigerating apparatus positioned adjacent one side of said plate member and in heat exchange relation thereto; and means for passing water over the other side of said plate to build up a slab of ice, said plate being inclined with respect to the vertical and said evaporator means being positioned adjacent the upper side of said plate, said water running down the underside of said plate.

2. An ice making machine comprising: a cabinet structure inclosing an insulated housing having a lower front panel section, a centrally located door hinged at its lower edge on a horizontal axis to the upper edge of said panel, side walls, an upper rear wall section, a horizontal wall portion extending inwardly from the lower edge of said upper rear wall section, a lower rear wall section sloping forwardly and downwardly from the inner edge of said horizontal wall portion, and a floor section extending between said sloping wall section and said lower front panel section, whereby a storage bin is defined by said sloping wall section, floor section, front panel section, and the lower portions of said side walls, said housing also having an insulated top cover hinged to said upper rear wall section; readily disengageable means removably securing said lower front panel section to said floor to permit said lower front panel section and said door to be removed, whereby the entire front of said storage bin may be opened; refrigerating apparatus mounted within the lower rear portion of said cabinet outside said housing; removable panel means enclosing the exposed sides of said refrigerating apparatus; a plate member supported in the upper region of said insulated housing between said side walls; evaporator means for said refrigerating apparatus positioned adjacent one side of said plate and in heat exchange relation thereto; and means for passing water over the other side of the plate to build up a slab of ice, said plate being inclined with respect to the vertical and said evaporator means being positioned adjacent the upper side of said plate, said water running down the underside of said plate.

3. An ice making machine comprising: a flat plate member; means mounting said plate member in an inclined position with the plane of said plate at an angle of less than forty-five degrees to the horizontal; refrigerating means distributed adjacent the upper side of said plate member and in heat exchange relation thereto; and means for running water in the form of a film down the underside of said plate member, said last named means including an overflow trough adjacent the upper edge of said plate member having a level spill lip curving downwardly and meeting tangentially the under side of said plate member near the upper edge thereof, and means for supplying water to said trough at a point remote from said lip, whereby said trough is filled to overflowing, said water flowing over said spill lip and onto said underside of said plate member in a smooth thin film of substantially uniform thickness.

4. An ice making machine according to claim 3 which includes a comminuting means disposed beneath said plate member in a position to receive a slab of ice falling from said plate member, whereby said slab is broken up into small chips.

5. An ice making machine according to claim 4 in which said comminuting means comprises a rotating chopper.

6. An ice making machine according to claim 4 in which said comminuting means includes an inclined tray disposed beneath said plate member for receiving said slab of ice, and a rotating chopper adjacent the lower edge of said tray, whereby said slab is gravity fed into said chopper and broken up into small chips.

7. In an ice making machine, the combination of: an insulated housing; a flat plate member in the upper region

of the housing; means mounting said plate member in an inclined position with the plane of said plate at an angle of less than forty-five degrees to the horizontal; refrigerating means distributed adjacent the upper side of said plate member and in heat exchange relation thereto, the underside of the plate member defining an ice forming surface; and means for running water in the form of a film down said ice forming surface whereby a slab of ice is built up thereon, said last named means including an overflow trough adjacent the upper edge of said plate member having a level spill lip curving downwardly and meeting tangentially said ice forming surface near the upper edge thereof, and means for supplying water to said trough at a point remote from said lip, whereby said trough is filled to overflowing, said water flowing over said spill lip and onto said ice forming surface in a smooth thin film of substantially uniform thickness.

8. An ice making machine according to claim 7 in which said refrigerating means are more densely distributed adjacent the upper regions of the top side of said plate member than adjacent the lower regions thereof.

9. In an ice making machine, the combination of: an insulated housing; a flat-plate member in the upper region of said housing; means mounting said plate member in an inclined position with the plane of said plate at an angle of less than forty-five degrees to the horizontal; refrigerating means distributed adjacent the upper side of said plate member and in heat exchange relation thereto, the underside of said plate member defining an ice forming surface; means for running water in the form of a film down said ice forming surface, whereby a slab of ice is built up thereon; and means for heating the underside of said plate member after said slab of ice is built up thereon, whereby said slab of ice may be separated from said plate member, said ice forming surface of said plate member including at least one shallow channel having an increasing width from the upper edge to the lower edge of said plate member for breaking the atmospheric seal between the slab of ice and the ice forming surface after the underside of said plate member is heated.

10. An ice making machine comprising, in combination: an insulated housing; a refrigerating apparatus for said housing; a plate member disposed in the upper region of said housing at an inclination with respect to the vertical; evaporator coils for said refrigerating apparatus distributed adjacent the top side of said plate member, the underside of said plate defining an ice forming surface; a water reservoir positioned adjacent the lower edge of said plate; filter means between said lower edge and said reservoir; a water overflow trough adjacent the upper edge of said plate and including a curved lip portion merging into said ice forming surface; a pump for moving water from said reservoir into said overflow trough, whereby a film of water runs down said ice forming surface and builds up into a slab of ice, excess water passing through said filter to said reservoir; means for removing said slab of ice after a predetermined quantity has formed; means positioned beneath said plate member for receiving and breaking up said slab of ice; and a storage bin defined by the lower region of said housing for collecting said broken ice.

11. An ice making machine according to claim 10, in which the means for removing said slab of ice includes a thermal element positioned at a given spacing below said ice forming surface, and means responsive to actuation of said thermal element for heating said ice forming surface.

12. An ice making machine according to claim 10, in which said ice forming surface includes at least one shallow channel having an increasing width from the upper edge to the lower edge of said plate member for breaking the atmospheric seal between said slab of ice and said ice forming surface after said predetermined quantity has been formed.

13. An ice making machine according to claim 10, in which said evaporator coils are more densely distributed adjacent the upper regions of the top side of said plate member than adjacent the lower regions thereof.

14. An ice making machine according to claim 10, in which said ice forming surface of said plate member is of a material having a cohesive attraction for water, and in which there are provided side flanges for said surface, said flanges being of a material lacking in cohesive attraction for water.

15. An ice making machine according to claim 10, including means responsive to the quantity of ice in said storage bin for shutting off said refrigerating apparatus.

16. An ice making machine according to claim 10, in which said means positioned beneath said plate member for receiving and breaking up said slab of ice comprises a grid of two groups of parallel wires at substantially right angles to each other, and means for heating said wires, whereby ice cubes are formed from said slab of ice.

17. An ice making machine according to claim 10, in which said means positioned beneath said plate member for receiving and breaking up said slab of ice comprises an inclined tray, and comminuting means adjacent the lower edge of said tray, whereby said slab is gravity fed into said comminuting means and broken up into small chips.

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