May 12, 1942. O. SCHWIMMER 2,282,546

APPARATUS FOR CUTTING ICE

Filed Dec. 17, 1938 2 Sheets-Sheet 1

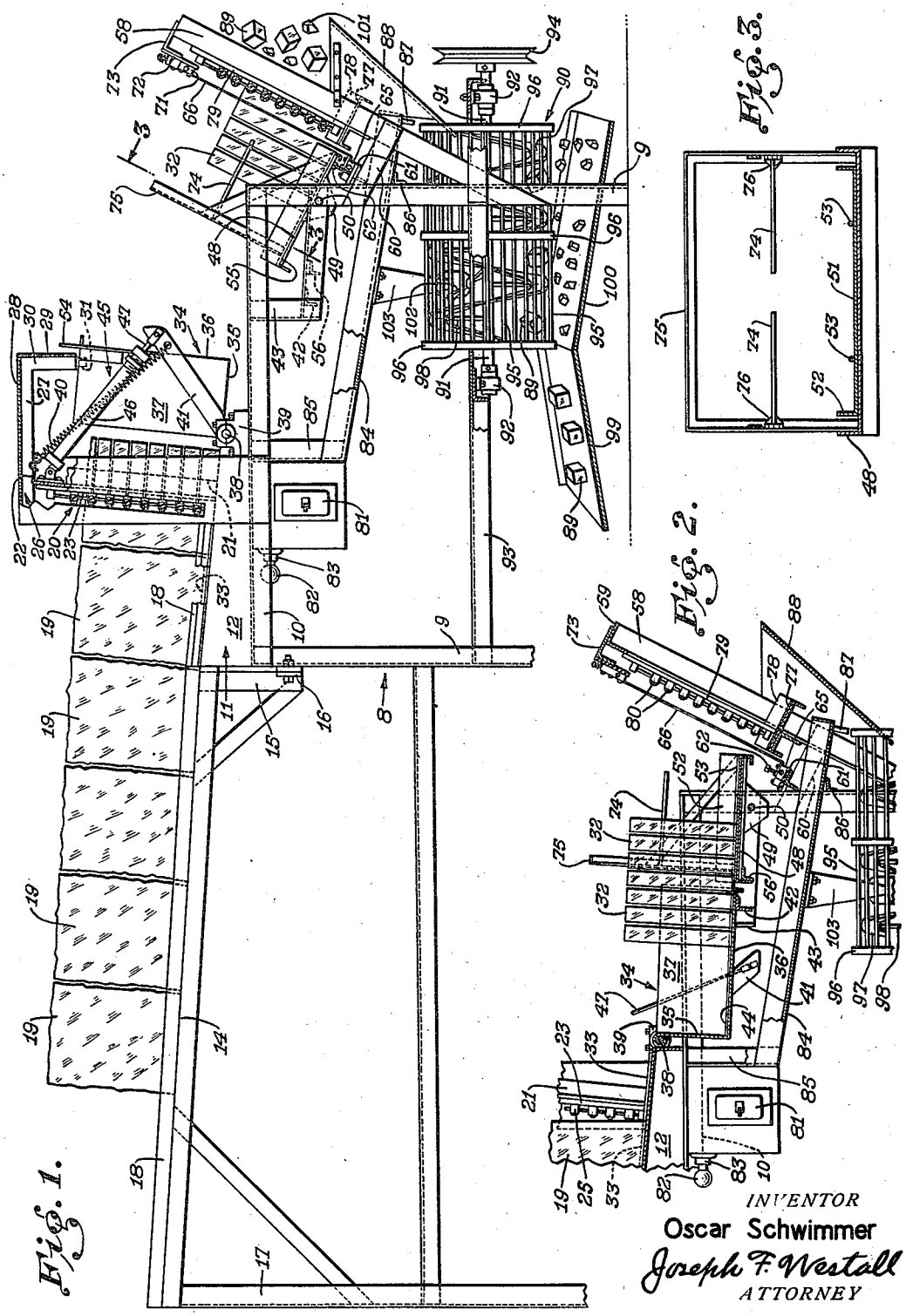


Fig. 1.

Fig. 3.

Fig. 2.

INVENTOR
Oscar Schwimmer
Joseph F. Westall
ATTORNEY

May 12, 1942. O. SCHWIMMER 2,282,546

APPARATUS FOR CUTTING ICE

Filed Dec. 17, 1938 2 Sheets-Sheet 2

Fig. 4.

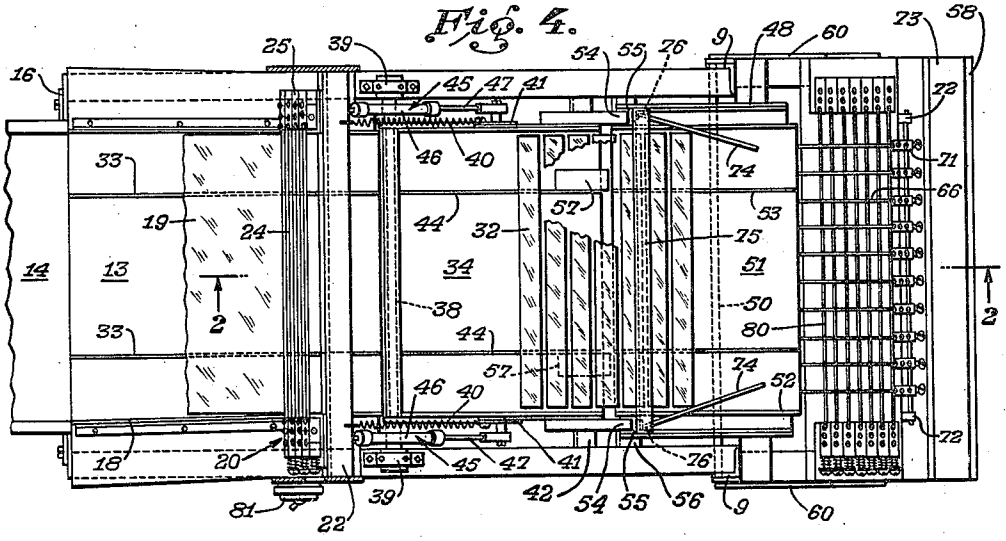


Fig. 5.

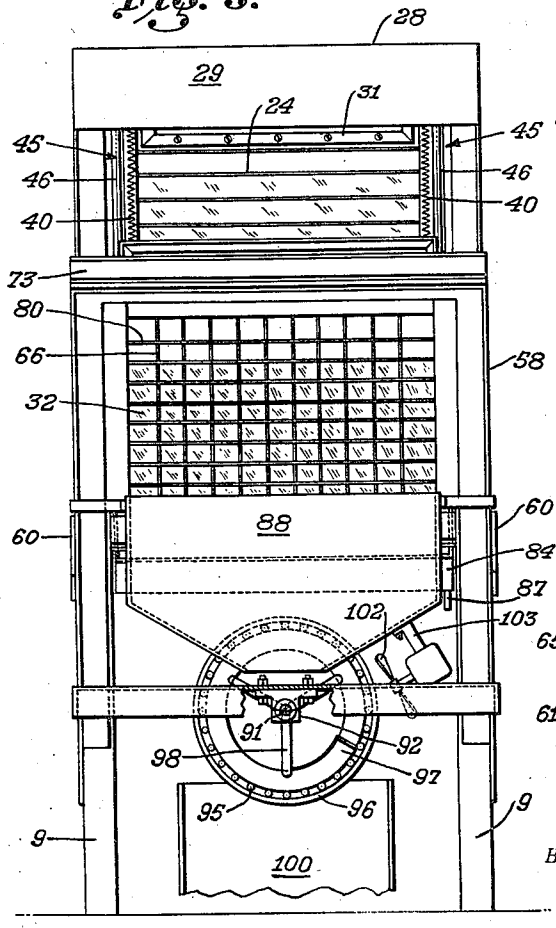


Fig. 6.

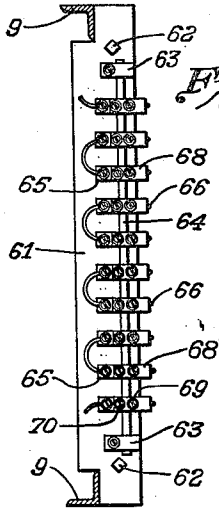
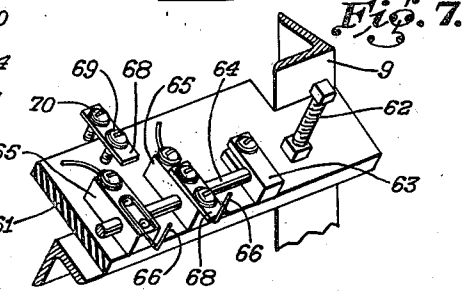


Fig. 7.



INVENTOR
Oscar Schwimmer
BY Joseph F. Westall
ATTORNEY

Patented May 12, 1942

2,282,546

UNITED STATES PATENT OFFICE

2,282,546

APPARATUS FOR CUTTING ICE

Oscar Schwimmer, Los Angeles, Calif.

Application December 17, 1938, Serial No. 246,523

9 Claims. (Cl. 219—19)

This invention relates to apparatus for cutting ice from larger blocks, and particularly contemplates apparatus utilizing electrically-heated wires as cutting instruments, including means for automatically feeding the ice blocks into the machine successively, and means for drying and sorting the pieces of ice formed thereby.

This application is a continuation-in-part of my copending applications, Serial No. 184,590, filed January 12, 1938, now Patent No. 2,226,413, issued December 24, 1940, for Apparatus and methods of cutting and packaging ice cubes, and Serial No. 173,185, filed November 6, 1937, for Ice cubing apparatus.

It is a general object of this invention to provide three grids superimposed upon and at right angles to conveying chutes, operable to cut ice blocks successively into cubes by the gravitation of the ice blocks thereagainst.

A more specific object is to provide a conveyor to shift the substantially horizontal slabs of ice cut by the first grid to a substantially vertical position in combination with a chute over which the turned slabs will gravitate against additional grids to form cubes of the slabs.

Another object is to provide a drain to carry all water melted from the ice during the course of its passage through the machine away from the ice and into a suitable receptacle.

Another object is to provide a separator adapted to receive the ice after passing through the third grid to sort the cubes of the desired dimensions from the other pieces of ice necessarily resulting from cubing irregular ice blocks, and to provide means for directing the cubes and irregular smaller pieces into separate receptacles.

Another and highly important object is to provide a positive directional control of the ice during its passage through the machine, thereby obviating tendency of the ice to clog the apparatus and insuring the formation of cubes of desired dimensions.

Still another object is to provide means for surface-drying the cubes to facilitate packaging and cold storaging in bulk, and obviate regelation of the cubes when packed.

Other objects and salient features of my invention such, for example, as simplicity of construction and safety in operation, economy of manufacture, and minimum loss of ice, will be apparent to those of skill in the art from an examination of the following description read in the light of the accompanying drawings, in which:

Fig. 1 is a side elevation of the machine illustrating a plurality of ice blocks at various stages of the continuous operation of the apparatus;

Fig. 2 is a broken sectional view partly in elevation taken on lines 2—2 of Fig. 4 showing a portion of the machine with the ice-block transfer receptacle thereof in a different position from its normal position as shown in Fig. 1;

Fig. 3 is a sectional view taken on lines 3—3 of Fig. 1;

Fig. 4 is a broken plan view of the machine with the parts in position as shown in Fig. 2;

Fig. 5 is an end elevation illustrating particularly the ice-cubing grid, feed hopper, drier, and separator;

Fig. 6 is an enlarged sectional view of the lower portion of the second grid;

Fig. 7 is an enlarged fragmentary perspective of the means of attachment for one end of the wires of the second grid and the means for limiting the downward movement of the ice slab shifting platform, illustrating one of the water shedding plates in detached relation.

Referring to the drawings in detail, the numerals of which indicate similar parts throughout the several views, 8 designates generally a frame comprising legs 9, supporting at their upper ends horizontal angle beams 10. An ice block receiving table 11 is mounted on one end of frame 8, having sides 12 secured to the horizontal beams, to support an inclined tray 13 superimposed on the table top above the beams 10 of a width less than the width of the table. A magazine chute 14 inclined to a degree slightly less than the incline of the tray 13, for a purpose later referred to, is supported with the lower end thereof flush with the higher end of the tray by short legs 15 bolted to legs 9 of the frame as at 16. The lower end of the chute is adapted to slightly overlie the adjacent end of the tray to permit the ice melt from the chute to flow onto the tray. The higher end of chute 14 is supported by legs 17. The chute and tray 13 are provided with side walls 18 to direct the flow of water as hereinafter described. The chute 14 is adapted to receive a plurality of ice blocks 19 which gravitate therefrom onto the tray 13 of the table and against a grid 20 about to be described. Adjacent the lower end of each side of table 11 an angle support 21 is secured, extending upwardly to form, substantially, a right angle with the tray 13. An angle beam 22 is secured in a horizontal position above the table with its opposite ends secured to the upper ends of supports 21.

A pair of parallel grid supporting plates 23

disposed at right angles to the plane of the table top are secured to the respective supports 21 for the support of grid 20. The grid comprises a plurality of horizontal grid wires 24 having their opposite ends attached by suitable means to pairs of aligned blocks 25 carried by grid supporting plates 23. The specific means of attaching the grid wires 24 to the blocks 25, the means of supporting said blocks on the grid supports, and for adjusting the tension of said wires, form no part of this invention, being particularly described and claimed in my copending application, Serial No. 173,185, filed November 6, 1937.

A hood supporting frame 26 comprising a pair of parallel horizontal angle beams 27 are secured above the grid 20 to supports 21 respectively, so as to extend over opposite sides of the grid. A hood 28 carried by frame 26, has its forward end 29, extending to the side of the grid to which the ice moves, turned downwardly over a pair of vertical angle irons 30 comprising a part of frame 26. The opposite ends of a rubber covered bumper bar 31 are secured to the lower ends of angle irons 30 so as to extend slightly below the lower edge of the outer end 29 of hood 28, for a purpose later referred to.

The ice blocks 19 on the chute may tend to freeze together where the device is used in sub-freezing temperatures. However, upon reaching the greater incline of the tray 13, each block will tilt and break from the following block of ice and thence move with slightly greater celerity against the grid 20 which cuts the blocks 19 into a plurality of superimposed slabs 32 (Fig. 1).

A pair of guide wires 33 are secured in spaced parallel relation to the upper surface of the tray 13 of the table to melt into the ice as the blocks move toward the grid, and thereby maintain the proper alignment of the ice blocks as the same successively contact and move to the opposite side of the grid.

The slabs 32 gravitate from the end of tray 13 into an ice slab transfer receptacle 34 open on two sides and comprising a bottom 35, a back wall 36, and sides 37. The edge of bottom 35 adjacent an open side of the receptacle is secured to a hinge rod 38 having its ends journalled in bearings 39 mounted on respective beams 10 of frame 8. The transfer receptacle is normally held in its upper position, i. e., with bottom 35 parallel to and forming an extension of the tray 13 and with the upper end of the wall against bumper 31 to receive the slabs 32 of the ice block 19 from table 13, by a pair of retracting springs 40, each having one of its ends hooked in a hole adjacent the end of one of a pair of arms 41 secured to opposite sides 37 of the receptacle, and its opposite upper end hooked in an aligned hole in the angle beam 22. As the slabs gravitate from tray 13 into the receptacle across the hinge rod 38, the weight of the ice slabs 32 will cause receptacle 34 to swing on rod 38 to thereupon transfer the weight of the slabs of ice from bottom 35 to the back wall 36, which will assume a position slightly declined in the direction of movement of the ice slabs to permit the slabs to gravitate from the receptacle, as will appear. The downward swing of the receptacle is limited by its abutment against a transverse stop bar 42 suspended by suitable hangers 43 secured to the beams 10 of the frame. A pair of parallel wires 44 (Fig. 4) are secured in spaced relation to the wall 36 to melt into the ends of ice slabs and maintain their proper alignment as they slide from the receptacle.

A pair of hydraulic shock absorbers 45 are provided to prevent the too rapid drop and consequent jar of the transfer receptacle against stop bar 42 in response to its gravitation, and against the bumper bar 31 when subsequently elevated by springs 40. The absorbers 45 comprise cylinders 46 pivotally connected to opposite ends of the angle beam 22, and pistons (not shown) within the respective cylinders having attached thereto rods 47. The opposite end of each rod 47 extends from the end of its respective cylinder 46 and is pivotally connected to one of arms 41, respectively.

A tilting platform 48 having a pair of lugs 49 extending downwardly from its opposite sides is supported on a rod 50 extending through the lugs. The ends of rod 50 are journalled in legs 9 of the frame. A feed tray 51 (Fig. 4) having side walls 52, is secured on the upper surface of platform 48 and is of a width less than the width of the platform. Guide wires 53 (Fig. 4) are secured by soldering or the like to the upper surface of tray 51 in alignment with the wires 44 of the wall 36 to maintain the ice slabs 32 against lateral movement on the ice track comprising wall 36 and tray 51. At each side of wall 36 a retaining bar 54 is attached which extends above the free edge of the wall. As the receptacle 34 is swung downwardly by the weight of ice slabs 32, the retaining bars 54 will engage the respective sides of the platform 48 as at 55 to swing the latter on rod 50 against a transverse stop bar 56 suspended from the frame rearwardly of rod 50 by the hanger 43, whereby the tray 51 and wall 36 of the transfer receptacle will form a flat declined chute. While in this position, the adjacent edges of the wall and tray will be slightly spaced apart to permit the drainage of ice melt from the receptacle therebetween. A pair of bridging bars 57 (Fig. 4) are secured in spaced relation to wall 36 and extend beyond the free edge of the wall, terminating closely adjacent to the upper edge of platform 48 when the latter is resting against bar 56 to assist in the transfer of the ice slabs from the receptacle to the tray 51 across the drain opening therebetween.

A pair of arms 58 having their lower ends secured by suitable means to the legs 9 of the frame in which the pivot rod of the platform is mounted, extend obliquely outward and upward from the end of the frame, being connected at their top by an angle beam 59. A brace 60 between each arm 58 and the leg 9 to which it is attached, extends across the angle formed between said arm and leg and provides a support for the ends of a transverse member 61. A screw 62 (Fig. 7) is threaded into each end of member 61 against which the underside of the lower end of the platform 48 abuts as the ice slabs slide across the rod 50 tilting the platform. The extent to which screws 62 are threaded into the member will determine the degree to which platform 48 will be tilted.

Adjacent each end of member 61, a bar 63 (Fig. 7) is secured carrying the ends of a rod 64. Mounted slidably on rod 64 are a series of blocks 65 for the attachment of a series of parallel grid wires 66 in a manner about to be described. Blocks 65 are spaced apart a distance equal to a second dimension of the cubes desired to be cut. A clamping plate 68 is secured to each block by two screws 69 and 70 with plates 68

overhanging the outer end of respective blocks. A grid wire 66 is connected to each block and extends from under plate 68 adjacent the body of screw 69 and around the body of screw 70 returning adjacent the opposite side of the body of screw 69 and thence from under the end of the overhang of plate 68. The opposite ends of the parallel wires 66 are secured by suitable means to blocks 71 mounted on a member 72 bolted to an angle beam 73 secured by suitable means to angle beam 59.

The slabs 32 of ice slide slowly from the receptacle 34 onto the tray 51, but as the balance of their weight is transferred to the opposite side of the rod 50, the platform will tilt against the head of screw 62, and will tend to accelerate the gravitation of the slabs against the grid. To prevent too rapid movement of the ice slabs against the grid wires 66, a pair of gate levers 74 are pivotally attached to uprights 75 mounted on the platform at opposite sides of the tray by hinges 76. Torque springs (not shown) in the hinges are adapted to urge gate levers 74 to a position extending across the tray to engage the slabs of ice moving onto tray 51 from the transfer receptacle and retard the speed of movement of the ice toward the grid, as well as to maintain the upright position of the slabs. As the slabs leave the end of the tray, they pass through the grid comprising wires 66 for their vertical cut. The ice is received at the opposite side of the grid, comprising wires 66, from the platform on a short track 77 having its ends secured to the arms 58. Guide walls 78 integral with the edges of the track assist in maintaining the ice against lateral movement as it is being cut by the third grid, about to be described. Water melted onto tray 51, as well as the ice melt from the grid wires 66, will flow through the opening between the lower end of tray 51 and track 77. It will be observed that the platform will shield the blocks 65 and associated parts from the flow of the ice melt.

A grid support 79 (Fig. 2) is secured to each of the opposed surfaces of arms 58, to which grid supports, the ends of a plurality of horizontal, relatively spaced grid wires are attached by suitable means. Wires 80 are adapted to sever the ice slabs 32, cut vertically by wires 66, into a plurality of cubes.

Each of the wires 24, 66, and 80 of the three grids is connected in an electric circuit through a switch 81 by means not shown. An electric light bulb 82, threaded in a socket 83 below tray 13, is also connected in the circuit and serves as a warning when the switch is thrown that the wires are charged. Where the machine is used in sub-freezing temperatures, the absorption of heat emanating from the light bulb by the receiving tray 13, will prevent the ice blocks 19 from freezing to the tray. An important feature of the invention resides in the continuous operation of the apparatus whereby the operator is assured that every block of ice loaded on the magazine chute will be cubed to the desired dimension with the minimum waste of ice, and that the cubes and smaller pieces of ice thus formed will be sorted without further attention to the machine. Such continuous operation is not possible in sub-freezing temperatures without some means for preventing the ice blocks from freezing to tray 13. Accordingly, this function of the electric light bulb is of great value in the present embodiment.

An inclined drain 84 is suspended within the frame 8 by hangers 85 attached to the beams 10 with the upper end of the drain disposed below the lower end of the table 11 and with its lower end, supported by angle irons 86, secured to the legs 9 of the frame, disposed below the third grid, comprising wires 80. Drain 84 will receive the ice melt from the magazine chute 14 and tray 13, as well as from the receptacle 34, tray 51 and the second and third grids. A spout 87 connected in the lower end of drain 84 directs the flow of ice melt into a suitable receptacle (not shown).

A hopper 88 is secured adjacent the grid to the arms 58 to receive the cubes 89, trimmings and other smaller pieces of ice cut by the third grid. The lower end of hopper 88 extends into an axially horizontal separating cage 90 mounted on a shaft 91 in a manner about to be described. The shaft is journalled in bearings 92 carried by beams 93 forming lower braces of the frame 10 between the legs 9 of the frame. On the outer end of shaft 91, a pulley 94 is mounted to which a suitable drive belt (not shown) may be operatively connected in an obvious manner to rotate shaft 91 and the cage 90. The cage is composed of a plurality or rods 95, arranged circumferentially, and carried in annular bands 96, which space the rods a distance apart slightly less than the distance between the wires of each of the grids to prevent cubes fed into the cage by the hopper from dropping between the rods. A helicoid conveyor ribbon 97 is secured within the cage to the rods 95. The cage 90 is held concentric to shaft 91 by a plurality of spokes 98 secured at one of their ends to individual hubs spaced along the shaft end at their opposite ends to ribbon conveyor 97. The conveyor is thus adapted upon rotation of the shaft and cage to move the ice cubes 89 therethrough and eject them from the end of the cage opposite to the end into which they are fed onto one of a pair of chutes 99 and 100 inclined in opposite directions and joined together directly below the end of the cage from which the cubes are ejected. As the ice blocks from which the cubes are cut are never of uniform size, miscellaneous pieces 101 of ice smaller than the cubes 89 of the size desired, will be produced. These pieces will drop on chute 100 from between the rods 95 of cage 90. The ice cubes 89 and the waste pieces 101 of ice will slide on chutes 99 and 100, respectively, into suitable receptacles (not shown). The undersize cubes and trimmings may be directed into a conventional type crusher and convert otherwise waste ice into commercial crushed ice.

A fan 102 is suspended by a hanger 103 secured to the underside of the drain 84 adjacent one side of the cage to direct a blast of cold air against the ice cubes 89 within the cage to surface-dry the same before they are dropped from the cage to prevent their regelation when packed, or when stored in bulk.

While I have described but one embodiment of my invention, it will be understood that numerous changes in size, design, proportion, and number of the various parts may be made without departing from the spirit of my invention as defined by the appended claims.

What I claim and desire to secure by Letters Patent is:

1. In an ice cutting machine, an inclined grid, a transfer receptacle adapted to receive ice to be cubed, means to eccentrically mount said receptacle, said receptacle being movable on said means to a predetermined position in response

to the weight of ice received therein to swing said ice toward said grid.

2. In an ice cutting machine, an electric grid for cutting ice, a transfer receptacle movable in a predetermined arc to partially support ice in contact with said grid, means to normally retain said receptacle at one end of its arc of movement, and means to limit the speed of movement of the receptacle to the opposite end of its arc of movement.

3. In an ice cutting machine, a transfer receptacle, means to pivotally mount said receptacle, means to deliver ice slabs into said receptacle, means to receive said slabs from said receptacle, said receptacle being movable to deliver said ice slabs to said means in position at substantially right angles to the position of the slabs as received by the receptacle, and an ice grid connected to said receiving means to cut an ice block thereon.

4. In an ice cutting machine, a feed tray, means to pivotally mount said feed tray below the weight center thereof, an ice delivery member, means to move said tray to a position parallel to said member and with one edge thereof adjacent thereto, said tray being adapted to tilt in response to the weight of ice thereon at the opposite side of said first-named means from said delivery member, and a cutting grid to cut ice received from said tray.

5. In an ice cutting machine, a feed tray, means to pivotally mount said feed tray below the weight center thereof, an inclined member for the delivery of ice to said tray, means to move said tray to a position parallel to said member and with one edge thereof adjacent the member, said tray being adapted to tilt in response to the weight of ice thereon at the opposite side of said first-named means from said delivery member, a cubing grid, means to mount said grid at substantially right angles to the plane of said tray when the latter is in tilted position.

6. In an ice cutting machine, a feed tray adapted to carry a plurality of ice slabs on their ends, means to move said feed tray to a declined position, means to engage said ice slabs on said tray to retard the speed of the gravitation of said slabs on said tray and an ice cutting grid to cut said slabs gravitating from said tray.

7. In an ice cutting machine, an inclined tray for the support of ice to be cut, a grid support above said tray at a substantially right angle to the tray, an ice cutting grid carried by said support, and a chute for said ice connected to the upper edge of said tray inclined to a lesser angle than the incline of the tray.

8. In an ice cutting machine, an electrically heated grid, an inclined ice-feed tray adjacent said grid, and a heating element below and adjacent the lower end of said tray to heat said tray by air moving upwardly against the tray and toward the upper end of the tray.

9. In an ice cubing machine, an electrically heated grid, an ice feed tray adjacent said grid, a light bulb below said tray, and means to supply current to both said grid and bulb simultaneously whereby the light of said bulb will warn that the grid is charged and the heat of the bulb will heat the tray.

OSCAR SCHWIMMER.