Feb. 19, 1952 C. A. WESEMAN ET AL 2,586,588

MECHANISM FOR PRODUCING CLEAR ICE BODIES

Filed March 26, 1949

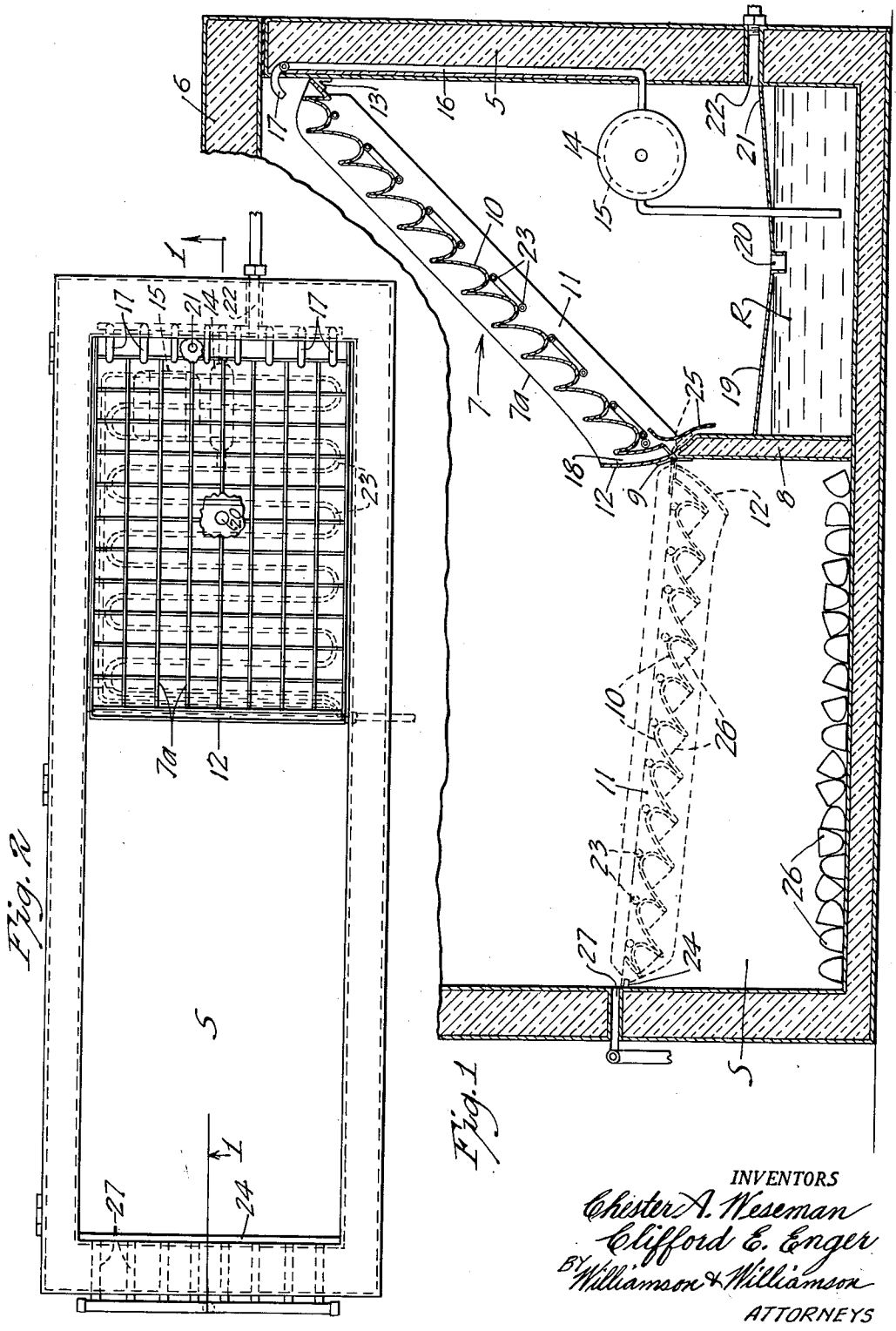


Fig. 2

Fig. 1

INVENTORS
Chester A. Weseman
Clifford E. Enger
BY Williamson & Williamson
ATTORNEYS

Patented Feb. 19, 1952

2,586,588

UNITED STATES PATENT OFFICE

2,586,588

MECHANISM FOR PRODUCING CLEAR ICE BODIES

Chester A. Weseman, Austin, Minn., and Clifford E. Enger, Los Angeles, Calif., assignors to Roberts Products, Incorporated, Austin, Minn., a corporation of Minnesota

Application March 26, 1949, Serial No. 83,556

4 Claims. (Cl. 62—106)

1

This invention relates to a device for producing clear ice cubes in molds and for subsequently removing said cubes from said molds.

It is an object of our invention to provide a novel and improved clear ice cube producer including a simplified means for releasing the cubes from their respective molds.

More specifically, it is an object to provide a mechanism mounted in an insulated box including an inclined tray which is divided to form a plurality of individual molds and having a stream of liquid adapted to be cascaded down said inclined tray from one mold to the next to circulate the liquid in said molds during the freezing operation to produce clear ice cubes, and said tray being hinged at the bottom thereof to permit the same to be inverted and thereafter defrosted to release the cubes therefrom and drop the same into a collection chamber for storage therein.

It is another object to provide a reservoir for the circulation pump adapted to maintain the water therein at a relatively cold temperature in spite of the use of relatively warm water for defrosting the ice cube tray.

These and other objects and advantages of our invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a longitudinal vertical sectional view of our improved clear ice cube producer taken substantially along the line 1—1 of Fig. 2 showing the tray in inclined freezing position in full lines and in inverted defrosting position by dotted lines; and

Fig. 2 is a top plan view of my ice cube producer with the cover removed and showing the pump in dotted lines.

As illustrated in the accompanying drawings, we provide an insulated casing 5 having a top 6 hinged for swinging movement on an axis disposed longitudinally of said casing. An ice cube tray 7 is hingedly mounted within said casing 5 on a suitable supporting and dividing member 8 sealingly fixed within the casing and has a suitable hinged connection therewith, such as the rubber strip 9. The tray 7 has a plurality of cup-shaped individual molds 10 formed therein with space provided between a substantial portion of adjacent molds 10 to permit rapid defrosting thereof. The tray 7 has side plates 11 fixed at the respective sides thereof, and said plates extend upwardly a slight distance above the top of the molds and downwardly a slight distance below the bottom thereof to prevent water from spilling over into the chamber therebelow. The hinged edge of the tray 7 has an upstanding partition 12 extending therealong and fixedly connected in sealed relation to the sides 11 at the extremities thereof.

2

The tray 7 is shown by full lines in inclined freezing position with its upper end engaged against the end wall of casing 5, and a suitable rubber sealing gasket and stop 13 are provided to prevent water from flowing down along the said engaged end wall. A pump 14 having a motor 15 is provided for supplying water to the upper portion of tray 7 through a main conduit 16 and branch conduits 17, as best shown in Fig. 2. A branch conduit 17 is provided for each of the sloping rows of molds in the tray 7, and an upstanding partition 7a divides each row to confine the flow of water within the row into which it is introduced. A drain trough 18 is provided at the bottom edge of tray 7 to carry the water down into the pumping reservoir R therebelow, the partition 12 preventing the water from spilling over into the storage compartment designated by the letter S and disposed on the other side of upstanding support 8 from the pumping reservoir designated by the letter R. The pumping reservoir has a cover 19 formed thereacross which slopes toward the center at which point a supply inlet 20 is formed to drain water into the reservoir R when the level therein falls below the slightly depressed central portion of cover 19. A suitable vent 21 permits the air trapped under the cover to escape and permits said reservoir R to be kept filled. An overflow outlet 22 is formed above the cover 19 and discharges the excess water to a suitable drain.

A suitable refrigeration system (not shown) supplies freezing fluid to the coil 23 extending across under the transverse rows of trays. A suitable flexible connection or pivot point for the supply lines of the freezing coil permits the tray 7 to be swung from inclined freezing position downwardly into the inverted defrost position shown by the dotted lines of Fig. 1 and which is slightly inclined in the opposite direction from the freezing position. A suitable sealing stop element 24 is provided for the free end of said tray and supports the same in sealed relation to the other end wall of the casing 5 to prevent liquid from flowing down said wall into the storage chamber therebelow. A suitable closure flap 25 is provided at the bottom of drain trough 18, as best shown in Fig. 1, and serves to sealingly close said drain trough when the tray 7 is in inverted defrost position. Each of the molds 10 has a cube 26 formed therein, as shown in the dotted position of Fig. 1.

Any suitable means for defrosting the inverted tray may be provided, such as a reverse cycle refrigeration system to circulate hot gas through the coil 23, or as is illustrated, water may be supplied through the inlet 27 to warm the molds and release the cubes 26 therefrom, the normally

downwardly extending portions of sides 11 extending upwardly when tray 7 is in inverted position to prevent spilling of the water over the sides of said tray.

Operation

Water is initially pumped out through the branch outlet conduits 17, and the individual molds 10 are thereby filled with water to be frozen, and the refrigeration system supplies freezing fluid to the coil 23 for freezing the water in the molds. During the freezing cycle water is continually pumped up through conduit 16 and into the inclined rows of trays to cascade the water down through the individual molds and maintain a circulation in the molds while the ice is freezing therein. The excess water flows out through the trough 18, under the sealing flap 25 and down onto the cover 19 of the reservoir R. If the water in the reservoir is below the level of inlet 20, then this relatively cold water flows down into the reservoir, and this will be the case during the freezing cycle to supply water for the pump 14. When the cubes have been frozen, the tray is swung over into the inverted defrosting position shown by dotted lines in Fig. 1, and water is supplied to flow across the mold bottoms which in inverted position form a tray to carry the water thereacross, over the flap valve 25, and onto the reservoir top 19. The first water which flows over the molds 10 during the defrosting cycle will be relatively cold and will serve to refill the reservoir R with cold water, but as soon as the water level reaches the inlet 20, any additional water supplied will merely flow across the cover 19 and out through drain outlet 22. As the water continues to flow across the upwardly disposed bottom side of the tray 7 in inverted position and the peripheral surfaces of the cubes 26 are melted slightly, said cubes will drop out of the molds 10 into the storage chamber S, and the water will gradually reach the temperature at which it was supplied through inlet 27. This warm water will not enter reservoir R but will flow directly across the top surface of cover 19 and out through drain outlet 22 so that the cold water in the reservoir will not be warmed and relatively cold water will always be supplied to the pump 14 to increase the efficiency of the freezing cycle.

It will be seen that we have provided an extremely simple, highly efficient clear ice cube producing machine which includes a simplified defrosting step and a liquid supply reservoir adapted to keep the liquid therein at a relatively cold temperature to increase the efficiency of the freezing cycle. The circulation of the liquid through the ice cube molds 10 carries the air out of the water in the molds and produces substantially clear cubes in each of the molds. This cascading of the water through the molds inclined at a relatively steep angle is an extremely simple yet highly effective way of freezing clear ice cubes and permits quick freezing of the cubes without clouding the same. Also, by inclining the tray 7 at a relatively steep angle, a compact unit is provided which will quickly freeze a large number of cubes without taking up an excessive amount of space.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of our invention.

What we claim is:

1. A clear ice cube producer comprising a hinged inclined tray provided with a plurality of open-topped molds and hingedly mounted along one edge thereof, means for continuously discharging liquid onto the upper portion of said tray during the freezing of liquid therein to cascade the liquid successively over said molds to carry the air from the liquid being frozen therein and produce substantially clear ice cubes, defrosting means for releasing said frozen cubes when said tray has been swung on its hinged edge to invert said molds, and means for collecting the cubes when released from said molds.

2. A clear ice cube producer comprising as essential elements only an insulated box, a tray having a plurality of ice cube molds and hingedly mounted along one edge thereof within said insulated box to permit said tray to be swung into inclined freezing position and into inverted defrosting position, means for supplying liquid to be frozen at the top of the tray in inclined position to cascade the liquid downwardly over the tray to circulate said liquid in the molds during the freezing cycle, means for freezing the liquid in said molds, and means for defrosting said tray to release the frozen cubes therefrom when said tray is in inverted position.

3. Mechanism for producing clear ice cubes comprising an insulated sealable box, a partition dividing said box into an ice storage compartment and a liquid reservoir, an ice cube tray hinged along one edge to the top of said partition to permit the same to be disposed in inclined freezing position and to be swung into inverted defrosting position, a liquid reservoir formed on one side of the bottom of said box, and a pump for carrying the liquid from said reservoir to the top of said tray when in inclined freezing position to cascade the liquid over said tray during the freezing of cubes therein, means for flowing liquid over the bottom of said tray when in inverted defrosting position to permit the frozen cubes to drop into the storage chamber, said defrosting liquid flowing over said tray bottom and into the pump reservoir to refill the same, said reservoir having a drain outlet to carry off the excess liquid.

4. The structure set forth in claim 3 and a cover enclosing said reservoir and having a relatively small inlet and an air vent formed therein, said reservoir having a drain outlet formed adjacent the cover plate to drain the liquid off therefrom, said cover plate permitting said reservoir to be refilled through said inlet but preventing the mixture of relatively warm defrosting liquid with the cold reservoir liquid to maintain the cascading liquid substantially cold to increase the efficiency of the freezing operation.

CHESTER A. WESEMAN.
CLIFFORD E. ENGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
706,510	Barrath	Aug. 12, 1902
2,117,658	Gilliam	May 17, 1938
2,349,451	Motz	May 23, 1944
2,407,053	Clum	Sept. 3, 1946
2,484,017	Copeman	Oct. 11, 1949
2,526,262	Munshower	Oct. 17, 1950