

Dec. 11, 1962

C. M. LINGLE  
AUTOMATIC ICE VENDOR

3,067,591

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2 Sheets-Sheet 1

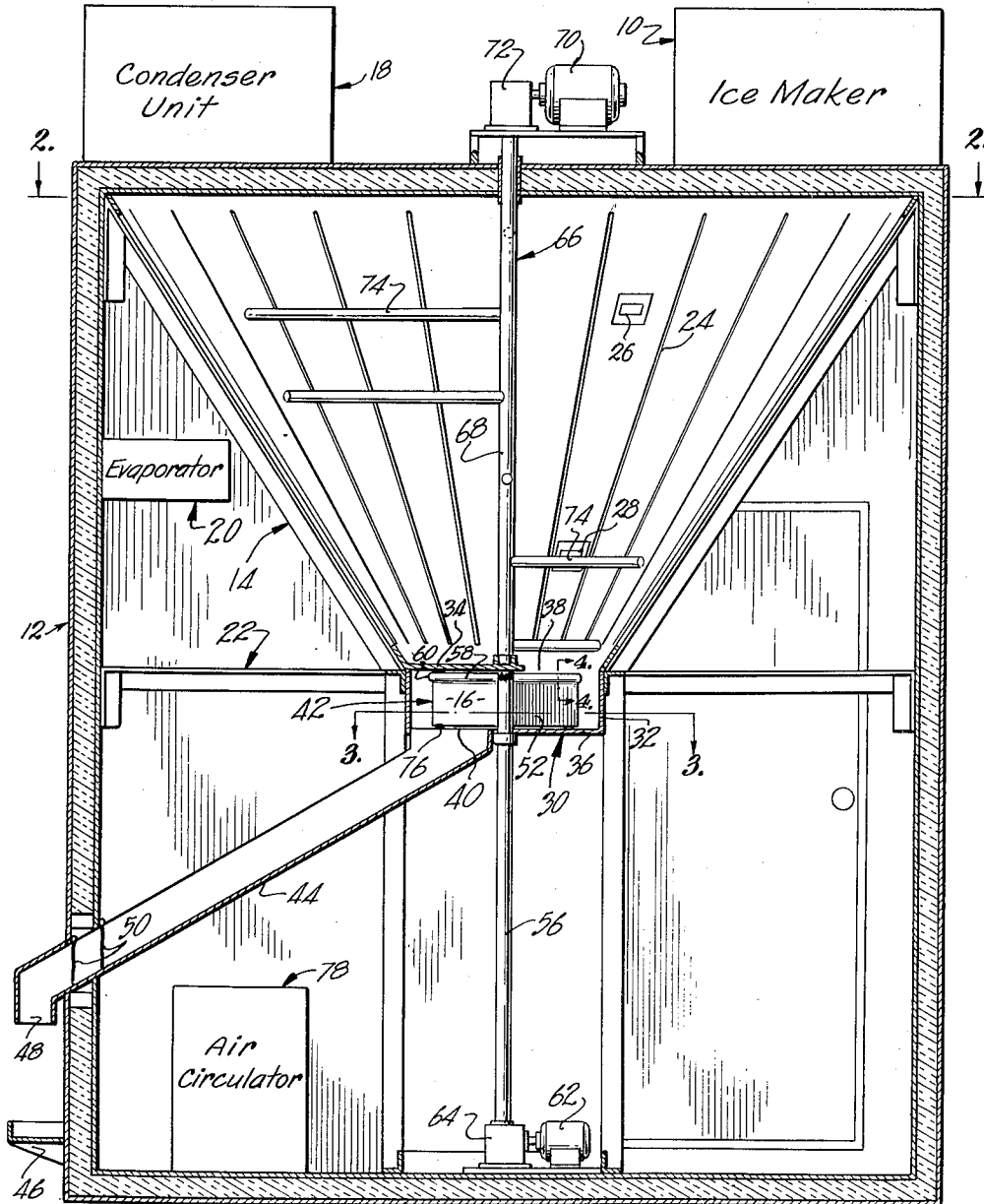


Fig. 1.

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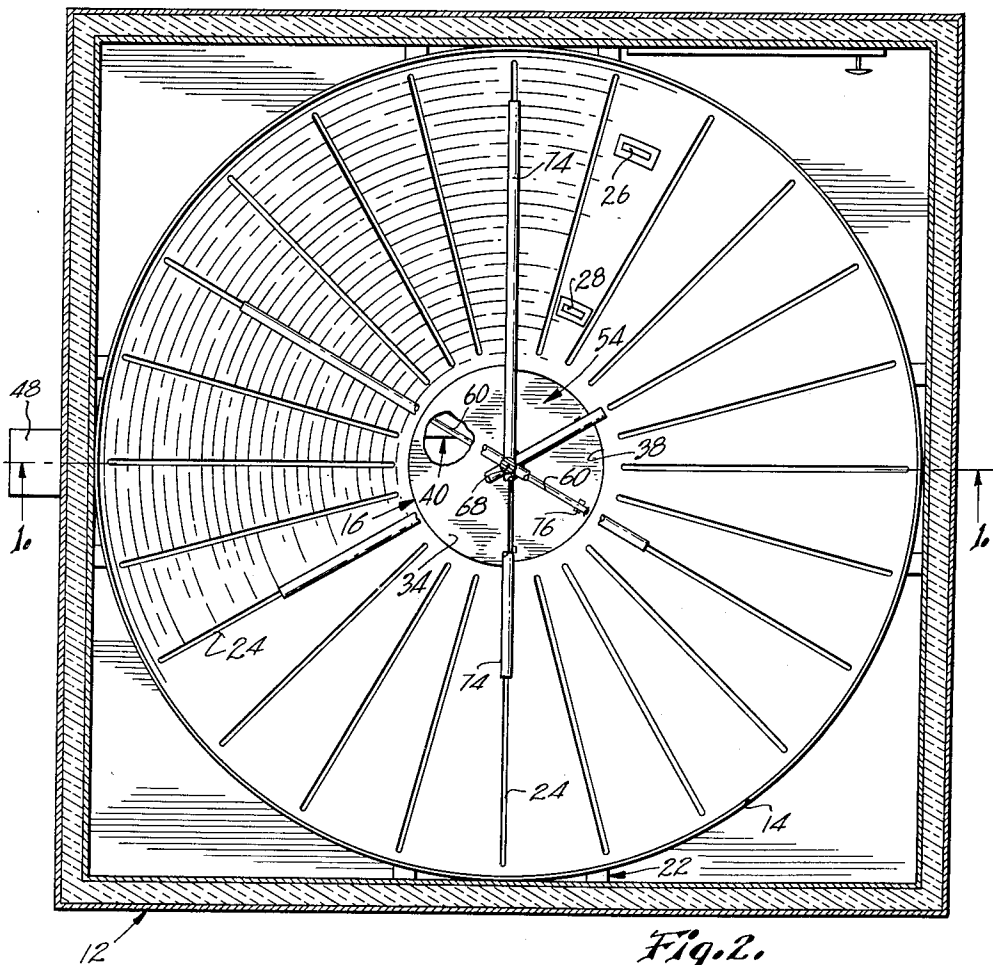


Fig. 2.

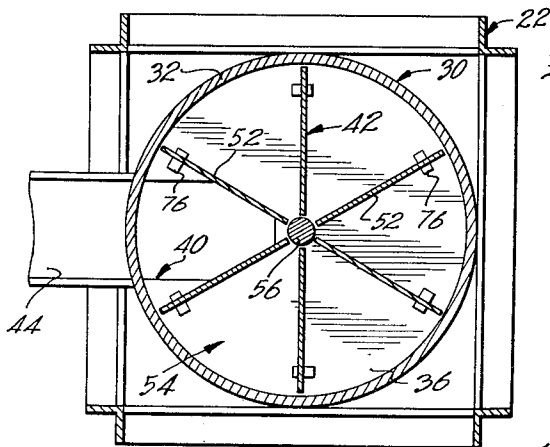


Fig. 3.

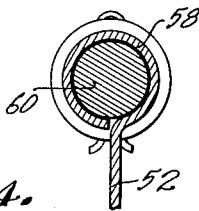


Fig. 4.

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1

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## AUTOMATIC ICE VENDOR

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5 Claims. (Cl. 62-344)

This invention relates to the automatic vending of ice cubes in bulk including structure especially adapted to handle material of such nature, making it possible to utilize coin control mechanism so that a predetermined quantity of ice cubes will be dispensed to the purchaser upon insertion of a suitable coin or coins.

Another important object of the present invention is to provide an automatic ice vendor that removes all difficulties which would otherwise be presented in a machine of such character having to do with the tendency of ice cubes to freeze together and, therefore, cluster in units too large to handle, thereby making it impossible to assure delivery of the same predetermined quantity of cubes each time a purchase is made.

Still another important object of the present invention is to provide a machine of the aforementioned character that is adapted for use in connection with an automatic ice cube maker to the end that a constant supply of ice cubes is made available at all times without substantial attention or servicing.

In the drawings:

FIG. 1 is a substantially central, vertical, cross-sectional view through an automatic ice vendor made pursuant to my present invention and taken on line 1-1 of FIG. 2.

FIG. 2 is a cross-sectional view taken on line 2-2 of FIG. 1.

FIG. 3 is a fragmentary, detailed, enlarged cross-sectional view taken on line 3-3 of FIG. 1; and

FIG. 4 is a fragmentary, detailed, cross-sectional view still further enlarged taken on line 4-4 of FIG. 1.

The primary component parts of the vendor illustrated in the drawings include an automatic ice cube maker 10, a cooler 12, which may support the ice maker 10 as shown in FIG. 1, a hopper 14 in the cooler 12 disposed to receive ice cubes from the maker 10, and a dispenser broadly designated by the numeral 16 communicating with the hopper 14 for vending a predetermined quantity of ice cubes each time the dispenser 16 is actuated.

The walk-in cooler 12 chosen for illustration of the principles of the instant invention, should be provided with insulated walls as shown, and the temperature maintained within a predetermined range below the freezing point of water through use of a refrigerator, including condenser unit 18 and its component parts as is quite conventional. Unit 18 may likewise be carried by the cooler 12 and be operably coupled with evaporator 20 in the cooler 12 and shown only schematically in FIG. 1.

Hopper 14 is preferably funnel-shaped and carried by the cooler 12 therewithin through use of suitable framework broadly designated by the numeral 22. Hopper 14 should be foraminous, and to this end, its construction as illustrated, includes a plurality of spaced-apart slots 24 therearound. The same results may be accomplished by a construction that employs a series of spaced-apart slats. In any event, the open top of hopper 14 may directly underlie the top wall of cooler 12 and communicate with the ice maker 10 so that ice cubes manufactured by the latter, gravitate directly into the hopper 14.

In this respect, the details of construction of the ice maker 10 form no part of the instant invention and have, therefore, not been illustrated. It is suffice to point out that such equipment is readily available on the open market and operates to continuously harvest the ice cubes and dump the same to a point of collection as, for example, the hopper 14 as herein contemplated.

2

The electrical components of the ice maker 10 are well adapted to include necessary controls and, to this end there is shown an electric switch 26 within the hopper 14 that is actuated by the ice cubes themselves when the level thereof in hopper 14 reaches switch 26. When the cubes actuate switch 26, the ice maker 10 is in turn de-energized. Conversely, a switch 28 is provided in the hopper 14 that is also actuated by the ice cubes and when the level of cubes drops below the switch 28, the ice maker 10 is automatically placed into operation.

The dispenser 16 includes a collection box 30 in the cooler 12 immediately below the hopper 14, provided with an annular side wall 32, a top wall 34, and a bottom wall 36. The wall 34 is suitably cut away to present an inlet 38 communicating with the frusto-conical hopper 14 at its apex end. The bottom wall 36 is also cut away in offset relationship to the inlet 38 to present an outlet 40 into which ice cubes are transferred by a feeder broadly designated by the numeral 42.

An open top, inclined chute 44 communicates with the outlet 40 for gravitational flow of the ice cubes to a station 46 exteriorly of the cooler 12. Chute 44 terminates outside cooler 12 in a downturned nozzle 48 for directing the ice cubes into a bag, bucket or other container that may be supported by the station 46 shown to be in the nature of a suitable shelf. Flexible flaps 50 in the chute 44 are provided to reduce the amount of loss by heat transfer.

The feeder 42 includes a plurality of vanes 52 spaced to present a number of pockets 54 within the box 30. Vanes 52 are mounted in any suitable manner on a rotatable vertical shaft 56 so that the vanes 52 can be caused to deflect each time the shaft 56 is actuated. Hence, by way of illustration (FIG. 4), hinge barrels 58 on the vanes 52 are wrapped around rods 60 radiating from the shaft 56 within the box 30, rendering the vanes 52 freely swingable vertically.

The shaft 56, the rods 60, and the vanes 52 make up a rotor that may be driven by an electric motor 62 through speed reducer 64. It can thus be seen that it is possible to operably couple the motor 62 with a coin control mechanism (not shown) disposed exteriorly of the cooler 12 and perhaps carried thereby adjacent the station 46 or the outlet 48 of chute 44. Thus, upon deposit of a suitable coin or coins in such mechanism, motor 62 may be caused to operate a sufficient period of time to bring one of the pockets 54 into register with the outlet 40, thereby depositing its content of ice cubes in the chute 44. As the emptied pockets 54 move into communication with the inlet 38 they will immediately be filled with ice cubes gravitating from the hopper 14.

An essential factor that must be given prime consideration in apparatus of the nature above described is the elimination of clustering in the ice cubes that takes place because of freezing together. The cubes must be maintained in a separated condition at all times, not only in the hopper 14, but in the box 30 until final delivery to the customer.

To this end therefore, there is provided first, an agitator 66 in the hopper 14 that includes a shaft 68 that may be vertically aligned with the shaft 56 thereabove, centrally within the hopper 14. Shaft 68 should be continuously rotated at a predetermined, relatively slow speed by an electric motor 70 through a speed reducer 72.

A plurality of radial arms 74 rigid to the shaft 68, are arranged in staggered relationship and progressively decrease in length as the lowermost end of the hopper 14 is approached.

Agitation means is also provided in the dispenser 16 and such means includes the swingable nature of the vanes 52, together with a plurality of raised projections

76 on the bottom 36 of the box 30 and disposed for successive engagement by the lowermost edges of the vanes 52 as the same are caused to rotate within the box 30. In order to pass over the projections 76, the vanes 52 must swing rearwardly opposite to the direction of rotation thereof, and in so doing, the ice cubes within the adjacent pockets 54 will be agitated. This breaks up any tendency of the cubes within the pockets 54 to freeze together, particularly if the machine remains idle over any continued period of time.

The problem is still further alleviated by the provision of a suitable air circulator 78 in the cooler 12 to continually cause air movement therewithin. Such air circulation is present also within the hopper 14, particularly by virtue of the slots 24 therein, as well as within the dispenser 16 and in the chute 44. In other words, the chute 44 is kept in a cool condition and air may enter the box 30 through both the inlet 38 and the outlet 40 thereof.

The air circulation, together with the agitation above described, is quite adequate to prevent troublesome operation because of the tendency of the particular product to form into clusters or clumps that would not easily be bendable in the manner contemplated by the instant invention.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a combination with an automatic ice cube maker, a cooler; a hopper in the cooler disposed to receive ice cubes from said maker; means for continuously agitating the ice cubes in the hopper; and a dispenser communicating with the hopper for vending a predetermined quantity of ice cubes each time the dispenser is actuated, said dispenser including a collection box in the cooler below the hopper, said box having a top wall provided with an inlet opening for gravitational flow of ice cubes thereinto and a bottom wall provided with an outlet opening in underlying relationship to said top wall and in laterally spaced relationship to said inlet opening for gravitational flow of ice cubes therefrom, and a shiftable feeder in said box between said top and bottom walls for transferring the ice cubes from the inlet to the outlet, said feeder being movable along a substantially horizontal path underlying said inlet opening and overlying said outlet opening.

2. In combination with an automatic ice cube maker, a cooler; a hopper in the cooler disposed to receive ice cubes from said maker; means for continuously agitating the ice cubes in the hopper; and a dispenser communicating with the hopper for vending a predetermined quantity of ice cubes each time the dispenser is actuated, said dispenser including a collection box in the cooler below the hopper, said box having a top wall provided with an inlet opening for gravitational flow of ice cubes thereinto and a bottom wall provided with an outlet opening in underlying relationship to said top wall and in laterally spaced relationship to said inlet opening for gravitational flow of ice cubes therefrom, and a shiftable feeder in said box between said top and bottom walls for transferring the ice cubes from the inlet to the outlet, said feeder including a vertical shaft in the box having a plurality of radially extending rods thereon disposed below and in relatively close proximity to the top wall, and a vane on each rod, each of said vanes having a normally uppermost longitudinal edge pivotally mounted on the corresponding rod, said vanes being circumferentially spaced to present a number of ice cube receiving pockets, said shaft being rotatable to shift said pockets along a substantially horizontal path underlying said inlet opening and overlying said outlet opening.

3. In combination with an automatic ice cube maker, a cooler; a hopper in the cooler disposed to receive ice cubes from said maker; means for continuously agitating the ice cubes in the hopper; and a dispenser communicating with the hopper for vending a predetermined quantity of ice cubes each time the dispenser is actuated, said dispenser including a collection box in the cooler below the hopper, said box having a top wall provided with an inlet opening for gravitational flow of ice cubes thereinto and a bottom wall provided with an outlet opening in underlying relationship to said top wall and in laterally spaced relationship to said inlet opening for gravitational flow of ice cubes therefrom, and a feeder for transferring the ice cubes from the inlet to the outlet, said feeder including a vertical shaft in the box having a plurality of radially extending rods thereon disposed below and in relatively close proximity to the top wall, and a vane on each rod, each of said vanes having a normally uppermost longitudinal edge pivotally mounted on the corresponding rod, said vanes being circumferentially spaced to present a number of ice cube receiving pockets, said vanes being disposed in substantially spanning relationship to said top and bottom walls, said box being provided with means on said bottom wall and engageable with said vanes for pivoting the vanes about the corresponding rods as the rotor is actuated whereby to agitate the ice cubes in the pockets.

4. In combination with an automatic ice cube maker, a cooler; a foraminous hopper in the cooler disposed to receive ice cubes from said maker; means for continuously agitating the ice cubes in the hopper; a dispenser communicating with the hopper for vending a predetermined quantity of ice cubes each time the dispenser is actuated, said dispenser including a collection box in the cooler below the hopper, said box having a top wall provided with an inlet opening for gravitational flow of ice cubes thereinto and a bottom wall provided with an outlet opening in underlying relationship to said top wall and in laterally spaced relationship to said inlet opening for gravitational flow of ice cubes therefrom, a shiftable feeder in said box between said top and bottom walls for transferring the ice cubes from the inlet to the outlet, said feeder being movable along a substantially horizontal path underlying said inlet opening and overlying said outlet opening, and an open top chute disposed for gravitational flow of ice cubes from said outlet to a station exteriorly of the cooler; and means for circulating air in the cooler through the hopper around the ice cubes therein and through the dispenser and the chute.

5. In combination, a cooler; an ice cube supply hopper in the cooler; means for continuously agitating the ice cubes in the hopper; an actuable dispenser communicating with the hopper for vending a predetermined quantity of ice cubes each time the dispenser is actuated; and shiftable means within said dispenser and engageable with the ice cubes remaining in the dispenser for agitating said cubes when said dispenser is actuated.

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