ABSTRACT: Apparatus for receiving and storing particulate ice, such as cubes, including a rotating dispenser which can be operated to release controlled quantities of ice on demand. A revolving disc carries lifters which provide small compartments for the receipt of ice discharged from a storage zone through apertures in the disc.
BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates generally to apparatus for storing and dispensing ice and, more particularly, to a sanitary ice cube dispensing adapted to receive ice from an adjacent ice-making unit and provide a storage bin and means for dispensing controlled quantities of ice upon demand.

In conventional ice-cube-making machines, the cubes are formed according to a freeze and harvest cycle, and are intermittently discharged into a storage bin, normally located underneath the ice-making unit. Suitable automatic controls are usually provided for discontinuing the operation of the ice maker when the storage bin is full.

One problem with known prior art apparatus of this type is that the ice is removed manually, either by using a scoop, or, in some cases, by simply removing the required quantity of cubes by hand. This conventional method of handling the cubes is unsatisfactory for sanitary reasons, particularly in hospitals, restaurants and similar locations where sanitation is critical, since manual handling is likely to contaminate the cubes or the storage compartment with bacteria.

Still another factor is that if demand for ice is high, the bin cover is open a good part of the time subjecting the mass of ice in the bin to ambient temperatures and, thereby, causing melting and regelation of the cubes in the bin. This is one reason why ice-dispensing units have not been practical in the past.

Once the ice has solidified, it requires considerable power to break up the mass and maintain the ice in a flowable condition to enable its removal through a chute or other conveyor.

In the apparatus of the present invention, a large disc separates a bin into a storage compartment and a discharge compartment. The disc, mounted for rotation, is provided with lifters extending into the discharge compartment and agitator pins extending into the storage compartment. Slots formed in the periphery of the disc afford openings through which small quantities of ice cubes pass from the storage to the discharge compartment into the lifters. As the disc is driven, the agitator pins loosen the mass of ice in the storage compartment and the cubes are caused to flow through the peripheral slots into the lifters. As the cubes are carried up, they eventually reach a discharge chute and fall by gravity to the dispensing station.

It is, therefore, a principal object of the invention to provide an ice storage and dispensing apparatus which maintains the ice stored within the bin in a flowable condition.

Another object of the invention is to provide a readily cleanable, sanitary storage and dispensing unit in which the user does not contact the ice while in the storage zone.

Still another object of the invention is to provide a vending apparatus which requires relatively little power to retain the stored ice in a flowable condition.

Additional objects and advantages will become apparent from reading the following detailed description taken in conjunction with the drawings.

THE DRAWINGS

FIG. 1 is an isometric view of the exterior of the ice storage and dispensing apparatus constructed in accordance with the principles of the present invention;

FIG. 2 is a front elevation view, with portions broken away and in cross section of the apparatus shown in FIG. 1; and

FIG. 3 is a cross-sectional view taken along the plane of line 3-3 of FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

Turning now to FIG. 1, there is shown an ice storage and dispensing unit 10 having an ice dispensing station 12, a drain board 14, and a water valve 16. The unit 10 is adapted to be used in conjunction with an ice-making unit mounted on the upper wall thereof so that the cubes are discharged into the storage compartment. The ice-making unit, while not shown, is mounted, in any conventional manner, above the storage and dispensing unit 10 on a frame 18.

The ice cube storage and dispensing unit, as best illustrated in FIGS. 2 and 3, is provided with a housing 20 having a rear wall 22, sidewalls 24 and 26, front wall 28, and a top wall 30. The drain board 14 extends forwardly as a space for water and drain lines (not shown) and also for a gear motor 32 which will be explained in more detail below. A decorative panel 23 extends across the front of the unit below drain board 14.

A generally U-shaped bin is provided by a bin liner 34 having a rear wall 35, sidewall sections 36 and 38, and a curved lower wall section 40. The lower wall extends upwardly from a partition 42 and is secured thereto within a frame 44.

Attached to the front wall 28 of housing 20 is a boxlike sheet metal structure 46 which forms the rear wall 47 and sidewalls 49 of the dispensing station 12. The rear wall 47 supports a bearing 39 which, together with another bearing 41 on the rear wall 22 of the housing, journal a rotatable shaft 48 driven by gear motor 32. The shaft is connected to a circular disc 50 which is designed to conform to the shape of the bin liner lower wall section 40.

The disc 50 is positioned so as to divide the bin into a storage zone 52 and a discharge zone 51 extending forwardly from the disc. The periphery of the disc is provided with a plurality of slots 53 which are sized to permit the flow of a small number of cubes from the storage zone to the discharge zone as the disc is rotated. Lifters 56, which are secured to the forward face of the disc, comprises generally U-shaped, sheet metal straps 55 which are located with the side portions fastened adjacent the opposite sides of each slot 53.

Means for receiving the ice and conducting it out of the discharge zone 51 at the dispensing station 12 may take the form of a hopper or chute 54. This also can be secured to front wall 28 and generally surrounds the structure 46 which defines the dispensing station.

In order to prevent premature release of the cubes as they are carried upwardly toward the hopper 54, a sheet metal guide 57 is secured to the partition 42 and extends from the hopper to a point approximately 100" therefrom in a direction opposite the disc's rotation.

In order to insure that the ice within the storage bin is maintained in a flowable condition, the bin is provided with a series of pins 58 which serve to agitate and break up the ice within the storage zone. Also, to encourage movement of ice from the rear wall toward the disc, an inclined plate 60 is stationed in the lower portion of the bin liner. It has also been found that a flange member 62 extending forwardly from the rear wall of the bin liner absorbs the shock of the storage zone from the ice maker (not shown) and, when the bin is substantially full, it also helps to relieve the pressure on the ice in the lower part of the storage zone beneath the shaft 48, to retard regelation of the ice mass.

In operation, when ice is to be dispensed, the operator energizes the gear motor drive through controls (not shown) which cause the disc 50 to begin rotating in a counter, clockwise direction (as viewed in FIG. 2). Ice cubes will be ejected from the storage zone through the slots at the periphery thereof and be picked up by the sidewalls of the lifters. During the first 90° of lifting, the lower wall of the bin liner provides the base of what can be considered a movable pocket. As the cubes are carried upward further, the guide 57 will provide a lower surface to support the ice and prevent cubes from being released downwardly until they reach the hopper 54. The cubes are then discharged by gravity through the hopper and into the dispensing station.

While this invention has been described in connection with a certain specific embodiment thereof, it is to be understood that this is by way of illustration and not by way of limitation; and the scope of the appended claims should be construed as broadly as the prior art will permit.

What we claim is:
3,592,366

3. Ice dispensing and storage apparatus comprising means defining a bin having a curved lower wall section and upstanding sidewall sections; a disc mounted for rotation in said bin, said disc dividing said bin into a storage zone for particulate ice and a dispensing zone on the opposite side of said disc; means for driving said disc; lifters secured to said disc and extending into said dispensing zone; means defining at least one opening in the peripheral edge of said disc providing a flow path for ice from said storage zone to said dispensing zone into an area where it may be engaged and carried by said lifters; and means for receiving ice at the upper portion of said disc to conduct said ice out of said dispensing zone.

4. Apparatus as defined in claim 3 including a baffle in said storage zone extending forwardly and downwardly toward the peripheral portions of said disc, whereby ice in said storage zone is urged into engagement with that portion of the disc in common with the storage zone.

5. Apparatus as defined in claim 4 including agitator means carried by said disc extending into said storage zone and adapted to break up a mass of regelled ice.

6. Ice dispensing and storage apparatus comprising means defining a bin having a curved lower wall section and upstanding sidewall sections; a disc mounted for rotation in said bin, the periphery of said disc conforming closely with the lower wall section of said bin, said disc dividing said bin into a storage zone for particulate ice and a dispensing zone on the opposite side of said disc; means for driving said disc; lifters secured to said disc and extending into said dispensing zone; means defining a plurality of openings in the peripheral edge of said disc, each providing a flow path for ice from said storage zone to said dispensing zone into an area where it may be engaged and carried by said lifters; a chute positioned adjacent the upper portion of said disc for receiving ice to be discharged by gravity at a dispensing station; guide means extending from the upper portion of said lower wall section in a generally circular path and terminating adjacent said chute so as to provide a surface to support the ice lifted upwardly to a point where it can fall by gravity from the lifters into said chute.