ABSTRACT

Apparatus for storing chunk or cube ice and for delivering ice on command in which a plurality of elongated members mounted for staggered reciprocating movement in side by side relationship at the bottom of a generally rectangular storage bin having sides sloping slightly outwardly from top to bottom of the reservoir are provided with serrated upper surfaces inclined downwardly from the back of the reservoir toward a discharge area at the front and are adapted to be driven to discharge ice from said bin.

14 Claims, 4 Drawing Figures
BIN ICE DELIVERY MECHANISM

BACKGROUND OF THE INVENTION

Generally in the prior art at a soda fountain or the like stored chunk or cube ice is gathered manually by scooping it from a bin either directly with the glass or other container in which they were to be finally placed or via some intermediate device such as a scoop. Insertion of human hands and external devices into an ice-filled bin is inconvenient and is unsanitary. The open bin itself is unsanitary.

Automatic ice makers known in the art have small capacities. Automatic ice storage and dispensing devices of the prior art of relatively large capacity have certain limitations and disadvantages. Most of them require auxiliary agitators located in the bin above the delivery area. These auxiliary agitators add to the complexity of the structure and to the power requirement of the machine. Some ice storage and delivery mechanisms incorporate inwardly tapering sides leading to a delivery auger or the like. Melting and resolidification of ice chunks in such a machine result in bridging of a mass of ice between the sides over the auger. Power requirements of machines of the prior art are high. They are vulnerable to mechanical failure.

It has further been suggested that stored cubes of ice be fed down an inclined plane under the action of a vibrator located below the plane. Such a structure does not solve the problem of separating ice pieces which have joined together. In order to operate satisfactorily it must be located in the freezer compartment of a refrigerator or the like. The mechanical arrangements employed in ice dispensers of the prior art are bulky and are not suited for use as components of automatic drink dispensing apparatus where space is limited.

I have invented an ice storage and delivery mechanism which overcomes the defects of ice storage and delivery systems discussed hereinabove. My mechanism does not require auxiliary agitators. It is not susceptible to jamming. Its power requirement is relatively low. It is compact, simple and inexpensive to construct.

SUMMARY OF THE INVENTION

One object of my invention is to provide an ice storage and delivery mechanism which overcomes the disadvantages of systems of the prior art.

Another object of my invention is to provide an ice delivery mechanism which does not require auxiliary agitators.

A further object of my invention is to provide an ice storage and delivery mechanism having a relatively low power requirement.

A still further object of my invention is to provide an ice delivery mechanism which is not susceptible to jamming.

Still a further object of my invention is to provide an ice delivery mechanism which is compact.

Other and further objects of my invention will become apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIG. 1 is a side elevation of my bin type ice delivery mechanism with the left side wall removed.

FIG. 2 is a front elevation of the drive apparatus of my bin type ice delivery mechanism with the front wall removed and with parts broken away and with other parts in section.

FIG. 3 is a top plan view of the drive apparatus of my bin type ice delivery mechanism.

FIG. 4 is a fragmentary side view of a portion of my bin type ice delivery mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the bin, indicated generally by reference character 10, has side walls 12 and 14, a front wall 16, a rear wall 18, a floor 20, and an open top 22. The front and rear walls 18 and 20 are slightly inwardly directed from bottom to top of the bin to inhibit bridging. Floor 20 includes a central well portion 21 for collecting melt down and generally level front and rear portions 23 and 24 which support a plurality of elongated ice agitating and delivering members 26 the upper surface of each of which slopes downwardly from back to front of the dispensing mechanism 10.

The sloping upper surface of each of the members 26 is formed with a plurality of teeth 28 so shaped as to promote unidirectional flow of stored ice toward the front of the delivery mechanism 10. I form the rear portion of each member 26 with a rectangular recess 36 which receives an eccentric 38. Preferably to facilitate assembly and disassembly for cleaning I provide recesses 36 which are open at the bottoms, as shown in FIG. 4. I mount the eccentrics 38 on a shaft 40 having a hexagonal cross section. For this purpose I provide each of the eccentrics with an offset opening 39 having flat sides for engaging diametrically opposite flats on shaft 40. I arrange the eccentrics in pairs across the width of the machine with the eccentrics of each pair being 180° out of phase. Moreover, each pair of eccentrics is arranged so as to be 60° out of phase with the adjacent pair. This is readily achieved by placing each eccentric on the shaft 40 with the flat sides of the opening 39 in engagement with the proper flats of shaft 40. With all of the eccentrics 38 on a common shaft the result of the arrangement just described will readily be apparent from the relative positions of the bars 26 in FIG. 3. This arrangement ensures uniform ice delivery and a slower ice delivery in ounces per second when required.

In the particular arrangement illustrated in the drawings the common shaft 40 is driven by a motor 42 carried by a bracket 44. It will readily be appreciated that alternative arrangements are contemplated. For example, I may provide two delivery stations on one bin. In such an arrangement one motor would be used to drive the eight bars at the left and another motor would drive the eight bars to the right. The motors could be energized either individually or simultaneously.

I provide my machine with means for controlling the movement of ice from the storage area over the bars 26 to the delivery chute 52. In the particular embodiment illustrated in the drawings I attach a plurality of resilient fingers 48 formed from rubber or the like to the front wall of the cabinet by any suitable means such as screws.

The top 22 of the bin ice delivery mechanism 10 is provided with a cover 58 which, when removed, provides access to the bin storage area 50 for loading. The cover 58 may be provided with a handle for complete
removal or may be slid away in a conventional track or attached by hinges and swung upward.

When the bin ice delivery motor 42 is energized, it drives the shaft 40 which in turn causes the series of eccentrics 38 to rotate with the shaft 40. The rectangular openings 36 at the rear of the dispensing members 26 in which the eccentrics are disposed are of a width approximately equal to the diameter of the eccentrics and of a height greater than the diameter of the circular locus of the outermost path of travel of the eccentrics. As shown in FIG. 4, the eccentric 38 is closely confined by the right and left sides 60 and 62 respectively of the rectangular opening 36 but is not confined by the upper edge 64. As a result of this arrangement, rotation of the eccentric 38 about the shaft 40 causes the dispensing members 26 to reciprocate horizontally.

As is pointed out hereinabove the eccentrics 38 are arranged in pairs of adjacent eccentrics across the machine with the eccentrics of a pair being 180° out of phase. Moreover, each pair of eccentrics is 60° out of phase with the adjacent pair.

In operation the cover 58 is removed and ice is fed into the open top 22 either manually or by automatic apparatus such as an ice making machine. The ice is stored in the bin storage area 50 which may be cooled externally by any conventional refrigeration apparatus. When a quantity of ice is desired from the bin mechanism 10, a switch 70 is closed thereby activating the motor 42. As the motor 42 rotates the shaft 40 causes the eccentrics 38 to drive members 26. The dispensing members 26 are subject to reciprocation in a vertical direction on floor 20. The teeth 28 on the members 26 force the ice pieces in contact with them toward the front of the bin mechanism 10, past the fingers 48 and through the delivery chute 52 to the appropriate waiting receptacle.

Ice may be fed into the bin 10 either manually or directly from an ice making machine. The delivery mechanism 10 may be energized manually to dispense ice into a container on command or it may operate automatically in conjunction with another device such as a cold drink machine. My invention may serve as a component of an ice-making machine and be joined with a refrigeration apparatus to maintain the bin 10 at freezing temperatures.

It will be seen that I have accomplished the objects of my invention. I have provided a bin ice storage and delivery system which overcomes the defects of storage and delivery systems of the prior art. My system does not require auxiliary agitators. It is not susceptible to jamming. Its power requirement is relatively low. It is simple and compact.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. Apparatus for storing a supply of ice in pieces and for delivering pieces of ice from said supply including in combination, a generally rectangular container for holding a supply of ice in pieces, said container having a front wall and a back wall, each of said front and back walls being slightly inwardly directed from the bottom thereof to the top thereof, said container having a bottom, said container formed with a delivery opening adjacent to said bottom, a plurality of ice delivery members, means mounting said members on said bottom for movement toward and away from said delivery opening, and means for driving said members to move pieces of ice from said supply toward said delivery opening.

2. Apparatus as in claim 1 in which said members are mounted for reciprocating movement.

3. Apparatus as in claim 2 in which said drive means reciprocates said members in out-of-phase relationship.

4. Apparatus as in claim 3 in which said members are arranged in pairs across said machine and in which the members of a pair are reciprocated in 180° out-of-phase relationship.

5. Apparatus as in claim 1 in which each of said members has an upper surface inclined downwardly from a location remote from said delivery opening to a location adjacent to said delivery opening.

6. Apparatus as in claim 5 in which each of said members is formed with teeth in the upper surface thereof.

7. Apparatus as in claim 1 including spring fingers between said delivery area and the remainder of said container.

8. Apparatus for storing a supply of ice in pieces and for delivering pieces of ice from said supply including in combination, a container for holding said supply of ice in pieces, said container having a front and a back and a bottom provided with a flat generally horizontally disposed surface portion, said container front being formed with a delivery opening adjacent to said bottom, a plurality of ice delivery members, each of said members being formed with an undersurface received for sliding movement on said flat bottom surface portion, said members being arranged in side by side relationship across said bottom for reciprocating movement in a direction from front to back of said container, means for reciprocating said members to move pieces of ice from said supply toward said delivery opening and means for removing melt down from said supply from said bottom.

9. Apparatus as in claim 8 in which said melt down removing means comprises means forming a well portion in said bottom.

10. Apparatus as in claim 8 in which said front and rear walls are inclined slightly inwardly from top to bottom thereof.

11. Apparatus as in claim 8 in which each of said members has an upper surface inclined downwardly from the back toward the front of said container.

12. Apparatus as in claim 11 in which each of said members is formed with teeth in the upper surface thereof.

13. Apparatus for storing supply of ice in pieces and for delivering pieces of ice from said supply including in combination, a generally rectangular container having a bottom and a front wall and a rear wall and side walls for holding a supply of ice in pieces, a delivery area adjacent to said front wall, a delivery outlet in said area, a plurality of elongated ice delivery members, means mounting said members in side-by-side relationship over substantially the entire distance between said side walls with the members extending from adjacent to said rear wall toward said delivery area and for limited reciprocating movement in the direction of the length of the members whereby said members form the sup-
port for said supply, each of said members having a toothed upper surface inclined downwardly toward said bottom in a direction from said rear wall toward said front wall, and means for reciprocating adjacent ones of said members in out-of-phase relationship, said members being arranged in pairs across said machine, said reciprocating means reciprocating the members of said pairs in 180° out-of-phase relationship and reciprocating adjacent pairs in 60° out-of-phase relationship.

14. Apparatus as in claim 13 in which said reciprocating means comprises a shaft having a hexagonal cross section and eccentrics having openings with flat sides for engaging said shaft.

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