United States Patent [19]

Kohl et al.

[11] **3,796,351**

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[54] **ICE DISPENSING MACHINE**

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[52] **U.S. Cl.** **222/108,** 222/168

[51] **Int. Cl.** **B67d 1/08**

[58] **Field of Search** ..... 222/108, 146 C, 168, 167, 222/168.5, 169

[56] **References Cited**

UNITED STATES PATENTS

2,781,153	2/1957	Roberts	222/146 C X
3,406,871	10/1968	Hoenisch	222/129.3 X

FOREIGN PATENTS OR APPLICATIONS

514,915	11/1939	Great Britain	222/108

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[57] **ABSTRACT**

An apparatus for dispensing flaked or particulate ice including a rotatable ice storage bin, means defining a discharge opening below the storage bin and communicable with a discharge spout, a discharge chute selectively movable in response to a receptacle being moved into an ice receiving position below the spout for communicating particulate ice from the discharge opening to the discharge spout and effecting rotation of the storage bin.

4 Claims, 6 Drawing Figures

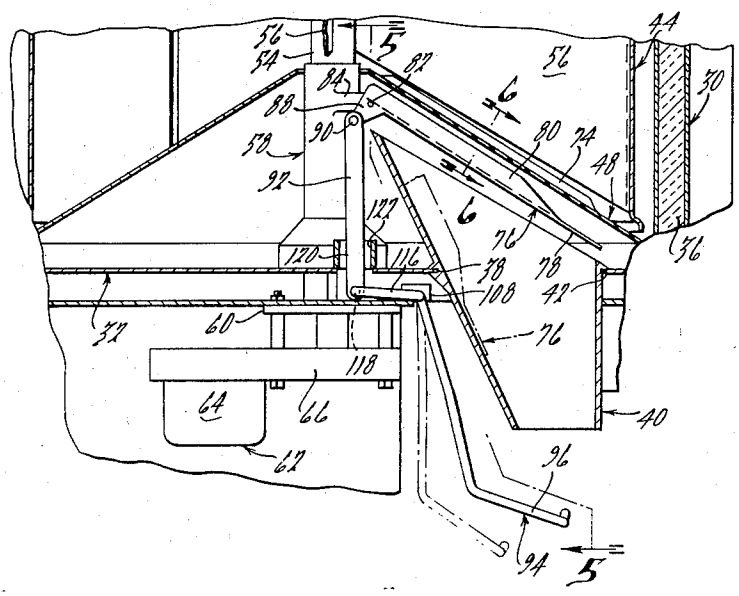


Fig. 1.

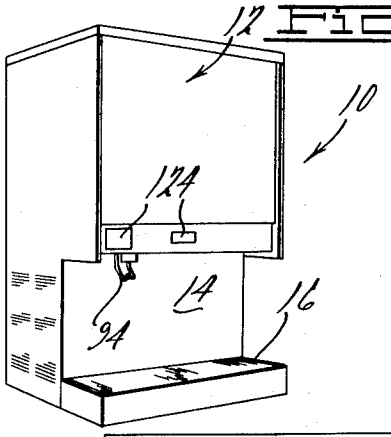
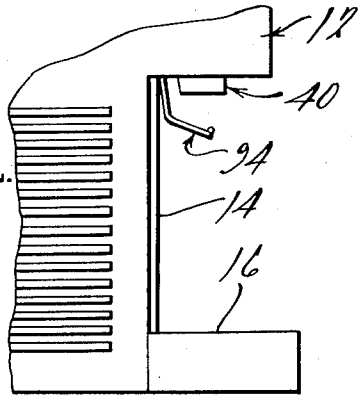


Fig. 2.



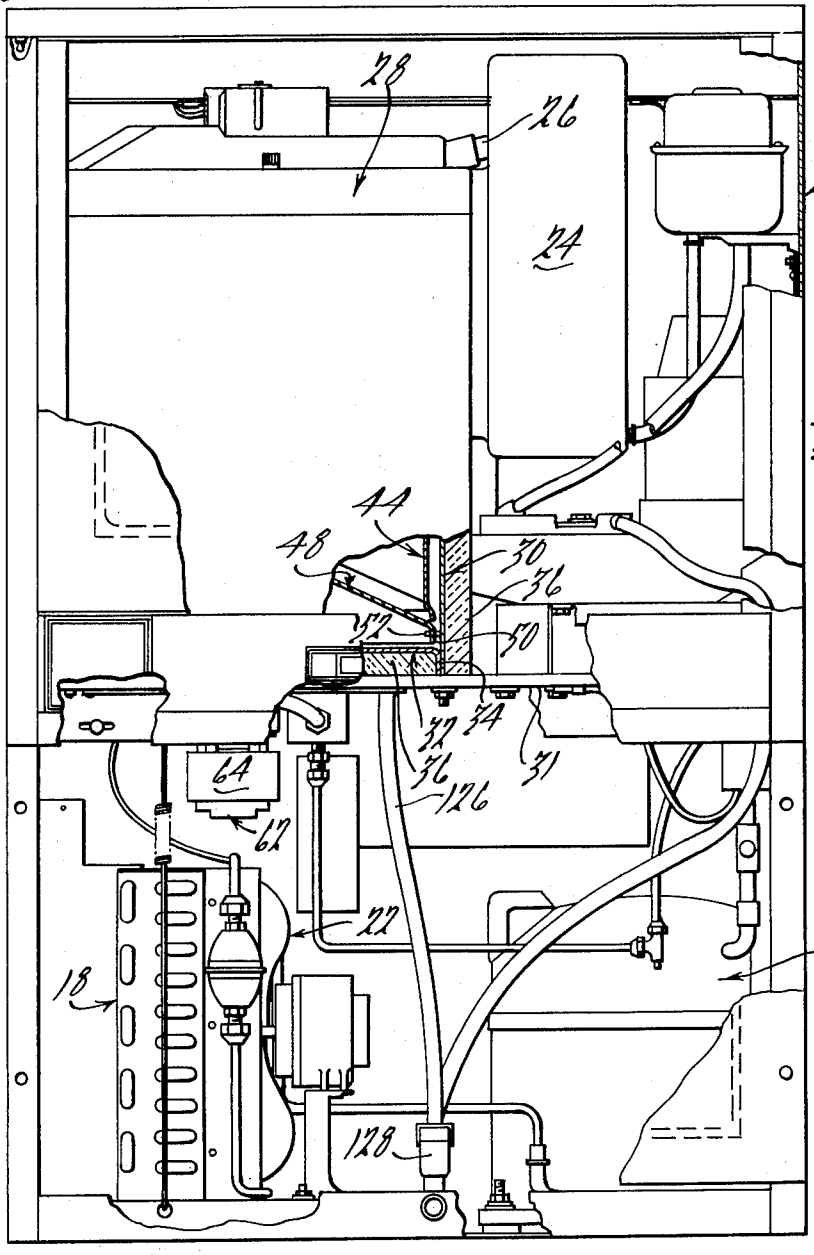


Fig. 3.

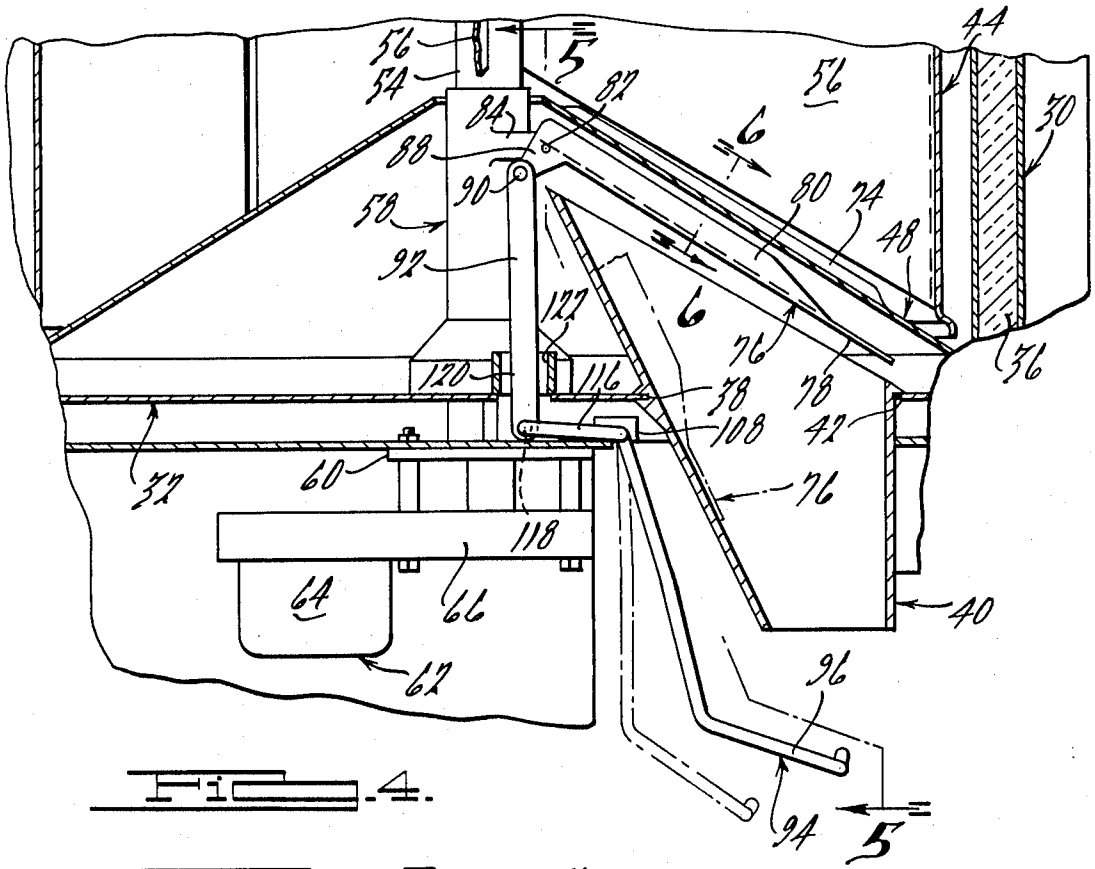


Fig. 4.

Fig. 5.

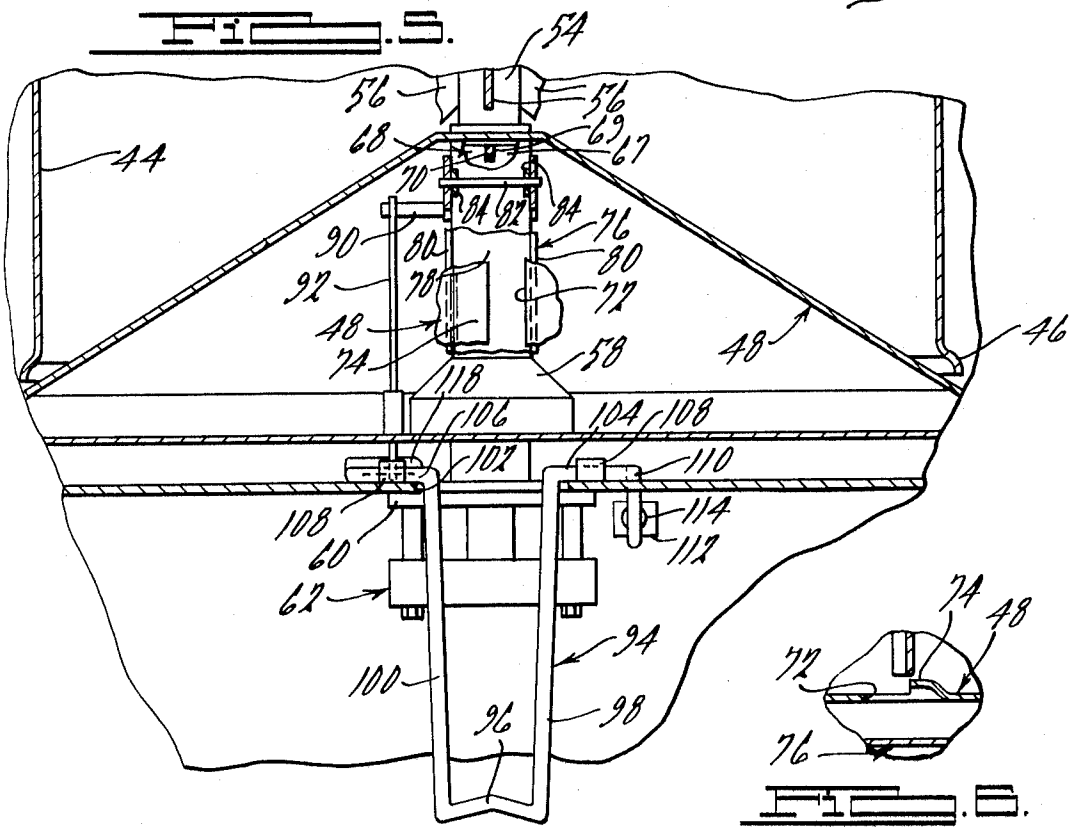


Fig. 6.

ICE DISPENSING MACHINE

BACKGROUND OF THE INVENTION

Generally speaking, the particulate ice dispensing apparatus of the present invention comprises an ice storage bin that is rotatably mounted within a dispensing housing and within which a mass or volume of particulate ice is stored prior to being discharged therefrom. At such time as it is desired to dispense particulate ice from the storage bin, the entire mass of stored ice is rotated over a stationary discharge spout supported in a plate adjacent the lower end of the ice mass, this plate being provided with means for shearing ice from the lower end of the mass in the event that there exists any adhesion or "bridging" between the ice particles.

More particularly, the present invention is concerned with certain improvements over the flaked ice dispenser shown and described in U. S. Pat. No. 3,406,871, issued Oct. 22, 1968, which generally shows an ice dispensing machine of the above described type, but which includes a shutter assembly that is rotatable with the ice storage bin to selectively close or block the flow of ice and incidental melt water between the discharge opening in the bin and the discharge spout. The present invention features a novel ice discharge chute which takes the place of the aforementioned shutter assembly and which is adapted to be selectively actuated by means of a receptacle actuated control lever that depends downwardly into the dispensing cavity of the machine directly below the ice discharge spout. The discharge chute normally assumes a position below the discharge opening whereby any ice or melt water which may drop downwardly therethrough will be directed into an outer storage bin which is in turn communicable with a system drain, thereby positively preventing any ice or melt water from dropping downwardly through the discharge spout during periods of non-use. At such time as it is desired to dispense or vend a quantity of particulate ice, the aforementioned control lever is actuated by inserting a glass or other suitable receptacle below the discharge spout, whereby the control lever will effect energization of the drive motor controlling rotation of the storage bin, and simultaneously will effect movement of the discharge chute from the aforementioned position to a position guiding the downward flow of ice from the discharge opening into the discharge spout, as will hereinafter be described in detail.

SUMMARY OF THE INVENTION

This invention relates generally to improvements in apparatus for storing and dispensing ice, and more particularly, to an extremely simple and compact apparatus for storing and dispensing ice in flaked or particulate form.

It is accordingly a primary object of the present invention to provide a new and improved ice dispensing apparatus featuring a novel ice discharge chute arrangement which functions to positively prevent ice and melt water from dropping downwardly through the ice discharge spout during periods of non-use, and which is movable to a position for guiding or directing ice from the discharge opening to the discharge spout during a vend cycle.

It is another object of the present invention to provide a new and improved ice discharge spout arrangement which is of a relatively simple design and which is therefore economical to manufacture, easy to assemble and which will have a long and effective operational life.

It is still another object of the present invention to provide an improved particulate ice dispensing machine of the above character that facilitates the handling of particulate ice in a sanitary manner.

It is a more specific object of the present invention to provide a particulate ice dispensing apparatus of the above character wherein the ice is stored and delivered without contact with human hands and other possible sources of contamination.

It is a further object of the present invention to provide a new and improved ice dispensing machine of the above described type wherein the rotatable ice storage bin is simultaneously actuable with actuation of the ice discharge chute.

It is still a further object of the present invention to provide a new and improved ice dispensing machine of the above character wherein both the ice discharge chute and drive motor for rotating the ice storage bin are actuated upon engagement of an ice receiving receptacle with a control lever located within the dispensing cavity of the machine.

It is still a further object of the present invention to provide a particulate ice dispensing machine which may be easily installed and readily assembled and disassembled for cleaning and the like without the use of any special tools.

Other objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevated perspective view of an ice dispensing machine embodying the principles of the present invention;

FIG. **2** is an enlarged fragmentary side elevational view of a portion of the dispensing cavity of the ice dispensing machine of the present invention;

FIG. **3** is an enlarged cross sectional view, partially broken away, of the interior components of the ice dispensing machine of the present invention;

FIG. **4** is an enlarged fragmentary cross sectional view of the ice discharge spout, discharge chute and discharge opening which cooperate with the ice storage compartment of the ice dispensing machine of the present invention;

FIG. **5** is an enlarged transverse cross sectional view taken substantially along the line **5—5** of FIG. **4**; and

FIG. **6** is a fragmentary cross sectional view taken substantially along the line **6—6** of FIG. **4.**

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now in detail to the drawing, a flaked or particulate ice dispensing machine **10,** in accordance with one preferred embodiment of the present invention, is shown as comprising an exterior cabinet housing **12** which is formed with a dispensing cavity **14** and a drainboard **16** at the lower end of the front or forward side thereof. The housing **12** is adapted to contain a refrigeration system of the type well known in the art and includes a condenser **18,** a compressor **20** and a cooling fan assembly **22.** This refrigeration system serves to

supply refrigerant to a particulate ice producing system 24 of conventional design and located in the upper end of the cabinet 12 (see FIG. 3). The refrigeration system may also be used to cool a liquid, such as drinking water or the like, to be dispensed through a suitable conduit or the like located within the discharge cavity 14, as is well known in the art. An ice chute or spout 26 is provided in the upper end of the cabinet 12 and is adapted to communicate particulate ice produced by the system 24 to an ice dispensing or vending assembly, generally designated by the numeral 28. As best seen in FIG. 3, the assembly 28 is mounted in the front or forward portion of the cabinet 12 and functions to selectively dispense preselected quantities of ice in particulate form to a suitable receptacle disposed within the dispensing cavity 14, in a manner hereinafter to be described.

It may be noted that while the particular arrangement of the aforementioned refrigeration and ice producing components is not essential to advantageous use of the various features of the present invention, their combination with the storage and dispensing portions of the hereinafter to be described ice vending assembly 28 provide a completely self-contained unit that will serve to conveniently and economically furnish ice in flaked or particulate form, without exposing such ice to any source of contamination. It will further be noted that the ice producing system 24 per se does not constitute a material part of the present invention and therefore will not be described in any further detail. By way of example, this system may be of the type shown and described in Trow et al, U.S. Pat. No. 2,753,694, issued July 10, 1956, which is incorporated herein by reference as a part of the descriptive portion of this specification.

Referring now to FIGS. 4 and 5, the ice vending assembly 28 is shown as comprising an elongated, generally cylindrically shaped outer bin 30 which is supported on a suitable structure or platform 31 in the position shown in FIG. 3. The lower end of the bin 30 is closed by an annular bottom closure member 32 which is preferably, although not necessarily, fabricated of stainless steel, or an equivalent corrosion resistance material, such as molded plastic or the like, the member 32 providing a fluid tight closure at the lower end of the bin 30 and being supported therein by having a downwardly extending flange section 34 fixedly secured within the inner periphery of the bin 30. A suitable insulating material, generally designated by the numeral 36, is preferably provided around the outer periphery of the outer bin 30 and on the underside of the closure member 32, as illustrated. A generally radially extending, oval shaped opening 38 is formed in the bottom closure member 32 within which is supported a downwardly projecting particulate ice outlet or discharge spout 40 that is formed with a peripheral groove or slotted section 42 which is adapted to nestingly receive the periphery of the opening 38, whereby to be operatively supported in the position shown in FIG. 4. As illustrated, the spout 40 extends downwardly below the platform 31, with the lower end thereof terminating within the upper end of the dispensing cavity 14. Disposed coaxially within the outer bin 30 is a particulate ice storage inner bin 44 which is slightly smaller in diameter than the outer bin 30 and is mounted for rotary movement therewithin. The lower end of the inner or ice storage bin 44 is formed with an outwardly flared section 46 which serves to uniformly space the bin 44 from the inner periphery of the outer bin 30. Disposed directly below the storage bin 44 is an annular inner bottom plate or member 48 which is of a generally conical configuration, i.e., tapered radially inwardly and upwardly, and is formed with a generally cylindrical downwardly depending peripheral flange section 50 which is adapted to be detachably secured within the lower end of the outer bin 30 by means of a plurality of circumferentially spaced locking pins 52 which are adapted, for example, for bayonet locking engagement with suitable L-shaped slots or the like formed in the flange section 50, whereby to permit convenient removal of the member 48 for purposes of cleaning or the like, as will be apparent to those skilled in the art.

The inner or ice storage bin 44 is fixedly secured to an axially disposed, elongated central shaft 54 by means of a plurality (preferably three) of generally radially extending vanes or partition members, designated by the numeral 56. Each of the vane members 56 is formed with suitable transverse flange portions or the like on its radially inner and outer edges which flange portions are adapted to be fixedly secured to the central shaft 54 and inner periphery of the bin 44, thus providing a unitized rotatable assembly. The lower ends of the vanes 56 are inclined or tapered radially outwardly and downwardly from the shaft 54 toward the lower end of the bin 44 and thereby conform to the conical shape of the bottom member 48, as illustrated.

The shaft 54 is adapted to be operatively supported for rotational movement within the outer bin 30 by means of a generally annular or cylindrically shaped hollow support sleeve 58 which is mounted at the lower end of the bin 30 and extends generally axially upwardly therefrom. The sleeve 58 is fixedly secured at the lower end thereof to a support plate 60 which is secured, as by suitable screws, bolts or the like, to the platform 31, with the sleeve 58 projecting axially upwardly beneath the shaft 54 and being adapted to rotatably receive the lower end of the shaft 54 within the upper end thereof. Disposed below the ice vending assembly 28 is a drive motor assembly, generally designated by the numeral 62. The assembly 62 comprises a suitable electrically energized drive motor 64 which is adapted to drive a suitable gear train housed within an enclosure 66, the gear train 66 in turn being adapted to drive or rotate a generally vertically disposed shaft 67 which projects upwardly through the sleeve 58. Suitable coupling means, generally designated by the numeral 70, is provided between the upper end of the drive shaft 67 and the lower end of the shaft 54, whereby rotation of the drive shaft 67 upon energization of the motor 64 will effect rotation of the shaft 54 and hence rotation of the vanes 56 and the inner bin 44. Such coupling means is representatively illustrated in FIG. 5 as comprising a generally diametrically extending pin 69 provided on the lower end of the shaft 54, which pin 69 is adapted to be nestingly received within a suitable diametrically extending recess or slot 70 formed in the upper end of the drive shaft 67. It will be appreciated, of course, that various alternative drive arrangements may be utilized without departing from the scope of the present invention. By virtue of the aforedescribed coupling arrangement between the shaft 54 and shaft 67, the entire inner bin 44 may be conveniently removed for purposes of cleaning or the like.

As best illustrated in FIGS. 4 and 6, the inner bottom member 48 is formed with a particulate ice discharge opening 72 that extends radially from a point adjacent the central shaft 54 to a point adjacent the inner bin 44, the opening 72 being located directly above the ice discharge spout 40 that is supported in the bottom member 32, whereby particulate ice stored within the inner bin 44 may flow or drop under the influence of gravity directly through the opening 72 and spout 40 into a suitable receptacle, such as a glass or the like which is inserted into the dispensing cavity 14. The dispensing of ice is accomplished by rotating the inner bin 44, upon suitable actuation of the drive motor assembly 62, whereby the mass of particulate ice within the inner bin 44 is rotated relative to the inner bottom member 48. As best illustrated in FIG. 6, the portion of the inner bottom member 48 defining the far side of the discharge opening 72 (relative to the direction which the particulate ice is rotating) is slightly raised, whereby to define an ice shearing edge, herein designated by the numeral 74. As the mass of particulate ice rotates relative to the inner bottom member 48, due to the aforementioned rotary movement of the inner bin 44, the lowermost particles of ice which do not drop through the discharge opening 72 under the influence of gravity are sheared from the moving mass and thereafter drop through the opening 72 and the discharge spout 40 into the aforesaid receptacle.

In accordance with the principles of the present invention, interposed between the underside of the inner bottom member 48 and the discharge spout 40 is an elongated ice discharge chute, generally designated by the numeral 76. The chute 76 comprises a generally flat or planar central portion 78 having a pair of upstanding side sections 80 forming along the longitudinally opposite sides thereof. The chute 76 extends generally radially outwardly from the support sleeve 58 at a position underlying the discharge openings 72, as best seen in FIG. 4. Generally speaking, during periods of non-use, the discharge chute 76 is disposed in the solid line position shown in FIG. 4, wherein the chute 76 is arranged generally parallel to the inner bottom member 48, i.e., slopes downwardly and outwardly. The length of the chute 76 is such that any ice or incidental melt water, which may have a tendency to drop downwardly from the ice mass within the inner bin 44 through the opening 72, will fall onto the chute 76 and be directed downwardly and outwardly beyond the outer portion of the discharge spout 40, with such ice or melt water being directed into the lower end of the outer bin 30 and be subsequently communicated to a suitable discharge drain or the like hereinafter to be described. At such time as the machine 10 is actuated, the chute 76 is adapted to be pivoted in a manner such that the outer end thereof moves downwardly or in a generally clockwise direction in FIG. 4 from the solid line position shown in this figure to the dotted or phantom line position. In this latter position, the chute 76 is adapted to guide the ice which drops downwardly through the opening 72 into the spout 40 for subsequent dispensing.

The aforesaid pivotal movement of the discharge chute 76 is provided by means of a generally horizontally disposed pivot pin 82 (see FIG. 5) which extends laterally through the side sections 80 at the upper end of the chute 76 and also through a pair of laterally spaced bosses 84 integrally formed on the support sleeve 58 at positions laterally outboard of the side sections 80. The chute 76 is formed with a generally downwardly projecting tab portion 88 adjacent the upper end thereof which is adapted to be pivotally connected via a suitable pivot pin or the like 90 to a downwardly projecting connecting or link member 92.

As best shown in FIGS. 2 and 4, an elongated, generally U-shaped glass filler control element or lever depends downwardly into the dispensing cavity 14 at a position directly rearwardly of the discharge spout 40. The lever 94 is formed with a generally U-shaped lower end portion 96 which projects beneath the lower end of the discharge spout 40 to a position wherein a glass or other receptacle into which ice is to be dispensed may be engaged therewith. The lower end portion 96 of the lever 94 is formed with upwardly directed, laterally spaced, leg sections 98 and 100 which project through a suitable opening 102. The upper ends of the leg sections 98, 100 are formed with laterally outwardly extending integral support sections 104 and 106, respectively, which are adapted to be pivotably mounted on the upper side of the platform 31 by means of a pair of journal blocks, generally designated 108, whereby the lever 94 is pivotable between the solid and dotted line positions shown in FIG. 4. The support section 104 is formed with a rearwardly and downwardly extending arm portion 110 which is cooperable with a control switch assembly, generally designated by the numeral 112. The assembly 112 comprises a depressable switch element 114 which is adapted to be engaged by the arm section 110 of the lever 94 in order to complete an electrical control circuit to the drive motor assembly 62. More particularly, at such time as the lever 94 is pivotably biased by means of a suitable glass or other receptacle from the solid line position shown in FIG. 4 to the dotted line position shown in this figure, the switch element 114 will be depressed by the section 110 to a position completing the aforesaid control circuit, thus effecting energization of the drive motor 64. Similarly, at such time as the aforesaid receptacle is removed, resulting in the lever 94 returning to the solid line position in FIG. 4 from the dotted line position, the switch element 114 will move to an open position, thus opening the electric circuit to the drive motor 64 to effect de-energization of the same.

The support section 106 of the lever 94 is formed with a rearwardly extending arm section 116 having a generally laterally extending end portion 118 that is pivotably connected to a lower end portion 120 of the linkage member 92, the end portion 120 projecting downwardly through a suitable opening 122 as illustrated. By virtue of the operative connection of the control lever 94 with the chute 76 via the linkage member 92, at such time as the lever 94 is depressed, i.e., biased from the solid line to the dotted line position in FIG. 4, the linkage member 92 will be biased upwardly in FIG. 4, resulting in ice discharge chute 76 being pivoted downwardly from the solid line position to the phantom line position, as above described. It will thus be seen that at such time as the lever 94 is pivoted rearwardly, as above described, the switch assembly 112 will be actuated to effect energization of the drive motor assembly 62, and simultaneously, the discharge chute 76 will be pivoted from the position blocking the communication of particulate ice between the discharge opening 72 to the discharge spout 40, to a position providing such communication of particulate ice.

A detailed description of the overall control system of the machine 10 will not be given for purposes of conciseness of disclosure, it being sufficient to say that the machine 10 may typically be provided with a control system such as that shown and described in U. S. Pat. No. 3,406,871, which is incorporated by reference in the descriptive portion of this specification, such control system typically including a selector or vend control switch 124 mounted on the cabinet 12 and providing, for example, for the dispensing of continuous ice upon depressing the lever 96, the dispensing of metered ice (preselected quantities) and/or the simultaneous or separate dispensing of cooled drinking water. Assuming that the switch or switches 124 have been properly selected or positioned, the operator may place a receptacle, such as a glass or the like, into the dispensing cavity 14 to a position below the lower end of the discharge spout 40. As this is done, the receptacle will engage the lower end of the lever 94 and bias the same from the solid line position in FIG. 4 to the dotted line position. Such pivotal movement of the lever 94 will effect actuation of the switch assembly 112 and simultaneous pivotal movement of the discharge chute 76 from the solid line position to the dotted line position in FIG. 4. With the assembly 112 thus actuated, the drive motor assembly 62 will effect rotation of the inner bin 44, resulting in the mass of particulate ice contained therewithin moving across the discharge opening 72 and thereafter being directed by means of the discharge chute 76 downwardly into and through the spout 40 into the receptacle located therebelow. At such time as the vend cycle has been completed, the operator will remove the receptacle, resulting in the lever 96 being moved back to the solid line position of FIG. 4 and further resulting in deactuation of the drive motor assembly 62 and repositioning of the chute 76 back to the solid line position in FIG. 4 wherein any residual ice or melt water that may drop downwardly through the opening 72 may be directed into the lower end of the outer bin 30 and be subsequently communicated via a suitable drain conduit 126 and drain assembly 128 (see FIG. 3) to a tuitable system drain.

It will be seen from the foregoing that the present invention provides a novel ice dispensing machine which features an improved ice discharge arrangement wherein any ice or melt water which may fall downwardly through the discharge opening will be conveyed directly to a system drain instead of falling through the discharge spout. The chute arrangement described herein will be seen to be of an extremely simple design and hence may be economically manufactured and will have a long and effective operational life. It will be appreciated, of course, that many alternative arrangements may be utilized for operatively connecting the control lever 94 with the chute 76 and control switch assembly 102 without departing from the scope or fair meaning of the subjoined claims and that the arrangement described hereinabove has been shown merely as a highly satisfactory method of carrying out the present invention.

While it will be apparent that the preferred embodiment herein illustrated is well calculated to fulfill the objects stated, it will be appreciated that the present invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In combination in an apparatus for dispensing a particulate material,
   - a movably supported particulate material storage bin, said storage bin being movable toward and away from a discharge position,
   - means defining a particulate material discharge opening adjacent the lower end of said bin,
   - a discharge spout for communicating particulate material from said opening into a suitable receptacle therefor,
   - a relatively movable discharge chute for communicating particulate material from said opening to said spout,
   - said discharge chute being movable from a first position wherein material placed thereon will be directed to a first location and a second position wherein material placed thereon will be directed toward said discharge opening, and
   - means for simultaneously moving said bin toward said discharge position and causing said discharge chute to be moved from said first position toward said second position, whereby particulate material within said storage bin will pass toward said discharge opening and thereafter along said chute into a receptacle.

2. The invention as set forth in claim 1 wherein said chute is movable between a first position communicating with a drain and a second position communicating with a receptacle.

3. The invention as set forth in claim 1 wherein said chute is movable between a first position communicating particulate material from said discharge opening towards said spout and a second position communicating said discharge opening with a drain.

4. The invention as set forth in claim 1 wherein said storage bin includes a rotatable inner bin disposed within said storage bin and means for selectively rotating said inner bin.

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