United States Patent

[11] 3,580,428

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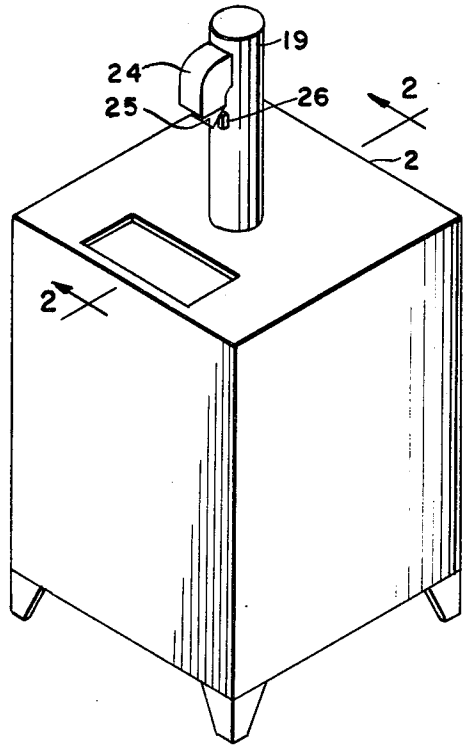
[54] **ICE DISPENSING MACHINE**
10 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **222/241,** 222/236, 222/254, 222/318, 222/410
[51] **Int. Cl.** **B67d 5/52,** G01f 11/10
[50] **Field of Search** 222/241, 254, 318, 371, 405, 410, 236

[56] **References Cited**
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Primary Examiner—David M. Bockenek
Attorney—Munson H. Lane

ABSTRACT: An ice dispensing machine having an insulating casing with a platform adjacent the bottom for supporting a mass of flaked ice with a rotatable impeller mounted adjacent the bottom of the mass of ice to shave the ice therefrom and direct such ice to a vertically extending conveyor for carrying the ice upwardly to a discharge spout with a receptacle actuated lever for starting the operation of the impeller and conveyor.



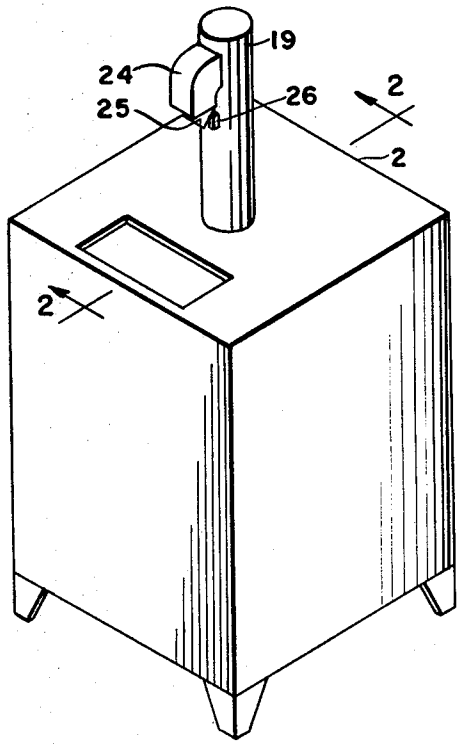


Fig. 1.

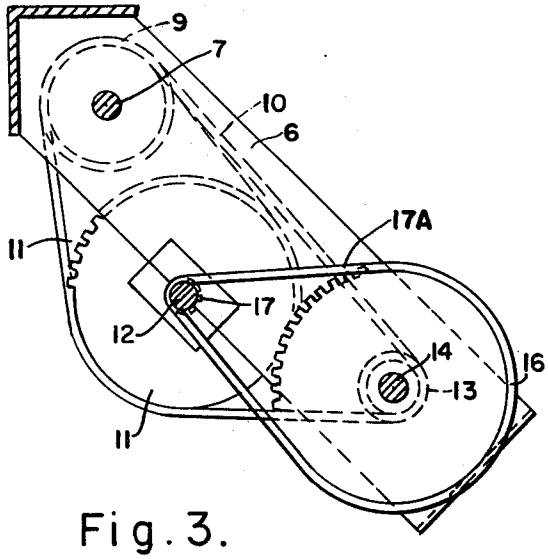


Fig. 3.

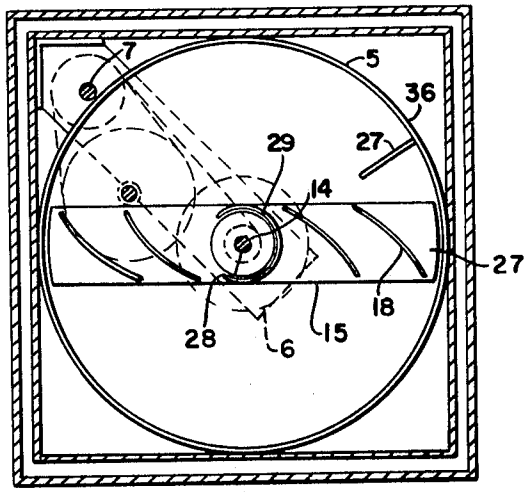


Fig. 4.

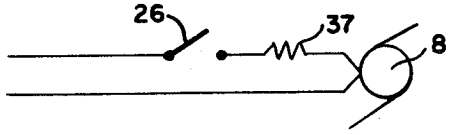


Fig. 5.

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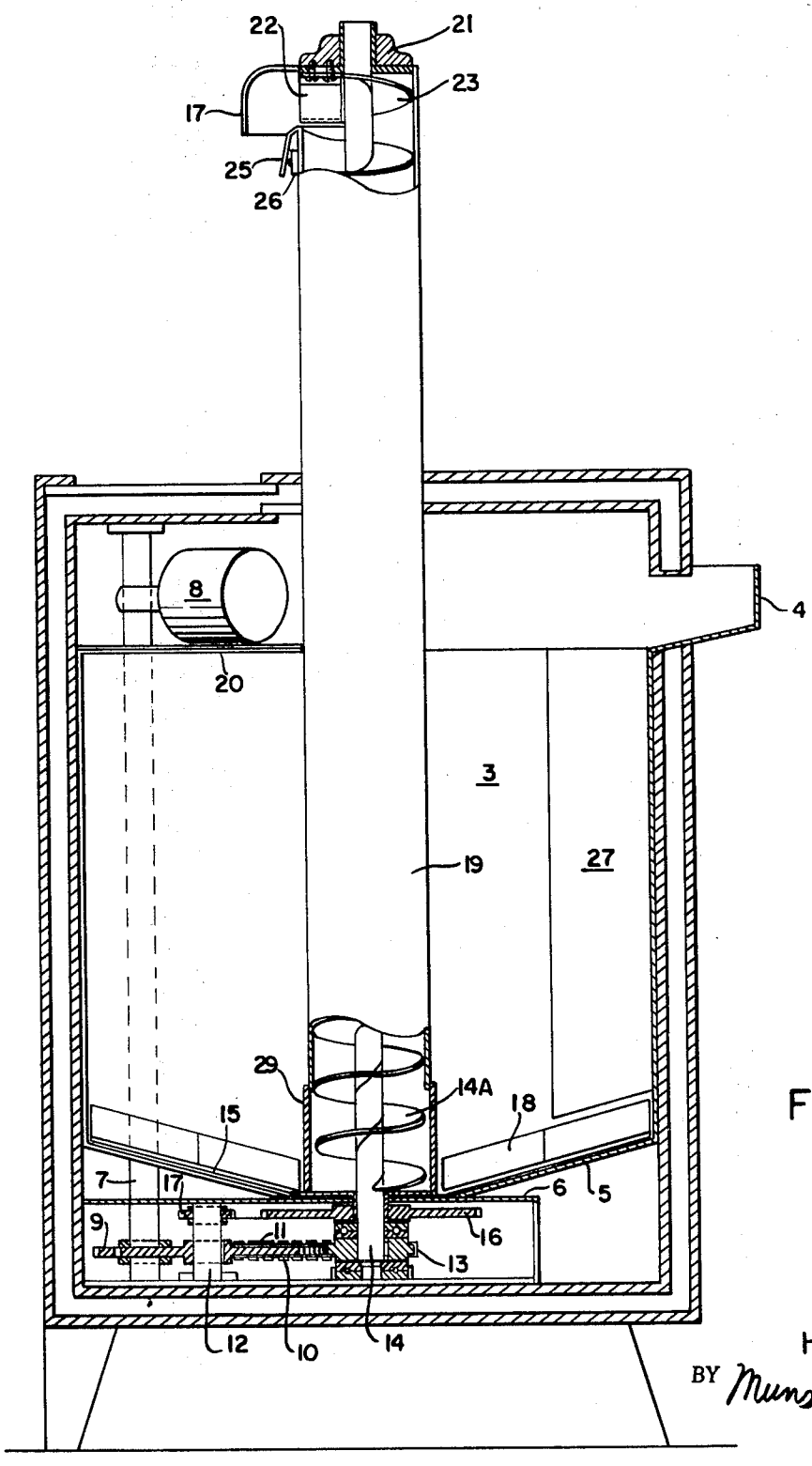


Fig. 2.

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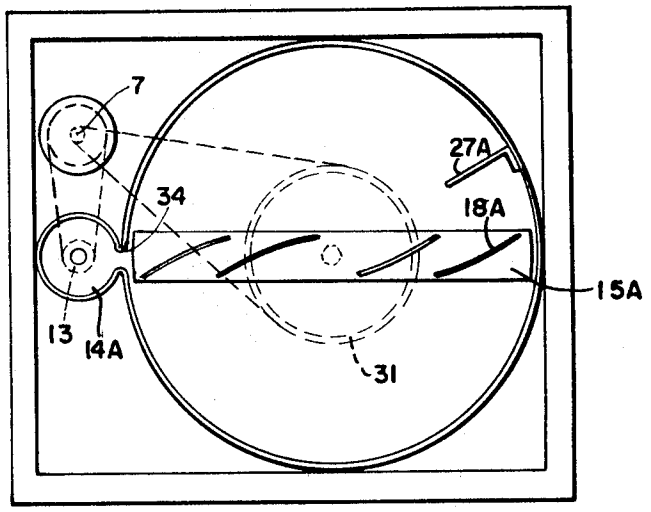


Fig. 7.

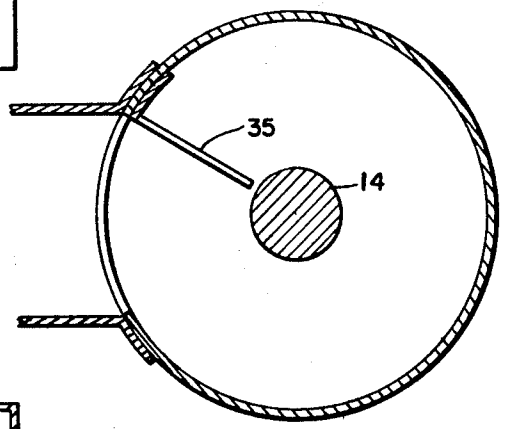


Fig. 8.

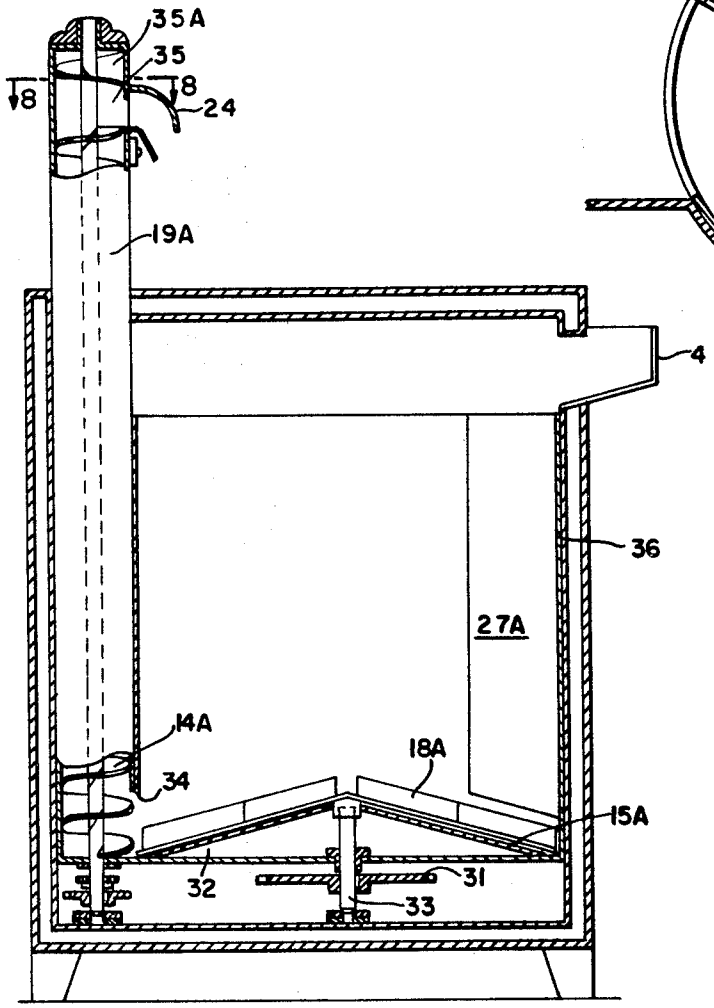


Fig. 6.

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ICE DISPENSING MACHINE

The present application relates to the subject matter of my prior application Ser. No. 688,060, filed Dec. 5, 1967, now U.S. Pat. No. 3,463,362 granted Aug. 26, 1969.

This application relates to dispensing and more particularly to dispensing particulate material such as flake ice or granulated ice.

Heretofore, various types of equipment have been provided for dispensing particulate material and for dispensing ice, but the structures have not been entirely satisfactory because of the complicated mechanism involved and the difficulty in maintaining the equipment in operative condition.

An object of the invention is to provide an ice dispensing machine which will overcome the objections of the prior art and provide satisfactory dispensing over long periods of time.

Another object is to provide an ice dispenser with agitating means to assure that the ice will be broken from the mass of ice and conveyed to the place of dispensing.

A further object is to provide a dispensing machine with means to operate it by contact with the receptacle for receiving the dispensed material.

Other and further objects will be apparent as the description proceeds and upon reference to the accompanying drawings wherein:

FIG. 1 is a perspective of one form of the ice machine showing the discharge spout and the receptacle engaging lever operated microswitch;

FIG. 2 is a transverse section taken substantially on plane 2–2 of FIG. 1 showing the impeller for loosening the ice from the bottom of the mass and the screw conveyor for raising the ice to the discharge spout and showing the drive mechanism therefor;

FIG. 3 is a schematic view showing the drive mechanism for the screw conveyor and the ice loosening impeller;

FIG. 4 is a plan view of another form of drive mechanism showing the impeller vanes;

FIG. 5 is an electrical wiring diagram showing the operation;

FIG. 6 is a vertical section of another form of the invention having a convex platform and cooperating impeller with the screw conveyor at one side;

FIG. 7 is a section taken on line 8–8 of FIG. 6 showing the position of the stationary deflector.

FIG. 8 is an enlarged detail taken on line 8–8 of FIG. 6.

Briefly the invention in dispensing machines includes a casing having a platform for supporting the particulate material and an impeller rotatably mounted thereover for agitating the bottom of the mass of material and directing such material into a vertically extending conveyor which in one modification is centrally positioned with respect to the impeller and in another modification is positioned laterally thereof and in each form a receptacle actuated switch is positioned adjacent the discharge spout on the screw conveyor for causing dispensing of the ice while the receptacle is in proper position.

Referring more particularly to the drawings, the dispensing machine 2 includes an insulated casing providing a chamber 3 for storing ice passing into the chamber through a suitable chute 4 which directs the ice into the container and such ice is supported on a conical platform 5 of concave shape which is suitably fixed to the casing above a driving mechanism supporting frame 6 of generally U-shape which rotatably supports a plurality of shafts including a drive shaft 7 driven by a motor 8 supported in the upper portion of the chamber 3 and which drives a sprocket 9 which drives a chain 10 which engages an idler sprocket 11 fixed to a shaft 12 and the chain 10 also drives a sprocket 13 carried by the screw conveyor shaft 14. An impeller 15 is rotatably supported on screw conveyor shaft 14 and is driven by a sprocket 16 which is driven from a small sprocket 17 on the idler shaft 12 by means of a chain 17A so the impeller 15 is rotated at a very slow rate of speed compared to the rotation speed of the screw conveyor 14.

The impeller 15 has a pair of diverging blades carrying vanes 18 which are arranged in the manner shown in FIG. 7 with respect to impeller 15A.

The screw conveyor 14 is mounted in a tube 19 which is supported from the top wall of the casing and from the motor support 20 and at the upper end of such screw conveyor is a bearing 21 which carries a deflector 22 which remains fixed with respect to the tube 19 and the bearing 21, the screw blade terminating just below the deflector plate 22 and the deflector plate 22 having a reverse screw blade 23 fixed with respect to the tube 19 and the bearing 21 so that ice will be directed downwardly from the bearing and outwardly against the stationary deflector and thence dispensed through the spout 24. A lever 25 pivoted at its upper end adjacent the nozzle cooperates with a microswitch 26 to operate the motor 8.

From the above-description it will be evident that ice deposited in the receptacle through the opening 4 will be supported on the platform 5 and the mass of such ice will be prevented from rotation with the impellers by a stabilizer plate 27 fixed to the side of the casing 2 and the impeller will cause the ice to move inwardly into the opening 28 in the tubular plate 29 fixed to the impeller 15 and the ice so collected in the feed sleeve 29 will be fed upwardly by the screw conveyor 14 and passed through the discharge nozzle due to the action of deflector 22 and reverse screw element 23.

In FIG. 4 the motor shaft 7 which operates the sprockets and shafts as shown in FIG. 3 drives the impeller shown in plan in FIG. 4.

In the modification shown in FIGS. 6, 7 and 8 inclusive the drive from the motor driven shaft 7 may drive the impeller 15A through a sprocket 31 and drive the conveyor screw 14A by means of its sprocket 13, the drive being accomplished by suitably chains.

In this modification a convex platform 32 of conical shape is mounted over the drive mechanism housing and the impeller shaft 33 driven by the sprocket 31 is suitably mounted in bearings and carries the impeller blade 15A which has the vanes 18A thereon, it being apparent that the impeller blades extend outwardly and downwardly generally parallel with the corresponding surface of the platform 32 and direct the ice removed from the bottom of the mass to an opening 34 in the conveyor tube 19A and thereby the ice is moved upwardly by the conveyor screw 14A to the discharge nozzle 24.

It will be noted that a stabilizer plate 27A prevents the mass of ice from rotating in the modification of FIGS. 6 and 7. A discharge deflector plate 35 is mounted on the tube 19A adjacent the discharge opening to the spout 24 and above such discharge plate a screw element 35A is fixed to the screw shaft 14A to direct any ice moving above the spout downwardly into the discharge opening and into the spout and into the receptacle therebelow.

In each modification a cylindrical ice retaining wall is provided around the periphery of the platforms 5 and 32 as shown at 36, a suitable opening being provided for the entrance of the ice and also for the passage of the ice into opening 34 in the tube 19A.

From the above-description the operation is believed to be apparent since the closing of microswitch 26 causes the motor 8 to operate momentarily and then delay the operation for a limited period of time by a control unit 37 and after the short period of delay any further operation by the receptacle engaging plate 25 including the microswitch 26 causes the motor to operate and causes ice to be dispensed from the discharge spout. The invention is therefore suitable for use in self-service cafeterias or any other location where the ice is to be dispensed in accordance with the presence of a receptacle such as a cup or glass placed against the plate lever 25.

From the above-description it will be apparent that changes may be made within the spirit of the invention as defined by the valid scope of the claims.

I claim:

1. A dispensing machine comprising an upright cylindrical housing having a conical material receiving platform adjacent the bottom of said housing, means at the upper portion of said housing for supplying material to said conical platform, an impeller rotatably mounted in said housing above and adjacent

to said platform for contact with the lower portion of the mass of material therein, means to drive the impeller to loosen material from the bottom of the mass thereof, a screw conveyor extending upwardly above said housing and including a conveyor tube fixed in said housing and extending from adjacent the impeller, said conveyor tube having an entrance opening for material loosened by said impeller, a screw conveyor element in said tube, means to rotate said screw element, said conveyor tube having a discharge opening adjacent the upper end thereof, and means to cause the material to pass into the screw conveyor and outwardly from the material to pass into the screw conveyor and outwardly from the discharge opening said impeller comprising a pair of oppositely inclined blades mounted above said conical platform and sloped to conform thereto and serving to direct material received from said upper material supply means to the entrance opening of said conveyor tube.

2. The invention according to claim 1 in which the impeller and the screw conveyor are mounted on coincident vertical axes.

3. The invention according to claim 1 in which a motor drives the impeller and the screw conveyor element and a switch operating member is mounted adjacent the discharge opening to control the operation of the motor.

4. The invention according to claim 1 in which the screw element of the screw conveyor terminates adjacent the discharge opening in the conveyor tube and a deflector plate is mounted in the tube for engaging the material through the discharge opening.

5. The invention according to claim 4 in which a section of a reversely pitched conveyor element is fixed to the shaft of the conveyor element above the deflector plate to assist in the discharge of the material.

6. The invention according to claim 4 in which a reversely pitched screw section is fixed to the conveyor tube upwardly of the deflector plate.

7. The invention according to claim 4 in which a screw element is fixed to said conveyor tube adjacent said deflector plate.

8. The invention according to claim 1 in which the screw conveyor element and the impeller are mounted for rotation on a coincident vertical axis and the supporting platform flares upwardly and outwardly and the arms of the impeller extend outwardly and upwardly.

9. The invention according to claim 1 in which the screw conveyor and impeller are mounted for rotation on parallel vertical axes and the impeller and platform extend outwardly and downwardly from the center thereof and the conveyor tube is mounted adjacent the periphery of the platform.

10. The invention according to claim 1 in which the axes of rotation of the impeller and of the screw conveyor are vertical and a cylindrical casing is provided extending upwardly from the platform for the ice material and a stabilizer blade extends radially inwardly from the housing to engage the ice material and prevent rotation thereof.