United States Patent

Shartle

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[54] **TANK DEFROSTER FOR BEVERAGE DISPENSING MACHINE**

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[52] **U.S. Cl.** **62/155,** 62/156, 62/351, 62/394, 165/61

[51] **Int. Cl.** **F25d 21/06**

[58] **Field of Search** 62/156, 276, 351, 155, 234, 62/80, 394, 395; 165/17, 61

[56] **References Cited**

UNITED STATES PATENTS

2,744,391	5/1956	Deane	165/61
3,469,415	9/1969	Cornelius	62/394
2,601,466	6/1952	Thomas	62/155

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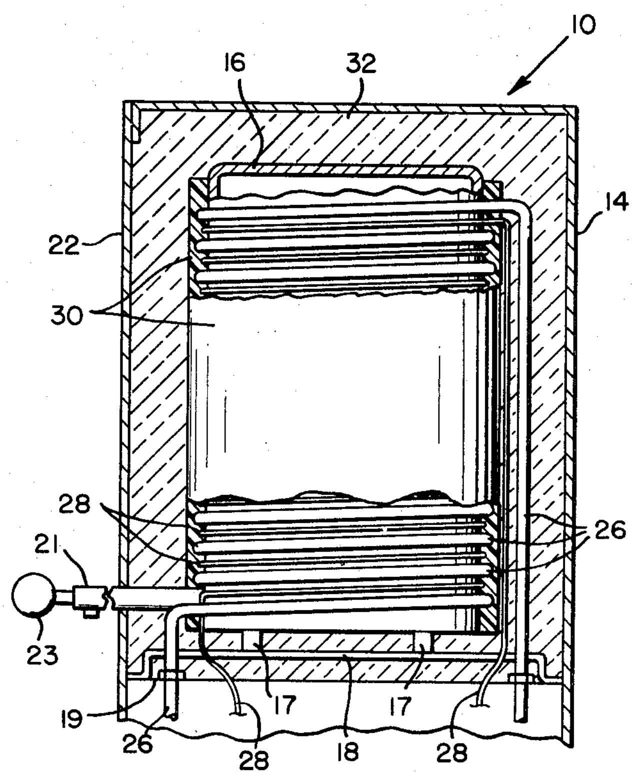
[57] **ABSTRACT**

A slush-type soft drink dispenser contains one or more cylindrical tanks for holding the drinks that are to be dispensed. Each tank has the usual tap or spigot, and is surrounded by a helically-wound tubular evaporator or cooling coil which is connected in the usual manner to a refrigerator unit in the dispenser, and by a helically-wound electrical heater coil, the convolutions of which alternate with those of the cooling coil. The coils are secured by a flexible layer of mastic to the outside of each tank, and this assembly is enclosed in a layer of heat insulation in the dispenser. A switch is provided for selectively actuating the refrigeration unit and the heater coil, respectively.

2 Claims, 3 Drawing Figures



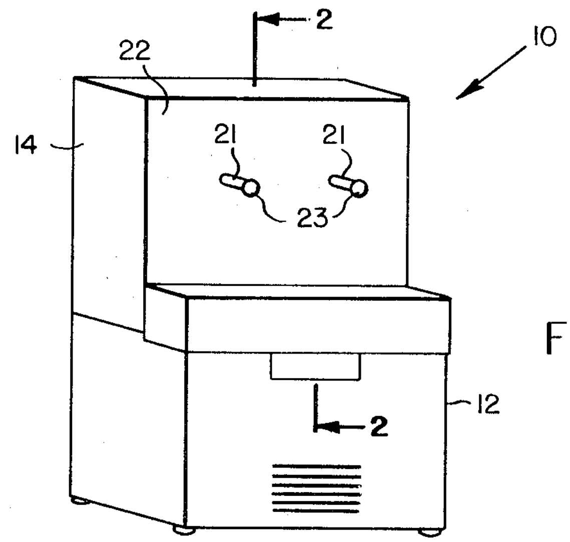


FIG. 1

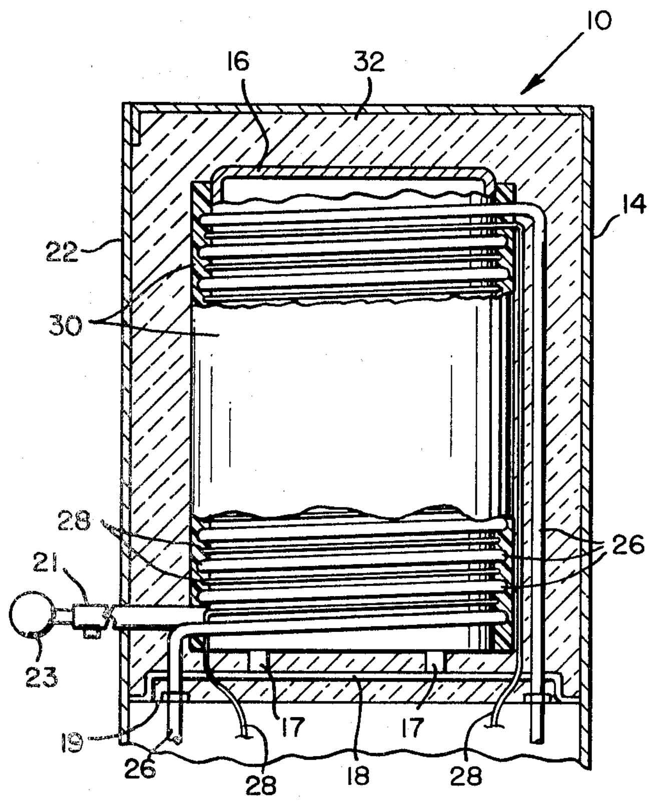


FIG. 2

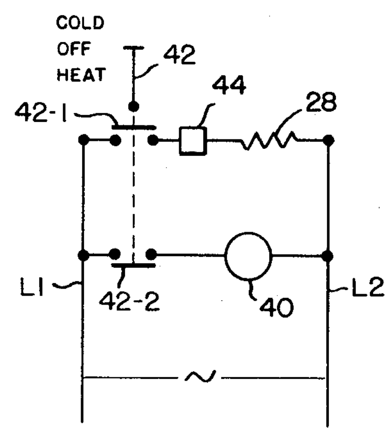


FIG. 3

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TANK DEFROSTER FOR BEVERAGE DISPENSING MACHINE

This invention relates to a beverage dispenser, and more particularly to a defrosting device for a slush-type beverage dispenser.

Soft drinks of the type that are dispensed in slush form have become quite popular in recent years. By using a refrigerated dispenser, which causes small crystals of ice to form in the soft drink while still in the dispenser, the need for subsequently adding ice to the drink after it is dispensed is eliminated. Moreover, as compared to drinks that are merely chilled before serving, the slush-type soft drink remains cold for a substantially longer period of time.

It is essential, of course, when using such a dispenser, to prevent the crystals of slush from becoming too large, because lumpy or oversize crystals are undesirable for consumption, and also tend to impair the proper operation of the dispenser. The present models of these dispensers are so well insulated that the frequent occurrence of lumpy or oversize ice crystals in the machines has become quite a problem. Usually by the close of a day the slush crystals have become too large for desirable consumption; and the dispensing units are so well insulated that without the use of induced heat the unit will not thaw out enough to be ready for operation the following day.

The primary object of this invention is to provide an improved soft drink dispenser which can rapidly and readily be defrosted, when desired.

A further object of this invention is to provide an improved dispenser of the type described, which has improved means for regulating the size of ice crystals formed in the drinks dispensed therefrom.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims, particularly when read in conjunction with the accompanying drawing.

In the drawing:

FIG. 1 is a perspective view of a typical slush-type soft drink dispenser incorporating a defrosting device made in accordance with one embodiment of this invention;

FIG. 2 is an enlarged, fragmentary sectional view taken generally along the line 2–2 in FIG. 1 looking in the direction of the arrows; and

FIG. 3 is a wiring diagram illustrating one manner in which this defrosting device may be wired for operation.

Referring now to the drawing by numerals of reference, **10** denotes generally a soft drink dispenser having in its lower section **12** a conventional refrigeration unit (not illustrated), and in its upper section **14** a pair of cylindrical chilling tanks **16**, only one of which is illustrated in FIG. 2. Each tank **16** is supported by a plurality of feet **17**, or the equivalent, on a horizontal base plate **18**, which is fastened on a shelf **19** above the dispenser's refrigeration unit. Each tank **16** has the usual fluid discharge pipe or spigot **21**, which projects from the lower end of the tank through a registering opening in a front panel or cover **22** for the section **14**. Each spigot contains the usual, normally closed flow valve (not illustrated), which is operable manually by a headed or knobbed lever **23**, which projects from each spigot.

Wound around the outside of each tank **16** in a helical path axially of the tank, is an evaporator or cooling coil **26** opposite ends of which extend downwardly beneath shelf **19** for attachment in the usual manner to the refrigeration unit. Also wound in a helical path around the outside of each tank **16**, with its convolutions alternating with those of the associated cooling coil **26**, is an insulated electric heating element or wire **28**, which may be of the type used for radiant cable heat. Both the cooling coil **26** and the heating cable **28** are cemented or secured to the outside surface of the tank by a layer or coating **30** of thermal conducting mastic, which remains flexible indefinitely. While in practice this layer **30** of mastic material is relatively thin, in FIG. 2 its thickness has been exaggerated for purposes of illustration.

The tanks **16** are contained within the upper section **14** of the dispenser **10**, and the space between the tanks and the housing **14** is filled with a conventional heat insulating material **32**, so that the tanks are completely encapsulated in thermal insulation.

In FIG. 3, lines L1 and L2 represent a typical means for supplying power to the heating and cooling elements of one of the tanks **16** in the dispenser **10**. These lines are adapted to be connected in any conventional manner to an AC power source. Connected in parallel between lines L1 and L2 are the heater coil or element **28** for a tank, and the motor **40** for the refrigeration unit, that provides the coolant for the evaporator or cooling coil **26** of that tank. The heater coil **28** and the motor **40** are controlled by a double-throw switch **42**, which has a first contact **42-1** connected in series with the coil **28**, and a second contact **42-2** connected in series with the motor **40**. When the switch **42** is in the "OFF" position illustrated in FIG. 3, both the coil **28** and the motor **40** are deenergized. When switch **42** is moved to a first or "COLD" position, its contact **42-2** closes to energize the motor **40**, but its contact **42-1** remains open to maintain the heater coil deenergized. On the other hand, when the switch **42** is moved to its "HEAT" position, contact **42-1** closes to energize the heater coil **28**, while the contact **42-2** remains open to maintain the motor **40** deenergized.

In use, and assuming for purposes of illustration that the heating and cooling coils of each tank **16** are controlled by separate switches **42**, so that the coils of one tank **16** are energizable independently of the coils of the other tank; and assuming also that the tanks **16** have been filled with the desired soft drinks, each switch **42** usually is disposed in its "COLD" position, so that the associated motor **40** is operating to maintain the contents of the associated tank **16** chilled to the point where the soft drink is in slush form upon being dispensed from one of the spigots **21**. If the ice crystals in the slush become too large, or too lumpy, the operator need only manipulate switch **42** to shutdown the refrigeration cycle, and turn on the electric heater coil **28** to accelerate defrosting of the tank.

If desired, a timer or thermostat may be provided to automatically restart refrigeration when the defrosting cycle is complete. **44** denotes a timer or thermostat. When the defrosting cycle is complete the unit **44** will release a spring or actuate a solenoid (not shown) to deenergize coil **28** and shift switch **42** automatically to again close the current to the motor **40** that supplies refrigerant to the cooling coil **26**.

Heretofore, once the oversized crystals had formed in the soft drink, the dispenser tended to operate erratically if at all; and mere interruption of the refrigeration cycle was no solution, because of the inordinately long period of time necessarily involved in thawing the tank contents. Now if a dispenser of the type disclosed herein begins to freeze up at a time when customers are lined up for service, the operator need only to turn switch **42** to its "HEAT" position, and the coil **28** will rapidly thaw and reduce the size of the ice crystals in the tank **16**. Obviously this permits the operator readily to control the size of crystals formed in the soft drink, merely by manipulating switch **42**.

Since the coils **26** and **28** are never operated simultaneously, any residual heat, or lack thereof, in the respective coils, will have little effect upon the subsequently energized or actuated coil. By employing a permanently flexible mastic material **30** for holding the coils around and against the associated tank **16**, the rapid temperature changes, which occur upon movement of a switch **42** between its two operative positions, create no undue stresses in the system; the flexible coating **30** will absorb any sudden expansion or contraction of the coils **26** and/or **28**.

Although a separate switch **42** has been illustrated and described for controlling each coil **28** and motor **40**, it will be apparent to one skilled in the art, that any number of coils **28** could be connected in parallel with one another to be controlled by switch contact **42-1**. Similarly a single motor **40** could be used for supplying a coolant to a plurality of the cooling coils **26**, Also, if desired, a conventional timer could also be employed for automatically effecting operation of either the coil **28** or motor **40**, or both.

Having thus described my invention, what I claim is:

1. Apparatus for dispensing soft drinks in slush-ice form while maintaining the proper consistency of the slush-ice, comprising
   a tank for holding a soft drink,
   a tubular cooling coil wound helically around the outside of said tank, and connected to a refrigeration unit,
   an electric heater coil wound helically around the outside of said tank with its convolutions alternating with those of said cooling coil,
   a layer of mastic around the outside of said tank and in which said coils are embedded to secure said coils to said tank, and to maintain the convolutions of the two coils spaced from one another,
   a housing surrounding said tank in spaced relation to said tank and the layer of mastic,
   a layer of thermal insulation disposed in the space between said tank and said housing and encapsulating said tank and said layer of mastic,
   a spigot connected at one end to the bottom of said tank, and projecting at its opposite end through said insulation and said housing to the exterior of the housing, and operable for controlling the flow of drink from the tank, and
   means for actuating said refrigeration unit and said heater coil, and
   movable control means for said actuating means operative when said refrigeration unit is actuated to render said heater coil inoperative, and vice versa, thereby to control the size of the ice crystals formed in said tank,
   said layer of mastic being flexible, to permit expansion and contraction of said coils in response to temperature changes produced therein.

2. Apparatus as defined in claim 1, wherein said actuating means includes means for reactuating said refrigeration unit automatically upon deactivation of said heater coil.

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