Jan. 29, 1957 J. R. PICHLER ET AL 2,779,165

ICE AND WATER DISPENSER

Filed Jan. 19, 1954 2 Sheets-Sheet 1

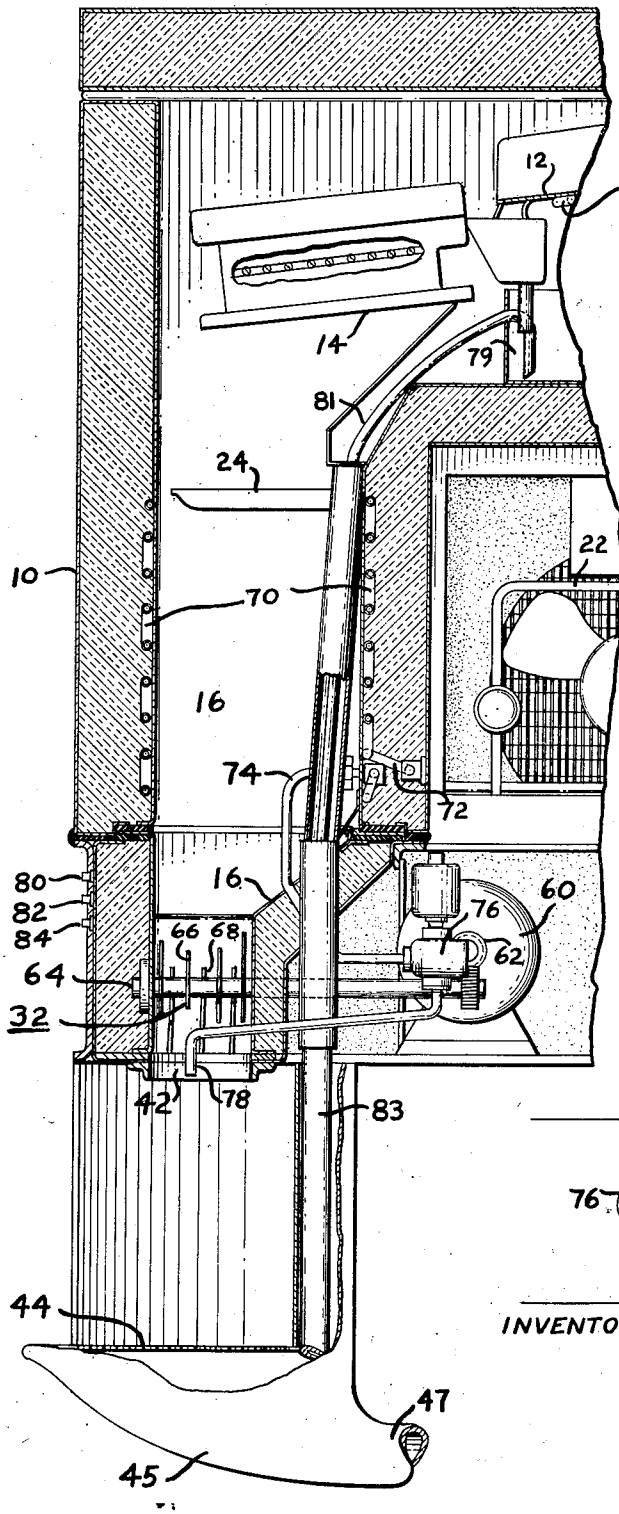


Fig. 1

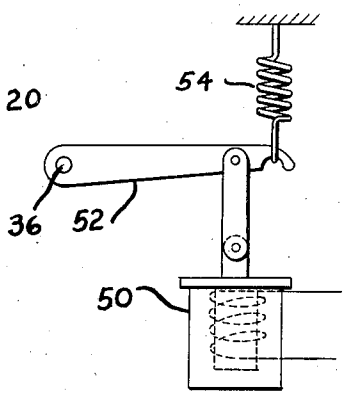


Fig. 4

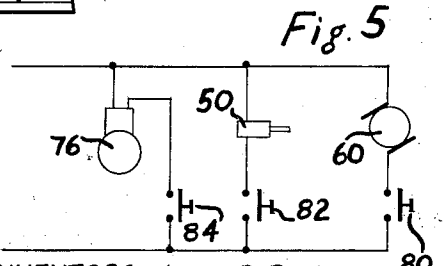


Fig. 5

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ICE AND WATER DISPENSER

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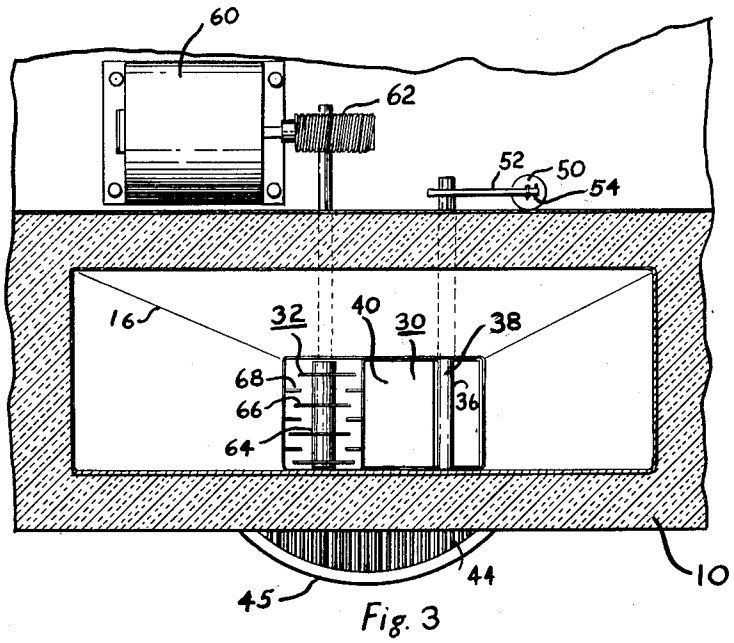


Fig. 3

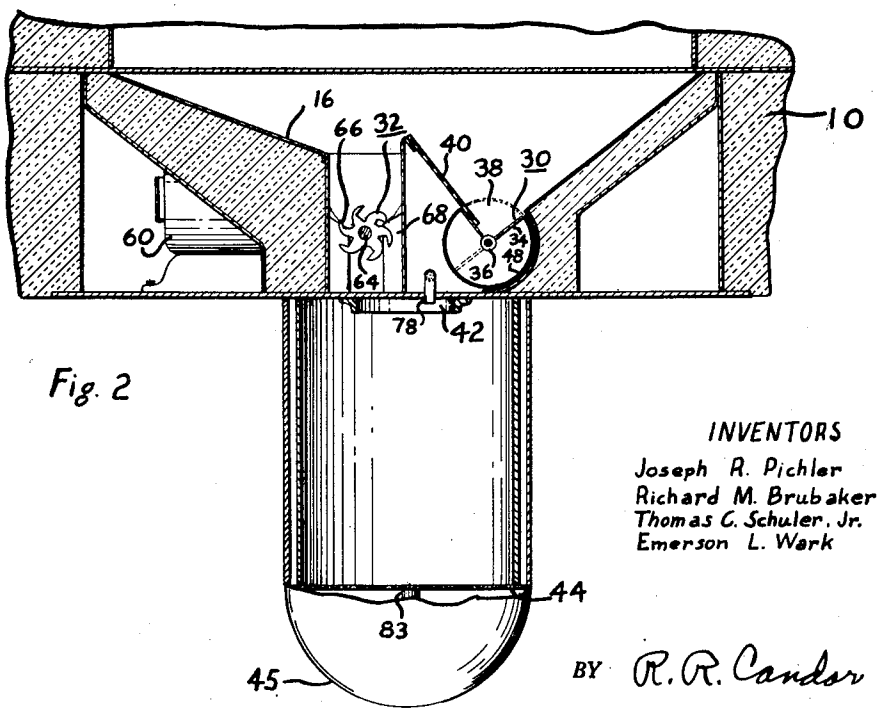


Fig. 2

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ICE AND WATER DISPENSER

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Application January 19, 1954, Serial No. 404,842

9 Claims. (Cl. 62—105)

This invention relates to refrigerating apparatus and more particularly to a device which may be used for selectively dispensing either refrigerated water, ice cubes or crushed ice.

It is an object of this invention to provide a simple and inexpensive arrangement for manufacturing and dispensing ice for use in chilling drinks and the like.

Another object of this invention is to provide a device for selectively dispensing either cold water, ice cubes or chipped ice.

Still another object of this invention is to utilize the ice cubes stored in the dispenser bin of an ice maker for precooling water or the like.

Still another object of this invention is to provide a device in which the mere pressing of buttons will cause the device to selectively dispense the above mentioned items at a given station.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a vertical elevational view with parts broken broken away showing the arrangement of the parts within the cabinet;

Figure 2 is a fragmentary front elevational view with parts broken away showing the ice cube metering device and the ice crushing device;

Figure 3 is a view looking down into the bottom portion of the ice cube hopper;

Figure 4 is a fragmentary elevational view showing the actuator mechanism for the ice cube metering device; and,

Figure 5 is a schematic circuit diagram showing the controls for the dispensing mechanisms.

Referring now to the drawing wherein a preferred embodiment of the invention has been shown, reference numeral **10** generally designates a cabinet of the type which is adapted to be mounted above the work surface in a modern kitchen, store counter or the like. Within the upper portion of the cabinet there is provided an automatic ice maker of the type more fully shown in copending applications Serial Number 355,061 filed May 14, 1953, now Patent No. 2,747,375, granted May 29, 1956, and Serial Number 278,928 filed March 29, 1952. Ice makers of this general type are now in extensive use and are known in the trade as Frigidaire ice makers. This ice maker is provided with a slanting plate **12** on which slabs of ice are frozen. After a slab of ice of a predetermined thickness has been frozen on the plate **12**, the plate is allowed to warm up and the slab slides down the inclined plate onto an ice dissector or grid **14** which cuts the slabs of ice into cubes which then are free to fall down into an ice cube storage bin **16**. An evaporator **20** serves to refrigerate the slanting ice freezing plate **12** in accordance with practice which is now well known in the trade. The evaporator **20** is supplied with liquid refrigerant from the refrigerant liquefying unit generally

designated by the reference numeral **22** and mounted beneath the freezing plate **12** as shown. The ice making equipment is designed to operate continuously until the ice cube storage bin **16** has been substantially filled, at which time the ice cubes will come in contact with the thermostat **24** which projects into the upper portion of the ice cube storage bin or hopper and shuts off the ice making equipment until the supply of ice drops below the thermostat **24**. Since the ice making equipment and the controls therefor are of a construction which is now well known and which is fully shown and described in said above mentioned applications they need not be described in greater detail herein.

The lower end of the bin **16** is provided with an ice cube metering and dispensing device **30** and an ice crushing device **32** which are located side-by-side above a common delivery chute **42**. The ice cube dispensing and metering device **30** consists of an oscillatable element **34** supported on a shaft **36**. The element **34** has a V-shaped pocket **38** forming the bottom of the ice cube storage bin **16**. Upon rotation of the shaft **36** from the solid line position in which it is shown in Figure 2 to its dotted line position, it will cause the ice cubes in the pocket **38** to be shoved past a flexible rubber gate element **40** into the delivery chute **42** from whence the ice cubes are delivered into a glass or other container (not shown) which may be set on the perforated drain board **44** located directly beneath the delivery chute **42**. An arcuate extension **48** on the element **30** prevents the ice cubes in the bin from interfering with the return movement of the ice cube dispenser **30** at the completion of the ice cube dispensing operation.

The shaft **36** which operates the ice cube dispensing device **30** is adapted to be automatically operated by means of an electric solenoid **50** which has its armature connected to a lever or crank arm **52** secured to the shaft **36** as best shown in Figure 4. A spring **54** returns the ice cube dispenser into the full line position in which it is shown in Figure 2 when the solenoid is deenergized. Upon energization of the solenoid **50** the force of the spring **54** will be overcome and a given quantity of ice cubes will be dispensed. Upon deenergization of the solenoid **50** the dispenser returns to the full line position so as to cause the V-shaped pocket **38** to be refilled.

In the event that the user wishes crushed ice rather than ice cubes, the ice crusher **32** can be placed into operation. The ice crusher **32** is driven by means of an electric motor **60** through a gear drive device **62**. The ice crusher consists of a rotatable shaft element **64** which carries a plurality of blades **66** which pass between stationary blades such as the blades **68** so as to crush ice cubes from the bin before delivery into the chute **42**.

A water chilling coil **70** is wrapped around the inner wall of the ice storage bin so as to cause the water in the coil to be refrigerated by the ice cubes in the bin. Water enters the coil through an inlet **72** which is adapted to be connected to any suitable water supply such as the city water mains. The water leaves the coil **70** through the line **74** which leads to a solenoid operated valve **76**. Upon energization of the solenoid valve **76** the water is discharged through a water dispensing nozzle **78** which is located within the delivery chute **42**. In the event that the valve **76** is opened when no glass or other receptacle is in position to receive the water dispensed from the nozzle, the water will run down onto the perforated drain board **44** and into a drain receptacle or catch basin **45** from whence the water discharges into a conventional drain pipe **47** leading to a sewer or the like. The drain receptacle **45** is also adapted to catch any of the water from ice which may be melted in the ice bin.

In an ice maker of the type shown, it is standard practice to periodically drain sediment from the water recepta-

cle 79 through the siphon tube 81. This tube passes down through the ice storage bin 16 as shown in Figure 1 and has an outlet 83 located behind the delivery chute 42 with the result that a single drain may be used for disposing of all of the waste water.

The ice crushing motor 60, the ice cube dispensing solenoid 50 and the water dispensing solenoid valve 76 are adapted to be controlled by means of suitable push button switches 80, 82 and 84 respectively, located at the front of the cabinet in close proximity to the delivery chute. These buttons bear suitable indicia (not shown) indicating their purpose.

By virtue of the above described arrangement it is obvious that the mere pushing of a selected button will cause the device to dispense either refrigerated water, ice cubes, or chipped ice depending upon which of the three buttons the operator presses. Since the ice making equipment is of the fully automatic type which maintains a continuous amount of ice cubes in the bin 60, it is obvious that it is not necessary to provide an attendant to look after the supply of ice cubes. Whereas this invention contemplates using an ice cube maker of the type disclosed in said copending applications, it is obvious that any type of automatic ice maker could be used for supplying ice cubes to the bin 16.

Figure 5 shows very schematically the electrical circuit for controlling the dispensing mechanism. As shown therein the control switches and the devices to be energized by the respective switches are connected in parallel to a power source.

While the invention contemplates selectively dispensing either cold water, whole ice blocks or chipped ice it should be apparent, by virtue of the water, whole ice blocks and crushed ice being dispensed through the single delivery chute 42 and of the parallel connections of the various switches in the electrical circuit, that a combination of crushed ice and ice blocks or either ice blocks and cold water and particularly crushed ice and cold water can, if desired, be simultaneously dispensed from the apparatus. To accomplish this the user of the apparatus may depress the button of two of the push button switches 80, 82 and 84 at one and the same time such, for example, as buttons 84 and 82 when cool water and ice blocks are desired to be dispensed and caught in a receptacle to be placed on a dinner table and/or buttons 84 and 80 when cool water and crushed ice are desired to be dispensed and caught in a glass or receptacle.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a self-contained water cooler and automatic ice maker and dispenser, a cabinet, means within said cabinet forming an insulated ice cube storage bin, a water cooling coil arranged in thermal exchange relationship with said ice cubes while in said bin, a delivery chute adjacent the bottom of said bin, ice cube dispensing means for delivering a predetermined quantity of whole ice cubes from said bin into said delivery chute, means for crushing ice cubes, said last named means being arranged to receive ice cubes from said bin and to dispense crushed ice through said same delivery chute, means for dispensing water from said coil into said same delivery chute, and drain means beneath said delivery chute for draining away excess water and melted ice, said bin being relatively long and narrow and having a V-shaped bottom with the vertex of the V arranged to deliver ice cubes to said ice cube dispensing means and to said ice crushing means.

2. In an ice dispenser, a cabinet, an insulated ice storage compartment within said cabinet, said ice storage compartment terminating in an ice delivery chute at its lower end, first means in said delivery chute for discharging a limited quantity of whole ice cubes from said chute, second means for crushing ice and for discharging crushed ice from the lower end of said delivery chute, a heat exchange device arranged in thermal exchange relationship with ice in said compartment, and means for discharging liquid cooled in said heat exchange device at a point in said chute above the outlet therefrom.

3. In an ice dispenser, a cabinet, an insulated ice cube storage compartment within said cabinet, said ice cube storage compartment terminating in an ice cube delivery chute at its lower end, first means in said delivery chute for discharging a measured quantity of whole ice cubes from said chute, second means in said chute for crushing ice cubes from said compartment and for discharging the crushed ice from the lower end of said delivery chute, a liquid cooling device arranged in thermal exchange relationship with ice cubes in said receptacle, and means for discharging liquid from said cooling device at a point adjacent the bottom of said delivery chute, a drain board located beneath said delivery chute and serving as a support for a receptacle into which either ice or liquid is to be discharged, and a drain beneath said drain board.

4. In an ice dispenser, a cabinet, an insulated ice cube storage compartment within said cabinet, said ice cube storage compartment terminating in an ice cube delivery chute at its lower end, first means in said delivery chute for discharging a measured quantity of whole ice cubes from said chute, second means in said chute for crushing ice cubes from said compartment and for discharging the crushed ice from the lower end of said delivery chute, a liquid cooling device arranged in thermal exchange relationship with ice cubes in said receptacle, and means for discharging liquid from said cooling device at a point adjacent the bottom of said delivery chute, a drain board located beneath said delivery chute and serving as a support for a receptacle into which either ice or liquid is to be discharged, a drain beneath said drain board, an automatic ice making machine in said cabinet for filling said storage compartment, said machine discharging impurities from the water to be converted into ice into said drain.

5. In a self-contained water cooler and automatic ice maker and dispenser, a cabinet, means within said cabinet forming an insulated ice cube storage bin, a water cooling coil arranged in thermal exchange relationship with said ice cubes while in said bin, a delivery chute adjacent the bottom of said bin, ice cube dispensing means for delivering a predetermined quantity of whole ice cubes from said bin into said delivery chute, means for crushing ice cubes, said last named means being arranged to receive ice cubes from said bin and to dispense crushed ice through said same delivery chute, means for dispensing water from said coil into said same delivery chute, drain means beneath said delivery chute for draining away excess water and melted ice, a first solenoid for controlling said ice cube dispensing means, a second solenoid for controlling said water dispensing means, a motor for operating said ice crushing means, a source of electrical energy, and individual switch means for selectively connecting said first and second solenoids and said motor to said source of electrical energy.

6. In a self-contained water cooler and automatic ice maker and dispenser, a cabinet, means within said cabinet forming an insulated ice cube storage bin, a water cooling coil arranged in thermal exchange relationship with said ice cubes while in said bin, a delivery chute adjacent the bottom of said bin, ice cube dispensing means for delivering a predetermined quantity of whole ice cubes from said bin into said delivery chute, means for crushing ice cubes, said last named means being arranged to receive ice cubes from said bin and to dispense crushed ice through said same delivery chute, means for dispensing water from said coil into said same delivery chute, drain means beneath said delivery chute for draining away excess water and melted ice, a first solenoid for controlling said ice cube dispensing means, a second solenoid for controlling said water dispensing means, a motor for operating said ice crushing means, a source of electrical

energy, and individual switch means for selectively connecting said first and second solenoids and said motor to said source of electrical energy, said solenoids and said motor being mounted in said cabinet outside of said ice storage compartment.

7. An ice making apparatus comprising, a cabinet having insulated walls forming an ice block storage bin therein, a water cooling conduit arranged in thermal exchange relationship wtih said ice blocks while in said bin, a single delivery chute adjacent the bottom of said bin, ice block dispensing means for delivering a predetermined quantity of whole ice blocks from said bin through said delivery chute, means for crushing ice blocks, said last named means being arranged to receive ice blocks from said bin and to dispense crushed ice through said delivery chute, means for dispensing water from said water cooling conduit through said delivery chute, and controls for said means certain of which are capable of being operated at the same time to cause a combination of whole ice blocks and crushed ice to be simultaneously dispensed from said storage bin through said single chute.

8. An apparatus as defined by claim 7 wherein a combination of water from the water cooling conduit and whole ice blocks is caused to be simultaneously dispensed through the single chute.

9. An apparatus as defined by claim 7 wherein a combination of water from the water cooling conduit and either whole ice blocks or crushed ice is caused to be simultaneously dispensed through the single chute.

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