

April 4, 1950

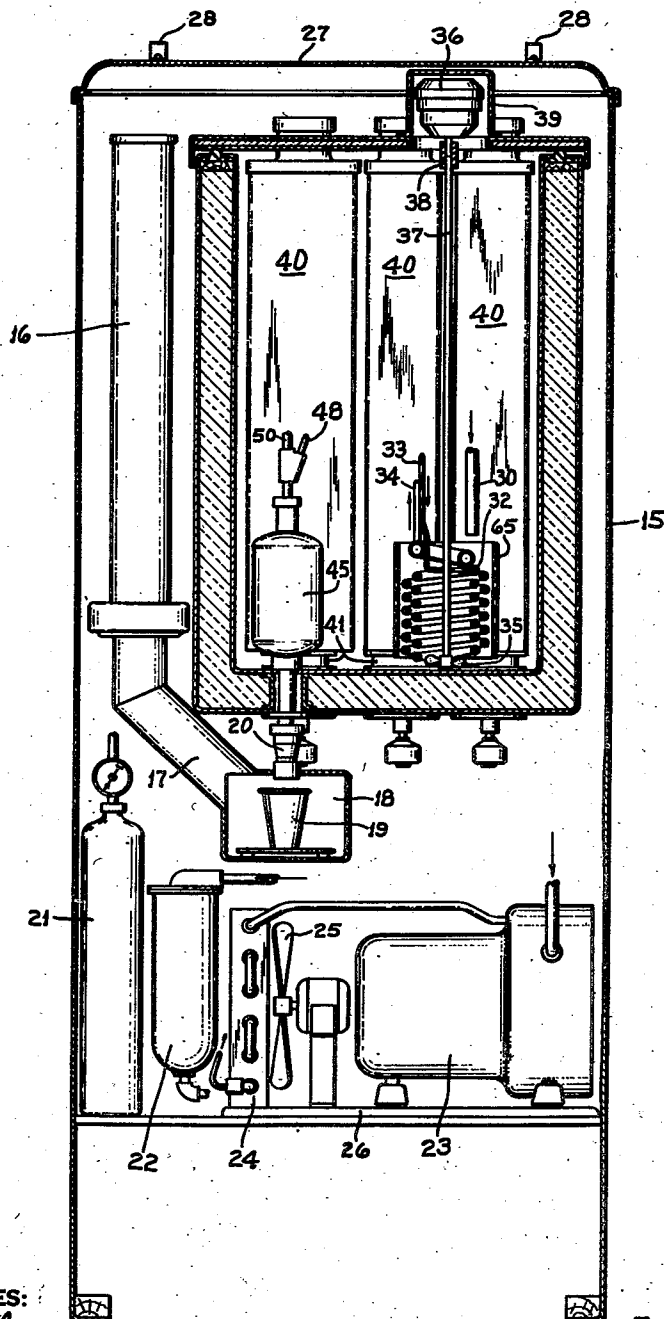
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2,502,603

APPARATUS FOR COOLING AND DISPENSING BEVERAGES

Filed June 30, 1943

3 Sheets-Sheet 1



WITNESSES:

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FIG. 1.

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FIG. 2.

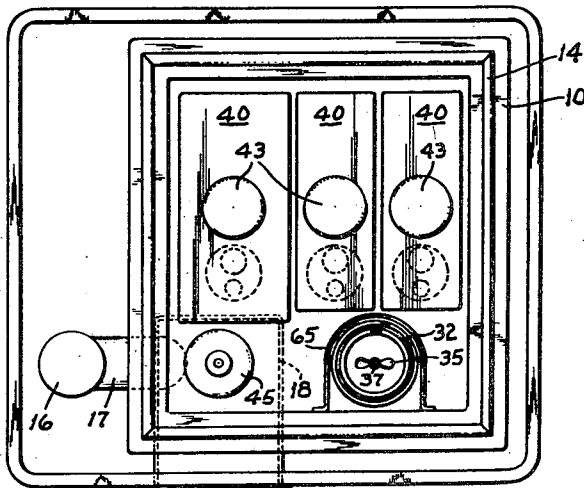
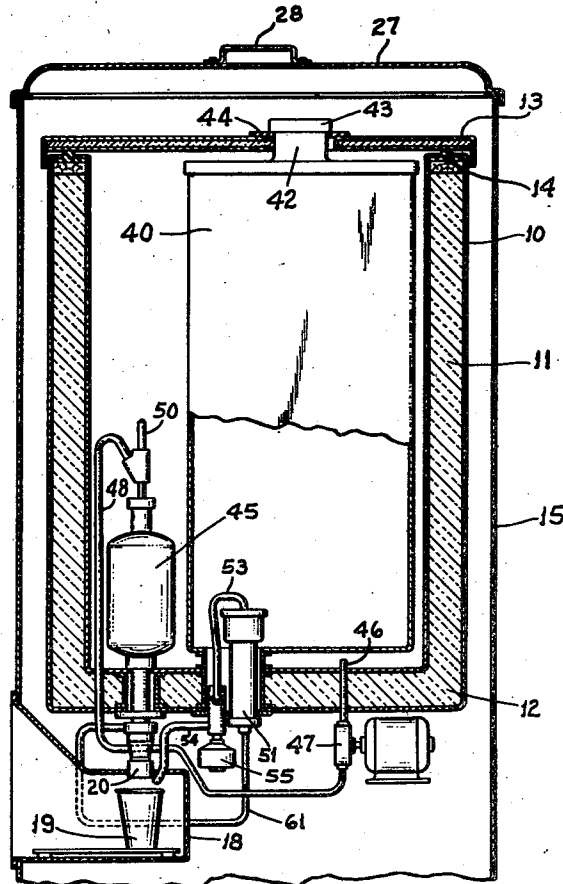


FIG. 3.

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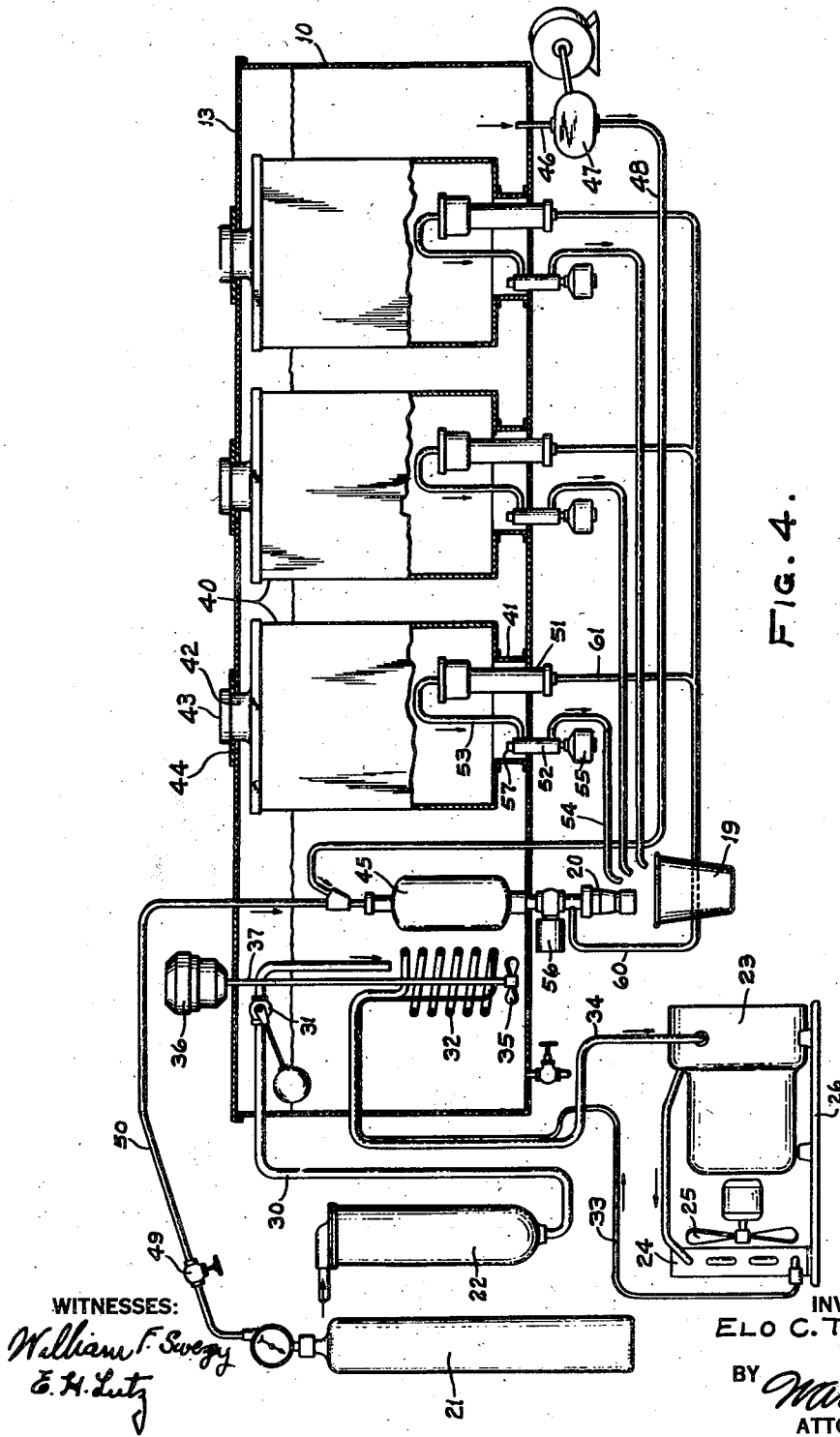
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UNITED STATES PATENT OFFICE

2,502,603

APPARATUS FOR COOLING AND
DISPENSING BEVERAGES

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6 Claims. (Cl. 225-21)

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This invention relates to dispensing apparatus and particularly to apparatus of the type wherein a cold, mixed beverage is dispensed into a cup or other receptacle through a valve or faucet.

An object of the invention is to provide a compact, unitary arrangement of parts for storing and refrigerating component parts of the beverage to be dispensed, the arrangement being such that one of the beverage components is directly cooled by refrigerating means and the cooled component is then used to cool another component part or parts of the beverage to dispensing temperature.

A further object of the invention is to provide such an arrangement as set forth in the preceding paragraph, wherein the refrigerated beverage component is used to cool parts of the dispensing apparatus such as the carbonator, the syrup pumps and valves and the dispensing valve.

The invention further contemplates the provision of an agitator or circulator in association with the aforesaid apparatus, whereby the directly refrigerated beverage component is positively circulated in contact with the associated parts of the dispensing apparatus so as to insure a uniform temperature of the beverage component and the parts cooled by it.

More specifically, the invention relates to a means for cooling a beverage component by direct refrigeration, utilizing the cooled beverage component to cool other components of the beverage, and positively agitating the directly cooled beverage component to ensure a uniform temperature of all the component parts of the beverage.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in accordance with the accompanying drawings, forming a part of my application, in which:

Fig. 1 is a front elevation, partly in section, showing a dispensing apparatus embodying my invention;

Fig. 2 is a side elevation, partly in section, of the upper portion of the apparatus shown in Fig. 1;

Fig. 3 is a plan view of the apparatus shown in Fig. 2, with the tank and cabinet covers removed and certain other parts omitted for the sake of clarity; and

Fig. 4 is a diagrammatic view or flow chart, showing the arrangement of the apparatus for cooling the beverage components and the circuits for the beverage components to the dispensing valve mechanism.

As is well known, carbonated beverages usually comprise a syrup component or components diluted to predetermined proportions with a carbonated water component. Preferably, in drink-dispensing machines the water component should be carbonated just prior to being used, and both the water component and the syrup component should be refrigerated to a temperature sufficiently low to produce a palatable drink. The accepted temperature range is from 36-40 degrees F. Also, the carbonator should be maintained at a low temperature both to ensure adequate carbonation of the water and because the carbonated water is preferably dispensed directly from the carbonator to the cup or receptacle.

It is also desirable in an apparatus of this character, that all the syrup component be maintained at a low temperature at all times so as to ensure that the mixed beverage is dispensed at the proper temperature and also to prevent any deterioration of the quality of the syrup component.

One embodiment of an apparatus for accomplishing the foregoing purposes, as illustrated in the accompanying drawings, comprises a tank 10 having insulated side walls 11 and an insulated bottom wall 12. Tank 10 is preferably provided with a removable insulated cover 13 resting on a gasket 14 provided on the upper edge of tank 10.

This tank 10 is supported by suitable means (not shown) in the upper part of a cabinet 15, made of suitable sheet material, and providing an enclosure for the entire dispensing, cooling and carbonating mechanism. Other mechanisms disposed in the cabinet 15 include a cup magazine 16 disposed adjacent tank 10 and provided with a chute 17, terminating at the recessed dispensing station 18 in a manner to dispose a cup 19 beneath the dispensing valve mechanism 20 each time the apparatus is operated. Operation of the dispensing apparatus may be initiated by any suitable and known means (not shown) such as the insertion of a coin, the manipulation of a lever or the turning of a knob. Neither the cup-dispensing mechanism nor the means for initiating operation of the drink-dispensing mechanism forms part of the present invention.

Other mechanism disposed in the cabinet 15 includes a replaceable tank of compressed carbon dioxide 21, a water filter 22, and the motor-compressor unit 23 and condenser 24 of a mechanical refrigerating system, the latter including a motor-driven fan 25 for cooling the condenser. All this mechanism may be supported on a suitable platform indicated at 26 and disposed inside the

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cabinet. The cabinet 15 may be provided with a removable top 27 having handles 28 affixed thereto.

Referring to Fig. 4 where the beverage cooling and control system is shown diagrammatically for the purpose of clarity, the tank 10 comprises a receptacle for the cooling and storage of water to be carbonated and dispensed. Preferably, the lining for the tank, as well as the exterior surfaces of all the parts of the apparatus disposed in the tank 10, are made of a material not readily corroded by water. The water is derived from any suitable source and, after passing through a filter 22, enters the tank 10 through a pipe 30. The level of the water in the tank may be controlled by any suitable means, here shown as a float valve 31.

The water in tank 10 is refrigerated by means of a refrigerant evaporator or heat-absorbing unit 32, operatively connected to the condenser 24 by a conduit 33 which may be in the form of a capillary tube to serve as a pressure-reducing means, and operatively connected to the compressor 23 by a suction conduit 34. The compressor may be started and stopped by any suitable means such as a thermostat (not shown) responsive to the temperature of the water in tank 10.

In order to assist in the maintenance of a uniform temperature of the water in tank 10, and of the parts of the apparatus cooled by the water, an agitator or circulator 35 operated by a motor 36 through a shaft 37 is provided. Preferably the cooling unit 32 is disposed adjacent the bottom of tank 10 with the agitator shaft 37 extending vertically through it, and with the agitator blades 35 adjacent or just below the lower part of the cooling unit. The agitator motor 36 may be detachably supported by the tank cover 13 and may be separated from shaft 37 through a detachable coupling 38. A separate cover 39 may be provided for the agitator motor.

One or more syrup receptacles 40 are disposed within the main water tank 10. These tanks, which may be rectangular in shape, are provided at their lower ends with cylindrical collars 41 having fluidtight engagement with the bottom wall of tank 10. Each syrup receptacle is provided with a neck 42 projecting through the tank cover 13, which neck is closed by a cap 43. The purpose of the necks and caps is to enable the contents of the syrup receptacles to be replenished without the tank cover 13 being removed. A removable gasket 44 of rubber or other suitable material may be placed around the neck 43 of each syrup receptacle above the tank cover 13, so that any syrup accidentally spilled during the filling of the receptacles will not seep into the tank 10. A carbonator 45 is disposed in the tank 10, preferably just above the dispensing valve 20, so as to provide the shortest path for carbonated water through the dispensing valve to the cup.

Cooled water from the tank 10 is pumped through conduit 46, pump 47 and conduit 48 to the top of carbonator 45. Pump 47 is preferably of the positive displacement type, capable of developing a head pressure of 150 pounds or more per square inch. This pressure is not critical however and is dependent solely on the pressure normally prevailing in the carbonator. Carbon dioxide gas is supplied to the carbonator from tank 21 through a throttling valve 49 and conduit 50.

Each syrup tank is supplied with a syrup pump 51 and a syrup valve 52. A conduit 53 connects the syrup pump with the syrup valve, and a conduit 54 conveys syrup from the syrup valve

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to a point adjacent the water-dispensing valve 20, so that water and syrup components are dispensed separately but concurrently into the cup 19. The syrup valves 52 are controlled by solenoids 55 and the carbonated water valve is controlled by a solenoid 56. Each syrup valve 52 is a two-way valve so that unless its solenoid 55 is energized, syrup from pump 51 will return to the syrup tank through outlet 57. When the solenoid 55 is energized, however, the outlet 57 is closed and syrup passes through the valve 52 and conduit 54 to the cup.

The syrup pumps 51, which may be, for example, of the diaphragm type, are operated by the pressure of carbonated water flowing through a by-pass conduit 60 and branch conduits 61 to the syrup pumps. Thus, when the dispensing apparatus is set in operation, for example, by the insertion of a coin in a slot, electrical circuits are energized which energize the carbonated water control valve solenoid 56 and only one of the syrup valve solenoids 55, depending on the flavor selected. Instantly, as the water valve solenoid is energized, cold carbonated water will flow to the cup 16 and likewise the pressure of the carbonated water through conduits 60 and 61 will operate all the syrup pumps 51. However, syrup will flow to the cup 19 only through that syrup valve 52 whose solenoid 55 is energized. The other syrup pumps will discharge into their respective tanks through the outlets 57. When the water valve solenoid 56 and selected syrup valve solenoid 55 are deenergized by suitable timing mechanism after a predetermined quantity of the beverage components have been dispensed, the pressure in conduits 60 and 61 will drop and the syrup pumps will refill preparatory to the next dispensing operation.

Reverting to the beverage cooling system, comprising the primary object of this invention, water, preferably filtered, is admitted to tank 10 through float-controlled valve 31 and conduit 30. Preferably, the outlet from the water conduit is disposed adjacent the cooling unit or evaporator 32, thus bringing the relatively warm fresh water into immediate contact with the cold refrigerant coil. The coil or evaporator may be surrounded by a vertical sleeve or baffle 65 which may or may not be perforated. The circulator 35, which is usually driven only when the refrigerant compressor is operating, turns in such a direction as to draw the warm incoming water down over the cooling coil where it is cooled and spread over the bottom of tank 10. The general path of water circulation is then; through the cooling coil from top to bottom then along the bottom of tank 10 and upwardly along the sides of the tank and through the flues formed by the various syrup receptacles and carbonator to the top of the tank and then back through the cooling coil 32.

The capacity of the cooling coil is such that once the temperature of the water bath has been reduced to dispensing temperature, it is adequate to cool incoming water used to replace that which has been withdrawn at a rate such that under normal conditions of operation the incoming water does not materially affect the temperature of the bath for any critical time. The cooled water in tank 10, because of its active circulation, cools the syrup receptacle 40, the carbonator 45 and their contents to dispensing temperature so that the mixed drink is always dispensed at a constant temperature.

Likewise, the various syrup pumps and valves

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and carbonated water-dispensing valve and nozzle are cooled by conduction through the cooled syrup and water to a relatively low temperature so that they do not affect the temperature of the beverage components passing through those parts to the cup, particularly in view of the relatively short time the liquid components are in contact with those parts.

The removable lid 27 on the cabinet permits the service operator to have immediate access through the top of the cabinet to the syrup receptacles and cup magazine.

The syrup and water dispensing system and mechanisms herein disclosed per se form no part of the present invention, and are the subject matter of another application to be filed.

The terms dispensing valve dispensing nozzle and dispensing valve mechanism as used herein are not to be construed as meaning only a single outlet, but rather as including a composite device discharging a plurality of beverage components into a single cup or receptacle simultaneously or consecutively, so as to produce a mixed beverage in the cup. The terms dispensing valve dispensing nozzle and dispensing valve mechanism are also to be construed as meaning a device which discharges either a single liquid, a mixed liquid or a plurality of liquids into a cup or receptacle.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In apparatus for dispensing a cold, mixed carbonated beverage through a dispensing valve, the combination of an insulated tank subjected to atmospheric pressure and providing a storage compartment for the water component of the beverage, a syrup receptacle disposed in said tank, a carbonator also disposed in said tank, mechanical refrigerating apparatus including a refrigerant heat-absorbing unit disposed in said tank for cooling the water therein, said cooled water serving to cool the syrup receptacle and the carbonator, means for conveying cooled water from said tank to the carbonator, a dispensing valve mechanism associated with the tank for dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, whereby to produce a cold, mixed, carbonated beverage.

2. In apparatus for dispensing a cold, mixed carbonated beverage through a dispensing valve, the combination of a tank subjected to atmospheric pressure and providing a receptacle for the water component of the beverage, said tank having side and bottom walls and a top wall, a syrup receptacle and a carbonator so positioned in said tank as to be substantially surrounded by water stored therein, mechanical refrigerating apparatus including a refrigerant cooling means disposed in said tank for directly cooling the water contained therein, said cooled water serving to cool the syrup receptacle, the carbonator and their contents to dispensing temperature, said syrup receptacle having a portion extending through the top wall of the tank for the filling thereof, means for conveying cooled water from the container to the carbonator, a dispensing valve mechanism associated with the tank for

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dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, whereby to produce a cold, mixed carbonated beverage.

3. In apparatus for dispensing a cold, mixed, carbonated beverage through a dispensing valve, the combination of a tank subjected to atmospheric pressure and providing a receptacle for the water component of the beverage, a syrup receptacle and a carbonator so positioned in said tank as to be substantially surrounded by water stored therein, mechanical refrigerating apparatus including a refrigerant cooling means disposed in said tank for directly cooling the water contained therein, means for positively circulating the water in said tank, said cooled circulated water serving to cool the syrup receptacle, the carbonator and their contents to dispensing temperature, means for conveying cooled water from the tank to the carbonator, a dispensing valve mechanism associated with the tank for dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, whereby to produce a cold, mixed carbonated beverage.

4. In apparatus for dispensing a cold, mixed, carbonated beverage through a dispensing valve, the combination of a tank subjected to atmospheric pressure and providing a receptacle for the water component of the beverage, a syrup receptacle and a carbonator so positioned in said tank as to be substantially surrounded by water stored therein, mechanical refrigerating apparatus including a refrigerant cooling means disposed in said tank for directly cooling the water contained therein, said tank having side and bottom walls and a top wall, an agitator for positively circulating the water in said tank, a motor for driving said agitator, said motor being disposed outside said tank and supported by said top wall, said cooled circulated water serving to cool the syrup receptacle, the carbonator and their contents to dispensing temperature, means for conveying cooled water from the tank to the carbonator, a dispensing valve mechanism associated with the tank for dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, whereby to produce a cold, mixed, carbonated beverage.

5. In apparatus for dispensing a cold, mixed, carbonated beverage through a dispensing valve, the combination of a tank subjected to atmospheric pressure and providing a receptacle for the water component of the beverage, a syrup receptacle and a carbonator so positioned in said tank as to be substantially surrounded by water stored therein, mechanical refrigerating apparatus including a refrigerant cooling means disposed in said tank for directly cooling the water contained therein, means for positively circulating the water in said tank, said cooled water serving to cool the syrup receptacle and the carbonator, means for conveying cooled water from the tank to the carbonator, a dispensing valve associated with the tank for dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, said means including movable parts at least partially disposed in the syrup receptacle so as to be constantly immersed in the contents thereof.

6. In apparatus for dispensing a cold, mixed, carbonated beverage through a dispensing valve, the combination of a tank subjected to atmos-

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pheric pressure and providing a receptacle for the water component of the beverage, a syrup receptacle and a carbonator so positioned in said tank as to be substantially surrounded by water stored therein, mechanical refrigerating apparatus including a refrigerant cooling means disposed in said tank for directly cooling the water contained therein, means for positively circulating the water in said tank, said cooled water serving to cool the syrup receptacle and the carbonator, means for conveying cooled water from the tank to the carbonator, a dispensing valve associated with the tank for dispensing cold carbonated water to a cup, and means for conveying cold syrup component from the syrup receptacle to the cup, said means including a syrup pump

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and a valve at least partially disposed in the syrup receptacle so as to be constantly immersed in the contents thereof.

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