May 7, 1940. M. A. MARTIN 2,199,503

BEER COOLING SYSTEM AND APPARATUS

Filed Dec. 11, 1937 2 Sheets-Sheet 1

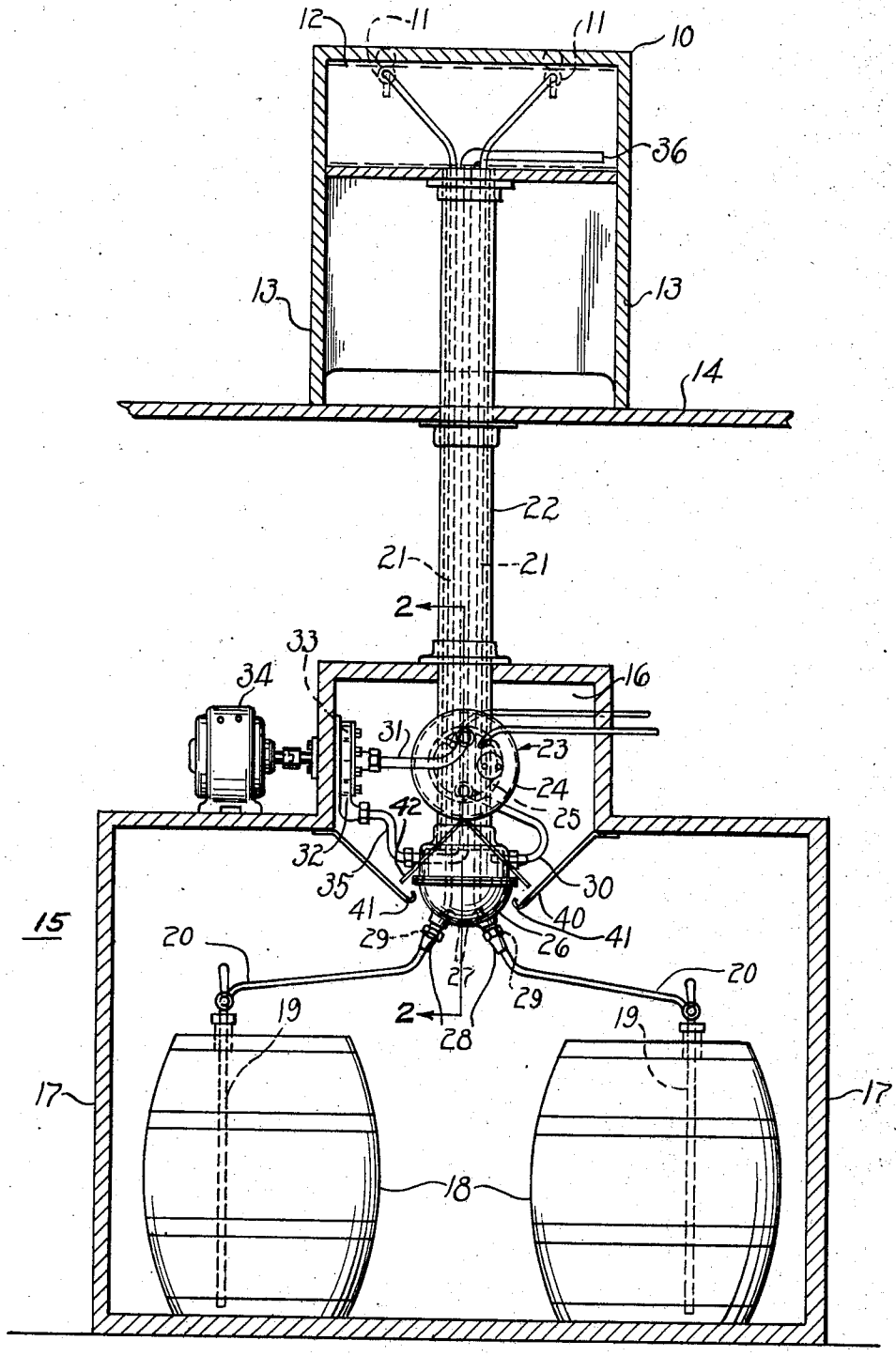

Fig-1

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BEER COOLING SYSTEM AND APPARATUS

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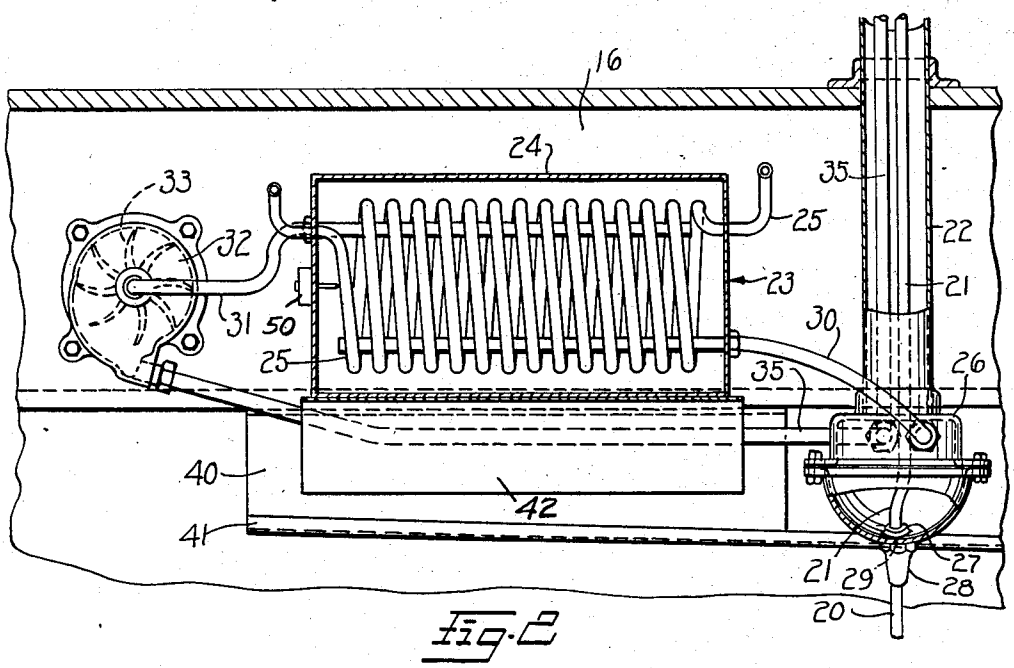

Fig. 2

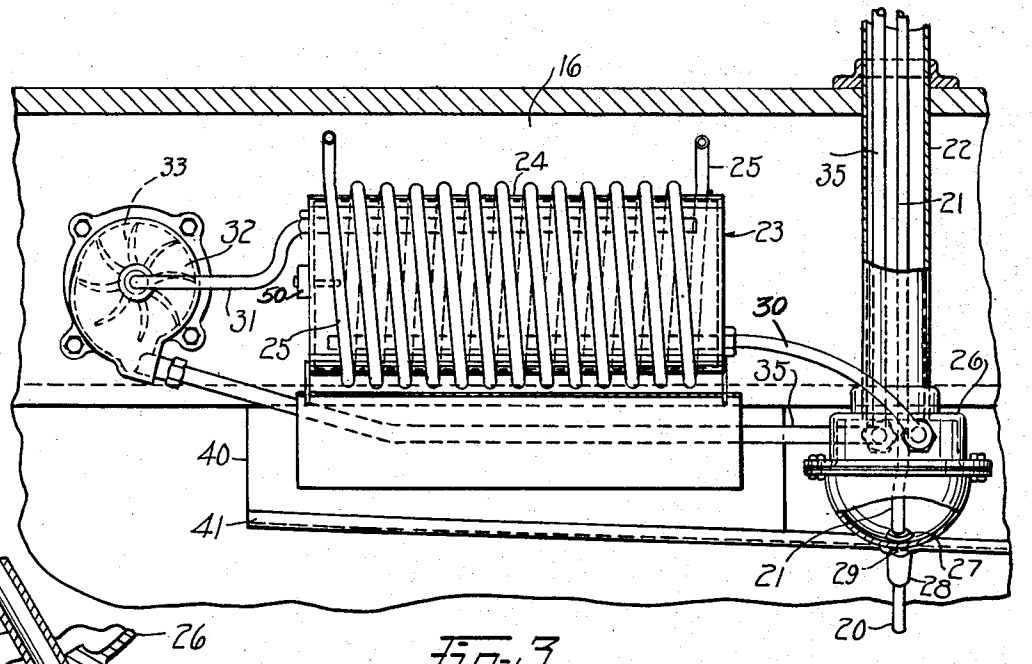

Fig. 3

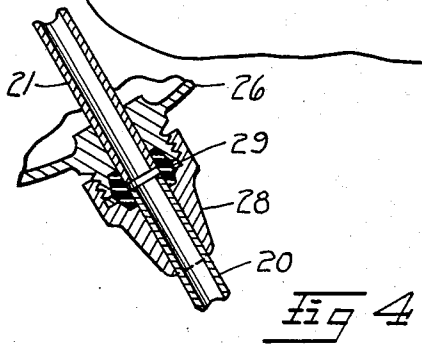

Fig 4

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BEER COOLING SYSTEM AND APPARATUS

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9 Claims. (Cl. 225—40)

This invention relates to beverage cooling systems and apparatus, and more particularly to means for jointly cooling a beverage dispenser and a beverage container stored at a point remote from the dispenser by a single unit.

Prior beverage cooling systems with which I am familiar have commonly cooled the beverage dispenser by an evaporator mounted therein and have maintained the beverage containers cool by disposing them in a cold room which is independently cooled. The cold room or storage room is usually relatively large to accommodate the person handling the containers, resulting in considerable space to be maintained cool and which is relatively expensive. Also, the provision of two independent systems results not only in considerable operating expense but in high original cost of equipment and of installation.

The storage or cold room, although cool, is of a higher temperature than the proper consumption temperature of the beer since the cost of maintaining such a room at a desired temperature, such as 40°, would be excessive, the beer is thus required to be rapidly lowered in temperature upon reaching the dispenser and before withdrawal and under peak conditions warm beer is frequently drawn. In transmitting the beer from the storage room to the dispenser, the beer supply line usually passes through a relatively warm zone, such as the tap room, and although the line is usually heat insulated, the beer is usually raised somewhat in temperature.

I have devised a system for cooling beverages wherein a relatively small storage compartment may be provided and the evaporator unit is eliminated in the dispenser permitting a larger amount of cooling liquid to be used in a given size dispenser. Both the dispenser and the storage unit are cooled by a single means and the pipes supplying beer or the like to the dispenser are immersed in cooling liquid from the storage cabinet to the dispenser. A reservoir of cooling liquid is maintained at a temperature normally substantially lower than the cooling liquid in the dispenser and this arrangement together with the low temperature of the beverage containers in the storage compartment and the additional precooling of the beer prior to reaching the dispenser, permits the capacity of a given size dispenser under peak conditions to be considerably increased while maintaining the beer within desired temperature limits.

It is an object of my invention therefore to provide an improved system and apparatus for cooling beverages such as beer.

Another object of my invention is to provide a cooling system for stored beverage containers and for the beverage dispenser which is relatively compact and economical in operation.

Another object of my invention is to provide an improved cooling system for beer containers in a storage room, a dispenser, and supply line from the container to the dispenser, wherein the capacity of a given size dispenser to cool beer under peak conditions is materially increased.

Other objects of my invention and the invention itself will be increasingly apparent from a consideration of the following description of drawings wherein:

Fig. 1 is a diagrammatic view of a beer cooling system and apparatus embodying my invention,

Fig. 2 is a fragmentary section along the line 2—2 of Fig. 1,

Fig. 3 is a view similar to Fig. 2 showing a modified form of cooling unit, and

Fig. 4 is an enlarged fragmentary section showing a connection I may employ.

Referring now to the drawings, and particularly to Fig. 1, I have indicated generally at 10 a beer or similar beverage dispenser which comprises a box having heat insulated walls and provided with connections 11 for the usual taps or faucets. The dispenser is adapted to be filled to a level such as 12, with a cooling liquid, preferably water, although any suitable brine or similar solution may be used. The dispenser is disposed in a tap room or the like and may be supported in any desired manner as by standards 13 resting on the floor 14 of the tap room.

A storage room for beverage containers or beer barrels is usually provided adjacent the tap room and in this instance is illustrated as being beneath the tap room, although the particular location of the storage room relative to the tap room is immaterial other than permitting beer supply lines and cooling liquid supply lines to be run therebetween. Disposed in the storage room is a cabinet generally indicated at 15, preferably provided with heat insulated walls, the cabinet being generally of box form and having a superposed relatively small inverted box-form compartment 16 associated therewith. The cabinet is provided with hinged side walls 17 permitting beer barrels 18 to be inserted in and removed from the cabinet, although the particular manner of placing the beer containers within the cabinet constitutes no essential part of my invention.

The barrels 18 are provided with the usual

tap rods 19 detachably connected to preferably flexible supply lines 20 which in turn connect with copper or the like lines 21 extended upwardly through a conduit 22 to connect with the tap or faucet connections 11. It will be understood that upon manipulation of the faucets that beer under pressure will be forced upwardly and drawn in the usual manner. The conduit 22 preferably has heat insulated walls and is projected through the tap room floor 14 to open upwardly into the base of the dispenser 10. The lower end of the conduit 22 is closed and preferably extends below compartment 16. Cooling unit 23 as best illustrated in Fig. 2, comprises a closed, preferably cylindrical tank 24, having an evaporator 25 therein, which may comprise a plurality of coils through which refrigerant fluid may be transmitted from a conventional compressor condensor unit (not shown). The particular shape of tank 24 or arrangement of evaporator 25 constitutes no essential part of my invention and I contemplate that cold water or brine maintained at a predetermined low temperature may be forced through the coils as the refrigerant medium rather than ammonia or like compressible fluid. The lower end of conduit 22 comprises an enlarged head 26 through which the supply lines 21 for the beverage are projected and a suitable sealing arrangement is provided preventing leakage of cooling liquid, preferably comprising a coupling element 27 threadingly engaging head 26 and a coupling element 28 threadingly connected to element 27 with a rubber or the like washer 29 clamped therebetween and compressingly engaging the supply line 21.

A connection 30 extends from the head 26 to the base of tank 24 whereby cooling liquid may be drawn into the tank from conduit 22 and withdrawn by a connection 31 preferably to a chamber 32 having an impeller 33 therein operable by an electric motor 34. A line 35 from chamber 32 is projected through head 26 and extends upwardly to terminate in the dispenser in an open end 36.

The connection 30 preferably terminates adjacent one end of tank 24 and connection 31 adjacent the opposite tank end to insure that warm liquid entering the tank will traverse the entire length of the evaporator 25 prior to leaving the tank.

It will be noted by reference to Fig. 2 that tank 24 is spaced from each end of compartment 16 and baffle plates 40 are secured adjacent the lower portion of compartment 16 and converge downwardly to extend beneath tank 24. The baffle plates are preferably bent to form troughs 41 to receive any moisture dropped from the surface of tank 24. The baffle plates are preferably substantially co-extensive with tank 24 longitudinally. A second set of baffle plates 42 are secured to the base of tank 24 and diverge downwardly to deflect any condensation from tank 24 into troughs 41 which are inclined to drain to a convenient point.

Referring now to Fig. 3, I have shown a modified form of cooling unit similar to that illustrated in Fig. 2 but wherein the coils of the evaporator 25 are disposed externally of tank 24 and the cooling liquid internally of the tank is cooled by conduction through the tank walls. Inasmuch as the tank walls are formed of high heat conduction material the cooling liquid and air in cabinet 15 may be properly cooled by employing either type cooling unit.

The operation of the system will now be described. The dispenser 10, together with the tank 24 and the interconnecting conduits will be filled with cooling liquid which will be cooled by the evaporator 25 and the compressor unit of the refrigerant system may be made operably responsive to the temperature of any desired part of the cooling system, although for convenience I have shown the compressor as being responsive to the temperature of cooling liquid in tank 24 through the provision of a thermostatically operable switch 50. Also, the compressor may be operably responsive to the pressure of refrigerant fluid in the line by the use of a conventional pressure responsive switch. The motor 34 may be operably responsive to actuate impeller 33 either to the temperature within the cabinet 15 or the beverage temperature or the temperature of the cooling liquid in the dispenser. A similar switch 50 may be employed for this purpose. At a pre-determined high temperature motor 34 will be actuated and cooling liquid will be pumped from tank 24 through connection 31 and chamber 32 to line 35 and through opening 36 into the dispenser. The relatively warm cooling liquid in the dispenser will be withdrawn downwardly through conduit 22 to head 26 and then through connection 30 into the tank. It will be noted that tank 24 has the ends thereof substantially spaced from the end walls of compartment 16 whereby relatively warm air may flow upwardly to contact tank 24. The air will be cooled by contact with tank 24 and the relatively cold air will drop downwardly between the baffle plates 40 and 42. The baffle plates tend to retard the free circulation of air and cause the air to remain in contact with tank 24 a sufficient time to be properly cooled. The baffles also tend to direct air inwardly to contact the tank and any condensation is trapped in troughs 41, the troughs may be provided with any suitable drainage means.

Thus, the beer is initially maintained cool in the barrels or containers 18 and the lines 20 are maintained at the temperature of the cabinet 15 and the lines 21 at the temperature of the cooling liquid transversing conduit 22, so that a considerable length of the beer supply line is pre-cooled substantially to the dispenser temperature prior to entering the dispenser. Due to its considerable travel, the beer may be properly cooled despite rapid withdrawal under peak conditions and which result could not be effected in a conventional dispenser wherein a relatively short travel from the base of the dispenser to the connection 11 is effected through the cooling liquid. The cooling unit not only cools the beer supply line and the dispenser, but maintains the storage cabinet cool. Due to the relatively small size of the cabinet, a minimum heat exchange energy is required and considerable saving of space is effected as compared to the conventional large storage room. Also, only conduit 22 need be heat insulated since the beer supply lines and the cooling liquid line 21 are disposed within conduit 22.

For purpose of illustration I have shown the cabinet disposed in a separate room from the tap room but it is understood that my invention is equally applicable when the cabinet is disposed in the same room as the dispenser and in that instance I may prefer that the conduit 22 project through an end of the cabinet. Also, although I have shown the conduit 35 through which cooling liquid is pumped to the dispenser as entering the head 26 of conduit 22, I contemplate that it may enter conduit 22 at any desired point or not

be projected within conduit 22 and separately insulated.

Although I have shown and described a preferred form of my invention, I contemplate that numerous and extensive departures may be made therefrom without departing from the spirit of my invention and the scope of the appended claims.

Having thus described my invention, what I claim is:

1. In combination a beverage dispenser adapted to contain a cooling liquid, a storage cabinet at a point remote from the dispenser, a beverage container in the storage cabinet having a beverage supply line associated therewith for supplying beverage to the dispenser, a cooling apparatus for the dispenser and storage cabinet comprising a tank disposed within the storage cabinet adapted to contain cooling liquid, heat exchange means associated with the tank to maintain the cooling liquid below a pre-determined temperature, the tank being formed of heat conducting material whereby air in the storage room may be cooled by contact therewith, a relatively large heat insulated conduit inter-connecting the tank and dispenser and having the beverage supply line projected therethrough, a small conduit inter-connecting the tank and dispenser and projected through the large conduit, pump means associated with the conduits whereby cooling liquid from the tank may be forced through the small conduit to the dispenser and returned to the tank through the large conduit, the tank being disposed adjacent the cabinet top and spaced from the walls thereof whereby warm air may pass upwardly to contact the tank, and baffle means spaced from opposite walls of the cabinet whereby warm air may flow upwardly intermediate said walls and baffle means over the tank and downwardly between said baffle means retarding the downward passage of air and directing the air into contact with the tank.

2. In combination a beverage dispenser adapted to contain a substantial amount of cooling liquid, a storage cabinet at a point remote from the dispenser, a beverage container in the storage cabinet having a beverage supply line associated therewith for supplying beverage to the dispenser, a cooling apparatus for the dispenser and storage cabinet comprising a tank disposed within the storage cabinet adapted to contain cooling liquid, heat exchange means associated with the tank to maintain the cooling liquid below a pre-determined temperature, the tank being formed of heat conducting material whereby air in the storage room may be cooled by contact therewith, conduit means interconnecting the tank and dispenser for transmitting cooling liquid therebetween, the tank being disposed adjacent the cabinet top and spaced from the cabinet side walls whereby warm air may pass upwardly to contact the tank, and baffle means spaced from opposite walls of the cabinet whereby warm air may pass between said walls and the baffle means over the tank, and the baffle means retarding downward passage of air causing the air to follow a tortuous path prior to being returned to the lower portion of the cabinet.

3. The combination as described in claim 2 and wherein the baffle means are formed to receive condensed liquid from the tank surface and direct said liquid to a drainage outlet.

4. The combination as described in claim 2 and wherein the baffle means comprises a pair of plates diverging downwardly from the tank, and a second pair of plates secured to opposite side walls of the cabinet and converging downwardly in spaced relation beneath the first said pair of plates.

5. The combination of a heat insulated cabinet, a tank adapted to contain cooling liquid supported adjacent the cabinet top and in spaced relation to the cabinet side walls, heat exchange means associated with the tank for maintaining the cooling liquid therein below a pre-determined temperature, longitudinally extending plate means beneath the tank spaced from the cabinet end walls permitting upwardly flowing warm air to pass between the ends of the cabinet and the plate means over the tank, a relatively large heat insulated cooling liquid conduit extended from the tank through a wall of the cabinet, a second cooling liquid conduit disposed within the large conduit and connected with the tank whereby both conduits may be connected with cooling apparatus disposed externally of the cabinet to form a closed cooling liquid circuit, and a beverage supply line extending from within the cabinet through the large conduit adapted to be connected to the cooling apparatus.

6. The combination of a beverage dispenser adapted to contain a substantial amount of cooling liquid, a storage cabinet at a point remote from the dispenser, a beverage container in the storage cabinet having a beverage supply line associated therewith for supplying beverage to the dispenser, a cooling apparatus for the dispenser and storage cabinet comprising a tank disposed within the storage cabinet and adapted to contain cooling liquid, heat exchange means associated with the tank to maintain the cooling liquid below a predetermined temperature, the tank being formed of heat-conducting material whereby air in the storage cabinet may be cooled by contact therewith, a relatively large heat-insulated conduit interconnecting the tank and dispenser having the beverage supply line projected therethrough, a small conduit interconnecting the tank and dispenser projected through the large conduit, pump means for circulating cooling liquid from the tank through said conduits and the dispenser responsive to the heat exchange between beverage and the cooling liquid, and the beverage supply line being immersed in cooling liquid from the cabinet to the dispenser to effect a heat exchange therebetween during travel of beverage from the cabinet to the dispenser.

7. The combination of a beverage storage cabinet, a dispenser, a beverage container within the cabinet, a relatively large conduit projected through a wall of the cabinet having a closed end within the cabinet, a tank within the cabinet adapted to contain cooling liquid, heat exchange means associated with tank to maintain the cooling liquid below a predetermined temperature, a beverage supply line extending from the beverage container and projected through the large conduit, a connection extending from the conduit to the tank, a second conduit enclosed by the large conduit, and pump means for circulating cooling liquid from the tank through said conduits and the dispenser responsive to the heat exchange between beverage and cooling liquid, and each of said connections terminating within the tank adjacent opposite ends of the tank whereby cooling liquid drawn from one connection will traverse the major portion of the tank length prior to entering the other connection.

8. The combination of a beverage dispenser adapted to contain a substantial amount of cool-

ing liquid, a heat-insulated storage cabinet adapted to receive a beverage container, a tank within the cabinet adapted to contain cooling liquid, heat exchange means associated with the tank to maintain the cooling liquid below a predetermined temperature, the tank being formed of a heat-conducting material whereby air in the storage room may be cooled by contact therewith, guide means forming with portions of the cabinet a passage through which air may be directed to contact the tank, cooling liquid supply and return conduits interconnecting the tank and the dispenser and forming therewith a closed cooling liquid circuit, a beverage supply line extending from the container to the dispenser and extended through one of said conduits for a substantial distance whereby the beverage supply line may be immersed in cooling liquid prior to entering the dispenser, and an intermittently operable pump means for effecting circulation through the cooling liquid circuit.

9. The combination of a beverage dispenser adapted to contain a substantial amount of cooling liquid, a storage cabinet remote from the dispenser adapted to receive a beverage container, a cooling apparatus for the dispenser and storage cabinet comprising a tank disposed within the storage cabinet adapted to contain cooling liquid, heat exchange means associated with the tank to maintain the cooling liquid below a pre-determined temperature, the tank being formed of heat-conducting material whereby air in the storage room may be cooled by contact therewith, a relatively large heat-insulated conduit inter-connecting the tank and the dispenser adapted to have a beverage supply line projected therethrough, a small conduit connecting the tank and the dispenser and projected through the large conduit, pump means for circulating cooling liquid through said conduits and the dispenser responsive to the heat exchange between the beverage and the cooling liquid, and the beverage supply line being adapted to be immersed in cooling liquid from the cabinet to the dispenser to effect a heat exchange therebetween during travel of beverage from the cabinet to the dispenser.

MICHAEL A. MARTIN.