Feb. 3, 1942. M. A. MARTIN 2,271,868

APPARATUS FOR COOLING BEVERAGES

Filed July 11, 1939 4 Sheets-Sheet 1

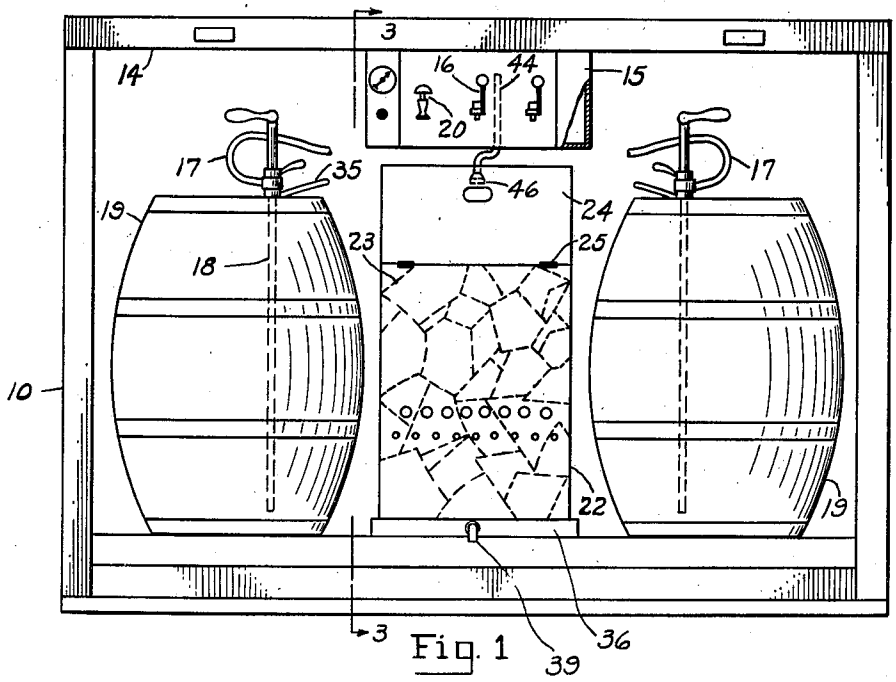


Fig. 1

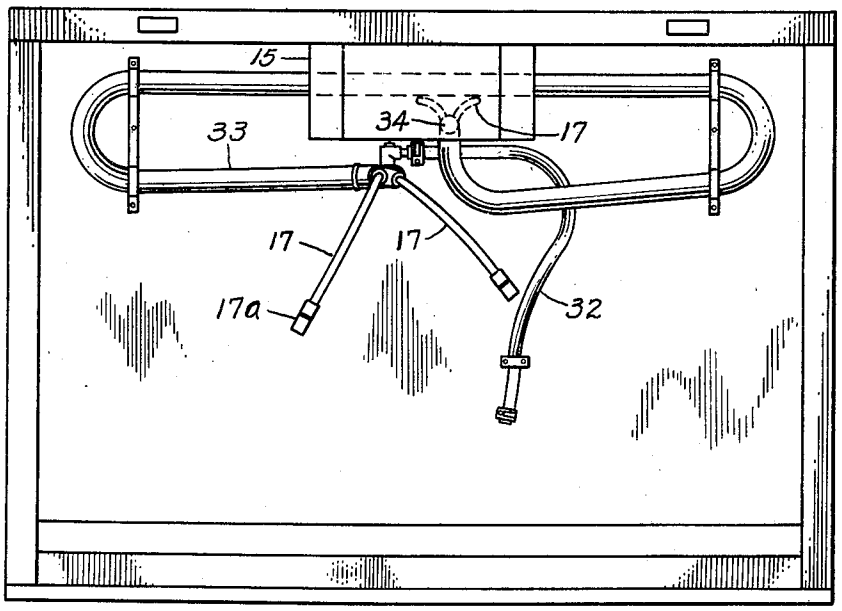


Fig. 2

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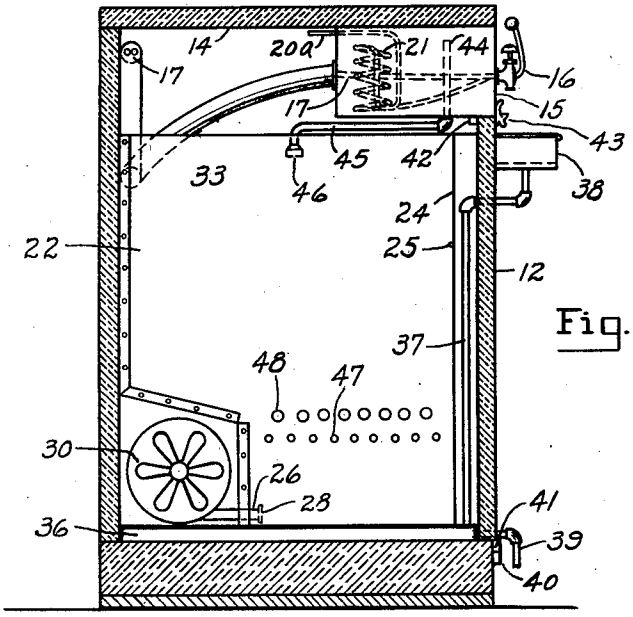


Fig. 3

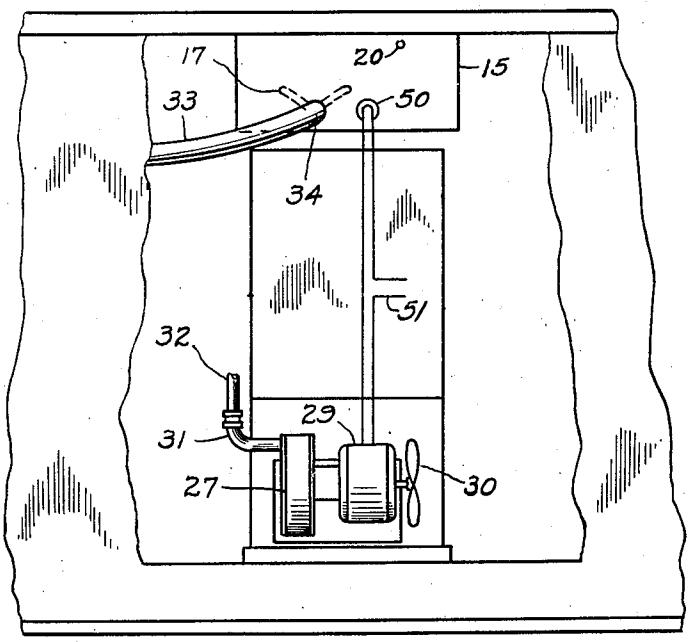


Fig. 4

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Fig. 5

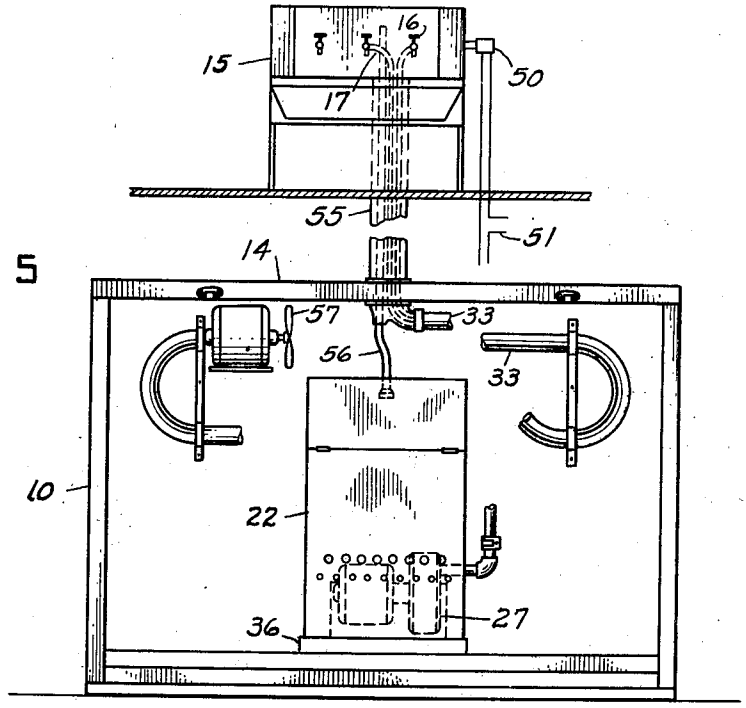
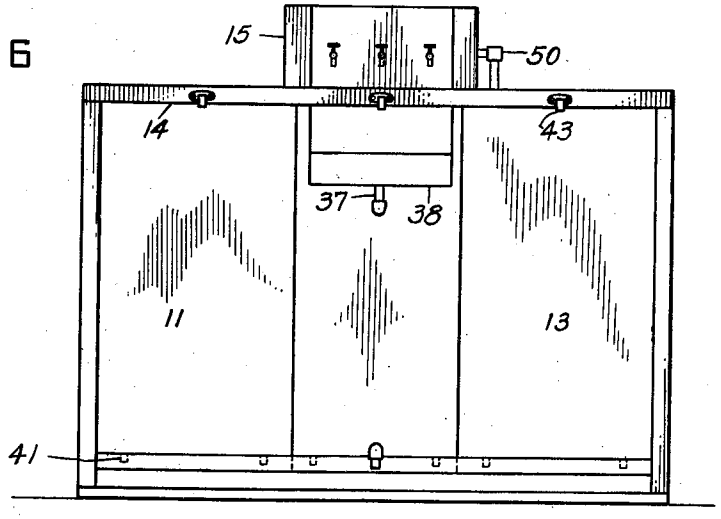


Fig. 6



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Filed July 11, 1939 4 Sheets-Sheet 4

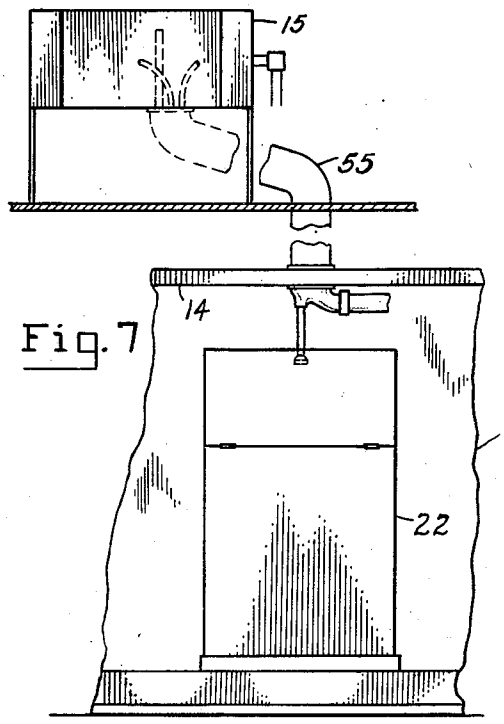


Fig. 7

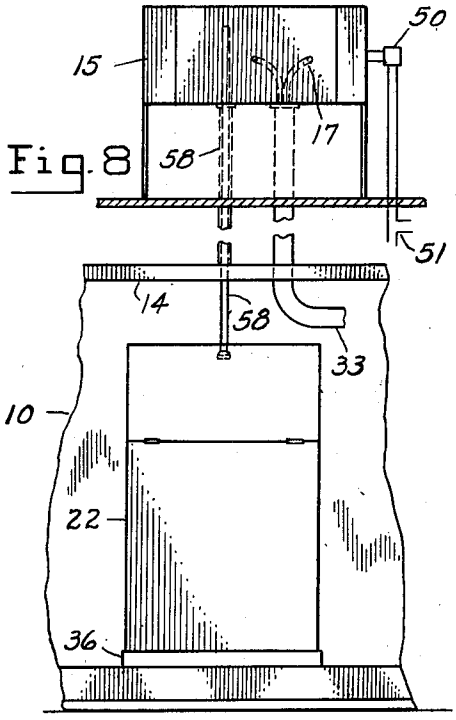


Fig. 8

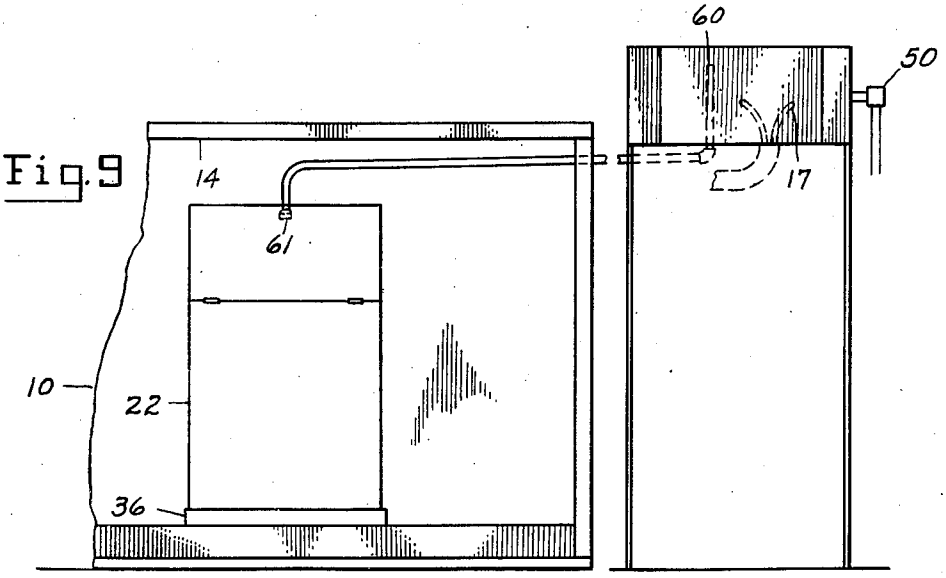


Fig. 9

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UNITED STATES PATENT OFFICE

2,271,868

APPARATUS FOR COOLING BEVERAGES

Michael A. Martin, Erie, Pa.

Application July 11, 1939, Serial No. 283,799

5 Claims. (Cl. 62—142)

This invention relates to cooling apparatus and more particularly to an improved apparatus and system for cooling beer and similar beverages by manually loading the apparatus with ice supplied from an external source whereby beverage containers within a cabinet and beverage drawn from a cooling tank is maintained at or below a pre-determined temperature.

I am familiar with electrically refrigerated cooling apparatus of this general type wherein a compressor-condenser unit is employed to effect a heat exchange with a cooling liquid supplied to a cooling tank by an evaporator. However, apparatus of this type is relatively expensive for initial installation and it is desirable that service facilities be conveniently available in the event of a break-down in the system. In many instances it is desirable to install a system which is comparable to an electrically operable system in controlling the temperature of drawn beverage but heretofore an accurate temperature control of beverage could not be effected by loading the apparatus with ice from an external source. This is particularly true in rural districts or some urban centers where natural or manufactured ice is available but the conventional system of loading the cooling tank itself with blocks of ice is unsatisfactory due to the wide variation in temperature of the drawn beverage.

In prior ice-packed beer cooling systems with which I am familiar, the temperature of drawn beverage cannot be accurately controlled since the ice is packed around beverage coils in the cooling tank and after a period of non-use, the beverage in the coils is substantially the temperature of the ice or ice water rather than 42° F. which is considered the ideal withdrawal temperature. In this type system under peak conditions, the beer is not sufficiently cooled in traversing the coils, resulting in unpalatable warm beer in addition to waste due to excess foam.

I have devised a beverage cooling system and apparatus which is adapted to be supplied with natural or artificial ice from an external source and wherein a relatively large reserve supply of ice water is provided which can be pumped to the cooling tank in correspondence with the heat exchange between beverage passing through the cooling tank and cooling liquid in the cooling tank, whereby the temperature of the drawn beverage can be accurately controlled. Further, the apparatus is adapted to maintain beverage containers cool and to pre-cool beverage during travel from the container to the cooling tank thereby largely relieving the cooling tank of the heat exchange function and permitting the cooling tank to bring the beverage to a desired withdrawal temperature.

I provide a cooling cabinet within which beverage containers are stored and air in the cabinet by natural or forced draft is caused to circulate through the cabinet and in contact with ice disposed therein to maintain the containers cool. The cooling tank may be disposed within the cabinet, mounted on an external wall thereof, or be located at a point remote from the cabinet.

It is a primary object of my invention to provide an improved beverage cooling system and apparatus employing manually packed ice as a cooling medium.

Another object of my invention is to provide a cooling apparatus for beverages which is adapted to be charged with ice supplied from an external source and wherein the temperature of drawn beverage can be controlled within relatively narrow temperature limits.

Another object of my invention is to provide a beverage cooling medium and wherein beverage containers are maintained pre-cooled, beverage in a cooling tank is maintained at or below a predetermined temperature, and beverage is precooled during travel from the container to the cooling tank.

Another object of my invention is to provide a beverage cooling system adapted to be supplied with ice from an external source and employing circulating ice water and wherein the circulation of the ice water is controlled responsive to the temperature in the circulating system.

Another object of my invention is to provide a beverage cooling system of the above type which is relatively inexpensive to manufacture and which is relatively simple to install.

Another object of my invention is to provide a beverage cooling system of the above type, including a beverage container cooling cabinet having improved means for effecting cooling and circulation of air within the cabinet.

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

Fig. 1 is a rear elevational view of cooling apparatus embodying my invention with a rear portion of the cooling cabinet removed for clearness of illustration.

Fig. 2 is a rear elevational view similar to Fig. 1 with beverage containers and ice box omitted for clearness of illustration.

Fig. 3 is a section taken along the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary front elevational view of the apparatus of Fig. 1 with a portion of the front wall removed for clearness of illustration.

Fig. 5 is a rear elevational view, largely diagrammatic, showing a modification of my invention.

Fig. 6 is a rear elevational view showing a further modification of my invention.

Figs. 7, 8 and 9 are elevational views, largely diagrammatic, showing further modifications of my invention.

Referring now to the drawings, I have indicated generally at 10 a heat-insulated cabinet provided with a suitable exterior finish and removable rear panels 11, 12 and 13. The exterior of the cabinet is preferably metal-lined and supported generally centrally of the cabinet top wall 14 is a cooling tank 15. The cooling tank is provided with the usual beverage dispensing faucets 16 which connect with beer supply leads indicated at 17, the leads 17 in turn connecting with the usual pipes 18 mounted in beverage containers 19 and extending to adjacent the bottom of the container. As best illustrated in Fig. 3, I preferably make the cooling tank of substantially less width than the cabinet 10.

The cooling tank if desired may be equipped to deliver seltzer water or cool drinking water and I have indicated a drinking water tap which will be supplied from a pipe 20 preferably projected through the rear of the cooling tank and being in coil form or the like within the cooling tank as indicated at 21 to provide sufficient heat exchange area for contacting cooling liquid which will be supplied to the cooling tank in a manner to be described.

Also disposed generally centrally of cabinet 10 is a box 22 formed of suitable heat-conducting metal and adapted to be charged with ice from an external source. The ice indicated at 23 preferably being supplied in relatively large chunks and for ease in loading box 22, I provide a chute 24 hinged as indicated at 25 and forming the upper portion of the rear wall of box 22 in closed position and adapted to open outwardly to direct ice into the box.

The manner of loading the box with ice constitutes no essential part of my invention but I have found the above described means to be a convenient arrangement.

The lower front portion of box 22 is of undercut form as best illustrated in Figs. 3 and 4 to provide clearance for a pump and fan unit. A pipe 26 extending from pump 27 is sealingly projected through a wall of box 22 and adjacent the box base whereby ice water in the lower portion of the box may be drawn into the pump. I preferably provide a strainer 28 over the end of pipe 26 to prevent foreign matter from entering the pump. The pump may be driven by an electric motor 29 which also drives a fan 30. I preferably mount the pump-fan unit by securing the same to box 22 but any suitable mounting means may be used. The outlet from pump 27 is indicated at 31 and is coupled to a preferably flexible conduit 32 which in turn is coupled to a relatively large flexible conduit 33 whereby ice water may be pumped from the bottom portion of box 22 through conduit 33. Conduit 33 is preferably of substantial length and is supported by the front wall of cabinet 10, the opposite end of conduit 33 entering cooling tank 15 as indicated at 34. Although I have shown conduit 33 as entering the cooling tank through the front wall thereof, it is understood that it may enter at any convenient point, such as the cooling tank base, although I preferably supply the cooling liquid to the cooling tank at the bottom portion thereof.

As best illustrated in Figs. 1 and 2 beer leads 17 are provided with the usual coupling 17a whereby a container may be replaced in the usual manner, the lead 17 being sealingly projected through the free end of conduit 33 and entering the cooling tank through the opening provided for sealingly engaging the opposite end of conduit 33. It will now be apparent that beverage being transmitted from containers 19 to the cooling tank by supply leads 17 will be in heat exchange relation with the cooling liquid in conduit 33 for a substantial distance whereby considerable pre-cooling of the beverage may be effected prior to entering the cooling tank.

The usual connections for supplying gas under pressure, such as carbon dioxide, to the beverage containers are indicated at 35.

The cabinet 10 is heat-insulated in any suitable manner and I preferably provide relatively thick insulation at the base of the cabinet. Box 22 is supported in a drip pan 36 which projects beyond the cabinet sides a sufficient distance to catch any condensation which may form on the external surface of the box. Drip pin 36 is also extended beyond the box at the rear thereof to receive the lower end of a drain pipe 37 which is projected through center panel 12 and connected to drip sink 38. A suitable drain pipe 39 leads from drip pan 36 to a convenient waste drain.

As best illustrated in Figs. 2 and 6, the base of cabinet 10 at the rear thereof has a sheet metal or the like angle strip 40 secured thereto. The horizontal leg of strip 40 is secured to the cabinet base in any suitable manner as by welding and the vertical leg of the strip is spaced from the vertical rear face of the cabinet base to provide an upwardly open longitudinal pocket. The strip is co-extensive with the cabinet base and preferably has the end portions of the vertical leg turned inwardly to close the pocket at the ends thereof. All of the panels 11, 12 and 13 are provided with pins 41 projecting downwardly from their bottom edges adapted to be received within the aforesaid pocket. Panel 12 may be easily assembled with the cabinet by inserting pins 41 thereof in the pocket and moving the top portion of the panel inwardly beneath the underside of the cooling tank 15 to engage a stop 42. The top portion of the panel rides over and is held by a catch 43.

I preferably support drip sink 38 on panel 12 and the drip sink together with drain pipe 37 will be removable with panel 12 whereby chute 24 may be inclined outwardly to receive ice. The side panels 11 and 13 will be secured in a similar manner and will engage the underside of the cabinet top wall 14 and also the sides of cooling tank 15.

I have found the above arrangement to be relatively simple for quickly inserting and removing the panels but any desired construction may be employed whereby heat insulated panels will form a sealed rear wall for the cabinet. By providing three panels it is only necessary to remove one panel when charging the cabinet with ice or when replacing a beverage container and thus minimize the amount of relatively warm air admitted to the cabinet during these opera-

tions. Although I have shown a cabinet adapted to receive two containers, it is understood that by increasing the capacity of the ice box 22 and the size of the cabinet that any desired number of containers may be accommodated such as four, six or eight. In employing a cabinet for a greater number of containers than two, I may provide additional beer supply leads 17 and faucets although I find that two faucets are normally sufficient and the containers not connected to the beer leads will merely be stored for cooling.

A pipe 44 extends upwardly within cooling tank 15 a sufficient distance to insure that the beverage supply leads 17 within the cooling tank will always be immersed in cooling liquid. Pipe 44 is connected by pipe 45 to a spray nozzle 46 extending into box 22 generally centrally thereof whereby as ice water is pumped into the cooling tank relatively warm water will be returned to box 22 through spray 46 and filtered over the ice to be cooled in passage to the bottom portion of box 22. At a pre-determined height above the base of box 22 I provide a series of holes 47 to limit the volume of ice water in the bottom portion of box 22, the excess ice water flowing through holes 47 and being received in drip pan 36.

Fan 30 will cause a circulation of air through cabinet 10 when operating and the relatively warm air forced over the top of box 22 will be cooled and passed through box 22 in contact with the ice therein and the cooled air will pass from box 22 into the cabinet through holes 48.

Although I have shown fan means for circulating air it is understood that this may omitted since there will be a natural circulation of air through the cabinet and box 22 since warm air rising in the cabinet will pass over and thence through box 22 as previously explained. Also when employing a fan, the fan may be operated independently of the pump rather than concurrently therewith as illustrated in Fig. 4 and also may be placed at any advantageous position in the cabinet such as adjacent the top of box 22 as illustrated in Fig. 5.

To control operation of motor 29 I provide a thermostatic switch 50 of any suitable type and which may comprise a thermostatic bulb contacting the cooling liquid in the cooling tank whereby the circuit through power leads 51 will be closed to operate the pump when the cooling liquid rises to a pre-determined maximum temperature and thus force ice water from the base of box 22 into the cooling tank to lower the temperature of the cooling liquid in the cooling tank. Upon a decrease in temperature to a predetermined value switch 50 will open the circuit and the pump will cease operating. Switches of this type are adjustable to control the temperature limits and thus the temperature of cooling liquid in the cooling tank can be maintained within narrow temperature limits at which beer is most palatable such as 40° F. to 43° F.

I preferably form the cooling tank sides and front wall of heat-conducting metal when the cooling tank is disposed within the cabinet and the rear wall of heat-insulating material thus, since the cabinet is entirely heat-insulated there will be relatively little heat loss other than in cooling the beverage and during periods when beer is not being drawn cooling liquid will not be pumped over the ice so that relatively little melting will occur.

Beer barrels are usually cool when delivered from the brewery and upon being disposed in cabinet 10 relatively little lowering of temperature is required. Due to the fact that the beverage containers are maintained at a temperature close to the desired drawing temperature of the beverage and the fact that beverage during its travel from the container to the cooling tank is maintained in heat exchange relation with substantially 32° cooling liquid, little heat exchange is required in the cooling tank itself and the cooling liquid therein acts primarily as an equalizing medium to bring the beverage to the desired withdrawal temperature.

Referring to Fig. 5 I have shown an arrangement generally similar to that in Figs. 1 to 4 inclusive wherein cabinet 10 is remote from the cooling tank 15. In this modification I provide a relatively large conduit 55 opening into the base of the cooling tank and also opening into top wall 14 of cabinet 10. A reducing coupling is secured to the lower end of conduit 55 whereby flexible conduit 33 may be connected thereto for pumping cooling liquid from box 22 through conduit 55 to the cooling tank. Conduit 33 terminates at the lower end of conduit 55 and the beer leads 17 encased by conduit 33 within box 10 are extended through conduit 55 to connect with faucets 16. A return pipe 56 extends to a desired height in the cooling tank and is sealingly projected through the lower end of conduit 55 to extend generally centrally of box 22 whereby returning cooling liquid may be filtered over the ice as previously described. In this modification the center panel will be of the same height as the side panels to completely seal the cabinet and the operation of the pump will be under the control of thermostatic switch 50 as described heretofore.

In this modification it will be noted that I have disposed the fan 57 adjacent the cabinet top and in a position to direct air over the open top of box 22. The fan in this instance being driven by a separate motor from the pump and the motor may be wired to operate by switch 50 concurrently with the pump or control means independent of the pump may be used.

Referring to Fig. 6 I have shown a form of my invention generally similar to that of Figs. 1 to 4 inclusive but wherein the cooling tank 15 is mounted on top of the cabinet. In this modification I preferably have conduit 33 open into the base of the cooling tank and also project the return pipe through the cooling tank base. Also in this modification the cooling tank will be heat-insulated since it will be exposed to relatively high tap room temperature.

In Fig. 7 I have illustrated an arrangement similar to that shown in Fig. 5 but wherein the cooling tank is not positioned directly above cabinet 10 but laterally thereof and in this modification conduit 55 may be formed of flexible heat-insulating material whereas in the modification of Fig. 5 I preferably employ a heat-insulated metal conduit for the connection between cabinet 10 and the cooling tank.

In Fig. 8 I have shown an arrangement generally similar to that illustrated in Fig. 5 but wherein the large conduit 55 is omitted and flexible conduit 33 is projected through the floor of the tap room and connected directly to the cooling tank. The return conduit indicated at 58 also is projected through the floor of the tap room to have its lower end extended to box 22. As previously stated conduit 33 is preferably formed

of heat-insulating material and in this modification at least the portions of conduits **33** and **58** extending from the cooling tank to the top wall **14** of cabinet **10** will be heat insulated.

In Fig. 9 I have shown an arrangement similar to that shown in Fig. 8 but wherein the cabinet **10** and cooling tank **15** are supported on the same level either in the same room or adjacent rooms. Due to the fact that the cooling tank is always mounted a considerable distance above the floor level so that the faucets will be conveniently accessible to the bar tender, the top of return pipe within the cooling tank as indicated at **60** will be a sufficient level above the lower or spray end of the return pipe indicated at **61** to insure sufficient head to flow the return cooling liquid through the top of ice box **22**.

Although I have illustrated and described my invention as employing natural or artificially manufactured ice, I contemplate that this term includes dry ice or any solid cooling medium supplied from an external source and wherein the cooling medium itself is melted in effecting the heat exchange as distinguished from mechanical refrigerating means. I further contemplate that other cooling liquids than ice water may be used, such as brine, or other liquids that might be cooled by the cooling agent.

Although I have shown and described preferred forms 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.

What I claim is:

1. In a beverage cooling apparatus, the combination of a heat-insulated cabinet adapted to receive a beverage container, a box within the cabinet adapted to have a solid cooling agent adapted to be liquefied by heat stored therein, the bottom of the box being adapted to receive liquid to a predetermined level cooled by contact with the cooling agent, a cooling tank, a beverage supply line adapted to connect with the beverage container extending to the tank, conduit means extending from the bottom portion of the box to the tank and encircling the beverage supply line for a substantial distance, return means extending from the tank to the box, pump means for circulating cooling liquid through the conduit means, tank and return means, and the box being open at the top portion thereof and provided with perforations in the bottom portion thereof whereby air in the cabinet may circulate through the box and in contact with the cooling agent to be cooled thereby.

2. In a beverage cooling apparatus, the combination of a heat insulated cabinet adapted to receive a beverage container, a box within the cabinet adapted to be charged with ice from an external source, a cooling tank adapted to contain cooling liquid to a pre-determined level, a beverage supply line extending from the tank and adapted to be connected to a beverage container, conduit means of substantial length connecting the bottom portion of the box and the tank, return means extending from the tank to the box, fan means for circulating air through the cabinet, and pump means for intermittently pumping cooling liquid from the box to the tank.

3. The beverage cooling apparatus as described in claim 2 and wherein the fan means and pump means are operable by a common motor.

4. In a beverage cooling apparatus, the combination of a heat-insulated cabinet adapted to receive beverage containers, a box within the cabinet adapted to be charged with ice from an external source, the box being open at the top portion and having perforations in the bottom portion whereby air in the cabinet may circulate through the box and in contact with the ice, a cooling tank supported by the cabinet and adapted to contain cooling liquid to a predetermined level, a beverage supply line extending from the tank and adapted to be connected to a container, conduit means connecting the box and tank, the conduit means encircling the beverage supply line for a substantial distance, return means from the tank to the box, and pump means operably responsive to the temperature of cooling liquid in the tank for transmitting relatively cool liquid from the bottom portion of the box to the tank causing cooling liquid in the tank to flow through the return means and filter through ice disposed in the box.

5. In a beverage cooling apparatus the combination of a heat-insulated cabinet adapted to receive a beverage container, a box within the cabinet adapted to be charged with a solid cooling agent from an external source, a cooling tank adapted to contain cooling liquid to a pre-determined level disposed at a point remote from the cabinet, conduit means extending from the bottom portion of the box through the cabinet to the tank, a beverage supply line extending from the tank through the conduit into the cabinet and adapted to be connected to the beverage container, return conduit means extending from the tank to the box, pump means responsive to the temperature of cooling liquid in the tank for circulating cooling liquid through the conduit means and flowing return liquid over the cooling agent and the box being adapted to have air circulate therethrough in direct contact with the cooling agent.

MICHAEL A. MARTIN.