March 26, 1940. J. F. ZIGLAR 2,194,582

APPARATUS FOR THE COOLING OF BEVERAGES

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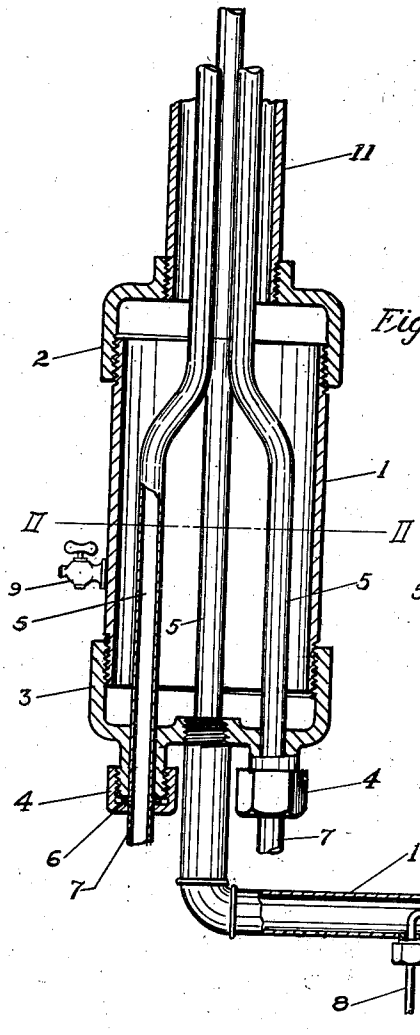


Fig. 1.

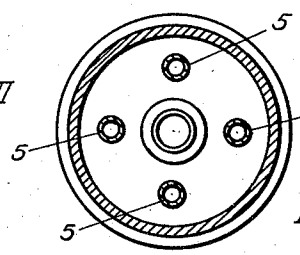


Fig. 2.

James F. Ziglar INVENTOR.

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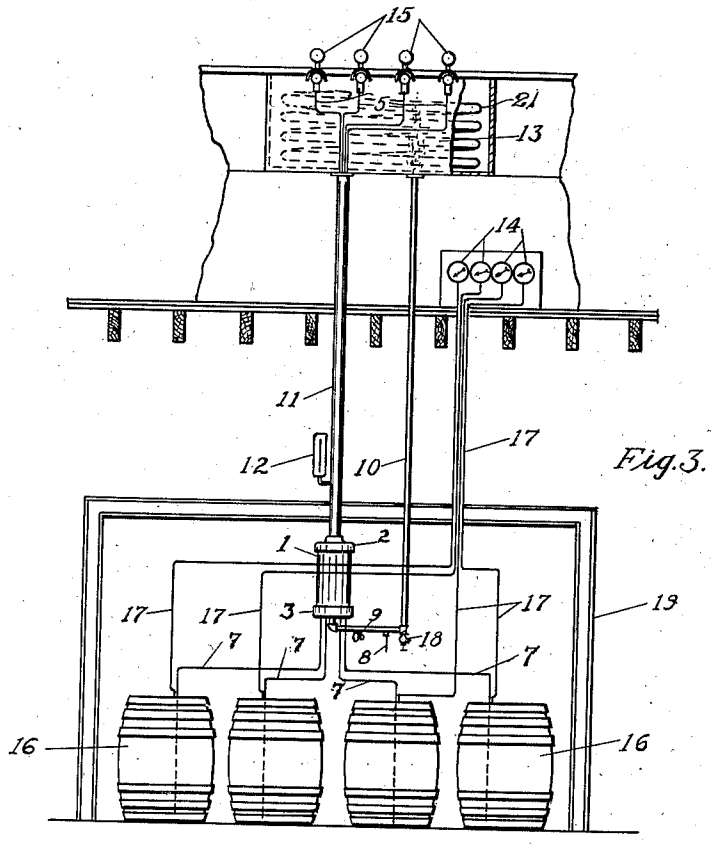


Fig. 3.

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2,194,582

APPARATUS FOR THE COOLING OF BEVERAGES

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Application August 2, 1937, Serial No. 157,025

3 Claims. (Cl. 62—141)

This invention relates to apparatus for cooling liquids and for causing them to circulate in cooled condition. The apparatus which is the subject of this invention is intended more particularly for the cooling and circulating of beverages in hotels, restaurants, ships, and private or public institutions where large quantities of liquids are used for human consumption.

One purpose of the invention is to provide a circulation system of a simple character which can be installed at a comparatively small expense. A related object of the invention is to provide a circulation system in which the maintenance costs are small.

The improved apparatus for circulating liquids is illustrated by means of the accompanying drawings in which:

Figure 1 is an elevation partly in section illustrating the lower portion of the cooling system;

Figure 2 is a horizontal section on the line II—II of Fig. 1; and

Figure 3 is a diagrammatic view illustrating the circulating system as a whole.

Referring to the drawings in detail, the lower cooling chamber 1 has a cylindrical body which is threaded at the top for connection with the screw cap 2 and threaded at the bottom for engagement with the cap support 3. The cap 2 has an upper opening which is threaded for engagement with a cooling water conduit 11. The cooling water is continuously cooled by means of a coil in the box 13. The cooled water descends from the box 13 down the conduit 11 into the lower cooling chamber 1 and thence by the return conduit 10 which has one leg threaded into the central portion of the cap support 3, a horizontal leg shown in the lower part of Figure 1, and a long vertical return to the tank 13 as shown particularly in Fig. 3. The direction of circulation of the cooling liquid is determined by means of an air jet 8 which is shown particularly in the lower part of Fig. 1. The outlet of this jet is shown as directed to the right. The opening of the jet has a reduced area or a number of fine perforations so that air in the pipe 8, where the pressure is slightly greater than atmospheric, issues in small bubbles which carry the cooling water along the return conduit in the direction described above.

The beverages to be dispensed are kept for example in receptacles 16 which are located in the cold storage room 19 as indicated in the lower part of Fig. 3. This cold storage room can be conveniently located in a basement or cellar where it is easy to maintain low and comparatively uniform temperatures as compared with the variable temperatures above the surface of the ground. A pressure slightly above atmospheric pressure is maintained in the receptacles 16 by means of a corresponding number of air lines in which the respective pressures are indicated by means of the gauges 14. Each of these air lines 17 has a gas tight connection with the upper portion of the interior of a receptacle 16. There is a beverage outflow pipe 7 extending from near the bottom of each receptacle up to the cooling chamber 1. Each pipe 7 is tightly connected to an upflow pipe 5 as indicated for two of the pipes in Fig. 1. The pairs of pipes to be connected are flanged as indicated at 6 in Fig. 1 and a washer may be inserted between the adjacent ends of the pipes 7 and the corresponding pipes 5. The screw caps 4 are used to tighten the connections between the pipes 7 and the corresponding pipes 5. The beverage pipes 5 extend up through the cooling chamber 1 and thence up through the cooling pipe 11 into the coil box 13 and from there to taps 15 in the room or rooms where it is desired to dispense the beverages.

The same air supply can be used to keep the beverage liquids in the receptacles 16 under pressure and also to maintain the stream of fine air bubbles from the outlet of the small pipe 8 where the bubbles issue toward the right as seen in Fig. 1 and then pass up the vertical leg of the pipe system 10 into the coil box 13. On looking from above into this box a gentle flow of air bubbles is seen rising up through the liquid in the box 13 from the top of the vertical leg of the pipe system 10.

Ordinarily, when the cooling chamber 1 is installed with its axis in a vertical position and it is desired to drain the system of its cooling water, the valve 18 is opened. An outlet for the cooling water may also be placed in the position indicated at 9 in Fig. 3. When the cooling chamber 1 is from reasons connected with the available space arranged with its axis horizontally disposed, the outlet 9 can be placed as a tap attached to the side of the chamber. Such an attachment is shown in Fig. 1. The tap 9 will, however, not be generally used when the cooling chamber has its axis vertically disposed as indicated in Fig. 1. Both of the taps 9 and 18 can be used when it is desired to empty the cooling water quickly.

In assembling the apparatus shown particularly in Fig. 1 the beverage pipes 5 can first be fitted snugly in corresponding openings in the cap 3 so that the lower edges of the pipes 5 extend approximately to the lower edges of the nipples on

the cap 3. Sections of the beverage pipes 7 are then connected tightly to the corresponding ends of the pipes 5 with the aid of the washers and by tightening the nuts 4. It is preferable that the upper ends of the pipes 7 and the lower ends of the pipes 5 be provided with lateral flanges between which the washers are held tightly. In the case of the pipes 5, they may be inserted in the cap 3 without flanges with their lower edges extending slightly below the lower edges of the nipples in which they fit. The lower edges of the pipes 5 can then be forced tightly against the corresponding nipples by means of a suitable tool. With the aid of washers the pipes 7 are then clamped on the ends of the pipes 5 by means of the nuts 4 as mentioned above. The threaded cylinder 1, the cap 2, and the conduit 11 can then be successively screwed into place. The remainder of the installation can be completed by ordinary pipe fitting methods. The method of assembly of the applicant's installation which has just been described is mentioned by way of example, and it is not intended to convey the impression that this is the only way in which the applicant's installation could be assembled.

The applicant has found the apparatus described above very efficient and economical in operation. The temperature of the cooling liquid in the chamber 1 and in the conduit 11 is easily maintained at about 40° Fahrenheit in spite of large changes of temperature outside of the building in which his apparatus is installed. Such outside temperatures may exceed 100° Fahrenheit on the sunny side of the building.

The slight flow of air through the vertical leg of the pipe system 10 in combination with the tendency of the liquid cooled in the coil box to sink downwardly from the coil box toward and through the cooling chamber 1 makes it possible to maintain the circulation that has been described for an indefinite period at a very small cost. The chamber 1 affords a reservoir for cooling water near the lowest point of the cooling water circulation system. The temperature of the water in this chamber 1 is approximately the temperature at which water has its maximum density. A thermometer is indicated at 12 in Fig. 3 for the use of the operator in measuring the temperature of the cooling water in the conduit 11, but it is found in the use of the applicant's apparatus that very little control by the operator is necessary. The pipe systems 10 and 11 are insulated (with a covering of magnesia-asbestos for example) between the coil box 13 and the cold storage room 19. Gauges are shown at 14 in Fig. 3 for showing the air pressure in each receptacle 16.

A number of variations can be made in the structural details of the applicant's installation and in the methods of assembly of the parts without departing from the invention which is defined within the compass of the following claims.

I claim:

1. Apparatus for cooling potable liquids comprising an upper chamber containing a cooling coil, a vertical conduit in which cooling water from said chamber moves downwardly around a plurality of pipes containing potable liquids under pressure, an enlargement of said conduit at its lower end to form a cold water reservoir surrounding said pipes, a return conduit by which water that has been used for cooling is passed from said reservoir to said upper chamber, and means for directing a continuous stream of air bubbles into said return conduit to maintain a continuous circulation of the cooling water.

2. Cooling apparatus for potable liquids comprising a refrigerating chamber disposed above a storage chamber, containers within said storage chamber holding potable liquids under pressure greater than atmospheric, a cold water receptacle constituting an enlarged conduit and disposed at a height intermediate that of the containers in the storage chamber and of the refrigerating chamber, a circulating system for cooling water including said receptacle and a connecting conduit for downward flow of the cooling water from the bottom of the refrigerating chamber to the top of said receptacle, a return conduit for the cooling water from the bottom of the receptacle back to the refrigerating chamber, conduits for the potable liquids extending from respective containers in the storage chamber up through the receptacle and the connecting conduit and through the refrigerating chamber to manually operable taps, and means for injecting air in the form of small bubbles into the return conduit for the cooling water in a direction to maintain a continuous circulation in the same direction.

3. Apparatus for cooling potable liquids comprising an upper chamber containing a cooling coil in which cooling liquid from said chamber moves downwardly around a plurality of pipes containing potable liquids under pressure, an enlargement of said conduit at its lower end to form a cold liquid receptacle surrounding said pipes, a return conduit by which liquid that has been used for cooling said potable liquids is passed from said receptacle to said upper chamber, and means for directing a continuous stream of gas bubbles into said return conduit to maintain a continuous circulation of the cooling liquid.

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