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APPARATUS FOR COOLING AND DISPENSING CARBONATED BEVERAGES

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This invention relates to liquid dispensing apparatus and it has particular reference to apparatus useful for serving carbonated beverages.

The invention contemplates a compact and efficient apparatus for dispensing carbonated beverages such as ginger ale, root beer, or the like, from a mechanically refrigerated unit in such manner that the temperature of the dispensed liquid and the amount of gas contained therein are both held within predetermined limits calculated to make the drink most palatable. A typical form of the invention, the nature of which will appear more fully from the hereinafter appended claims, is illustrated in the accompanying drawing, wherein:

Fig. 1 is a section of a dispensing unit taken substantially along the line 1-1 of Fig. 2, with parts broken away, and

Fig. 2 is a section taken along the line 2-2 of Fig. 1.

The dispensing apparatus is preferably mounted in a rectangular box 10 formed of sheet metal or other suitable material and having the customary side and top walls. A partition 11 is disposed horizontally in the box 10 to form a compartment thereabove for the dispensing elements, and the top 12 of the compartment is made removable to facilitate access to the interior thereof as occasion may require. The front wall of the box 10 is provided with openings closed by pivoted covers 13 which may be swung open for purposes of adjusting the valves which are also included in the apparatus.

The apparatus is preferably used in connection with a mechanical refrigeration apparatus including a compressor and condenser assembly serving as a source of supply of liquid refrigerant. As such assemblies are well known in the art, no attempt is made to illustrate such unit in the appended drawing. It will be noted, however, that the drawing shows a refrigerant supply line 14 leading into an expansion valve 15 mounted in the lower portion of the box 10, and in line with one of the openings closed by a cover member 13. The discharge side of the expansion valve 15 is connected to an expansion coil 16 in the form of half-round tubing which, as is best shown in Fig. 1, is led into the upper part of the box 10 and is there formed into a helical coil having a plurality of superimposed turns. The extreme end of the coil 16, which is designated by the numeral 17, extends downward through the box 10 and is adapted to be connected to the suction side of the refrigerant compressor, thereby providing a circulating system for the refriger-

ant. A thermostatic bulb 18 is secured to the suction line 17 and it is adapted to actuate the refrigerating apparatus upon increase in temperature of the refrigerant above a predetermined value, in accordance with the customary practices for such control.

It will be noted that the rows of turns of the expansion coil 16 are spaced, and that interposed between them is a second coil constituting a coil for admitting liquid to be cooled into the apparatus. The liquid coil is adapted to lead from a reservoir (not shown) into a pipe 21 which is interwound with the coil 16 so that liquid in its passage through the apparatus is brought into thermal contact or heat exchanging relation with the refrigerating medium. The extreme end of the liquid coil 21 terminates in a section of pipe 22 which is connected to a fitting 23 mounted on the end of a cylinder 24 disposed within all of the coils 16 and 21. That is to say, the refrigerant coil and the liquid coil are wound each upon the other and both are wound upon a cylindrical shell into which the liquid coil discharges.

The cylinder 24, which serves as a reservoir for cold drink, is provided with an inlet valve 25 controlled by a ball float 26 which is operated by variations in the liquid level within the cylinder. As the cold liquid enters the cylinder 24, the ball float 26 is raised until finally the valve 25 closes, thereby preventing further admission of liquid. When liquid is withdrawn from the reservoir 24, the float drops and additional liquid is thereupon permitted to enter. In practice, the valve 25 is set to operate between predetermined limits of liquid level so that a substantially constant volume of cold liquid is maintained within the reservoir at all times. Liquid may be withdrawn at will from the reservoir 24 through a pipe line 27 projecting through the front wall of the cabinet 10 and terminating in a manually operable faucet 28.

The cylinder and coil assembly is maintained in a fixed position in its compartment by means of strap members 29 which extend about the outer coil layer and are secured to a rigidly mounted angle iron frame 30.

As thus far described, it will be understood that the apparatus provides an effective refrigerating unit for dispensing cold beverages. The amount of liquid refrigerant passing through the refrigerant coil 16 is, to a certain extent, dependent upon the draft or load imposed on the liquid coil 21. Thus, if the potable liquid is withdrawn at a fairly rapid rate, there will be a

tendency to exhaust the refrigerating effect of the refrigerant, which will be reflected in a rise in temperature of the refrigerant in the suction line 17, which temperature will be measured by the thermostatic control bulb 18. When the temperature of the bulb 18 is increased, the refrigerating compressor is automatically cut into service, the operation of the compressor conjointly with the operation of the automatic expansion valve 15 will therefore supply to the expansion coil 16 an amount of refrigerant requisite to cool the liquid flowing through the pipe 21, and hence the dispensed liquid will have a sufficiently low temperature at all times. On the other hand, if the load imposed on the liquid line is very light, as may occur when only limited quantities of liquid are withdrawn intermittently through the faucet 28, the thermostatic bulb 18 will, by virtue of its thermal condition, prevent the operation of the compressor, and an excess of refrigerant will not be supplied to the apparatus. By proper balance of the parts, therefore, in a manner well understood by those skilled in the art, the temperature of the dispensed liquid may be maintained within predetermined limits desired for the liquid, and there will be little or no likelihood of the liquid either becoming too cold or too warm.

In the dispensing of carbonated beverages, there is usually present a large amount of dissolved gas in excess of that desired in the dispensed drink. It is therefore necessary to provide satisfactory means for relieving the liquid of the excess pressure and to remove the volumes of gas which are released when the pressure is lowered. In many instances, the liquid line 21 will be coupled to a supply tank under a pressure which may be 120 pounds, more or less. The dispensed liquid, however, is to be served at atmospheric pressure, and if the liquid pressure were suddenly diminished from the stated 120 pounds to atmospheric pressure, the escaping gas would cause the liquid to froth and boil and so render it unsuitable as a drink. According to the present invention, the pressure is reduced within the cylinder or liquid reservoir 24 to a value just above atmospheric pressure, so that when the liquid is withdrawn through the faucet 28, there is only a mild boiling effect which is pleasing to the eye and which also enhances the palatability of the drink.

The pressure release means comprises a tube 31 extending from the upper part of the reservoir 24 and downward into a separator tank 32 which may be mounted on one side of the remaining apparatus and within the box 10. The separating tank 32 is provided with a depending baffle 33 spacing the inlet line 31 from an outlet line 34 which leads from the separator to a pres-

sure relief valve 35. The tank 32 is also provided with a pet cock 36 at its lower end by means of which liquid entrapped in the separator 32 may be withdrawn as occasion requires. It will thus be seen that as liquid under high pressure enters the chamber 24 past the valve 25, the pressure is diminished, since gas is free to escape from the liquid through the line 31 and through the tank 32, and thence cut through the valve 35 and to waste through a suitable discharge line 36. Quantities of liquid entrapped in the gas are gravitationally separated in the tank 32, and may be removed to waste as required through the pet cock 36.

In using the apparatus to dispense ginger ale, for example, the pressure relief valve 35, which may be of any suitable construction, is set to open at pressures in excess of, say atmospheric plus two pounds. The pressure in the tank 24 is therefore maintained at just a few pounds in excess of atmospheric pressure, and, as the liquid in the tank 24 is always cooled to the right degree, the liquid as dispensed through the valve 28 is in proper condition to be served as an appetizing and palatable beverage.

I claim:

1. In a dispensing device for carbonated beverages, beverage supply means, a reservoir, a pair of pipe coils wound about and substantially covering the exterior thereof, one of said coils having one end in communication with said supply means and its opposite end in communication with the reservoir, the remaining coil being adapted to receive and convey refrigerant in heat exchange relation with said reservoir and first coil, means for maintaining a predetermined beverage level in said reservoir, a manually operable valve for controlling withdrawal of beverage from the reservoir, and pressure release means for venting gas and maintaining a predetermined pressure in said reservoir.

2. In a dispensing device for carbonated beverages, beverage supply means, a cylindrical reservoir, a pair of pipe coils wound about said reservoir, said coils being arranged in a plurality of alternate layers thereon, one of said coils having one end in communication with said supply means and its opposite end in communication with the reservoir, the remaining coil being adapted to receive and convey refrigerant in heat exchange relation to said reservoir and said first coil, means for maintaining a predetermined beverage level in said reservoir, a manually operable valve for controlling withdrawal of beverage from the reservoir, and pressure release means for venting gas and maintaining a predetermined pressure in said reservoir.

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