Jan. 24, 1928.

1,657,112

W. E. DOUGHTY

SETTLING CHAMBER

Filed Feb. 1, 1926

Fig. 1.

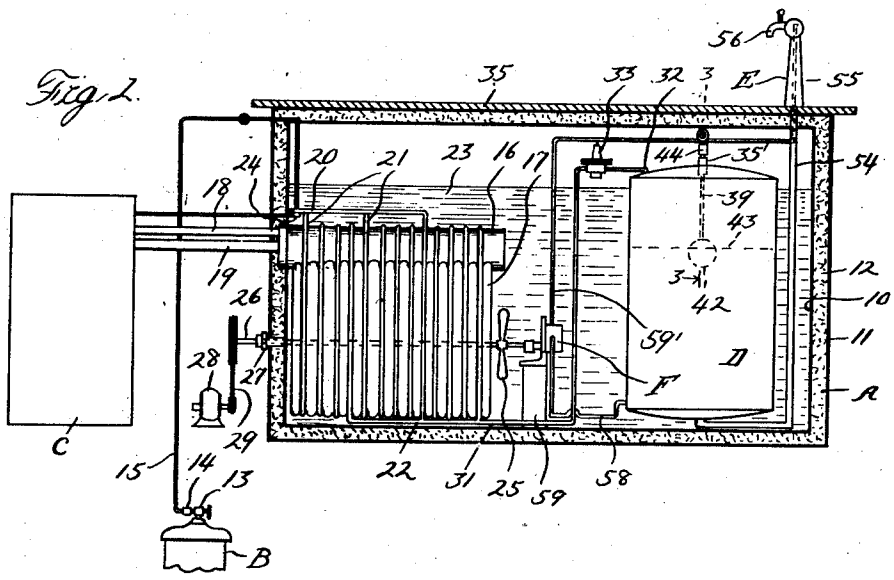


Fig. 2

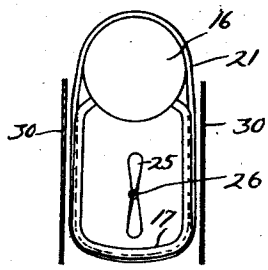
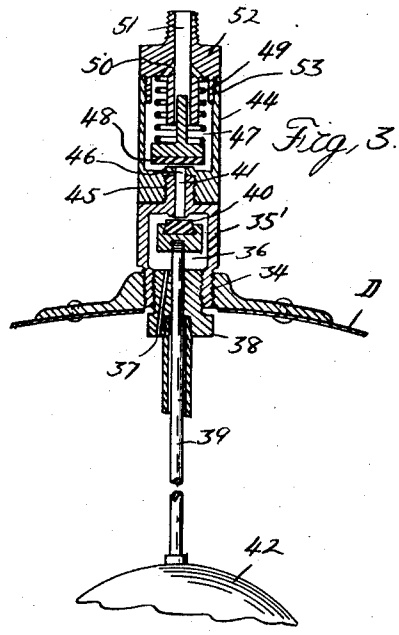


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM E. DOUGHTY, OF DETROIT, MICHIGAN, ASSIGNOR TO JAMES VERNOR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

SETTLING CHAMBER.

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The invention relates to beverage dispensing and refers more particularly to an improved method and apparatus for dispensing carbonated beverages such as ginger ale.

Under the present practice of dispensing ginger ale, the beverage is prepared in carbonated condition and stored under a relatively high pressure. Ginger ale in such condition is commonly known as high pressure ale. It is desirable to run this high pressure ale into a settling tank or chamber before drawing off the ale for drinking, the ale in the settling chamber being under relatively low pressure and known as low pressure ale. From the settling chamber the low pressure ale is drawn off for drinking. Thus the settling chamber provides for relief of the greater amount of gas from the ale so that when the ale is drawn from the settling chamber, it will not become unduly foamy, a condition which would result if the ale were drawn directly from the high pressure tank to the atmosphere.

One of the objects of my invention is to provide an improved settling chamber for always keeping a relatively low predetermined pressure on the ale in the chamber.

A further feature of my invention resides in the provision of a novel dispensing apparatus for use in connection with a settling chamber, or other source of supply of a liquid suitable for drinking.

With these and other objects in view, the invention resides in the novel features of construction and combination and arrangements of parts as more fully hereinafter described and claimed.

Referring to the drawings in which like reference characters indicate corresponding parts,

Figure 1 represents an elevation view partly in cross section and diagrammatic to some extent, illustrating one embodiment of my invention;

Figure 2 is an end elevation view showing the header and coils of the refrigerating unit and parts associated therewith, and

Figure 3 is a detail view in section along 3—3 of Figure 1.

In the drawings, reference character A represents a tank or refrigerating chamber having inner and outer walls 10 and 11 respectively with a temperature insulating medium 12 therebetween, such as cork, for example.

B represents a tank or container providing a source of the liquid to be dispensed described for purposes of illustration as ginger ale, the ale within the tank being carbonated in accordance with general practice and preferably under a relatively high pressure such as one hundred sixty pounds per square inch, for example. For convenience in handling, storage and shipment, the tanks B may be of ten gallon size, for example, having a control valve 13 and coupling 14, the latter being adapted to detachably connect with a pipe or conduit 15. The latter pipe is passed through the tank A as shown in Figure 1.

For cooling the ale during its travel through the tank B or other source of supply to the point of dispensing I might provide a mechanical refrigerating unit C of the ordinary commercial type or other suitable construction. Such a unit includes a motor (not shown) and a thermostatically controlled switch (not shown) for cutting the motor in and out at the respective limits of temperature desired. Thus when the temperature rises above a predetermined point the thermostat will act to cut in the motor and thus act to lower the temperature with the control mechanism (as will later be apparent) until the desired low temperature limit is reached, at which time the thermostat will act to cut out the motor. Such operation for refrigerating units in general, is quite common and will be readily understood by one skilled in the art. 16 represents the header or boiler having the cooling coils 17 communicating therewith. Cooling fluid is circulated between the header and unit C through pipes 18 and 19 as will be readily understood. The pipe 15 is preferably formed with a header 20 and communicating therewith are a plurality of branch pipes 21, each of the latter pipes preferably being spirally coiled for a number of turns around the header 16 and cooling coil 17. The spiral coils of the branch pipes 21 preferably engage adjacent cooling coils 17 being nested closely therebetween whereby the heat of the coils 21 may be dissipated by conduction to the cooling coils 17.

The free ends of the branch pipes 21 are

connected with another header 22 which is preferably positioned substantially adjacent the bottom of the tank A, this point being the coolest in the tank as will later be apparent.

The tank A is preferably partially filled with a liquid 23 such as water, the level of the same being preferably above the header 16 as shown. Located below this water level and preferably at the point of connection between pipe 15 and header 20 is the usual refrigerating unit motor control bulb 24, the latter preferably contacting with header 20 or pipe 15 so as to be subjected to the temperature of the ale passing from the relatively warm source B to the cooling coils 21. Thus the bulb is located at a point in the refrigerating system where the inflowing ale is the warmest, insuring the desired temperature at further points along the system. Also when ale is drawn from the system, relatively warmer ale will flow to the header 16 to replace the ale drawn and with the bulb 24 located adjacent the pipe 15 or header 20 an extremely sensitive control for the motor is obtained, more so than if the bulb were located so as to be entirely surrounded by the water 23.

A further feature of my invention resides in providing means for preventing the formation of an insulating film of cold water immediately adjacent the boiler 16 and cooling coils 17. To this end, I have provided a propeller agitator or circulating propeller 25 mounted on a shaft 26, the latter being extended through a suitable packed bearing 27. 28 is a motor for rotating shaft 26 and propeller 25 through reduction drive 29 when desired.

Referring to Figure 2, I have discovered that by providing vertical baffles 30 spaced adjacent the vertical portions of coils 17 and 21, a more concentrated flow of cold water will take place down between the baffles, serving to increase the rate of heat transfer to the cooling coils 17 and header 16 from the ale in the ale circuit. With the parts arranged substantially as shown in the drawings the coolest part of the water 23 will be at the bottom of tank A preferably where the ale is conducted from header 22 as by pipe 31.

In operation of the system as thus far described, when the ale is conducted from the pipe 31 by any suitable device such as hereinafter set forth, ale to replace that conducted away will flow from the supply tank B to the header 20, whence it will be distributed to the branch pipes 21 for cooling by circulation adjacent the cooling coils 17 and by the water 23 agitated by propeller 25. I have found it desirable to maintain the temperature of the ale at substantially 36° F. and to this end the mechanism controlling the operation of the refrigerating unit motor from the bulb 24 may be set to cut in the motor when the temperature in the bulb is 37° F. and to cut out the motor at 34° F. The presence of the relatively large body of water 23 serves to stabilize the system preventing fluctuations of temperature within the chamber A. I have found that with fifty feet of one-quarter inch block tin ale-conducting pipe, within the chamber A my device described above, can cool forty gallons of ale per hour from 74° F. to 36° F. continuous flow. Such a capacity is sufficient for ordinary purposes and if added capacity is found desirable, the coils 21 or 17 or both of these coils may be increased. Preferably when added capacity or an increased rate of cooling of the ale is found desirable at any time, I have found it convenient to add cracked ice to the water 23. Such ice will not readily melt because of the relatively low tempertaure but will serve to readily and conveniently increase the rate of cooling of the ale.

Preferably within the chamber A and surrounded by the water 23 is a settling chamber D adapted to receive the high pressure ale from the pipe 31 and to afford partial relief of the ale pressure. The ale from pipe 31 passes into the settling chamber D as at 32, the flow being controlled by a pressure regulator 33 of standard or other suitable construction. This regulator 33 may be set to permit flow of ale into chamber D when the pressure in the chamber falls below any predetermined pressure, the latter being ordinarily governed by the head or distance the ale must flow vertically to the point of draft. The latter point is indicated in the drawings by the draft apparatus E shown mounted on counter 35 forming the top of tank A although the draft apparatus may be positioned at any other desired point remote with respect to the tank A, as for example, several floors above the tank. Thus for the relatively small head illustrated in the drawings, the pressure regulator 33 may be set to permit flow of the ale into the chamber D whenever the pressure therein falls below six pounds per square inch.

The ale flowing into the chamber D will become foamy, liberating a certain amount of the gas contained in the high pressure ale. In order to permit escape of this gas, to insure a relatively low pressure at all times of the ale in the settling chamber, to afford a proper taste of the ale, and to permit the ale to readily settle to liquid form, the following construction is provided.

Threadedly engaging an opening 34 in the top of chamber D, preferably above the water line, is a primary valve casing 35' providing a gas chamber 36. The gas from the settling chamber is free to pass to the chamber 36 through port 37 of plug 38, the latter having an axial bore affording a slid-

ing bearing for valve stem 39 of a primary valve 40, the latter controlling the escape of gas from chamber 36 by way of the port 41. Connected with the valve stem 39 is a float 42 whereby the primary valve 40 is controlled by the settled or low pressure ale 43 within the settling chamber. 44 is a secondary valve casing connected as by a threaded engagement at 45 with the primary valve casing 35', the casing 44 having an inlet port 46 registering with the port 41 affording passage of the gas from chamber 36 to a chamber 47 in the secondary valve casing, the passage of gas thereto being controlled by a secondary valve 48 normally seated by a spring 49. The gas in chamber 47 is free to escape through ports 50 and 51, the latter communicating, by reason of suitable piping, preferably with the atmosphere. The compression of spring 49 may be regulated by rotating the cap 52, forming an abutment for the spring, at the point of threaded engagement 53 with casing 44.

I have found it desirable, for example, to arrange the spring 49 to act to seat the secondary valve 48 whenever the pressure of the gas in the settling chamber falls below two pounds per square inch, such pressure established a minimum for the ale in the settling chamber. When ale is drawn from the settling chamber the float 42 lowers unseating valve 40. If the pressure in the settling chamber is less than six pounds per square inch, high pressure ale will flow into the chamber D past regulator 33 from pipe 31. Whenever the pressure of ale in chamber D is more than two pounds per square inch, and the valve 40 unseated, the excess pressure passes from chamber D to primary valve chamber 36 past valve 40 and ports 41 and 46 to the secondary valve chamber 47, whence it acts to unseat secondary valve 48, the gas then escaping to the atmosphere by way of ports 50 and 51.

It will thus be noted that I have provided a control device whereby there will be at all times from two to six pounds per square inch pressure on the low pressure settle ale in the settling chamber D. Heretofore, "pop" valves were used to liberate the settled ale, these valves frequently becoming worn so as to leak, liberating all the gas from the settled ale and thus leaving the ale with a "flat" undesirable taste. With my invention the escape of the gas from the settling chamber is positively controlled by the height of the ale and when the valve 40 is unseated, then the valve 48 will operate to liberate gas in excess of two pounds per square inch pressure. Even if the valve 48 should leak, there is always a relatively large amount of gas being liberated by the inflowing high pressure ale and when the ale level rises, the valve 40 will positively close, thus trapping the remaining liberated gas from the ale in the settling chamber. There will always be a pressure on the settled ale of from two to six pounds per square inch. When the valve 40 closes the regulator 33 will function as at other times to build up the pressure to six pounds per square inch.

As shown in Figure 1, the settling chamber D is preferably located within the tank A and nearly entirely surrounded by the cooling water 23. The propeller 25 serves to maintain the temperature of the water in the vicinity of chamber D, the same as the temperature in the vicinity of the cooling coils 17.

The ale from the chamber D is drawn off to the draft apparatus E by a pipe 54 preferably communicating with the chamber at the bottom where the surrounding cooling water is of the lowest temperature. The draft apparatus E comprises the draft arm 55 terminating in the draw-off spout or nozzle 56 controlled by a valve 57. As aforesaid the regulator 33 may be set to correspond with the pressure necessary to force the ale up to the valve 57, the head being relatively low as shown in the drawings.

In order to maintain the temperature of the ale in the draft arm 55 equal to that in the chamber D, I have provided means for circulating the cold ale from the settling chamber to the draft arm so that as soon as valve 57 is opened, ale will be drawn from nozzle 56 at the temperature of the ale in the chamber D. To this end a circulating pipe 58 is connected preferably between the bottom of chamber D and a circulating pump F mounted on support 59 and actuated preferably by the shaft 26. This pump forces the ale through pipe 59' which has a portion 60 extending upwardly into the draft arm 55 open-ended so as to pass the cold ale from chamber D to a point adjacent the valve 57. Thus this circulating pipe will cause a continuous flow of cold ale upwardly through the pipe portion 60 and downwardly through the draft arm 55 and pipe 54 to the chamber D. Thus, even though the ale is drawn from the nozzle 56 at intermittent periods, the ale drawn will always be of a temperature the same as the ale in the chamber D. It will further be noted that the draft apparatus E may be located remotely from the chamber D or other source of cold ale, at the same time insuring properly cooled ale when drawn from the dispensing nozzle. I have thus avoided the objection of drawing ale warmed during passage from the source of supply to the dispensing nozzle.

While it is believed from the foregoing description, the nature and advantage of my invention will be readily understood, I desire to have it understood that I do not limit myself to what is herein shown and

described and that such changes may be resorted to when desired as fall within the scope of the claims.

What I claim as my invention is:—

1. The combination with a settling tank adapted to receive a high pressure carbonated beverage to permit settling of the same, of a pressure controlled inlet valve, an outlet for withdrawing the settled relatively low pressure ale, and means for limiting the minimum pressure within the tank, said means including a valve casing having an inner open end threadedly engaging an opening in the top of the said tank, an apertured plug partially closing the inner end of the said valve casing to provide a chamber within the said valve casing, the said chamber being constantly in communication with the interior of the said tank, a second valve casing secured to the first mentioned valve casing, the said second valve casing being provided with a passage opening into the chamber of the first mentioned valve casing, a float controlled valve in the chamber of the first mentioned valve casing adapted to seat on one end of the said passage, and a pressure controlled valve in the other casing adapted to seat on the other end of the said passage.

2. The combination with a settling tank adapted to receive a high pressure carbonated beverage to permit settling of the same, of an inlet valve adapted to limit the maximum pressure within the tank, an outlet for withdrawing the settled relatively low pressure ale, and means for limiting the minimum pressure within the tank, said means including a valve casing threadedly engaging an opening in the tank, a plug substantially closing one end of the valve casing to form a chamber within the valve casing, the said plug being apertured whereby the said chamber is in constant communication with the interior of the said tank, a second valve casing carried by the first mentioned valve casing, the second valve casing also being provided with a chamber, a vent providing communication between the said chambers, and oppositely seating valves for controlling the escape of gas through the said vent.

3. In combination, a settling chamber adapted to receive high pressure ale, pressure controlled means for regulating the flow of ale into the said chamber, a primary valve casing threadedly engaging an opening in the top of the said tank, the said primary valve casing providing a gas chamber in constant communication with the interior of the tank, a secondary valve casing threadedly connected with the primary valve casing, the said secondary valve casing having an inlet port registering with an outlet port formed in the primary valve casing, a float controlled valve adapted to control the passage of gas through the outlet port of the primary valve casing, and a pressure controlled valve adapted to control the passage of gas through the inlet port of the secondary valve casing.

4. In combination, a settling tank adapted to receive high pressure carbonated ale, pressure controlled means for regulating the flow of ale into the said chamber, and means for permitting the escape of a portion of the gas liberated from the ale, said means including a pair of valve casings secured to the tank and forming a pair of separate chambers, one of the said chambers having a passage opening directly into the said tank, and the other of the said chambers having a vent opening to the atmosphere, a valve controlled passage providing communication between the two chambers, a float controlled valve in one of the chambers for closing one end of the said passage, the said float controlled valve being controlled by the level of the ale within the tank, and a pressure controlled valve in the other of the said chambers for closing the other end of the said passage, the said pressure controlled valve being actuated by the pressure within the tank upon opening of the float controlled valve.

In testimony whereof I affix my signature.

WM. E. DOUGHTY.