

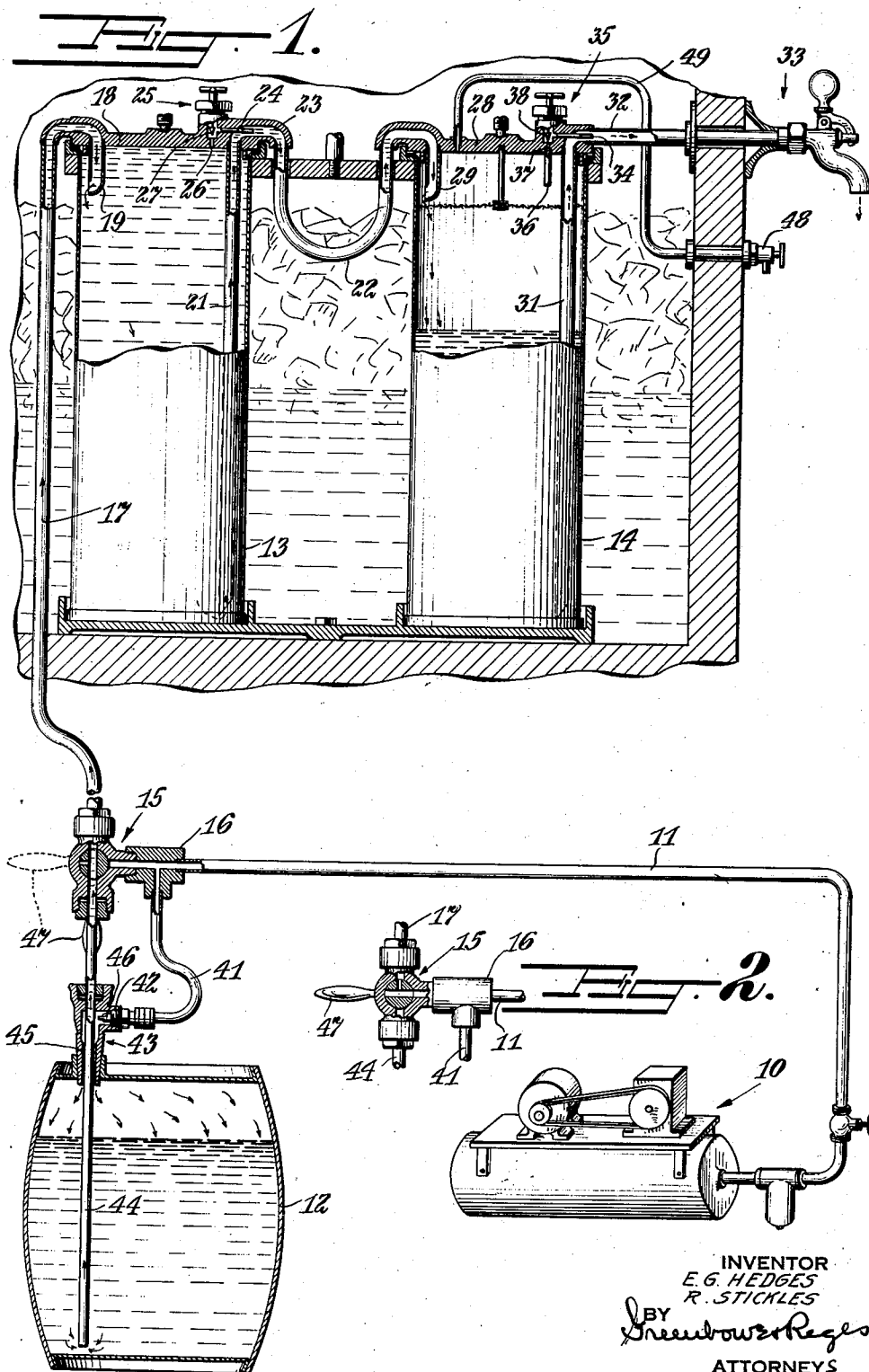
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METHOD OF FILLING LIQUID DISPENSING SYSTEMS

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METHOD OF FILLING LIQUID DISPENSING SYSTEMS

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6 Claims. (Cl. 225-1)

This invention relates to a method and apparatus for cooling and dispensing liquid and relates more particularly to a system through which a gas containing liquid is forced under applied pressure.

In our copending application Serial No. 65,284, filed February 24, 1936, now Patent Number 2,098,093 for Liquid dispensing apparatus, an apparatus is shown and described in which a plurality of cooling tanks are employed. The tanks are connected by conduits in which ejector elements are so disposed and arranged that as the tanks receive liquid any gas accumulating above the liquid level of one tank is, by reason of the ejectors, drawn into the succeeding tank permitting all tanks to fill completely except the final or dispensing tank in which the gases accumulate above the liquid level and are then drawn off by means of a controlled outlet orifice.

The apparatus above described provides a sealed system making it possible to dispense liquid such as beer without losses of liquid through relief outlets such as automatic valves as heretofore employed. The present invention is an improvement upon the system just described. By reason of the present invention we have found that it is possible to operate a system of the sealed or closed type without permitting any appreciable amount of gases to escape from the beer or other gaseous liquid as it fills the containers.

The above advantage is accomplished by creating a pressure in the tanks or containers substantially equal to the pressure necessary to hold the gases in the liquid and in gradually releasing said pressure as the liquid fills the containers.

It is an object of the present invention to provide a method whereby a body of gas containing liquid may be moved from one container to another without the escape or loss of appreciable amount of the gaseous content of the liquid.

Another object of the invention is to move by fluid pressure a body of gas containing liquid from one container to another without the escape or loss of an appreciable amount of the gaseous content of the liquid.

Another object of the invention is to provide a method of filling one or more cooling tanks with an effervescent liquid while subjecting the free surfaces of the liquid to a medium serving to prevent the escape of gases from said liquid.

Another object of the invention is to provide a method of filling one or more tanks with a gas containing liquid in which the surface area of the incoming liquid is subjected to a column of gas at sufficient pressure to prevent the escape

of gas from the liquid and in causing the column to recede as the incoming liquid advances.

Another object of the invention is to provide an apparatus including a plurality of communicating sealed containers and means for introducing a fluid under pressure into said containers prior to the entrance of a liquid under pressure.

Another object of the invention is to provide an apparatus whereby a plurality of containers may be filled with a pressure fluid and with means for releasing said fluid in advance of liquid entering the containers.

Another object of the invention is to provide a simple and effective means for introducing a pressure fluid into a plurality of containers and for releasing said fluid in advance of liquid entering the containers.

Another object is to provide a source of liquid supply and a source of fluid under pressure and means for directing said fluid into one or more containers and for terminating the flow of pressure fluid into said containers while supplying said fluid to force said liquid into said containers.

The invention will be more clearly understood by reference to the following description together with the accompanying single figure of the drawing which shows a plurality of cooling tanks and a source of liquid supply together with means for supplying a pressure fluid. The drawing is more or less diagrammatic and except for certain added elements is similar to the construction shown in the above mentioned co-pending application.

It is to be understood that although the present selected embodiment of the invention shows only two cooling tanks that one or more may be used. Furthermore the cooling medium may be in the form of ice, or mechanical or other refrigeration methods may be employed.

In systems which employ a plurality of cooling tanks from which liquid such as beer is dispensed it is of course necessary to fill the tanks by forcing the beer from the source of supply, usually a keg, into the tanks. The beer in the keg may, when connected to the system, be at a temperature sufficiently high to permit a copious release of gas as the beer enters the tanks. The tanks as heretofore used contained air at atmospheric pressure when the initial filling was made or at subsequent fillings. The incoming beer which is delivered to the tanks by subjecting the surface of the beer in the keg to a relatively high pressure, rushes into the first tank and is agitated causing a release of the gases especially if the beer is at a relatively high temperature.

In our co-pending application this loss has been

reduced to a very small quantity and in the present system is reduced still further with the added advantage that the loss of gases or the decarbonating action of the beer has been almost entirely eliminated.

Briefly, the present system is so constructed and arranged that the cooling tanks are first filled with a pressure fluid at the same pressure as the fluid applied to the surface of the beer in the keg or other source of supply.

The beer is then admitted to the tanks and the pressure in the tanks is relieved by means of an outlet valve. This valve controls the outflow of the pressure fluid which may be slowly released. As the pressure in the tanks falls the beer begins to fill the tanks but the level of the incoming liquid is always subjected to a column or blanket of opposing pressure fluid. This pressure fluid is by-passed from one tank to the next and since the beer is held between two opposing forces it is not agitated and the gases remain in the beer. Thus the first glass of beer drawn has substantially the same CO₂ content as the beer in the keg. The advantage of this condition of the beer is obvious since in systems where the introduction of beer into the cooling tanks was attended by the escape of gases a large amount of the beer in the cooling tanks had a low gas content making the beer less palatable.

The invention will be more clearly understood from the following description together with the accompanying drawing in which

Fig. 1 is a more or less diagrammatic side elevational view of a dispensing system embodying the present invention and

Fig. 2 is a detail view of a valve element for controlling pressure fluid in the system.

A practical embodiment of the present system may include any suitable pressure source such as a tank of CO₂ or a compressor 10 having a pipe or conduit 11 for subjecting beer in a keg 12 to a suitable pressure and for providing tanks 13 and 14 with a pressure fluid prior to the entrance of the beer into the tanks.

Means for directing and controlling the pressure fluid consists of a valve 15 and conduit T-member 16. The operation and function of these elements will be later described. Leading from the valve 15 is a stand pipe or conduit 17 which communicates with tank 13 through a cover plate 18 to deliver beer to the tank. The conduit 17 terminates in an extension 19 with a lateral orifice to cause the beer to flow against the wall of the tank. An outlet pipe 21 is provided for tank 13 leading from the bottom of the tank through the cover plate 18 and connecting with an intermediate conduit 22. The pipe 21 has a horizontal portion or elbow 23 in which an extension pipe 24 of an ejector element 25 is disposed.

The ejector includes a constricted aperture 26 controlled by a valve 27 and communicating with the pipe 24. When the tanks are filled and beer is being drawn, a drop in the level of the beer in tank 13 for example may cause an accumulation of gas at the top of this tank, however, as the beer flows through the pipe 21 the liquid passing the extension pipe 24 causes the gas above the liquid level in the tank 13 to pass into the next tank. Thus the pressure does not build up in the tanks as would otherwise be the case during the dispensing of beer and a condition reached wherein a layer of gas would accumulate to the exclusion of the beer making it impossible to secure the full benefit of the cooling capacity of the tanks. The function of the ejectors is fully set forth in

our co-pending application Serial No. 65,284, filed February 24, 1936, and by reason of the ejectors it is possible to provide a sealed system; in other words a system free from relief valves or other pressure operated means which open the system to the atmosphere.

The pipe 22 leads through a cover plate 28 of tank 14 and terminates in an extension 29 similar to the extension 19 in tank 13.

An outlet pipe 31 leads from the bottom of tank 14 and terminates in a horizontal conduit 32 terminating in a hand valve or spout 33 of any suitable type. Disposed in the conduit 32 is an extension pipe 34 constituting part of an ejector 35 similar to the ejector 25. This ejector 35 has a depending pipe 36 leading to a constricted aperture 37 controlled by a valve 38 and when the liquid level in tank 14 is below the end of the pipe 36 gas is carried through the spout 32 giving an indication that the keg is empty.

The above described system includes an arrangement of operating elements by means of which the present method may be effectively practiced and to which operating elements may be conveniently added to obtain the results sought by the present invention.

As above pointed out the present method includes the step of first creating a pressure within the tanks which is the same as the pressure applied to the liquid in the keg. This is accomplished by means of the two-way valve 15 and the conduit T-member 16. The T-member leads directly to the valve 15 and to a pipe 41 which leads to an inlet 42 of a two-way bung 43. Extending through the bung 43 is a pipe 44 leading to valve or bung rod cock 15. The pipe 44 is of less diameter than the bung, leaving a passage 45 by means of which pressure is produced in the keg above the liquid and the pipe 41 having a one-way valve 46 communicates with the passage 45.

When a keg is connected to the tanks the valve 15 is moved by means of handle 47 to close pipe 44 and connect pipe 17 with pipe 11. Thus pressure fluid is supplied by the compressor or other suitable means to the keg and the tanks so that the pressure in the tanks is the same as the pressure in the keg.

The handle 47 may now be moved to close pipe 11 and establish communication of pipe 44 with pipe 17 as shown. At this time no beer would flow into the tanks since the pressure which forces the beer into the tanks is not sufficient to overcome the pressure opposing the movement of the beer particularly since the beer must be lifted.

When the system has been prepared with balanced pressure as above described, a release of the pressure in the tanks will cause the beer to flow into the tank. The release of this pressure may be accomplished by means of a hand controlled cock 48 located convenient to the one dispensing the beer, and as shown this cock may be just below the spout 33. Leading from the cock is a pipe 49 which communicates with tank 14 through cover 28. The tank 14 is the dispensing tank or the last tank of the series.

When the cock is opened the pressure may gradually be relieved and so controlled that the incoming liquid is maintained under a pressure sufficient to prevent the escape of any appreciable amount of gas. When the cock is first opened an initial release of pressure occurs in the first tank through the pipe 21. As the liquid enters the tank 13, however, it closes the end of the pipe

21 and the pressure fluid passes through the constricted passage 26.

This passage leading into pipe 22 acts as a bypass for the gas and by reason of the relatively small area of the passage a gradual rise in the liquid level results in the tank 13.

Inasmuch as the area of the passage 26 may be varied the rate of filling of the tanks may be varied. It will be found, however, that by adjusting the valve controlling the passage or by making the passage a determined diameter it is possible to fill the tanks within a relatively short period of time and at the same time avoid any agitation of the incoming liquid. It will be evident that although only two tanks are shown that any practical number of tanks may be employed.

The present method of filling the tanks consists in moving a body of liquid from one position to another in a tubular container in which gas tight plungers in the form of fluid columns, contact opposite surfaces of the liquid and move simultaneously to displace the body of liquid in the container and keep the liquid in a stable condition. The fluid column at one side of the liquid in the present system serves to retain the gas in the liquid and to force the liquid as a body from one position to another while the fluid column at the other side of the body holds the gases against escape from the liquid and recedes as the liquid body advances.

The present invention provides a method and apparatus which greatly improves dispensing systems for carbonated liquids and is of particular advantage for liquids such as beer or the like in which the proper gas content is important to taste and quality.

Although a preferred embodiment of the invention is shown and described herein, it is to be understood that variations in the method and modifications may be made in the apparatus shown without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. The method of maintaining the effervescent properties of a liquid such as beer while being conveyed from a supply container to a cooling and dispensing container which comprises initially filling said dispensing container with a pressure fluid in excess of that required to retain the gases in said liquid, subjecting the liquid in said supply container to a pressure fluid equal to that in said dispensing container, simultaneously interrupting the supply of pressure fluid to said dispensing container and connecting said supply container to said cooling and dispensing container, and gradually decreasing the pressure of said fluid in said dispensing container to a value sufficient to retain the gases in the liquid yet insufficient to retard the flow of liquid into the dispensing container without exposure of said liquid to the atmosphere during its flow from the supply container to the dispensing container or during retention of said liquid in said dispensing container prior to withdrawal for consumption.

2. An apparatus for dispensing liquids of the effervescent type comprising a supply container and at least one dispensing container, means for supplying a pressure medium, a conduit for the passage of said medium to said supply container and to said dispensing container to supply the latter with a pressure opposing incoming liquid, a liquid supply conduit leading from the bottom of said supply container to said dispensing container, valve means for controlling the flow of

said pressure medium through said liquid supply conduit and for controlling the flow of liquid therethrough, and means for decreasing the pressure in said dispensing container below that supplied to said supply container to enable the flow of liquid from said supply container to said dispensing container.

3. An apparatus for dispensing liquids of the effervescent type comprising a supply container and at least one dispensing container, means for supplying a pressure fluid, a conduit leading from said means to said dispensing container for initially supplying pressure fluid to said dispensing container, means connecting said conduit to said supply container for supplying pressure fluid to said liquid equal to the pressure in said dispensing container, a conduit leading from the bottom of said supply container and connected to said first mentioned conduit, means operable at the will of an operator for interrupting the supply of pressure fluid to said dispensing container and opening said conduit for the flow of liquid therethrough from said supply container to said dispensing container, and means connected to said dispensing container for gradually relieving the pressure therein to a value sufficient to retain the gases in said liquid but insufficient to retard the flow of said liquid from said supply container to said dispensing container.

4. The combination of a supply container for liquid of the effervescent type and a dispensing container, the latter being at a higher elevation than the former, a conduit leading from the bottom of said supply container to said dispensing container, fluid pressure supply means connected to said supply container, having a pressure greater than that necessary to retain the gases in said liquid and adapted to be connected to said conduit, means connected to said conduit and operable at the will of an operator to initially connect said fluid pressure supply means to said dispensing container to supply fluid pressure thereto equal to the fluid pressure supplied to said supply container, said means also being operable at the will of the operator to simultaneously disconnect said fluid pressure supply means from said dispensing container and to open said conduit for the flow of liquid from said supply container to dispensing container, and means for relieving a portion of the fluid pressure from said dispensing container to cause the flow of liquid from said supply container to said dispensing container and said liquid to be retained in the latter under pressure on both sides sufficient to retain the gases in the liquid.

5. In a liquid dispensing system, a dispensing tank, a liquid supply container, a conduit leading from the bottom of said container to said tank, a pressure medium, a pressure conduit for passing said medium into said container, a valve connecting said pressure conduit with said first mentioned conduit for passing said pressure medium into said tank to create a pressure therein to oppose incoming liquid, said valve also being operable to terminate the passage of said medium to said tank and for causing liquid from said container to pass through said first mentioned conduit into said tank, and means for decreasing the pressure in said tank to cause the flow of liquid from said container into said tank.

6. In a liquid dispensing system, a cooling chamber, a dispensing tank in said chamber, a liquid supply container, a supply conduit leading from the bottom of said container to the top of said dispensing tank, a discharge nozzle for said

dispensing tank, an outlet conduit leading from the bottom of said dispensing tank to said nozzle, fluid pressure supply means for subjecting the liquid in said container to a given pressure, means
5 operable by an operator to initially supply a similar pressure in said tank and for thereafter opening said supply conduit for the flow of liquid

from said container to said tank, and means for creating a difference of pressure between said tank and said container for causing liquid to flow into said tank through said supply conduit.

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