The present invention relates to improvements in or relating to a method of and apparatus for dispensing liquids which are stored or supplied under pressure particularly but not exclusively aerated, carbonated or gas containing liquids such as for example as alcoholic or non-alcoholic beverages.

It has been found in most cases impracticable or inconvenient to dispense aerated, carbonated or other gas containing liquids directly from bulk containers under the pressure within the containers owing to the fact that they issue with undue violence and/or in a form largely consisting of a froth or foam which is obviously inconvenient.

It has been previously proposed to provide dispensing apparatus for such liquids in which the liquid is first discharged under pressure into a dispensing chamber generally of glass in which the pressure is then relieved by opening a vent or snifting valve communicating with the space above the level of the liquid in the dispensing chamber after which the liquid is drawn off by gravity through a suitable outlet.

In practice it has been found that the liquid delivered from such apparatus has become flat or on the other hand comprises an excessive amount of froth or foam.

It has now been found that these difficulties can be overcome by providing an apparatus with common control means for the inlet, discharge and vent means, in which the control means are so arranged that the snifting of air and/or gas from the dispensing chamber can be controlled by the operator according to the nature of the liquid to be dispensed. This is effected according to the invention by arranging that when the control means is operated to open the inlet, the vent means can, for example by moving the control handle to a suitable extent, be opened but only after the inlet means is opened and the vent means is necessarily closed before the inlet means is closed. In this way a too sudden or too rapid escape of gas from the liquid can be prevented.

By suitably operating the control handle the inlet can be opened without opening the vent means and, if desired, the chamber can be filled in this way until the superincumbent pressure therein is equal to that of the liquid supply after which the chamber may be filled further by operating the control handle to open the vent means. When the chamber has filled to the desired extent the vent means is first closed and then the inlet. If this last operation is carried out relatively slowly the pressure in the chamber will rise again to that of the supply before the inlet means is closed. It is preferred that this opening of the vent means should be arranged to be a slight opening only so that the liquid enters the chamber under a substantial back pressure. Thereafter the control handle may be moved to open the discharge means and simultaneously or just before this occurs the same or another vent means may be opened but this time preferably to a greater degree of opening to reduce the pressure in the chamber to atmospheric.

It will be apparent that by varying the rate of movement of the control handle or by pausing at suitable points the entry of liquid and the displacement thereof to and from the chamber may be controlled as desired and the snifting may take place gradually or in stages. The vent or snifting valve may be arranged to open gradually, for example by employing a conical lift valve, or by employing slow lift cams or by adopting both these measures.

It will be understood that any suitable valves may be employed. Thus, for example, one or more of the valves may be mushroom, poppet, lift, needle or the like valves, in which case they may conveniently be operated from one or more suitable cam shafts, and if desired suitable bearing plates may be interposed between the cama and the valve stems. Again some or all of the valves may be rotary valves, such as disc or other rotary valves. For example, they may be constituted by transverse valve passages through a cylindrical or conical valve member registering with ports in a correspondingly formed valve housing. It will be understood of course that the vent or snifting valve or valves must be arranged to open above the level of liquid in the chamber.

It will be understood that any suitable means may be provided for effecting pressure release within the receptacle or chamber, gradually and/or in stages. Thus for example a plurality of vent valves of the same or different apertures may be arranged to operate successively or one or more valves may be arranged to be operable to open gradually and/or successively to varying degrees.

The present invention is particularly but not necessarily exclusively applicable to apparatus for dispensing beer and other beverages which may be stored at relatively low pressures for example 20 lbs./square inch and less or at a relatively high pressure such as 60 lbs./square inch and more. Particularly in the case of beer and like beverages which are capable of foaming or
frothing vigorously it is important that the pressure when at or near its maximum should not be released too fast, unless stops are taken to restore it before the final pressure reduction before or during dispensing.

In order that the invention may be well understood, a preferred embodiment thereof will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a front elevation of a form of apparatus according to this invention the stand being partly broken away.

Figure 2 is a section on the line 1—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a front elevation with certain parts removed showing the valve in the discharge position.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a section on the line 6—6 of Figure 1.

Figure 7 is a section on the line 7—7 of Figure 2.

Referring to the drawings a dispensing chamber 1 is provided comprising a glass cylinder 2 surrounding by a dome 3 preferably of metal for example stainless steel. The dome 3 is provided with a suitable annular seating 4 and fits on the cylinder 2 in a fluid tight manner, a resilient washer 5 being provided for this purpose. The cylinder 2 likewise is mounted in a fluid tight manner on a resilient washer 6 on a seating 7 carried by a suitable base or support 8. In the base 8 are inlet and outlet passages 9 and 10 communicating with the interior of the chamber 1 and with ports 11 and 12 respectively, in a flat valve face 13 against which a rotary valve disc 14 bears. The valve face is also provided with ports 15 and 16 adjacent to said ports 11 and 12 respectively and respectively communicating with an inlet pipe 17 for liquid and a discharge pipe or spout 18. The valve disc 14 is provided with an arcuate slot 19 through which communication may be established between the ports 11 and 18 or between the ports 12 and 17 according to the position of the valve disc. The inlet pipe 11 is of course connected to a suitable supply of liquid under pressure.

The valve disc 14 is carried by a spindle 20 supported in a suitable bearing 21 formed in a web 22 of the base 8. The valve disc 14 is supported on the spindle 20 against the valve face 13 by means of cup 23 which is keyed on to the spindle 20, a pin 24 on the cup 23 entering a recess in the valve disc 14 to prevent relative rotation between these two parts. A resilient washer 25 is interposed between the cup 22 and the valve disc 14. On the other side of the web 22 the spindle 20 carries washer 26 freely mounted thereon which fits into a recess in the web 22. Beyond this a cam 27 is keyed on to the spindle. The end of the spindle beyond the cam is screw threaded and carries a nut 28 and a spring washer 29 is interposed between the nut 28 and the cam 27. By screwing up the nut 28 on the spindle 20 the several parts carried by the spindle are moved into the base 8 and the valve disc 14 is pressed firmly against the valve face 13. The nut 28 is recessed to accommodate a locking bolt 30 which enters the recessed and internally screw threaded end of the spindle 20. At the other end the spindle is provided with an operating handle 3 which has a projection 31a cooperating with screw stops 31b to limit the movement of the handle.

A tube 32 is provided centrally within the chamber and directly above the cam 27. The tube carries a nut 33 by means of which a resilient packing washer 34 can be held against the base to provide a fluid tight joint at the base of the tube where the latter enters the base. At its upper end the tube 32 is screw threaded and passes through the dome 3 and carries an apertured screw threaded securing cap 35 whereby the dome 3 and cylinder 2 can be clamped firmly on the base 8. A resilient washer 36 is interposed between the securing cap 35 and the dome or cover 3 to ensure fluid tightness.

Within the tube 32 is a plunger 37 which bears at its lower end against the cam 27. At its upper end the plunger is bored and internally screw threaded to receive the screw threaded end of a valve rod 38. Above the plunger the valve rod carries a nut 39 above which is a packing cup 40 of resilient material and above this is a sleeve 41, the packing cup 40 and the sleeve 41 being held in position between the nut 39 and an upper nut 42. Above the nut 42 on the valve rod 38 is a washer 43 against which bears a projection 44 and a projection 3a cooperating with screw stops 3b to limit the movement of the handle.

On the other side of the tube 32 is a washer 45 which bears against an internal annular shoulder 46 formed by reducing the upper internal bore of the tube 32. The valve rod 38 is a loose fit in the reduced bore of the tube 32, at or above the top of the dome 3 the bore of the tube 32 is again enlarged to form a valve chamber in which the valve rod 38 carries a valve member 46 screwed thereon having a resilient valve face 35 member or disc 47 which cooperates with a seating 48. Transverse passages 49 in the wall of the upper part of the tube 32 communicate from the interior of the chamber 1 with the reduced bore of the tube 32 around the valve spindle 38. The cap 35 has a central aperture 50 communicating with the atmosphere. It follows that when the valve 47, 48 is open the interior of the chamber 1 is in communication with the atmosphere. Owing to the resilience of the valve disc 47 the valve rod 38 can be lifted slightly without the valve opening.

A pipe 51 communicates through a cock 52 with the interior of the chamber through an aperture 53 in the base. Cleansing or other fluid may be valve disc 14 carried by a spindle 20 through the pipe 51 with which it is desired to cleanse, disinfect or sterilize the chamber and the various conduits and valve passages.

Above the inlet passage 9 is a baffle plate 54 which is clipped on to the tube 32 and serves for deflecting incoming liquid thus spreading it out and preventing undue turbulence.

It will be understood that the base 8 may be suitably shaped to provide a stand or any suitably shaped stand or support may be provided for mounting the apparatus in the place where it is to be used.

The valve 47, 48 which may be termed a vent or snift valve is operated from the control handle 51 through the spindle 20, cam 27, plunger 37 and valve rod 38.

The arrangement and operation of the various parts held in tight assembly and the valve disc 14 is pressed firmly against the valve face 13. The nut 28 is recessed to accommodate a locking bolt 30 which enters the recessed and internally screw threaded end of the spindle 20. At the other end the spindle is provided with an operating handle 3 which has a projection 31a cooperating with screw stops 31b to limit the movement of the handle.

When the handle 31 is in its vertically upright position (Figure 3) the arcuate slot 19 is also in a central position so that it does not uncover any of the ports 11, 12, 15 or 16. At the same time the vent or snift valve 47, 48 is closed. If the handle is rotated in a clockwise direction 75.
towards the position shown in Figure 2 first of all the inlet port 11 is uncovered by the slot 19 and in this position the end of the plunger 37 drops down slightly into a recessed portion 55 of the cam 27 so that there will be a certain amount of resistance by the spring 44 to further movement of the handle 10. If the handle is further rotated the slot 19 starts to uncover the port 18 thereby establishing communication between the inlet pipe 17 and the interior of the chamber 1. After this communication has been established the plunger 32 starts to rise on the arc 56 of the cam 27 and finally after the port 16 has been fully uncovered the vent or snift valve 45, 47 is opened to a slight extent only. These operations are reversed when the handle is returned to its central position.

Upon rotating the handle 31 in a counterclockwise direction the plunger 37 is lifted by the portion 57 of the cam to open the vent or snift valve 47, 48 and thereafter the ports 12, 16 are uncovered establishing communication between the interior of the chamber 1 and the discharge spout, the vent or snift valve 47, 48 being fully opened. The operation of the apparatus is as follows:— Suppose the chamber 1 is empty and the handle 31 is in its central position so that all the valves are closed. The handle is rotated in a clockwise direction to open the inlet valve, so that the liquid which is supplied under pressure to the pipe 17 enters the chamber 1. If the handle is not rotated sufficiently far to open the vent or snift valve liquid will continue to enter the chamber, compressing the air in the chamber until the pressure therein is equal to the pressure in the bulk storage container or other source of supply. When dispensing water liquids it may be desirable to allow this to occur. Upon further rotation of the handle the vent or snift valve is opened slightly whilst the inlet valve remains open so that further liquid can enter the chamber against a superincumbent pressure which is quite substantial owing to the small orifice available for the escape of air or gas from the chamber. When the chamber has filled in this way to the desired level the handle is turned back to the central position whereby the vent or snift valve and the inlet valve are closed in such a manner and is further rotated thereby opening the vent or snift valve to its full extent preferably in most cases gradually whereby the pressure in the chamber is reduced to atmospheric and the outlet valve is opened permitting the liquid to run out under gravity through the spout 18 into a suitable vessel placed to receive it. The handle is then returned to its central position and all the valves are closed. The speed of movement of the handle over the different parts of its travel may be varied to suit the dispensing requirements of different liquids.

The capacity of the glass cylinder is preferably about equal to the amount of liquid which it is desired to serve at one serving for example half a pint or a pint so that as far as possible no residue will in general be left in the chamber after serving. The dimensions of the glass cylinder, dome and inlet and outlet valve passages will be dimensioned according to the kind of liquid to be dispensed, the pressure of the liquid supply and the amount to be served at a time, to secure the use of the smallest possible material within the liquid served of a suitable quantity of gas and the prevention of excessive foaming or frothing. In an example the diameter of the glass cylinder is 5" and its capacity is 35.3425 cubic", the capacity of the dome is 6.26 cubic", the diameter of the inlet valve is 7/16" and that of the outlet valve 5/16".

It might be desirable in some cases to make a slight pause after opening the inlet valve and before opening the snift valve and/or after closing the inlet valve and if desired any suitable yieldable stops or the like may be provided for indicating the points at which the pauses should be made. Also stops may be provided for controlling the stroke of the handle. If desired also, suitable spring or other means may be provided for preventing too rapid actuation of the handle. Any suitable packing may be provided for the valves to prevent undesired escape of liquid from the chamber.

While only one of the various possible embodiments of the invention has been described herein, it will be clear to those familiar with the art that various modifications may be made without departing from the scope of the following claims.

1. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, valve controlled liquid inlet and outlet means for said chamber, a vent or snift valve for said chamber, cam means for operating said vent or snift valve and common control means for said valves, said cam means being so arranged that the vent or snift valve is opened after the liquid inlet has been opened and is closed before the inlet means is closed.

2. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, inlet and outlet means for liquid to and from said chamber, valve means for controlling supply and withdrawal of liquid to and from said chamber through said inlet and outlet means, vent means communicating between the upper part of said chamber and the atmosphere, valve means for controlling said vent means and common control means for actuating said valve means in a cycle comprising opening the inlet means, partially opening said vent means, closing said vent means, closing said inlet means, fully opening said vent means and said outlet means and finally closing said outlet means and said vent means.

3. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, a tube extending upwardly through said chamber and communicating at the top with the atmosphere, an inlet passage in the base of said chamber, an outlet passage in the base of said chamber, a valve housing communicating with said inlet and outlet passages, a supply passage communicating with said valve housing, a discharge passage communicating with said valve housing, a rotary valve member within said valve housing, channel means in said valve member for establishing communication between said inlet passage and said supply passage or between said outlet passage and said discharge passage according to the position of said valve member, apertures in the upper part of said tube, a constricted valve seating in said tube above said apertures, a vent valve within said tube cooperating with said seating, a plunger within said tube for operating said vent valve, said plunger fitting tightly in said tube below said apertures, a control spindle below said valve member, a control valve below said control spindle, a said rotary valve member, and a cam on said
4. Spindle cooperating with the end of said plunger to control said vent valve.

20. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, liquid inlet and outlet passages to and from said chamber, a common valve member for controlling said inlet and outlet passages to open them one at a time, a vent passage communicating with the upper part of said chamber, a lift valve for controlling said vent passage, a valve rod for actuating said lift valve, a control spindle for actuating said valve member, a cam on said control spindle for actuating said valve rod, said cam having a lift portion operative to lift said valve rod to open the lift valve slightly when the inlet passage is fully opened by said valve member and a second lift portion to lift said valve rod to open said lift valve fully as the outlet passage is opened.

5. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, a valve seating, two ports in said seating communicating with the inside of said chamber, a rotary valve disc bearing against said seating, a control spindle carrying said valve disc, a third port in said seating adjacent to one of said first named ports, a supply conduit for liquid communication with said third port, a fourth port in said seating, adjacent to the other of said first named ports, a discharge conduit communicating with said fourth port, an arcuate channel in said valve disc for establishing communication alternately between the two adjacent ports of each pair of adjacent ports, an outlet in the upper part of said chamber, a lift valve in said outlet, a plunger for operating said lift valve, a cam on said spindle for operating said plunger, said cam having a low lift portion opposite the end of said arcuate channel which is used for opening the supply conduit, and a high lift portion opposite the other end of said arcuate channel.

6. Apparatus for dispensing liquids stored under pressure comprising a base, a glass cylinder, a central tube secured to said base and passing through said base, a cap on said tube for holding said base and cylinder in assembly, an aperture in said cap, transverse passages in said tube within said base and near the top thereof, a lift valve and passages, controlling communication between the interior of the base and the atmosphere, a plunger within said tube for operating said lift valve, said plunger having a gas tight fit in said tube below said transverse passages, inlet and discharge passages for liquid in said base, communicating with the interior of the cylinder, valves for controlling supply and discharge of liquid through said passages, and common control means for operating said various valves, the arrangement being such that the lift valve is open to some extent at least, in at least one position of said control means in which the inlet passage is opened.

7. Apparatus for dispensing liquid comprising a bulk storage container for liquid under pressure, a dispensing chamber, means for admitting liquid from said bulk storage container to said dispensing chamber, means for discharging liquid from said dispensing chamber to a desired point of delivery, vent means for said chamber and common control means for operating the apparatus according to the following cycle, namely admitting liquid to said dispensing chamber, slightly reducing the pressure therein to allow the said chamber to fill to the desired level, restoring the pressure of said chamber to that of the bulk storage container, reducing the pressure in said chamber to atmospheric and discharging liquid therefrom at that pressure.

8. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, inlet means for admitting liquid under pressure to said chamber, vent means for relieving pressure in the chamber, and common control means for said inlet, vent and discharge means, the arrangement being such that said vent means is opened to relieve the pressure after the opening of said inlet means and is closed before said inlet means is closed.

9. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, a valve housing, a port in said valve housing communicating with a liquid supply pipe, a second port in said housing communicating with the interior of said chamber, a rotary valve member in said housing, an arcuate slot in said valve member greater in length than the arcuate distance between said ports, vent means for relieving pressure in said chamber, and control means for said vent means associated with said valve member in such manner that said vent means is opened to relieve the pressure after the opening of said inlet means and is closed before said inlet means is closed.

10. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, a valve housing, a port in said valve housing communicating with a liquid supply pipe, a second port in said housing communicating with the interior of said chamber, a rotary valve member in said housing, a control spindle for said valve member, an arcuate slot in said valve member of greater length than the arcuate distance between said ports, vent means for relieving pressure in said chamber, a cam for operating said vent means mounted on said spindle, and a lift portion on said cam so arranged with respect to said arcuate slot that said lift portion is operative only when said slot is in registry with both of said ports.

11. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, a valve housing, a port in said valve housing communicating with a liquid supply pipe, a second port in said housing communicating with the interior of said chamber, a discharged nozzle, a fourth port in said housing communicating with said discharge nozzle, a rotary valve member in said housing, an arcuate slot in said valve member of greater length than the arcuate distance between said first-mentioned two ports, a control spindle for said valve member, a cam for controlling said vent means mounted on said control spindle, a lift portion on said cam so arranged with respect to said arcuate slot that it is operative only when said arcuate slot is in registry with said first-mentioned two ports, a lift portion on said cam so arranged with respect to said arcuate slot that it comes into operation just before or just as said arcuate slot starts to register with said third and fourth ports.

12. Apparatus for dispensing liquids stored under pressure comprising a dispensing chamber, inlet means for admitting liquid under pressure
to said chamber, discharge means for discharging liquid from said chamber, a tube extending upwardly through the chamber and communicating with the atmosphere at the top, a lift valve at the top of said tube, apertures in said tube below said lift valve, a plunger within said tube for operating said lift valve, said plunger fitting tightly in said tube below said apertures, and common control means for said inlet and discharge means and said plunger, the arrangement being such that said plunger is operated to open said lift valve after the opening of said inlet means and is closed before said inlet means is closed.

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