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[54] **LIQUID METERING DISPENSER**  
 12 Claims, 11 Drawing Figs.

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[51] Int. Cl. .... G01f 11/04,  
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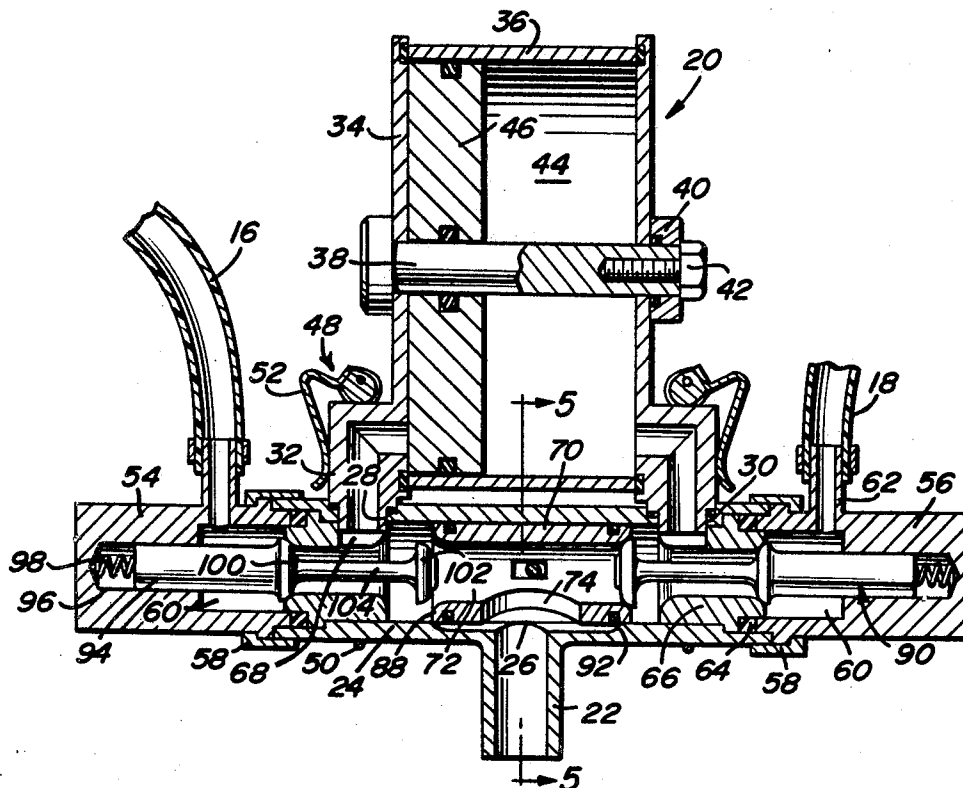
[50] Field of Search ..... 222/249,  
 250, 386.5; 73/239, 269

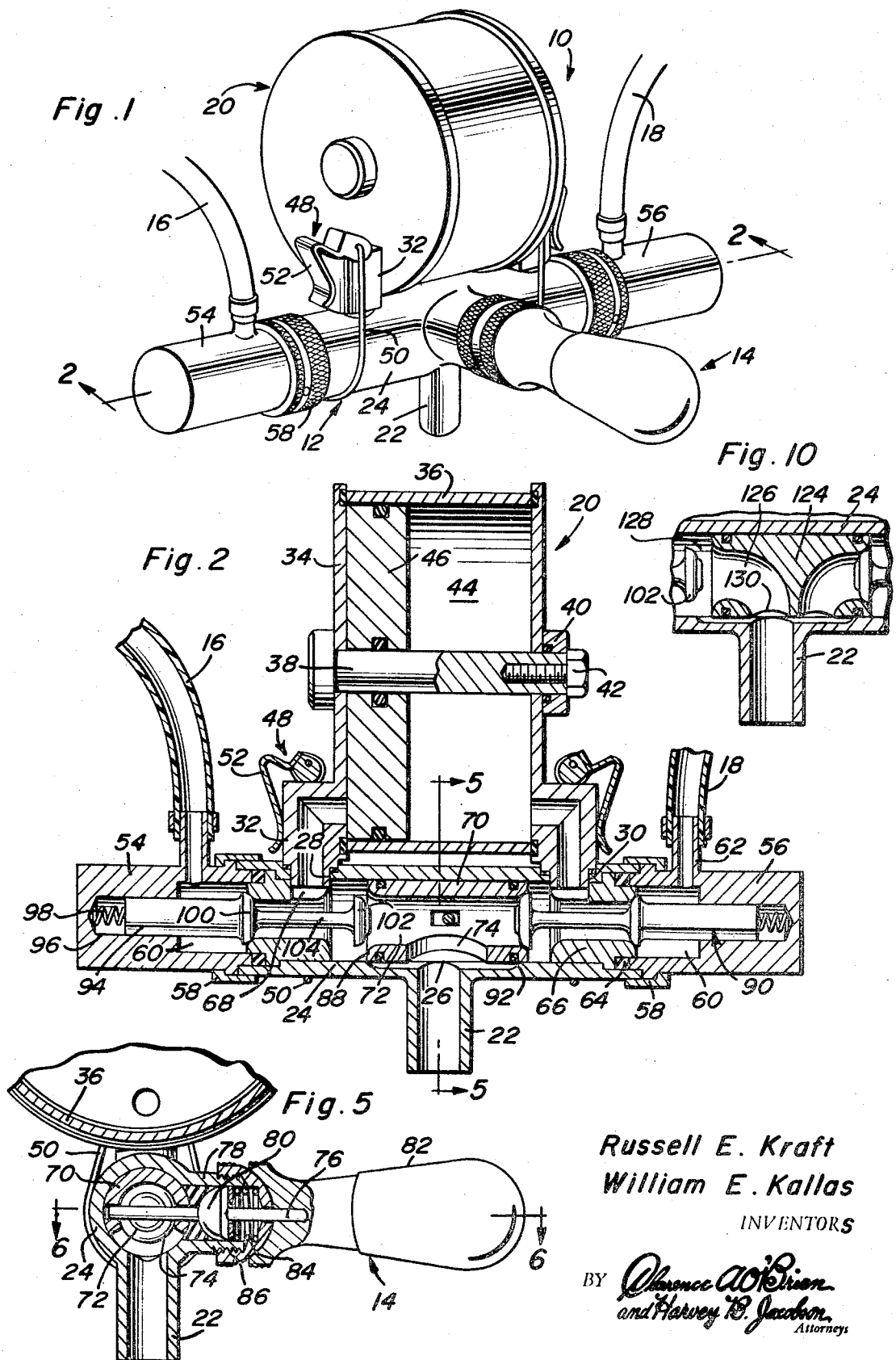
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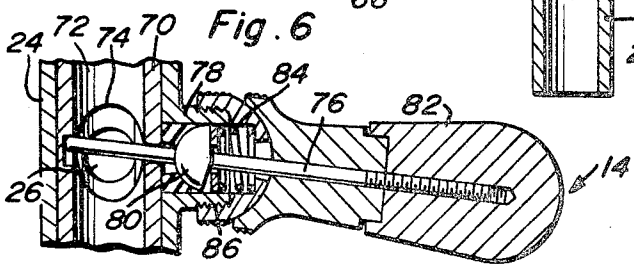
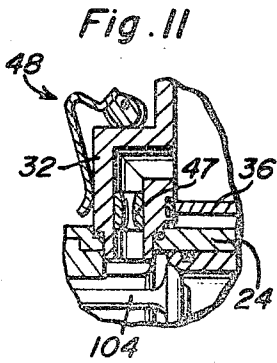
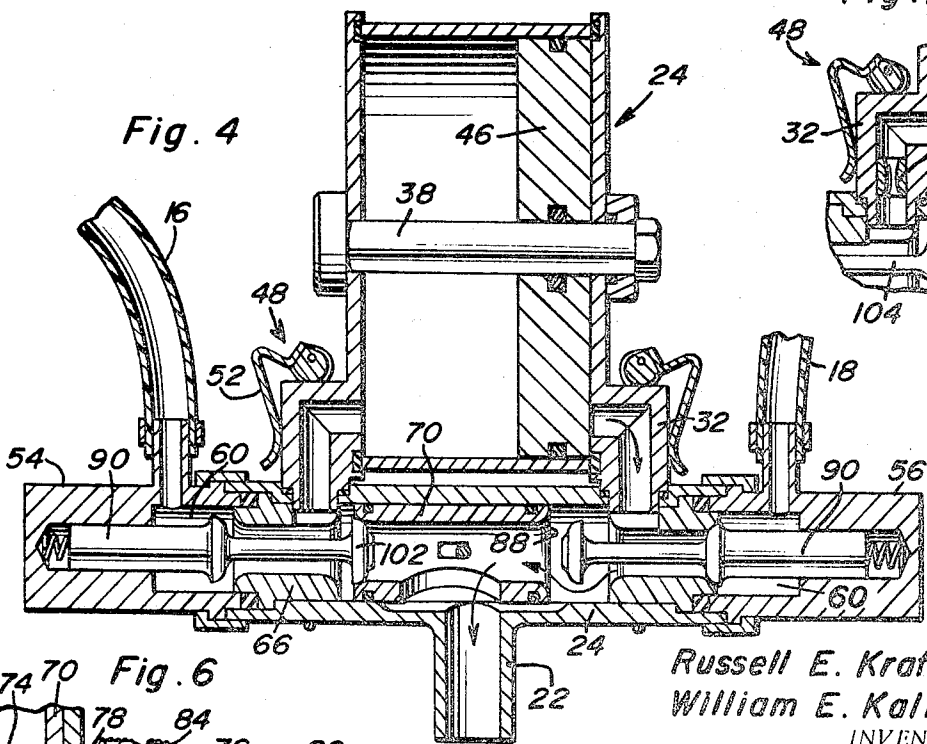
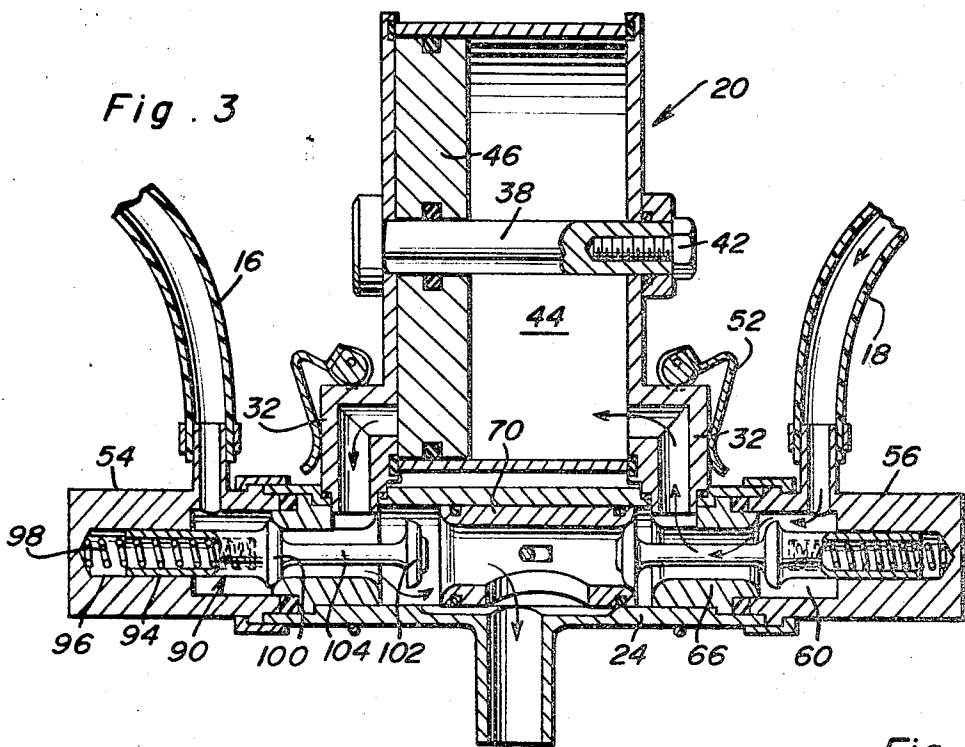
**ABSTRACT:** Liquid under pressure within a bulk container is dispensed in measured quantities through a valve assembly having an actuated valve element engageable with a pair of spring-biased valves to control inflow and outflow from opposite sides of a piston within a fluid-measuring chamber. The measuring chamber is remote from or removably clamped to the valve assembly which includes a tubular valve body closed at opposite ends by closure caps that slidably mount the spring-biased valves and connect the valve assembly to the pressurized container.





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Fig. 7

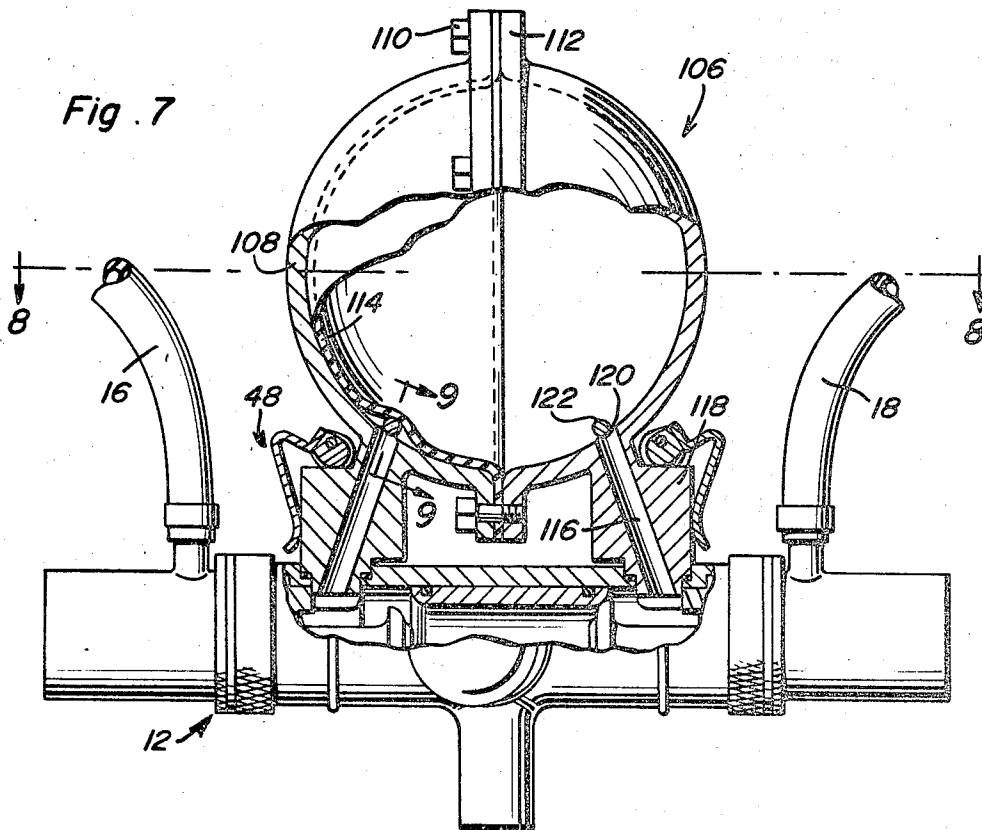


Fig. 8

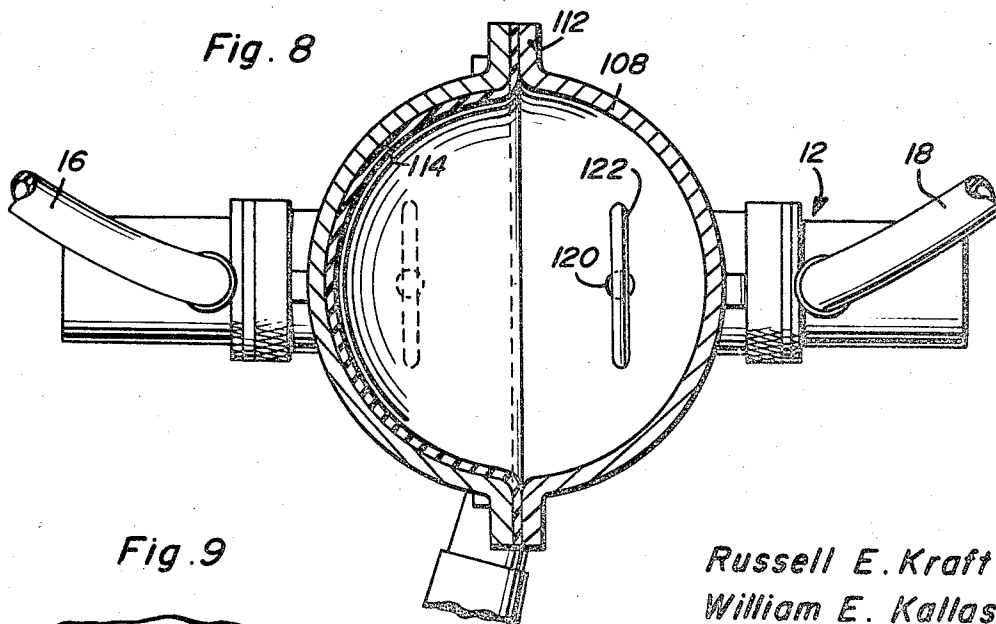
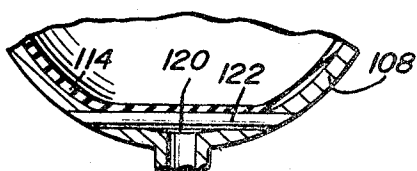


Fig. 9



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# LIQUID METERING DISPENSER

This invention relates to the dispensing of measured quantities of liquid such as draft beer and carbonated beverages from pressurized bulk containers. More particularly, the present invention relates to a novel valve mechanism and measuring chamber combination.

Many forms of liquid-dispensing valve mechanisms are available wherein a fluid chamber is charged with fluid on one side of a piston while the fluid on the other side of the piston is being dispensed. Such metering valve dispensers often leak and are difficult to disassemble for replacement of parts.

In accordance with the present invention, leakage is minimized, and servicing of the valve mechanism facilitated by means of a valve assembly which includes a tubular valve body having inlet ports communicating with the fluid-measuring chamber through conduits attached to the measuring chamber while the opposite ends of the valve body are closed by closure caps through which fluid communication to the pressurized container is established. The closure caps slidably mount spring-biased valve members which normally close the supply passages formed within the closure caps. The spring-biased valve members are however displaced against the bias of the springs to open the supply passages by a tubular valve member displaced by a suitable actuator from one operative position to another to thereby permit inflow of fluid to the measuring chamber on one side while outflow of fluid from the other side is conducted through a valve passage in the actuated valve member to a discharge spout.

Disassembly of the valve mechanism is accordingly facilitated for cleaning and repair purposes while the measuring chamber may be readily replaced by measuring chambers of different sizes in order to afford a wide range of capacity. Accordingly, different beverages may be dispensed through the discharge spout in exact desired quantities by simple displacement of the actuator from one operative position to the other, the actuator capable of being operated either manually or electrically.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view showing one embodiment of the liquid-metering dispenser of the present invention.

FIG. 2 is a sectional view taken through the dispenser taken substantially through a plane indicated by section line 2-2 in FIG. 1 showing the dispenser in a closed condition.

FIG. 3 is a sectional view similar to FIG. 2 but showing the dispenser in a dispensing condition corresponding to one operative position of the actuator.

FIG. 4 is a sectional view similar to FIG. 3 but showing the dispenser in a dispensing condition in the other operative position of the actuator.

FIG. 5 is a partial sectional view taken substantially through a plane indicated by section line 5-5 in FIG. 2.

FIG. 6 is a partial sectional view taken substantially through a plane indicated by section line 6-6 in FIG. 5.

FIG. 7 is a side elevational view of a dispenser having another form of metering chamber device.

FIG. 8 is top sectional view taken substantially through a plane indicated by section line 8-8 in FIG. 7.

FIG. 9 is a partial sectional view taken substantially through a plane indicated by section line 9-9 in FIG. 7.

FIG. 10 is a partial side sectional view through a modified form of valve assembly.

FIG. 11 is a partial side sectional view showing a modification of the dispenser illustrated in FIG. 2.

Referring now to the drawings in detail, the dispenser generally referred to by reference numeral 10 in FIG. 1 includes a valve assembly generally referred to by reference numeral 12 enclosing a valve mechanism adapted to be actuated by a manual actuator 14 in the illustrated embodiment. The valve assembly is connected to a pressurized source of fluid

through a pair of flexible tubes 16 and 18 and removably mounts thereon, a measuring chamber device 20. It will become apparent therefore, that displacement of the actuator 14 between two operative positions will dispense a quantity of liquid through the discharge spout 22, the quantity dispensed being determined by the capacity of the measuring chamber device 20. Thus, each time the actuator is displaced from the position shown in FIG. 1 in the proper direction to one of the operative positions, the same quantity of liquid will be dispensed into a container placed under the discharge spout 22.

Referring now to FIGS. 2, 5 and 6, it will be observed that the valve assembly includes a tubular valve body 24 having a central outlet port 26 establishing fluid communication between the spout 22 and a pair of inlet ports 28 and 30. The inlet ports are formed by sealed, recessed openings into which passage portions 32 of the measuring chamber device 20 are inserted. The passage portions 32 project from the end walls 34 of the measuring device held assembled with the cylindrical wall 36 by means of the assembly bolt 38 and the clamping nut 40 secured to the assembly bolt by the screw fastener 42. Fluid chambers 44 are accordingly enclosed within the measuring device on either side of a piston member 46 which is slidably mounted on the assembly bolt 38. The measuring device is held assembled on the valve body 24 by means of the clamps 48 which include U-shaped rods 50 embracing the tubular valve body and which are connected at the ends thereof to the releasable lock elements 52 engaging the passage portions 32.

The opposite axial ends of the tubular valve body 24 are closed by a pair of closure cap members 54 and 56 coupled by the couplings 58 to the valve body. Each closure cap member encloses a supply passage 60 communicating with the pressurized container through the flexible tube 16 or 18 coupled to the fitting 62. The closure cap member is clamped to the tubular valve body 24 by the coupling 58 against an annular seal element 64 which also holds a valve seat member 66 assembled within the tubular valve body. Each valve seat member is provided with an opening 68 aligned with the outlet ports 28 within the tubular valve body aforementioned. Accordingly, the supply passage 60 may communicate with the fluid chambers 44 through the valve seat members 66 in order to charge the measuring chamber device with fluid from the pressurized container.

A tubular valve member 70 is slidably mounted within the tubular valve body 24 for displacement by means of the actuator 14 between the outlet ports 28. A valve passage 72 is formed within the valve member 70 in constant fluid communication with the outlet port 26 through the opening 74. In one form of the invention, the valve member 70 is axially displaceable by means of an actuator rod 76 associated with the actuator 14, the actuator rod being pivotally mounted within the fitting 78 in any suitable manner as for example by the pivot element 80 as shown in FIGS. 5 and 6. Any suitable handle assembly 82 may be connected to the actuator rod which may also be biased to a position past over center by means of a spring device 84 housed within the pivotal bearing member 86 on which the handle is assembled. It will of course be appreciated that other types of actuators may be utilized performing a similar function in displacing the valve member 70 to opposite axial limit positions on one side or the other of a center position at which it is yieldably held when released. When the actuator is released therefore, the valve member 70 will assume a position such as illustrated in FIG. 2 wherein one of its valve seating ends 88 engages one of the valves 90 respectively mounted by the closure cap members 54 and 56. The tubular valve member 70 is also provided with annular O-ring seals 92 adjacent the valve seating ends 88 so as to confine flow through the valve passage 72 from one of the axial ends 88 when the valve member is displaced to one of the opposite axial end positions thereof to which it is limited by the valves 90. The valves 90 are similar in construction and operation and each includes a tubular end portion 94 slidably mounted within a bore 96 formed in the closure cap member.

A spring 98 is seated within the bore 96 and extends into the tubular portion 94 of the valve so as to bias the valve inwardly to a position wherein a radially projecting valve land 100 engages one axial end of the valve seat member 66. A second valve land 102 is connected in spaced relation to the valve land 100 by means of the connecting portion 104 of the valve 90 and is adapted to engage one of the valve seat ends 88 of the tubular valve member 70.

When the actuator is released, as shown in FIG. 2, the valve member 70 will be in engagement with the valve land 102 associated with the valve 90 in the closure cap member 56. The bias of the spring 84 associated with the actuator 14 will however be insufficient to displace the valve member 90 against the bias of spring 98 so that the valve member will close the supply passage 60 within the closure cap member 56. The valve 90 associated with the closure cap member 54 will also close the supply passage 60 associated therewith. Accordingly, no fluid from the pressurized container may flow into the valve assembly. However the measuring chamber device 20 will be charged with fluid on one side of the piston 46 as shown in FIG. 2. Inasmuch as the valve land 102 associated with the valve 90 within the closure cap member 56 engages the adjacent valve seating end 88 of the valve member 70, the valve passage 72 is closed so as to prevent leakage of any fluid. If the valve member 70 is then displaced in a left-hand direction from the position shown in FIG. 2 to the position shown in FIG. 4, the valve passage 72 will open since the valve member 70 will then be spaced from the land 102 of the right-hand valve 90 permitting fluid on the right side of the piston 46 to be conducted into the spout 22. At the same time, the valve passage 72 will be closed at the opposite end and the left-hand valve 90 will be displaced to an open position against the bias of spring 98 as shown in FIG. 4. The supply passage 60 will then establish fluid communication between the tube 16 and the fluid chamber on the left side of the piston 46 causing displacement of the piston 46 in a right-hand direction and displacement of the fluid in chamber 44 previously charged until all of the fluid on the right side of the piston has been displaced from the fluid chamber 44 as shown in FIG. 4. When the valve member 70 is displaced to the other axial position as shown in FIG. 3, fluid is displaced from the left side of the piston 46 in order to dispense the same quantity of fluid.

The dispenser hereinbefore described may be adapted for the handling of different types of beverages. In connection with high pressure beverages, a restrictor 47 may be placed between the fluid chambers 44 of the measuring chamber device 20 and the valve assembly 12 in the passage portions 32 as shown in FIG. 11 or on the intake side of the dispenser. More satisfactory operation of the dispenser may also be obtained in order to handle either gravity flow beverages, pressurized beverages or carbonated beverages by replacing the measuring chamber device 20 hereinbefore described by another type of measuring chamber device 106 as illustrated in FIGS. 7, 8 and 9.

As shown, the measuring chamber device 106 includes a pair of hemispherical sections 108 secured together by the fasteners 110 at the flange portions 112 in order to enclose a pressure sealed spherical chamber. A flexible diaphragm 114 is peripherally clamped between the flange portions 112 internally of the chamber device so as to displace a metered quantity of fluid from either side thereof. Thus, fluid under pressure introduced into the spherical chamber enclosed by the sections 108 will displace the diaphragm 114 against the hemispherical wall of one of the sections 108 shown. Fluid is introduced under pressure from the valve assembly 12 to one side or the other of the diaphragm through passages 116 formed in the passage portions 118 projecting from the hemispherical sections 108 of the measuring chamber device. The passage portions 118 fit into the valve assembly and are clamped thereto in the same manner as hereinbefore described with the passage portions 32 associated with the measuring chamber device 20.

In order to prevent sealing of the port 120 at the end of the passages 116, by the diaphragm 114, a pin 122 is inserted through the sections 108 extending chordally across the ports 120 to thereby space the diaphragm from the ports without however blocking passage of fluid through the ports. Thus, the measuring chamber device 106 may properly operate in a manner similar to the chamber device 20 hereinbefore described wherein the diaphragm 114 replaces the piston 46. More accurate metering is however possible with the diaphragm even when high pressure fluids are involved since there is no leakage problem with a diaphragm as compared to a piston.

The measuring chamber device could also be located remote from the valve assembly 12 and connected thereto by flexible conduits extending from the outlet ports 28 of the valve assembly similar to the conduits 16 and 18 extending from the inlet ports. The valve assembly may then be accommodated within a smaller space. In such an installation, the actuator may be arranged to return to a neutral or central position closing off both inlet ports from the outlet ports.

A modified form of valve assembly is shown in FIG. 10 in which the valve member 70 of FIG. 2 is replaced by a valve member 124 having a pair of separate passages 126 extending from the axial ends 128 engaged by the valve lands 102 to the lower lateral side of the valve member at spaced ports 130 alternately aligned with the outlet spout 22.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

We claim:

1. A liquid-dispensing device adapted to discharge metered quantities of fluid from a source of fluid under pressure, including measuring means for receiving said fluid having a fluid chamber and a piston enclosed therein, a valve assembly on which said measuring means is mounted and a valve actuator displaceable to two operative positions, said valve assembly comprising an elongated valve body having spaced inlet ports communicating with said fluid chamber on opposite sides of said piston and an outlet port intermediate said inlet ports, valve means displaceable by said actuator within said valve body between said inlet ports for controlling flow of the fluid having a valve passage in constant communication with said outlet port, a pair of valve members engageable with said valve means, and supply means operatively connecting said source of fluid to the valve assembly and movably mounting the valve members for establishing fluid communication to said inlet ports and blocking the valve passage in the valve means.

2. The combination of claim 1 wherein said supply means comprises a pair of valve closure members coupled to said valve body, each of said valve closure members having a supply passage communicating with one of said inlet ports and means constantly biasing one of the valve members to a closed position blocking the supply passage.

3. The combination of claim 2 wherein each of said valve members includes a first valve portion engageable with said valve means to limit movement thereof and close said valve passage to one of the inlet ports, and a second valve portion displaced by the valve means to an open position against the bias of the biasing means opening the supply passage to the inlet port while the valve passage is closed to said inlet port.

4. The combination of claim 3 wherein said valve means comprises a tubular element having valve seat portions at opposite ends thereof engageable by the first valve portions of the valve members.

5. The combination of claim 4 wherein said valve body comprises a tubular member having opposite ends coupled to the supply means, clamp means holding the measuring means assembled on the tubular member and connected to the inlet

ports and valve seats mounted in the tubular member at said opposite ends thereof for engagement by the second valve portions of the valve members.

6 The combination of claim 1 wherein said valve means comprises a tubular element having valve seat portions at opposite ends thereof engageable by the valve members.

7. The combination of claim 6 wherein said valve body comprises a tubular member having opposite ends coupled to the supply means, clamp means holding the measuring means assembled on the tubular member and connected to the inlet ports and valve seats mounted in the tubular member at said opposite ends thereof for engagement by the valve members.

8. In a liquid-dispensing device adapted to discharge metered quantities of fluid from a source, including measuring chamber means having a fluid chamber for receiving said fluid and a fluid displacing element enclosed therein, valve assembly on which said measuring means is mounted and a valve actuator displaceable to two operative positions, said valve assembly comprising a valve body having an inlet port communicating with said fluid chamber on side of the fluid-displacing element and an outlet port spaced therefrom, valve means displaceable by said actuator for controlling flow of the fluid having a valve passage in constant communication with said outlet port, a valve member engageable with said valve means, a closure member coupled to said valve body having a supply passage communicating with said inlet port and means biasing said valve member to a closed position blocking the supply passage when the valve passage is open, said valve means having a valve seat engaged with the valve member to close the valve passage.

9 The combination of claim 8 wherein said measuring

means includes a passage portion connecting the chamber to the inlet port, and clamp means holding the passage portion assembled on the valve body.

10 The combination of claim 9 wherein said fluid-displacing element comprises a flexible diaphragm, and spacing means mounted in the fluid chamber of the measuring chamber means spacing the diaphragm from the passage portion to prevent blockage of fluid inflow to the measuring chamber means from the valve assembly.

11. The combination of claim 10 wherein said fluid chamber is spherical in shape and said spacing means includes a pin extending chordally through the fluid chamber overlying the passage portion.

12 In combination with a fluid-metering chamber, a valve assembly comprising a valve body having an inlet port in communication with the metering chamber and an outlet port, valve means displaceable between at least two operative positions having a passage in constant communication with said outlet port for controlling flow of fluid, a valve member engageable with the valve means in one of the operative positions thereof, supply means operatively connected to the valve body and mounting the valve member for movement by the valve means to a position conducting an inflow of fluid through the inlet port into the metering chamber, means biasing the valve member to another position blocking said inflow to the metering chamber, and actuating means engageable with the valve means for displacement thereof to the other of the operative positions spaced from the valve member conducting outflow of fluid from the metering chamber to the outlet port.

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