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Liquid dispenser.


 In a liquid dispenser (1) for dispensing metered aliquots of a liquid, an inlet (5) is provided for admitting liquid into a chamber (2) of the said liquid dispenser (1) and for permitting egress of air from within the said chamber (2), said inlet (5) being provided with two generally semi-circular or D-section conduits, said conduits being of substantially the same area and a said area being selected such that liquid flowing through a said conduit into said chamber (2) does not cause the formation of air bubbles in any liquid already within the chamber (2). A suitable cross-sectional area for a said generally D-shaped conduit is $15 \pm 1.5 \text{ mm}^2$.

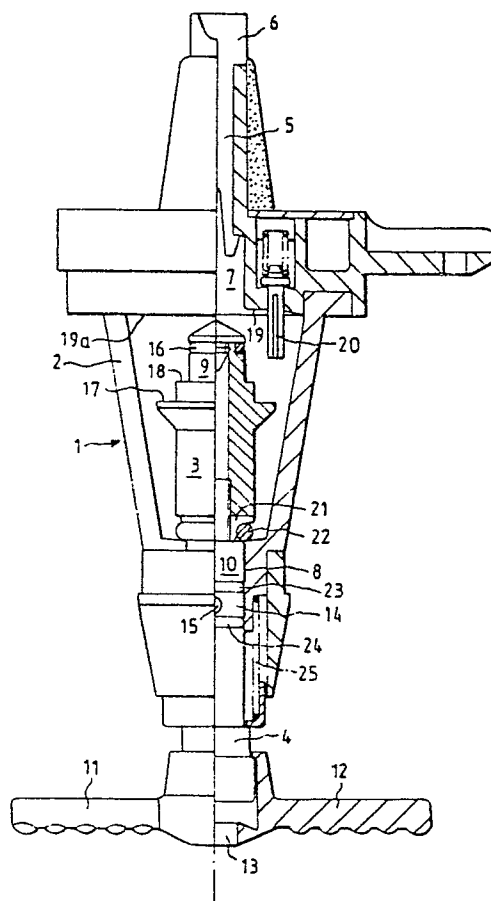


Fig.1 .

LIQUID DISPENSER

This invention relates to a liquid dispenser and, more particularly, to a liquid dispenser for dispensing metered quantities of a liquid from an inverted bottle containing a said liquid.

Such liquid dispensers are well known and a popular range of such dispensers is available under the British Registered Trade Mark 'OPTIC' (No.470,373).

Although there have been many proposals to improve liquid dispensers, there is still scope for further improvement, e.g. to meet proposed British and European legislation.

It is to be noted, in particular, that there are various pieces of written and unwritten legislation which apply to spirit measures (for whisky, gin, rum and vodka) for use in licensed premises in the United Kingdom. Amongst these is a requirement that substantially the whole of the internal volume of a chamber for containing liquid to be dispensed should be visible from outside the measure. Another requirement is that no air should remain within the chamber when the measure is charged with liquid.

In the past, air has been conducted out of the chamber by providing an upwardly frustoconical ceiling or upper surface in the chamber. However, in order for this to be effective, the upper surface should be formed at an angle to the horizontal of, e.g., 20°. Such an angled surface is likely to cause a part of the volume of the chamber to be visually obscured, thus failing to comply with the first requirement mentioned above.

It has now been found that it is possible to solve the problem of air remaining within the chamber, in a satisfactory fashion, by arranging that the flow of liquid into the chamber be suitably slow.

According to the present invention there is provided a liquid dispenser for dispensing metered aliquots of a liquid having an inlet for admitting liquid into a chamber of a said liquid dispenser and for permitting egress of air from within a said chamber, characterised in that said inlet is provided with two generally semi-circular or D-section conduits, said conduits being of substantially the same area and a said area being selected such that liquid flowing through a said conduit into said chamber does not cause the formation of air bubbles in any liquid already within the chamber.

A suitable cross-sectional area for a said generally D-shaped conduit is $15 \pm 1.5 \text{ mm}^2$.

An embodiment of a liquid dispenser will now be described, by way of example only, by reference to the accompanying drawings in which:

Fig. 1 shows a front elevation in partial section of an embodiment of a liquid dispenser according to the present invention;

Fig. 2 shows a detail of the inlet of the embodiment of liquid dispenser of Fig. 1;

Fig. 3 shows a further detail of the inlet of the embodiment of liquid dispenser of Fig. 1.

Referring to the drawings, a transparent-walled liquid dispenser 1 comprises a chamber 2 for holding liquid, a valve 3 within the chamber for selectively admitting liquid into and releasing liquid from said chamber, and valve operating means 4. The dispenser 1 is provided with a liquid inlet 5 adapted to be received within the neck of an inverted bottle (not shown) and sealed therewithin by means of an annular cork (Fig. 1). The liquid inlet 5 is longitudinally divided by a partition 6 to facilitate the admission of air into the bottle and to help prevent the formation in the bottle of a partial vacuum. Said inlet 5 comprises a circular cross-section tube of inside diameter 7mm, divided in half axially by the central partition 6 to form two generally D-section conduits. The partition 6 has a width of 1.2mm, thus to provide a cross-sectional area for each D-section conduit of approximately 15 mm^2 . An inlet 5 formed in such a fashion has been found to be extremely effective in producing liquid-filled volume within a said chamber of a liquid dispenser, with a substantially complete absence of air-spaces or voids therein.

The inlet 5 is in communication with an inlet bore 7 of chamber 2. The chamber 2 also includes an outlet bore 8. Valve 3 is provided at its upper and lower ends with Valve stems 9, 10 respectively cooperating with inlet bore 7 and with outlet bore 8 of the chamber 2.

Valve operating means 4 includes a pair of laterally extending members 11, 12 to which axial pressure can be applied, by direct manual pressure or via a glass held beneath the dispenser 1 and an axially extending outflow passage 13. Adjacent the inner end 14, of valve operating means 4 there is provided a transverse bore 15 communicating with outflow passage 13 and located so as to communicate also with outlet bore 8 of chamber 2. Said inner end 14 of valve operating means is secured to the valve stem 10 of valve 3 so that valve 3 moves unitarily with valve operating means 4.

The valve stem 9 of valve 3 is provided with primary sealing means in the form an elastomeric silicone polymer O-ring 16 adapted to seal the inlet bore 7 of chamber 2 to prevent ingress of liquid into chamber 2, when valve stem 9 is moved into inlet bore 7. Valve stem 9 is also provided with auxiliary sealing means in the form of a radially

extending flange 17 having a radially extending planar sealing surface 18, for sealing with a flat annulus 19 provided on the ceiling or upper surface 19a of chamber 2. An air inlet valve 20 is provided in said surface 19a, biased to a closed state, at a position such that it can be opened by said radially extending flange 17 to admit air into chamber 2 to replace liquid passing from chamber 2 through bore 15 and outflow passage 13 of valve operating means 4.

Valve stem 10 is provided with a groove 21 in which is seated an elastomeric silicone polymer O-ring 22 for sealing outlet bore 8 of chamber 2. The inner end 14 of valve operating means is provided with a pair of spaced elastomeric silicone polymer O-rings 23, 24 located one on each side of transverse bore 15 of valve operating means 4 to seal with outlet bore 8 of chamber 2.

The assembly of valve 3 and valve operating means 4 is biased into a position in which outlet 8 of chamber 2 is closed, by means of a coil spring 25.

In use, in a rest position, inlet bore 7 of chamber 2 is open and liquid can flow into chamber 2 and outlet bore 8 is closed. Upon axial movement of valve operating means 4, valve 3 moves within chamber 2 and primary O-ring seal 16 seals inlet bore 7. Continued axial movement of valve 3 in the same direction thereafter causes O-ring seal 23 to leave outlet bore 8, thus allowing liquid within chamber 2 to flow through bores 15 and 13 of valve operating means 4. Auxiliary sealing of inlet bore 7 is provided by sealing surface 18 sealing with annulus 19 of chamber 2 and liquid is prevented from leaving chamber 2 other than via bore 15 by means of O-ring 24. Flange 17 acts upon air inlet valve 20 to allow ingress of air into chamber 2.

The liquid dispenser of the present invention provides a reliable, accurate and convenient means of dispensing metered aliquots of liquid. The formation of an air-filled space within the chamber of the liquid dispenser during charging of the chamber with liquid is substantially prevented. Moreover, the liquid chamber may be entirely transparent to allow for inspection of substantially the whole of the chamber contents.

It is to be noted that other features of the liquid dispenser described above and illustrated in the accompanying drawings form the subject of a copending patent application of even date. That application describes and claims a liquid dispenser for dispensing metered aliquots of a liquid, which dispenser comprises a chamber having an inlet bore for liquid and an outlet bore for liquid, a valve in the chamber for controlling dispense of liquid from the dispenser, and valve operating means, said valve having first and second valve stems for reception respectively within said inlet bore and

within said outlet bore, said first valve stem being provided with sealing means for sealing said inlet bore, and first, second and third resilient sealing means being provided for sealing said outlet bore, the arrangement being such that during movement of the valve from a position in which it entirely seals the outlet bore to a position in which liquid within the chamber is free to flow through the outlet bore, the inlet bore is sealed before a said flow of liquid can occur.

The present invention may be performed otherwise than as has been particularly described and the invention includes within its scope all such changes and modifications as would be apparent to one skilled in the art.

Claims

1. A liquid dispenser (1) for dispensing metered aliquots of a liquid having an inlet (5) for admitting liquid into a chamber (2) of the said liquid dispenser (1) and for permitting egress of air from within the said chamber (2), characterised in that said inlet (5) is provided with two generally semi-circular or D-section conduits, said conduits being of substantially the same area and a said area being selected such that liquid flowing through a said conduit into said chamber (2) does not cause the formation of air bubbles in any liquid already within the chamber (2).

2. A liquid dispenser according to claim 1, wherein each said generally D-shaped conduit has a cross-sectional area of $15 \pm 1.5 \text{ mm}^2$.

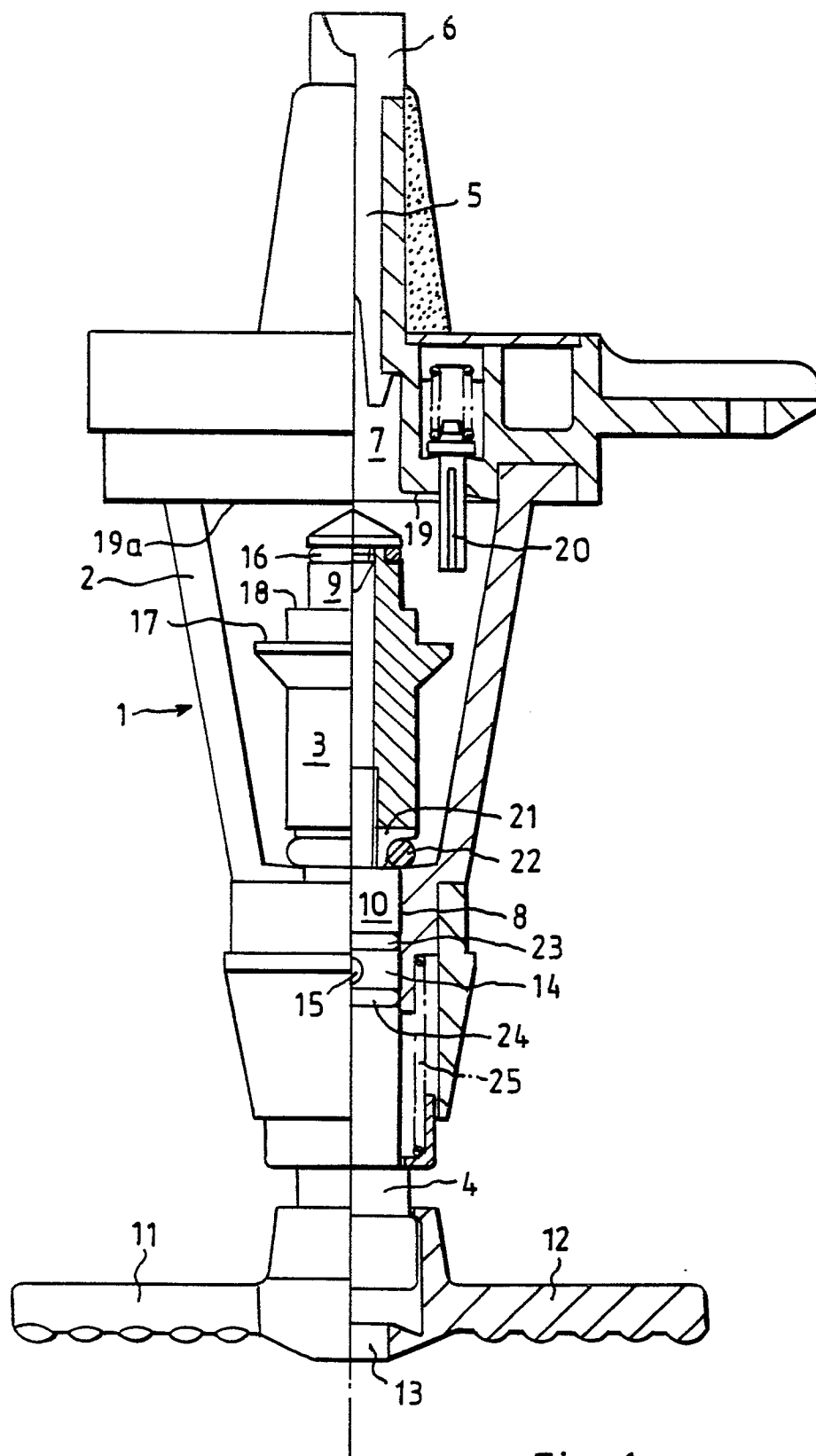


Fig.1 .

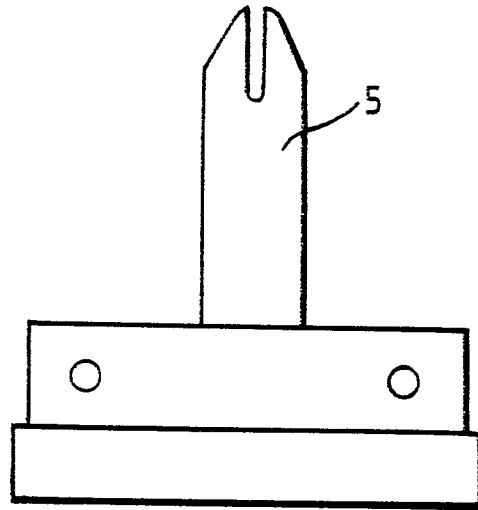


Fig.2 .

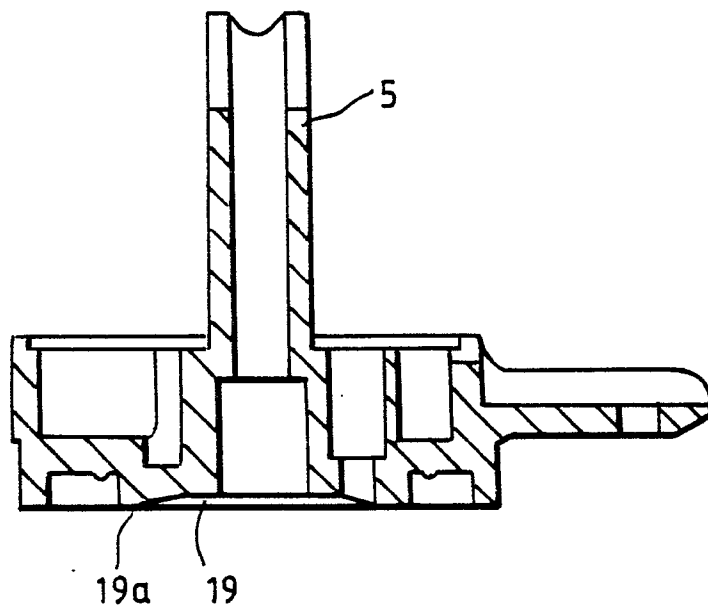


Fig.3 .