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(54) Automatic venting means for hot liquid dispensers

(57) In order to eliminate the risk of back-flow into the water bottle due to gases released in the hot water reservoir 201, the top of the reservoir has a housing 206 for a float 208. The float carries a valve body 209 which normally seals a vent outlet 207, but when gas builds up in the reservoir the float falls allowing the gas to be released.

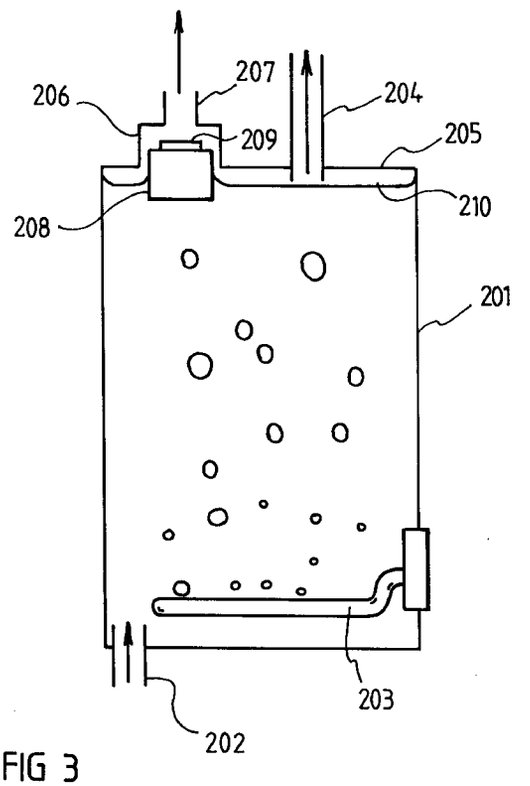

FIG 3

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Description

TECNICAL FIELD OF THE INVENTION

This invention relates to liquid dispensers such as bottled water dispensers.

BACKGROUND

Bottled water dispensers are usually arranged to receive the neck of an inverted bottle filled with clean water. Sometimes, as in EP 0 581 491 A, the bottle is provided with a cap through which a feed tube is inserted to discharge the water from the bottle into one or more reservoirs inside the dispenser. The water may then be heated or cooled in the reservoir, from whence the water can be drawn via a discharge valve.

There is currently a requirement to maintain strict hygiene in water dispensers. In the majority of dispensers which incorporate a hot reservoir in which the water is heated, there is a risk that gas will be released in the reservoir causing a reverse flow of warm water back towards the bottle. This can result in contamination of the clean water in the bottle, warming of the bottled water and increased risk of bacterial growth therein, and could lead to a dangerous pressure build-up.

An aim of the present invention is to provide a form of liquid dispenser which is patentably different from existing dispensers.

SUMMARY OF THE INVENTION

The present invention proposes a bottled liquid dispenser as set forth in the appended Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description and the accompanying drawings referred to therein are included by way of non-limiting example in order to illustrate how the invention may be put into practice. In the drawings:

Figure 1 is a vertical front-rear section through a water dispenser of the invention,

Figure 2 is horizontal section through the dispenser of Fig. 1 showing part of the dispenser in plan view, and

Figure 3 is a vertical section through a hot water reservoir included in the dispenser.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring firstly to Fig. 1, the dispenser includes a housing 31 which defines a generally funnel-shaped mounting portion 32 in its top wall for receiving and supporting a conventional inverted water bottle (not shown). The mounting portion 32 leads downwardly to a central circular opening 33 for receiving a capped neck of the bottle, and a feed tube 34 projects axially upwards through the centre of the opening 33, to pass sealably through the cap.

The feed tube 34 forms part of an injection moulded plastics manifold unit 152. The feed tube projects co-axially within an integral outer cup portion 151 to define an annular collecting channel 153. The feed tube 34 is longitudinally divided into two axially extending passages 132 and 133 by an internal dividing wall 134. The dividing wall projects beyond the upper end of the feed tube to support a shield 135 which prevents entry of dirt and debris into the feed tube. Water from the bottle passes into the feed tube and travels along one of the passages 132 to a twinned pair of connecting nipples 154 formed on the bottom of the manifold, only one of which is visible in Fig. 1.

A vent inlet 156 projects radially from the lower end of the feed tube 34 in communication with the second passage 133. Air is taken in through a valve and filter unit 10 (Fig. 2) which removes dirt and bacteria, and includes a one-way check valve to prevent water from escaping through the filter. A blow-out valve may also be incorporated to release any pressure built-up in the water system. Clean air travels from the filter 10 to the vent inlet 156 via a length of flexible plastics or rubber tubing 140, and then travels along the second passage 133 into the bottle to replace discharged water.

The bottom of the cup 151 is provided with a third connecting nipple 142 to couple with a further length of flexible plastics or rubber tubing 143 for conducting any spillage water from the collecting channel 153 to waste. The connecting nipple 142 may incorporate a check valve 144, which is closed by the capped neck of the bottle but when the bottle is removed the valve opens to conduct any spillage to waste.

The manifold is releasably mounted in the housing 31 in any convenient manner. In the illustrated example the upper end of the cup 151 has a generally rectangular external flange 191 (Fig. 2) which slides between a pair of opposed mounting brackets 192 (only one being shown), supported on runners 193 which project inwardly from the mounting brackets. The flange 191 abuts a depending stop 194 (Fig. 1) on the lower end of the funnel portion 32, and a cutout 195 is provided opposite the stop 194 for the feed tube 34 to pass through.

One of the two connecting nipples 154 is connected to a length of flexible plastics or rubber tubing 157 to feed water to a chilled water reservoir assembly 160. An open topped case 162 of expanded polypropylene or other heat-insulation material contains a flexible plastics reservoir bag 163 having a moulded mouth fitting 164 to which the tube 157 is coupled. A cooling coil 165 is recessed into the side wall of the case 162 so that the bag 163 closely conforms to the shape of the coil when filled with water. Water enters the top of the bag from the fitting 164, and an outlet tube 166 projects from the fitting to

the bottom of the bag to feed cooled water via a further length of plastics or rubber tubing 167 passed through a manually operable discharge valve 168 in the form of a pinch valve. The fitting 164 also has a further connection point 169 which may be blanked off as shown or used to vent the bag to a suitable level.

The second connecting nipple 154 leads via a length of flexible plastics or rubber tubing 158 to a hot water reservoir 201, which is shown in Fig. 3. The tubing 158 joins the reservoir via an inlet nipple 202 in the bottom wall of the reservoir. The lower portion of the reservoir contains a heating element 203 for heating the water as it enters the reservoir. The heated water leaves via an outlet nipple 204 in the top wall 205 of the reservoir to pass via flexible plastics or rubber tubing 178 (Fig. 2) through a second pinch valve 188. The top wall 205 also contains an upwardly projecting float housing 206 which, at its upper end, has an air vent outlet 207, which may be vented via a further length of tubing (not shown) if desired. A hollow airfilled float 208 is mounted in the housing 206 to permit vertical sliding movement therein. The upper end of the float carries a seal 209 which, when the float rises to the upper part of the housing 206, sealably closes the vent outlet 207. Thus, when the reservoir is filled with water the float acts to close the vent outlet to prevent loss of water therethrough.

Should any bubbles of gas be released when the water is heated they will rise to form a gas pocket 210 at the top of the reservoir. The float 208 will then tend to move down inside its housing 206, allowing the trapped air to escape through the vent outlet 207. This, in turn, allows the water to rise as fresh water flows in through the inlet 202, lifting the float and re-sealing the vent outlet as described.

The maximum amount of water displacement which will take place during this process is easily calculated, so that the volume of the connecting tubing between the hot reservoir and the bottle can be arranged to adequately accommodate such displacement. Thus, there is no risk of water flowing back into the bottle.

During maintenance, the manifold unit 152 is removed together with the plastics or rubber tubing, the hot reservoir 161, and the cold water bag 163. The respective items are then replaced by clean ones.

Although the apparatus will usually be used with bottled water it will be appreciated that other bottled liquids could be used such as bottled fruit juices.

Claims

1. A bottled liquid dispenser comprising a seat for an inverted liquid bottle, a feed arrangement for sealable engagement with a neck of the bottle to conduct liquid therefrom, a hot reservoir (201) provided with heating means (203) and connected to receive liquid from the feed arrangement, the hot liquid reservoir being connected to supply heated liquid to a discharge valve,

   characterised in that the hot reservoir is provided with means (208) responsive to the liquid level therein to operate a valve (209) which releases through a vent outlet (207) any gas which accumulates in the reservoir.

2. A bottled liquid dispenser according to Claim 1, in which said means (208) responsive to the liquid level comprises a float which moves with the level of liquid in the reservoir.

3. A bottled liquid dispenser according to Claim 2, in which said float (208) carries a valve body (209) which co-operates with a fixed valve seat.

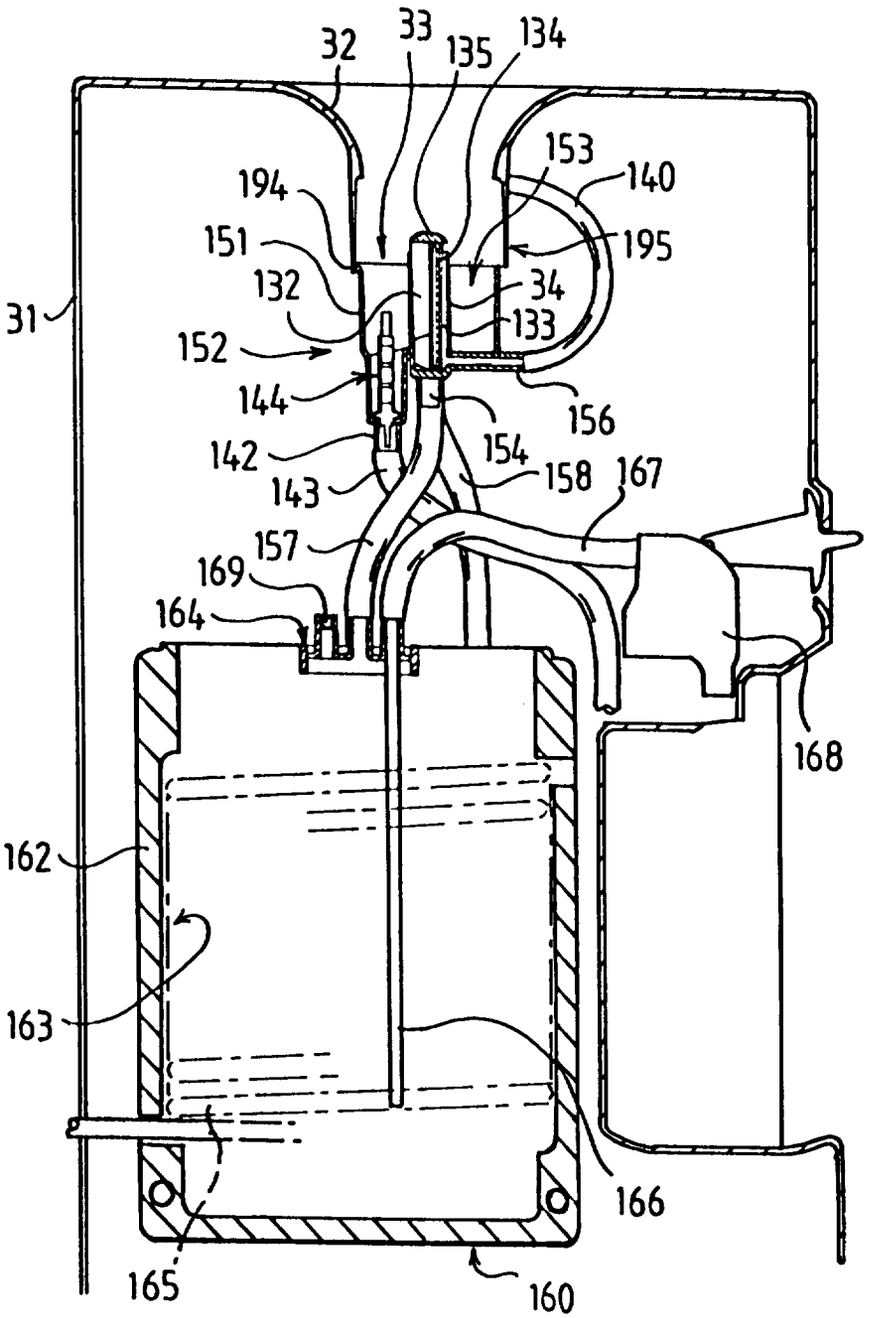
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FIG 1

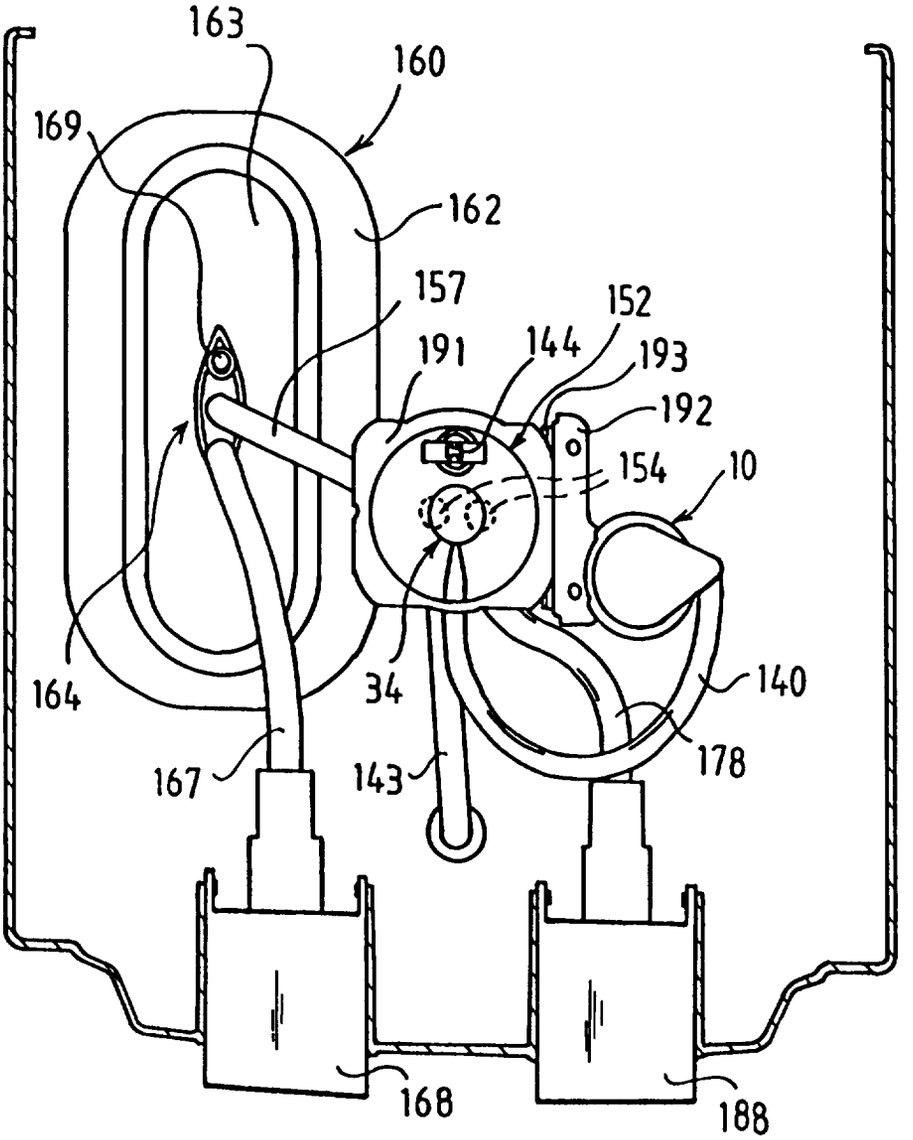
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FIG 2

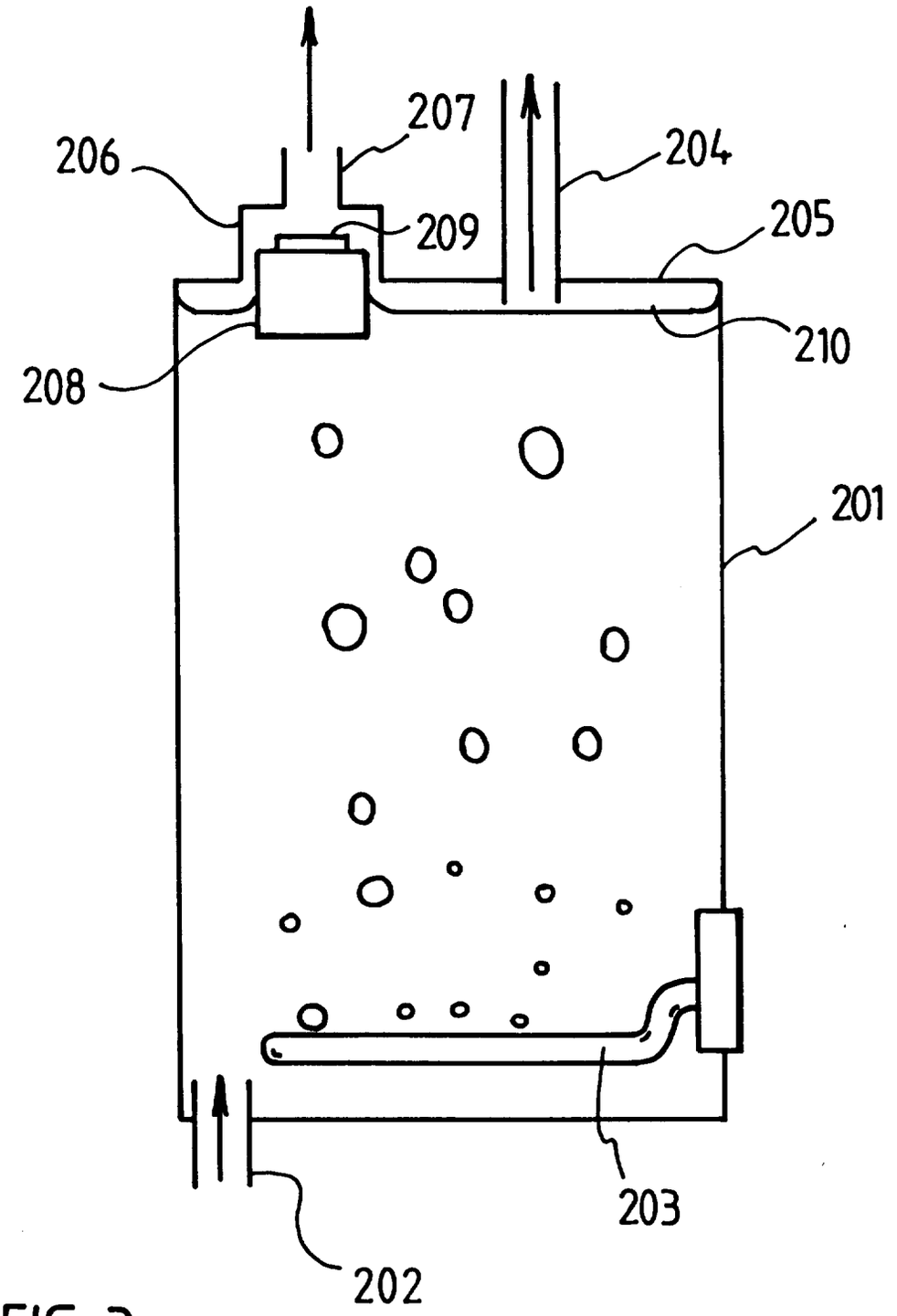

FIG 3

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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 7197

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,Y	EP-A-0 581 491 (EBAC LTD) * claim 1 *	1-3	B67D3/00 B67D5/58
Y	US-A-5 033 646 (MC CANN'S ENGINEERING AND MANUFACT. CO.) * column 6, line 25 - column 7, line 25; figures 1-3 *	1-3	
A	FR-A-1 330 136 (ARNOT DESIGNS LTD)		
A	EP-A-0 258 811 (OY HACKMAN AB)		
A	US-A-3 835 295 (RONCHESE)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 February 1996	J.-P. Deutsch

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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