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(54) **Bottled liquid dispensers**

Flaschenzapfeinrichtung

Distributeur de liquide à partir d'une bouteille

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US-A- 1 460 209
US-A- 2 160 501
US-A- 2 929 535
US-A- 5 833 096

EP 1 236 675 B1

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] This invention relates to bottled liquid dispensers.

BACKGROUND

[0002] Large floor-standing bottled water dispensers are well known in offices and other commercial premises. For example, **EP 0 581 491 A** describes a water dispenser having a vertically elongate housing which supports an inverted bottle. A feed tube projects upwardly into the neck of the bottle through which liquid discharges under gravity into a reservoir in the form of a flexible bag. For hygienic purposes the feed tube is incorporated in unit which can be removed together with the bag and relaced during a maintenance operation.

[0003] **US 2 929 535** proposes a bottled liquid dispenser in which liquid is supplied from a bottle to a discharge outlet via a reservoir, wherein the dispenser includes means for holding the bottle, a bottle connector for releasable sealing engagement with a neck formed at the top of the bottle, the bottle connector being provided with an air inlet for supplying air to an upper region of the bottle, a dip tube for removing liquid from a lower region of the bottle, and a transfer tube for supplying liquid to the reservoir, thermal means for controlling the temperature of liquid in the reservoir, and an outlet tube for conducting liquid from the reservoir to a discharge outlet.

[0004] The present invention seeks to provide a new and inventive form of bottled liquid dispenser which is smaller and more compact than known dispensers of the kind described in **EP 0 581 491 A.**

[0005] **US-A-2 929 535** discloses a bottled liquid dispenser according to the preamble of claim 1, in which liquid is supplied from a bottle to a discharge outlet via a reservoir, wherein the dispenser includes:

- means for supporting the bottle;
- a bottle connector for releasable sealing engagement with a neck formed at the top of the bottle, the bottle connector being provided with an air inlet for supplying air to an upper region of the bottle, a dip tube for removing liquid from a lower region of the bottle, and a transfer tube for supplying liquid to the reservoir;
- thermal means which removably receives the reservoir for controlling the temperature of liquid in the reservoir; and
- an outlet tube for conducting liquid from the reservoir to the discharge outlet;

wherein the reservoir is provided with a closure which incorporates a fluid inlet for connection with the transfer tube and a draw tube for connection with the outlet tube and having a fluid outlet disposed adjacent to the bottom of the reservoir.

SUMMARY OF THE INVENTION

[0006] The present invention provides a bottled liquid dispenser in which the reservoir is pre-formed of plastics material, the thermal means includes a heat-conducting holder which embraces and snugly receives the reservoir with a minimal intervening gap, and said thermal means includes thermoelectric means for controlling the temperature of liquid in the reservoir, the arrangement being such that, for hygiene purposes, the reservoir and the bottle connector can be removed together with associated tubes and replaced with clean components.

[0007] To maintain hygiene the replaceable components can be changed at intervals.

[0008] Preferably, the bottled liquid dispenser includes an air pump means arranged to supply pressurised air to the bottle to cause movement of liquid from the bottle to said reservoir, and a pressure sensor responsive to the pressure of air supplied to the bottle to limit the rise in air pressure produced by said air pump means.

[0009] With such an arrangement the height of the dispenser is minimised since the dispenser can operate with little or no pressure head. The arrangement also has the following advantages:

- A high instantaneous discharge rate can be achieved compared with a liquid pump.
- An air filter can be included in the air supply to the bottle.
- If the bottle contains carbonated soft drinks, pressurisation of the bottle reduces the risk of the contents becoming flat as the bottle becomes empty.
- Low cost.

[0010] The pressure sensor is preferably arranged to switch off the air pump means when the sensed air pressure exceeds a predetermined level.

[0011] The air inlet is preferably connected to a releasable coupling which incorporates an air filter whereby the air filter is replaced with the bottle connector and reservoir.

The bottle connector preferably incorporates a rotatable connection, which prevents kinking of the tubes.

[0012] For optimum efficiency and reduced size the holder preferably only embraces part of the reservoir. Where the thermoelectric means acts to cool the liquid in the reservoir the thermoelectric means preferably only embraces an upper part of the reservoir. The bottom portion of the reservoir is preferably stepped inwardly relative to the upper part.

[0013] The thermoelectric means may include a peltier element.

[0014] The holder is preferably provided with a plurality of heat-conducting fins for improved efficiency. The

thermoelectric means is preferably disposed between the fins and the holder. The holder is preferably provided with a fan or other means for creating an air flow over said fins.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] 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 general view showing the front, top and one side of a bottled water dispenser in accordance with the invention;

Figure 2 is a rear elevation of the dispenser;

Figure 3 is a schematic drawing showing the internal components of the dispenser;

Figure 4 is a more detailed general view of the replaceable components of the dispenser;

Figure 5 is a general view of a single component of the dispenser, namely a tip moulding;

Figure 6 is a general view of another component of the dispenser, namely a flow spreader;

Figure 7 is a general view of the reservoir and cooling unit of the dispenser; and

Figure 8 is a bottom view of another component, namely the plug of Fig. 4.

DETAILED DESCRIPTION OF THE DRAWINGS

[0016] The bottled water dispenser shown in the drawings is suitable for use on a kitchen work surface or the like. Referring to Fig. 1, the dispenser comprises a moulded plastics housing 1 having a base 2 and side walls 3. A lid 4 is connected to the side walls by a single hinge 5 at the rear of the housing. At one side of the housing the base 2 projects from the wall 3, best seen in Fig. 2, to form a platform 6 for supporting a water bottle (not shown), which may be a 5 litre capacity bottle of the kind which can be purchased from supermarkets and other retail outlets. The lid 4 projects over the platform 6 to cover the neck of the bottle.

[0017] At the front of the housing the wall 3 is formed with a recess 7 for receiving a drinking vessel, which is normally held by hand during filling. A water outlet, indicated generally at 8, is located at the top of the recess for dispensing water into the drinking vessel under the control of a valve which is operated by a lever 9. The bottom of the recess is formed by the base 2, which may be slightly concave and may also be provided with drainage apertures 10 to collect any small spillages of water.

[0018] On the opposite side of the housing relative to the platform 6 there is an air vent 11.

[0019] The main internal components of the water cooler are shown diagrammatically in Fig. 3. A bottle connector 12 is coupled to the neck of the water bottle *B*. The connector 12 incorporates a flexible dip tube 13 which is connected to a transfer tube 14 leading to the upper part of a reservoir 15. The reservoir is provided with an external cooling device 16 for cooling liquid in the reservoir. A draw tube 17, having a main outlet opening 18 at the bottom of the reservoir, extends through the top of the reservoir 15. The draw tube is connected to an outlet tube 19 for transferring cooled liquid to the discharge valve 8. It will be noted that the draw tube 17 has an auxiliary outlet opening 21 at the top of the reservoir, of smaller diameter than the main opening 18.

[0020] The bottle *B* and reservoir 15 are located alongside each other at substantially the same level. An air pump 22 supplies atmospheric air via an air filter 23 and air tube 24, through the connector 12 into the top of the bottle *B*. This pressurises the bottle so that when the discharge valve 8 is opened water flows from the bottle *B* into the reservoir 15 displacing cooled water from the reservoir through the openings 18 and 21.

[0021] The pump 22 is provided with a pressure sensitive switch 122 which shuts off the pump when the pressure at the pump outlet rises above a predetermined level. The cutoff pressure is set to ensure that there is sufficient pressure in the system to dispense a useable quantity of liquid when the valve 8 is opened. Normally the pump will start as soon as the pressure drops, thereby ensuring a continuous discharge of cooled water at an acceptable rate.

[0022] The dispenser is also useful for cooling fizzy soft drinks since the carbonation is maintained by the pressurisation of the bottle.

[0023] The auxiliary outlet port 21 allows air to purge from the reservoir 15 as the reservoir fills with liquid for the first time. Furthermore, when all the water has been removed from the bottle *B* and air therefore starts to enter the reservoir, air will start to discharge from the reservoir as soon as the port 21 is uncovered. The reservoir therefore remains filled with water so that when the bottle is replaced with a full bottle, delivery recommences almost immediately.

[0024] Bottled water should be supplied free from bacteria and impurities. In order to maintain a high level of hygiene all of the components which come into contact with the water can be periodically replaced with a new set of clean components. Fig. 4 shows the replaceable parts of the dispenser in more detail. Components which correspond to those of Fig. 3 are referenced similarly. The air filter 23 is housed within a twist-lock connector 25 for releasable connection with the air pump 22. The bottle connector 12 incorporates a moulded cap 26 to which the tubes 24, 13 and 14 are coupled. The cap has an angled through-connector 27 to which the

dip tube 13 and transfer tube 14 are coupled while the air tube 24 is pushed onto a tubular spigot 28. The cap 26 is held onto the neck of the bottle by a screw-threaded flanged ring 29, with a sealing ring 30 interposed between the cap and the rim of the bottle. The ring 29 thus allows the cap 26 to be connected with the bottle without twisting the tubes which are connected to the cap. The cap 26 and/or the ring 29 can be changed, if required, for use with different kinds of bottle.

[0025] The dip tube 13 and the transfer tube 14 are formed of corrugated-wall plastic to allow them to be easily stretched and flexed during bottle replacement without being longer than necessary. The volume of water which they hold is thus kept to a minimum. A tip moulding 31, also shown in Fig. 5, prevents the dip tube 13 from being obstructed by contact with the bottle *B*. The moulding has a generally cylindrical portion 32 which is a press-fit into the end of the dip tube 13 and is provided with an external flange 33. The flange carries an arcuate projection 34 which prevents the entry hole 35 from being obstructed.

[0026] Referring back to Fig. 4, the reservoir 15 is moulded of polythene or a similar semi-rigid thermoplastic and is vertically elongate, being of square or rectangular cross section. The bottom portion 36 of the reservoir is stepped inwardly for ease of insertion into the cooling device 16. The tubes 14, 17 and 19 are connected to the reservoir via coupling spigots 37 formed on a screw-threaded plug 38. A flow spreader 39, shown also in Fig. 6 is inserted into the water inlet spigot of the plug 38. The spreader has a cruciform section 40 which is inserted into the spigot and which carries an external end plate 41. Thus, when water enters the reservoir through the plug 38 it hits the plate 41 and is dispersed into the top region of the reservoir to reduce mixing of the warmer water entering the reservoir with the cooled water at the bottom of the reservoir.

[0027] Referring to Fig. 7, the cooling device includes a heat-conducting metal sleeve 42 which snugly receives the upper part of the reservoir 15, being shaped such that there is a minimal air gap between the reservoir and the sleeve. The sleeve 42 is formed with an integral vertically extending T-section head 43, which is coupled to the cold side of a thermostatically controlled peltier cooling unit 44. The opposite hot side of the peltier unit is thermally coupled with a heatsink plate 45 having an array of closely spaced parallel vertical cooling fins 46 projecting away from the reservoir. A fan 47 is mounted on the fins adjacent to the air vent 11 to force air between them. Thus, the peltier unit 44 removes heat from the water in the reservoir, which is dissipated into the atmosphere. Since warmer water will tend to move to the top of the reservoir by convention currents, cooling of the reservoir is very efficient.

[0028] Although Fig. 3 shows the auxiliary outlet port 21 as a hole in the draw tube 17 it is preferably formed in the plug moulding 38. As can be seen in Fig. 8, the outlet port may comprise an axial groove 48 which extends along the external surface of the spigot 37' on which the draw tube 17 is received. The groove also extends for a short distance 49 along the top wall 50 of the plug, beyond the wall of the draw tube, so that air and water can pass from the highest part of the reservoir into the draw tube 17 via the groove sections 49 and 48. This arrangement ensures complete purging of air from the reservoir.

[0029] In a modification to the basic cooler shown in Fig. 3, the temperature of the dispensed water can be instantly controlled by means of a mixer valve 51. The mixer valve is connected in the tube 19 and receives water at ambient temperature through a bypass tube 52 from the bottle *B* through transfer tube 14. Thus, the user can vary the relative proportions of cooled and ambient water issuing from the discharge valve 8.

Claims

1. A bottled liquid dispenser in which liquid is supplied from a bottle (B) to a discharge outlet (8) via a reservoir (15), wherein the dispenser includes:

- means (6) for supporting the bottle;
- a bottle connector (12) for releasable sealing engagement with a neck formed at the top of the bottle, the bottle connector being provided with an air inlet (24) for supplying air to an upper region of the bottle, a dip tube (13) for removing liquid from a lower region of the bottle, and a transfer tube (14) for supplying liquid to the reservoir;
- thermal means (42, 44) which removably receives the reservoir (15) for controlling the temperature of liquid in the reservoir; and
- an outlet tube (19) for conducting liquid from the reservoir to the discharge outlet;

wherein the reservoir (15) is provided with a closure (38) which incorporates a fluid inlet for connection with the transfer tube (14) and a draw tube (17) for connection with the outlet tube (19) and having a fluid outlet (18) disposed adjacent to the bottom of the reservoir,

characterised in that

the reservoir (15) is pre-formed of plastics material, the thermal means includes a heat-conducting holder (42) which embraces and snugly receives the reservoir with a minimal intervening gap, and said thermal means includes thermoelectric means (44) for controlling the temperature of liquid in the reservoir, the arrangement being such that, for hygiene purposes, the reservoir and the bottle connector (12) can be removed together with associated tubes (13, 14) and replaced with clean components.

2. A bottled liquid dispenser according to Claim 1, including air pump means (22) arranged to supply pressurised air to the bottle (B) to cause movement of liquid from the bottle to said reservoir (15).

3. A bottled liquid dispenser according to Claim 2, including a pressure sensor (122) responsive to the pressure of air supplied to the bottle (B) to limit the rise in air pressure produced by said air pump means (22).

4. A bottled liquid dispenser according to Claim 3, in which the pressure sensor (122) is arranged to switch off the air pump means (22) when the sensed air pressure exceeds a predetermined level.

5. A bottled liquid dispenser according to any preceding claim, in which the air inlet (24) is connected to a releasable coupling which incorporates an air filter (23) whereby the air filter is replaced with the bottle connector (12).

6. A bottled liquid dispenser according to any preceding claim, in which the bottle connector (12) incorporates a cap (26) to which the air inlet (24), the dip tube (13) and the transfer tube (14) are coupled, said cap being engaged with the neck of the bottle by a ring (29) which is rotatable relative to the cap.

7. A bottled liquid dispenser according to any preceding claim, in which the thermoelectric means (44) acts to cool the liquid in the reservoir and the holder embraces (42) only an upper part of the reservoir.

8. A bottled liquid dispenser according to any preceding claim, in which the holder (42) is provided with a plurality of heat-conducting fins (46) and the thermoelectric means (44) is disposed between the fins and the holder.

9. A bottled liquid dispenser according to Claim 8, in which the holder (42) is provided with means (47) for creating an air flow over said fins (46).

10. A bottled liquid dispenser according to any preceding claim, in which the bottom portion (36) of the reservoir (15) is stepped inwardly relative to the upper part of the reservoir.

Patentansprüche

1. Flaschenzapfeinrichtung, in der Flüssigkeit aus einer Flasche (B) über ein Reservoir zu einem Ausgabeauslass (8) (15) zugeführt wird, wobei die Zapfeinrichtung aufweist:

Mittel (6) zum Tragen der Flasche,

einen Flaschenverbinder (12) zur lösbaren, dichten Verbindung mit einem Hals, der oben an der Flasche gebildet ist, wobei der Flaschenverbinder mit einem Lufteinlass (24) zum Zufuhren von Luft zu einer oberen Region der Flasche, einem Tauchrohr (13) zum Entnehmen von Flüssigkeit aus einer niedrigeren Region der Flasche und mit einem Übertragungsrohr (14) zur Zufuhr von Flüssigkeit zu dem Reservoir versehen ist,

Thermoeinrichtungen (42, 44), die das Reservoir (15) entnehmbar aufnehmen, um die Temperatur der Flüssigkeit in dem Reservoir zu steuern, und

ein Auslassrohr (19) zum Leiten von Flüssigkeit aus dem Reservoir zu dem Ausgabeauslass,

wobei das Reservoir (15) mit einem Verschluss (38) versehen ist, der einen Flüssigkeitseinlass zur Verbindung mit dem Übertragungsrohr (14) und ein Saugrohr (17) zur Verbindung mit dem Auslassrohr (19) und mit einem Flüssigkeitsauslass (18) hat, der benachbart zu dem Boden des Reservoirs angeordnet ist,
dadurch gekennzeichnet, dass
das Reservoir (15) aus Kunststoffmaterial vorgeformt ist, dass die Thermoeinrichtungen einen wärmeleitfähigen Halter (42) aufweisen, der das Reservoir umfasst und es mit einer minimalen dazwischenliegenden Lücke passend aufnimmt, und dass die Thermoeinrichtungen thermoelektrische Einrichtungen (44) zum Steuern der Temperatur der Flüssigkeit in dem Reservoir enthalten, wobei die Anordnung so ist, dass, aus Hygienegründen, das Reservoir und der Flaschenverbinder (12) zusammen mit den zugehörigen Rohren (13, 14) entnommen werden können und durch saubere Komponenten ersetzt werden können.

2. Flaschenzapfeinrichtung nach Anspruch 1, mit einer Luftpumpeinrichtung (22), die dazu ausgelegt ist, der Flasche (B) Druckluft zuzuführen, um eine Bewegung der Flüssigkeit aus der Flasche in das Reservoir (15) zu bewirken.

3. Flaschenzapfeinrichtung nach Anspruch 2, mit einem Drucksensor (122), der auf den der Flasche (B) zugeführten Druck reagiert, um den Anstieg des Luftdrucks, der durch die Luftpumeinrichtung (22) erzeugt wird, zu begrenzen.

4. Flaschenzapfeinrichtung nach Anspruch 3, bei der der Drucksensor (122) dazu ausgelegt ist, die Luftpumpeinrichtungen (22) auszuschalten, wenn der erfasste Luftdruck ein vorgegebenes Niveau überschreitet.

5. Flaschenzapfeinrichtung nach einem der vorhergehenden Ansprüche, bei der der Lufteinlass (24) mit einer lösbaren Kupplung verbunden ist, die einen Luftfilter (23) enthält, wodurch der Luftfilter mit dem Flaschenverbinder (12) ersetzt wird.

6. Flaschenzapfeinrichtung nach einem der vorhergehenden Ansprüche, bei dem der Flaschenverbinder (12) eine Kappe (26) enthält, mit der der Lufteinlass (24), das Tauchrohr (13) und das Übertragungsrohr (14) verbunden sind, wobei die Kappe mit dem Hals der Flasche durch einen Ring (29) verbunden ist, der relativ zu der Kappe drehbar ist.

7. Flaschenzapfeinrichtung nach einem der vorhergehenden Ansprüche, bei der die thermoelektrischen Einrichtungen (44) dazu wirken, die Flüssigkeit in dem Reservoir zu kühlen, und bei der der Halter (42) nur einen oberen Teil des Reservoirs umfasst.

8. Flaschenzapfeinrichtung nach einem der vorhergehenden Ansprüche, bei der der Halter (42) mit einer Mehrzahl von wärmeleitfähigen Rippen (46) versehen ist, und die thermoelektrischen Einrichtungen (44) zwischen den Rippen und dem Halter angeordnet sind.

9. Flaschenzapfeinrichtung nach Anspruch 8, bei der der Halter (42) mit einer Einrichtung (47) versehen ist, um einen Luftstrom über die Rippen (46) zu erzeugen.

10. Flaschenzapfeinrichtung nach einem der vorhergehenden Ansprüche, bei der der Bodenbereich (36) des Reservoirs (15) relativ zu dem oberen Teil des Reservoirs nach innen versetzt ist.

Revendications

1. Distributeur de liquide en bouteille dans lequel du liquide est adressé d'une bouteille (B) à une sortie de décharge (8) par l'intermédiaire d'un réservoir (15), dans lequel le distributeur comprend :

- un moyen (6) pour supporter la bouteille ;
- un connecteur de bouteille (12) en vue d'un engagement de scellement étanche libérable avec un col formé à la partie supérieure de la bouteille, le connecteur de bouteille étant doté d'une entrée d'air (24) pour adresser de l'air à une région supérieure de la bouteille, un tube plongeur (13) pour retirer du liquide d'une région inférieure de la bouteille, et un tube de transfert (14) pour adresser du liquide au réservoir ;
- un dispositif thermique (42, 44) qui reçoit de manière amovible le réservoir (15) pour contrôler la température de liquide dans le réservoir ; et
- un tube de sortie (19) pour conduire du liquide du réservoir à la sortie de décharge ;

dans lequel le réservoir (15) est doté d'une fermeture (38) qui incorpore une entrée de fluide en vue de la connexion avec le tube de transfert (14) et un tube de soutirage (17) en vue d'une connexion avec le tube de sortie (19) et ayant une sortie de fluide (18) disposée de manière adjacente au fond du réservoir,

caractérisé par le fait que

le réservoir (15) est préformé de matière plastique, le moyen thermique comprend un support conducteur de chaleur (42) qui entoure et reçoit à frottement doux le réservoir avec un espace intermédiaire minimal, et ledit dispositif thermique comprend un dispositif thermo-électrique (44) pour contrôler la température de liquide dans le réservoir, le dispositif étant tel que, à des fins d'hygiène, le réservoir et le connecteur de bouteille (12) peuvent être retirés conjointement avec les tubes associés (13, 14) et remplacés par des composants propres.

2. Distributeur de liquide en bouteille selon la revendication 1, comprenant un moyen de pompe à air (22) disposé pour adresser de l'air pressurisé à la bouteille (B) afin de provoquer un déplacement de liquide de la bouteille audit réservoir (15).

3. Distributeur de liquide en bouteille selon la revendication 2, comprenant un capteur de pression (122) sensible à la pression d'air adressé à la bouteille (B) afin de limiter la montée en pression d'air produite par ledit moyen de pompe à air (22).

4. Distributeur de liquide en bouteille selon la revendication 3, dans lequel le capteur de pression (122) est disposé pour couper le moyen de pompe à air (22) lorsque la pression d'air détectée dépasse un niveau prédéterminé.

5. Distributeur de liquide en bouteille selon l'une quelconque des revendications précédentes, dans lequel l'entrée d'air (24) est connectée à un raccord libérable qui incorpore un filtre à air (23), ce par quoi le filtre à air est remplacé par le connecteur de bouteille (12).

6. Distributeur de liquide en bouteille selon l'une quelconque des revendications précédentes, dans lequel le connecteur de bouteille (12) incorpore un capuchon (26) auquel l'entrée d'air (24), le tube plongeur (13) et le tube de transfert (14) sont couplés, ledit capuchon étant engagé avec le col de la bouteille par une bague (29) qui est apte à tourner par rapport au capuchon.

7. Distributeur de liquide en bouteille selon l'une quelconque des revendications précédentes, dans lequel le dispositif thermo-électrique (44) agit pour refroidir le liquide dans le réservoir et le support entoure (42) seulement une partie supérieure du réservoir.

8. Distributeur de liquide en bouteille selon l'une quelconque des revendications précédentes, dans lequel le support (42) est doté de plusieurs ailettes conductrices de chaleur (46) et le dispositif thermo-électrique (44) est disposé entre les ailettes et le support.

9. Distributeur de liquide en bouteille selon la revendication 8, dans lequel le support (42) est doté de moyens (47) pour créer un courant d'air sur lesdites ailettes (46).

10. Distributeur de liquide en bouteille selon l'une quelconque des revendications précédentes, dans lequel la partie inférieure (36) du réservoir (15) est en décochement vers l'intérieur par rapport à la partie supérieure du réservoir.

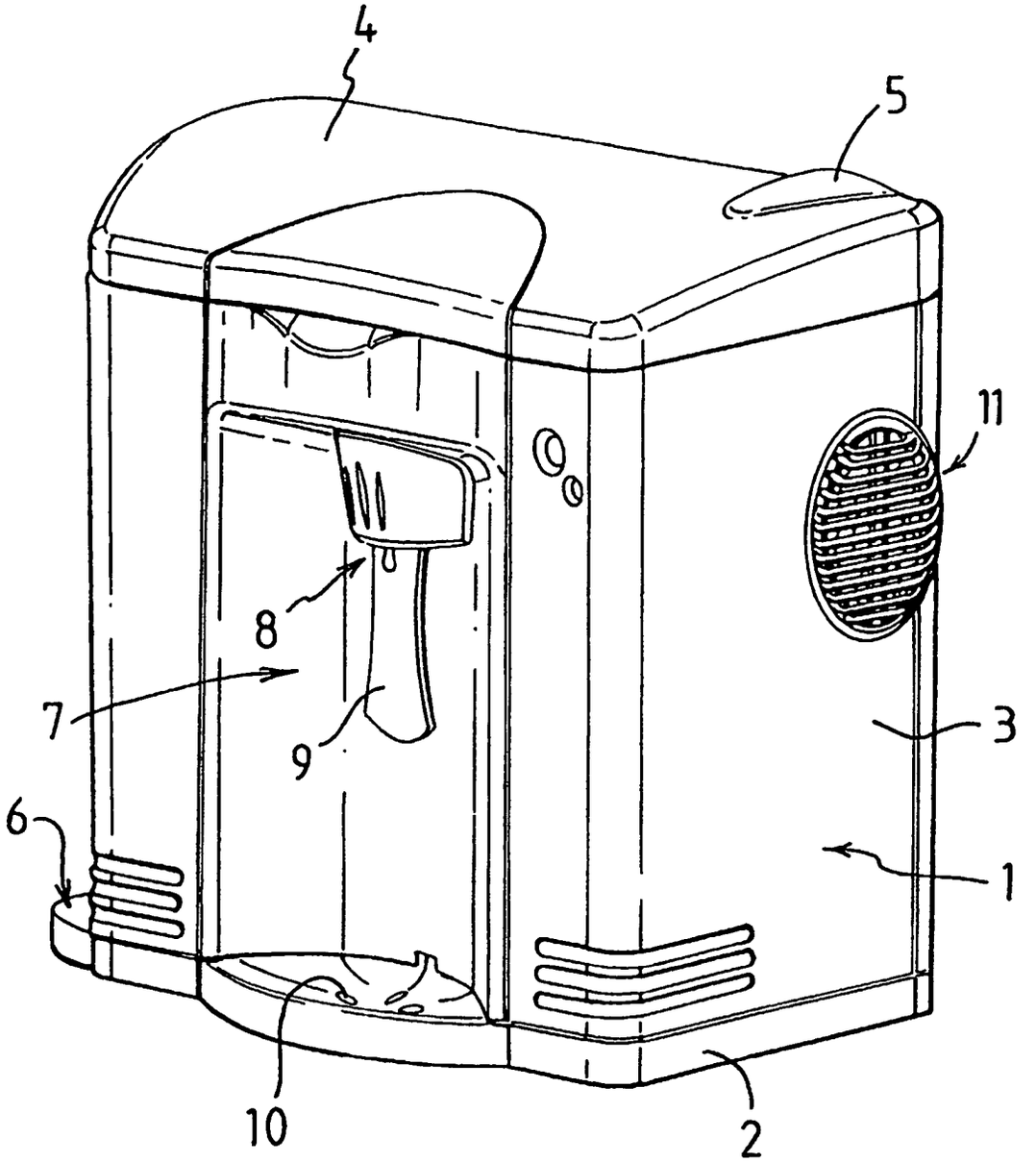


FIG 1

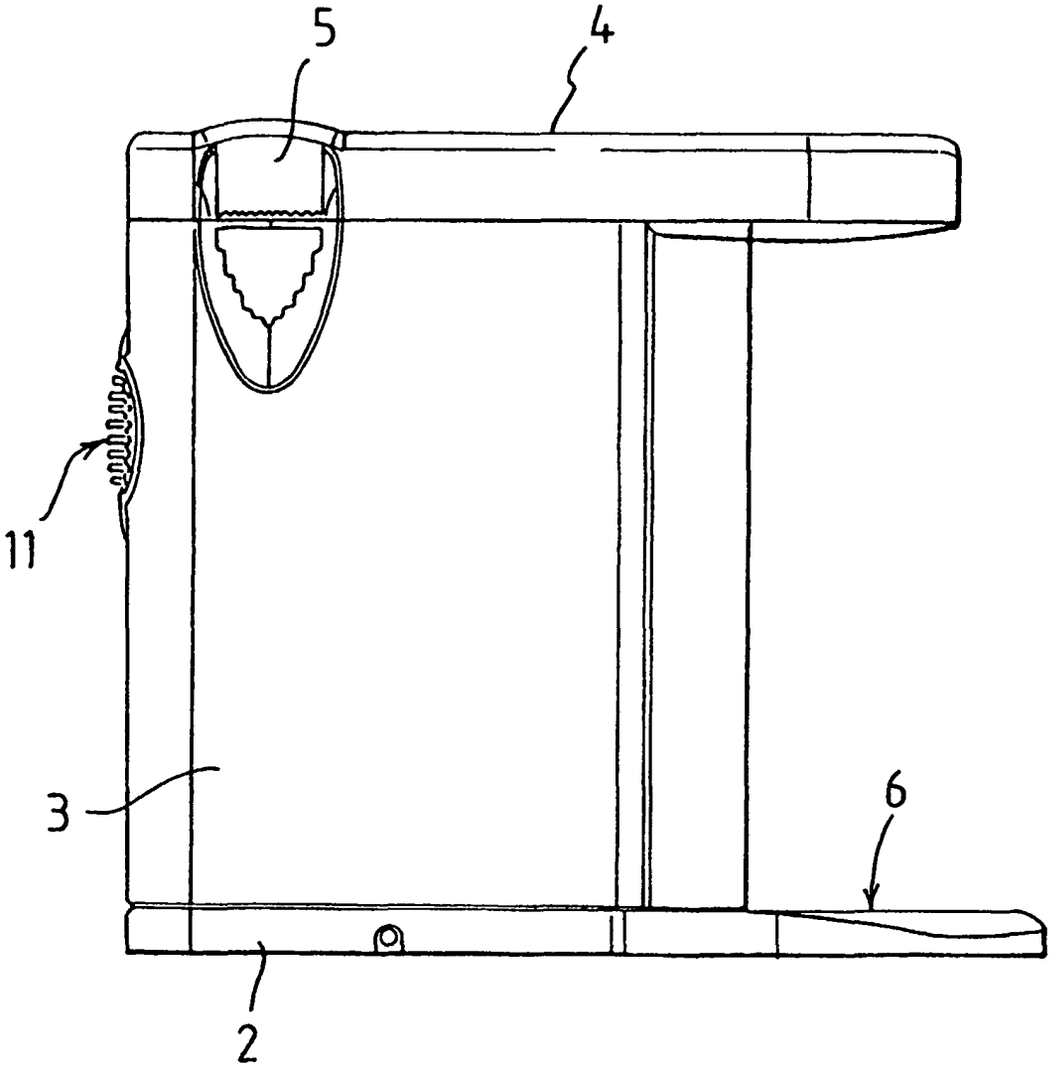


FIG 2

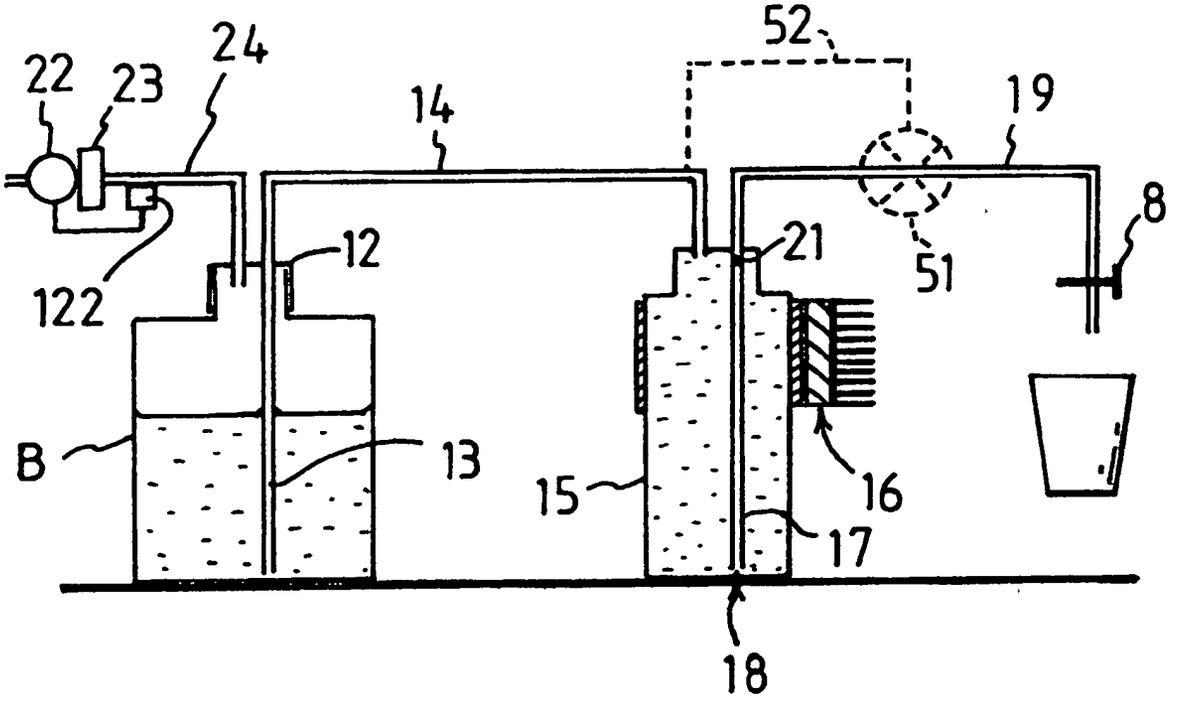


FIG 3

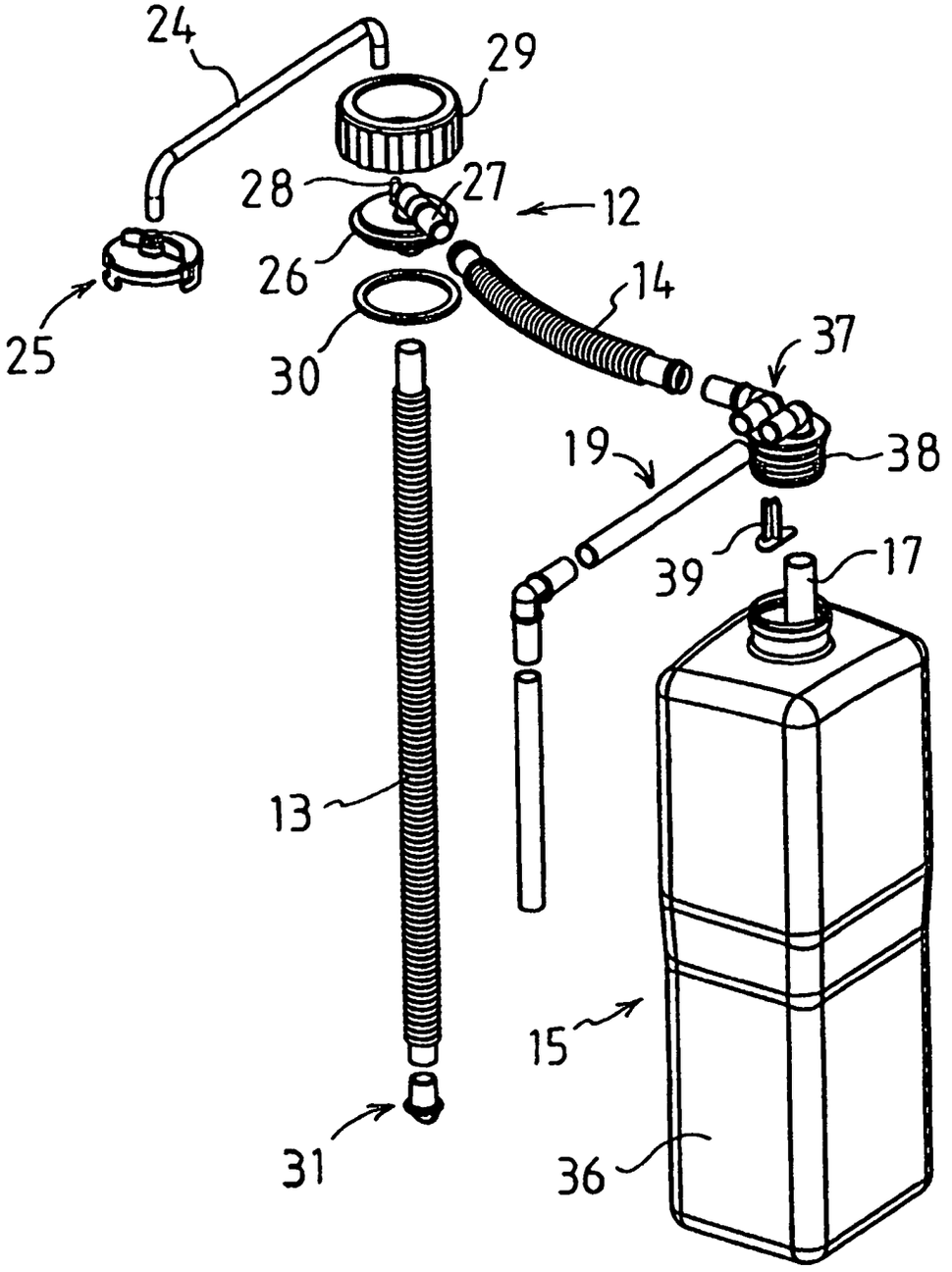
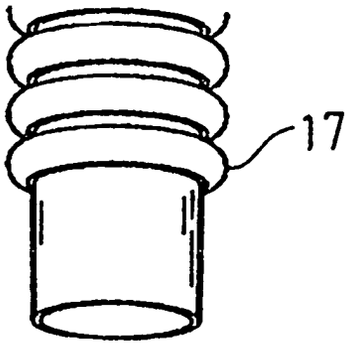


FIG 4



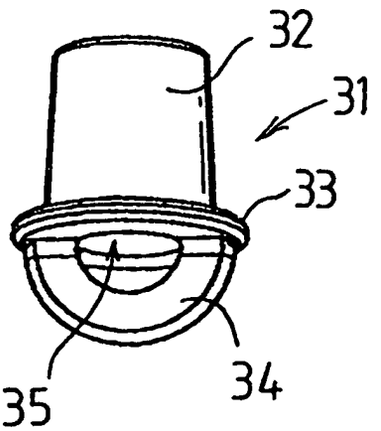


FIG 5

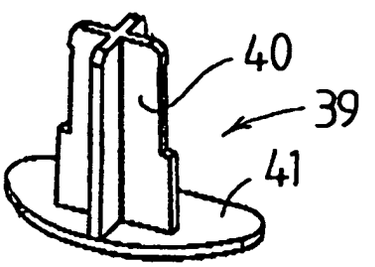


FIG 6

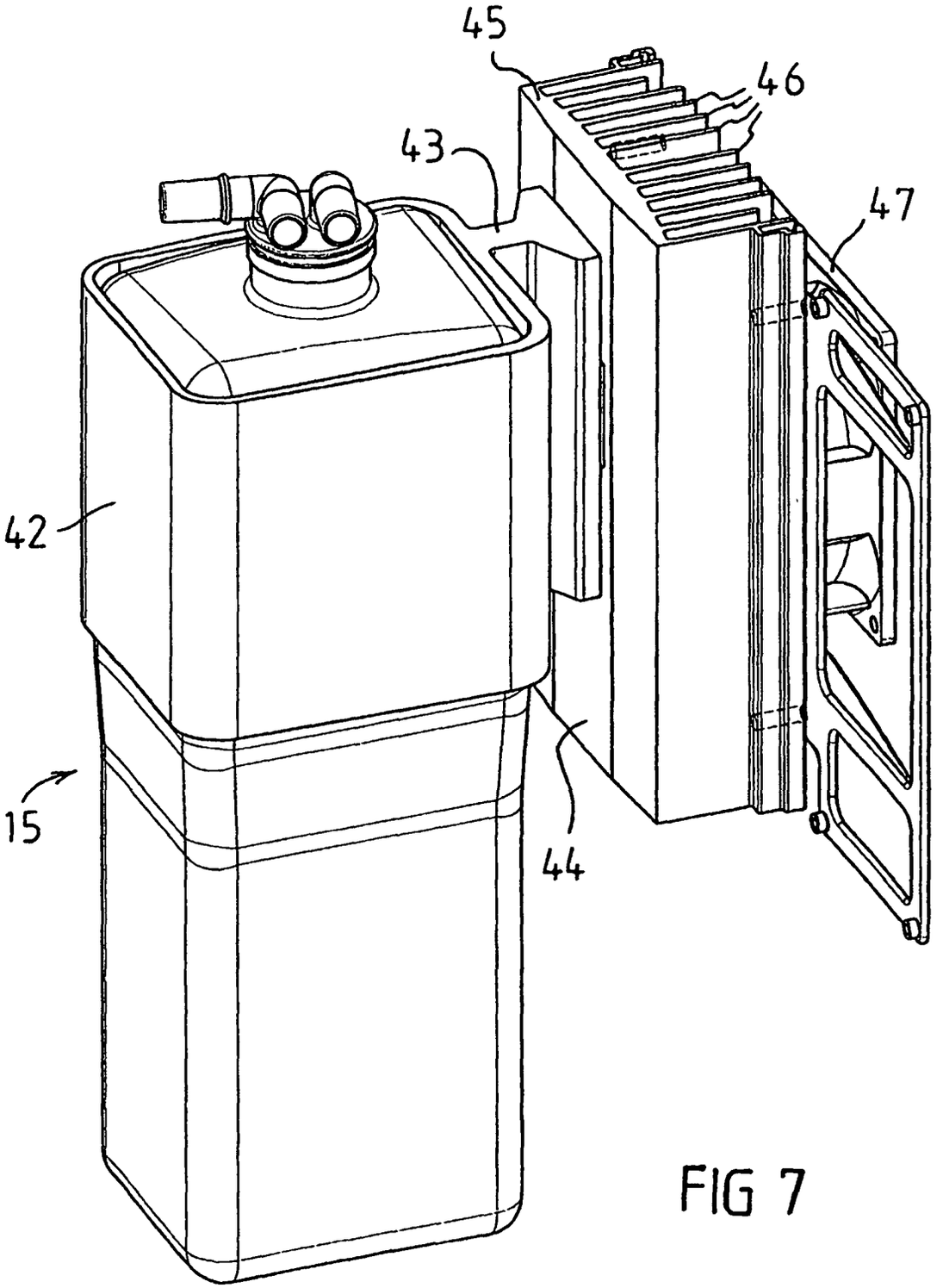


FIG 7

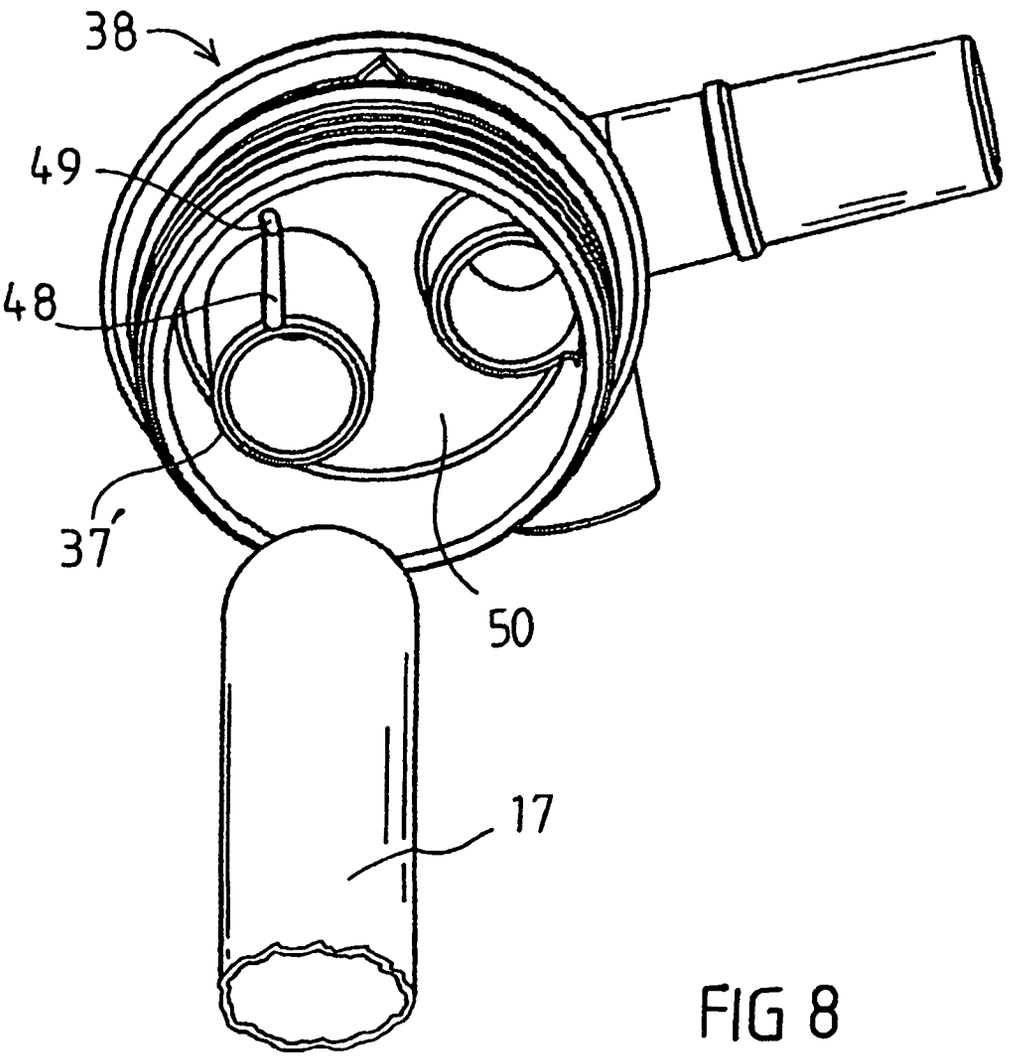


FIG 8