(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 330 578 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
24.01.2007 Bulletin 2007/04

(21) Application number: **01978645.8**

(22) Date of filing: **30.10.2001**

(51) Int Cl.:
E03D 9/03 *(2006.01)*

(86) International application number:
PCT/GB2001/004808

(87) International publication number:
WO 2002/036894 (10.05.2002 Gazette 2002/19)

(54) **LIQUID DOSING DEVICES**

FLÜSSIGKEITSDOSIERVORRICHTUNGEN

DISPOSITIFS DE DOSAGE DE LIQUIDE

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(30) Priority: **03.11.2000 EP 00309776**

(43) Date of publication of application:
30.07.2003 Bulletin 2003/31

(73) Proprietor: **Slade, Brian**
Ashford,
Kent TN24 8BX (GB)

(72) Inventor: **Slade, Brian**
Ashford,
Kent TN24 8BX (GB)

(74) Representative: **Oxley, Rachel Louise**
Mewburn Ellis,
York House,
23 Kingsway
London WC2B 6HP (GB)

(56) References cited:
EP-A- 1 046 755
WO-A-00/49238
WO-A-92/20876
US-A- 5 597 255

EP 1 330 578 B1

Description

Field of the Invention

[0001] This invention relates to devices for dosing a liquid product into a flow of liquid, and especially to devices intended to be used in systems which have an intermittent flow of liquid. In one preferred form, the invention is particularly concerned with the dosing of a liquid product into a receiver such as a water closet or a urinal bowl in association with the flushing of the receiver. The invention has, however, wider applicability.

Background

[0002] The background to the present invention will be set with reference to the preferred application of a toilet freshener, although as already mentioned above, and as will be appreciated from the discussion further below, the invention has much wider applicability than this.

[0003] It has been known for a long time to provide so-called toilet fresheners in the form of a solid or semisolid product, a 'rim block', to be mounted within the inner rim of a water closet bowl where the flushing water will wash over the product and so dissolve or erode it to release active constituents into the water flow.

[0004] More recently, it has been proposed to use a liquid toilet freshening product in a similar manner. For example, EP-A-0538957 describes a device that can be mounted within the inner rim of a water closet bowl to dose a liquid freshening product into the flushing water.

[0005] In this device, the liquid product is dosed into the water flow from a porous substrate which is disposed in the path of the flushing water. The porous substrate is supplied with the liquid product from a reservoir disposed above the substrate, a mouth of the reservoir opening onto the upper surface of the substrate. Although this arrangement is simple in construction, it suffers from the drawback that the volume of liquid product that flows into the substrate between flushes is dependent, at least in part, on the head of liquid in the reservoir, since this directly influences the rate of flow from the reservoir onto the surface of the substrate. The result is an inconsistency in the dose of liquid product into the toilet bowl over time.

[0006] EP-A-0785315 describes a development of the device discussed above. The same basic principle of dosing a liquid product into a flow of water from a porous substrate is employed. However, liquid product from a reservoir is deposited onto the upper surface of the substrate via a regulating channel. The liquid is metered into the channel through an orifice and a separate air opening to the interior of the reservoir is provided. The sizes of the metering orifice and the air opening are strictly regulated to the viscosity of the liquid being dosed. This is described as having the effect of providing a substantially constant head of the liquid above the substrate, independent of the level in the reservoir. However, although this arrangement provides a consistent flow rate of liquid product to the absorbent substrate, inconsistent dosing of the flushing water can still result, dependent at least in part on the duration of the periods between flushes. This is thought to be due to the reliance of this device on coagulation of the liquid product to stem its flow onto the substrate, a mechanism which is very dependent on the environment in which the device is operated. It is also thought that the head of liquid bearing down on the substrate can lead to 'supersaturation' of the substrate, so it becomes over loaded with product.

[0007] In WO-A-0049238 a distributor for releasing a substance into a toilet bowl is a perforated or slotted tube fitted around the bowl in the path of flush water. Solids or liquids in the tube are washed out with flush water. The tube may be filled from inverted containers (Figs. 19-22). There is no disclosure of how a liquid may be retained in the tube when flush water is not running.

[0008] In WO-A-9220876 a unicameral device to be hung in the path of flushing water contains a solid or gel in its chamber to which access is gained by the water upwardly through a perforated or porous base. The gel or solid is dissolved and drops from the container. No specific air inlet is disclosed. The process will not necessarily be proportionate to the amount of flushing water and because of its slowness will continue for some time after the flush ceases. The inventor did not disclose that liquids could be used.

[0009] The present invention, in contrast, enables a liquid material or a fluent gel (i.e. one which will flow under gravity) such as a deodorant, perfume, disinfectant or bleach, to be reliably retained in the device until water contacts the device then, being fluent, to flow immediately reliably and proportionately into the water and then to cease flow when the water flow ceases. The water will usually be flush water of a toilet bowl or urinal, but may be bath or wash-basin water.

[0010] EP-A-1046755 dispenses a liquid from a reservoir through a restricted opening which a conjunction with the viscosity of the liquid is said to exert a pressure on a porous plate which is independent of the liquid level in the reservoir. The porous plate is supported opposite the opening by a non-porous wall of a chamber, and liquid is transported laterally in the plate to portions of it which are exposed to flush water, beyond the chamber.

[0011] The present invention provides a device for dosing a product into a flow of liquid, the device comprising a chamber for the liquid product, said chamber having a porous wall through which the liquid product is transported when an outer surface of the porous wall is within the flow of liquid but which retains the product within the chamber when the liquid flow ceases.

[0012] It is characterized by the product being fluid (liquid or fluent gel) and by the provision of a hydraulic head in the chamber which is held substantially constant, independently of the head of product in the reservoir, by means of an air supply from atmosphere equalizing the pressure in the chamber with the atmospheric pressure

outside.

[0013] In this way, the desired "on-off" effect can be achieved by appropriate selection of the resistance of the porous chamber wall to movement of the fluid product through it, for instance by selection of the pore size of the wall, based on the rheology of the liquid product, in particular its viscosity, but the dosage will not be affected substantially by the amount of product remaining in the reservoir. More specifically, the resistance of the wall is selected to be sufficient to substantially resist any flow of the product from the chamber when the outside of the chamber wall is exposed to ambient pressure, since its hydrostatic pressure cannot exceed a certain value. However, as the liquid into which the product is dosed flows over the porous wall of the dosing chamber there is a resulting drop in static pressure to the outside of the wall. The resistance of the porous wall is chosen such that the resultant pressure difference across the wall causes the fluid product to flow outwardly through the wall into the liquid flow. When the liquid flow stops, or the chamber is removed from the flow, the pressure balance across the wall of the chamber is almost instantaneously regained and the liquid product ceases to move through the wall.

[0014] It will be appreciated that in this way the invention provides a device of relatively simple construction which is nevertheless able to offer very good control of the dosing of the fluid product into the liquid flowing over the chamber. As such, it has wide applicability. Examples of preferred uses include the dosing of a foaming bath product or the like into a bath along with the tap water and dosing an e.g. deodorising and/or disinfecting liquid product into a toilet bowl or urinal along with the flush water.

[0015] Accordingly, there may be means for suspending the dosing chamber within the receiver in the path of said liquid flow.

[0016] The receiver may be, for example, a water closet bowl or a urinal.

[0017] In either of the above aspects, the reservoir or container from which the product can be supplied to the chamber has a closed top and feeds to the chamber by gravity. With such an arrangement it would prove problematic if the full head of fluid in the reservoir acts in the dosing chamber. For instance, the resultant static pressure may cause seepage of the liquid product through the porous wall of the chamber when the reservoir is full. Alternatively, if the resistance of the wall is set sufficiently high to avoid this seepage, when the head in the reservoir reduces as the product is used, the static pressure in the dosing chamber may not be sufficient to cause a flow of liquid through the wall when liquid flows across the wall.

[0018] This is why the dosing device is arranged such that the hydrostatic pressure in the chamber is held substantially independently of the head of fluid in the reservoir.

[0019] This is achieved with an arrangement in which the device includes an air supply through which air can enter the lower end of the reservoir or the chamber. The base of the reservoir is also closed save for an outlet to the dosing chamber.

[0020] In a similar manner to the traditional "chicken-feeder" this arrangement finds an equilibrium position in which, due to a reduction in pressure in an air space formed above the liquid in the reservoir at its closed, upper end, the column of liquid in the reservoir is supported by atmospheric pressure acting via the air supply, on the product in the dosing chamber, as explained in more detail below.

[0021] It is also desirable to provide compensation for temperature variations, which it has been found can give rise to a significant expansion in the volume of the air pocket trapped at the upper end of the chamber and thus upset the pressure balance achieved. Thus, means are preferably provided to accommodate liquid displaced as a result of this expansion.

[0022] In a further aspect the invention provides a dosing closure for a container, e.g. a bottle having a closed top when inverted, the closure comprising a chamber to be supplied with a liquid or fluent gel product that will flow under gravity from the container into the chamber when connected to the container, said chamber having a porous wall through which the liquid product is transported when the outer surface of the porous wall is disposed within a flow of liquid, but retains the product when the liquid flow across the wall ceases, and there are means for maintaining a constant hydrostatic pressure in that chamber (when connected to an inverted said container of product) by an air supply from ambient to the chamber to equalize pressure at a product/air interface there with atmospheric.

[0023] Where the closure is for instance installed in a top opening of a container, the dosing chamber may be open to the interior of the container so that it can be filled simply by inverting the container. The inverted container can then be held with the dosing chamber under a flow of liquid, e.g. a running tap where the dosed product is a foam bath for instance, to dose the liquid product into the flowing liquid.

[0024] The liquid products used with each of the various aspects of the invention preferably comprise a component that has as affinity for the flowing liquid into which it is dispensed. For instance, where the flowing liquid is water, the liquid product may comprise a component having hydrophilic properties, such as a surfactant.

[0025] Embodiments of the invention are described below in more detail, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a sectioned side view of a dosing device of a first embodiment of the present invention;

Fig. 2 is a part-sectioned front elevation of the device of Fig. 1;

Fig. 3 is a sectioned side view of another dosing device of a second embodiment of the invention;

Fig. 4 is a part-sectioned front elevation of the device

of Fig. 3 showing the reservoir substantially full;
Fig. 5 is a front elevation of the device of Fig. 3 showing the reservoir when depleted; and
Fig. 6 shows a dosing closure according to another embodiment of the invention installed in the dosing opening of a container.

[0026] The dosing devices 2, 2' of Figs. 1-2 and 3-5 are adapted for dosing a liquid product, such as a cleansing and/or deodorising product into the bowl B of a water closet, in conjunction with the flow of water F generated when the water closet is flushed. The dosing devices 2,2' each comprise a porous walled dosing chamber 6,6' of cylindrical form, suspended by a strap 8,8' from the rim R of the water closet bowl B in the path of the flushing water F. A liquid product P is supplied by gravity to the dosing chamber 6,6' from a reservoir 10,10' mounted above the chamber 6,6'.

[0027] A holder 12,12', to which the strap 8,8' is attached, serves as a support for both the dosing chamber 6,6' and the reservoir 10,10'. A cavity 14,14' within the holder 12,12' serves as a conduit between a reservoir outlet 16,16' and a centrally disposed inlet 18,18' to the dosing chamber 6,6'.

[0028] The reservoir 10,10' is detachably received within a correspondingly shaped seat 20,20'in the holder, allowing the reservoir to be removed and replaced or refilled once the liquid product it holds is exhausted. It is envisaged that the reservoirs will be provided in an initially sealed configuration. A seal 22,22' across outlet of the reservoir can be broken by a pointed element 24,24', which in these examples is moulded integrally with the holder, which pierces the seal when the reservoir 10,10' is installed on its seat 20,20'.

[0029] In use, the flush water F flows over the porous wall 26,26' of the dosing chamber 6,6' creating a reduction in pressure at its outer surface sufficient to create a large enough pressure difference across the wall 26,26' to cause the liquid product P to flow outwardly through the wall. The product P is therefore dosed in a controlled manner into the water flow F in the form of micro fine filaments excreted from the pores of the wall.

[0030] This greatly enhances the solubility of the product P in the flowing water F, leading for instance to improved foaming of the product where that is desired.

[0031] Once the water flow F stops, the pressure to the outside of the porous wall 26,26' returns almost instantaneously to ambient and the flow of liquid product through the wall stops. The more volatile perfume components of the liquid product, where they are present, are able to permeate through the wall, however, even in the absence of a flow of water, providing a continuous deodorising effect.

[0032] It is also notable that so long as the dosing chamber has a capacity greater that the dose of product per flush of the water closet, and/or the gravity supply from the reservoir is sufficiently fast, it can remain almost constantly primed, so that no matter how quickly successive flushes of the water closet follow one another the desired dose of product is introduced into the flow of water F.

[0033] The device can be used for dosing a variety of liquid products into a liquid flow. Typically, for the exemplary application described - cleansing and deodorising a water closet bowl - the product will include both surfactant and perfume components. The rheological behaviour of the material, in particular its viscosity, can be selected with regard to the physical properties of the porous wall of the dosing chamber 6,6', which will typically have pores of size 50 to 120 microns, or vice versa, to ensure that the liquid product P is appropriately dosed into the flush water F. Normally, the liquid product P will be more viscous than the flowing liquid F.

[0034] In order that the pressure difference across the wall 26,26' of the dosing chamber 6,6' can be kept substantially consistent from flush to flush, to ensure a consistent dose, it can be important to ensure that the hydrostatic pressure of the liquid product P within the chamber 6,6' is kept substantially constant, even though the head of liquid in the reservoir 10,10' will reduce with time as the product P is consumed. Figs. 1 and 3 illustrate two alternative arrangements used to achieve this.

[0035] Looking first at Fig. 1, it can be seen that an air supply tube 30 opens at its lower end 32 into the cavity 14 of the holder 12. The upper end 34 of this tube is open to atmosphere. When the reservoir 10 is initially installed on the holder 12, its outlet 16 is opened by the spike 24 and product P flows from the reservoir 10 down through the cavity 14 into the dosing chamber 6. The liquid escaping from the reservoir 10 is replaced by air, which enters the reservoir via the air supply tube 30. Once the liquid in the cavity 14 covers the lower end 32 of the supply tube 30, the passage of air to the reservoir 10 is cut off. This in turn causes a drop in pressure in the free space 36 above the liquid product in the reservoir 10. A state of equilibrium is rapidly reached in which, given the reduction in pressure in the space 36, the liquid column in the reservoir 10 and cavity 14 above the lower end 32 of the air supply tube 30 is supported by atmospheric pressure at the liquid/air interface 38 at the lower end of the air supply tube 30.

[0036] As the product is dosed into the flush water F, the liquid level in the reservoir 10 falls further. This results in an increase of the volume of the sealed air space 36 and a consequential drop in the air pressure in this space 36. This in turn causes air to flow into the cavity 14 through the air tube 30, the air forming a series of bubbles 40 at the lower end 32 of the tube 30 to bubble upwardly through the reservoir to the air space 36, increasing the pressure in that space until an equilibrium is once again restored. Once the equilibrium is restored, the hydrostatic pressure of the liquid at the level of the lower end of the air tube 30 is equal to atmospheric pressure once more.

[0037] Significantly, since there is atmospheric pressure acting at the liquid/air interface 38 at the lower end of the air tube 30, then in the equilibrium condition shown

the hydrostatic pressure of the liquid at the level of this interface 38 is equal to atmospheric pressure. Thus, the hydrostatic pressure at this level in the cavity 14, and hence the hydrostatic pressure within the dosing chamber 6, is maintained substantially constant irrespective of the level of the liquid in the reservoir 10.

[0038] Fig. 3 shows an alternative arrangement that operates in a very similar manner to achieve the desired substantially constant pressure within the dosing chamber 6'. The principal difference between the device of Fig. 1 and that illustrated in Fig. 3 is that the latter is specifically adapted to safeguard against seepage of product from the dosing chamber 6' as a result of ambient temperature variations.

[0039] In the Fig. 3 device, a delivery tube 50 extends downwardly from the reservoir outlet 16 into the cavity 14 of the holder. The liquid product P exits the reservoir through this tube 50, which in the present example is fixed to the reservoir 10', but which might equally be formed integrally with the seat 20' of the holder 12'. Otherwise, the structure of the device is very similar to that shown in Fig. 1, with the exception that the air supply tube 30' does not protrude so far into the cavity 14.

[0040] In use, as with the Fig. 1 device, when the reservoir 10' is installed on the holder 12' the liquid product P flows into the cavity 14' and from there into the dosing chamber 6'. However, unlike the Fig. 1 device in which the equilibrium position is only reached once the cavity 14 and dosing chamber 6 are full of the liquid product, the presence of the delivery tube 50 causes an equilibrium condition to be obtained whilst there remains a generally annular air space within the cavity 14 around this tube 50. The resulting free liquid level L in the cavity 14' is open to atmosphere via the air tube 30'. In this condition, the head of liquid above the lower end 52 of the delivery tube 50 is negated by the negative pressure present in the air space 36' at the upper end of the reservoir 10'.

[0041] During operation of the device, as the liquid product is consumed, when the level of liquid in the cavity 14' will drop below the lower end 52 of the delivery tube 50, product flows from the reservoir 10 once more into the cavity, recovering the lower end 52 of the tube to return the device to its equilibrium condition. In this way, the free liquid level in the cavity 14 is maintained substantially constant at or around the bottom end of the delivery tube 50. Since this surface is open to atmosphere, this in turn means that the hydrostatic pressure in the dosing chamber 6' is also maintained substantially constant as desired.

[0042] An increase in ambient temperature will cause the air trapped in the space 36' above the liquid product in the reservoir 10' to expand. This expansion will displace liquid product from the reservoir 10' into the cavity 14' raising the liquid level in the cavity. With an arrangement of the form seen in Fig. 1, this would drive liquid product up the air supply tube 30, increasing the head of liquid above the dosing chamber, possibly leading to seepage of the product through the wall of the chamber due to the increased hydrostatic pressure. However, with the arrangement of Fig. 3, in which the cavity 14 is not full, a much greater volume of product must be displaced from the reservoir 10' into the cavity 14' before any appreciable rise in the liquid level L is seen. Thus, the effects of an ambient temperature rise are significantly less, and most likely negligible with this arrangement.

[0043] A similar compensation for temperature variations could be provided in the embodiment of Fig. 1 by giving a portion of the air supply tube 30 at or near its lower end 32 an enlarged cross-section, thus increasing the area volume into which the liquid can expand without travelling a significant distance up that tube 30.

[0044] Turning to Fig. 6, a container 60 having a closure 62 in accordance with another embodiment of the invention is illustrated, suitable for instance for dosing a foam bath product P' at a controlled rate into a bath with water F' flowing from a tap T.

[0045] The closure 62 includes a porous, dome shaped plug 64, which has a hollow interior to define a dosing chamber 66. The plug 64 is open to the interior of the container 60, this open end of the plug 64 being sealed to ring 68, which surrounds the end of the plug 64 and is received in the mouth 70 of the container to close it.

[0046] An annular recess 72 is formed in the ring 68, facing away from the mouth 70 of the container. This recess 72 receives the base of a cap (not shown) which can be used to cover the plug 64 when the container 60 is not in use.

[0047] A U-shape air supply tube 74 opens at one end into the dosing chamber 66, close to the closed end of the plug 64, and opens at the other end into the annular recess 72, thus providing a conduit for air from outside the container 60 into the dosing chamber 66. Conveniently, the outer end of the air tube 74 in the recess 72 is blocked off by the cap (not shown) when in place, to prevent any inadvertent spillage of the liquid product P' through this tube when the container 60 is upright.

[0048] In use, the container 60 is inverted (as shown in Fig. 6). The liquid product P', for example a bath foam product, flows into the dosing chamber 66 from the interior of the container 60. As it does so, the pressure of the air trapped in the space 76 above the product P' at the base 78 of the container 60, is reduced and, as in the devices of Figs. 1 and 3, an equilibrium position is reached in which the column of liquid P' in the inverted container 60 is supported by a combination of the partial vacuum created in the space 76 and atmospheric pressure acting at the liquid/air interface 80 at the inner end of the air supply tube 74. The pore size of the porous wall 65 of the dosing chamber 66 is selected, based on the viscosity of the liquid product P', to ensure that in this equilibrium condition, with the container inverted, no product escapes through the wall.

[0049] When the container is positioned with the plug 64 in a flow of water F', e.g. from a tap T, the reduction in static pressure to the outside of the porous wall 65

brought about by the flowing water F', creates a pressure differential across the wall sufficient to cause the liquid product P' to travel through the wall to be taken up by the flowing water F'.

[0050] Similarly to the other embodiments described above, as the product P' is dispensed, the level in the container 60 drops, reducing further the air pressure in space 76. The resulting imbalance in pressures across the liquid column causes air to bubble in through the air tube 74 until an equilibrium is attained once more. The result is a generally constant hydrostatic pressure within the dosing chamber 66, at or about atmospheric pressure (this being the pressure that acts at the liquid/air interface 80 within the chamber 66), irrespective of the head of liquid product P' in the inverted container 60.

[0051] When the product P' is a bath foam for instance, dosing it in the manner described above, using the container 60 of Fig. 6, can create a great deal of foam with very little effort on the part of the user, particularly since there is no need for the container to be squeezed. Moreover, the dosing is very controllable, being dependent almost entirely on the length of time the plug 64 is held under the running tap T.

[0052] Various modifications to the embodiments specifically described can be made without departing from the invention as defined by the claims. For instance, although the porous walls of the dosing chambers 6,66 in the described examples are substantially rigid to retain their shape, they might be replaced, for example, by a semi-permeable membrane or the like which, if not itself sufficiently rigid to form the dosing chamber, may be supported by other means.

Claims

1. A device for dosing a product (P,P') into a flow of liquid (F), the device comprising a reservoir (10,10', 60) for the product having a closed top end, the device also comprising a chamber (6,6',66) for the product, said chamber having a porous wall (26,26', 65) through which in use the product (P,P') is transported when an outer surface of the porous wall (26,26',65) is within the flow of liquid (F,F') but which retains the product (P,P') within the chamber (6,6', 66) when the liquid flow (F,F') across the wall ceases, the product being a liquid or a gel that will flow under gravity from the reservoir to the chamber the device further comprising an air supply (30,30',74) from atmosphere through which air can enter the lower end of the reservoir or the chamber to equalize pressure at a product/air interface (38,L,80) there with atmospheric, wereby the hydrostatic head in the chamber (6,6',66) is being held substantially constant independently of the head of product in the reservoir (10,10',60).

2. A dosing device according to claim 1, wherein the air supply is a tube (30,30') extending along the reservoir to the level of the chamber.

3. A dosing device according to claim 2, providing for an air space in a cavity (14') which is above the chamber but below the reservoir for accommodating liquid displaced as a result of expansion due to a rise in temperature of an air pocket (36') trapped at the closed upper end of the reservoir (10').

4. A device according to any one of the preceding claims, comprising means (24,24') for penetrating a seal (22,22') on the reservoir as the latter is installed with the device.

5. A dosing closure (62) for a container (60) having an outlet (70) and a closed top when inverted, e.g. a bottle, the closure comprising a chamber (66) to be supplied with a product which is a liquid or a gel that will flow under gravity from the container into the chamber when connected to the container, said chamber having a porous wall (65) through which the product is transported only when the outer surface of the porous wall is disposed within a flow of liquid (F'), the closure comprising also means (74,80) for maintaining a constant hydrostatic pressure of said product in said chamber when connected to an inverted said container of product, the means including an air supply (74) from the ambient atmosphere to the chamber (66) to equalize the pressure at a product/air interface (80) there with atmospheric.

6. A closure according to claim 5, wherein the air supply (74) is a tube in the closure leading from outside the chamber.

7. A container for a liquid product, the container comprising an outlet (70) and a closure (62) according to claim 5 or claim 6 installed in said outlet.

8. A dosing device according to any one of claims 1 to 5, or a container according to claim 7, wherein the reservoir or container contains a liquid product comprising a component that has an affinity for the flowing liquid into which it is to be dispensed.

Patentansprüche

1. Vorrichtung zur Dosierung eines Produkts (P, P') in einen Flüssigkeitsstrom (F), wobei die Vorrichtung einen Vorratsbehälter (10, 10', 60) für das Produkt mit einem geschlossenen oberen Ende umfasst, wobei die Vorrichtung außerdem eine Kammer (6, 6', 66) für das Produkt umfasst, wobei die Kammer eine poröse Wand (26, 26', 65) aufweist, durch welche das Produkt (P, P') während der Anwendung transportiert wird, wenn sich eine Außenoberfläche der

porösen Wand (26, 26', 65) innerhalb des Flüssigkeitsstroms (F, F') befindet, die aber das Produkt (P, P') in der Kammer (6, 6', 66) zurückhält, wenn der Flüssigkeitsstrom (F, F') entlang der Wand endet, wobei das Produkt eine Flüssigkeit oder ein Gel ist, die/das aufgrund der Schwerkraft vom Vorratsbehälter in die Kammer fließt, wobei die Vorrichtung weiters eine Luftzufuhr (30, 30', 74) aus der Atmosphäre umfasst, durch welche Luft in das untere Ende des Vorratsbehälters oder der Kammer eintreten kann, um den Druck an der Produkt-Luft-Grenzfläche (38, L, 80) mit dem atmosphärischen auszugleichen, wodurch die hydrostatische Höhe in der Kammer (6, 6', 66) unabhängig von der Höhe des Produkts im Vorratsbehälter (10, 10', 60) im Wesentlichen konstant gehalten wird.

2. Dosiervorrichtung nach Anspruch 1, worin die Luftzufuhr ein Rohr (30, 30') ist, das sich entlang des Vorratsbehälters auf das Niveau der Kammer erstreckt.

3. Dosiervorrichtung nach Anspruch 2, die einen Luftraum in einem Hohlraum (14'), der sich über der Kammer aber unterhalb des Vorratsbehälters befindet, zur Aufnahme von Flüssigkeit bereitstellt, die als Folge der Ausdehnung aufgrund eines Temperaturanstiegs eines Lufteinschlusses (36') verdrängt wird, der am geschlossenen oberen Ende des Vorratsbehälters (10') eingeschlossen ist.

4. Vorrichtung nach einem der vorangegangenen Ansprüche, ein Mittel (24, 24') zum Durchdringen einer Versiegelung (22, 22') am Vorratsbehälter umfassend, wenn Letzterer in die Vorrichtung eingesetzt wird.

5. Dosierverschluss (62) für einen Behälter (60) mit einem Auslass (70) und, wenn er umgedreht wird, einer verschlossenen Oberseite, wie z.B. eine Flasche, wobei der Verschluss eine Kammer (66) umfasst, die mit einem Produkt gefüllt wird, das eine Flüssigkeit oder ein Gel ist und aufgrund der Schwerkraft vom Behälter in die Kammer fließt, wenn diese mit dem Behälter verbunden ist, wobei die Kammer eine poröse Wand (65) aufweist, durch welche das Produkt nur dann transportiert wird, wenn die Außenoberfläche der porösen Wand innerhalb eines Flüssigkeitsstroms (F') angeordnet ist, wobei der Verschluss außerdem ein Mittel (74, 80) zur Aufrecherhaltung eines konstanten hydrostatischen Drucks des Produkts in der genannten Kammer umfasst, wenn diese mit dem genannten umgedrehten Produktbehälter verbunden ist, wobei das Mittel eine Luftzufuhr (74) von der Umgebungsatmosphäre in die Kammer (66) umfasst, um den Druck an der Produkt-Luft-Grenzfläche (80) mit dem atmosphärischen auszugleichen.

6. Verschluss nach Anspruch 5, worin die Luftzufuhr (74) ein Rohr im Verschluss ist, das von außerhalb der Kammer hineinführt.

7. Behälter für ein flüssiges Produkt, wobei der Behälter einen Auslass (70) und einen an diesem Auslass angebrachten Verschluss (62) nach Anspruch 5 oder Anspruch 6 umfasst.

8. Vorrichtung nach einem der Ansprüche 1 bis 5 oder Behälter nach Anspruch 7, worin der Vorratsbehälter oder Behälter ein flüssiges Produkt enthält, das eine Komponente mit Affinität für die Strömungsflüssigkeit umfasst, in die es eingeleitet werden soll.

Revendications

1. Dispositif pour doser un produit (P,P') dans un écoulement de liquide (F), le dispositif comprenant un réservoir (10,10',60) pour le produit ayant une extrémité supérieure fermée, le dispositif comprenant également une chambre (6,6',66) pour le produit, ladite chambre ayant une paroi poreuse (26,26',65) à travers laquelle, en cours d'utilisation, le produit (P, P') est transporté lorsqu'une surface extérieure de la paroi poreuse (26,26',65) se situe dans l'écoulement du liquide (F,F') mais qui retient le produit (P, P') dans la chambre (6,6',66) lorsque l'écoulement du liquide (F,F') à travers la paroi cesse,
le produit étant un liquide ou un gel qui s'écoulera sous gravité du réservoir à la chambre, le dispositif comprenant en outre une amenée d'air (30,30',74) de l'atmosphère à travers laquelle l'air peut entrer dans l'extrémité inférieure du réservoir ou dans la chambre pour égaliser la pression à une interface de produit/air (38,L,80) avec l'atmosphère, par quoi la tête hydrostatique dans la chambre (6,6',66) est maintenue sensiblement constante indépendamment de la tête du produit dans le réservoir (10, 10', 60).

2. Dispositif de dosage selon la revendication 1, où l'amenée d'air est un tube (30,30') s'étendant le long du réservoir au niveau de la chambre.

3. Dispositif de dosage selon la revendication 2, réalisant un espace d'air dans une cavité (14') qui se situe au-dessus de la chambre mais en dessous du réservoir pour recevoir le liquide déplacé par suite de la dilatation à cause d'une augmentation de la température d'une poche d'air (36') piégée à l'extrémité supérieure fermée du réservoir (10').

4. Dispositif selon l'une des revendications précédentes, comprenant des moyens (24,24') pour percer un joint d'étanchéité (22,22') sur le réservoir lorsque le dernier est installé dans le dispositif.

5. Fermeture de dosage (62) pour un récipient (60) ayant une sortie (70) et un dessus fermé lorsqu'il est retourné, par exemple une bouteille, la fermeture comprenant une chambre (66) destinée à recevoir un produit qui est un liquide ou un gel qui s'écoulera sous gravité du récipient dans la chambre lorsqu'elle est reliée au récipient, ladite chambre ayant une paroi poreuse (65) à travers laquelle le produit est transporté seulement lorsque la surface extérieure de la paroi poreuse est disposée dans un écoulement de liquide (F'), la fermeture comprenant également des moyens (74,80) pour maintenir une pression hydrostatique constante dudit produit dans ladite chambre lorsqu'elle est reliée à un récipient retourné précité du produit, les moyens incluant une amenée d'air (74) de l'atmosphère ambiante à la chambre (66) pour égaliser la pression à une interface de produit/air (80) avec l'atmosphère.

6. Fermeture selon la revendication 5, où l'amenée d'air (74) est un tube dans la fermeture menant depuis l'extérieur de la chambre.

7. Récipient pour un produit liquide, le récipient comprenant une sortie (70) et une fermeture (62) selon la revendication 5 ou la revendication 6 installée dans ladite sortie.

8. Dispositif de dosage selon l'une des revendications 1 à 5, ou récipient selon la revendication 7, où le réservoir ou récipient contient un produit liquide comprenant un composant qui a une affinité avec le liquide d'écoulement dans lequel il doit être distribué.

Fig.1

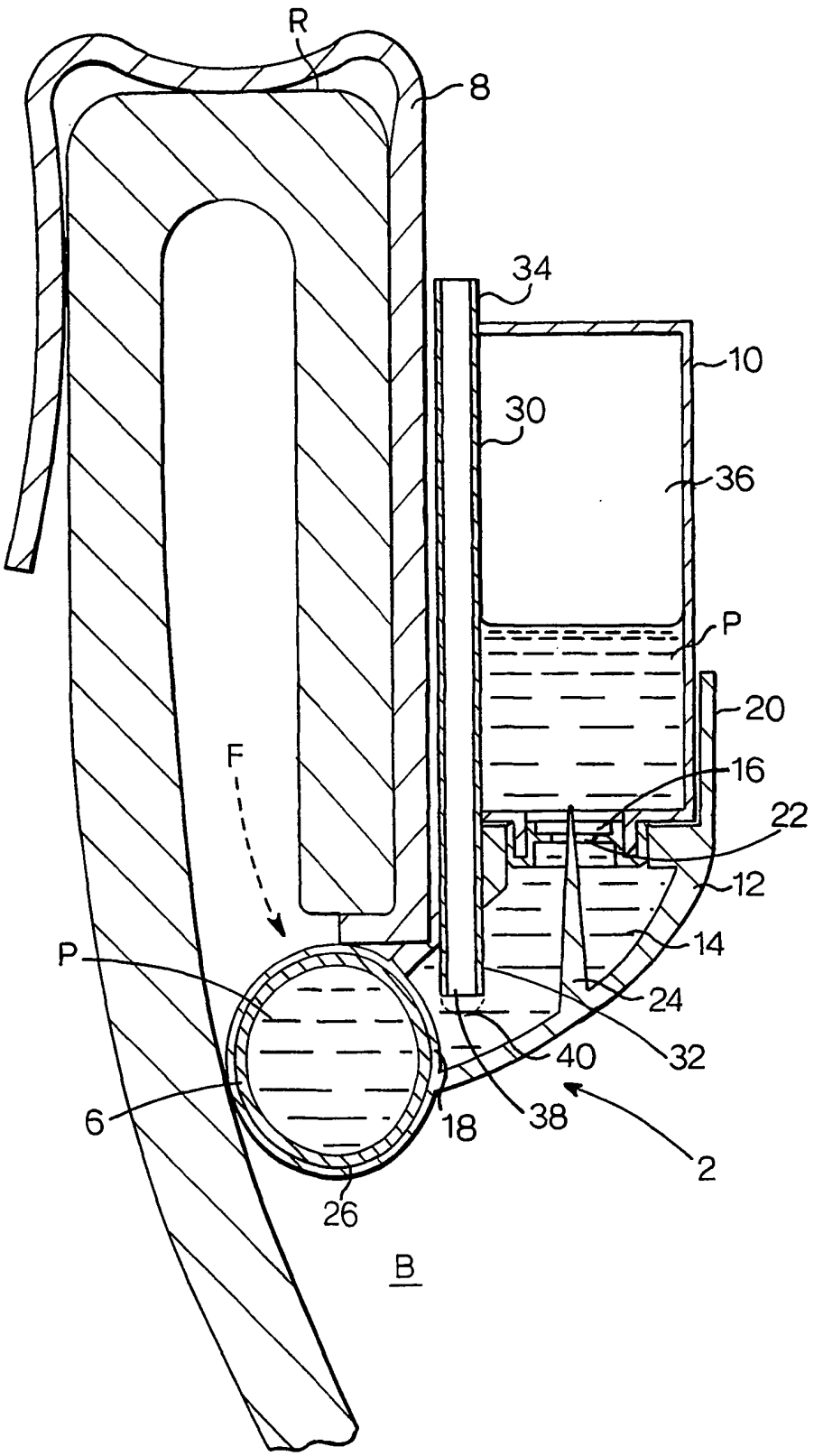

Fig.2

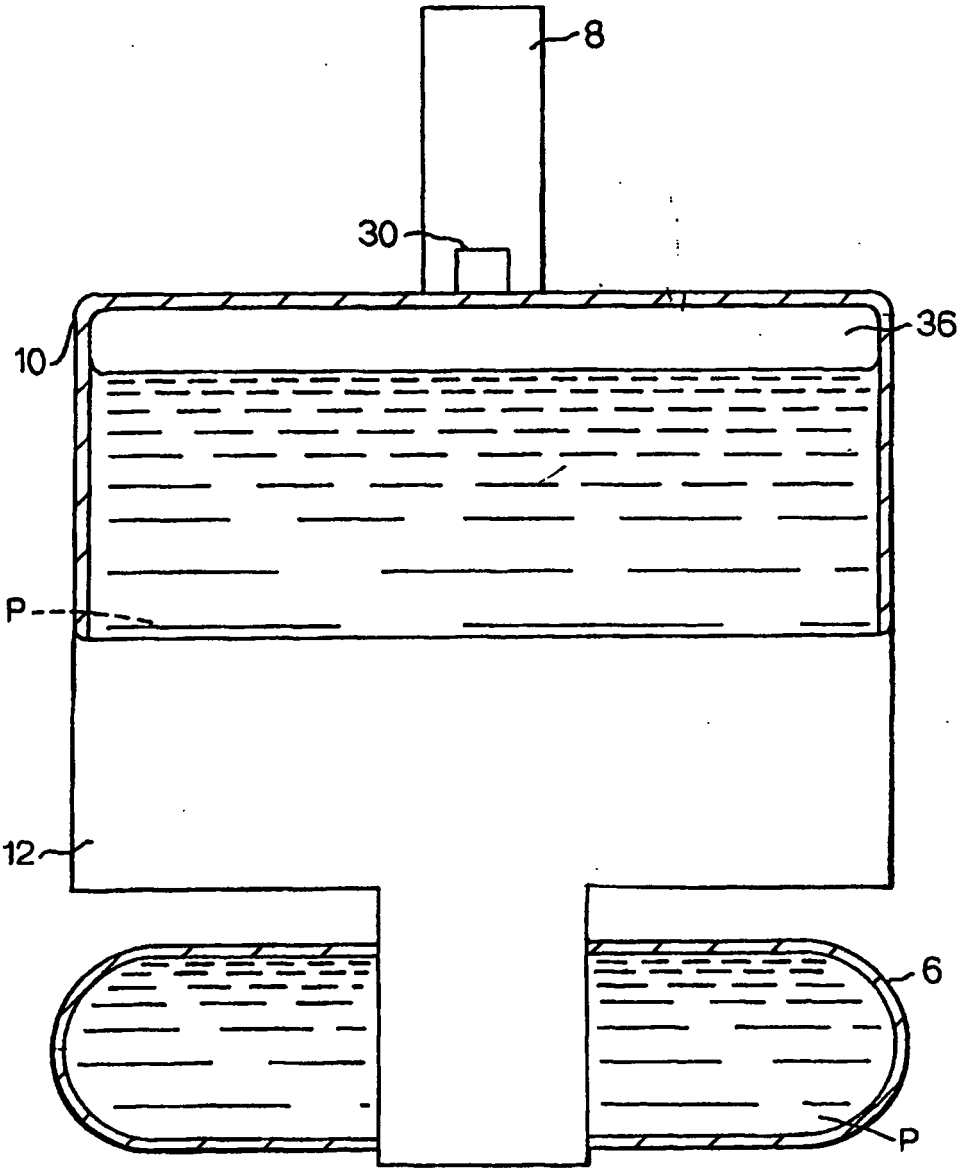

Fig.3

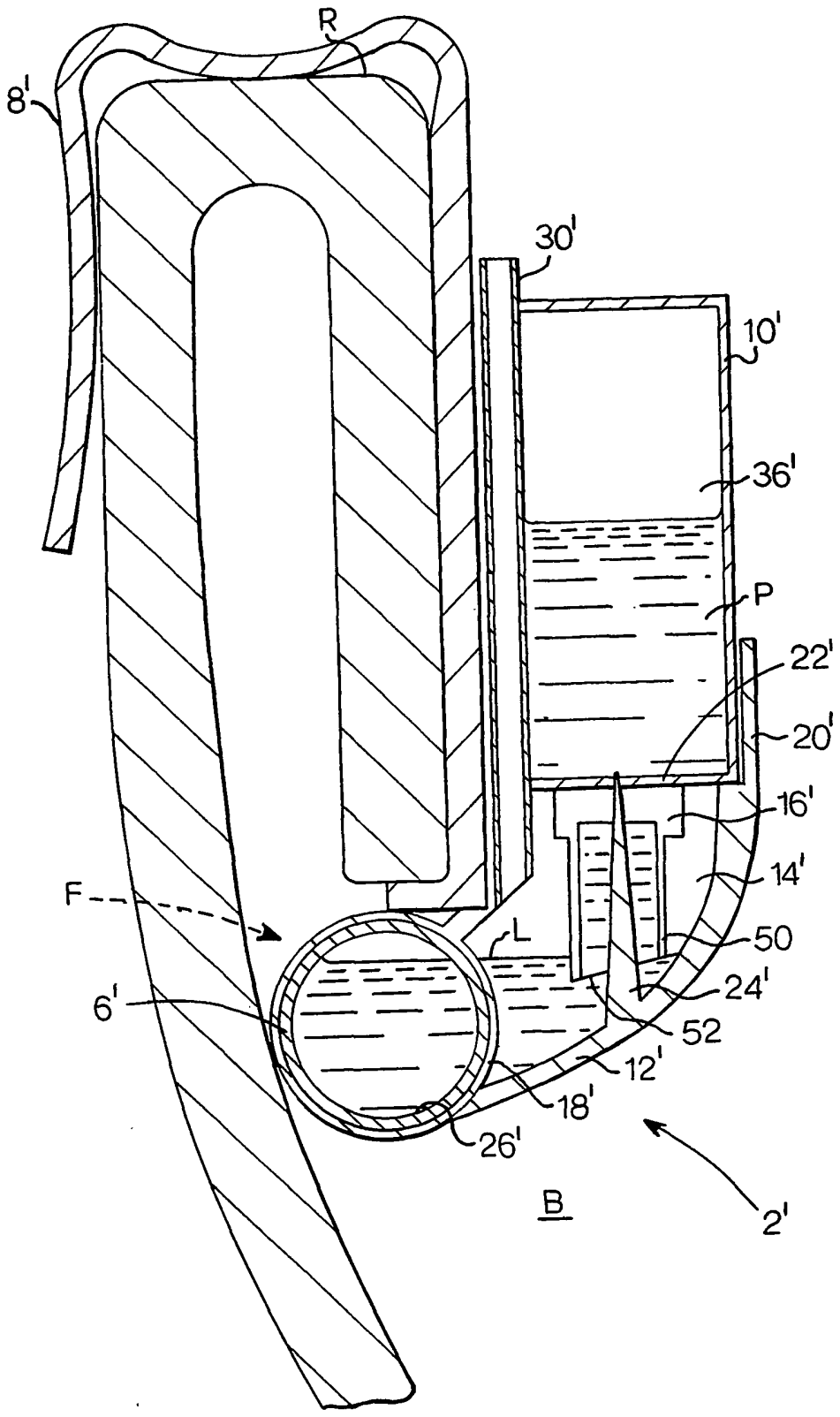

Fig.4

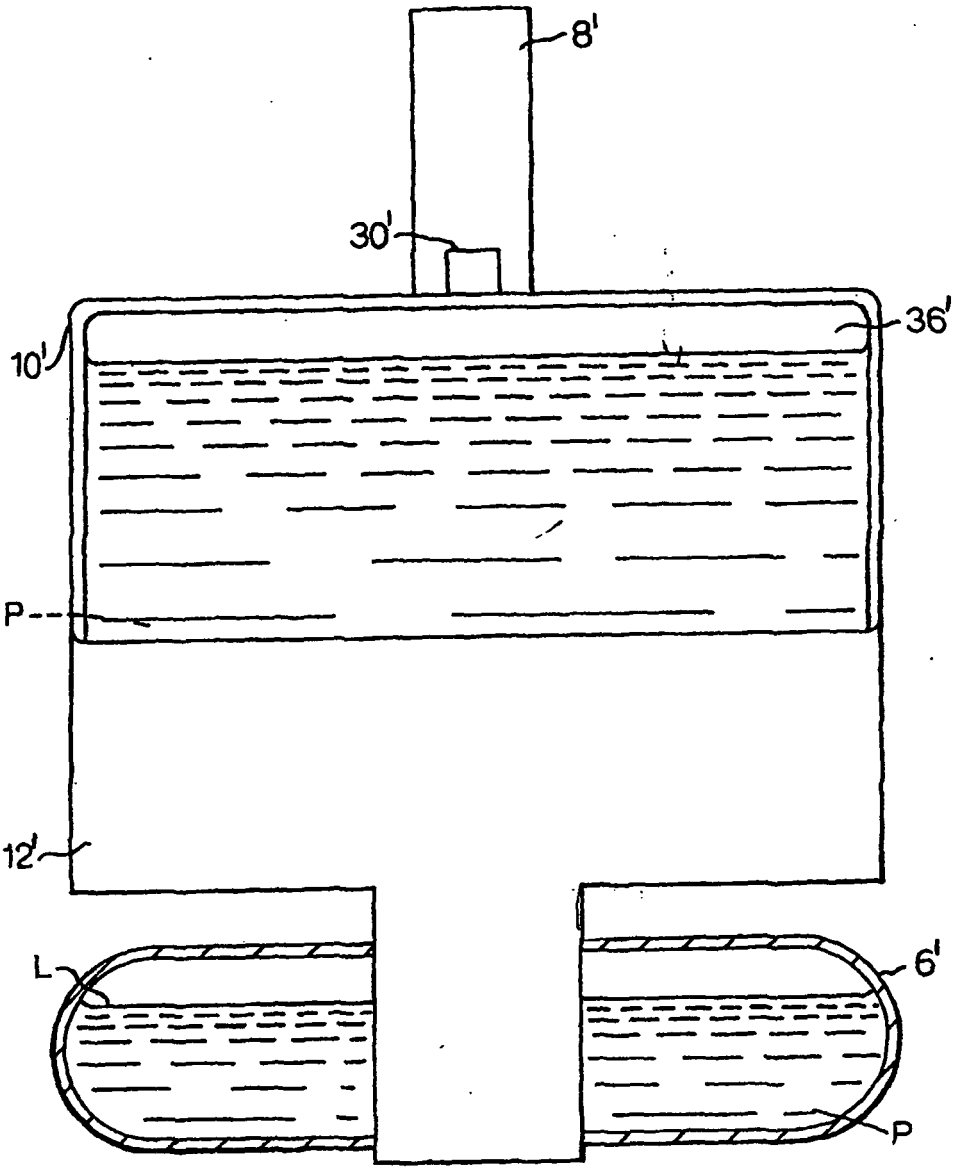

Fig.5

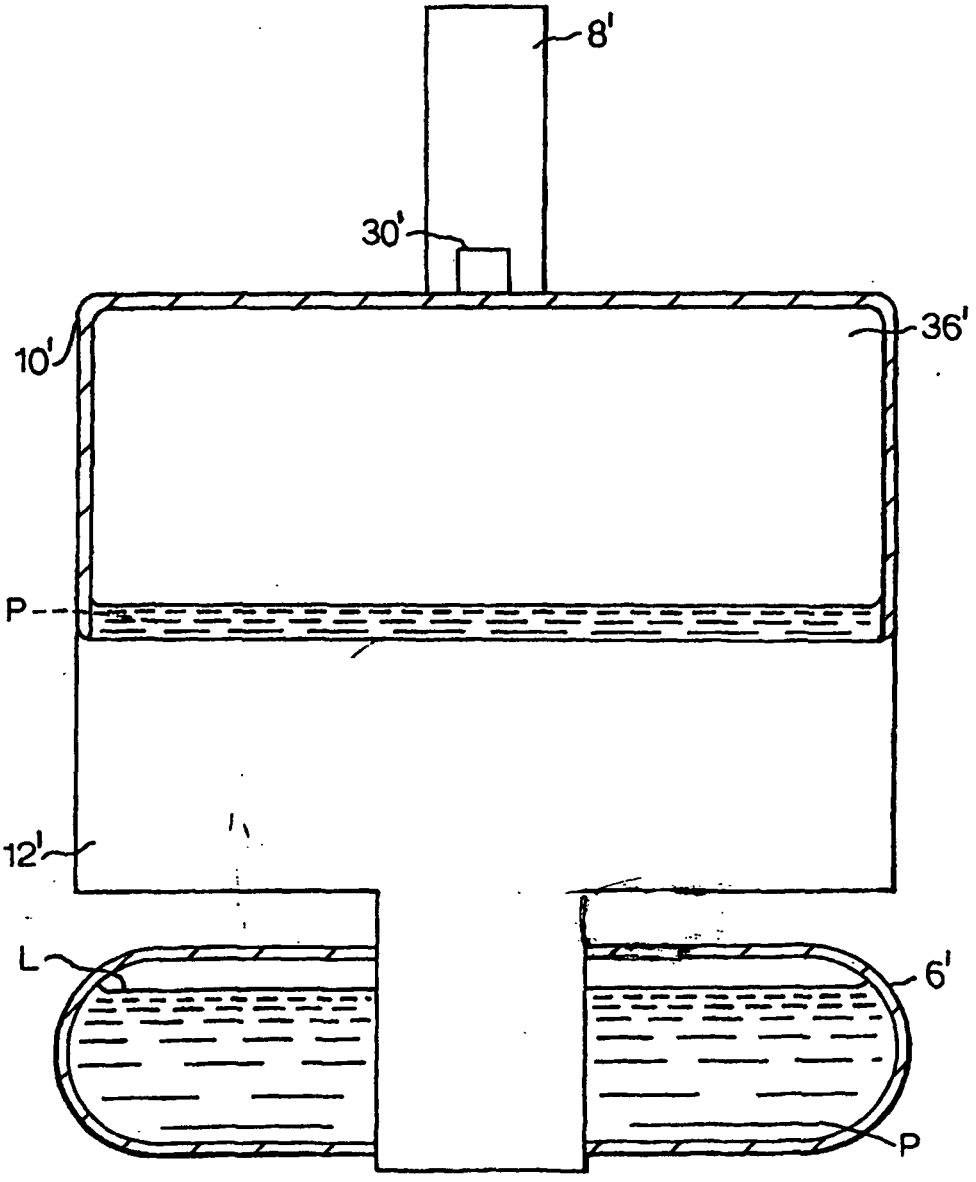

Fig.6