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(54) Title: A LIQUID DELIVERY SYSTEM

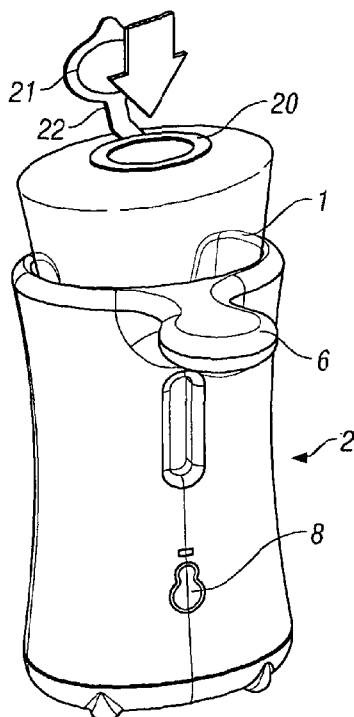


FIG. 3

(57) Abstract: A liquid delivery system comprising a base unit ( 2 ) comprising a liquid inlet in an upwardly facing surface, a liquid duct leading from the inlet to a liquid outlet above the liquid inlet; a pump for pumping the liquid from the inlet to the outlet; a motor to drive the pump; and a shroud extending upwardly in a manner which surrounds the inlet, the system further comprising a vessel ( 1 ) received within the shroud in an inverted configuration with its outlet lowermost and in communication with the fluid inlet, the vessel ( 1 ) having a refill opening ( 20 ) towards the end opposite to the outlet.



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- *with international search report (Art. 21(3))*
- *with information concerning incorporation by reference of missing parts and/or elements (Rule 20.6)*

**A LIQUID DELIVERY SYSTEM**

The present invention is directed to a liquid delivery system.

5

In particular, it is directed to the base unit of the liquid delivery system described in our earlier application GB 0820981.9.

10

The fluid delivery system comprises a base unit into which a liquid container containing the material to be dispensed is fitted in an inverted configuration, namely with its outlet at the lowermost end. The base unit contains a liquid inlet in an upwardly facing surface, a liquid duct leading from the inlet to a liquid outlet above the liquid inlet; a pump for pumping the liquid from the inlet to the outlet; a motor to drive the pump; and a shroud extending upwardly in a manner which surrounds the inlet, the shroud having an upper edge. Such a base unit is referred to subsequently as being "of the kind described".

20

In use, the refill unit is provided with a valve at its lowermost end. As the refill unit is fitted into the base, an upwardly projecting spigot surrounding the fluid inlet opens the valve in the refill unit to allow fluid to flow from the refill unit into the base.

25

The present invention provides an alternative method for refilling the system.

30

According to the present invention, a liquid delivery system comprises a base unit of the kind described and is

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characterised by the system further comprising a vessel received within the shroud in an inverted configuration with its outlet lowermost and in communication with the fluid inlet, the vessel having a refill opening towards the end  
5 opposite to the outlet.

The presence of a refill opening in what will be, in use, the top of the vessel, allows the user to refill the vessel without ever needing to remove it from the base,  
10 rather than having to dispose of the vessel and replace it with a new one.

In GB 0820981.9, the vessel is a bottle with a valve at the outlet, the valve being resiliently biased to close  
15 the outlet and arranged to be opened upon insertion into the base to open the flow path out of the vessel and into the base. Such a valve may also be provided in the present invention. However, as the vessel does not need to be removed in the refilling process, such a valve is  
20 unnecessary. As an alternative, therefore, there may be no valve to control the flow from the outlet. In this case, in order to reduce mess, the vessel may initially be inserted into the base when empty and subsequently filled, or the base may be inverted such that it is placed on top of the  
25 vessel before the assembly of the base and vessel is overturned into its operating configuration.

In its simplest form, the vessel may be a liner with a cup-like configuration to receive the liquid. The liner may  
30 be provided with a removable cap for storage, transportation and refilling purposes. Alternatively, it may have a bottle-like configuration which itself may be selectively

closable by a closure element. This may take the form of, for example, a self-closing valve or a removable cap which may be separate from the bottle, or may be attached in some way, for example, by a sliding mechanism or hinge.

5

An example of a system in accordance with the present invention will now be described with reference to the accompanying drawings, in which:

10 Fig. 1 is a cross-section through a dispenser having a bottle according to GB 0820981.9 which is included for background interest only;

Fig. 2 is a cut-away perspective view of the refill of Fig. 1 being introduced into the dispenser but not yet being  
15 engaged;

Fig. 3 is a front perspective of a first example of a system according to the present invention; and

Fig. 4 is a front perspective of a second example of a system according to the present invention.

20

Before describing the present invention, the operation of the dispenser with the refill of GB 0820981.9 will be described for background interest.

25 The dispenser is a hands-free dispenser which is generally suitable for domestic use. The dispenser is primarily intended to dispense liquid soap, but may also be used to dispense other liquid or semi-liquid products (ideally with a viscosity greater than water), such as hand  
30 cream, body lotion, moisturiser, face cream, shampoo, shower gel, foaming hand wash, shaving cream, washing up liquid,

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toothpaste, acne treatment cream, a surface cleaner or a sanitising agent such as alcohol gel.

The dispenser comprises two main parts, namely a vessel  
5 1 and a base unit 2. The vessel 1 provides a reservoir of liquid to be dispensed and is fitted to the base unit 2 as set out below.

The base has an interface 3 into which liquid is  
10 dispensed from the refill unit. The interface 3 is in fluid communication with a dispensing tube 4. A pump 5 is selectively operable to pump a metered dose of the liquid along dispensing tube 4 and out of dispensing head 6.

15 The base has an infrared transmitter 7A which transmits an infrared beam through a window 8 to a receiver 7B to sense the presence of a user's hands in the vicinity of the dispenser. Control circuitry reacts to a signal from the proximity sensor to activate the pump. The illustrated  
20 sensor is a break beam sensor, but may also be a reflective sensor. Although an infrared sensor is shown, any known proximity sensor such as a capacitive sensor may be used. The device may be mains powered or battery powered.

25 The interface between the bottle 1 and base unit 2 will now be described in greater detail with reference to Fig. 2.

The base unit 2 comprises a cowling 10 which surrounds a significant portion of the bottle to protect and support  
30 it. A spigot 11 projects at the base of the cowling 10. The spigot has a plurality of castellations 13 in its top

- 5 -

surface. An O-ring seal 14 surrounds the spigot 11 beneath the castellations 13.

When the refill 1 is placed into the base unit 2, the  
5 spigot 11 enters an annular outlet 15 in the base of the  
refill 1 against which the O-ring seal 14 seals. The spigot  
then lifts outlet valve element 16 against the action of  
resilient biasing member 17 to open a flow path into the  
base. Two pressure relief valves 18 allow air to enter the  
10 bottle as liquid is dispensed.

The refill according to the present invention is shown  
in Fig. 3. This refill has the same overall shape as the  
previously described refill, although it may have a  
15 different shape. The refill may have the valve element 16  
and/or one or more pressure relief valves 18. However,  
these are not necessary for its operation.

The refill 1 that has a refill opening 20 in the top  
20 which is selectively closable by a cap 21 attached to the  
top of the bottle by a flexible hinge 22.

The refill 1 may be supplied full of liquid or empty.  
If it is full of liquid, it will require a removable cover.  
25 This will be removed and the base 2 should ideally be  
inverted and placed on top of the housing before the whole  
assembly is turned over into the configuration shown in Fig.  
3, whereupon the device can operate as normal.  
Alternatively, the refill 1 may be empty in which case it  
30 can simply be placed into the base 2 in the orientation  
shown in Fig. 3. If the bottle is empty, or when a full  
bottle requires refilling, a user simply opens the cap 21

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and pours fresh liquid into the refill 1 and continues to use the device in the normal way.

Alternatively, as shown in Fig. 4, the entire top section of the refill 1' may be removed so that the refill has a cup-like configuration rather than the bottle-like configuration shown in Fig. 3. This cup-like refill may be closable with a cap (larger than the cap 21) which fits over the top of the refill.



**CLAIMS:-**

1. A liquid delivery system comprising a base unit comprising a liquid inlet in an upwardly facing surface, a  
5 liquid duct leading from the inlet to a liquid outlet above the liquid inlet; a pump for pumping the liquid from the inlet to the outlet; a motor to drive the pump; and a shroud extending upwardly in a manner which surrounds the inlet, characterised by the system further comprising a vessel  
10 received within the shroud in an inverted configuration with its outlet lowermost and in communication with the fluid inlet, the vessel having a refill opening towards the end opposite to the outlet.
- 15 2. A system according to claim 1, wherein there is no valve at the outlet from the vessel.
3. A system according to claim 1 or claim 2, wherein the  
20 refill is selectively closable by a closure element.
4. A system according to any one of the preceding claims, wherein the base unit further comprises a sensor to sense the presence of an object in the vicinity of the outlet to trigger a dispensing operation.
- 25 5. A system according to any one of the preceding claims, wherein the base unit is a free standing unit.
6. A system according to any one of the preceding claims,  
30 wherein the base unit contains batteries to power the motor.

7. A system according to any one of the preceding claims, wherein the vessel has a bottle-like configuration.

8. A system according to any one of claims 1 to 6, wherein  
5 the vessel has a cup-like configuration.

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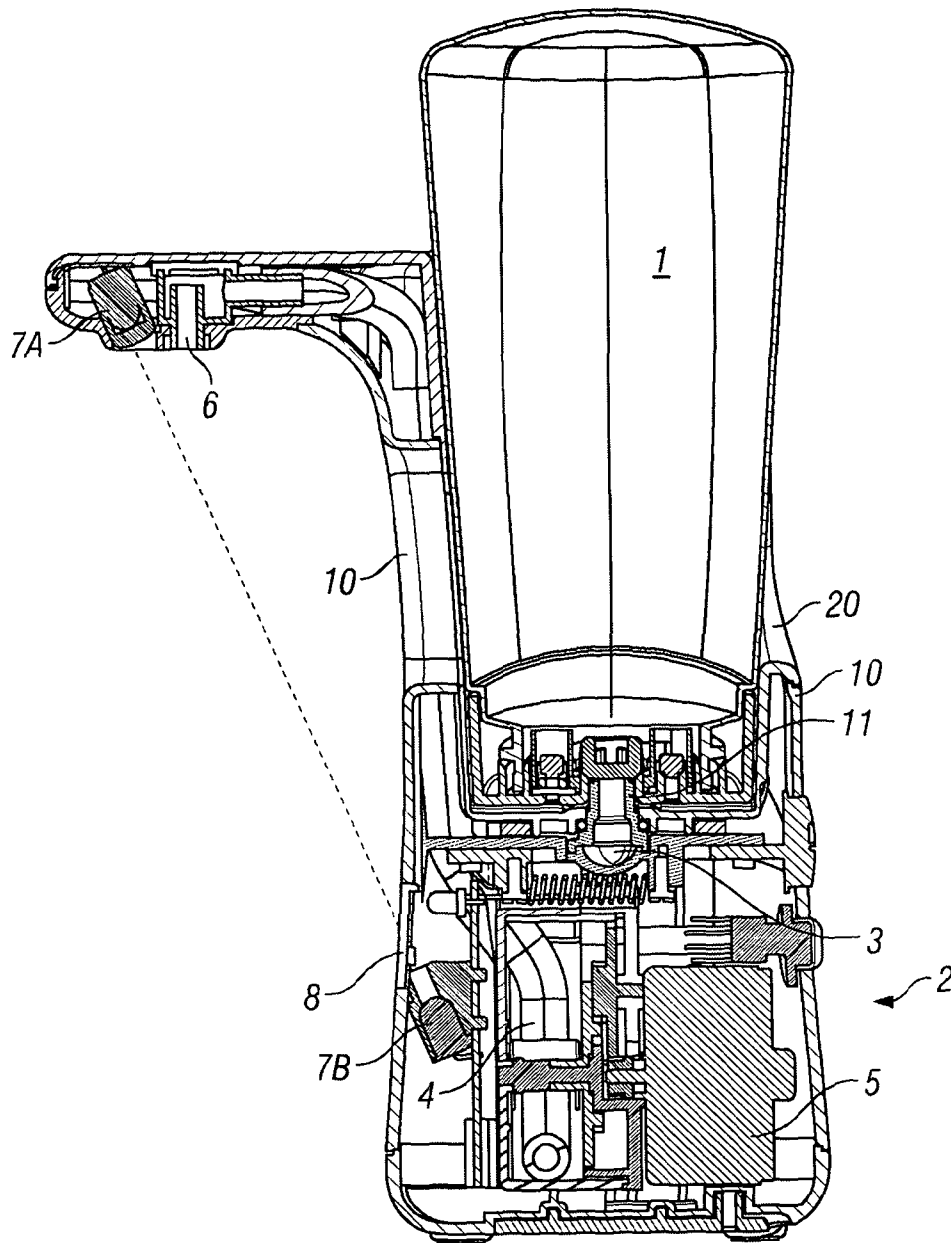


FIG. 1

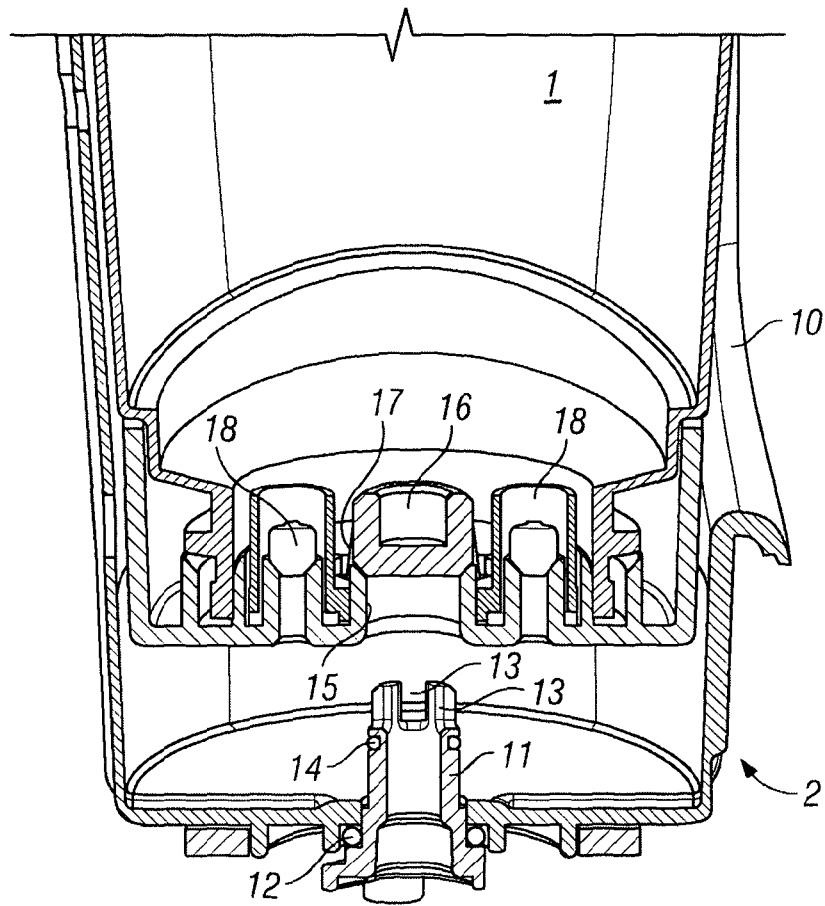


FIG. 2

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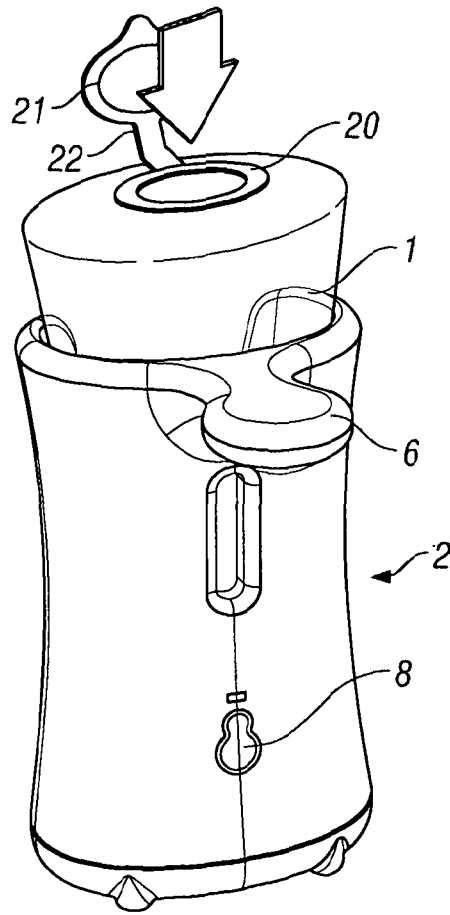


FIG. 3

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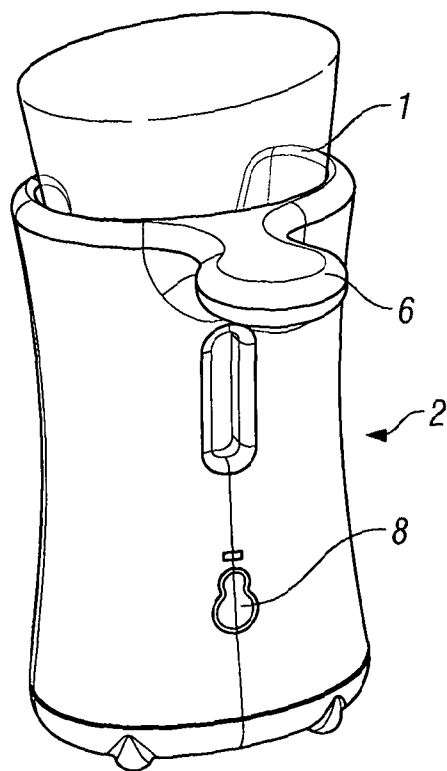


FIG. 4

INTERNATIONAL SEARCH REPORT

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<p>A. CLASSIFICATION OF SUBJECT MATTER INV. A47K5/12 ADD.</p>		
<p>According to International Patent Classification (IPC) or to both national classification and IPC</p>		
<p>B. FIELDS SEARCHED</p>		
<p>Minimum documentation searched (classification system followed by classification symbols) A47K</p>		
<p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p>		
<p>Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal</p>		
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/185396 A1 (YANG FRANK [US] ET AL) 7 August 2008 (2008-08-07) page 3, paragraph 33 - paragraph 43 page 4, paragraphs 48,56 page 5, paragraphs 62, 64, 65, 66; figures 1-3	1-8
X	----- WO 2006/134314 A1 (MINDSIN SYNC LTD [GB]; SCORGIE IAIN [GB]) 21 December 2006 (2006-12-21)	1-6,8
Y	page 5, paragraph 2 - paragraph 3 page 9, paragraph 3 - page 11, paragraph 1; figures 1-3,5	7
X	----- US 2004/226962 A1 (MAZURSKY RICHARD [US] ET AL) 18 November 2004 (2004-11-18)	1-6,8
Y	page 1, paragraph 22 - paragraph 29 page 3, paragraph 35; figures 1-5, 8, 9	7
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<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.      <input checked="" type="checkbox"/> See patent family annex.</p>		
<p>* Special categories of cited documents :</p>		
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>		<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>
<p>Date of the actual completion of the international search 30 June 2011</p>		<p>Date of mailing of the international search report 14/07/2011</p>
<p>Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016</p>		<p>Authorized officer Fajarnés Jessen, A</p>

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	column 2, line 57 - column 3, line 11; figures 1,5	1-3
A	----- US 6 814 261 B1 (GEBRAYEL NEHME [US]) 9 November 2004 (2004-11-09) abstract; figures -----	1-3,5,8



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Information on patent family members

International application No PCT/GB2011/050784
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