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(54) Fluid product dispenser

(57) A dispenser for dispensing a fluid product, comprising:
a housing for removably accommodating an assembly, the assembly comprising:
- a collapsible reservoir, for containing a liquid product, and;
- a pump, connected to the reservoir, for dispensing a fluid product using the liquid product as an input, whereby:
- when the assembly is accommodated in the housing, the pump is located at the underside of the reservoir, and;
- the liquid product is withdrawn by the pump from the reservoir without a substantial gas flow back into the reservoir,

the dispenser further comprising actuating means for actuating the pump so as to dispense fluid from the pump to the exterior of the assembly,

wherein:
- the reservoir has a relatively flat form when empty and a relatively bulged form when at least partially filled, whereby bulging of the reservoir along a first direction occurs as a result of corresponding contraction of the reservoir along a complimentary second direction;
- the housing comprises tensioning means for applying an external force to the reservoir which is tensile along the second direction.

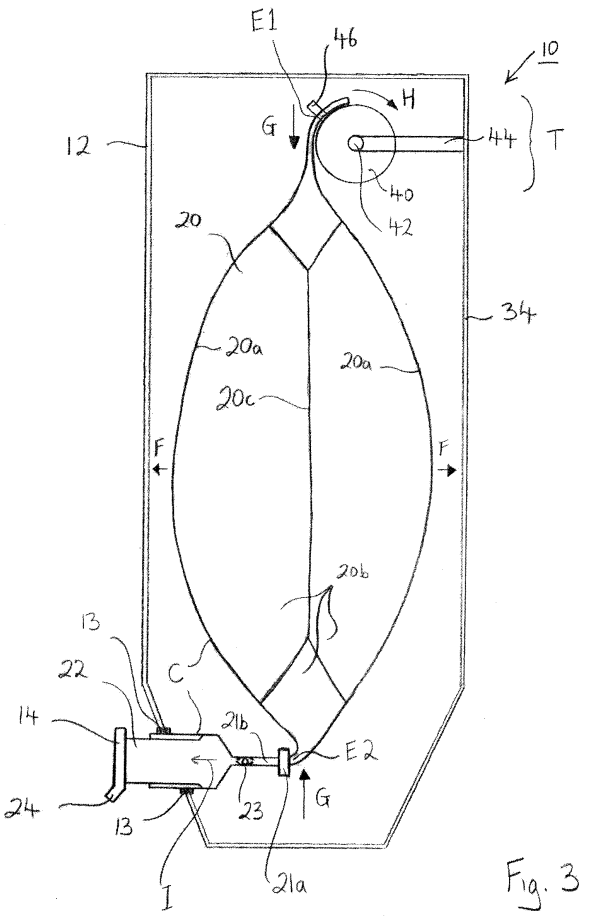

Fig. 3

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Description

[0001] The invention relates to a dispenser for dispensing a fluid product, comprising:

a housing for removably accommodating an assembly, the assembly comprising:

- a collapsible reservoir, for containing a liquid product, and;
- a pump, connected to the reservoir, for dispensing a fluid product using the liquid product as an input, whereby:

- when the assembly is accommodated in the housing, the pump is located at the underside of the reservoir, and;
- the liquid product is withdrawn by the pump from the reservoir without a substantial gas flow back into the reservoir,

the dispenser further comprising actuating means for actuating the pump so as to dispense fluid from the pump to the exterior of the assembly.

[0002] For purposes of clarity and consistency, the following terms as used throughout this text and the appended claims should be interpreted as follows:

- The term "fluid" should be interpreted as encompassing a liquid, a suspension of a granulate solid in a liquid, a gel, and a foam, for example.
- The term "product" should be interpreted as encompassing soap (including shower gel), detergent, and exfoliating scrub, for example, as well as mixtures of these substances.
- The "liquid product" may be dispensed directly through the pump, or may first be mixed with another substance, such as air or another gas, another liquid, or a granulate solid, for example.
- The term "pump" refers to any type of pump suitable under the circumstances. The pump in question may employ a piston, bellows, and/or membrane, for example.

[0003] Fluid product dispensers of the type described in the opening paragraph are well known, and are described *inter alia* in US 5,445,288 (Deb), for example. Such dispensers are, for example, employed in washrooms, toilets, kitchens, hospitals, surgeries, hair/beauty salons, workshops and factories. In many cases, such dispensers are mounted to a wall, often in the vicinity of a basin, bath, shower or toilet bowl; alternatively, such dispensers may be freestanding, and may be placed on a shelf, worktop or wash hand basin, or a trolley. In use, the actuating means are typically operated by hand, arm or elbow so as to dispense a quantity of fluid product. In many applications, this fluid product will be dispensed into the operator's hand, or onto a carrier such as a cloth, after which the fluid product is rubbed onto the skin, or is applied from said carrier onto a surface to be treated, such as a metal or ceramic surface to be cleaned, for example.

[0004] Because the reservoir in such a dispenser is collapsible, and because the pump withdraws liquid product from the reservoir without an air return (or substantial flow of other gas) back into the reservoir, the reservoir will steadily contract in upon itself as more and more of the liquid product is withdrawn by the pump. Such contraction tends to push liquid product out of the reservoir, helping to ensure that the reservoir is substantially emptied before it has to be replenished. However, despite this effect, a certain amount of liquid product nevertheless tends to get trapped in the reservoir, particularly along folds, seams and/or gussets that may be present in the reservoir, or in internal corners; such product is essentially wasted, since it is discarded with the old reservoir once a new reservoir is loaded into the housing. The quantity of liquid product wasted in this manner depends *inter alia* on the viscosity of the liquid product.

[0005] This wastage problem can become particularly significant in the case of relatively viscous liquid products such as thick soap or detergent solutions, especially those containing a suspended granulate solid; liquid products containing such a granulate solid often contain chemicals that deliberately increase their viscosity, so as to prevent the particles of the granulate solid from settling or floating out of homogeneous suspension. Many such liquid products can have viscosities of the order of 10^4 - 10^5 times as high as that of a watery soap solution typically used in conjunction with a foam or spray pump, for example. In tests, it has been observed that, even when the employed reservoir is a thin-walled plastic foil bag (see, for example, US 5,732,853 (Bentfield)), as much as 6-8 % of the initial load of liquid product can get trapped in the reservoir when high-viscosity liquid products are used; this percentage is significantly higher when the employed reservoir is a relatively stiff-walled collapsible container, as in the abovementioned US 5,445,288 (Deb), for example. This is a substantial disadvantage, *inter alia* for the following reasons:

(i) The liquid products concerned often contain relatively expensive chemicals, e.g. to keep them aseptic, prevent clotting, maintain the correct buoyancy level for suspended granulates, effectively dissolve various types of dirt, etc. As a result of the use of these chemicals, the products can typically cost of the order of € 20 per liter. Wasted liquid product can therefore translate to relatively significant sums of wasted money.

(ii) The presence of substantial quantities of trapped liquid product in a depleted reservoir will generally mean that that reservoir will have to be treated as chemical refuse rather than as simple plastic residue. This obviously puts a greater potential strain on

the environment. As a result, more elaborate disposal procedures will be necessary in this situation, with an attendant increase in costs.

[0006] It should be noted that many jurisdictions are currently considering stringent legislation to force manufacturers to package their wares in an environmentally responsible manner. However, as a possible alternative to such legislation, some governments are willing to first evaluate the results that can be achieved by self-imposed waste-reduction covenants in various branches of industry. Manufacturers would generally prefer to have to work with such self-imposed covenants than with more explicit legislation, and are thus eagerly seeking measures to reduce waste.

[0007] It is an object of the invention to address these issues. More specifically, it is an object of the invention to provide a dispenser that helps to reduce waste of liquid product. In particular, it is an object of the invention to reduce the amount of liquid product that tends to get trapped in collapsible reservoirs as set forth above.

[0008] These and other objects are achieved in a dispenser as specified in the opening paragraph, characterized in that:

- the reservoir has a relatively flat form when empty and a relatively bulged form when at least partially filled, whereby bulging of the reservoir along a first direction occurs as a result of corresponding contraction of the reservoir along a complimentary second direction;
- the housing comprises tensioning means for applying an external force to the reservoir which is tensile along the second direction.

[0009] Tensioning the reservoir in the manner according to the invention basically amounts to a constant attempt to negate the bulging of the reservoir. Since such bulging is caused by the act of (partially) filling an empty reservoir that is relatively flat to start off with, a constant attempt to negate this bulging thus amounts to a constant attempt to revert the reservoir to flatness and emptiness. In other words, the tensioning means in the housing according to the invention actively squeeze liquid product out of the reservoir, rather than just passively relying on gravity to cause as much liquid product as possible to migrate toward the pump. By applying a tensile force along the second direction, the bulging of the reservoir is pulled inward in a substantially homogeneous manner, thus decreasing the risk that excessive crumpling of the reservoir will occur, and therefore reducing the attendant risk of liquid product getting trapped in the internal folds, corners, etc, arising from such crumpling.

[0010] In a particular embodiment of the dispenser according to the invention, the tensioning means comprise suspending means for suspending the reservoir by a first extremity so that it hangs under the force of gravity, the pump being attached to a second extremity of the reservoir located opposite the first extremity. Because the reservoir is hung up in the housing - rather than, for example, sitting on a retaining shelf - the weight of the reservoir and its contents apply a tensioning force to the reservoir along the vertical direction (second direction), thus serving to counteract the (net) outward bulging of the reservoir in the horizontal direction (first direction).

[0011] In a particular embodiment of dispenser according to the invention, the suspending means comprise a drum that can be rotated about a substantially horizontal axis. The drum is rotationally/torsionally biased (e.g. using a spiral spring, elastic belt, etc.) in a first rotational sense, and the top of the reservoir is hung on the drum in such a manner that the weight of the reservoir (+ liquid product within) exerts a moment on the drum in a second rotational sense opposite to the first rotational sense. It has already been set forth above that, as the empty reservoir is filled, it starts to bulge outward along a first direction, which causes an attendant contraction of its length along a complimentary second direction; conversely, as the reservoir is emptied, the tensile force applied by the tensioning means according to the invention causes the reservoir to expand along the second direction in response to an attendant decrease of the bulge along the first direction. In a situation as set forth in the preceding paragraph, in which the top (first extremity) of the reservoir were simply hung from a fixed point, this lengthening would tend to cause the lowest point (second extremity) of the reservoir to move steadily downward as the reservoir was emptied; however, since the pump is attached to this lowest point, and since it is generally desired to keep the pump and its connection to the reservoir at a fixed level/posture, such steady downward motion may be undesirable. The biased drum set forth at the start of this paragraph addresses this issue in that, as the reservoir empties, its weight decreases, as a result of which:

- the moment exerted by the reservoir in the second rotational sense reduces, so that;
- the drum can relax in the first rotational sense, as a consequence of which;
- the upper portion of the reservoir is "rolled onto" the drum, thus taking up the slack caused by the expansion of the reservoir along the second direction, and thus;
- the lower portion of the reservoir can remain at a steady level in the dispenser.

[0012] In tests of such a dispenser according to the invention, the inventor used a thick soap solution comprising a suspended granulate solid; commercially available examples of such a solution/suspension include Deb Swarfega™, Stockhausen STOKO Solopol™ and CWS Abrasiva™. The viscosity of this (tixotropic) solution/suspension was measured to be of the order of 10^5 centipoise in static measurements, and of the order of 4×10^3 centipoise in dynamic measurements. The em-

ployed reservoir was a plastic foil bag having two major opposing flat surfaces, which were sealed together at the head and foot and were joined at the sides by foil sheet parts with a central longitudinal folding seam; in this manner, the reservoir could collapse flat in a concertina-like fashion. This reservoir was suspended from a drum arrangement as set forth in the preceding paragraph. It was observed in this instance that as little as 0.9-2% of the initial load of viscous liquid product got trapped in the reservoir, which represents an improvement of a factor of at least three (and, in many cases, a factor of eight or more) compared to the results obtained using a non-inventive dispenser (see above).

[0013] In another embodiment of a dispenser according to the invention:

- the pump comprises a liquid inlet valve for admitting liquid product into the pump from the reservoir, the influx of liquid product through the valve occurring along a flow axis;
- the housing comprises clamping means for clamping the pump in a given posture, whereby the pump is thus postured by the clamping means that the flow axis is substantially horizontal.

[0014] In general, in order to empty the reservoir to as great an extent as possible, the efficiency of the pump must be kept as high as possible. This means that, when the pump is actuated so as to dispense fluid, the liquid inlet valve must be tightly shut, so as to minimize migration of liquid product from the pump back into the reservoir. In the case of a liquid product containing a suspended granulate solid, a build-up of granulates within the liquid inlet valve (e.g. between a ball bearing / flap member / top hat member and a corresponding valve seat, or in the throat of a duckbill valve) can prevent the valve from shutting properly, and this can result in the creation of a substantial dead volume upstream of the valve. However, by ensuring that the flow axis into the valve is substantially horizontal, the inventor has been able to minimize such an accumulation of granulates in the valve. It is believed that the reason for this is as follows. If a buoyancy imbalance arises and granulates start to precipitate out of suspension, they will either sink downward (parallel to the direction of gravity) or float upward (anti-parallel to the direction of gravity). In the event of a vertical flow axis through the valve, a sinking effect would tend to cause a forward accumulation of granulates at the entrance side of the valve, whereas a floating effect would tend to cause a similar backward accumulation at the exit side of the valve - either of which would eventually lead to incorrect operation (jamming) of the valve. However, by arranging the flow axis to be horizontal (or, at least, substantially horizontal), the component of gravity along the flow axis is zero (or, at least, substantially zero), thus avoiding the accumulation effects described above.

[0015] As indicated in the opening paragraph, when the assembly of reservoir + pump is accommodated in the housing, the pump is located at the underside of the reservoir. For example, a throat may be provided at (or proximal to) the lowest point of the reservoir, and this throat may be connected to the liquid inlet valve of the pump (see previous paragraph) using a duct; see, for example, the abovementioned US 5,732,853 (Bentfield). The inventor has observed that, in the case of viscous liquid products as alluded to above, the distance H between the liquid inlet valve of the pump and the point at which the pump is attached to the reservoir is preferably kept as short as possible; for example, in the previous sentence, said duct is ideally kept as short as possible (without sacrificing practicality). In this manner, pressure loss in the head H is kept to a minimum, so that the ability of the pump to suck liquid product out of the reservoir is optimized. This helps achieve a further reduction in the amount of liquid product trapped in the reservoir.

[0016] In a particular embodiment of a dispenser according to the invention, the actuating means comprise at least one of:

(i) an actuating organ movably connected to the housing and serving to cooperate with said pump, whereby the pump can be actuated by manually moving the actuating organ;
(ii) - a detector, for detecting that a member onto which fluid is to be dispensed has been offered to a dispensing head of the pump, and;

- an electric actuator, for actuating the pump on the basis of a signal output from the detector.

[0017] The invention will now be elucidated in more detail on the basis of exemplary embodiments and the accompanying schematic drawings, in which:

Figure 1 renders a perspective view of a dispenser according to the prior art;
Figure 2 renders a longitudinal cross-sectional view of the subject of Figure 1, taken along the line A-A';
Figure 3 renders a longitudinal cross-sectional view of a dispenser according to an embodiment of the current invention;

[0018] In the Figures, corresponding elements are denoted by corresponding reference symbols.

Example (prior art)

[0019] Figure 1 renders a schematic perspective view of part of a dispenser 10 for dispensing a fluid product, in accordance with the prior art.

[0020] Figure 1 shows a housing 12, which can be mounted to a wall of a washroom, for example. The housing 12 accommodates an assembly C that comprises a collapsible reservoir 20, for containing a liquid product, and an attached pump 22; these items are only visible in Figure 2, and will be discussed later in more detail. Ac-

tuating means 14 are movably connected to the housing 12, and can be actuated so as to operate said pump 22. Also shown are an inspection window 16, which allows the amount of liquid product in the reservoir 20 to be seen from outside. An aperture 18 allows insertion of a tool with the aid of which the housing 12 can be unlocked and opened, allowing access to the assembly C (reservoir 20 + pump 22) located within. The housing 12 is made from any suitable rigid material, such as metal or a plastic, for example.

[0021] Figure 2 renders a cross-sectional view of the subject of Figure 1, taken along the line A-A'. The reservoir 20 is now visible, and is here embodied as a flexible plastic container. The liquid product contained in the reservoir 20 may, for example, comprise soap, shower/bath gel, detergent, exfoliating scrub, or mixtures of (certain of) these products.

[0022] A pump 22 is attached to the underside of the reservoir 20, so as to be able to draw liquid product from within the reservoir 20; since the pump 20 does not replace such withdrawn liquid product by air (or another gas), the reservoir 22 collapses inward as more and more liquid product is withdrawn therefrom. The pump 22 may be any suitable type of pump for the application in question, such as a liquid pump, spray pump or foam pump, for example, and may operate on the basis of a movable piston, bellows and/or membrane, for example. In operation, the pump 22 may directly dispense the liquid contained within the reservoir 20, or may first mix it with air to form a spray or foam, for example. In all cases, the pump 22 dispenses a fluid product from the nozzle 24. More information with regard to pumps suitable for use in this type of application can, for example, be gleaned from US 5,271,530 (Daiwa Can Company) and US 2004/0149777 (Taplast) - which are incorporated herein by reference - and from the website *www.airspray.nl.*

[0023] As can be seen in Figure 2, the actuating means 14 in this instance are hinged to the housing 12 via a hinge joint 26. This, together with the gap 28 below the actuating means 14, ensures that the actuating means 14 can be swung in and out of the housing 12. An arm 30 connects the actuating means 14 to the pump 22 in such a manner that, when the actuating means 14 are swung into the housing 12 about hinge point 26, arm 30 operates pump 22 so as to dispense a dose of fluid product through the nozzle 24. Biasing means, such as spring 32, ensure that the actuating means 14 are urged back into their swung-out position when released. In many applications, a user depresses the actuating means 14 using his hand palm, lower arm or elbow, for example, and collects the fluid product dispensed from the nozzle 24 in his hand or on a carrier (such as a cloth or tissue); in such applications, the nozzle 24 will generally face substantially downward.

[0024] The pump 22 is removably mounted to a bracket 36 that protrudes from the back wall 34 of the housing 12. This back wall 34 can be provided with screw-holes, magnets, or other means for mounting it to a wall or other surface. Also protruding from the back wall 34 is a lug 38B, which grips a cooperating lug 38A; however, using a tool inserted through aperture 18, these two lugs 38A, 38B can be disengaged, allowing the housing 12 to be opened, e.g. so as to replace the reservoir 20 and/or pump 22 located inside (this may involve replacing either the entire assembly C as a whole, or replacing the reservoir 20 or pump 22 as parts).

[0025] As is evident from Figure 2, the bracket 36 not only supports the pump 22, but also indirectly supports the reservoir 20 from beneath. The reservoir 20 is therefore free to sag downward and bulge sideways. Such free sagging/bulging is conducive to the formation of folds and corners in which liquid product can be trapped as the reservoir 20 collapses in upon itself.

Embodiment 1

[0026] Figure 3 renders a longitudinal cross-sectional view of a dispenser 10 according to an embodiment of the current invention. As in the Example above, the dispenser 10 comprises a housing 12 for removably accommodating an assembly C comprising a collapsible reservoir 20 and a pump 22 that is connected to the reservoir 20. However, unlike the Example above, the current dispenser 10 comprises tensioning means T, whose operation will now be explained.

[0027] The reservoir 20 in the current case is a plastic foil bag comprising two major opposing surfaces 20a that are sealed together at a first extremity (head) E1 and a second extremity (foot) E2, and are joined at the sides by an arrangement of foil sheet parts 20b with a central longitudinal folding seam 20c. Due to this construction, the reservoir 20 can collapse (substantially) flat in a concertina-like manner, whereby the parts 20a and 20b fold toward one another, hinging inward about the folding seam 20c. Consequently, the reservoir 20 has a relatively flat form when empty and a relatively bulged form when at least partially filled, whereby bulging of the reservoir along a first direction (the outward arrows F) occurs as a result of corresponding contraction of the reservoir along a complimentary second direction (the inward arrows G). In a particular example, the plastic foil of the parts 20a and 20b may, for example, comprise polyethene (PE), polyamide (PA), polyethene terephthalate (PET), polypropene (PP), ethene-vinyl alcohol polymer (EVOH), or combinations (e.g. sandwiches/laminates) of these materials.

[0028] According to the invention, the housing 12 comprises tensioning means T for applying an external force to the reservoir 20, which force is tensile along the second direction G. By tensing/stretching the reservoir 20 along the direction G (which amounts to pulling extremities E1 and E2 away from one another, i.e. opposite to the indicated arrows G), the outward bulging of the reservoir in the direction of the arrows F is counteracted. As here depicted, the tensioning means T comprise suspending means 46 for suspending the reservoir 20 so that it hangs/

dangles in the housing 12 under the force of gravity; this contrasts with the situation in Figure 2, in which the reservoir 20 is supported from beneath. Such hanging suspension of the reservoir 20 under its own weight applies a basic tensile force to the reservoir along the second direction G.

[0029] As here depicted, the suspending means 46 take the form of a lug in the housing 12, which lug cooperates with (for example) a hook or a hole provided through the sealed extremities of the faces 20a of the bag 20. However, as an alternative to such an arrangement, the skilled artisan could also easily conceive other suspending means 46 for suspending the reservoir 20, e.g. using clamping jaws, Velcro, adhesive tape, etc. In general, suspending the reservoir 20 along a line (or a distribution of points) has been observed to give more satisfactory results than suspending the reservoir 20 at a single point (or relatively confined area).

[0030] In a refinement of the tensioning means T, the suspending means 46 are provided on the cylindrical surface of a drum 40 that can be rotated about a substantially horizontal axis; in the drawing, the drum 40 is fitted on a substantially horizontal axle 42 provided at one end of an arm 44 that extends outward from the back wall 34 of the housing 12. This drum 40 is rotationally/torsionally biased about the axle 42 (using biasing means that have not been depicted in the figure, but that may comprise a spiral spring or elastic belt, for example) such that the drum wants to roll in the direction of the arrow H (first rotational sense), which is opposite to the moment (in the second rotational sense) exerted on the drum 42 by the weight of the reservoir 20 (+ liquid product within). This has two effects, namely:

- it results in an additional tensioning/stretching force on the reservoir 20 along the second direction G;
- it causes the upper portion of the reservoir 20 to be rolled onto the drum 40 as the reservoir 20 empties, thus taking up the slack that arises as a result of the relaxation of the reservoir along the second direction G, and, consequently, ensuring that the second/lower extremity E2 of the reservoir 20 remains at a substantially constant horizontal level in the housing 12.

[0031] At the second/lower extremity E2 of the reservoir 20 is a collar 21a providing flow access to the inside of the reservoir 20. The pump 22 is attached to the reservoir 20 at this point (e.g. by clamping) so that an inlet duct 21b of the pump 22 fits into the collar 21a (see, for example, the construction set forth for this purpose in the abovementioned US 5,732,853 (Bentfield)). Within the pump 22 is a non-return liquid inlet valve 23 for admitting liquid product into the pump 22 from the reservoir 20, the influx of liquid product through the valve 23 occurring along a flow axis I. With the aid of clamping means 13 provided as part of the housing 12, the pump 22 is held/postured in such a manner that the flow axis I is substantially horizontal.

[0032] The inventor has observed that, in the case of relatively viscous liquid products (e.g. products with a viscosity in the range 10^3-10^5 centipoise: see above), the distance H between the liquid inlet valve 23 of the pump 22 and the point 21a at which the pump 22 is attached to the reservoir 20 is preferably kept as short as possible; in the current case, this implies that the inlet duct 21b should have a minimum (practicable) length. In this manner, pressure loss in the head H is kept to a minimum, so that the ability of the pump 22 to suck liquid product out of the reservoir 20 is optimized.

[0033] It should be noted that the pump 22 in Figure 3 may also be tilted upward from horizontal. If one decides to use the pump 22 at such an above-horizontal angle, then one should generally ensure that:

- the lower part of the reservoir 20 in the vicinity of the second extremity E2 is not kinked, which might cause an undesirable restriction in the flow of liquid product out of the reservoir 20;
- the head H referred to in the previous paragraph does not have to be made disadvantageously long in order to accommodate the upward tilt of the pump 22.

[0034] As here depicted, the actuating means 14 merely comprise a cap on the pump 22, which cap can be operated by hand. However, more elaborate actuating means can also be employed as an alternative to this simple arrangement, as set forth above.

Embodiment 2

[0035] A further embodiment of a dispenser 10 according to the present invention is identical to that set forth in Embodiment 1 above, except as regards certain details of the tensioning means T. In this further embodiment, instead of rotationally biasing the drum 40, it can instead be used as a rotating pulley or a static sliding guide, and a spring or hanging counterweight (neither of which is depicted) can be used to tension the extremity E1 of the reservoir over this pulley/guide. Alternatively, instead of using a drum 40, the reservoir 20 can be hung from a spring or other resilient member (not depicted), which will pull the reservoir 20 upward as it becomes lighter (due to removal of liquid product therefrom).

Claims

1. A dispenser for dispensing a fluid product, comprising:

a housing for removably accommodating an assembly, the assembly comprising:

- a collapsible reservoir, for containing a liquid product, and;

- a pump, connected to the reservoir, for dispensing a fluid product using the liquid product as an input,

whereby:

- when the assembly is accommodated in the housing, the pump is located at the underside of the reservoir, and;
- the liquid product is withdrawn by the pump from the reservoir without a substantial gas flow back into the reservoir,

the dispenser further comprising actuating means for actuating the pump so as to dispense fluid from the pump to the exterior of the assembly,
characterized in that:

- the reservoir has a relatively flat form when empty and a relatively bulged form when at least partially filled, whereby bulging of the reservoir along a first direction occurs as a result of corresponding contraction of the reservoir along a complimentary second direction;
- the housing comprises tensioning means for applying an external force to the reservoir which is tensile along the second direction.

2. A dispenser according to claim 1, wherein the tensioning means comprise suspending means for suspending the reservoir by a first extremity so that it hangs under the force of gravity, the pump being connectable to a second extremity of the reservoir located opposite the first extremity.

3. A dispenser according to claim 2, wherein the suspending means comprise a drum that can be rotated about a substantially horizontal axis and that is rotationally biased in a first rotational sense, the reservoir being hung on the drum in such a manner that the weight of the reservoir exerts a moment on the drum in a second rotational sense opposite to the first rotational sense.

4. A dispenser according to any of the preceding claims, wherein:

- the pump comprises a liquid inlet valve for admitting liquid product into the pump from the reservoir, the influx of liquid product through the valve occurring along a flow axis;
- the housing comprises clamping means for clamping the pump in a given posture, whereby the pump is thus postured by the clamping means that the flow axis is substantially horizontal.

5. A dispenser according to any of the preceding claims, wherein the actuating means comprise at least one of:

(i) an actuating organ movably connected to the housing and serving to cooperate with said pump, whereby the pump can be actuated by manually moving the actuating organ;
(ii) - a detector, for detecting that a member onto which fluid is to be dispensed has been offered to a dispensing head of the pump, and;

- an electric actuator, for actuating the pump on the basis of a signal output from the detector.

6. A dispenser according to any of the preceding claims, comprising mounting means for mounting the housing to a surface.

7. A dispenser according to any of the preceding claims, wherein the liquid product is selected from the group comprising soap, shower gel, detergent, exfoliating scrub, and mixtures of these substances.

8. A housing suitable for use in a dispenser as claimed in any of the claims 1-7.

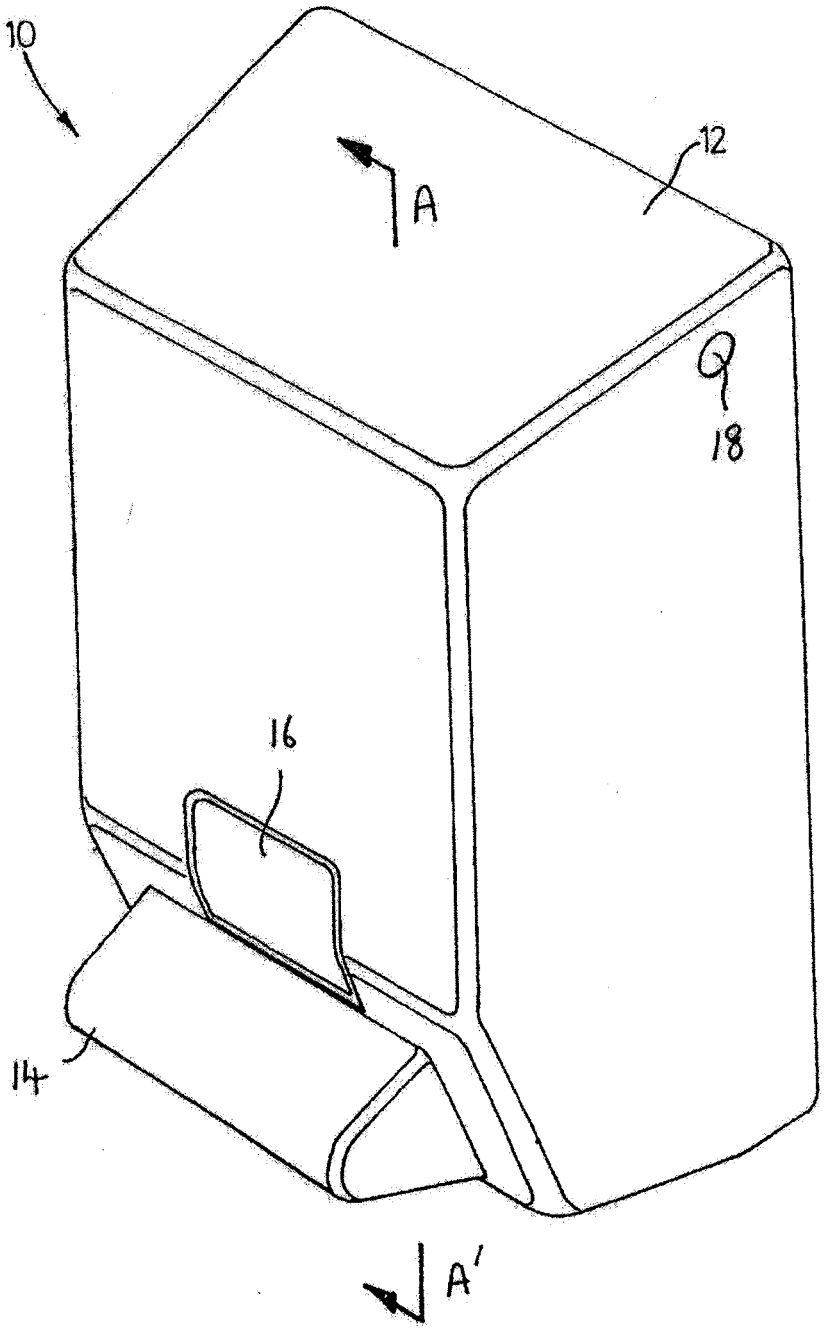

FIG. 1

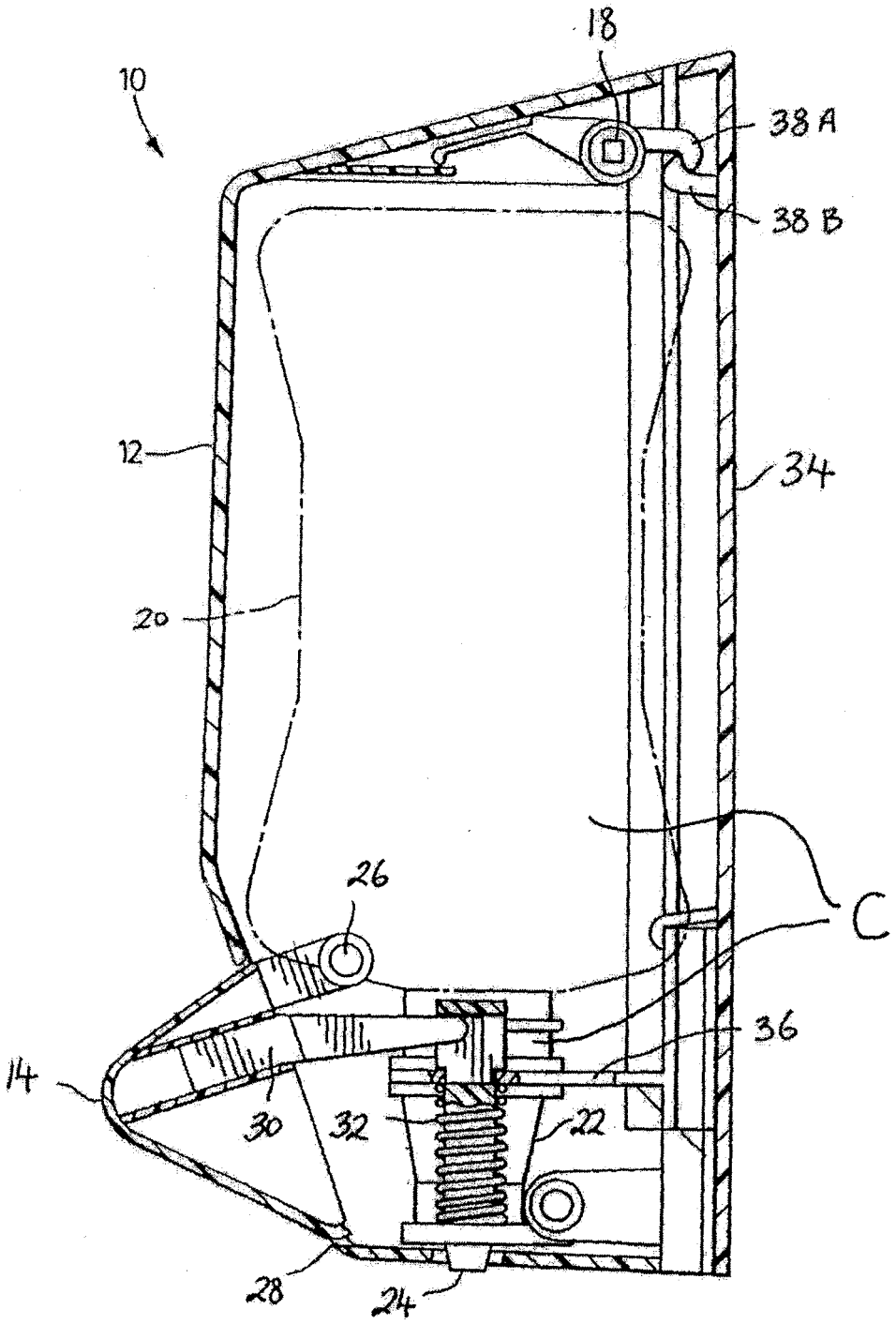

FIG. 2

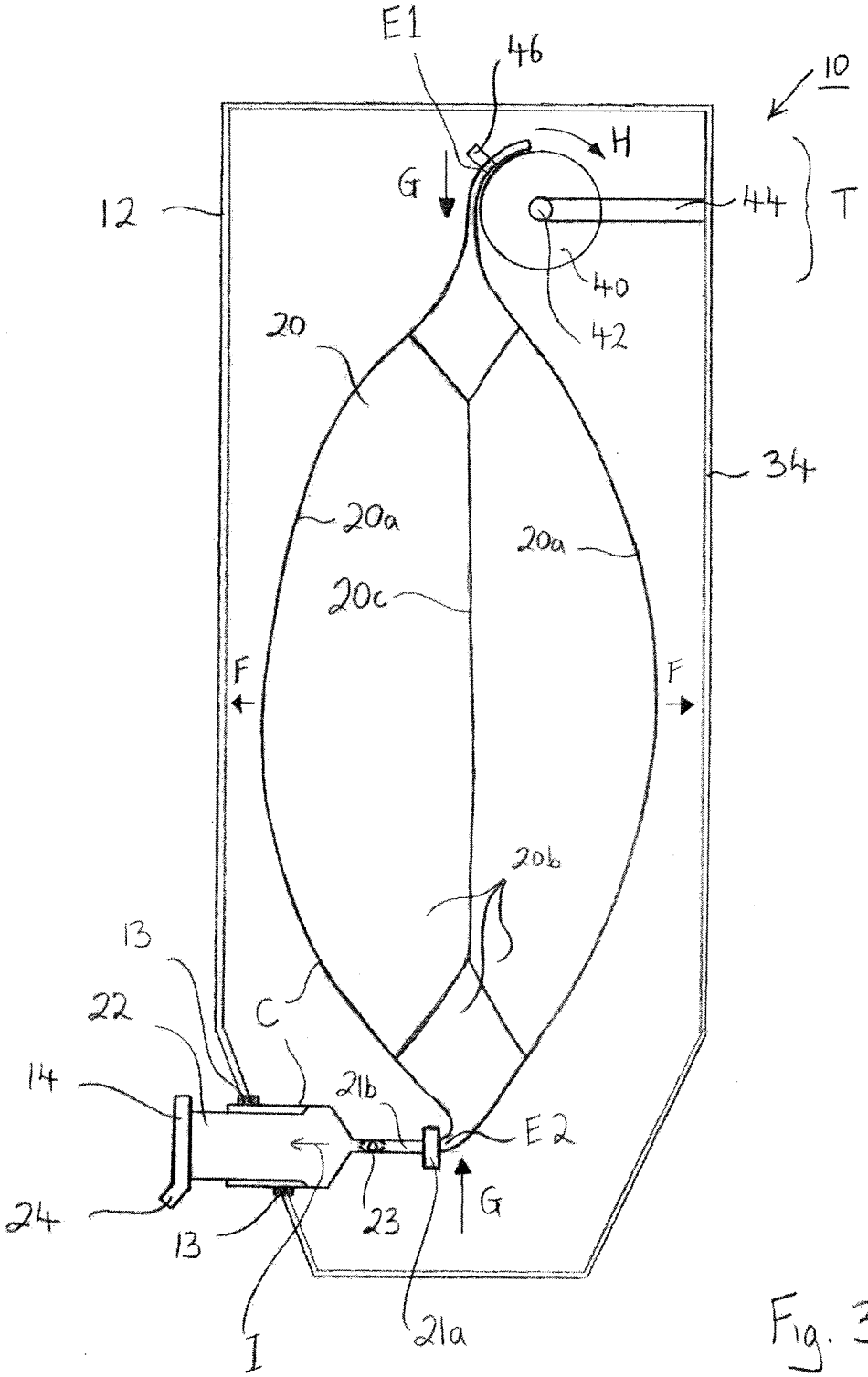
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Fig. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 1605

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 701 646 A1 (PROVENDI SA [FR]) 26 August 1994 (1994-08-26) * page 3, last paragraph - page 6, paragraph 2; figures * -----	1,2,4-8	INV. A47K5/12
X	WO 93/05693 A (APPOR LTD [GB]) 1 April 1993 (1993-04-01) * the whole document * -----	1,2,6-8	

TECHNICAL FIELDS SEARCHED (IPC)

A47K
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 May 2007	Fordham, Alan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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