Date of publication and mention of the grant of the patent: 22.09.2010 Bulletin 2010/38

Application number: 06745098.1

Date of filing: 14.05.2006

Designated Contracting States: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

Priority: 30.05.2005 IL 16887105 26.04.2006 IL 17521306

Date of publication of application: 13.02.2008 Bulletin 2008/07

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The present invention relates to an inflatable container for feeding babies and infants. More particularly, the invention provides an inflatable container which includes a conventionally-shaped nipple and which eliminates the need to allow air ingress as the fluid held therein is consumed. Presently all baby bottles known to the inventor are rigid or flexible thick-wall containers, provided with a removable nipple for the nursing baby or infant. For use the bottle needs to be axially, at least horizontal and when near empty needs to be held at an angle to the horizontal with the nipple pointing downwards. Some arrangement is necessary to allow air to enter the bottle as the liquid is consumed.

The nursing baby usually ingests some of the air accumulating above the liquid level of the nutritional fluid in the bottle and after feeding, the baby needs to be held and "burped" to release said air from the digestive tract.

A patent search revealed no disclosures directly relevant to the present invention, where the volume of a thin-wall container is expanded by the pressurized liquid contained therein. However the state of the art with regard to baby feed bottles is well represented by a review of the following patents.

US-A-20030150890 discloses a non elastic expandable container having an opening adapted to enable the introduction of a comestible fluid therein. In US Patent no. 4,754,887 Ou discloses a nursing bottle including a partition board provided with an elongated pipette and a valved partition board, the aim being to allow the infant to suck the contained fluid while lying or sitting.

Vencinguerra discloses a baby bottle having an inlet valve in US Patent no. 4,826,126. The valve and the nipple are retained by identically screw-on fixtures at opposite ends of the bottle.

A baby bottle provided with an air inlet valve at its side is described and claimed by Wu et al. in US Patent no. 4,928,836. A valve in an air-pressure-sensitive compartment opens under low bottle pressure, which moves a diaphragm.

The baby bottle described and claimed by De Gennaro in US Patent no. 5,607,074 has an air inlet valve responsive to pressure in the bottle, admitting air as the baby sucks. The same end is achieved by Lyons in US Patent no. 5,791,503 using a partially sealable check valve between the bottle top and the nipple. Patent no. DE 10029711 describes an insulating cover for a feeding body which can be inflated. However the bottle used therewith is not expandable.

There are large inflatable baby bottles commercially available from various manufacturers, but these are non-functional and are intended for clowns, actors and general entertainment and are totally unconnected with the subject of the present invention.

Prior art baby bottles all allow air ingress, although the method of doing so varies greatly. In the conventional bottle air enters through the same nipple orifice used by the comestible fluid. As the baby drinks, some of the air in the bottle enters the stomach causing discomfort and requiring its release by holding the baby upright and gently but repeatedly patting the back of the baby.

Furthermore, the nipple of the conventional bottle needs to be horizontal or near horizontal so that the comestible fluid enters the nipple. After most of the comestible fluid has been consumed, the bottle needs to be orientated at a nipple-down slope.

It is therefore one of the objects of the present invention to obviate the disadvantages of prior art baby feed bottles and to provide a container which is expanded by the pressurized fluid feed contained therein. It is a further object of the present invention to provide a baby feed bottle which can be used in any orientation.

Yet a further object is the substantial elimination of air inside the bottle to eliminate air inlet valves and to substantially reduce the need for "burping" the baby. The present invention achieves the above objects by providing an elastomeric expandable container, as claimed, having a first opening adapted to enable the introduction of a comestible fluid under pressure to inflate the same, and a second opening provided in a nipple-like projection extending from said container and adapted for nursing babies, said second opening being closed by valve means, and said valve means being opened and closed by the natural nursing actions of the baby to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.

In preferred embodiments the present invention provides a balloon-like elastomeric inflatable container having a first opening adapted to enable the introduction of a comestible fluid under pressure to inflate the same, and a second opening provided in a nipple-like projection extending from said container and adapted for nursing babies, said second opening being closed by valve means, and said valve means being opened and closed by the natural nursing actions of the baby.

In a preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container wherein said valve means comprises two inter-engaging elements wherein at least one of said elements is provided with an aperture facing said nipple-like projection and wherein a sealed, partially fluid-filled pneumatic or hydraulic actuating means is positioned between said elements and extends through said aperture into said nipple, the arrangement being such that a squeezing action on the nipple by a nursing baby displaces fluid within said actuating means to pneumatically or hydraulically separate said two elements and to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.
In another preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container, wherein said valve means comprises two inter-engaging elements wherein at least one of said elements is provided with an aperture facing said nipple-like projection and wherein a sucking action on the nipple by a nursing baby reduces pressure on the element sealing said aperture to pneumatically or hydraulically separate said two elements and to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.

In the present invention said first opening is adapted to enable the introduction of a comestible fluid under pressure by the inclusion therein of a first valve which is of the one-way type and thus allows the introduction of a comestible fluid under pressure to inflate the container.

In a further preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container, wherein said liquid is milk.

In a further preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container in combination with pump means for introducing said liquid into said container under pressure to inflate and fill the same.

In yet a further preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container which is disposable after use.

In another preferred embodiment of the present invention there is provided a disposable balloon-like elastomeric inflatable container wherein said container is pre-filled with a sterilized comestible fluid for an infant.

In another preferred embodiment of the present invention there is provided a balloon-like elastomeric inflatable container wherein said fluid is baby formula.

It will thus be realized that the novel device of the present invention has many advantages over the conventional baby bottle:

a) there is no need to admit any air into the container as the comestible fluid is consumed;

b) the pressure applied by the inflated container on the comestible fluid makes it easier for the baby to suck;

c) the container can be oriented in any direction during use;

d) the container, in most embodiments, can be transported and stored in the collapsed state;

e) the low weight of the thin-wall container translates into material and cost savings; and

f) some embodiments of the invention are provided for babies who primarily suck the tip of the nipple while other embodiments are better for babies who primarily compress the throat of the nipple.

Because of advantages (a) through (e) enumerated above, the container of the present invention can also be used in contexts other than that of feeding babies, for example as a feeding container for astronauts or for invalids or patients who cannot drink liquids in the normal manner.

Thus according to the present invention there is also provided an elastomeric expandable container having a first opening adapted to enable the introduction of a comestible fluid under pressure to inflate the same, and a second opening provided in a nipple-like projection extending from said container and adapted for sucking said comestible fluid from said container, said second opening being closed by valve means, and said valve means being opened and closed by a sucking action of the user to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.

The invention will now be described in connection with certain preferred embodiments with reference to the following illustrative figures so that it may be more fully understood.

With specific reference now to the figures in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

In the drawings:

FIG. 1 is a schematic, non-detailed view of a preferred embodiment of the container according to the invention;

FIG. 2 is a greatly enlarged view of the charging port attached to the container which is seen in FIG. 1;

FIG. 3 is a sectional view of a closed fluid-operated outlet valve also attached to the container which is seen in FIG. 1;

FIG. 4 is the same as FIG. 3 showing the valve in the open position;

FIG. 5 is a sectional view of a second embodiment of the outlet valve;

FIG. 6 is a schematic view showing an arrangement allowing recharging an empty container;

FIG. 7 is a schematic, non-detailed view of a preferred embodiment of a disposable container;

FIG. 8 is a partly sectioned elevational view of a substantially cylindrical embodiment;

FIG. 9 is a sectional view of part of a further embodiment, shown as feeding the liquid as a result of a baby sucking at the nipple;

FIG. 10 is the same as FIG. 9, but there is no flow as no suction is applied; and

FIG. 11 is an end view of the embodiment seen in
FIG. 9.

[0035] There is seen in FIG. 1 a balloon-like elastomeric inflated container 10, preferably made of a rubber, for example a natural rubber.

[0036] The container 10 has a first opening 12 including a first valve 14, which is of the one-way type and allows the introduction of a comestible fluid 16 under pressure to inflate the container. The first valve 14 will be seen in detail in FIG. 2.

[0037] The comestible fluid 16 can be water, a water-sugar solution, milk, baby formula, or fruit juice, depending on the age and tastes of the infant. The first valve 14 is opened by external fluid pressure and firmly closed by a spring 18 when such pressure is no longer applied.

[0038] A second opening 20 provided holds a conventional nipple-like projection 22 extending from the container and is adapted for nursing babies. The second opening 20 is closed by a second valve 24 which is operated indirectly by the natural nursing actions of the baby.

[0039] A more detailed description of the valves will be provided in following figures.

[0040] With regard to the rest of the figures, similar reference numerals have been used to identify similar parts.

[0041] FIG. 2 illustrates on a greatly expanded scale the first (inlet) valve 14 allowing filling of the container 10 seen to better effect in FIG. 1. The source of the pressurized feed liquid, an example being seen in FIG. 6, is held to the inlet port 28 by being screwed on. Incoming fluid presses against the U-shaped disk 30 and against the plunger 32, which then move downwards to allow passage for the fluid 16 through the orifice 34, which is inserted in the first opening 12, allowing fluid 16 to enter the container 10.

[0042] On removal of external pressure the compression spring 18 moves the plunger 32 to reseal the orifice 34.

[0043] A flexible seal washer 38 is seen between the container extremity 40 and the inlet screw-on housing 42.

[0044] Turning now to FIGS. 3 and 4 there is seen a second (outlet) valve 26 attached to the inflatable container 10 better seen in FIG. 1.

[0045] The present embodiment utilizes the biting action of the baby to open the valve 26.

[0046] The valve 26 comprises two inter-engaging elements 44 and 46. In the drawing the upper element 44 is a movable flap, biased downwards and hinged at its left extremity. The lower element 46 is fixed and provided with an aperture 48, which is normally sealed by the upper flap 44 coming into close contact to the edges of the aperture 48.

[0047] A first part 51 of a sealed, partially fluid-filled flexible pneumatic actuator 50 is positioned between the two inter-engaging elements 44, 46. A second part 52 of the actuator 50 extends into the nipple 22. The arrangement is such that a squeezing action on the distorted nipple 22a, seen in FIG. 4, by a nursing baby displaces fluid within the actuating means 50 to separate the two elements 44, 46 as the first part of the actuator 51 changes from a collapsed state seen in FIG. 3 to the round state 51 b seen in FIG. 4. This enables fluid 16 to flow under pressure of the inflated container 10 through the nipple 22, 22a and out of the nipple opening 54.

[0048] As can be seen in FIG. 3 the normal closed position of the upper flat is attained when there is no mechanical pressure on the actuator 50, and the first part 48 is a flat oval.

[0049] The actuator 52 is preferably filled with water 49 and leaving a small portion of the inner volume for air or an inert gas. The quantity of gas is just sufficient to allow the valve 26 to close when no external pressure is applied thereto. Thus when the baby releases pressure on the nipple 22, the part of the actuator disposed between the elements is pressed between the closed elements to revert to its flat oval form.

[0050] A light spring (not shown) can optionally be added to ensure closure of the valve as seen in FIG. 3.

[0051] Referring now to FIG. 5, there is seen a second embodiment 62 of the second (outlet) valve attached to the inflatable container 10 seen in FIG. 1.

[0052] The valve 62 comprises two inter-engaging elements 56, 58 wherein the lower element 58 is provided with an aperture 60 facing the nipple-like projection 22.

[0053] A sucking action on the nipple 22 by a nursing baby reduces pressure on the upper face of the element 56 which previously had sealed the aperture 60, to lift the element 56 and to enable fluid 16 to flow under pressure of the inflated container 10 through the nipple 22 and out of the nipple opening 54.

[0054] A light spring 63 reseats the upper element 56 when suction is no longer applied to the nipple 22.

[0055] Seen again in FIG. 6 is the balloon-like elastomeric inflatable container 10 as seen in FIG. 1.

[0056] A small plastic pump 64 having a funnel 66 in fluid communication with its inlet port 68 introduces the liquid 16 into the container 10 under pressure to inflate and fill the container 10.

[0057] The pump 64 is preferably electrically driven by a small motor 70. Current is supplied to the motor 70 through a pressure switch 72 which cuts off the motor power when inflation pressure reaches the design level.

[0058] Capacity of the funnel 66 is advantageously about equal to that of the container 10, which is typically about 250 - 400 cc.

[0059] The output port 74 of the pump 64 is shown connected to the first valve 14 of the container 10 by means of a tube 76. On cessation of pumping the first valve 14 closes to retain the fluid feed 12 and prevent spillage from the container 10. Thereafter the tube 76 is disconnected by the user.

[0060] Turning now to FIG. 7, there is depicted a disposable balloon-like elastomeric inflatable container 78 pre-filled with a sterilized comestible fluid 16 for an infant. In the disposable container 78 a first valve is neither
A container having a first opening adapted to enable the introduction of a comestible liquid under pressure to inflate the same, and a second opening provided in a nipple-like projection extending from said container and adapted for nursing babies, said second opening being closed by valve means, and said valve means being opened and closed by the natural nursing actions of the baby to enable fluid to flow under pressure of the pump inflated pressurized container through said nipple and out of the opening thereof, characterized in that said container is an elastomeric expandable container.

2. The elastomeric expandable container according to claim 1 having a first opening adapted to enable the introduction of a comestible fluid under pressure to inflate the same, and a second opening provided in a nipple-like projection extending from said container and adapted for nursing babies, said second opening being closed by valve means, and said valve means being opened and closed by the natural nursing actions of the baby.

3. The elastomeric expandable container according to claim 2, wherein said second valve means comprises two inter-engaging elements wherein at least one of said elements is provided with an aperture facing the nipple-like projection and wherein a sealed, partially fluid-filled pneumatic or hydraulic actuating means is positioned between said elements and extends through said aperture into said nipple, the arrangement being such that a squeezing action on the nipple by a nursing baby displaces fluid within said actuating means to pneumatically or hydraulically separate said two elements and to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.

4. The elastomeric expandable container according to claim 2, wherein said valve means comprises two inter-engaging elements wherein at least one of said elements is provided with an aperture facing said nipple-like projection and wherein a sucking action on the nipple by a nursing baby reduces pressure on the element sealing said aperture to pneumatically or hydraulically separate said two elements and to enable fluid to flow under pressure of the inflated container through said nipple and out of the opening thereof.

5. The elastomeric expandable container according to claim 1, wherein said liquid is milk.

6. The elastomeric expandable container according to claim 1, wherein said liquid is baby formula.

7. The elastomeric expandable container according to claim 2, in combination with pump means for introducing said liquid into said container under pressure to inflate and fill the same.

8. The elastomeric expandable container according to claim 2, wherein said container is disposable after use.

9. The elastomeric expandable container according to claim 1 wherein said container is pre-filled with a sterilized comestible fluid for a baby or infant.
Patentansprüche

1. Ein Behälter mit einer ersten Öffnung, die angepasst wurde, das Einführen einer Nahrungslüssigkeit unter Pumpendruck, um selbigen aufzublasen, zu ermöglichen, und einer zweiten Öffnung, die in einem nippelähnlichen Ansatz besteht, der von dem besagten Behälter absteh und angepasst wurde, Säuglinge zu füttern, wobei die besagte zweite Öffnung durch eine Ventilvorrichtung verschlossen wird und die besagte Ventilvorrichtung durch natürliche Saugbewegungen des Säuglings geöffnet und verschlossen werden kann, um der Flüssigkeit zu ermöglichen, unter Druck des durch eine Pumpe aufgeblasenen Druckdichten Behälters durch besagten Nippel und aus dessen Öffnung herausfließen, dadurch gekennzeichnet, daß der besagte Behälter ein elastomerer dehnbärer Behälter ist.

2. Der elastomere dehnbare Behälter gemäß Anspruch 1, der eine erste Öffnung hat, die angepasst wurde, das Einführen einer Nahrungslüssigkeit unter Druck, um selbigen aufzublasen, zu ermöglichen, und eine zweite Öffnung, die in einem nippelähnlichen Ansatz besteht, der von dem besagten Behälter absteh und angepasst wurde, Säuglinge zu füttern, aufweist, wobei die besagte zweite Öffnung durch eine Ventilvorrichtung verschlossen werden kann und die besagte Ventilvorrichtung durch natürliche Saugbewegungen des Säuglings geöffnet und verschlossen wird.

3. Der elastomere dehnbare Behälter gemäß Anspruch 2, wobei die besagte zweite Ventilvorrichtung zwei ineinandergreifende Elemente umfasst, wobei mindestens eines der besagten Elemente einen zu dem nippelähnlichen Ansatz gerichteten Durchlass aufweist und wobei eine abgedichtete, zum Teil flüssigkeitsgefüllte pneumatische oder hydraulische Betätigungsvorrichtung zwischen den besagten Elementen angebracht ist und durch besagten Durchlass in den besagten Nippel hereinragt, wobei die Anordnung derart ist, daß ein Drücken auf den Nippel durch den trinkenden Säugling Flüssigkeit innerhalb der besagten Betätigungsvorrichtung verlagert, um die besagten zwei pneumatische oder hydraulisch zu separieren und um zu ermöglichen, daß die Flüssigkeit unter dem Druck des aufgeblasenen Behälters durch den besagten Nippel und aus dessen Öffnung heraus fließt.

4. Der elastomere dehnbare Behälter gemäß Anspruch 2, wobei die besagte Ventilvorrichtung zwei ineinandergreifende Elemente umfasst, wobei mindestens eines der besagten Elemente einen zu dem nippelähnlichen Ansatz gerichteten Durchlass aufweist und wobei eine Saugbewegung an dem Nippel durch einen trinkenden Säugling den Druck auf das Ele-
4. Le contenant élastomérique expansible selon la revendication 2, dans lequel ledit mécanisme valvulaire comprend deux éléments interagissants où au moins un de ces éléments est fourni avec une passage orientée vers ladite saillie en forme de suceur et où un mécanisme d’actionnement scellé pneumatique ou hydraulique partiellement rempli de fluide est positionné entre lesdits éléments et s’étend à travers ladite passage dans le suceur, l’arrangement étant ainsi qu’un mouvement pressant sur le suceur par un bébé suceant déplace du fluide dans ce mécanisme d’actionnement pour séparer pneumatiquement et hydrauliquement lesdits deux éléments et pour permettre le fluide de couler sous pression du contenant gonflé à travers ledit suceur et hors de son aperture.

5. Le contenant élastomérique expansible selon la revendication 1, dans lequel ledit liquide est lait.

6. Le contenant élastomérique expansible selon la revendication 1, dans lequel ledit liquide est aliment pour bébés.

7. Le contenant élastomérique expansible selon la revendication 2, en combinaison avec un mécanisme de pompe pour introduire ledit liquide dans ledit contenant sous pression pour gonfler et remplir le même.

8. Le contenant élastomérique expansible selon la revendication 2, dans lequel ledit contenant est jetable après usage.

9. Le contenant élastomérique expansible selon la revendication 1, dans lequel ledit contenant est pré-rempli avec un fluide comestible stérilisé pour un bébé ou un petit enfant.
REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader’s convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

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