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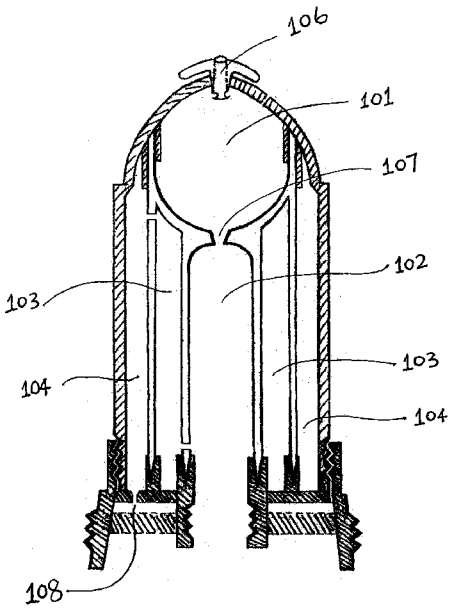
(54) **Title**: DOUBLE FUNCTIONS VENT DEVICE FOR NURSING BOTTLE WITH FUNCTIONS FOR AIR VENTING TO THE INNER BOTTLE AND A PEDIATRIC MEDICINE DELIVERY SYSTEM



(57) **Abstract**: A vent device for nursing bottles which enabling an external air will flow toward the inside of nursing bottle when feeding the infant with objective to prevent a vacuum within the bottle therefore an infant could suck the liquid from the bottle more comfortably. Besides its function for venting air towards the inside of nursing bottle, the vent device of present invention has an additional function as a pediatric medicine delivery system for baby and severe ill persons where the vent device is designed to allow a pipette or an injection syringe for dispensing medicine, vitamin towards the inside of nursing bottle would facilitate the infant's parent to provide a better healthcare programs for their beloved babies. While in another aspect, the application of this vent device has function for releasing too much excessive gas in the various liquid containers thru the air passage created in the vent device which is linked to the outside of the container via a fissure on the cap of the container. The vent device is designed to be put at the bottom of nursing bottle within the liquid surroundings which fills the inside of the bottle and other variations at any other side of nursing bottle. It is consist of several compartments and several one-way valves in fluid communication with the vent aperture. For its other function which intended to solve excessive gas problem generated by chemical liquid in various containers, the vent device's suitable position is at the orifice of the container which is unoccupied or free from liquid surrounding, may separated or incorporated with the bottle cap.

DOUBLE FUNCTIONS VENT DEVICE FOR NURSING BOTTLE WITH FUNCTIONS FOR AIR VENTING TO THE INNER BOTTLE AND A PEDIATRIC MEDICINE DELIVERY SYSTEM

FIELD OF THE INVENTION

The present invention relates to the double functions vent device that comprises of a method for directing and managing the flow of an external air towards the inside of nursing bottles, general bottles and a method for delivery medicine, vitamin to an infant by using nursing bottles which have integration with the double functions vent device.

BACKGROUND OF THE INVENTION

Conventional nursing bottle basically consist of chamber for receiving liquid feed, a nipple with fluid outlet at the upper end and a collar to fix the nipple onto the bottle. At the beginning of feeding, all infant generally can suck the conventional nursing bottle easily, however, after drinking a certain volume feed, an infant can't suck the liquid out from the nipple as the volume of liquid decrease, a proportional vacuum is generated inside the bottle, thus creating a pressure disparity between the external of the bottle and the inside chamber. Still hungry infant will naturally put more effort and keep trying to suck further and this situation can cause pressure disproportional along the ear canal which can lead to ear infection, or other illness. Stop feeding will trigger an air to be introduced promptly into the inside of nursing bottle via the nipple and thus creating a mixture of air and liquid in the nipple area. According to pediatrics, feeding of this mixture to infant will cause problems such as colic, nausea, and these problems will increase feeding time.

As a result, today's nursing bottle assemblies have incorporated with venting systems to prevent a vacuum inside nursing bottle while feeding and reduce the possibility of the infant ingesting liquid mixed with an air. However, many venting systems consist of a large number of components, small parts which cause difficulties and time consuming in cleaning and maintenance. More ever, few current venting systems is designed with over concern perspective to overcome the potential leakage from venting components thereby rendering it relatively difficult for the vent systems to activate itself simply by the infant sucking on the nipple. Besides that, few current venting systems particularly with top vents design might has possibility for an external air when

flow towards inside the bottle will still mix with some portions of the liquid and could cause subtle colic to the infant.

SUMMARY OF THE INVENTION

The present invention relates to the double functions vent device for intergration with nursing bottle with its position on the bottle bottom. The vent device is made from the assembly of several components and forms several compartments within the vent device unit. Every compartment within double functions vent device will have very low vacuum force. The pressure differential between inner bottle and outer bottle has changed at the presence of double functions vent device.

Double functions vent device comprises of top closure member, body member, bottom closure member, cylinder tube, one-way valves, high-density ballasts. The vent device provides vent path for an air from the external bottle to the inner bottle. When one-way valve in the top compartment open very slightly and make a tiny gap to allow an air flow towards the inner bottle, another one-way valve in the other compartment that has first contact with an external air will open very slightly as well to allow an air flow towards the vent device. When one-way valve in the top compartment at close position to hold up the liquid for further penetration to next compartment, another one-way valve will close concomitantly to block an external air from flowing towards the inside of outer layer compartment that has first contact with an external air. This design relates to the implementation of method that manage an external air as outside matter will never exchange with the liquid inside the nursing bottle in order to secure there is no leakage.

The present invention provide a simple and pratical method for users to acquire the benefit of its other function as a medicine and vitamin delivery system to an infant simply by taking out the removable cylinder tube which is screwed in the central compartment of the double functions vent device. A pipette or injection syringe is used for dispensing medicine, vitamin through the aperture at the upper end of opened central compartment directly towards the inside of nursing bottle.

The present invention encompassing the design of nursing bottle with extended body in the bottle bottom for integration with enlarged double functions vent device which has a diameter size as same as the diameter of the extended body of the nursing body.

DETAIL DESCRIPTION OF CERTAIN EMBODIMENTS

The vent device in this invention overcomes the conventional nursing bottle weakness as it provides method for directing an air into the inside of the bottle thru a fissure on the bottom closure member of vent device. With its position at the bottom, the air could only flow towards the inside of the bottle as when feeding time where the bottle is inverted or tilted in various angle. In this instance, the vent device is not within the liquid surroundings which means the vent path is far from the liquid, so the air never pass the liquid and will not mix with the liquid and the proportional air that constantly flowing inside in reacting with the demands made by the decrease of liquid will prevent the generation of any vacuum there in, regardless whether the nursing bottle's position is partially or fully inverted.

The proportional exchange of liquid sucked with an air that constantly flow-in will cause no vacuum exist and no pressure differential between the external and the internal of bottle as such the external air will not be attracted to flow towards the inside of bottle thru the nipple at the moment the infant stop sucking. In this instance, there is no mixture of air and liquid by implementing the vent device of this invention. The vent device is designed to maintain the liquid keeps flowing thru the nipple smoothly so the infant doesn't encounter any difficulty to suck the liquid from feeding bottle and prevent the mixture of an air and liquid as well.

The present invention relates to a method and vent device particularly but not exclusively limited to nursing bottle. The method related to the mechanism and systems that at certain circumstances require blocking the flow of an air and at the same time blocking the flow of liquid in the bottle to outside of the bottle as well in order to prevent them from exchange each other which cause leakage.

This air vent device may have a conical shape, spherical shape, cylindrical shape or other configuration. It has function enable directing air into the inside of nursing bottle and method that

inhibit the liquid leaking from the bottle. For another different area of implementation, it has function enable releasing excessive gas from the inside of bottle, jerry can, etc to the outside of the bottle since the accumulation of excessive gas within bottle will create pressure which will cause the bottle swelling, bottle cap could split open and bottle rupture. The method apply to this device would not cause liquid spill out when the liquid containers drop.

Although the vent device is disposed inside bottle's chamber at the bottom and within the liquid surroundings, it is designed using a method that creating several compartments with various configurations inside the vent devise. A number of one-way valves are placed in compartments and all together operate in integration with the function of vent device according to this invention and secure that no leaking from the nursing bottle.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is a perspective of one embodiment of a double functions vent device.

Figure 2 is a side elevation of a double functions vent device.

Figure 3 is an exploded perspective of a double functions vent device.

Figure 4 is a top plan view of a double functions vent device.

Figure 5 is a bottom plan view of a double functions vent device.

Figure 6 is a vertical cross-section of the double functions vent device showing the valves make a gap to permit an air will flow towards the inside of nursing bottle thru the apertures.

Figure 7 is a vertical cross-section of the double functions vent device showing compartments inside it and vent passageway.

Figure 8 is a top plan view of the bottom closure member.

Figure 9 is a perspective of another embodiment of a double functions vent device.

Figure 10 is a vertical cross-section of double functions vent device in Figure 9.

Figure 11 is a perspective of cylinder tube for vent device in Figure 9.

Figure 12 is a perspective of nursing bottle with wide bottom area.

Figure 13 is a fragmentary perspective of the nursing bottle with small portions broken to show the double functions vent device inside the nursing bottle.

Figure 14 showing the bottom portion of a pipette, injection syringe can be injected into the inner of nursing bottle thru the vent device for delivery medicines, vitamins to an infant via the nipple.

Figure 15. is a perspective of another embodiment of double functions vent device with diameter size is as same as the diameter of the body of nursing bottle.

Figure 16. is a perspective of nursing bottle assembly with extended body has threaded hollow at the bottom whereas its diameter size is as same as the diameter of the body of nursing bottle.

Figure 17. is a perspective of nursing bottle that has double functions vent device (Figure 15) integrating with it underneath.

DETAILED DESCRIPTION OF DRAWINGS

The vent device consists of top closure member (1), body (2) and bottom closure member (3) so as to form top compartment (101), central compartment (102), middle layer compartment (103) and outer layer compartment (104). The outer layer compartment and middle layer compartment surrounding external lateral side of central compartment and form such as layers which cover around the external of central compartment. A removable cylinder tube (4) is put inside the central compartment for easy cleaning.

The vent path is linked to the outside of the bottle via a fissure (105) at the bottom closure member of this device and its position is under the outer layer compartment. A bottom vent plug (5) is added for controlling the fissure's opening and closing status. The bottom closure member (3) of this vent device play a role as the bottom cap and screwed on the bottom of the bottle. The bottom closure member designed on this bottle has characteristics which enable to send air into the device and thru a vent passage in the compartments the air will be directed to the inside of the bottle via a fluid inlet (106) of removable fluid inlet plug (6). The removable fluid inlet plug has function for easy cleaning the vent device.

When the nursing bottle standing upright position, a sphere shape ballast (7) will suppressing a one way valve (8) inside the top compartment to seal or block the vent aperture (107), so no liquid is permitted to penetrate the inside of the central compartment and removable

cylinder tube. While in the outer layer compartment, a high-density cylinder ballast (9) that is placed in the above of another one-way valve (10) will be at position suppressing the valve to seal or block the vent aperture (108) in the outer layer compartment of this device and no air can be directed thru the vent device toward the inside of the bottle. Those ballasts will react quickly for opening and closing position.

In this particular instance, this invention related to the method which blocking the liquid penetration to cylinder tube in the central compartment and simultaneously in cooperation with method which preventing an external air flowing towards the inside of compartments with the help of another one-way valve. The second method has an objective to prevent an external air will flow inside compartments for exchange with liquid inside bottle, as the result, no liquid would be attracted to penetrate the top compartment although there is a pressure disparity between the vent device and inner bottle.

When feeding the infant, the nursing bottle is inverted or tilted to any angle, all of the one-way valves will open slightly and make a gap (109). An external air will enter the outer layer compartment first via the gap then flow to cylinder tube after passing middle layer compartment (103) and central compartment (102) via a vent aperture that is made at the lateral side of the middle layer and central compartment. From cylinder tube, the air will flow to the inside of bottle after passing the top compartment and fluid inlet (106).

Shaking of nursing bottle will possibly cause a very little amount of liquid will go inside the removable cylinder tube put inside the middle compartment. After feeding time, this cylinder tube can be taken out for cleaning and reinstall or replace with spare unit without have to unplug the whole vent device from the nursing bottle.

According to the present invention there is provided a nursing bottle designed with wider diameter at the bottom (11) whereby it permits to create appropriate size for threaded hollow and the vent device can be screwed onto it tightly.

The vent device in this invention encompasses provide another function that is as a pediatric medicine delivery system for baby, kids and also applies to adults that suffering severe

illness, unconscious or comatose. This system assures the delivery of an accurate dose in a practical way by opening the fluid inlet plug (6), opening top closure member (1) and taking out the one-way valve (8) and sphere shape ballast (7) from the inside of top compartment, and then pull out removable cylinder tube (4) from central compartment. It's ready to insert pipette (12) or injection syringe (13) into central compartment for dispensing medicine, supplement or vitamin inside the nursing bottle.

With regard to the second function as a pediatric medicine, supplement or vitamin delivery system for baby, kids, in another embodiment (Figure 9) of this invention, two cylinder shape one-way valves (201, 202) made of high-density material can be placed inside the cylinder tube. In this embodiment, the top compartment, one-way valve and sphere shape ballast inside the top compartment no more exits. Converting back and forth from its function as nursing bottle to pediatric medicine delivery system would be much easier and more practically simply by removing and installing the removable cylinder tube. The cleaning and maintenance for nursing bottle and vent device also take less effort.

In another further embodiment (Figure 15), the double functions vent device is designed with diameter size as same as the diameter of the nursing bottle at the bottom. In order to make it integrated well with nursing bottles, the nursing bottle is designed with extended body (301), has threaded hollow at the bottom (Figure 16) and the vent device is screwed onto the threaded hollow of the nursing bottle. At the bottom base of this nursing bottle, a small hole is created on the center point which has two functions, that is, for air passageway to the inside of nursing bottle and to allow the orifice of pipette, injection syringe can pass through the bottom base in order to deliver medicine, vitamin to the inside of nursing bottle..

The nursing bottle which has an extra unit of double functions vent device unite together underneath nursing bottle will come out with a bit taller bottle than all conventional nursing bottles or other type of nursing bottles from prior inventions that have same diameter and bottle capacity. When feeding an infant, an external air will be constantly attracted to flow towards the inside of nursing bottle by passing the vent aperture (302) of removable vent plug (303) at the lateral side of the vent device in order to replace a portion of an air within the vent device that has been attracted earlier to the inside of nursing bottle proportional with the demands made by the decrease

of liquids. Morever, the removable vent plug is designed with manual and adjustable venting knob for switch on (opening) and switch off (closing) to the vent aperture that has a direct contact with external air with objective for hygienic purposes to secure the venting nursing bottle will be free from contamination by an polluted air, poisoned gas, bad smell external air.

It is understood that a number of energy drinking water, health care, cosmetic and pharmaceutical liquid is containing oxidizing agents, reducing agents from chemical substances or chemical compounds with characteristics that gradually decompose themselves or by external factors (e.g. shaking, sun light, temperature) and uncompromisingly generate gas where the gas must be release during transportation or during long storage period at the shelve. Besides generate gas problem, some chemicals are dangerous goods which is corrosive, toxic, explosive which require special handling. The current practices by putting an internal cap with a vent aperture for releasing the excessive gas have high risk exposure since there is no protection from leakage as when the containers fall / collapse, the chemical liquid will spill out right away.

The present invention also applies to bottles or other containers that contain liquid that generates excessive gas such as chemical bottles, cosmetic bottles, honey and energy drink bottle.

CLAIMS :

1. A double functions vent device for nursing bottle, general bottles, etc, the vent device consist of the integration of several components and constitute a number of compartments with vent aperture along the vertical and horizontal partitions between compartments and vent path being defined by vent aperture in an in order directions.

2. A double functions vent device according to claim 1, in which contain two units one-way valves in fluid communication with the vent aperture. When nursing bottle at any position, one valve at the upper side has function to prevent liquid penetration to vent device or to permit an air to flow in. Another valves at the below side will block or let the external air entering the vent device.

3. A vent device according to claim 1 and 2, when nursing bottle fully or partially inverted, all valves will open slightly and together with vent aperture define a gap as the vent path to allow external air flowing toward inside bottle.

4. A vent device according to claim 1, where the model is conical shape, cylindrical shape, spherical shape, regular or irregular polygon or other mix shape.

5. A vent device according to claim 1 to 4, where the number of compartments can be less than or more than the number of compartments in this description. One and the other compartments within vent device can be configured in several models.

6. A vent device according to claim 2 and 3, where the number of one-way valves can be less than or more than the number of one-way valves in this description.

7. A vent device according to claim 1 to 6, has diameter smaller than the diameter of nursing bottle, can be disposed at the bottom of nursing bottle and other variations at any other side of the bottle.

8. A vent device according to any of claims 1 to 7, has removable fluid inlet plug at the external side of the top compartment for easy cleaning.

9. A vent device according to any of claims 1 to 8, has removable vent plug under bottom cap to manage the vent exposure degree with the external air.

10. A vent device according to any of claims 1 to 9, has but not limited to high-density sphere shape and cylinder shape ballast with function to push the one-way valves to close the vent path.

11. A vent device according to any of claims 1 to 10, has removable cylinder tube for easy cleaning after usage without have to take out the vent device from nursing bottle.

12. A method that replace removable cylinder tube with pipette or injection syringe for delivery medicine, supplement, vitamin to flow towards the inside of bottle

13. A method that blocks the external air accessibility to vent device while not feeding the infant where the bottle standing upright position.

14. A method that permits the external air accessibility to vent device when feeding the infant where the nursing bottle inverted or partially inverted to any angle.

15. A method that prevents the liquid penetration to the vent device by implementing one-way valves.

16. A vent device according to any of claims 1 to 15, incorporated with the screw threaded cap in the bottom of bottle

17. A vent device according to any of claims 1 to 16, in which bottom closure member with screw threaded functions as bottom cap of the nursing bottle.

18. A nursing bottle as infant venting bottle with wider diameter at the bottom of the bottle to enable create appropriate threaded hollow for putting the vent device inside the nursing bottle.

19. A nursing bottle according to any of claims 1 to 18, incorporated with vent device according to this invention has function as a pediatric medicine delivery appliances for baby, kids and adults.

20. A vent device according to claim 1 to 10, applicable for general bottles, jerry can, and other container for releasing excessive gas when transportation and storage.

21. A vent device according to any of claims 1 to 11, has diameter size as same as or bigger than that of the diameter of the extended body of the nursing bottle at the bottom.

22. A nursing bottle according to any of claims 1 to 21, with bottom base center has a small hole at adequate size for the orifice of pipette, injection syringe to pass through and has extended body from the bottle bottom with threaded hollow and diameter is as big as or bigger than the body of the nursing bottle.

23. A nursing bottle according to any of claims 1 to 22, where the vent aperture for first contact with an external air is designed at the lateral side of its double functions vent device.

24. A nursing bottle according to claim 22 when unite with double functions vent device according to claim 21 is taller than all other conventional nursing bottles dan other infant venting bottles from identical diameter and bottle capacity.

25. A nursing bottle according to any of claims 1 to 24 has a removable vent plug with manual venting knob for switch on (open) and switch off (close) to the vent aperture that has a direct contact with an external air.

AMENDED CLAIMS
received by the International Bureau on 29 May 2013 (29.05.2013)

1. A double functions vent device comprises several components that unite together and constitute a number of compartments. The compartments are filled with but not limited to a high-density sphere shape ballast, a cylinder ballast, one-way valves, a silicon rubber seal, a plunger, spring, mechanical and electronic components, single removable cylinder tube, double removable cylinder tubes. It has vent apertures along vertical and horizontal partitions between compartments. Vent path being defined by vent apertures in an order directions.

   A double functions vent device (Figure 6, Figure10, Figure15) that primarily has two major purposes and functionalities for nursing bottle, general bottles, i.e. :

   a) Venting an external air towards the inside of nursing bottle and guiding the flow of air doesn't pass the milk,
   b) Dispensing medicine, vitamin towards the inside of nursing bottle by applying injection syringe, pipette into the central compartment of this vent device after removing the cylinder tube out from vent device.

   A double functions vent device (Fig 6, Fig 10) which has diameter size smaller than that of nursing bottle is named a small module and inserted into the inside of nursing bottle at the bottom or other variations at any other side of the bottle. The different type of another double functions vent device (Fig 15) is named a big module because its dimension is bigger than small module and it has a diameter size as same as the diameter of nursing bottle for integration with it at the underneath which make the whole unit becomes taller as compared to the same capacity of another identical nursing bottle from prior arts.

   Both the internal of the small module and the big module is vacant and impermeable either by milk that surroundings the small module or by milk from the above segment of a big module. The vacant space can be utilized as flashlight and also suitable for putting accessories (sparkling lights, luminous pictures, glitter toys, digital clock with alarm).

3 A double functions vent device according to claim 1, when the nursing bottle is fully or partially inverted, all of one-way valves will open slightly and together with vent apertures define a gap as the vent path to allow external air flowing towards the inside of nursing bottle.

5. A double functions vent device according to claim 1 to 3, where the number of compartments is but not limited to two compartments. One and the other compartments within vent device can be configured into several models and form various variations of vent device.

6. A double functions vent device according to claim 1 to 5, where the number of ballast, one-way valve, silicon rubber seal, plunger, spring, removable cylinder tube is but not limited to one piece.

9. A double functions vent device according to claims 1 to 6, where for the first contact point with an external air, has a switch-able vent plug under bottom cap of small module vent device or at the lateral side of big module vent device to manage the vent exposure degree with the external air.

10. A double functions vent device according to claims 1 to 9, has but not limited to high-density sphere shape and cylinder shape ballast only with function to push the one-way valves to close the vent path.

11. A double functions vent device according to claims 1 to 10, has but not limited to removable cylinder tube, square tube, rectangle tube, polygon tube for easy cleaning after usage without have to take out the vent device from nursing bottle.

12. A method that replace removable cylinder tube with pipette or injection syringe for delivery medicine, supplement, vitamin to flow towards the inside of bottle

18. A newly design venting nursing bottle (Figure 17), comprising two internodes or two vertical segments separated by partition wherein the above segment contains milk while the below segment which is a double functions vent device is vacant and impermeable by the liquid inside the above segment.

19. A newly design venting nursing bottle according to claim 18, when operates together with injection syringe become a new model of medical and hospital appliances to assist sick infant; comatose adult and old people who is suffering severe illness will easily get accurate volume of nutrition, medicine intake.

20. A vent device according to claims 1 to 11, applicable for general bottles, jerry can, and other container for releasing excessive gas generated by strong oxidizing agent in the inside when transportation and storage.

22. A newly design venting nursing bottle according to claim 18 and 19, where comprises a plunger (401) and spring (501) or another various mechanical, technical and electronic components in the inside of the removable cylinder tube (a barrel) to operate the vent device.

24. A newly design venting nursing bottle according to claim 18, when unite with double functions vent device big module type is taller than all other conventional nursing bottles and other infant venting bottles from prior arts which has identical diameter and bottle capacity.

26. A method that implement components such as a plunger (401) and spring (501) into the removable cylinder tube (as a barrel) for managing and directing the external air towards the inside of nursing bottle.

27. A double functions vent device according to claims 1 to 11, comprises a pair of removable cylinder tube. One and another tube operates independently whereby one tube has venting function while another tube at the next is intended to make a specific space available for injection syringe to dispense medicine towards the inside of nursing bottle concomitantly. Both of the cylinder tubes to be removed for cleaning purposes only.

28. A newly design venting nursing bottle according to claim 18 and 19, comprises a pair of removable cylinder tube in its double functions venting device according to claim 27 become another new model of medical and hospital appliances.

29. A method that apply two units of removable cylinder tube inside the vent device. Thus, it's not necessary to pull out the single removable cylinder tube when require to dispense medicine, nutrition towards the bottle inside.

STATEMENT UNDER ARTICLE 19(1)

The applicant respectfully submits that the claims are suitably amended to overcome the anticipation and un-obviousness in the original claims as filed. The Applicant would like to draw the Examiner's attention to the fact that the double functions vent device ("Main Invention") is not a baby bottle, however, it is the device created for integration with baby bottle, general bottle which has two primarily functions, i.e.: venting the external air into nursing bottle and dispensing medicine, nutrition towards the inside of nursing bottle. Claim 1 in original application has expressed the basic structure of 'A double functions vent device' in short, however, the amended claim 1 elaborates its purposes, functionality and several optional structures in accordance with the description and drawings from original application to reflect that a double functions vent device is not within the same proportional category with the baby bottle which does not has vent device or venting systems in document D1 (US 2006/27597 A1). Claim 1 is particularly define for the protection for the 'double functions vent device' but not include the venting nursing bottle, thus, it is much appropriate to concentrate on the vent device solely where it can be found in cited arts D2, D3 and D4 when examine the claim 1 of present invention.

Further, the Applicant would like to draw the Examiner's attention to another fact that the double functions vent device in the application as filed consist of various models such as a small module (Fig. 6 and 10) and big module (Fig.15) may have different formation, but the respective modules is designed according to the objective of claim 1 which has venting purpose and dispensing medicine purpose. Furthermore, claim 1 and claim 19 of the present invention clearly shows that the device is indeed an efficient medical and hospital appliance. As you would notice that the pediatrician and physician would require this appliance to provide an accurate amount of medicine, nutrition intake to the sick infant and unconscious adult severe injured. The nipple (with longer type) that put inside the mouth will reach the larynx nearest but spoon can not. Thus, none of the cited arts provide any clue to a person skilled in the art to arrive to the invention of the double functions vent device.

Finally, the Examiner respectfully requested to withdraw the rejections and issue a favorable report.

FIGURE 1.

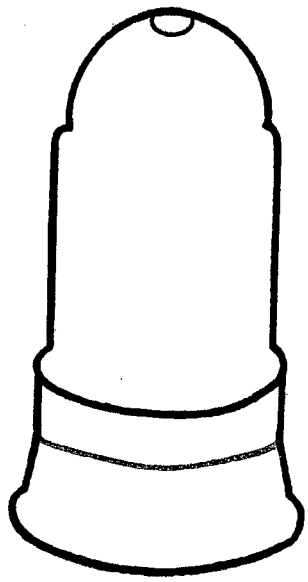


FIGURE 2.

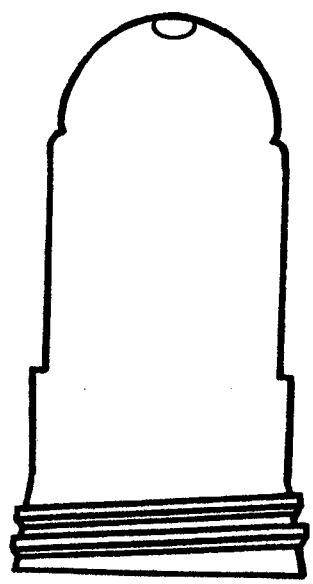


FIGURE 3.

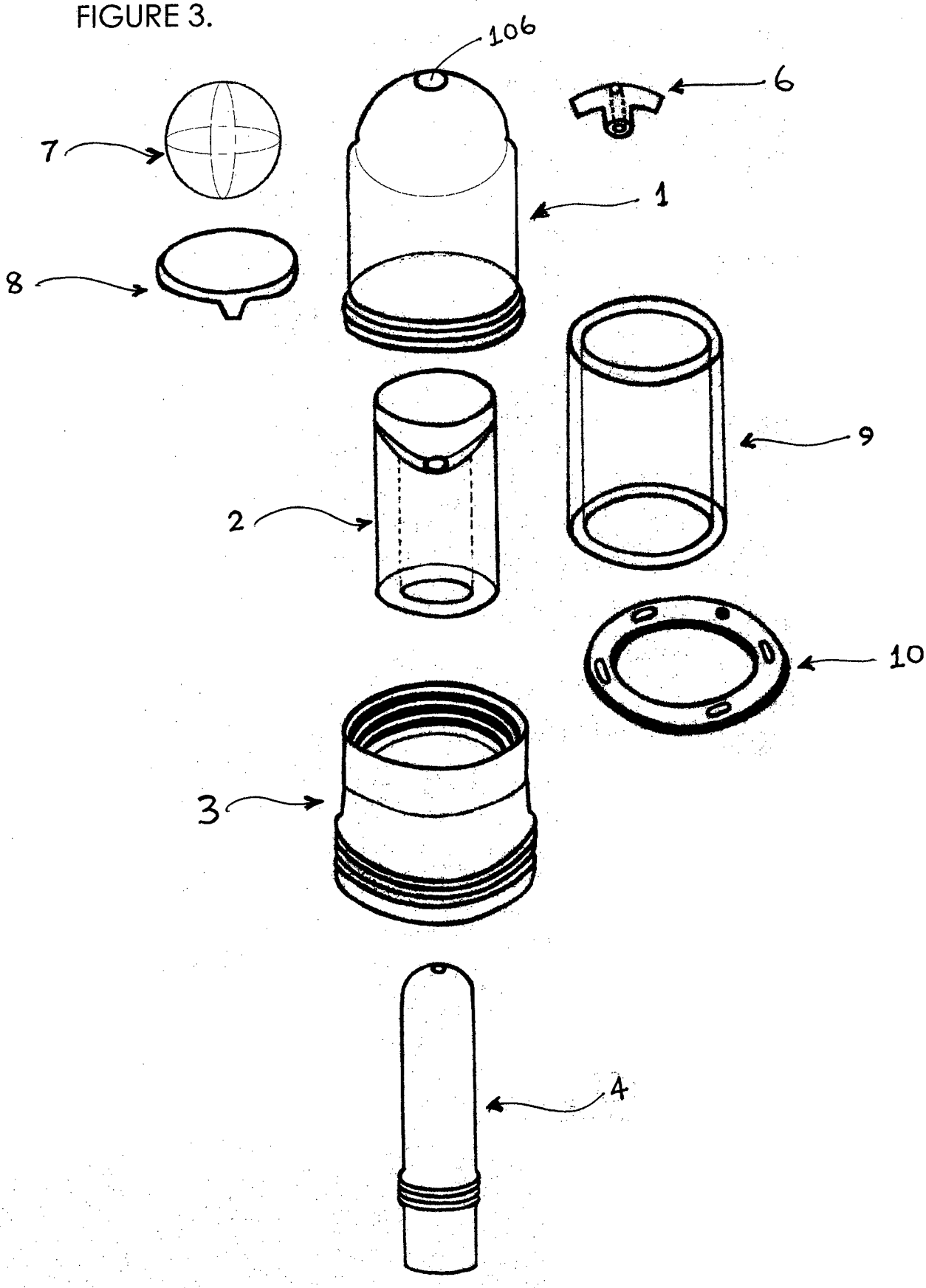


FIGURE 4.

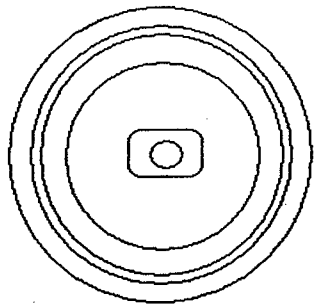


FIGURE 5.

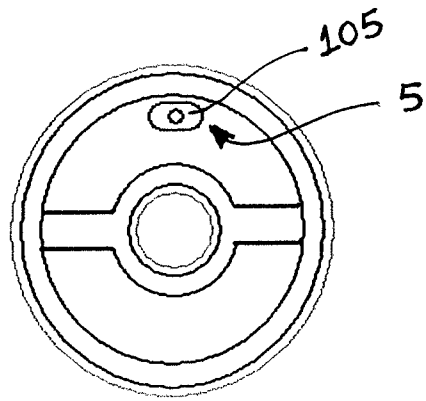


FIGURE 6.

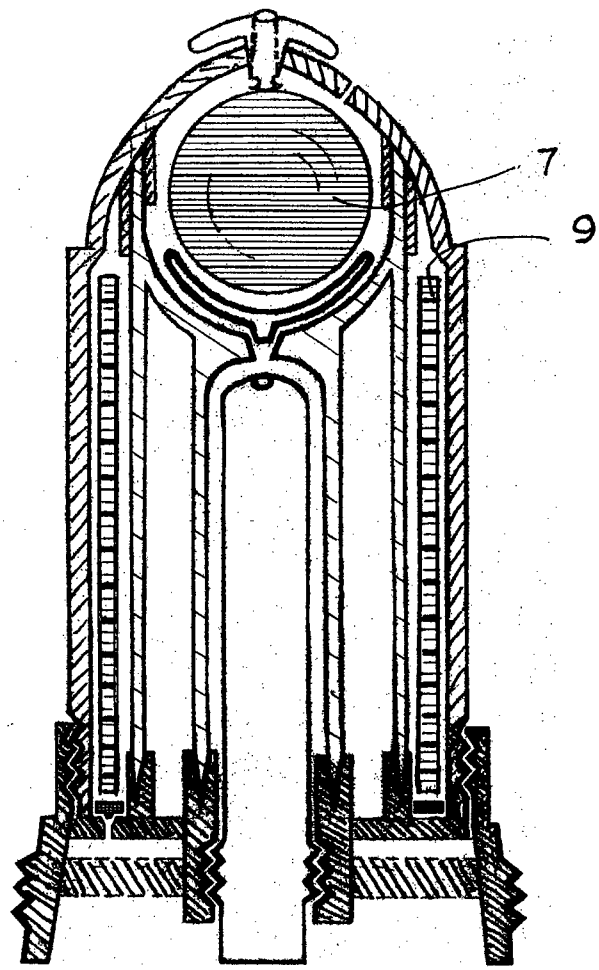


FIGURE 7.

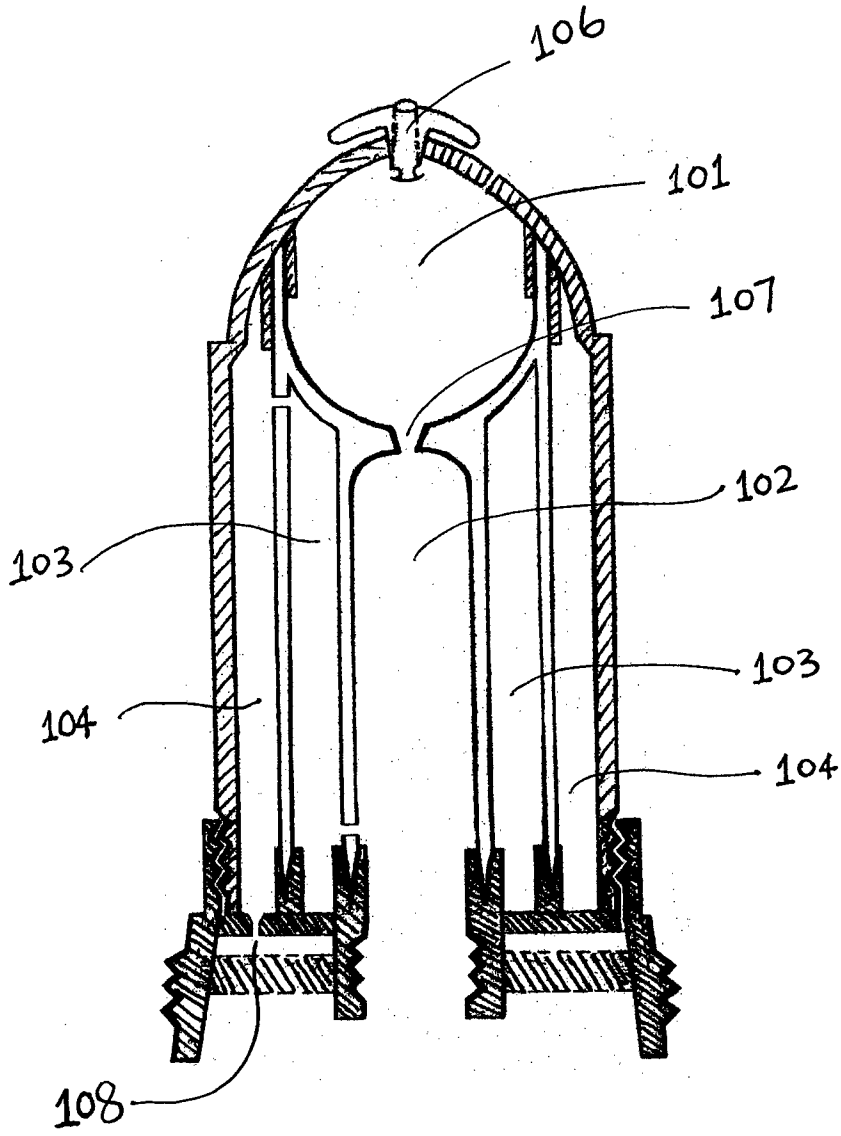
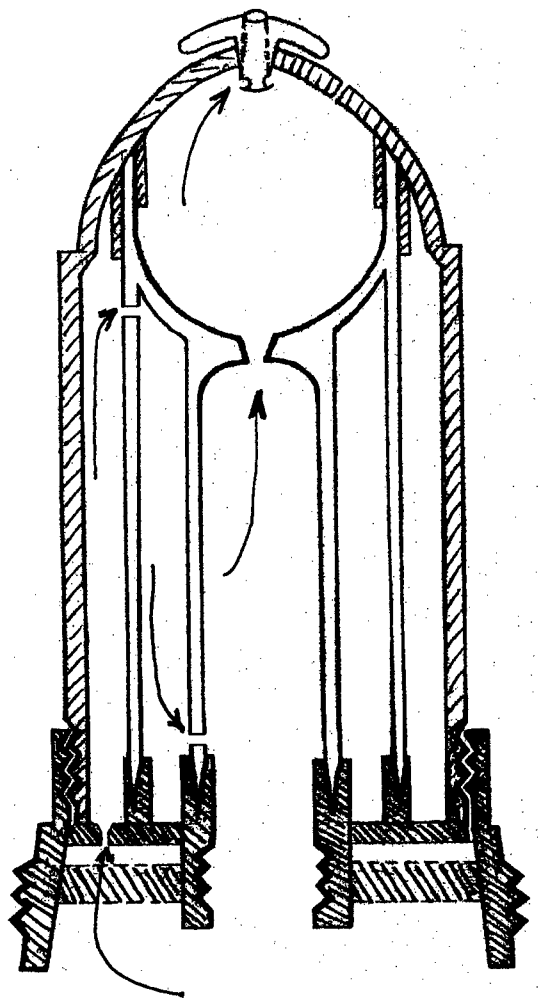


FIGURE 7.



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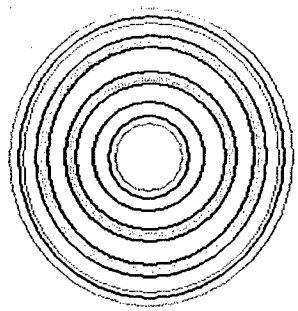

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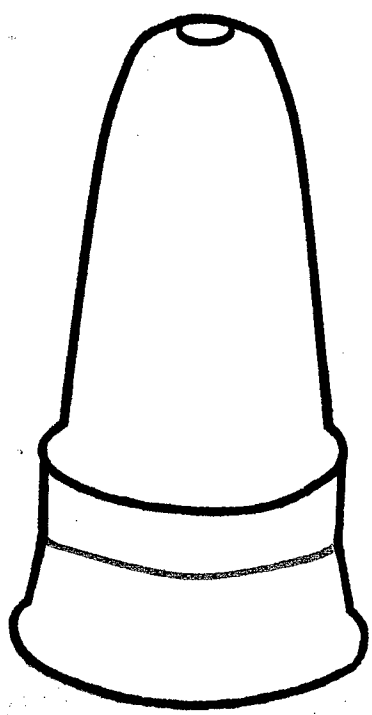
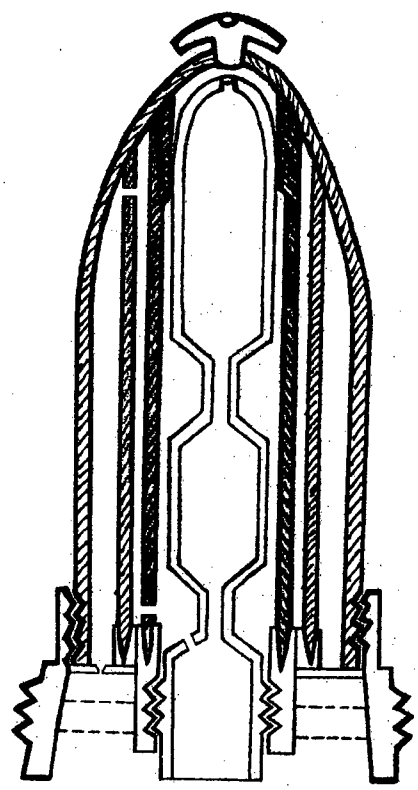


FIGURE 10.



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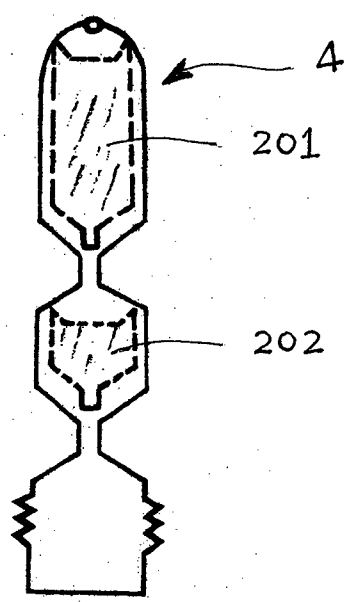


FIGURE 12.

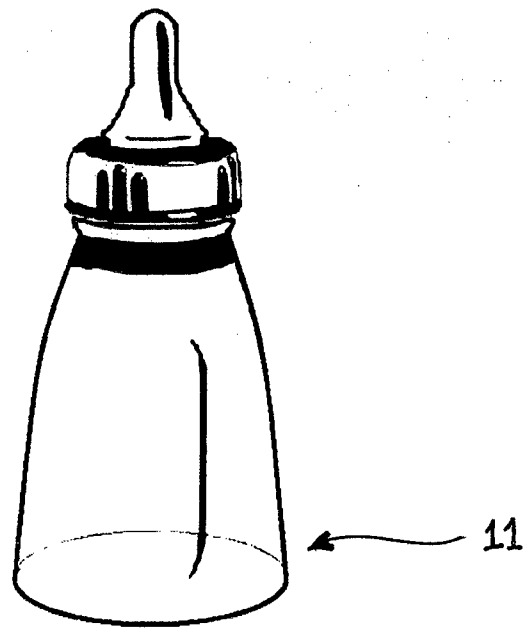


FIGURE 13.

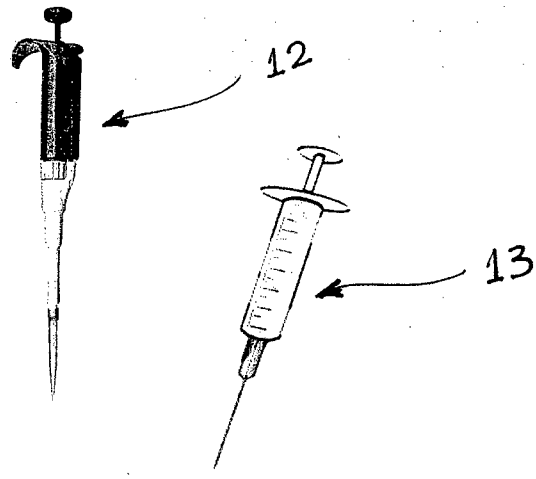


FIGURE 14.

FIGURE 15.

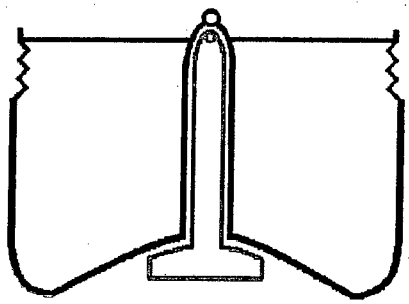
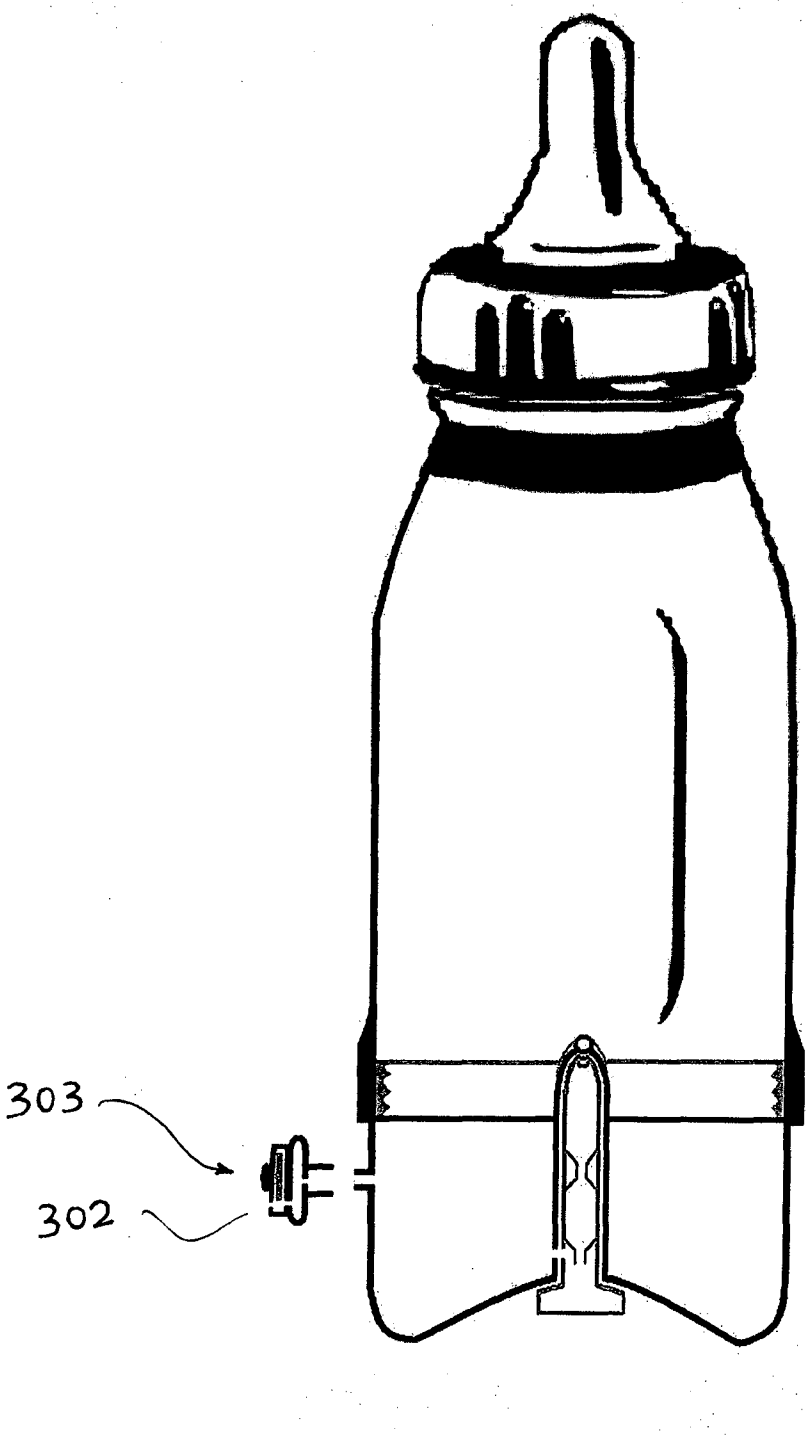


FIGURE 16.

FIGURE 17.



INTERNATIONAL SEARCH REPORT

International application No
PCT/ID2012/000006

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61J9/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 374 826 A1 (FONDERIE ET PLASTURGIE SA FPSA [FR]) 2 January 2004 (2004-01-02) figures 1-3	1,3-5, 13,14, 16,17, 19-22,24
X	US 2009/014403 A1 (LU CHIEN-CHIH [TW]) 15 January 2009 (2009-01-15) page 2, paragraphs 0025,0026; figures 1-3	1-6,14, 15,19,20
X	US 2003/183596 A1 (LOMBARDO LORI M [US] LOMBARDO LORI [US]) 2 October 2003 (2003-10-02) page 2, paragraph 0031-0033; figures 1-6	1,4,8,9, 16-19, 21,23-25
X	US 2006/278597 A1 (DAUGHERTY JONATHAN [US] ET AL) 14 December 2006 (2006-12-14) page 2, paragraph 0023; figures 1-3,6	1,3-7, 13-21,24

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Date of the actual completion of the international search	Date of mailing of the international search report
14 March 2013	26/03/2013

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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