Dec. 20, 1966 E. J. GREENE 3,292,808

VALVE MEANS FOR BOTTLE

Filed March 19, 1965

FIG.1.

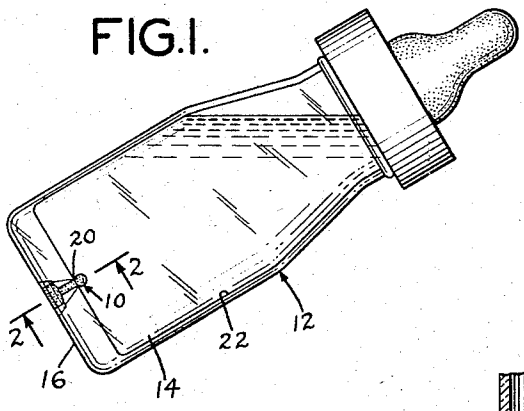


FIG.6.

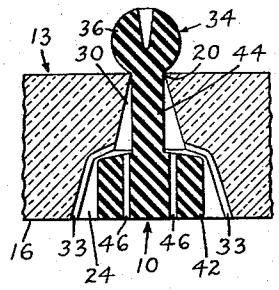


FIG.2.

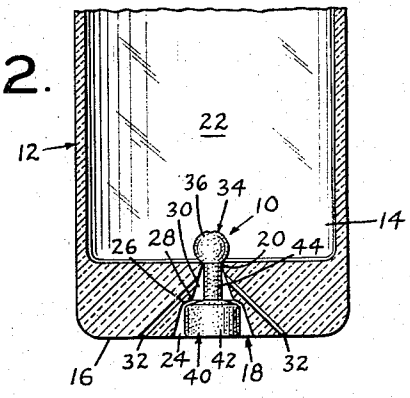


FIG.4.

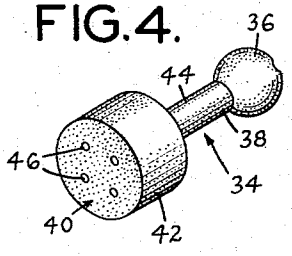


FIG.5.

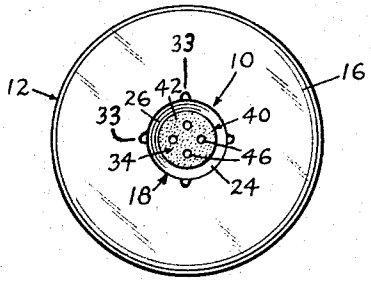
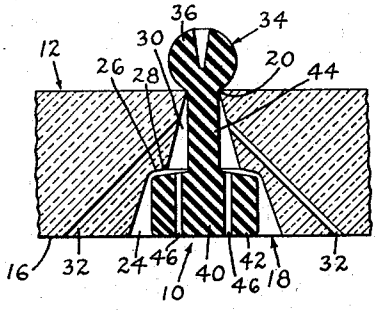


FIG.3.



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VALVE MEANS FOR BOTTLE

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This invention relates to a nursing bottle and more particularly to a valve means in the bottom of the nursing bottle.

One of the most frustrating problems arising from the use of nursing bottles is the reverse flow of air through the nipple of a nursing bottle to replace the liquid that has been sucked from the bottle by the baby. This reverse flow of air often causes bubbles to accumulate within the bottle, or the collapsing of the nipple so that baby cannot suck the milk or fluid from the bottle. This situation contributes a great deal to the discomfort of the baby because air bubbles are sucked into the baby's stomach causing poor digestion and gas pains.

In essence, the principal objection to these prior art devices have been the fact when liquid is sucked from the bottle, the air remaining in the bottle must now cover a larger area so that a low pressure system is created within the bottle. This low pressure seeks to be equalized and this, therefore, creates the aforementioned reverse flow which is so detrimental to the infant's comfort. This low pressure condition further creates difficulty in withdrawing liquid from the bottle and the infant must suck considerably harder to extract the liquid therefrom.

It is the general object of the present invention to avoid and overcome the foregoing and other difficulties of and objections to prior art practices by the provision of a valve arrangement which is both easily manufactured and easily applied.

Another object of the present invention is to provide a valve in the bottom of a nursing bottle which will eliminate the reverse flow of air through the nipple.

Yet another object of the present invention is to provide a valve which will allow air to replace liquid which has been removed from the bottle.

Yet a further object of the present invention is to provide a bottle with a valve arrangement which will allow an even and easy withdrawal of liquid from the bottle.

A further object of the present invention is to provide a bottle with a valve which is safe to use by a baby because of the lack of moving parts.

Another object of the present invention is to provide a bottle with a valve therein which will eliminate air bubbles within the bottle which result from a collapsed nipple.

Still another object of the present invention is to provide a bottle with a valve therein which is inexpensive to make and buy.

The aforesaid objects of the present invention, and other objects which will become apparent as the description proceeds are achieved by providing a nursing bottle having a valve arrangement therein and being provided with a passage means in the bottom face thereof. A seat is disposed in the passage means as well as an air chamber which has a plurality of air passages communicating therewith. An insertable valve element is disposed in the passage means to control the flow of air into the inside of the bottle while preventing liquid from flowing out through the passage means.

For a better understanding of the present invention reference should be had to the accompanying drawings, wherein like numerals of reference indicate similar parts throughout and wherein:

FIGURE 1 is a pictorial representation of a bottle with the valve in the bottom thereof;

FIGURE 2 is a cross sectional view of the lower portion of the bottle showing the valve;

FIGURE 3 is a cross sectional view of the bottom face of the bottle showing the valve arrangement in greater detail and an alternative embodiment;

FIGURE 4 is a perspective view of the valve element;

FIGURE 5 is a plan view of the bottom face of the bottle; and

FIGURE 6 is a cross sectional view of the preferred embodiment.

The principles of the present invention are adapted particularly for a baby's nursing bottle and hence it has been so illustrated and will be so described.

With specific reference to the form of the present invention illustrated in the drawings, and referring particularly to FIGURE 2, a valve arrangement is indicated generally by the reference numeral **10**.

In order to allow air to replace expended liquid in a baby's nursing bottle **12**, the valve arrangement **10** is provided in lower portion **14** of the nursing bottle **12**.

As shown in FIGURES 2 and 6 the valve arrangement **10** is disposed in the bottom face **16** of the bottle **12**. In this position the valve arrangement **10** cannot be tampered with by the infant as it takes its bottle **12**. It may be seen that the valve arrangement **10** may be placed in other parts of the bottle **12**, however, the most effective disposition of the valve arrangement **10** has been found to be in the bottom face **16** of the bottle **12**. It should be noted that the bottle **12** may be made of any material normally utilized in the production of nursing bottles.

In order to accommodate the valve arrangement **10**, a passage means **18** is provided in the bottom face **16** of the bottle **12**. The passage means **18** may be in the form of an inverted funnel having its narrow orifice **20** in communication with the inside **22** of the bottle **12**, and having the larger orifice **24** in communication with outside of the bottle **12**. As shown in FIGURES 2 and 6, the passage means **18** is counter-bored **26** thereby forming a seat **28** and an air chamber **30** between the seat **30** and the narrow orifice **20**. A plurality of air grooves **33** are cut into inner surface **35** of the air passage means **18** between the bottom face **16** and the air chamber **30** such that air may flow from the outside of the bottle **12** into the air chamber **30**, as shown in FIGURE 6.

One convenient manner of allowing and controlling the flow of air into the inside **22** of the bottle **12**, to replace expended fluid, is to provide a valve element **34** which may be disposed in the passage means **18**. The valve element **34** may be provided with a stopper portion **36** at its upper end **38** and a head portion **40** at its lower end **42**. A tension band **44** is provided between the stopper portion **36** and the head portion **40** such that the valve element **34** is of unitary or one piece construction. The valve element **34** is made of an elastic material such as rubber or the like, however, it should be noted that materials which are deformable and which will revert to their original or substantially original shape are the most desirable type of materials to be used.

The valve element **34**, as shown in FIGURES 2 and 6, is positioned in the passage means **18** such that the stopper portion **36** is in contact with the narrow orifice **20** thereby forming a liquid seal so that the liquid inside **22** the bottle **12** cannot flow out through the passage means **18**. The head portion **40**, which is approximately the same size as the counter-bored **26** portion of the passage means **18**, is prevented from pulling through the passage means **18** by the seat **28**. Further, the tension band **44** is slightly shorter than the distance between the narrow orifice **20** and the seat **28** so that the stopper por-

tion 36 of the valve element 34 is held against the narrow orifice 20 by a slight amount of tension thereby making the narrow orifice 20 leak proof.

As shown in FIGURE 4, the head portion 40 of the valve element 34 is provided with a plurality of second passages 46, such that air may flow from outside the bottle 12, into the air chamber 30. At this point it should be noted that when a low pressure area is created in the lower portion 14 of the bottle 12, there is a relatively high pressure in the air chamber 30, causing a pressure differential across the stopper portion 36 of the valve element 34 and the narrow orifice 20 of the passage means 18. Of course the pressure in the air chamber is atmospheric, but relative to the created low pressure area it is high so that the stopper portion 36 of the valve element may be unseated from the narrow orifice 20 just enough to allow air to flow from the air chamber into the inside 22 of the bottle 12 around the stopper portion 36 when the pressure differential occurs.

This result is achieved primarily because of the unitary type construction of the valve element 34 in cooperation with the configuration of the passage means 18.

Another of the primary reasons for the valve element 34 being made of elastic material will be seen when it is necessary to apply the valve element 34 to the bottle. Because of its elastic nature and the frusto-conical hole in the stopper portion 36, the valve element 34 may be inserted into the passage means 18, with the stopper portion 36 facing the inside 22 of the bottle 12, and from that position the stopper portion 36 may be pressed through the narrow orifice 20. Once the stopper portion 36 is placed inside 22 the bottle 12 and the head portion 40 of the valve element 34 is in position against the seat 28, the valve arrangement 10 is in proper operating position.

In operation, the bottle 12 is filled with liquid and when it is in the upright position the stopper portion 36 is resting on the narrow orifice 20 and is being held in such position by the elastic tension of the tension band 44. In the meantime air, at atmospheric pressure, is present in the air chamber 30 due to the grooves 33 and second air passages 46. When the bottle 12 is inverted and the infant begins to consume its contents, a low pressure area develops in the lower portion 14 of the bottle 12 causing a pressure differential across the narrow orifice 20. The pressure differential and the weight of the stopper portion 36 tends to overcome the elastic tension in the tension band 44 just enough so that air from the air chamber 30 may flow into the inside 22 of the bottle 12.

It will be recognized that alternatively first air passages 32 may be angularly cut in the bottom face 16 of the bottle such that air may flow into the air chamber 30 through these first air passages 32. As shown in FIGURES 2 and 3 the first air passages 32 can replace or complement the grooves 33 as a means of providing air in the air chamber 30, at atmospheric pressure.

It will be recognized by those skilled in the art that the objects of the present invention have been achieved by providing a valve arrangement for a baby's nursing bottle which will reduce the creation of bubbles in the bottle and allow liquid to be removed through the nipple without undue strain, by allowing air to replace the expended liquid in a safe manner using no mechanical moving parts.

While in accordance with the patent statutes a preferred embodiment and alternative embodiments of the present invention have been illustrated and described in detail, it is to be particularly understood that the invention is not limited thereto or thereby.

I claim:

1. A baby nursing bottle having a valve arrangement for allowing air to replace expended liquid comprising a bottle having a passage means in its bottom face communicating with the inside of said bottle, a seat disposed in said passage means, an air chamber formed in said passage means in communication with the inside of said bottle, said passage means being provided with a plurality of grooves communicating between said bottom face and said air chamber, and a valve element inserted in said passage means for controlling the flow of air into the inside of said bottle from said air chamber.

2. A baby nursing bottle having a valve arrangement for allowing air to replace expended liquid comprising a bottle having a passage means in its bottom face communicating with the inside of said bottle, a seat disposed in said passage means, an air chamber formed in said passage means in communication with the inside of said bottle, said passage means being provided with a plurality of grooves communicating between said bottom face and said air chamber, and a valve element inserted in said passage means for controlling the flow of air into the inside of said bottle, said valve element being provided with a head portion having a plurality of second air passages therein such that air may flow into said air chamber.

3. A baby nursing bottle having a valve arrangement for allowing air to replace expended liquid comprising a bottle having a passage means in its bottom face communicating with the inside of said bottle, a seat disposed in said passage means, an air chamber formed in said passage means in communication with the inside of said bottle, said bottom face of said bottle being provided with a plurality of first air passages in communication with said air chamber, and a valve element inserted in said passage means for controlling the flow of air into the inside of said bottle from said air chamber.

4. A baby nursing bottle having a valve arrangement for allowing air to replace expended liquid comprising a bottle having a passage means in its bottom face communicating with the inside of said bottle, a seat disposed in said passage means, an air chamber formed in said passage means in communication with the inside of said bottle, said bottom face of said bottle being provided with a plurality of first air passages in communication with said air chamber, and a valve element inserted in said passage means for controlling the flow of air into the inside of said bottle, said valve element being provided with a head portion having a plurality of second air passages therein such that air may flow into said air chamber.

References Cited by the Examiner

UNITED STATES PATENTS

297,174	4/1884	Seymour	215—1
1,732,126	10/1929	Gardner	215—11
1,999,619	4/1935	Reese et al.	215—11
2,355,288	8/1944	Fritzinger.	
2,571,893	10/1951	Kendall	137—525 X

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