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VENTED NURSER

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Fig. 1

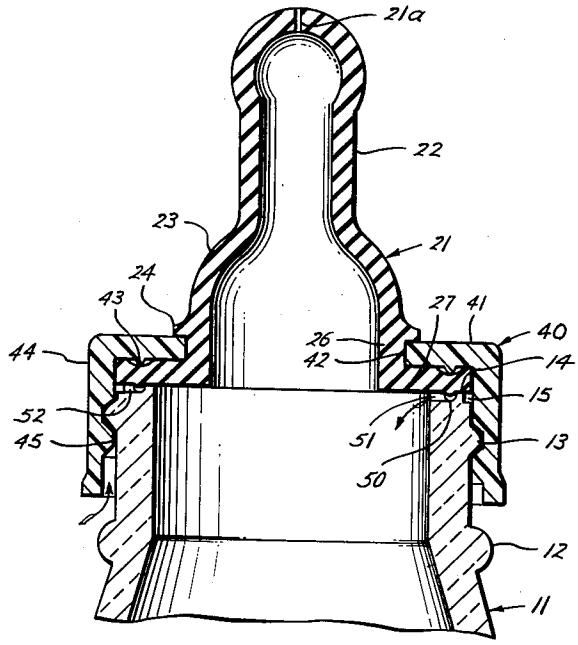
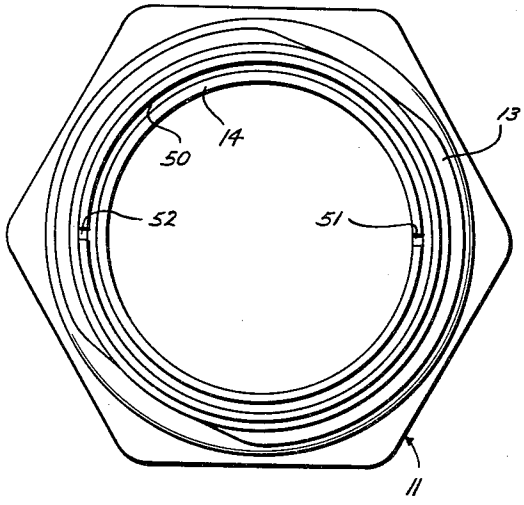


Fig. 2



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VENTED NURSER

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This invention pertains to nursing bottles, better termed nursing units or simply nursers, i.e., a bottle or other container for liquid having a nipple at the mouth of the bottle through which the liquid can be withdrawn. The invention pertains particularly to nursers having some means for admitting air to the nurser as liquid is withdrawn, thereby preventing a vacuum from building up inside.

A vacuum makes it difficult to suck liquid from a nurser and ultimately causes the nipple to collapse completely, preventing further withdrawal of liquid. When an infant cannot easily suck liquid from the nurser it begins to swallow air which causes stomach distress known as colic.

On the other hand, if a nurser is too freely vented the liquid will flow out of the nipple by gravity without any sucking by the infant. Filling the infant's mouth with liquid when it is not prepared to receive it may cause the liquid to run down the windpipe instead of into the stomach, thereby preventing normal respiration and also irritating the lining of the windpipe, this type of distress being known as choking or gagging.

A nurser which is vented sufficiently to prevent substantial vacuum buildup but not so much as to allow substantial gravity feed may be said to be properly vented. However, the degree of venting corresponding to proper venting may occupy a certain range within which changes in the size of the vent opening will serve to regulate the rate of flow from the nurser.

It is an object of the invention to provide a nurser having venting means which can be adjusted to bring the venting within the proper range.

It is a further object of the invention to provide a nurser having venting means which can be adjusted within the range of proper venting to regulate the rate of liquid flow from the nurser.

It is another object of the invention to provide a nurser which will not leak liquid through the venting means.

A further object of the invention is to provide better means for securing the nipple to the mouth of the liquid container.

Other objects and advantages of the invention will appear from the following description of preferred embodiments thereof in which

FIGURE 1 is a vertical section through a nurser embodying the inventions; and

FIGURE 2 is a top view of a bottle used in the nurser of the invention.

Referring now to FIGURE 1 there is shown a nurser comprising a glass bottle or other liquid container **11**, only the upper portion of which is shown. The bottle is provided with a decorative bead **12** around its neck and an interrupted screw thread **13** near its mouth. The lip **14** is rabbetted at **15** around its outer periphery, and has a circular groove or passageway **50** spaced away from the inner and outer peripheries of the lip. A radial groove **51** extends radially inwardly from groove **50** to the inner periphery of bottle lip **14**, and positioned approximately 180° away from groove **51** is a radial groove **52** extending radially outwardly from groove **50** to the outer periphery of lip **14**. It is preferred that grooves **51** and **52** be approximately 180° apart. Air flowing into the nurser through grooves **50**, **51**, **52** will follow the path of least resistance, so that if grooves **51**, **52** are not 180° apart, the passageway length is reduced.

Grooves **50**, **51**, **52** are shown in the drawing as semi-circular in cross-section, however, any other convenient shape, such as triangular or rectangular, may also be used. These grooves are made to a size large enough to allow air to flow through, but insufficient to allow liquid to flow without the application of pressure. When a groove of semi-circular cross-section is used, the cross-section radius should be between about 0.010 inch and 0.020 inch. When a rectangular cross-section is used, the groove should have a width of between about 0.020 and 0.040 inch, and a depth between about 0.010 and 0.030 inch. Thus generally the groove width should be between about ¾ and 2 times the depth, and the cross-sectional area should be between about 0.00015 and 0.0012 square inches.

Over the mouth of the bottle is disposed a rubber nipple **21**. The nipple has a tubular discharge tip **22**, the upper end of which is closed except for one or more small discharge openings **21***a*. The lower end of the tip merges with a hollow hemispherical body portion **23**. There is an annular shoulder **24** around the lower part of the body portion **23**. The lower end of the body portion **23** merges with a cylindrical conduit portion **26**. At the lower end of the conduit portion is an exterior radial flange **27** which rests on lip **14** of the bottle.

A Bakelite cap **40** holds nipple **21** on bottle **11**. The cap has a flat circular disc shaped top portion **41** through the center of which is a hole **42**. The thickness of the top portion of the cap is equal to the distance between the top of flange **27** and the bottom of shoulder **24**. On the lower face of the top portion **41** is a circular bead or axially extending circular flange **43** which has a diameter substantially equal to the diameter of groove **50**. Depending from the outer edge of top portion **41** is a cylindrical skirt **44** which has an internal screw thread **45** which meshes with thread **13** of the bottle mouth. Thread **45** is so proportioned as to leave a clearance between it and the bottle neck.

The inner diameter of the skirt **44** is substantially equal to the outer diameter of nipple flange **27**, and the diameter of hole **42** is substantially equal to the diameter of cylindrical conduit portion **26**, whereby the nipple **21** is positively centered in cap **40** and hence on bottle **11**.

In assembling the nurser the nipple tip and body are pushed through the hole in the cap, the nipple collapsing enough to allow shoulder **24** to pass through the hole and then expanding again so that shoulder **24** overlaps the inner periphery of the cap, locking the cap between the nipple flange and the shoulder on the nipple. The cap is then screwed on to the bottle, thereby holding the nipple over the bottle mouth.

Groove **50** forms a passageway between the nipple flange **27** and bottle lip **14**. This passageway is of capillary size, i.e., of a size large enough to allow air to flow through, but sufficiently small that the surface tension of water, milk, fruit juice, or other liquid used in the nurser will not flow through it without the application of more pressure than is exerted by the head of liquid in the bottle when it is inverted. According to this invention, the size of this passageway is adjustable by varying the tightness of cap **40**. Tightening of cap **40** causes bead **43** to press into nipple flange **27**, thereby causing the lower face of the nipple flange to be forced into groove **50** thereby decreasing the size of the passageway.

In operation, as liquid is withdrawn from the nurser through the tip of the nipple, the pressure in the nurser is decreased to below atmospheric pressure. Air then flows between threads **45** of the cap and interrupted threads **13** of the bottle, through radial groove **52**, then through grooves **50** and **51** into the nurser. If rapid feed-

ing is desired, cap **40** is tightened only enough to hold the nipple firmly, but when it is desired to slow down the feeding, the cap is tightened further, so that bead **43** forces the lower face of the nipple flange into groove **50** and reduces the size of the passageway. This reduces the flow of air, and therefore reduces the flow of liquid from the nurser.

Bead **43** has a dual function. In addition to its being used to regulate the venting, it also serves to lock the flange of the nipple between the cap and the bottle lip, by forcing the lower face of the nipple flange into groove **50**.

Due to the capillary size of groove **50**, as hereinbefore set forth, liquid in the nurser cannot leak out. Thus a vented nurser is provided in which the degree of venting can be easily regulated, and which will not leak liquid through the venting means.

While a preferred embodiment of the invention has been shown and described herein, many modifications thereof can be made by one skilled in the art without departing from the spirit of the invention, and it is desired to protect by Letters Patent all forms of the invention falling within the scope of the following claims:

We claim:

1. A nursing unit comprising a bottle, a nipple, and a screw cap, the bottle having a lip having a circular groove therein providing an inner and an outer annular projection, said outer annular projection having a radial groove extending outwardly from said circular groove to the outer periphery of the bottle lip, and said inner annular projection having a second radial groove circumferentially displaced from the first radial groove extending inwardly from the circular groove to the inner periphery of the bottle lip.

2. A nursing unit as defined by claim 1 wherein said circular groove is of capillary size.

3. A nursing unit comprising a bottle, a nipple, and a screw cap, said bottle having an externally threaded neck, said cap having internal threads mating with the bottle threads, said nipple having a flange adapted to be clamped between said cap and the end of the neck of the bottle, a circular groove in the end of the neck of the bottle providing an inner and an outer annular projection, a radial groove in the outer annular projection extending radially outwardly from the circular groove to the outer periphery of the bottle neck, and a second radial groove circumferentially displaced from the first radical groove in the inner annular projection extending radially inwardly from the circular groove to the inner periphery of the bottle neck.

4. A nursing unit as defined by claim 3 wherein said circular groove is of capillary size.

5. A nursing unit comprising a bottle, a cap, and a nipple, said bottle having an externally threaded neck

portion, a circular groove in the end of the neck providing an inner and an outer annular projection, said outer annular projection having a radial groove extending outwardly from said circular groove to the outer periphery of the bottle neck, and said inner annular projection having a second radial groove circumferentially displaced from the first radial groove extending inwardly from the circular groove to the inner periphery of the bottle neck; said nipple comprising a tubular portion having an outwardly extending flange, said flange extending outwardly substantially co-extensive with the outer periphery of the bottle neck; said cap comprising a disc shaped top portion having a depending bead on the lower face thereof of a diameter substantially the same as that of the circular groove in the end of the bottle neck, and a depending cylindrical skirt portion having internal threads adapted to engage the threads on the bottle neck.

6. A nursing unit as defined by claim 5 wherein the threads on the bottle neck are interrupted, and the inside diameter of the threads in the cap is larger than the outside diameter of the bottle neck, so that air can pass between the bottle neck and the cap skirt.

7. A nursing unit as defined by claim 5 wherein the circular groove is of capillary size.

8. A nursing unit as defined by claim 7 wherein the threads on the bottle neck are interrupted, and the inside diameter of the threads in the cap is larger than the outside diameter of the bottle neck, so that air can pass between the bottle neck and the cap skirt.

9. A nursing bottle having a neck portion, a circular groove in the end of said neck portion providing an inner and an outer annular projection, said outer annular projection having a radial groove extending outwardly from said circular groove to the outer periphery of the bottle neck, and said inner annular projection having a second radial groove circumferentially displaced from the first radial groove extending inwardly from the circular groove to the inner periphery of the bottle neck.

10. A nursing bottle as defined by claim 9 wherein said circular groove has a cross-sectional area of from about 0.00015 to about 0.0012 square inches, and a width which is from ¾ to 2 times the depth.

11. A nursing bottle as defined by claim 9 wherein said circular groove is of capillary size.

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