Sept. 5, 1967 G. BALLIN 3,339,771

INFANT FEEDING CONTAINER AND CAP ASSEMBLY

Filed May 17, 1966

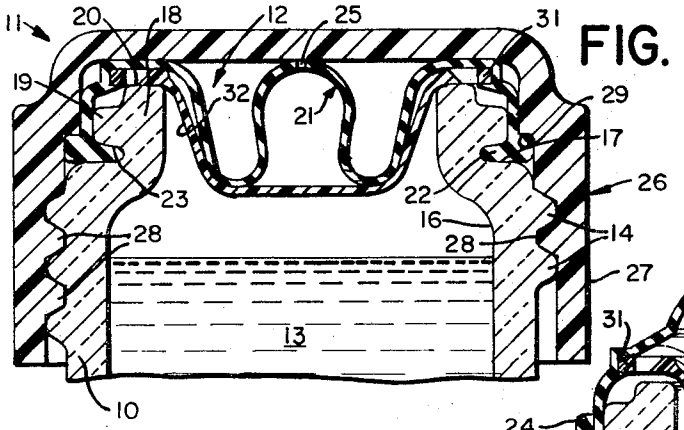


FIG. 1

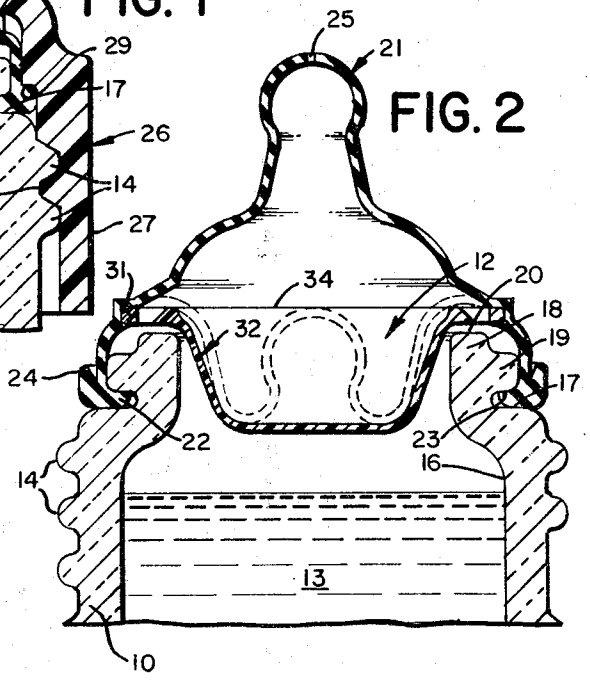
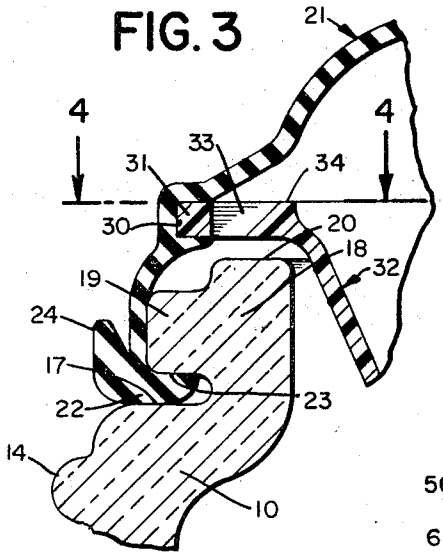


FIG. 2

FIG. 3



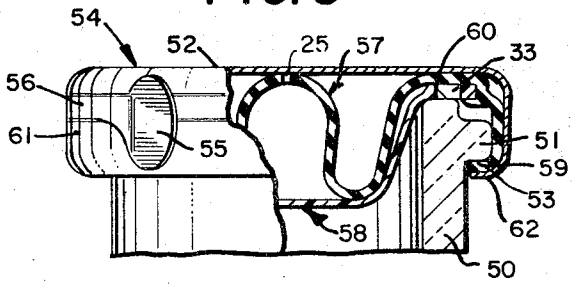


FIG. 5

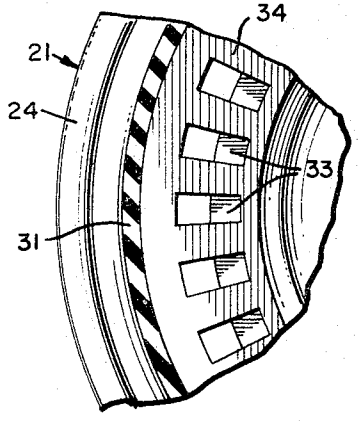


FIG. 4

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INFANT FEEDING CONTAINER AND CAP ASSEMBLY

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This invention relates to an infant feeding container and more particularly to a combined infant feeding container and cap assembly suitable for use in pre-sterilizing the container, nipple and contents therein and maintaining such sterilization until the contanier is ready for use.

Conventionally, an infant feeding bottle and cap has a nipple on one end and a threaded cap for maintaining the nipple in sealed position with the top of the bottle. Various methods heretofore have been used to maintain the bottle and nipple in sterile condition prior to use, such as by physically removing the nipple and inverting it, so that the nipple extends into the interior of the bottle, and covering the reversed nipple with a plate or disk. A cap maintains the seal and is threaded on the bottle until the bottle is ready to be used. The cap is unthreaded and the nipple carefully removed from the bottle, turned over, and the cap with the plate removed placed around the nipple and rethreaded on the bottle to make a seal between the underside of the flange of the nipple and the top of the bottle to prevent leakage. While this construction offers advantages of being able to pre-sterilize the interior and contents of the container, to maintain such sterilization, care has to be taken in removing and reversing the nipple just prior to use, or else the sterile condition is destroyed.

Another prior art construction has utilized a nipple cover which fitted over the erect nipple portion after sterilization to maintain it in sterile condition until ready to be used. In use this cover was physically removed and the bottle was ready to be used. This construction offered serious disadvantages in that the cover had to be sterilized separately and often was not put on correctly or, if put on correctly, it was difficult to remove.

Attempts have been made heretofore to prebottle feeding formula for infants in the infant feeding containers in sterile condition, so that the infant feeding containers are ready to be used and hence the necessity of individual mixing of ingredients to prepare formula for a day, or sterilizing the filled bottles, is avoided. One method of doing this is shown in my prior Patent No. 3,219,221 issued Nov. 23, 1965.

The present invention aims at providing an improved infant feeding container and cap assembly which can be prepackaged with formula in sterilized condition, which sterile condition can be maintained until the bottle is ready to be used, and which container requires the minimum amount of time to make it ready for use, by even the most unskilled help.

According to the present invention, a cap assembly is provided for a bottle having a nipple affixed to the bottle and extending erect therefrom in a ready-to-be-used position. Means are also provided for depressing the nipple inwardly into the interior of the container so that the nipple in conjunction with a disk provided below the nipple forms a seal to prevent the expulsion of any of the contents of the bottle prior to use. In the depressed position the bottle, nipple and contents are sterilized. The bottle is ready to be used by simply removing the outer cap assembly and allowing the nipple to spring into erect position in sterile condition ready for use.

The invention will be described in greater detail below and in the drawings, in which:

FIGURE 1 is a front elevational view, in section, showing the general arrangement of a cap assembly in combination with a nipple on an infant feeding container, in accordance with the present invention;

FIGURE 2 is a front elevational view, in section, of the arrangement shown in FIGURE 1, with the cap assembly removed;

FIGURE 3 is an enlarged view of the area of the nipple adjacent the top rim of the bottle;

FIGURE 4 is a top plan view of the sealing disk; and

FIGURE 5 is a front elevational view, in partial section, showing a further embodiment of a cap assembly, in sealed condition.

Referring first to the embodiment shown in FIGURES 1 through 4 of the drawings, numeral **10** generally designates a bottle or other type of container with which a cap assembly **11**, constructed in accordance with the present invention may be used. Bottle **10** is of a general configuration similar to the conventional infant feeding bottle heretofore used and has an opening **12** at the top.

Bottle **10** contains a liquid **13** which may be milk or any other formula prescribed for feeding, and is provided with a neck **16** having exterior threads **14** thereon. Neck **16** has a reduced diameter mouth **18** which forms a shoulder **17** with the threaded neck portion **16**. The upper edge of mouth **18** has an annular flange section **19** directed outwardly. A portion of mouth **18** extends above the annular flange **19** forming an annular horizontal surface **20**.

As shown in FIGS. 2 and 3, a flexible nipple **21** is mounted on mouth **18**. The bottom edge of the nipple **21** contains an annular inwardly extending rib **22** which abuts shoulder **17** on the bottom and abuts shoulder **23** of annular ring **19** on the top to form a tight sealing engagement. Surrounding the outer peripheral surface of nipple **21** and horizontally aligned with rib **22** is an annular rib **24** which has an upwardly and outwardly tapered inner surface spaced from the outer surface of nipple **21** when nipple **21** is in its normal erect position as shown in FIGURE 3. Nipple **21** is provided with an opening **25** at its top center.

A cap assembly **11** mounted on container **10** includes a cap **26** having tubular side walls **27**. The interior of side wall **27** is provided with a series of threads **28** complementary to threads **14**. The outer peripheral surface of cap **26** may, if desired, be provided with a knurled or roughened surface to aid gripping and rotating the cap on the bottle. The interior of cap **26** is also provided with an inwardly extending annular shoulder **29**.

Referring particularly to FIGURE 3 the interior of nipple **21** is provided with an annular groove **30** having a rectangular cross-section. The groove **30** is located so that it is a small distance above the top of shoulder **20** of the bottle **10** when the nipple is in its erect position. Coaxially located within nipple **21** is an insert **32** which is disposed within groove **30** of the nipple. Insert **32** contains an edge portion **31** designed to fit groove **30** with a close sealing relationship. Insert **32** is of sufficient size so that an annular horizontal portion **34** extends across shoulder **20** of bottle **10**. As shown in FIG. 4, peripherally disposed around annulus **34** of insert **32** is a series of openings **33**. Insert **32** may be made of plastic or any other suitable material which will not deform when subjected to sterilizing temperatures and which will be nonreactive in contact with the interior contents of bottle **10**.

In operation insert **32** is installed in nipple **21** and the entire nipple assembly is then forced over the rim of the bottle so that the rib **22** is located in the recess formed by **17** and **23** in a tight sealing relationship. Cap **26** is then threaded onto threads **14** and tightened downwardly. The top portion of nipple **21** will be depressed downwardly into the receptacle provided in insert **32** and the cap is then tightened further until the entire nipple assembly

and insert is depressed onto shoulder **20** of rim **18**. When the cap is in its fully tightened position insert **32** will be forced downwardly so that annulus **34** will be in abutting relationship with shoulder **20** of bottle **10**. In this position peripheral holes **33** are sealed against shoulder **20**. The rubber material of the nipple **21** exterior of the insert **32** will be forced outwardly causing a tight sealing fit with the interior surface of cap **26**. In addition, as cap **26** is tightened, shoulder **29** will engage rib **24** at the bottom periphery of the nipple causing a tight sealing relationship to prevent entry of contaminants from outside of the bottle. The seal thus formed prevents leakage of the contents or of vapor formed during the sterilization processing or entry of contaminated air, until the cap is loosened when the container is ready to be used. Further, insert **32** when in a sealed position prevents contact between the bottle contents and the nipple thereby preventing deterioration of the nipple by contact with the milk.

Referring to FIGURE 2, to utilize the container and contents, cap **26** need merely be removed. When cap **26** is removed the resiliency of nipple **21** will cause it to spring upwardly moving insert **32** upwardly with it thereby opening passages **33** so that the contents of the bottle can pass over shoulder **20** and out through openings **33**. The milk or other material contained within the bottle will pass through openings **33** into the nipple where it may be utilized by the infant in the normal manner. Annular portion **34** of insert **32** must be located sufficiently above shoulder **20** so as to prevent clogging of the passage area by the liquid being used to feed the infant. Since there is no necessity to touch the nipple or any portion of the interior of the bottle in the preparation of the bottle for use, no contamination can result.

FIGURE 5 discloses a modified form of the cap assembly utilizing the same general arrangement as that shown in FIGURE 1.

A container **50** for milk, feeding formula or other liquid to be supplied to an infant contains an annular outwardly extending rib **51** spaced a small distance below the top of the bottle. A nipple and insert assembly **57** and **58** of the same general configuration as that shown in FIGURE 1 is mounted at the top of bottle **50**. The lower edge of nipple **57** contains an inwardly extending annular rib **53** which is designed to fit below and against rib **51**. The nipple **57** and insert **58** engage shoulder **60** of bottle **50** in the same manner as in FIGURE 1 so to close openings **33** when the cap is in its sealed position.

A one-piece cap **54** is adapted to be removably mounted on the neck of bottle **50** and has a top wall portion **52** and an annular side wall portion **61**. An inwardly extending annular lip **62** is located at the bottom edge of the cap assembly.

To assemble cap **54** onto container **50**, the cap is placed above the erect nipple **57** and forced downwardly. This forces the nipple into the compressed position shown in FIGURE 5 and at the same time seals openings **33** of insert **58** against shoulder **60**. As shown in FIGURE 5 the lower edge of cap **54** is then bent inwardly under rim **59** of nipple **57** sealing the entire bottle from outside contaminents. Cap assembly **54** can be easily removed by pulling tab **55** which can be pulled out by the user and rolled back. Area **56** constitutes an area of weakened material which allows the upper portion of cap **54** to be separated from the bottle. When the separation occurs the nipple will spring outwardly raising insert **58** away from shoulder **60** and allowing the contents of the bottle to be evacuated. The remaining portion of cap **54** will seal the lower edge of nipple **57** so that no leakage can occur and to prevent the nipple from sliding down the bottle.

The cap inserts, as described above, may be molded of any suitable material, such as any of the many available appropriate synthetic organic resins, and may be polyethylene, polypropylene formaldehyde urea or deformable metals, such as aluminum or copper or combinations of these materials.

While preferred embodiments of the invention have been described above, it will be understood that these are illustrative only, and the invention is limited solely by the appended claims.

What is claimed is:

1. A cap and nipple assembly for a liquid-containing vessel having a mouth, comprising a flexible nipple, means for mounting said nipple on said mouth, an insert apertured adjacent its periphery, means on said nipple for retaining the edge of said insert with its aperture communicating with the interior of the nipple and the interior of the vessel when said nipple is in an erect position, and a cap structure cooperating with said nipple and vessel to sealably force said insert against the mouth of said vessel to seal said insert against said vessel when said cap structure is in a sealed position.

2. A cap and nipple assembly according to claim **1** further comprising threads exterior to said mouth and cooperating threads interior of said cap structure.

3. A cap and nipple assembly according to claim **1** wherein the means for retaining said insert is an annular groove interior of said nipple.

4. A cap and nipple assembly according to claim **1** wherein said means for mounting said nipple on said mouth comprises an annular rib on the interior bottom of said nipple and a groove on the exterior of said mouth designed to receive said rib.

5. A cap and nipple assembly according to claim **1** further comprising an annular rib exterior to the bottom of said nipple, and an annular shoulder portion interior of said cap located to engage said rib when said cap is in its sealed position.

6. A cap and nipple assembly according to claim **1** wherein said mouth has a flat surface perpendicular to the center line of said vessel and said insert has an annular flat surface, said aperture in said insert being located in said flat annular surface so as to be sealed by the flat surface of the mouth when the cap structure is in a sealed position.

7. A cap and nipple assembly according to claim **1** wherein said insert has a depressed center section.

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