

Nov. 23, 1965

G. BALLIN

3,219,221

INFANT FEEDING CONTAINER AND CAP ASSEMBLY

Filed Oct. 8, 1963

2 Sheets-Sheet 1

FIG. 1

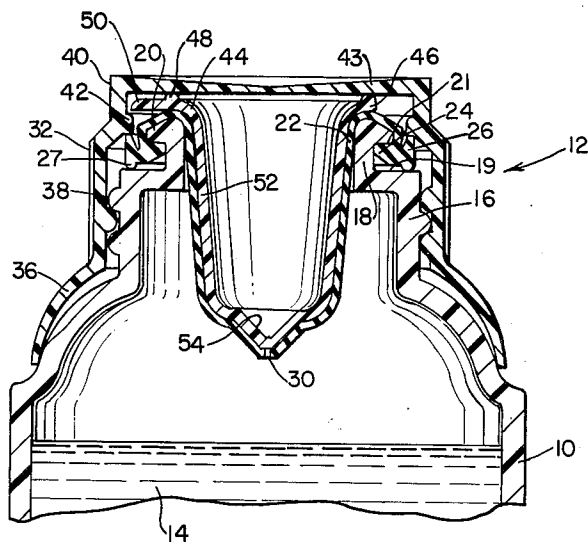


FIG. 2

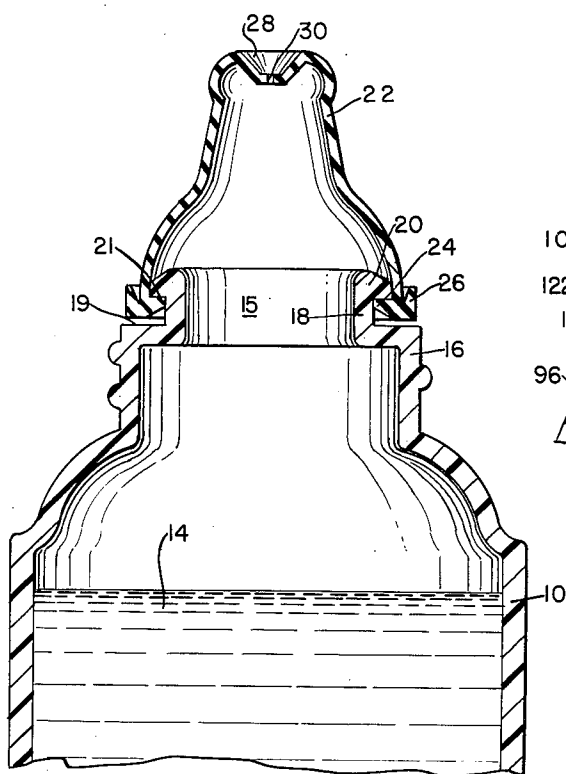


FIG. 3

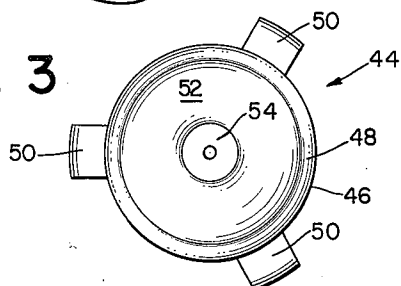
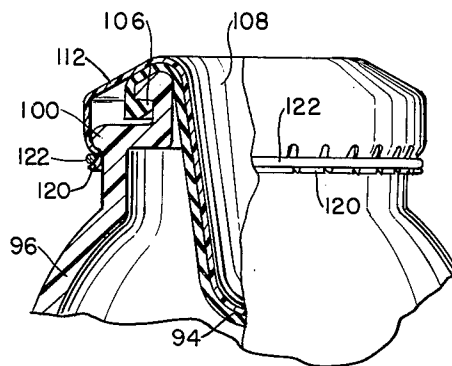


FIG. 7

INVENTOR.
GENE BALLIN

BY

Darby & Darby

ATTORNEYS

Nov. 23, 1965

G. BALLIN

3,219,221

INFANT FEEDING CONTAINER AND CAP ASSEMBLY

Filed Oct. 8, 1963

2 Sheets-Sheet 2

FIG. 4

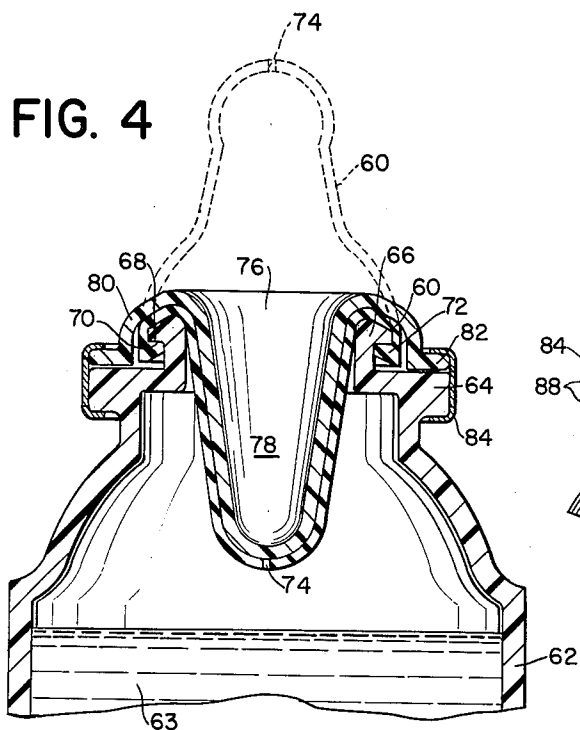


FIG. 5

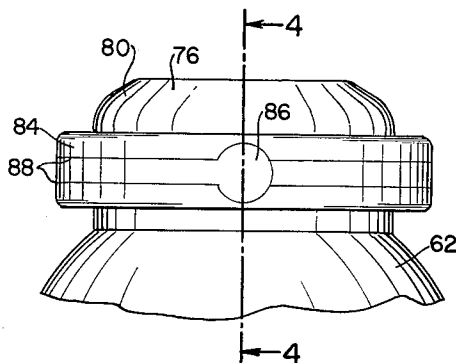


FIG. 6

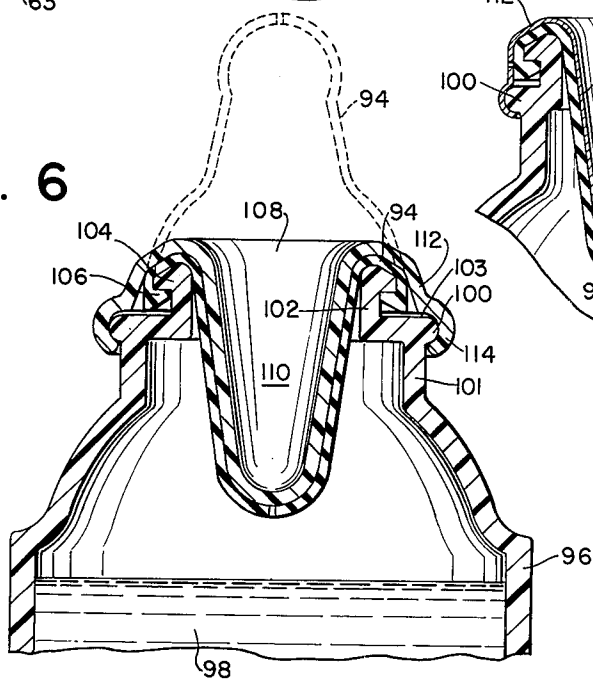
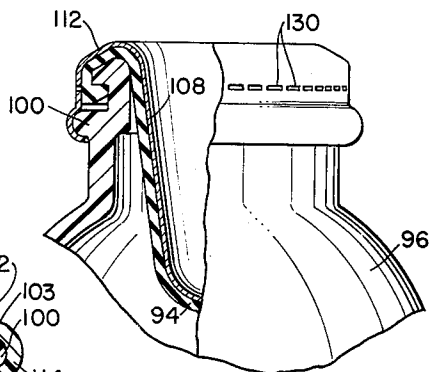


FIG. 8



INVENTOR.
GENE BALLIN

BY

Darby & Darby

ATTORNEYS

1

3,219,221 INFANT FEEDING CONTAINER AND CAP ASSEMBLY

Gene Ballin, Freeport, N.Y.
(3045 Shore Drive, Merrick, N.Y.)
Filed Oct. 8, 1963, Ser. No. 314,769
8 Claims. (Cl. 215—11)

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

A conventional 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 disc. 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 offered advantages of being able to presterilize the interior and contents of the container, and maintain it, care had to be taken in removing and reversing the nipple just prior to use, or else the sterile condition was destroyed.

Another prior art construction 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 heretofore made to prebottle formula for infants in 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. Formula has been packaged in bulk and shipped, and a predetermined quantity of formula placed in sterile bottles, which were capped and sealed in the usual manner, as described above. Attempts at filling individual bottles with formula in a sterile condition, so that the bottle would be ready for feeding with little or no additional work have failed, especially where large quantities of bottles are needed, such as for hospitals.

In view of the shortage of nurses in hospitals, and the high cost of trained help, which are necessary to prepare and bottle formula for infants under the stringent sanitary conditions required for newborn babies, attempts have been made to devise a container, nipple and cap assembly which could contain ready-to-use formula in a sterile condition, so that the bottle can be ready for use without any time-consuming careful preparation of the bottle to make ready for use. For nurses or aides in the hospital to unthread the cap, reverse the nipple and rethread the cap just prior to use for a large number of bottles normally needed at one time, creates sanitary problems, as well as expending too much time per bottle for the large number of infants to be fed at one time in hospitals.

2

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

According to the present invention, there is provided a cap assembly for a bottle having its nipple affixed to a bottle and extending erect therefrom in a ready to be used position, wherein the nipple is depressed inwardly into the interior of the container and fully inverted, maintained and supported in this position, and the bottle, nipple and contents are sterilized. The bottle is ready to be used by simply removing the cap assembly and the nipple springs back into erect position in sterile condition ready for use without any further handling.

A further object of the present invention is to provide a cap assembly for infant feeding bottle with a nipple affixed thereon, which maintains the nipple in inverted and sealed position within the bottle during the sterilizing process, and which is easily removed when the bottle is ready to be used.

A still further object of the present invention is to provide a prefilled infant feeding container with a cap assembly, which can be sterilized and a tamperproof seal provided so that the sterile condition will be maintained at all times, until the seal is broken, which provides a visible indication of whether the sterile condition is maintained.

Another object of the present invention is to provide a bottle with a nipple affixed at one end, which when inverted into the interior of the bottle provides a seal to prevent leakage from the bottle.

Still another object of the present invention is to provide a cap assembly and an infant feeding container which accomplishes all of the above in a simple, easy to use manner, which is positive-acting, durable in use and economical as to permit disposability of the entire unit after use.

These and other objects of the present invention will become more fully apparent from a consideration of the following description of preferred embodiments taken in conjunction with the appended drawings, in which like numerals designate like elements:

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, which is partially shown, in accordance with the present invention;

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

FIGURE 3 is a top plan view of the insert used with the cap assembly shown in FIGURE 1;

FIGURE 4 is a sectional view taken along line 5—5 of FIGURE 5, showing a further embodiment of a cap assembly and a tamperproof seal;

FIGURE 5 is a front elevational view of the embodiment of a cap assembly in combination with the container in sealed condition, shown in FIGURE 4;

FIGURE 6 is a front elevational view, in section, showing a further embodiment of a cap assembly in sealed condition, in combination with a container;

FIGURE 7 is a front elevational view, in section, showing a further embodiment of the present invention; and

FIGURE 8 is a front elevational view, partly in section, showing a further embodiment of the present invention, with a seal.

Referring first to the embodiment shown in FIGURES 1-3 of the drawing, numeral 10 generally designates a

bottle, vessel or container with which a cap assembly 12, constructed in accordance with the present invention, may be used. Advantageously, bottle 10 is of a general configuration similar to the conventional infant feeding bottle heretofore used and has an opening 15 at one end.

Bottle 10 contains a liquid 14, which may be milk, a formula of some type prescribed by a physician, or other type of liquid for an infant, and is provided with an exteriorly threaded neck 16. Neck 16 has a further reduced diameter mouth portion 18, which forms a shoulder 19 with the threaded neck portion 16. The upper edge of mouth 18 has an outwardly directed flange 20, which upper surface advantageously has a downwardly tapered circumferential surface, and which lower surface forms a shoulder 21.

Mounted on mouth 18 is a flexible nipple 22. Disposed circumferentially about the bottom edge of nipple 22 is a radially inwardly directed rib 24, which abuts shoulder 21 and has an inner diameter to abut the circumference of mouth 18 to form a tight sealing engagement therewith such as best seen in FIGURE 2. Surrounding the outer peripheral surface of a nipple 22 and generally horizontally aligned with rib 24, is an outwardly directed rim 26, which has an upwardly and outwardly tapered inner surface spaced from the outer surface of nipple 22, when nipple 22 is in its normal erect position, as best seen in FIGURE 2. Advantageously, rim 26 has a bead or rib 27 circumferentially disposed about its lower surface to engage with shoulder 19 on container 10 to aid in providing a better seal. Nipple 22 has at its apex a depression 28, which surrounds a nipple opening 30.

A cap assembly 12 mounted on container 10 includes a cap 32 with depending skirt portion 36. The inner surface of cap 32 is provided with threads 38 which are adapted to engage with the corresponding threads on bottle neck 16. The outer peripheral surface of cap 32 is preferably knurled, roughened or provided with longitudinal ribs 40 to aid in gripping and rotating cap 32 upon bottle neck 16. Cap 32 has an upwardly projecting rim 40 which is provided with an interiorly facing annular bead or rib 42 and a cover 43. Coaxially disposed within cap 32 is an insert 44. Insert 44 has a generally annular rim 46, which when in operative position within cap 32, is disposed in such radial relation to container 10 as to overlap the upper edge of flange 20 of mouth 18. Advantageously, annular rim 46 has an upwardly directed rib or bead 48, as best seen in FIGURE 1 which, when insert 44 is in its assembled position, engages the under surface of cover 43 of cap 32, so that the closing force of cap 32 is exerted directly onto the upper rim of flange 20. Radially outwardly extending from rim 46 is a plurality of arms 50, illustratively shown as 3 in FIGURE 3. As best shown in FIGURE 1, the outer ends of arms 50 extend radially beyond bead 42 of cap 32.

Downwardly extending from annular rim 46 is a finger or protuberance 52 in the general shape of an inverted nipple. At the apex of finger 52 is an extension 54, which cooperatively mates with the depression 28 of nipple 22. In operation, extension 54 mates with depression 28 of erect nipple 22 and hence aids in centering finger 52 with respect to nipple 22. Finger 52 is urged downwardly into container 10 and forces flexible nipple 22 to be depressed and inverted or reversed downwardly within neck 16 of container 10. When rim 46 of insert 44 urges nipple 22 into sealing contact with container edge 20, nipple 22 is full inverted within container 10. Finger 52 provides positive support to all of nipple 22 when nipple 22 is fully inverted inwardly into the interior of container 10 as best seen in FIGURE 1. Generally the outer surface of protuberance 52 has an inward taper to cooperate with the shape of nipple 22 to provide slight frictional gripping as finger 52 is withdrawn to aid nipple 22 to return to its original erect shape, as shown in FIGURE 2.

In operation, insert 44 is coaxially mounted within cap

32 by yieldingly snapping arms 50 past rib 42 into the position as shown in FIGURE 1. Arms 50 are free to rotate with respect to rim 40 of cap 32. The cap assembly with insert 44 in position is vertically aligned with respect to nipple 22, and extension 54 on finger 52 cooperatively mates with depression 28 in nipple 22. Cap 32 is forced downwardly toward container 10, so that skirt 36 encircles neck 16 and nipple 22 is depressed inwardly into the interior of container 10 and inverted by the inward movement of finger 52 into the interior of container 10, as best shown in FIGURE 1. Threading cap 32 on neck 16 of container 10 forces the undersurface of cover 43 to engage and urge downwardly bead 48 on insert 44 and forces finger 52 fully into container 10. Since finger 52 frictionally engages nipple 22, there is no rotation of finger 52 as cap 32 is threaded or unthreaded. Upon tightening cap 32, the under surface of rim 46 of insert 44 is urged downwardly towards the upper edge of flange 20 of neck 16 and nipple 22 is bent over and covers the tapered edge of flange 20. The under surface of rim 46 forces nipple 22 into sealing contact with the edge of flange 20 to form a vapor-tight seal. Due to the flexibility and yieldability of nipple 22, nipple 22 accommodates itself to any slight production variation in shape or dimensions of bottle neck 16. As shown best in FIGURE 1, when finger 52 is fully extended into the interior of container 10, the inner circumferential edge of flange 20 on neck 16 is spaced from the outer surface of finger 52 by the general thickness of nipple 22. The tapered surface of finger 52 makes a tight seal by forcing nipple 22 into tight engagement with neck 16. Also, when cap 32 is fully threaded, bead 42 on cap 32 engages the upper edge of nipple rim 26.

As shown in FIGURE 1, nipple 22 is fully inverted within container 10 and is supported throughout its surface by finger 52. A fluid-tight seal is formed by the downward pressure exerted on nipple 22 about mouth flange 20, so that no fluid can escape from or enter into container 10 and contaminate the contents 14 contained therein. Heat is applied to container 10 in the desired quantity and for the desired time interval to full sterilize nipple 22 and contents 14 without any danger of popouts of nipple 22 by reason of the vapor pressure created within container 10 during the heating process. Heating of large quantities of bottles containing milk or formula are done in autoclaves with relatively high temperature used.

The seal formed by the inverted nipple prevents leakage of the contents or vapor formed during the sterilizing process, or entry of contaminated air, until the cap is loosened when the container is ready to be used.

To use, after the container and contents have cooled, cap 32 is loosened by unthreading it from bottle neck 16. Rotating cap 32 does not rotate finger 52. Cap 32 is fully unthreaded and removed from neck 16 of container 10, also removing finger 52. Since the dimensions of finger 52 are slightly larger than the dimensions of the normal inverted nipple 22, there is a friction of force exerted on nipple 22 as finger 52 is withdrawn, which aids in snapping nipple 22 back to its normal erect shape, as shown in FIGURE 2, and container 10 is ready to be used. Since only cap 32 is handled during opening, there can be no possible contamination of nipple 22 or the contents 14. The only operation to place the container in ready-to-use condition is the unthreading operation.

The tapered space formed between nipple 22 and rim 26 about the base of nipple 22 cooperates with equipment for automatically affixing nipple 22 onto mouth 18 of container 10.

The tapered upper surface of flange 20 aids in assembling nipple 22 on mouth 18, since it allows flexible nipple 22 to be gradually enlarged before its slips over shoulder 24. Also, the tapered surface of flange 20 provides a generally smooth curved surface for nipple 22 to be flexed to form a tight seal therewith, and has no sharp points of stress to induce rupture.

FIGURES 4 and 4 show a modified form of the cap assembly which incorporates the depending finger generally similar to the one already described.

Nipple 60 is mounted on a container 62 which contains a liquid 63, which may be milk, formula or other liquid to be supplied to an infant. Container 62 has an annular outwardly directed flange 64 integrally mounted about neck 65. Above flange 64, neck 65 has a reduced inner diameter portion 66, which has about its upper edge an outwardly directed flange 68, having a shoulder 70 on its under surface. The upper rim of flange 68 has a radially inwardly directed annular rib or flange 72 about its inner base, which sealingly engages the outer circumferential surface of reduced neck portion 66 between flange 64 and shoulder 70. Nipple 60 has an opening 74 through which the liquid is passed during the sucking operation.

A one-piece cap 76 is adapted to be removably mounted on neck 65 and has a downwardly depending finger portion 78 and an outwardly and downwardly flared skirt portion 80. Disposed annularly about the circumferential outer edge of skirt portion 80 is an outwardly directed flange 82, which is juxtaposed to the upper surface of bottle flange 64 when finger portion 78 is depending into bottle 62. Skirt portion 80 of cap 76 has a surface generally parallel to the downward taper of upper rim of container 62.

To assemble cap 76 onto container 62, the lower edge of finger 78 urges the apex of erect nipple 60, as indicated by the dotted lines in FIGURE 4, downwardly and into the interior of container 62. As finger 78 is urged further into the interior of container 62, nipple 60 is pushed back into container 62 until flange 82 rests on bottle flange 64. Skirt portion 80 of cap 76 conforms to the corresponding tapered upper rim of container 62 and urges nipple 60 into sealing contact therewith. Flange 82 is clamped onto flange 64 of container 62 in any convenient manner, such as by a metal sealing band 84, which forces flange 82 into tight sealing engagement with flange 64. As shown, sealing clamp 84 can be easily removed by means of a tab 86, which can be pulled out by the user and rolled back. Two parallel lines 88 of weakened material allows sealing or clamping rim 84 to be removed by an easy twisting movement. After the clamping seal 84 is removed, cap 76 is removed from container 62, which withdraws finger 78 and allows and aids nipple 60 to snap back to its erect position as shown by dotted lines in FIGURE 4.

A further embodiment of the present invention is shown in FIGURE 6 in which a nipple 94 is mounted on a container 96 having liquid contents 98 therein. Container 96 has an annular rib 100 disposed about the outer peripheral surface of neck 101. Container 96 has a reduced diameter throat 102 forming a shoulder 103 and terminating in an outwardly directed flange 104. The upper rim of flange 104 is downwardly tapered in a manner similar to that described above with respect to FIGURE 4. Nipple 94 is mounted on neck 101 and has an inwardly directed flange 106, which sealingly mates with the outer diameter of throat 102 and the under surface of flange 104. Advantageously, nipple flange 106 abuts shoulder 103 to prevent passage of air or vapor. Nipple 94 is inverted into the interior of container 96 by means of a one-piece cap 108 having a depending finger 110, which urges nipple 94 into inverted position within container 96, as shown in FIGURE 6, in a manner similar to that described above. Cap 108 has outwardly and downwardly extending skirt portion 112, which has a portion corresponding to the tapered outer edge of flange 104. Skirt 112 terminates in an annular snap ring 114, which cooperates with annular rib 100 to hold cap 108 in operative position on neck 101 against pressure build up within container 96, during the sterilizing process.

To use, snap ring 114 is sprung past rib 100 and cap 108 removed from neck 101. Since the outer surface of

finger 110 frictionally engages the outer surface of nipple 94, nipple 94 is snapped back to its erect position, as best shown by dotted lines in FIGURE 6.

Still another embodiment of the present invention is shown in FIGURE 7 which corresponds generally to the embodiment shown in FIGURE 6 and the same identifying numerals identify respective elements. In place of snap ring 114, the embodiment shown in FIGURE 7 has a plurality of outwardly turned fingers 120, which are snapped past rib 100 on container 96 to hold cap 108 in operative position. When fingers 120 are in holding position with respect to rib 100, cap 108 urges nipple 94 into its fully inverted position within container 96 and forces nipple 94 into vapor sealing engagement with the upper rim 104 of container 96. Advantageously, to provide a tamperproof seal and aid in maintaining cap 108 in its operative position on container 96, a wire is mounted about the curved surface of fingers 120 and sealed in some manner, such as by soldering, clamping or other manner of physically attaching wires together and thereby providing a visual indication when the seal is broken.

Still another embodiment is shown in FIGURE 8, which has a one-piece cap generally similar to that shown in FIGURES 6 and 7. Cap 108 is advantageously made of deformable material and is sealingly mounted on bottle 96. Cap 108 is forced beneath the shoulder of rib 100 and crimped into position. Circumferentially disposed about skirt portion 112 of cap 108 is a series of intermittent slits 130, which allow cap 108 to be separated from the crimped under portion below the slits 130, and thereby allow cap 108 to be removed and allow the nipple to return to its fully extended and erect position.

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

Also, the caps disclosed may be hollow, solid or covered to prevent moisture collecting spaces. Further, the caps disclosed advantageously have a tapered surface so as to provide a slight frictional engagement with the nipples in their inverted positions to aid in the nipples springing back into erect position.

An infant feeding container and cap assembly has thus been disclosed for use with prepackaged formula or milk, which allows easy sterilizing of large quantities of such containers in tightly sealed condition, in autoclaves at relatively high temperatures for extended periods of time, with resulting internal pressure created within the containers, which maintains the nipples of the infant feeding container in inverted position within the container fully supported throughout its surface to prevent forced popout, by reason of the pressures created within the containers. On cooling, the cap is maintained in position on the container to insure sanitary surfaces and allows easy provision of a tamperproof seal to quickly show untampered condition until the feeding container is ready to be used. To use, the cap is simply and quickly removed by any unskilled help in an easy manner with no chance of contamination of the nipple or contents of the container, and the nipple automatically reverts to its upright position upon removal of the cap. Further, the simple construction allows the container and cap assembly to be made inexpensively of inexpensive materials and thus allow the entire unit to be discarded after use.

It will be apparent to those skilled in the art that various other changes may be made in the construction of this device without departing from the spirit and scope of this invention.

I claim:

1. A cap assembly for a liquid containing vessel having a mouth and a flexible nipple mounted on said mouth, comprising an elongated finger having the general shape of an inverted nipple and inserted into said vessel through

7

said mouth and fully inverting said nipple within said vessel, said finger having an outer surface frictionally engaging the outer surface of said inverted nipple, and cap structure cooperating with said inserted finger to provide a closure for said vessel mouth.

2. A cap assembly for a liquid containing vessel having a mouth and a flexible outlet bulb mounted on said mouth, comprising an elongated finger having the general shape of an inverted nipple and inserted into said vessel through said mouth and inverting said bulb within said vessel, said finger having an outer surface frictionally engaging the outer surface of said inverted bulb, closure structure cooperating with said finger to provide a closure for said vessel mouth, and sealing structure responsive to tightening of said closure upon said vessel for urging said bulb against the rim of said mouth to form a closure seal for said vessel.

3. A cap assembly for an infant feeding container having a flexible nipple mounted thereon, comprising a finger having the general shape of an inverted nipple and having its longitudinal axis substantially parallel to the axis of said container, means removably mounting said finger into the interior of said container, said finger engaging and depressing the erect portion of said nipple into said container and inverting said nipple, said nipple being supported in its inverted position within said container, and means urging said nipple into sealing contact with the rim of the mouth of the container.

4. A cap assembly for a liquid containing vessel having a mouth and a flexible nipple mounted on said mouth, comprising an elongated finger depending into said vessel from said mouth, said finger fully inverting and fully supporting said nipple in said inverted position within said vessel, means clamping said finger onto said vessel mouth, and sealing structure responsive to said clamping of said finger for urging said nipple against the rim of said mouth to form a vapor-tight seal for said vessel.

5. A cap assembly for a liquid containing vessel having a mouth and a flexible nipple mounted on said mouth, comprising an elongated finger having the general shape of an inverted nipple and having one end depending into said vessel through said mouth, said finger inverting said nipple within said vessel, means cooperating with said finger to provide a closure for said vessel mouth, holding structure removably clamping said closure means onto said mouth, and sealing structure responsive to clamping said closure upon said vessel for urging said nipple against said mouth to form a closure seal for said vessel.

6. A cap assembly for an infant feeding container having an outwardly directed flange about the mouth of the container and a flexible nipple mounted thereon, comprising a finger having the general shape of an inverted nipple and having one end depending into said container with its longitudinal axis substantially parallel to the axis of said container, said finger inverting said nipple within said

8

container and having a surface frictionally engaging the outer surface of said nipple, sealing structure urging said nipple against the rim of the mouth of the container for sealing said container holding structure cooperating with the other end of said finger for providing a closure for said vessel mouth, said closure yieldably engaging said container flange for clamping said closure onto said container mouth, and visible indicia means for maintaining said closure on said container.

7. A cap member for a liquid containing vessel having a flange extending about a mouth and a flexible nipple mounted on said mouth, comprising an elongated finger having one end depending into said vessel through said mouth, said finger inverting said nipple into said vessel, a surface extending from the other end of said finger and overlying said vessel mouth and said flange, said surface being crimped below said flange for holding said nipple in inverted position; a series of coplanar slits in said surface for forming a weakened plane, said finger being removable from said container by breaking said surface along said weakened plane.

8. A closure assembly for a container having a threaded mouth opening and a nipple mounted about said mouth opening, comprising a cap member having a depending cylindrical skirt portion provided with screw threads adapted to inter-engage with the threaded mouth of said container, said cap having an upwardly extending rim, a cover wall disposed about the free end of said rim, said rim having an interiorly facing rib on its inner peripheral surface spaced from said end wall, an elongated finger coaxially disposed within said cap member and facing the same direction as said skirt portion, said finger having a generally inwardly tapered outer surface and an annular rim disposed about the larger diameter end, a plurality of radially extending fingers attached to said annular rim and cooperating with said rib in said rim portion of said cap member, so that said finger is rotatably disposed within said cap member, an extension on the smaller diameter end of said finger adapted to cooperate with the apex of said nipple for guiding said nipple into the interior of said container as said finger is introduced through the neck of the container said finger rim urging said nipple into sealing engagement with the mouth of said container in response to the cap element being threadedly assembled on the mouth of the container.

References Cited by the Examiner

UNITED STATES PATENTS

2,628,913	2/1953	Horan	215—11
2,956,702	10/1960	Ransom	215—11
3,064,113	11/1962	Pitrone	215—11

FRANKLIN T. GARRETT, *Primary Examiner*.

GEORGE O. RALSTON, *Examiner*.