

[54] **PRIMARY NURSER ASSEMBLY**  
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3,220,588 11/1965 Lipari..... 215/11 R  
 3,266,910 8/1966 Barnby..... 99/171 ND  
 3,439,824 4/1969 Merrill, Jr. et al..... 215/11 C  
 3,530,979 9/1970 Merrill, Jr. et al..... 215/11 C  
 3,603,469 9/1971 Magni..... 206/47 A  
 2,628,910 2/1953 Horan..... 99/17 ND

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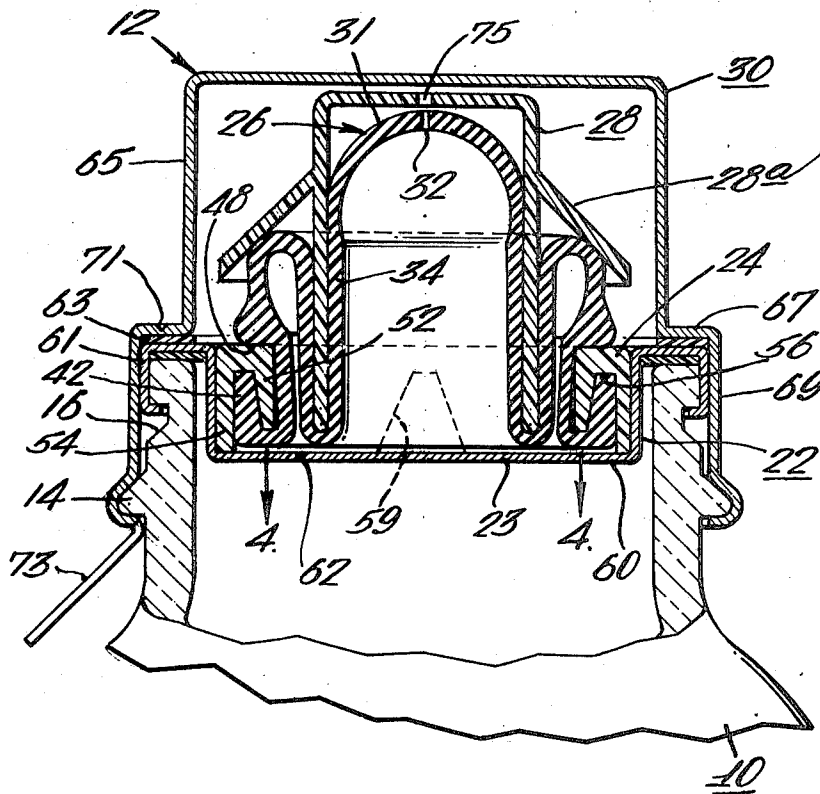
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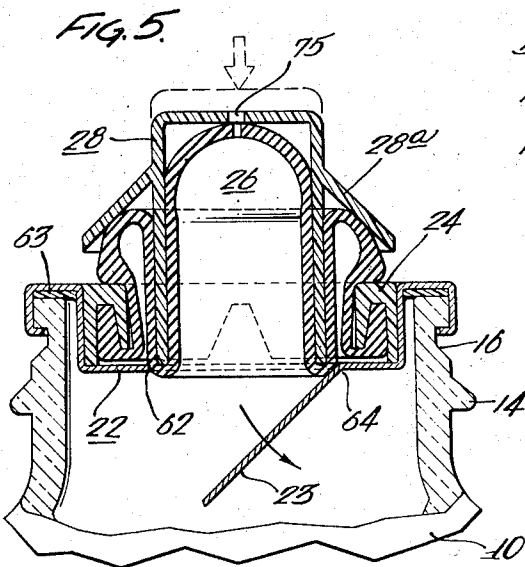
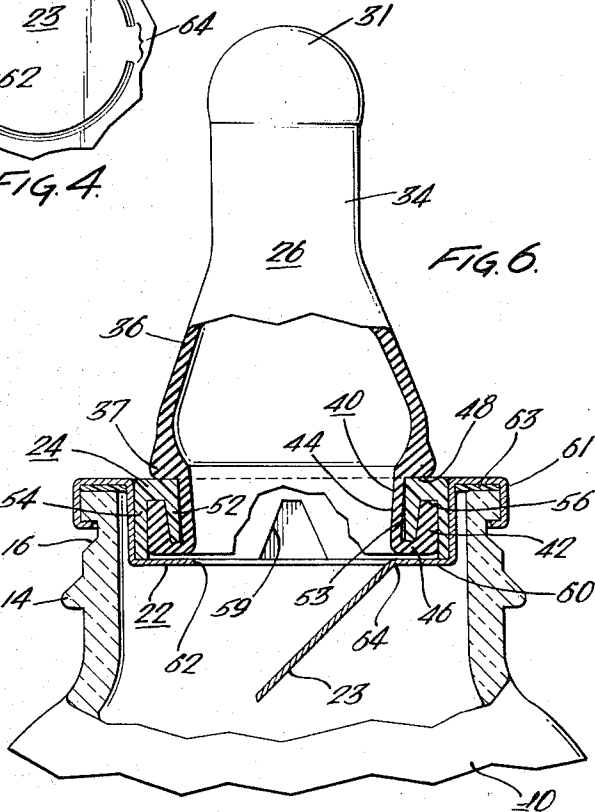
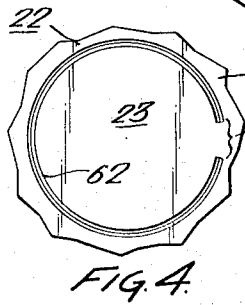
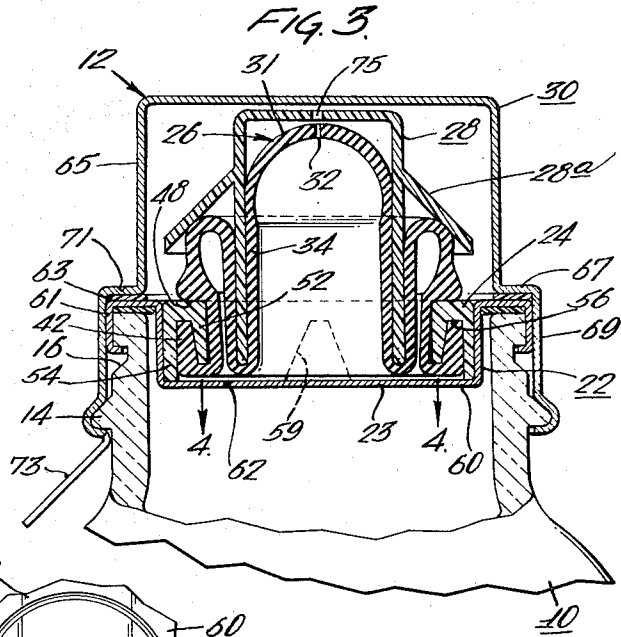
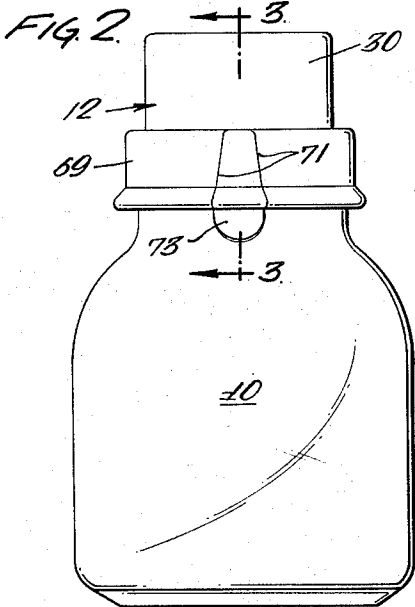
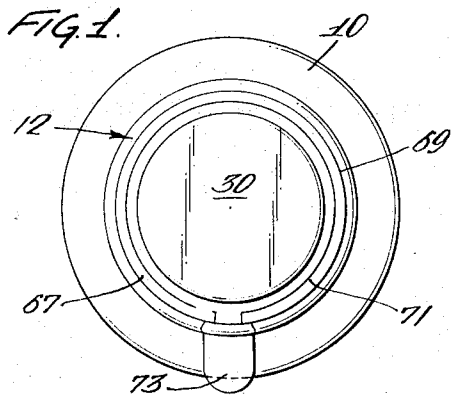
[57] **ABSTRACT**

A primary nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a portion at least partially detachable to provide an access opening for discharge of the contents of the container, a nipple having a base portion overlying the dam, a pusher element engageable over the feeding tip of the nipple operable upon displacement toward said dam to partially detach said portion, and an outer cover assembly hermetically sealing said elements.

18 Claims, 32 Drawing Figures

[56] **References Cited**  
**UNITED STATES PATENTS**  
 3,635,724 1/1972 Schaar ..... 215/11 C  
 3,519,157 7/1970 Meierhoefer..... 99/171 ND  
 3,323,276 6/1967 Thomas..... 215/11 C  
 2,793,776 5/1957 Lipari..... 215/11 R  
 3,187,918 6/1965 Moore..... 215/11 C



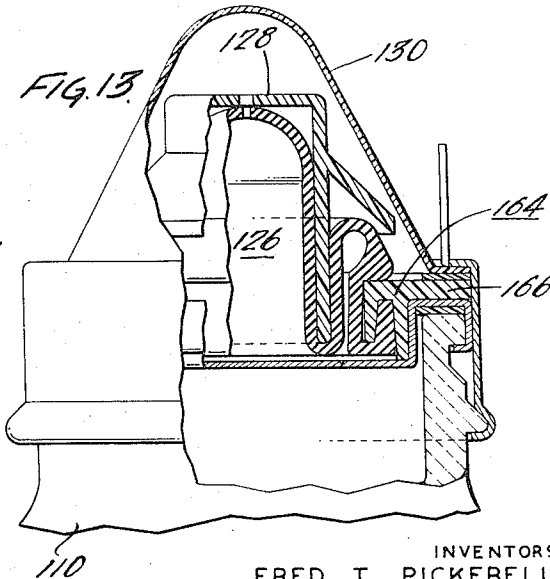
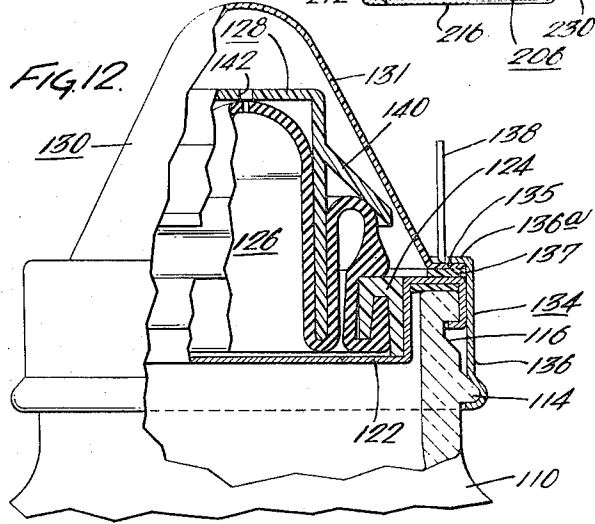
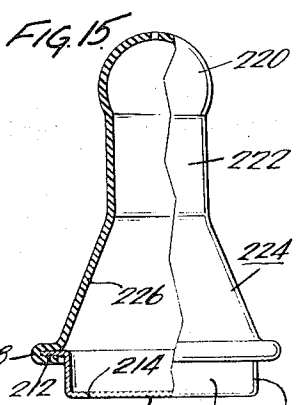
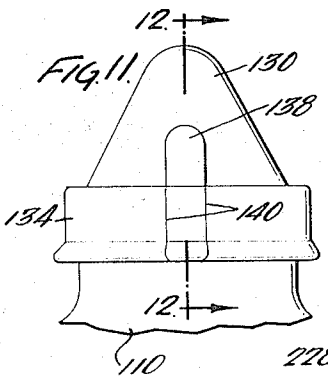
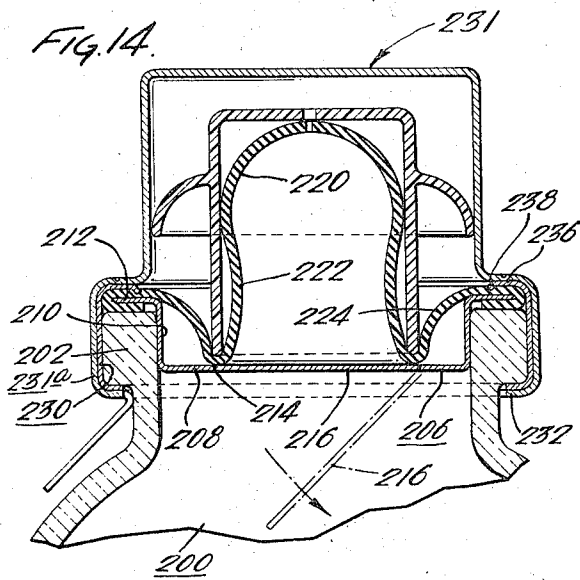
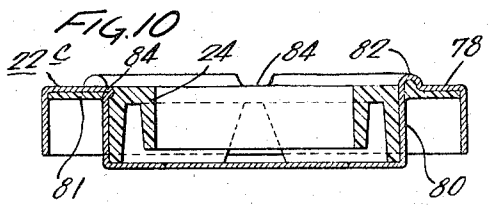
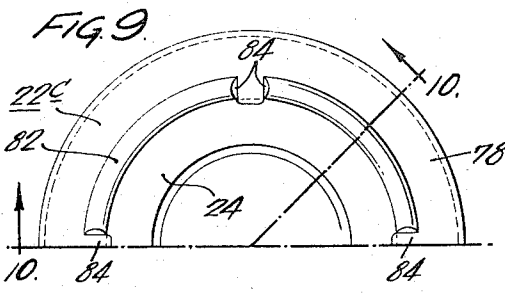
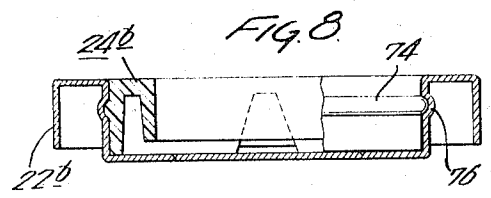
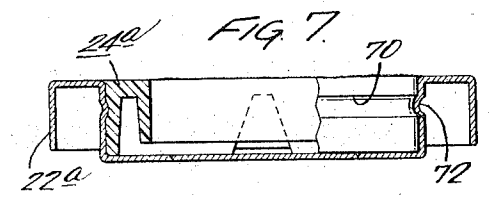


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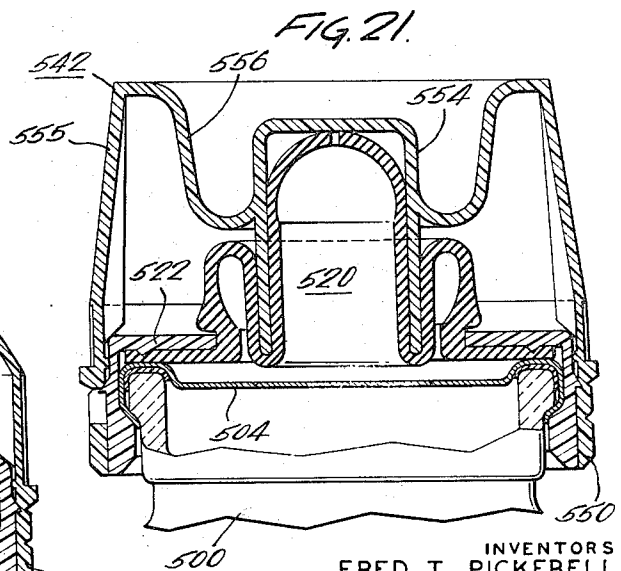
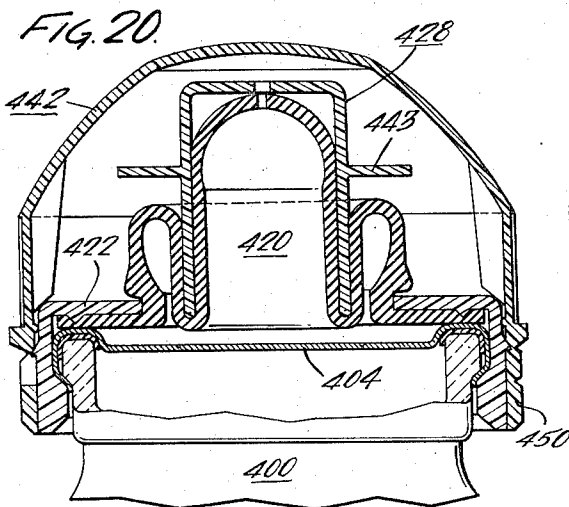
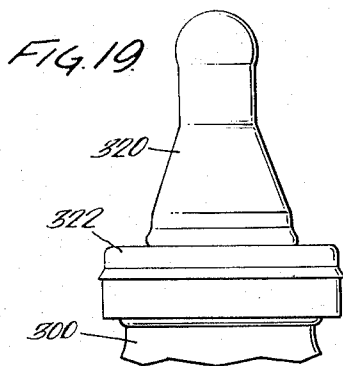
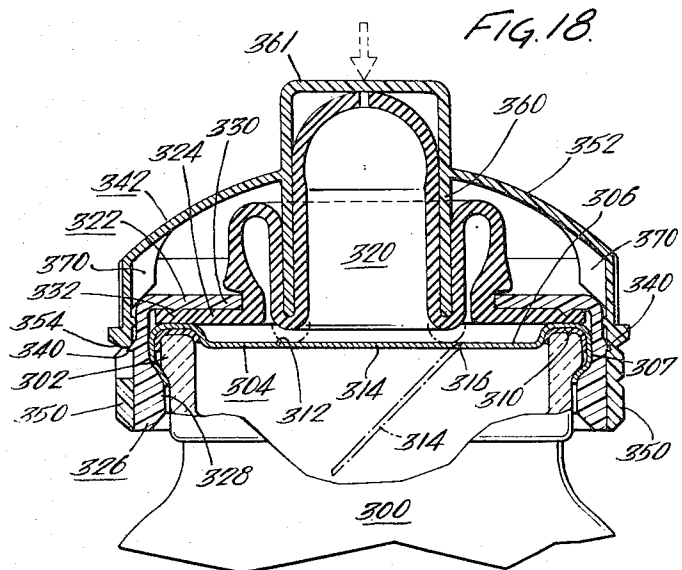
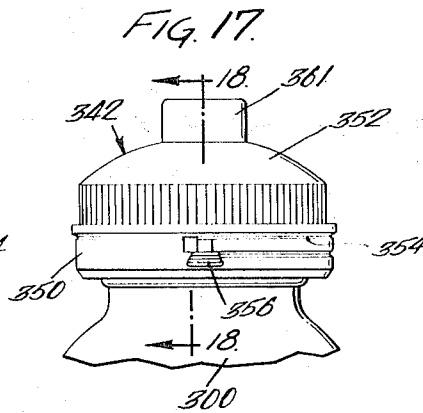
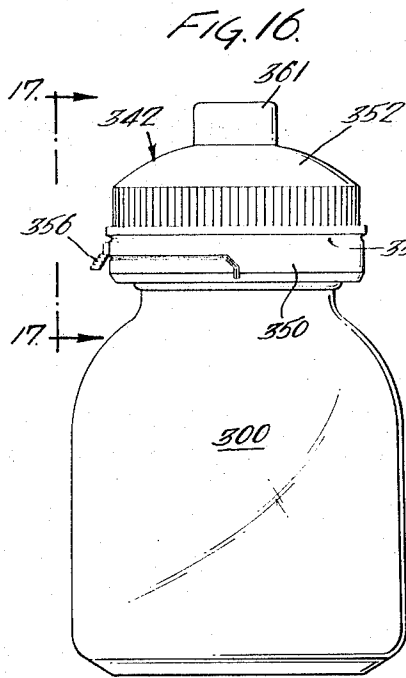
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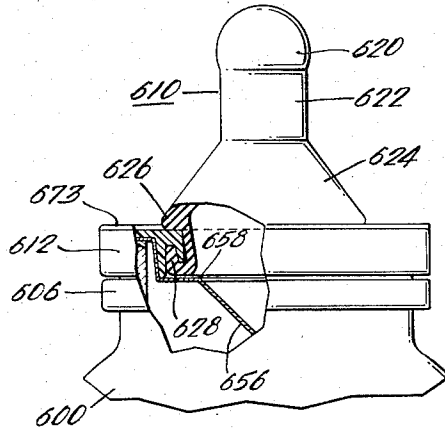
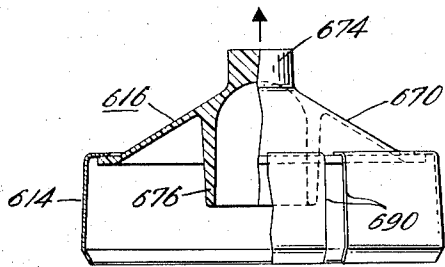
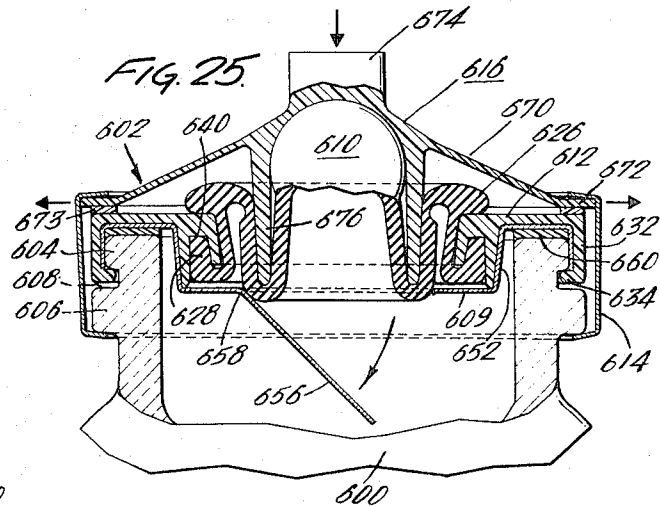
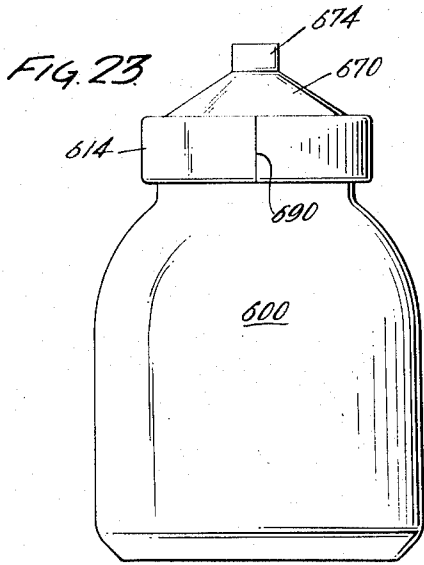
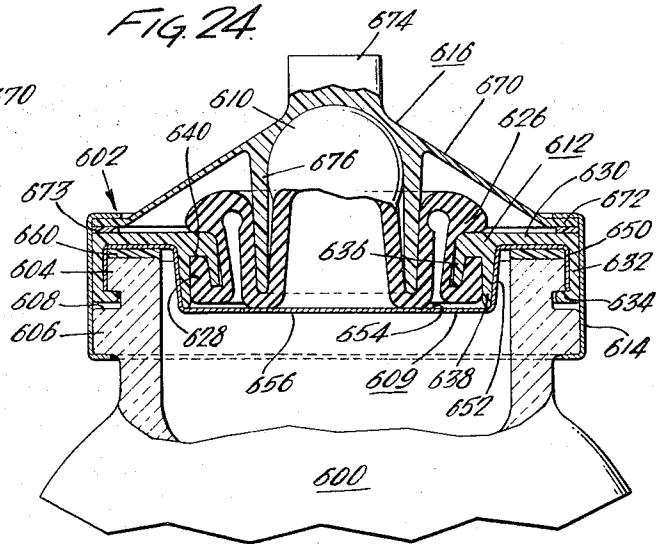
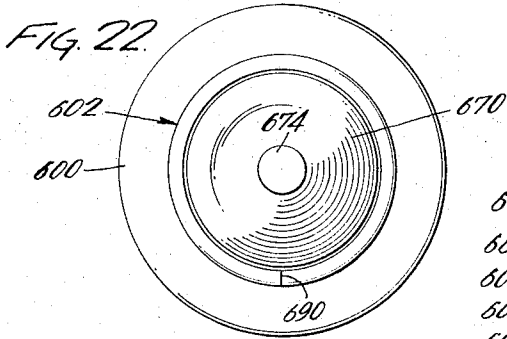
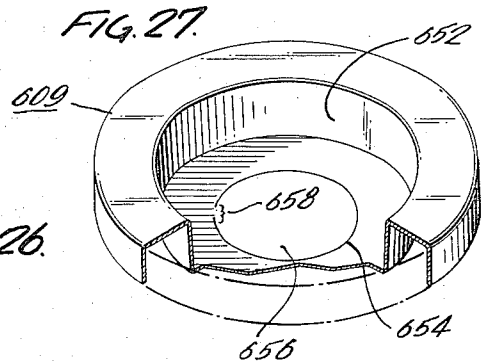
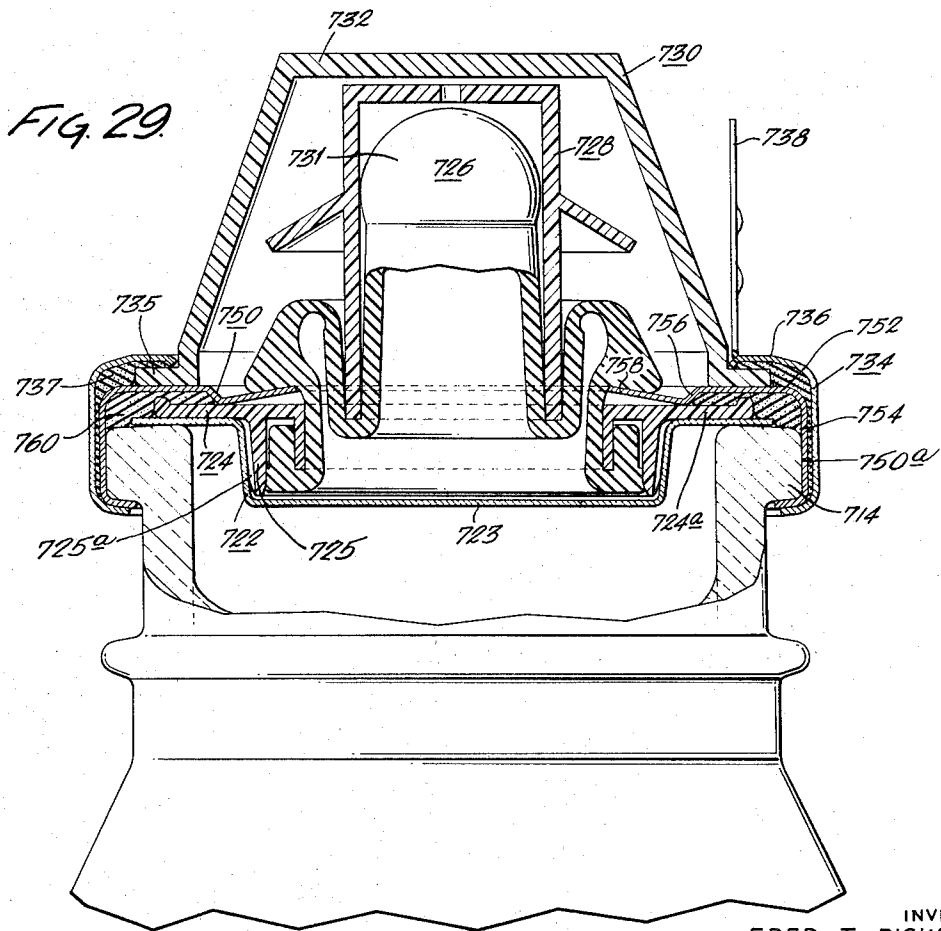
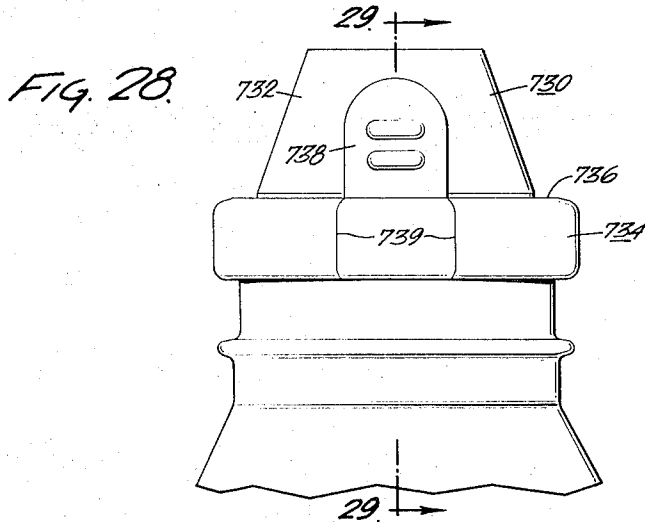


FIG. 26.

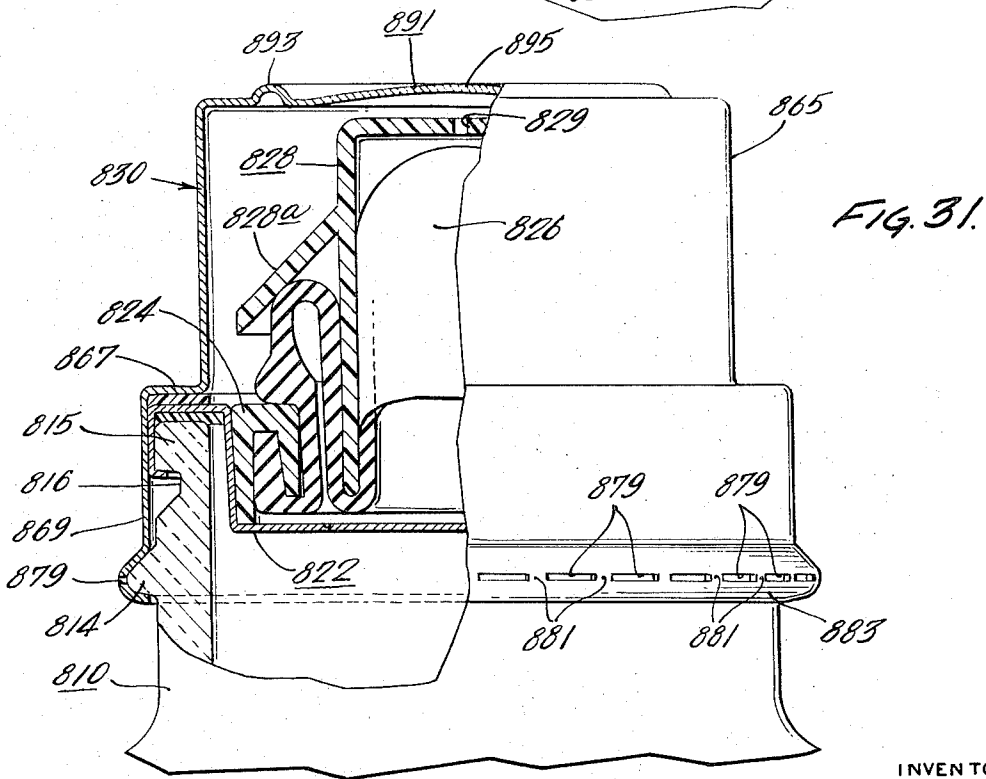
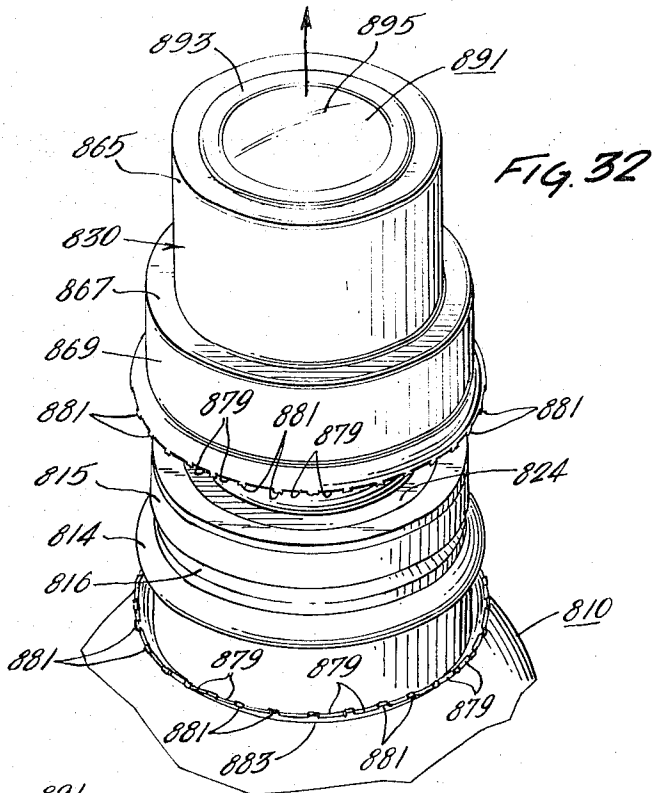
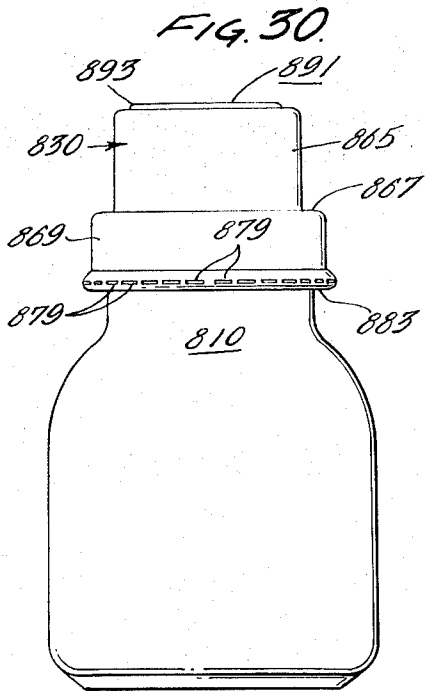


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## PRIMARY NURSER ASSEMBLY

The present invention relates generally to liquid food dispensing packages and more specifically to a package designed for infant feeding, referred to herein as a primary nurser.

Some of these conventional packages which are reusable generally comprise a container for the liquid product, for example milk formulae, a nipple and a retaining ring for holding the nipple over the open end of the container. The conventional reusable assemblies present the obvious problem of sterilization of the elements prior to each use which is tedious and time-consuming. The present invention relates to a disposable tamperproof sealed assembly which is adapted for hospital use as well as others. The assembly of the present invention is characterized by novel features of construction and arrangement providing a truly tamperproof assembly wherein the integrity of the liquid product prior to use and the sterility of nipple and surrounding surfaces are guaranteed.

The primary nurser assembly of the present invention includes a nipple sub-assembly adapted to be mounted over the open end of a container such as a bottle for the liquid product. The nipple sub-assembly includes a dam mounted in sealing relation over the open end of the container having a scored area defining a disk portion which may be actuated to an open position in a manner described hereafter when it is desired to withdraw the contents of the container. The nipple sub-assembly further includes a retainer mounted in the dam having locking means to which the nipple is secured, a pusher element mounted over the nipple, and an outer cover member detachably mounted over the nipple and pusher element including a tear band portion for removing the cover element when desired.

The primary nurser is truly tamperproof for the reason that the outer cover element maintaining the nipple and product sterile cannot be replaced without evidence of once having been opened and thus the integrity of the product and the sterile condition of the nipple are guaranteed prior to use. Further, in some forms of the invention the outer cover member is transparent so that if there is leakage of the liquid product past the dam, this can readily be determined. Leakage of product, of course, may result in chemical changes, for example, due to contact with the rubber nipple. Further, leakage of the liquid product past the seal is also evidence that the vacuum in the container may have been broken and thus the liquid product may not be fit for use.

The primary nurser assembly of the present invention is comprised of comparatively few parts which are easily and readily assembled and provide a very economical total assembly. Further, the assembly is easily and quickly manipulatable to a ready-to-use position. For example, the tear band is simply removed when it is desired to use the primary nurser to free the outer cover member and permit the user to actuate the pusher element downwardly without contacting the nipple to break the score line in the dam and actuate the disk downwardly to provide an opening in the dam through which the contents flow to the nipple. Thereafter, the user simply retracts the pusher element to elevate the nipple to a ready-to-use position and then discards the pusher element. The primary nurser is now ready for use. It is noted that during the entire preparation opera-

tion, the fingers of the user do not contact the sterile nipple, and thus the assembly is maintained in the desired aseptic condition for use in feeding, for example, an infant.

Even though the primary nurser assembly of the present invention is primarily used for infant feeding in hospitals, it is also obviously useful in feeding liquid or concentrated liquid nutrients to invalids, geriatric patients, animals and others requiring a nipple arrangement for liquid or concentrated liquid food intake.

These and other objects of the present invention and the various details of the operation and construction thereof are hereinafter more fully set forth with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of a primary nurser assembly in accordance with the present invention;

FIG. 2 is a side elevational view of the assembly;

FIG. 3 is an enlarged sectional view showing the details of the nipple mounting arrangement taken on lines 3—3 of FIG. 2;

FIG. 4 is a fragmentary view of the dam separating the nipple and contents of the container as viewed on lines 4—4 of FIG. 3;

FIG. 5 is a view similar to FIG. 3 with the outer cap removed and showing the dam in an open position;

FIG. 6 is a view of the assembly in a ready-to-use position;

FIG. 7 is a sectional view showing an alternate means for securing the nipple retaining ring to the dam;

FIG. 8 is a view similar to FIG. 7 with still another alternate means for securing the nipple retaining ring to the dam;

FIG. 9 is a fragmentary plan view of still further means for securing the nipple retaining ring to the dam;

FIG. 10 is a sectional view taken on lines 10—10 of FIG. 9;

FIG. 11 is a fragmentary side elevational view of still another embodiment of primary nurser assembly in accordance with the present invention;

FIG. 12 is a sectional view taken on lines 12—12 of FIG. 11;

FIG. 13 is a view similar to FIG. 12 of a modified form of retaining ring;

FIG. 14 is a sectional side elevational view of a third embodiment of primary nurser assembly in accordance with the present invention;

FIG. 15 is a partial sectional view of the nipple mounted on the dam;

FIG. 16 is a side elevational view of still another form of primary nurser assembly in accordance with the present invention;

FIG. 17 is a view of the assembly as taken on lines 17—17 of FIG. 16;

FIG. 18 is an enlarged sectional view of the assembly taken on lines 18—18 of FIG. 17 and showing in broken lines the open position of the dam;

FIG. 19 is a view of the assembly after the dam has been opened and the nipple raised to a position ready for use;

FIG. 20 is a sectional view similar to FIG. 18 with a modified form of pusher and outer cap;

FIG. 21 is a sectional view similar to FIGS. 18 and 20 of a still further modification of the pusher and outer cap;

FIG. 22 is a plan view of still another form of primary nurser assembly in accordance with the present invention;



FIG. 23 is a side elevational view thereof;

FIG. 24 is a sectional view showing the details of the nipple in the sealed position;

FIG. 25 is a view similar to FIG. 24 showing the dam in an open position;

FIG. 26 is an exploded view partly in section showing the nipple in an upright ready-to-use position and the nipple actuator detached therefrom;

FIG. 27 is a perspective view with parts broken away of the dam;

FIG. 28 is a side elevational view of a still further embodiment of primary nurser assembly in accordance with the present invention;

FIG. 29 is an enlarged sectional view taken on lines 29—29 of FIG. 28;

FIG. 30 is a side elevational view of another nurser assembly;

FIG. 31 is an enlarged view thereof partly in section; and

FIG. 32 is a perspective view thereof with the over-cap detached.

Referring now to the drawings and particularly to the embodiment of the invention illustrated in FIGS. 1-6 inclusive, the primary nurser assembly includes a container 10, such as a bottle for a formula preparation for infants and a nipple assembly broadly designated by the numeral 12 mounted over the open end of the container 10. In the present instance, the container 10 has an annular radially outwardly projecting bead 14 spaced downwardly from the upper axial end face thereof and an annular channel 16 between the bead 14 and the axial end face. This construction facilitates mounting of the nipple assembly 12 in the manner described in more detail hereafter.

The basic elements of the nipple assembly comprise a dam 22 having a displaceable disk 23 normally sealing the open end of the container, a retainer 24 mounted in the dam 22, a nipple 26 mounted in the retainer 24, a pusher element 28 having a frusto-conical shield 28a overlying the nipple and operable to effect displacement of the disk 23 of the dam 22 to gain access to the contents when desired and operable to facilitate positioning of the nipple in a fully extended position as shown in FIG. 6 and an outer detachable cover member 30.

Considering now more specifically the structural details and arrangement of the nipple assembly, the nipple 26 includes a spherical feeding tip 31 having at least one opening 32, a generally cylindrical section 34, a depending conical section 36 which terminates in a base 37 including locking portion 40. More specifically, the locking portion includes an upstanding rib 42 connected to a short cylindrical wall extension 44 of the base by a radial connecting wall 46. The locking rib 42 as shown underlies a radial shoulder 48 formed by the base 37 of the nipple. The wall 44 and locking rib 42 define a pocket for the retaining ring.

The retaining ring 24 as illustrated in an annular member comprising a pair of inner and outer depending walls 52 and 54 defining a channel 56 therebetween within which the locking rib 42 of the nipple is received. The inner wall 52 as illustrated is of a more shallow depth than the outer wall 54 and is chamfered at a predetermined angle to a plane of the inner face of the outer wall to facilitate assembly of the nipple. As illustrated in the assembled relation, the lower wall 48 of the base of the nipple presses firmly against the top

of the retaining ring. The nipple is assembled to the retaining ring simply by placing the feeding tip 31 through the opening 53 defined by the inner wall 52 of the retaining ring and then pulling the nipple axially relative to the retainer whereby the locking rib 42 snaps in place in the manner shown in FIG. 6. It is noted that the locking arrangement is sufficiently stable to resist displacement of the nipple during normal use. The inner wall 52 of the retaining ring has a V-shaped cut-out 59 to facilitate venting during use.

The retaining ring 24 as illustrated is mounted in the dam 22 and to this end the dam 22 is of an offset configuration defining a seat so that the retainer presses into the sidewall thereof. The dam has an outer flange arrangement 61 which is adapted to be crimped or spun over the upper end of the container and rolled into the channel 16 in the manner shown. As illustrated, the bottom wall 60 of the dam is scored or otherwise weakened, in the present instance, in a circular line 62, the ends of which are spaced apart to define a hinge connection 64. The central disc portion 23 defined by this scoring arrangement is adapted to be displaced downwardly in the manner shown in FIGS. 5 and 6 by fracturing the scoring when it is desired to use the assembly to feed an infant.

There is a seal 63 between the dam 24 and axial end face of the container 10 to maintain an internal vacuum of pressure in the container and to prevent possible ingress of bacteria into the container. This seal 63 may be a separate element or may be a flowed-in liner.

The outer cap 30 has a dome section 65 terminating in a radial wall 67 overlying the axial end face of the container and a skirt 69, the lower terminal edge of which is spun or crimped over the bead 14. The radial wall and skirt of the outer cap are scored as at 71 to permit removal and defined a tear tab 73.

The pusher element 28 is of inverted cup-shaped form having a downwardly tapered conical shield 28a which overlies the folded portion of the nipple to prevent contact of the hand of the user with the nipple when manipulating the pusher element to break the dam 23 and also to raise the nipple to an extended position.

There is shown in FIG. 7 a modified form of the retaining ring and dam sub-assembly described above. As illustrated, the retaining ring 24a is provided with a circumferentially extending groove 70 in the outer face of the outer wall and the dam is provided with a circumferentially extending projection 72 positioned to engage in the groove 70 to more firmly secure the retaining ring in the dam. This is of particular importance to maintain the parts in the assembled relation and prevent leakage during the autoclaving or sterilization process.

FIG. 8 shows still another alternate means for firmly securing the retaining ring and dam sub-assembly. In this instance, the outer wall of the retaining ring is provided with a circumferentially extending bead 74 which seats in a circumferentially extending recess or groove 76 in the side wall of the dam. Of course, the groove and bead are located relative to one another so that the parts snap into place when the lower edge of the outer wall of the retainer abuts the bottom wall of the dam in the manner illustrated.

FIGS. 9 and 10 illustrate another alternative for firmly attaching the retaining ring 24 and dam 22c. In this instance, the juncture of the radial wall 78 and

inner axial wall 80 of the dam is circumferentially ribbed as at 82 and the rib 82 is staked over the retaining ring at four equispaced locations as at 84. A flowed liner or gasket means 81 may be included as part of the sub-assembly.

There is illustrated in FIGS. 11 and 12 another embodiment of primary nurser in accordance with the present invention. The container 110 is identical to the container described in connection with the previous embodiment and includes a radially outwardly directed bead 114 spaced downwardly from the open end and a recess or groove 116 adjacent the axial end face of the container.

In the present instance, the nipple assembly includes a dam 122, a retainer 124 mounted in the dam, a nipple 126 detachably secured to the retainer, and a pusher element 128 overlying the nipple and operable to effect displacement of the dam to gain access to the contents when desired and to facilitate the positioning of the nipple in a fully extended position. These elements are identical structurally to the corresponding elements in the previously described embodiment, and accordingly, are not described in greater detail here.

In the present embodiment the overcap assembly 130 includes a dome-shaped member 131 made of a transparent material, for example plastic, so that the assembly can be inspected for leakage as described more fully below. The dome member 131 is maintained in a position overlying the assembly in the manner shown by means of a tear band 134 which has an upper inwardly directed flange 136 overlying the terminal edge 135 of the dome and is adapted to be crimped or spun over the bead 114 on the container at its lower end to secure the parts in the manner illustrated.

A seal 137 is provided between the terminal edge of the dome and dam to prevent possible ingress of bacteria into the area enclosed by the dome which may contaminate the nipple. This seal 137 can be a separate element or it may be formed integrally with the dome or dam as a flowed-in liner. The tear band 134 has a tear tab extension 138 for the user when it is desired to pull the tear tab free and release the band 134. The tab 138 is formed by scoring the band in the areas indicated at 140. The band may be initially formed with only an upper flange 136a and then simply placed axially over the assembly and the flange 136 spun over the bead 114 to maintain the parts in the assembled relation shown. Now when it is desired to use the assembly, the tab 138 is simply pulled downwardly to completely disengage it from the band 134. The band 134 is then removed as well as the dome 130. The pusher is then actuated downwardly to break the dam as shown in FIG. 5 and then moved in the opposite direction to erect the nipple in a ready-to-use position. The pusher 128 has a shield 140 overlying the folded portion of the nipple to preclude contact of the hand of the user with the nipple. The top of the pusher has an opening 142 to facilitate gas sterilization of the nipple.

The primary nurser shown in FIG. 13 is substantially identical to that of FIG. 12 except for the configuration of the retaining ring. In this instance, the retaining ring 164 has a radial outward wall extension 166 which acts as locking flange to insure against displacement relative to the dam during the autoclaving process.

There is shown in FIGS. 14 and 15 still another form of primary nurser assembly in accordance with the present invention.

The container 200 as illustrated has an enlarged bead 202 at its open end for mounting the nipple assembly. The nipple assembly includes as illustrated a dam 206 having a lower wall 208 spanning the opening in the container, a generally cylindrical side wall 210 and a radially outwardly directed flange 212. The lower wall is scored as at 214 to define a central disc portion 216 connected by means of a hinge in the same manner as the embodiments described above. The nipple as illustrated has a bulbous tip 220, a cylindrical body portion 222, and a depending skirt portion 224 which has a frusto-conical section 226. The nipple is assembled to the dam in the manner shown in FIG. 12 whereby the lower turned-in portion 228 provides a seal with the axial end face of the container. The nipple and dam are secured to the container in the position shown by means of a retaining band 230 which has a lower flange 232 crimped under the shoulder provided by the bead 202 and has an upward inwardly directed flange 236 with an inturned inner edge 238 which firmly imbeds itself in the nipple around the outer lip 212 of the dam.

There is illustrated in FIGS. 16-19 still another embodiment of primary nurser assembly in accordance with the present invention. The container 300 is of the conventional type and has an enlarged bead 302 at its open end for mounting of the nipple assembly.

The nipple assembly includes a dam 304 having a wall 306 which spans the opening in the container and has a peripheral flange 307 which wraps around the bead 302 on the container, the dam being provided with a flowed in liner 310 engaging the top of the container. The wall 306 of the dam also is scored, in the present instance, in a circular manner as at 312 to define a central disc portion 314 connected to the wall by means of a hinge 316. The scoring is located relative to the pusher so that when the pusher is actuated downwardly the disc portion 314 may be displaced to an open position permitting the contents of the container to be withdrawn.

The nipple assembly further includes a nipple 320 of generally conventional form which is supported over the container by a retaining ring 322. The nipple in the present instance has a radially extending base flange 324 of a size so that its outer peripheral edge overlies the dam and the axial end face of the container. The retaining ring 322 has a skirt portion 326 with an enlarged circumferentially extending inwardly directed rib 328 engagable under the bead 302 on the container and also serving to maintain the dam in pressure-applying relation and in a seated position over the upper end of the container. The retaining ring also has an inwardly directed flange 330 which overlies the base of the nipple and has a rib 332 aligned with the axial end face of the container to lock the nipple against displacement and also to effect a good seal between the retaining ring and nipple at this juncture to prevent leakage. There is a circumferential projection 340 on the outer wall of the skirt which serves to lock the outer cap 342 in place prior to use.

The outer cap comprises a tear band portion 350 and a cap portion 352 which are connected by a scored strip 354 having a tab 356 for removal of the strip. In the present instance, the upper circumferentially extending score line lies at approximately the apex of the projection 340 on the retainer 322, the inner wall at the juncture of the tear band and a cap having a V-shaped recess within which the projection engages to hold the

cap and tear band in place and prevent removal thereof without fracturing the tear band 350 and thereby provide a tamperproof construction.

The pusher element is formed integrally with the cap portion and simply comprises a cylindrical extension 360 of the cap portion which circumscribes the tip and body of the nipple and terminates closely adjacent the wall of the dam member prior to use. The cap portion also has strengthening ribs 370 to normally maintain the dome-shaped portion of the cap in an upright position and prevent accidental displacement of the cylindrical pusher element to open the dam. The cap portion of the outer cap assembly may be of a transparent material to facilitate inspection of the assembly for leakage.

Now when it is desired to use the assembly, the bottle is supported in one hand of the user and the tab 356 is gripped by the other hand. The tab 356 is then pulled outwardly and circumferentially around the outer cap to detach the tear band 350. The skirt is then completely detached from the cap portion so that it may be easily removed. Prior to removal, however, the pusher element is actuated downwardly in the direction indicated by the arrow in FIG. 18 to break the dam along the score line and actuate the central disc downwardly to provide an opening through which the contents of the container may be withdrawn through the nipple. The cap portion is then gripped around the cylindrical upper projection 361 and moved axially in the opposite direction to raise the nipple to the erected position [see FIG. 19]. Of course, then it is completely withdrawn from the nipple and discarded. It is noted that during the entire preparation operation the hands of the user do not contact the sterile nipple.

FIG. 20 is a modification of the assembly shown in FIG. 18 wherein the container, dam, retaining ring and nipple are identical to the elements of the assembly in FIG. 16 and have been given the same reference numbers except that they have been increased to the four hundred series. In the present instance, the skirt and tear band portion of the overcap assembly are identical. However, the cap portion 442 is a dome-like member and the pusher element 428 is a separate element which is of generally cup-like form having a circumferential wing-like projection 443 which overlies the folded portion of the nipple and serves to prevent contact of the hands of the user with any portion of the nipple when it is being used to actuate the dam and also to raise the nipple to a position ready for use.

FIG. 21 is likewise a modification of the assembly shown in FIG. 18 and, accordingly, identical parts are assigned the same reference numerals, except in the five hundred series. In this form of the invention the cap portion differs from the cap of FIG. 18 in that it has a raised side wall 555 which extends to a height above the top of the pusher element 554 and is connected thereto by an arcuate wall portion 556. This arrangement facilitates stacking of the assemblies without danger of accidentally actuating the pusher element to open the dam. Further, the configuration of the flexible wall portions 556 permits the pusher to be actuated downwardly sufficiently to rupture the score lines and open the dam.

There is illustrated in FIGS. 22-26 a further embodiment of primary nurser in accordance with the present invention. The assembly includes a container 600 which as illustrated has a finish adjacent its open end to accommodate the nipple assembly 602. The finish

includes a pair of axially spaced circumferentially extending beads 604 and 606 which have a groove 608 therebetween. The lower bead 606 as illustrated has a greater diametral dimension than the upper bead 604 to accommodate assembly of the nipple assembly.

In the present instance, the elements of the nipple assembly include a dam 609, a nipple 610, a retainer 612, a tear band 614 and a combination cover and pusher element 616.

Considering now more specifically the structural details of the nipple assembly, the nipple 610 has spherical feeding tip 620, a cylindrical depending extension 622, and a frusto-conical portion 624 terminating in a base 262. Depending from the base is a locking flange arrangement including, as in the previously described embodiment, a locking rib 628 which engages in a locking groove of the retainer.

The retainer in the present instance comprises an annular portion 630 having an outer skirt 632 terminating in a short radially inwardly directed terminal lip 634 which engages under the uppermost bead of the container and is adapted to be snapped into place. The inner end of the annular portion has a pair of depending inner and outer spaced apart walls 636 and 638 between which is defined the locking groove 640 for the locking rib of the nipple. The retainer not only supports the nipple, but also serves to hold the dam in place over the open end of the container. To this end the dam 609 has an inverted U-shaped ring-like segment 650 which fits over the upper axial end of the container and a central wall portion 652 spanning the container opening, the wall 652 being scored in a circular pattern as at 654 to define a displaceable central disc portion 656 pivotal about the hinge 658. (See FIG. 27). The score line 654 is located in relation to the pusher element so that when the pusher is actuated downwardly the disc portion is displaced to the position shown in FIG. 25. A sealing element 660 is mounted between the outer axial end face of the container and U-shaped annular segment of the dam to provide a fluid-tight joint at this connection to insure against leakage of fluid from the container and also to prevent ingress of foreign particles and bacteria which could contaminate the contents of the container. This gasket 660 may be a flowed-in-liner secured to the annular portion of the dam.

The pusher element 616 as best illustrated comprises a dome-like section 670 terminating in a radially directed flange portion 673 which overlies the outer peripheral edge of the retainer and seats against a sealing element 672 in the manner illustrated. The pusher element includes a projection or button 674 disposed centrally of a cylindrical depending pusher portion 676 which engages the nipple at the juncture of the cylindrical portion and conical section and normally maintains the nipple in a folded position as illustrated in FIG. 24.

The various elements described above are maintained in an assembled relation by means of the tear band 614 which has upper and lower inwardly directed circumferentially extending flanges overlying the outer terminal edge of the pusher element 616 and the lower bead of the container. This tear band may be initially formed with only one flange, for example the upper flange, and positioned over the parts of the assembly with the lower edge being spun under the bead after the various parts have been assembled to the container. The tear band has one or more axial score lines 690 extending from the upper edge to the bottom edge.

When the container and nipple assembly have been put together in the manner described above and shown in the drawings, the usual process described above for sterilization of the various elements is employed and thereafter the container and nipple assembly stored until ready for use. When it is desired to use the assembly, the button 674 of the pusher element is simply depressed downwardly which effects simultaneously the fracturing of the score line 654 to position the disc 656 in an open position and also because of the flexibility of the dome portion 670 effects radial outward displacement of the peripheral flange portion 670 in the direction of the arrows in FIG. 25 thereby putting radial pressure on the tear band and effecting separation thereof along the score lines 690. After the tear band has been fractured, the user simply peels it off the container and to facilitate this, the tear band may be provided with short scores at diametrically opposed positions from the score line 690. When the tear band has been removed, the button 674 is now gripped by the user and pulled in an upward direction [see FIG. 26], thereby moving the nipple to an erected position. It is noted that in this embodiment as in the previously described embodiments, the hand of the user does not contact any portions of the nipple, and thus the sterility of the nipple is insured. Further, the dome of the pusher element may be made of a transparent plastic material whereby the container may be inverted and examined for any possible leakage in the area visible through the dome. This insures that the contents have been maintained in a sealed condition.

There is illustrated in FIGS. 28 and 29 a further embodiment of primary nurser assembly in accordance with the present invention. The basic elements of the assembly as illustrated comprise a dam 722 having a displaceable disc portion 723 normally close to seal the container contents, a nipple retainer 724 mounted in the dam 722, a nipple 726 mounted in the retainer, a pusher element 728 overlying the nipple and operable to effect displacement of the disc 723 when desired to discharge the contents and also operable to facilitate positioning of the nipple in a fully extended position ready for use. The nipple as illustrated is of the same construction and configuration as in the previously described embodiments and includes a feeding tip 731 and a locking portion for securing the nipple to the retaining ring 724.

In the present embodiment, the overcap assembly 730 includes a dome-shaped member 732 preferably made of a transparent material, for example plastic, permitting inspection of the assembly for leakage as described previously. The dome may also be made of metal. The dome member 732 is maintained in position overlying the assembly by means of a tear band 734 which has an upper inwardly directed flange 736 overlying the outwardly directed lower terminal edge 735 of the dome and is adapted to be crimped or spun over the bead 714 on the container as its lower end to secure the parts in the manner illustrated. The tear band as illustrated has a tear tab extension 738 which may be gripped by the user to pull the tear tab along the score lines 739 to release the tear band 734.

In the present instance, an outer flowed-in seal 737 is provided which, as shown, extends from the area between the upper flange of the tear band and the dome terminal edge 735 to a point between the tear band and inner ring member 750 adjacent the crimped lower

flange to prevent possible ingress of bacteria into the area enclosed by the dome which may contaminate the nipple.

In the present embodiment the assembly further includes an inner annular ring member 750 disposed between the lower terminal edge of the dome 730 and the annular portion 724a of the retainer 724. The disc member as illustrated has an annular top 752 with a depending skirt 754 which is adapted to be crimped or spun under the bead 714 on the container at its lower terminal edge. The annular portion of the retaining ring terminates in a circumferentially extending downwardly diverging offset connecting portion 756 and an angularly upwardly directed inner annular portion 758 which normally biases the base of the nipple upwardly thereby insuring a firm seating of the nipple in the retainer. As illustrated, a seal 760, for example made of a material which may be flowed in place, is disposed between the disc insert 750 and the retaining ring 724.

One of the features of this embodiment of nurser is the fact that all of the elements of the nurser may be easily and quickly assembled to form an integral unit which may be sterilized as a unit and applied as an entire sterilized unit to a filled container. The nipple 726 is snapped into the retainer 724 from the lower side. This subassembly is then pulled into inner ring 750 to which the liner 760 has been applied previously whereby the base portion of the nipple automatically seats in the locking flange section of the retainer and the inner edge 758 of the ring abuts and tensions the nipple base to firmly secure these elements. The dam 723 is then pressed on retainer, the darts 725a on the outer flange 725 of the retainer frictionally engaging the cylindrical wall of the cup-shaped dam. The tear band 734 and dome 732 are held together by the flowed-in liner 737, the liner 737 also serving to support the nipple subassembly providing a press fit with the skirt 750a of the ring member 750. It is noted that the lower edge of the skirt 750a and the lower edge of the tear band side skirt are initially straight to facilitate assembly and are spun under together when the nurser is applied to a container.

There is illustrated in FIGS. 30-32 inclusive still another embodiment of primary nurser in accordance with the present invention generally similar in construction and arrangement to the primary nurser assembly shown in FIGS. 1-6 inclusive. This nurser is adapted to be applied to a container 810 which includes a radially outwardly directed bead 814 spaced downwardly from the upper axial end face thereof and an annular channel 816 between the bead 814 and the axial end face thereby defining a circumferential rib 815 above the bead 814.

The nipple assembly as illustrated includes a dam 822, a retainer 824 mounted in the dam, a nipple 826 detachably secured to the retainer and a pusher element 828 of inverted cup-shaped form having a shield 828a overlying the nipple. The pusher also includes an opening 829 to facilitate sterilization of the assembly and to permit air to enter into the interior of the nipple when it is desired to position the nipple in a fully extended position ready for use. The opening 829 precludes the nipple from being sucked into the opening in the dam when the scoring is broken. If the nipple were drawn into the dam, there would be no sanitary way to displace the nipple to a position ready for use. The elements set forth above are identical structurally

to the corresponding elements in the previously described embodiments of FIGS. 1-6 inclusive, and accordingly, are not described in greater detail here.

In the present instance, the overcap assembly 830 is of one-piece unitary construction comprising a dome section 865 terminating in a radial wall 867 overlying the axial end face of the container, and a skirt 869 depending from the radial wall 867, the lower terminal edge of which is spun or crimped over the bead 814 on assembly. In the present instance, the overcap is provided with a plurality of circumferentially spaced score line 879 adjacent the lower terminal edge of the skirt 869 which are spaced apart to define a plurality of bridge connections 881. By this construction, when it is desired to remove the overcap, the user simply tilts the overcap relative to the axis of the container to break the bridges 881 whereby the overcap may be removed axially in the manner shown in FIG. 32. Note that the lower retaining band 883 simply drops to the neck of the container. If desired, the rib 814 may be provided with a plurality of ribs so that the top portion of the overcap assembly may be rotated to break the bridges 881.

In the present instance, the top panel 891 of the dome-shaped section has a circumferential strengthening rib 893 and the wall portion 895 inside of the rib 893 is slightly dished. This facilitates storing of container one on top of the other without danger of accidentally displacing a pusher element to break the dam prematurely prior to use, which may have the effect of contaminating the contents of the container.

Considering now the process or system of preparing a primary nurser assembly in accordance with the present invention, some of the embodiments described above are primarily intended for direct application to a filled container prior to sterilization, and others are primarily designed for sterilization prior to assembly to a filled container.

For example, in regard to the nurser assembly of FIG. 29, all of the elements after assembly in the manner described above form an integral unit. A plurality of these units may then be packaged in a bag or the like and placed in a chamber where air is evacuated and a sterilizing gas is admitted to sterilize the units. It is noted that the opening 775 in the pusher member permits flow of the sterilizing gas to insure sterilization of the entire nipple. The opening 775 also admits air into the nipple to prevent vacuum from pulling it into the container and facilitate displacing it upwardly to an erected position. In instances where the manufacturer of the nipple sub-assembly and the formula supplier are not the same, the bags are simply shipped to the formula supplier. Preferably, the nipple sub-assemblies are then removed from the bags in a sterile atmosphere and assembled to the bottle or container 710. It is noted that prior to application of the nipple sub-assembly, superheated steam is injected into the head space of the bottle to provide a vacuum. This is for the purpose of offsetting the high pressures developed when the complete assembly is placed into a retort at high temperatures for sterilization of the formula product and also to evacuate oxygen thereby preventing oxidation of the formula product. In the sterile atmosphere, suitable means are provided to roll the lower flange of the tear band 734 and ring 750 on the bottle. Thereafter, the filled and sealed container is heated for a given time period at a suitable temperature to effect

sterilization. The assembled nursers and containers are then cooled rapidly, for example by means of cold water. It is noted that the nurser unit provides effective seals so that even unsterile water may be used in the cooling process. They may then be stored in an inverted position for a predetermined length of time, and thereafter inspected to determine if there is any leakage of the formula. In this regard, as noted, the use of a transparent cover member facilitates inspection. It is, of course, essential that there is no leakage past the dam since contact of the formula product with the rubber nipple may result in absorption of vitamins or other nutrients. Also, loss of vacuum in the container can result in contamination of the product over a period of time.

Of course, it is to be understood that the nurser assembly shown in FIG. 29 may, if desired, be applied directly to a filled container; for example, by automatic assembly equipment and techniques and then the assembly of container and nurser sterilized.

Others of the nurser assemblies illustrated are designed for direct application to a filled container prior to the sterilization process. For example, with the nurser shown in FIGS. 1-6 inclusive, the nipple 34, retainer 24, and dam 22 form a sub-assembly which is positioned over the open end of the container and secured in place by crimping or spinning the outer skirt of the dam to engage in the groove 16. The outer cover assembly 30 is then applied and secured by crimping or spinning the terminal edge of the skirt under the bead 14. The entire unit is then sterilized by conventional process. It is noted, however, that with slight modification, this assembly may be adapted for complete assembly and sterilization prior to assembly to a container. For example, the outer flange 61 of the dam 22 may be sized to frictionally fit inside the skirt 69 of the overcap assembly and the skirt 69 may be shortened to be crimped or spun simultaneously with the flange 61 of the dam in the groove 16.

The embodiments of the invention shown in FIGS. 12 and 13 are assembled in a similar manner to that of FIGS. 1-6 and are also intended primarily for assembly to a filled container prior to sterilization. These nursers may also be modified slightly in the manner described above so that they may be assembled to form an integral unit and sterilized separately prior to assembly to a filled container.

The nurser of FIGS. 14 and 15 is also intended primarily for complete assembly to a filled container prior to sterilization. Thus, in this case the dam is initially assembled to the nipple as shown in FIG. 15. The pusher is applied over the nipple tip and this sub-assembly is then positioned over the open end of the container.

After application of the retainer band 230, the overcap 321 is then positioned over the nipple sub-assembly and secured in place by spinning or crimping the lower terminal edge of the skirt under the shoulder on the container. The complete assembly is then sterilized by conventional means. It is noted that this nurser unit may be adapted for separate sterilization prior to assembly to a filled container and in this instance, the retainer band 230 may be eliminated and the overcap skirt 231a may be sized in relation to the nipple and dam so that there is a friction fit of the nipple sub-assembly in the overcap. It is noted in this arrangement the skirt 231a of the overcap is cylindrical its full extent

and is adapted to be crimped or spun over the shoulder on the container by automatic assembly equipment.

The nurser assemblies shown in FIGS. 16-21 inclusive are designed primarily for application to a filled container as follows. The dam 304 with the peripheral flange 307 and the flowed-in liner 310 is sealed onto the filled bottle. The bottle, thus sealed, is sterilized in a retort as described elsewhere. Meanwhile, the nipple 320, retaining ring 322 and outer cap 342 (or nipple 402, pusher 428, retaining ring 422 and outer cap 442 in FIG. 20) are pre-assembled, a quantity sealed in plastic bags, and gas sterilized as described elsewhere. When the filled and sealed bottles are removed from the retort, the top surface of the dam 304 must be chemically recleaned and resterilized.

The bottle is then moved into a sterile area with the nipple-ring-cap assemblies. Here the assembly is removed from the bag and snapped onto the bottle with its sterilized contents and rsterilized dam surface.

The nurser shown in FIGS. 22-27 inclusive is also of the type adapted to be applied to a filled container prior to sterilization of the combined unit. Thus the nipple 610 is initially assembled to the retainer and then the dam is pressed into place over the lower side of the retainer. Note that the flange 650 of the dam is flexible so that it may engage through the opening defined by the return lug 634 of the retainer and that the lower terminal edge of the flange 650 abuts the inner face of the lug 634 to retain the parts together. The overcap 616 is then applied over the nipple and pushed inwardly to collapse the nipple. This sub-assembly is then mounted over the open end of the container, the skirt of the retainer spreading upon application to clear the finish on the bottle and the lug 634 snapping into place in the groove 608. The tear band 602 which is initially formed with the inturned upper flange 614a and straight-sided cylindrical skirt then is mounted over the sub-assembly and then spun under the shoulder 606 to form the inturned lower flange 614b. The entire unit is then ready for sterilization.

The nurser assembly may be modified slightly for complete assembly of the parts and sterilization prior to assembly to a filled container. For example, the retainer may be of a diametral dimension to frictionally engage in the tear band and the lug 634 eliminated to permit assembly to a container without breaking the scoring 690. In this instance, the container need not be provided with the axially spaced pair of beads 604 and 606 on only one bead providing a shoulder for crimping the tear band is necessary.

The nurser in FIGS. 30-32 inclusive is generally similar to the nurser of FIGS. 1-6 and is intended primarily for assembly to a filled container prior to sterilization. However, this nurser can be modified in the same manner as the previously described embodiment so that it may be assembled as a unit, sterilized and then assembled to a filled container.

We claim:

1. A primary nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a portion at least partially detachable to provide an access opening for discharge of the contents of the container, a nipple mounted in overlying relation of the dam, a pusher element disposed over the feeding tip of the nipple operable upon displacement toward said dam to effect partial detachment of said portion to permit withdrawal of the con-

tents of the container, and an outer cover assembly hermetically sealing said elements.

2. A primary nurser assembly as claimed in claim 1 wherein the pusher element snugly engages the nipple and is provided with an opening providing air access means to the interior of the nipple.

3. A primary nurser assembly as claimed in claim 1 wherein said dam is of an offset configuration having a generally cylindrical side wall and including a retainer for the nipple press-fitted into the dam.

4. A primary nurser assembly as claimed in claim 1 including a first seal between the dam and container adjacent the opening therein and a second seal between said dam and outer cover assembly.

5. A primary nurser assembly as claimed in claim 1 wherein said dam includes a bottom wall having a score line in the shape of a circular line therein, the ends of the score line being spaced apart to define a hinge connection.

6. A primary nurser assembly as claimed in claim 5 wherein the pusher element is of an inverted cup-shaped form wherein the lower edge of the cup engages interiorly of said score line.

7. A primary nurser assembly as claimed in claim 3 wherein the side wall of the dam is provided with a circumferentially extending bead engagable in a circumferentially extending groove in the retainer to mount the retainer and dam against relative displacement.

8. A primary nurser assembly as claimed in claim 3 wherein the retainer is provided with a circumferentially extending bead which seats in a circumferentially extending groove in the side wall of the dam.

9. A primary nurser assembly as claimed in claim 1 wherein said outer cover assembly comprises a dome member and a detachable tear band.

10. A primary nurser assembly as claimed in claim 9 wherein the dome is made of a transparent material to facilitate examination for leakage.

11. A primary nurser assembly as claimed in claim 1 wherein said nipple has a radially extending base flange and including a retaining ring for mounting the nipple in place.

12. A primary nurser assembly as claimed in claim 11 wherein said outer cover member comprises a tear band portion and a cap portion connected by a scored strip and wherein the inner wall at the juncture of the tear band and cap has a recess within which a projection on the retaining ring seats.

13. A primary nurser assembly as claimed in claim 12 wherein the pusher element is formed integrally with the cap portion of the outer cover assembly.

14. A primary nurser assembly as claimed in claim 1 wherein the outer cover assembly includes a dome-like member and a tear band having an inwardly directed upper flange overlying a portion of the dome-like member and including a weakened section, said pusher element being formed integrally with the dome-like member, actuation of said dome-like member downwardly operable to simultaneously detach said portion of the dam member and effect separation of said tear band along said weakened section.

15. A primary nurser assembly as claimed in claim 1 including a retainer having locking means for mounting the base of the nipple and an inner ring member disposed between said outer cover assembly and said retainer and including a circumferentially extending angularly upwardly directed annular portion engagable

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with the base of the nipple to securely mount a nipple to the retainer.

16. A primary nurser assembly as claimed in claim 1 wherein said outer cover assembly is of unitary construction secured to said container including a cap portion and a tear band connected thereto by score means whereby the cap portion may be detached from the tear band by fracturing the score means.

17. A primary nurser assembly as claimed in claim 1 wherein the top of the outer cover assembly overlying said pusher element is provided with a strengthening rib.

18. A primary nurser assembly for mounting over the

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opening in a container comprising a dam member spanning the opening and having a portion at least partially detachable to provide an access opening for discharge of the contents of the container, a nipple mounted in overlying relation to the dam, a pusher element disposed over the feeding tip of the nipple operable upon displacement toward said dam to effect partial detachment of said portion to permit withdrawal of the contents of the container, and an outer cover assembly enclosing and sealing at least said detachable portion of said dam, said nipple and pusher element.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,779,413 Dated December 18, 1973

Inventor(s) FRED T. PICKERELL and DOMINIC J. BRIGNOLA

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 56, correct the spelling of  
"quickly".

Column 6, line 10, change "potiön" to --portion--.

Column 8, line 14, change "262" to --626--.

Column 9, line 52, correct the spelling of  
"previously".

Column 13, line 19, correct the spelling of  
"resterilized";

line 65, change "of" to --to--.

Signed and sealed this 19th day of November 1974.

(SEAL)  
Attest:

McCOY M. GIBSON JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents