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Guerster et al.

[11] **3,902,618**

[45] **Sept. 2, 1975**

[54] **PRIMARY NURSER ASSEMBLY**

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[73] Assignee: **The West Company**, Phoenixville, Pa.

[22] Filed: **Oct. 5, 1973**

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[52] **U.S. Cl.** ..... **215/11 R**; 215/11

[51] **Int. Cl.**[2] **A61J 11/02**; A61J 11/04

[58] **Field of Search** ..... 215/11 R, 11 B, 11 C; 128/252

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Primary Examiner—Herbert F. Ross

Attorney, Agent, or Firm—Howson and Howson

[57] **ABSTRACT**

A primary nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a detachable portion providing an access opening for discharge of contents of the container, a nipple means supporting the nipple in a position overlying the dam, said detachable portion being defined by scoring configuration providing two leaf sections, each pivotal about a hinge and being connected together adjacent the center of the detachable portion, means for actuating said detachable portion, whereby each leaf section is pivoted downwardly about its hinge connection and the pivotal displacement is limited by said central connection.

22 Claims, 12 Drawing Figures

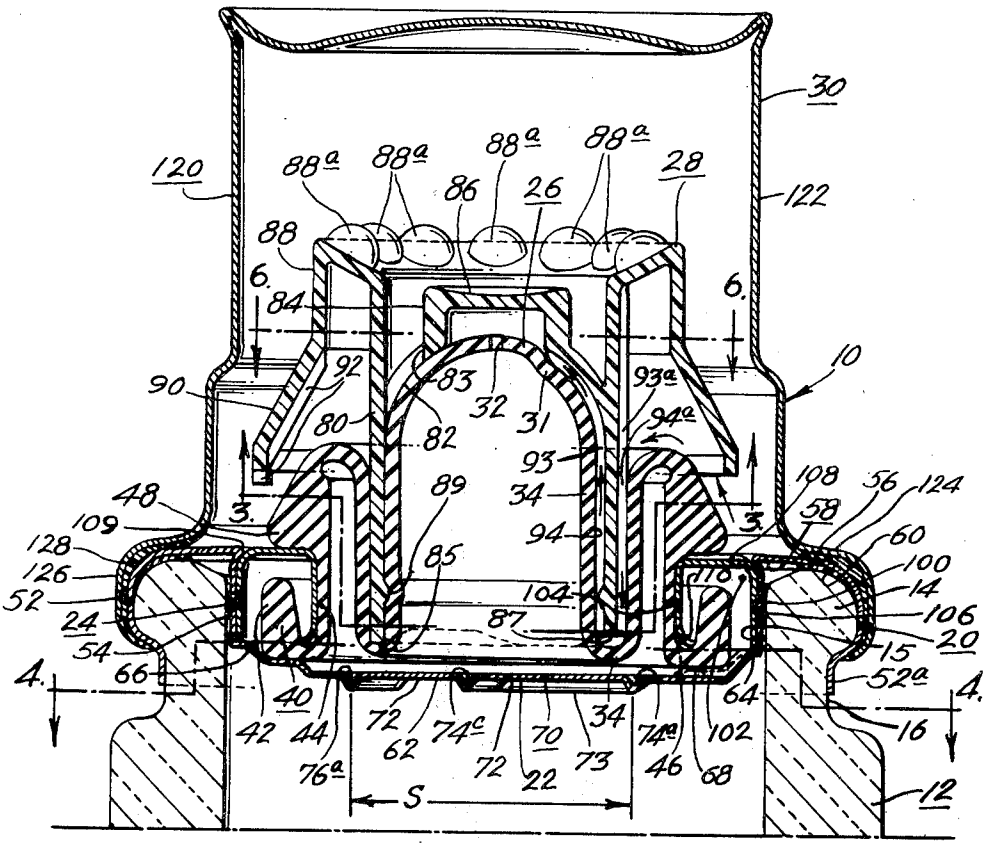


FIG. 1.

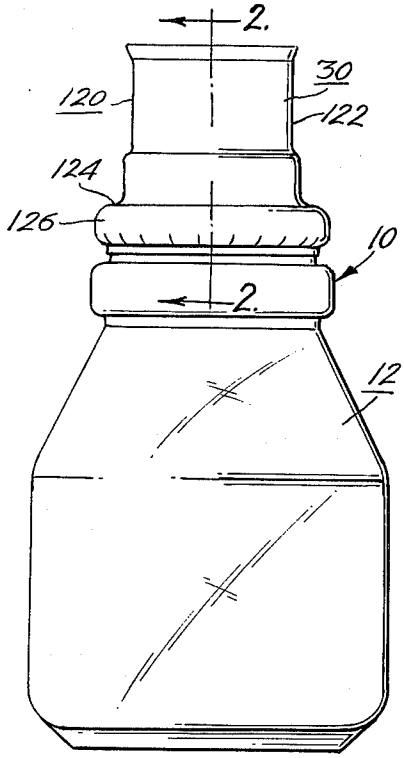


FIG. 3.

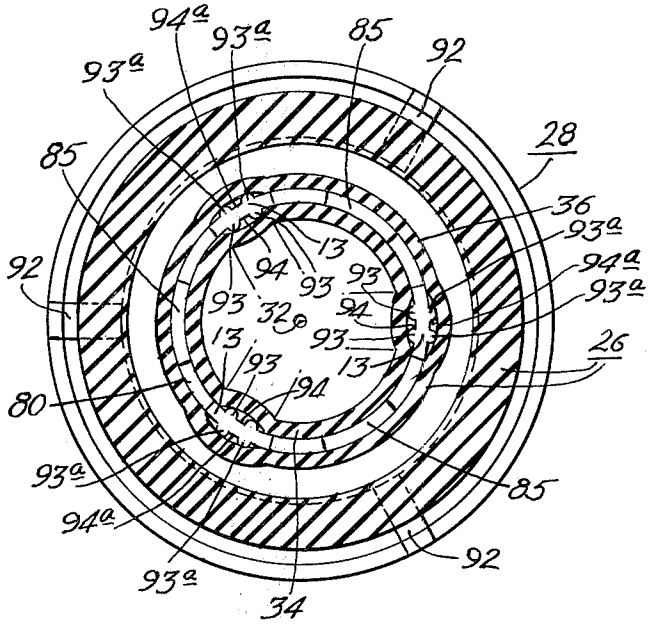


FIG. 2.

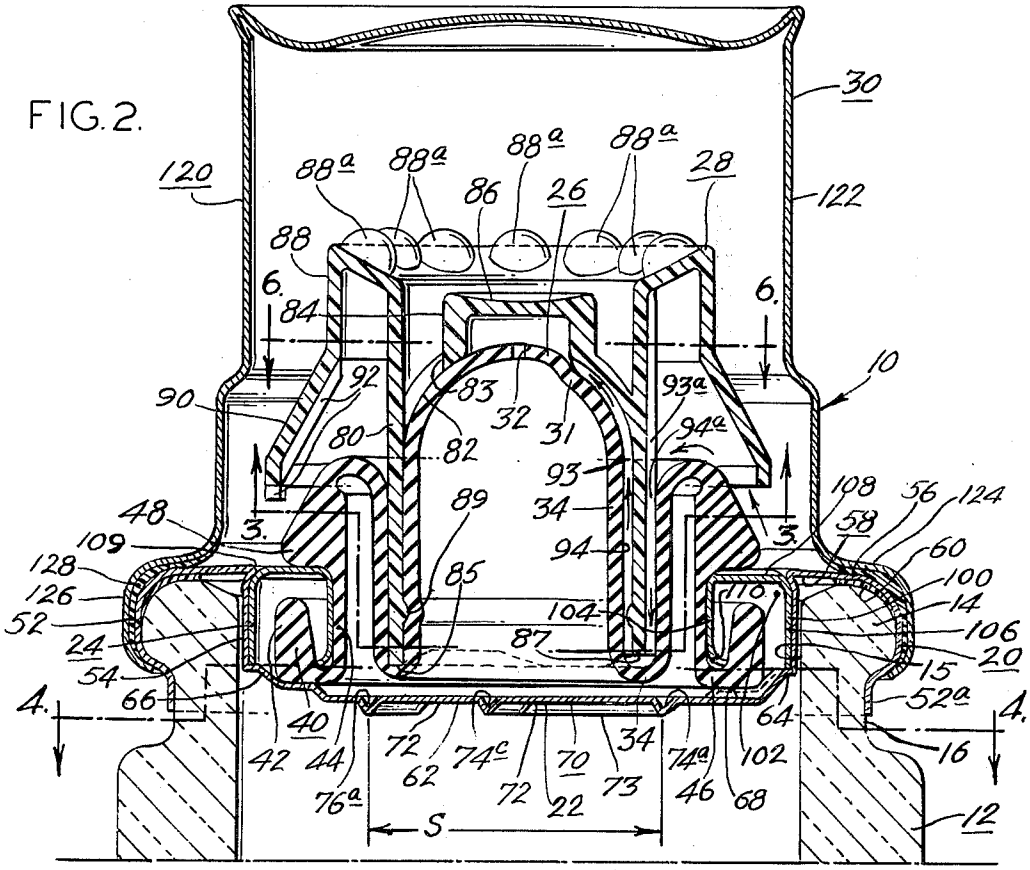


FIG.5.

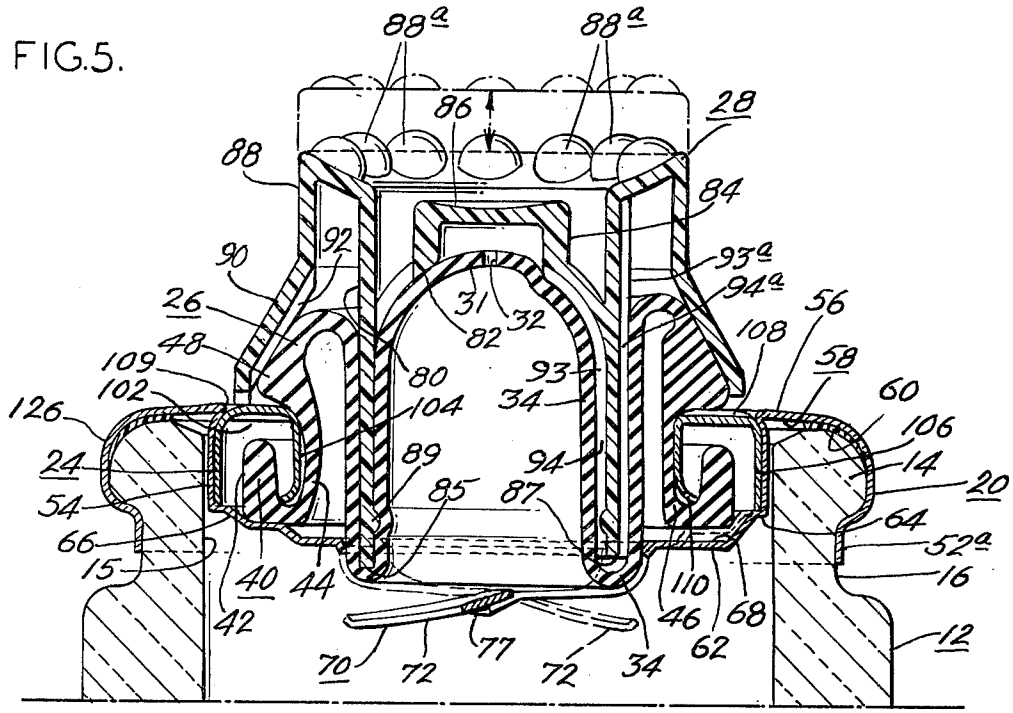

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FIG.4.

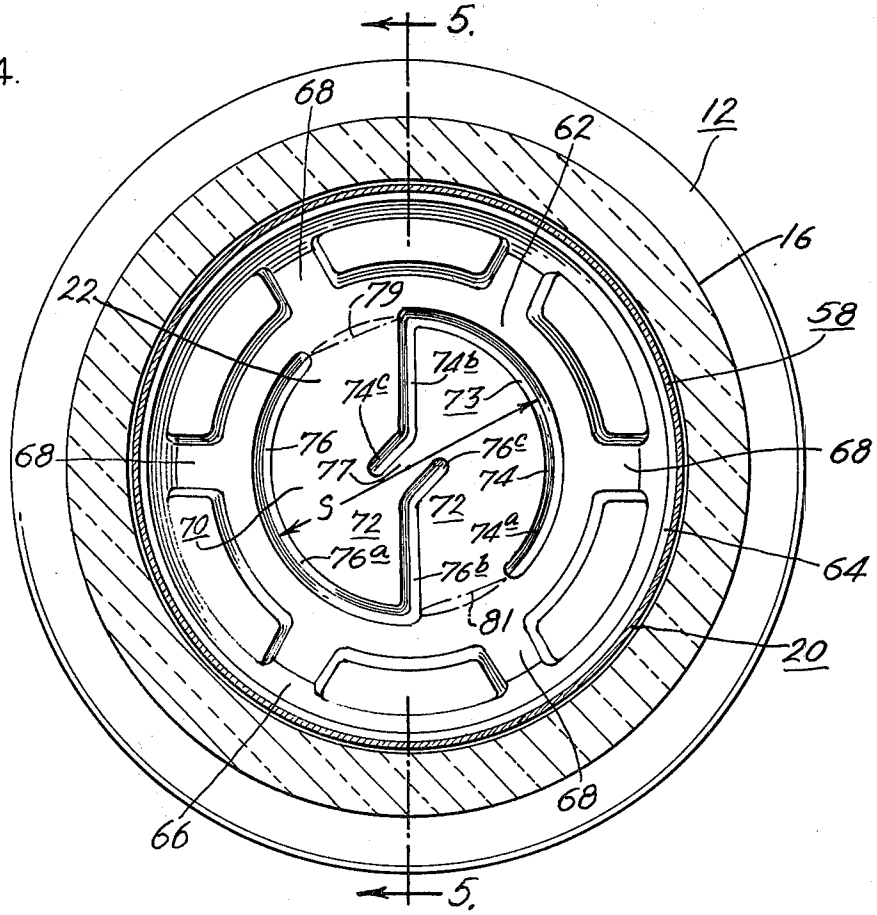

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FIG. 6.

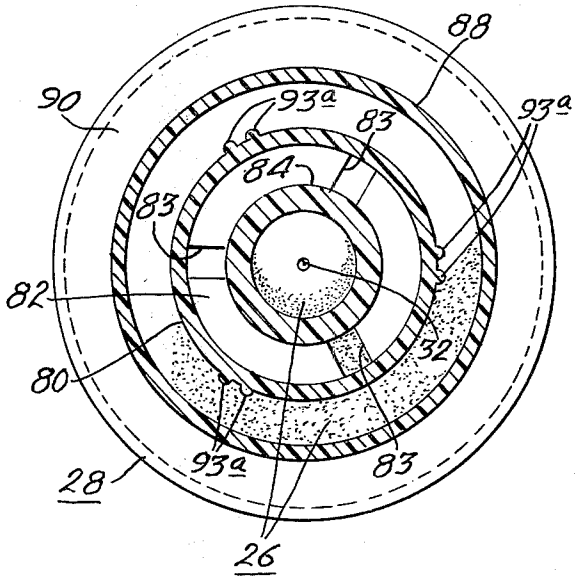


FIG. 7.

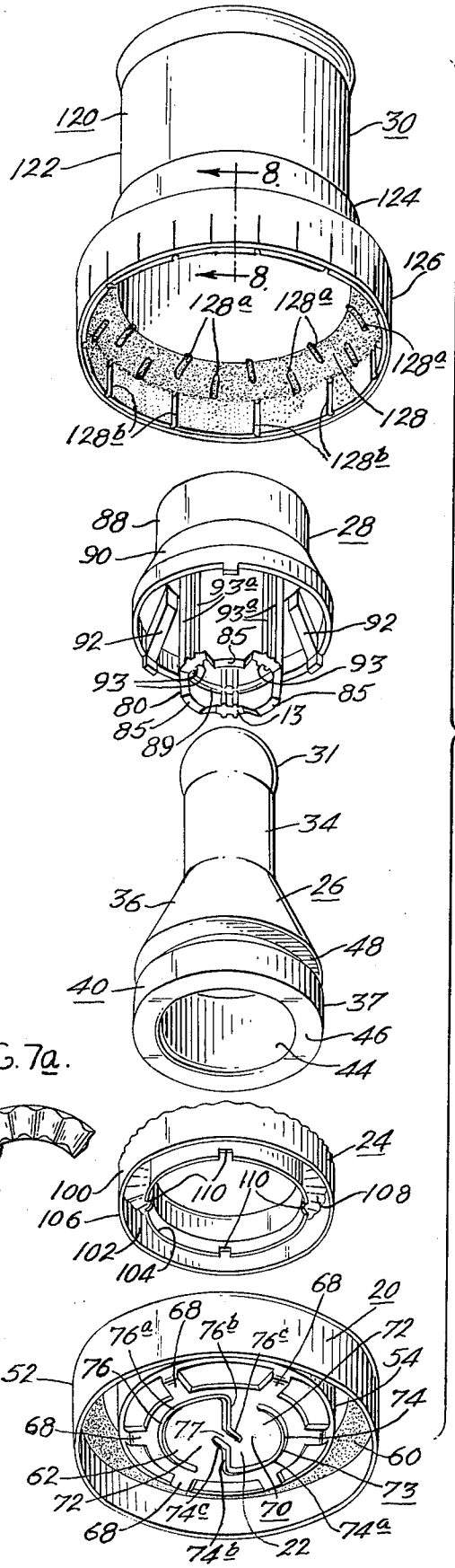


FIG. 7a.

FIG. 8.

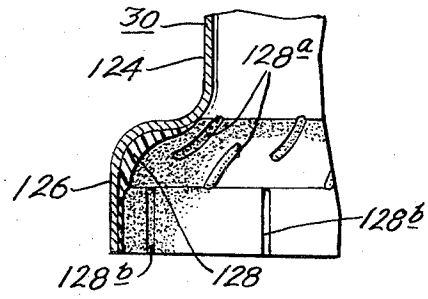


FIG. 9.

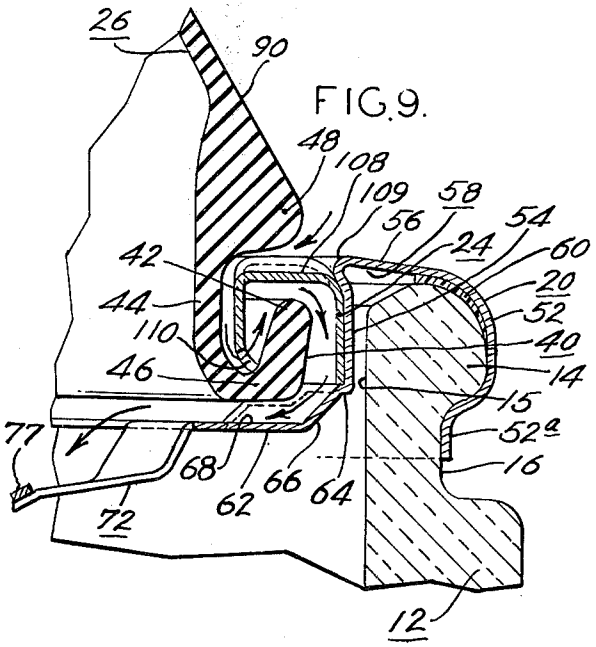


FIG. 10.

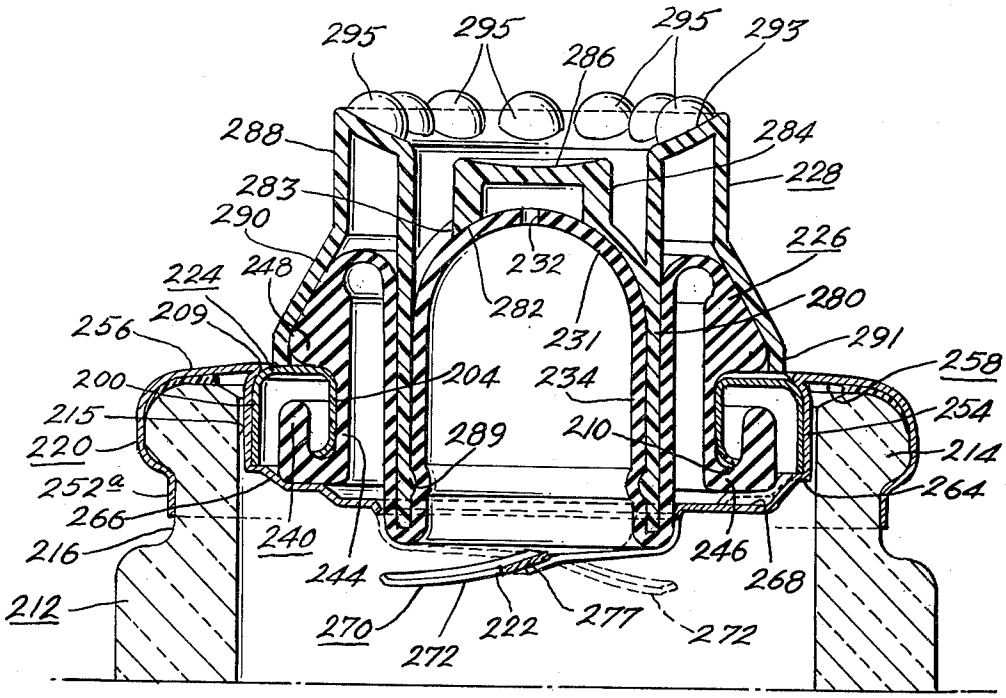
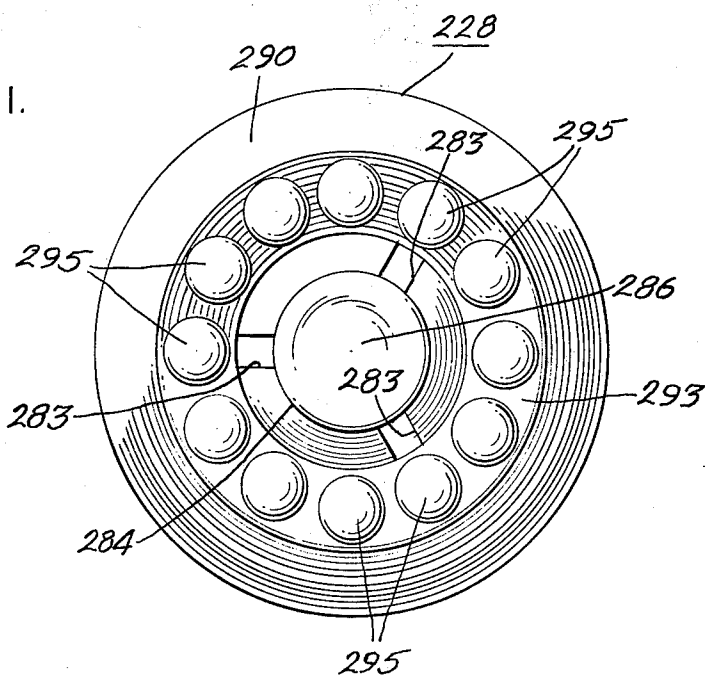

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FIG. 11.


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PRIMARY NURSER ASSEMBLY

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

The primary nurser assembly of the present invention is an improvement over the primary nurser assembly shown in application entitled Primary Nurser Assembly, Ser. No. 154,505, filed on June 18, 1971, which issued as U.S. Pat. No. 3,779,413 on Dec. 18, 1973, and is assigned to the assignee of the present invention. Even though the primary nurser assembly of the above identified application is extremely effective for the purposes intended, the primary nurser assembly of the present invention has novel features of construction and arrangement providing certain assembly and functional advantages over the prior nurser assembly. To this end the nurser includes as basic elements, a dam having a partially detachable portion actuatable to an open position defining a discharge opening to permit withdrawal of the contents of the container, a nipple retainer, a nipple mounted in the retainer, a pusher element for selectively actuating the detachable portion when desired and an over cap assembly normally sealing the various elements described above. The over cap assembly is a tamper-proof member which insures the integrity of the product and the sterile condition of the nipple prior to use.

The primary nurser assembly of the present invention includes specific structural details insuring against displacement of the nipple inwardly upon actuation of the pusher to deflect the detachable portion of the dam. More specifically, the detachable portion is defined by a predetermined scoring configuration defining two semi-spherical leaf sections which pivot about diametrically opposed hinges and which are connected by a central hinge limiting displacement of the leaf sections to thereby prevent the nipple from being drawn through the opening defined by the detachable portion of the dam and yet permit actuation to provide a discharge opening. Additionally, various elements of the assembly are provided with rib and groove arrangements defining passages and channels facilitating complete sterilization of all of the elements of the nurser assembly and proper venting during use of the assembly.

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

FIG. 1 is a side elevational view of a primary nurser assembly applied to a container for liquids such as a baby bottle;

FIG. 2 is an enlarged sectional view showing the details of the primary nurser and taken on lines 2—2 of FIG. 1;

FIG. 3 and 4 are enlarged sectional views taken on lines 3—3 and 4—4 respectively of FIG. 2;

FIG. 5 is a sectional view of the primary nurser with the overcap removed and showing the disc portion displaced;

FIG. 6 is a secitonal view taken on lines 6—6 of FIG. 2;

FIG. 7 is an exploded perspective view of the elements of the primary nurser assembly;

FIG. 7*a* is a partial plan view of the retainer;

FIG. 8 is a fragmentary sectional view taken on lines 8—8 of FIG. 7;

FIG. 9 is a sectional view of the primary nurser assembly showing the air flow path to vent the nipple;

FIG. 10 is a sectional view of another embodiment primary nurser assembly in accordance with the present invention, and;

FIG. 11 is a top plan view of the pusher element.

Referring now to the drawings and particularly to FIGS. 1 and 2 thereof, the primary nurser assembly, which is generally designated by the numeral **10,** is shown mounted on a container **12,** such as a bottle for a formula preparation for infants. In the present instance, the container **12** has an annular outwardly projecting bead **14** at its upper axial end adjacent the opening **15** in the bottle and a circumferential recess or channel **16** below the bead **14** to facilitate mounting of a primary nurser assembly in a manner described in more detail hereafter.

The basic elements of the primary nurser assembly include a dam member **20** having a displacable portion **22** normally sealing the open end of the container, a retainer **24** mounted in the dam **22,** a nipple **26** mounted in the retainer, a pusher element **28** overlying the nipple anad operable to be displaced downwardly to effect displacement of the portion **22** to permit the contents of the container to be withdrawn, and an overcap assembly **30** overlying and hermetically sealing the elements of the primary nurser assembly.

Considering now more specifically the structural details and arrangement of the nipple assembly, the nipple **26** inculdes 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 a locking portion **40.** More specifically the locking portion **40** 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 engagement with the retainer **24.**

The dam member **20** comprises as illustrated in FIGS. 4 and 7, an outer generally cylindrical skirt portion **52,** an inner depending inner skirt **54** connected by a radial wall **56** to define with the skirts a channel **58** of generally inverted U-shaped cross section which overlies the axial end of the container adjacent the opening therein, the outer skirt being of a sufficient axial depth so that the lower terminal edge **52a** engages in the groove **16** in the container when the outer skirt is crimped or spun to seat the same on the container.

In the present instance, the channel **58** is provided with a flowed-in liner **60** for effectively sealing the dam and the finish on the container when it is applied thereto. The dam member **20** further inculdes a disc-like bottom wall **62** spanning the opening in the container which has a circumferential ledge **64** at its outer periphery against which the nipple retainer seats in the manner shown in FIG. **2.** The ledge **64** terminates in a downwardly offset connecting wall **66** which is formed with a plurality of radially directed circumferentially spaced channels **68** defining air passageways when the nipple is seated in the dam as shown in FIGS. **2** and **5.** The bottom wall further includes a central disc portion **70** lying in the same plan as the base of each of the connecting channels **66,** the disc portion **70** of the bottom

wall having formed therein a pair of semi-detachable portions 72 defined by a scoring configuration 73.

More specifically, the scoring configuration consists of two sections 74 and 76, comprising semi-circular portions 74*a* and 76*a* disposed on the circumference of a common circle and radially inwardly directed leg portions 74*b* and 76*b* which are aligned and have oppositely offset terminal end portions 74*c* and 76*c* to define a central, hinge connection 77 therebetween. The semi-circular portions 74*a* and 76*a* are circumferentially staggered or spaced to define a pair of diametrically opposed outer hinge connections as at 79 and 81. In this manner when the pusher element is actuated downwardly the disc-like bottom wall portion is fractured along the score lines and defines two generally semi-circular leaf shaped sections, the leaf sections pivoting downwardly from their respective hinge connections 79 and 81 and having a limited downward displacement as a result of the central hinge 77. When the scoring is fractured by actuation of the pusher element, the central hinge 77 limits displacement of the leaf sections and prevents inversion of the nipple through the discharge opening. The arcuate score portions 74*a* and 76*a* are preferably of a diametral spacing S greater than the diameter of the lower end of the pusher element to facilitate downward displacement of the leaf sections of the dam and provide a flow passage for discharge of the contents of the container. This particular scoring configuration provides an adequate opening to facilitate flow of the content of the container through the dam and at the same time prevents the nipple from being drawn into the bottle due to the vacuum which exists in the head space of the container.

The pusher element 28 as best illustrated in FIGS. 2 and 7 comprises a generally cylindrical interior section 80 open at the lower end which is of a size to engage over and snugly embrace the cylindrical portion 34 of the nipple. Spaced from the upper end of the cylindrical section 80 is a contoured section 82 conforming to the feeing tip of the nipple and having a raised dome-like portion 84 with a slightly concave upper fact 86 engageable by the finger of the user to actuate the pusher element. The pusher element further includes a shield 88 spaced radially outwardly from the cylindrical inner section 80 which has a conical wall portion 90 and a plurality of internal ribs 92 which project slightly beyond the lower edge of the shield and are engageable with the nipple retainer to limit displacement of the pusher element relative thereto, and in turn limit inward displacement of the cylindrical section 80 to break the scoring in the dam member. The pusher element also includes three circumferentially spaced slots 83 in the contoured section 82 and a plurality of teat like protrusions 88*a* on the upper portion of the shield 88. The ribs 92 flex the nipple to permit ingress of air to the head space of the container when the pusher is moved downwardly to break the scoring in the dams (see FIG. 5). The interior section 80 has circumferentially spaced axially extending runners 93 and 93*a* on the interior and exterior wall surfaces defining air flow channels 94 and 94*a* to facilitate flow of a sterling gas through the parts of the assembly, as well as venting of the assembly during use. More specifically, the cylindrical inner section 80 has depending ear extensions 85 which are circumferentially spaced apart to define ports or openings 87 therebetween at the juncture of the air flow channels 94 and 94*a*. Additionally, the inner section 80 has an inwardly projecting bead 89 on the inner wall thereof adjacent the lower end of the inner section 80 which serves as a gripping element to insure against slippage between the pusher element and nipple when the pusher element is pulled upwardly to raise the nipple to an erect, read to use, position.

The nipple retainer 24 which may also be made of a comparatively thin guage aluminum material comprises an annular ring like member 100 of inverted U-shaped cross section defining a downwardly facing channel 102 within which the lower flange of the base of the nipplee engages. More specifically, the retainer comprises inner and outer radially spaced wall members 104 and 106 connected by a radially disposed top 108, the outer wall 106 being of a predetermined diametral dimension in relation to the dam so that there is a press fit when the retainer is assembled thereto in the manner shown in FIG. 2. Additionally, note that the outer wall of the retainer has a slight radius at the juncture with the top wall to facilitate crimping of the dam to lock the retainer in place as at 109 in the manner illustrated in FIG. 5. The lower terminal edge of the inner wall 104 of the retainer is rounded or spun outwardly and, in the present instance, is provided with four circumferentially equi-spaced cut outs defining air vent passages 110 to facilitate venting during use of the nipple and also complete sterilzation of all parts of the nurser assembly in the manner described in more detail herebelow. The out turned edge of the inner wall 104 of the retainer also prevents inadvertent removal of the nipple by the infant.

The overcap 120 has a dome section 122 terminating in a radially outwardly directed wall 124 and an outer skirt 126 adapted to be crimped or spun over the dam in the manner shown in FIG. 2. The overcap also has a flowed-in liner 128 providing a seal between the portions thereof which engage the radial wall and skirt of the dam. The dome section is of smaller diameter to serve as a pilot facilitating the capping operation by automatic equipment. The upper conical edge of the dome is formed with a circumferential rib for strength purposes and also to provide an edge engageable by the user to remove the overcap when it is desired to use the nurser assembly.

In the use of the primary nurser assembly of the present invention, parts thereof are assembled, sterilized and packaged in containers such as bags and thereafter shipped to the manufacturer of the infant formula. In the present instance, the nipple 26 is initially assembled to the retainer 24 by inserting the tip through the central opening in the retainer from the bottom side whereupon the nipple seats itself as it is pulled through the retainer and inserted into the pusher element. The retainer, with nipple attached, is then inserted into the dam member 20 and the edge at the juncture of the inner skirt and top peened to engagee over the retainer and firmly seat the same therein, the retainer and dam both being made of a thin gauge metal such as aluminum. Thereafter, the sub assembly comprised of dam, retainer, nipple and pusher are inserted into the overcap, the outer skirt of the overcap and dam being straight as shown in FIG. 7. The flowed-in liner 128 is provided with a series of circumferentially spaced inwardly projecting ribs or tracks 128*a* and circumferentially spaced grooves 128*b* to define fluid passage means between the overcap and dam when they are assembled, the ribs providing a snug fit with the dam to

hold the parts in assembly and yet permit passage of fluid to facilitate sterilization of the assembly and balancing of pressure during the process of applying the assembly to a filled container. In a typical process for g[illegible] sterilizing the nurser assembly, air is evacuated fr[illegible] the interior of the assembly by pulling a vacuum, the passage means defined by the tracks **128***a* permitting egress of air from the assembly. The assembly is then subjected to sterilizing gas under pressure, the passage means facilitating ingress of gas and the runners on the pusher element insuring flow of gas to all parts of the assembly. After a predetermined time the gas is withdrawn by vacuum means.

When the user desires to apply the primary nurser assembly to a container which is usually filled to a predetermined level with infant formula, the head space is flushed with superheated steam and the nurser assembly is then applied to the container while it is in the steam atmosphere. Thereafter the assembly is cooled drawing air into the overcap via passage means defined by the tracks **128***a* permitting venting of air and equalization of pressure on both sides of the dam to preclude weakening and possible fracture of the scoring in the dam. The skirt of the dam member and overcap are spun to seal the assembly in place on the container as illustrated in FIG. **2.**

Now when the user desires to withdraw contents of the container the overcap is simply removed by tilting it off. The skirt of the overcap may be provided with axially directed circumferentially spaced scoring to facilitate removal. With the overcap removed, the user depresses the pusher element downwardly by engaging the top thereof whereupon the scored sections of the dam are broken as illustrated in FIG. **5** to provide a discharge opening for contents of the container. Thereafter the pusher element is gripped at its outer periphery to position the nipple in an erect position, the pusher element being completely removed from the nipple by simply pulling it upwardly. The assembly is now ready for use. It is noted that the nipple is protected against contact with the hand of the user thereby to insure sterility.

As the contents of the container are being withdrawn by the infant, and the nipple is distorted by the sucking action, air enters the head space to prevent vacuum therein through an air flow path defined by the crevices in the undulating top of the retainer, the four flow channels at the terminal edge of the interior wall of the retainer and through the passages between the nipple and the disc portion of the dam (see FIG. **9**).

There is illustrated in FIGS. **10** and **11** another embodiment of a primary nurser assembly constructed in accordance with the present invention. The basic elements of the primary nurser assembly are identical to the previously described embodiment and include a dam member **220** having a displaceable portion **222** normally sealing the open end of the container, a retainer **224** mounted in the dam, a nipple **226** supported in the retainer, a pusher element **228** overlying the nipple and operable to be displaced downwardly to effect displacement of the portion **222** to permit the contents of the container to be withdrawn and an overcap assembly (not shown) overlying and hermetically sealing the elements of the primary nurser assembly which is similar in overall construction and arrangement to the overcap assembly **30** of the previously described embodiment.

Considering now more specifically, the structural details and arrangement of the primary nurser assembly, all of the elements with the exception of the pusher element **228** are identical structurally to that described previously and are assigned similar numerical designations raised to the **200** series. With regard to the pusher element assembly, this member in the present instance comprises a generally cylindrical interior section **280** open at its lower end which is of a size to engage over and snuggly embrace the cylindrical portion **234** of the nipple. Spaced downwardly from the upper end at the cylindrical section is a contoured section **282** conforming to the feeding tip of the nipple and having a raised dome like portion **284** with a slightly concave upper face **286** engagable by the finger of the user to actuate the pusher element. In the present instance, the wall portion of the contoured section **282** is provided with three circumferentially equi-spaced slotted openings **283** providing vent means permitting flow of a sterilizing medium to portions of the nipple disposed interiorly of the pusher element.

The pusher element further includes a shield **288** spaced radially outwardly from the sylindrical inner section **280** which has a conical wall portion **290** terminating in a axial skirt **291** which is adapted to engage the retainer when the pusher element is fully seated as shown in FIG. **10.** Note that the ribbed face of the retainer which the skirt **291** engages provides a plurality of passages for ingress of air to the head space of the container when the pusher element is actuated downwardly to fracture the displaceable dam portion **222.** In the present instance the frusto-conical wall **293** of the shield **288** connecting the cylindrical interior section **280** and the outer wall of the shield is provided with a plurality of teat-like protruberances **295** which are circumferentially spaced apart to provide air passages or vent means when the thumb of the user engages the top of the pusher element to permit passage of air when the pusher element is being displaced and thereby insure against a vacuum lock when the nipple is displaced downwardly to fracture the scoring defining the displaceable dam section **222.**

We claim:

1. A nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a partially detachable portion providing an access opening for discharge of contents of the container, a nipple, means supporting the nipple in a position overlying said dam member, said detachable portion being defined by a scoring configuration providing at least two leaf sections, each leaf section pivotal about its own first hinge, a common second hinge connecting said leaf sections, means for actuating said detachable portion whereby said leaf sections pivot about said first and common hinge connections and pivotal displacement thereof is limited by said common hinge connection.

2. A nurser assembly as claimed in claim **1** including a retainer mounted in said dam member and wherein said nipple includes a base portion having an annular locking rib engagable with said retainer, the base portion of the nipple engaging a wall portion of said dam member outwardly of said detachable portion and including means defining a plurality of circumferentially spaced radially extending channels in said wall portion of said dam member providing air flow passages between said nipple and dam.

3. A nurser assembly as claimed in claim 2 wherein said retainer is of inverted U-shaped cross section and includes inner and outer radially spaced skirt members, the inner skirt member engagable with the locking portion of said nipple and having at least one slot in its lower terminal edge defining an air flow passage.

4. A nurser assembly as claimed in claim 3 wherein the dam member is provided with a radially inwardly directed bead engagable with said retainer to firmly seat the retainer in the dam.

5. A nurser assembly as claimed in claim 1 including a pusher element having a circumferential extension engageable over the tip of the nipple and wherein said scoring includes arcuate scoring and wherein the diameter of said cylindrical extension is less than the diameter of the arcuate scoring defining said detachable portion of the dam.

6. A nurser assembly as claimed in claim 1 including a pusher element having a cylindrical extension circumscribing the tip portion of the nipple and a shield having a portion engagable to actuate the same, said portion having a plurality of protruberances defining air passages.

7. A nurser assembly as claimed in claim 1 wherein said means for actuating said detachable portion of said dam member comprises a pusher element engageable over the tip portion of the nipple.

8. A nurser assembly as claimed in claim 7 wherein said pusher element includes a generally cylindrical section snugly embracing the tip portion of the nipple and including a shield spaced radially outwardly of the cylindrical section having a lower terminal edge portion engageable with the retainer to limit downward displacement of said pusher element upon actuation thereof to engage the detachable portion of said dam member.

9. A nurser assembly as claimed in claim 1 wherein said scoring includes spaced arcuate portions lying on the circumference of a common circle defining outer edge portions of the leaf sections, said arcuate portions being circumferentially spaced to define diametrically opposed first hinge connections.

10. A nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a detachable portion providing an access opening for discharge of contents of the container, a nipple having a tip portion, means supporting the nipple in a position overlying said dam member, a pusher element having a generally cylindrical section snuggly embracing the tip portion of the nipple, a portion of the nipple engaging the outer peripheral surface of said cylindrical extension when the pusher element is partially seated, means defining channel means on said cylindrical extension providing a flow path between said nipple and cylindrical section of said pusher element facilitating flow of a sterilizing medium to internal portions of the elements of the nurser assembly.

11. A nurser assembly as claimed in claim 10 wherein said pusher element includes a bead on the interior surface thereof engagable with said nipple and operable to grip the same when it is raised to an erect position.

12. A nurser assembly as claimed in claim 10 wherein the lower end of said cylindrical section is provided with circumferentially spaced extensions defining slots therebetween communicating with the channels formed on opposite sides of sidewalls of said cylindrical extension.

13. A nurser assembly as claimed in claim 10 wherein said pusher element includes a shield spaced radially outwardly from the cylindrical inner section and overlying the nipple in the assembled relation to protect the same against contact by the hand of the user.

14. A nurser assembly as claimed in claim 13 wherein said shield has at least one internal rib which projects beyond the lower peripheral edge of said shield and is engageable with said retainer to limit downward displacement of said cylindrical extension when the pusher element is actuated to fracture said scoring.

15. A 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 contents of the container, a retainer, including an inner circumferential surface, secured to said dam member, a nipple including an annular base portion mounted in said retainer in overlying relation on said dam member, said base also including a circumferential surface normally in sealing relation with said circumferential surface of said retainer to prevent ingress of ambient air to said container, and an air passageway between said base portion and the inner circumferential surface of said retainer to permit ingress of air upon actuation of the nipple, a second air passageway between said base and said dam connecting said first passageway with the interior of said container, whereby displacement of said base circumferential surface upon actuation of the nipple permits ambient air to flow through said passageways to said container.

16. A nurser assembly as claimed in claim 15 including a pusher element engageable over the tip portion of said nipple having a portion overlying said detachable portion of said dam member operable upon actuation to pivot said leaf sections about the hinge connections, said pusher element including means engageable with the base portion of the nipple operable to effect at least local displacement of said confronting sealing surfaces of said retainer and nipple to establish fluid communication between said air passageway means.

17. A nurser assembly as claimed in claim 15 wherein said retainer is of inverted U-shaped cross section and includes an annular top and inner and outer radially spaced depending skirt members, the inner skirt member engagable with the locking portion of said nipple and having at least one slot in its lower terminal edge defining an air flow passage and wherein the base portion of the nipple includes a circumferentially extending radial shoulder overlying the annular top of said retainer and the lower axial end face of the base portion seats on a wall portion of said dam member radially outwardly of said scoring, the annular top being provided with a plurality of radially directed ribs defining with said shoulder radial air passages and the wall portion of said dam member having grooves formed therein defining with the axial end face of said base portion radial passages.

18. A nurser assembly for mounting over the opening in a container comprising a dam member spanning the opening and having a partially detachable portion providing an access opening for discharge of contents of the container, a nipple, means supporting the nipple in a position overlying said dam member, said detachable portion being defined by a scoring configuration providing at least two leaf sections, each leaf section pivotal about its own first hinge, a common second hinge

connecting said leaf sections, means for actuating said detachable portion whereby said leaf sections pivot about said first and common hinge connections and pivotal displacement thereof is limited by said common hinge connection and an overcap enclosing and sealing said dam member and nipple over the opening in the container.

19. A nurser assembly as claimed in claim **18** wherein the overcap has a stepped dome section to facilitate handling in automatic assembly equipment.

20. In a nurser assembly including a nipple adapted to be mounted over the discharge opening in a container, a dam member spanning the discharge opening and having a partially detachable portion providing an access opening for discharge of contents of the container, said detachable portion being defined by a scoring configuration providing at least two leaf sections, each leaf section pivotal about its own first hinge, a common second hinge connecting said leaf sections, said leaf sections being pivotal about said first and common hinge connections and pivotal displacement thereof being limited by said common hinge connection.

21. A dam member as claimed in claim **20** wherein said scoring includes spaced arcuate portions lying on the circumference of a common circle defining outer edge portions of the leaf sections, said arcuate portions being circumferentially spaced to define diametrically opposed first hinge connections.

22. A dam member as claimed in claim **21** wherein said common hinge connection is disposed adjacent the center of the circle defined by said arcuate scoring.

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