United States Patent [19]

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[11] **3,747,791**

[45] **July 24, 1973**

[54] **INFANT NURSING DISPENSER**

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[22] Filed: **Mar. 17, 1971**

[21] Appl. No.: **125,216**

[52] **U.S. Cl.** ..... **215/11 R**, 215/11 C
[51] **Int. Cl.** **A61j 9/00**
[58] **Field of Search** ..... 215/11 R, 11 A, 11 B, 215/11 C, 11 D, 11 E; 222/184

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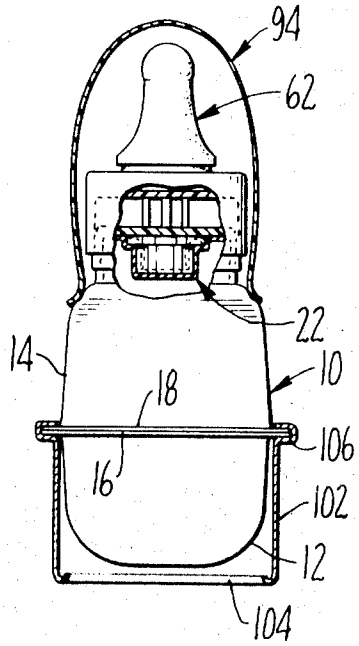
[57] **ABSTRACT**

An infant nursing dispenser and method of manufacturing same. The dispenser includes a body portion, which is at least partially collapsible and includes a fluid outlet having a seal cap affixed thereto. Piercing means is operatively associated with the seal cap and with a relatively movable actuator whereby relative movement between the actuator and piercing means causes said piercing means to break the seal cap when dispensing of the liquid in the body portion is desired. A postive locking arrangement is provided for maintaining the movable actuator and piercing means in fixed relative positions after breaking of the seal cap to insure the free flow of liquid in the body portion through the fluid outlet and a soft, pre-perforated nipple extending upwardly from the actuator. An overwrap is provided to insure the sanitary condition of the nipple prior to its use by an infant. In addition, support means in the form of an open ended tube at least partially surrounds the body portion to protect the body portion and provide a support therefore.

13 Claims, 6 Drawing Figures



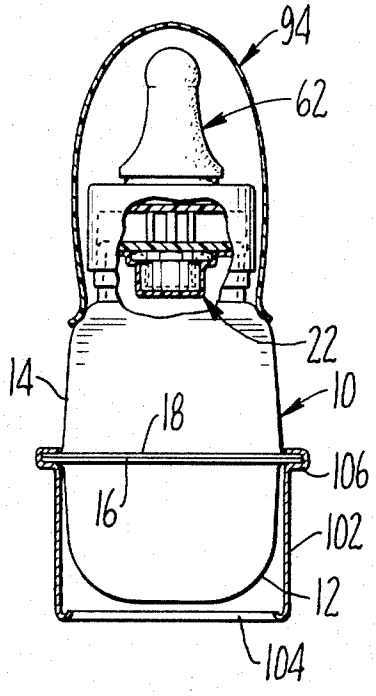


FIG. 1.

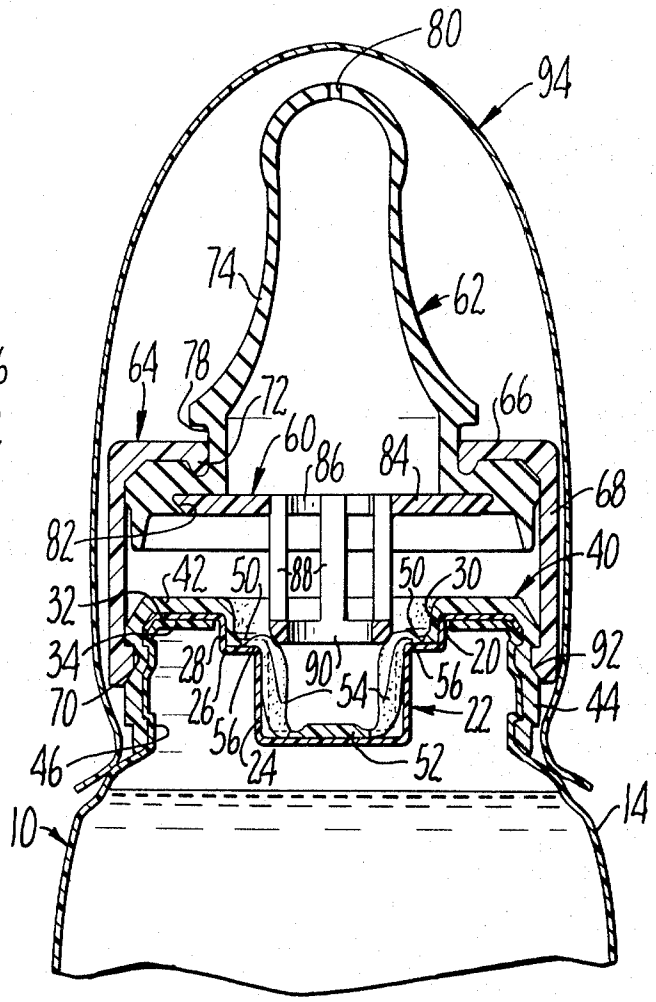


FIG. 2.

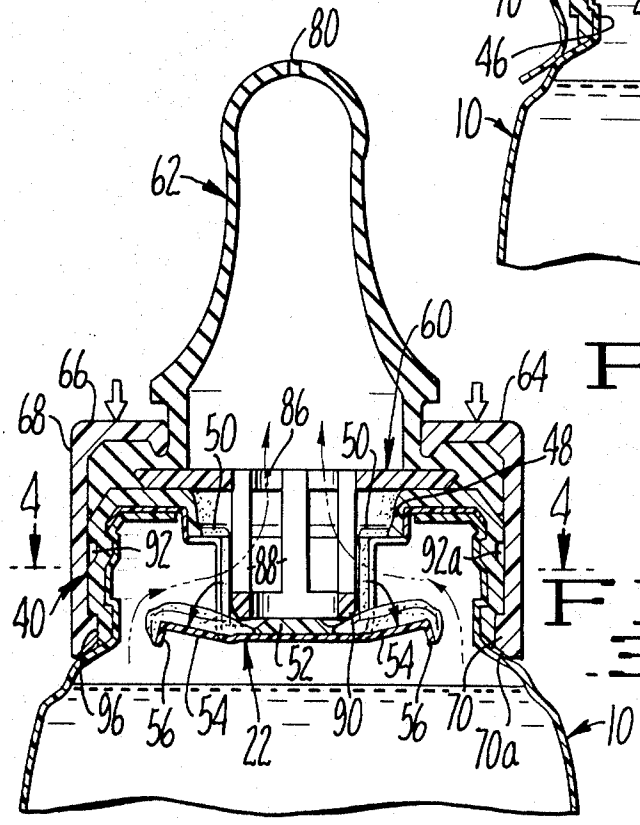


FIG. 3.

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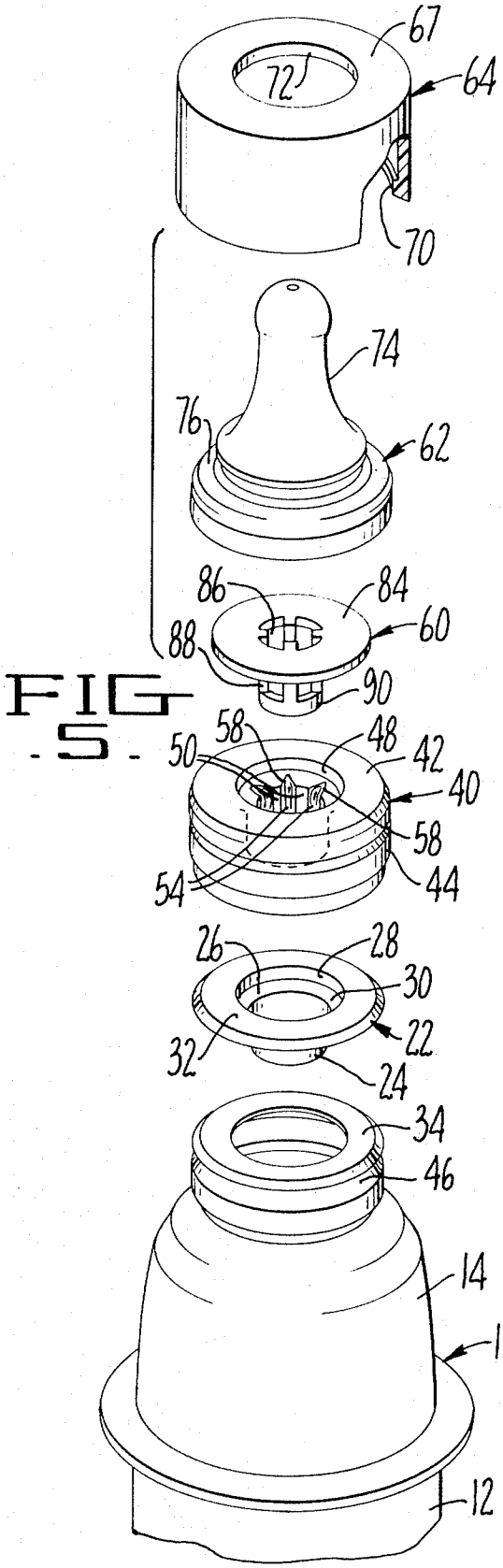

FIG. 5.

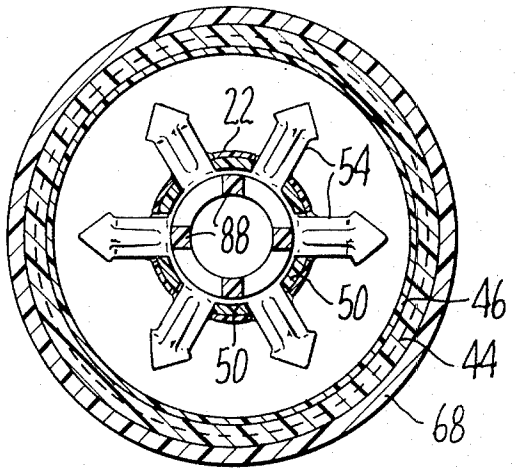

FIG. 4.

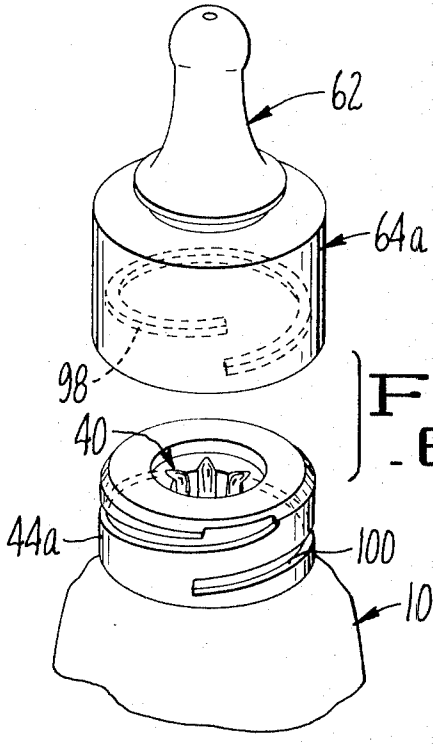

FIG. 6.

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INFANT NURSING DISPENSER

BACKGROUND OF THE INVENTION

The present invention relates to an improved fluid dispenser, and more particularly, to a dispenser particularly adapted to infant nursing. In addition, the invention is directed to a method of manufacturing an infant nursing dispenser wherein the component parts may be readily maintained in a sterile condition during assembly.

In the prior art, various arrangements have been provided to nurse infants with artificial devices simulating, to some extent, a mother's breast. The most typical of these devices simply take the form of a rigid bottle having a nipple secured over the open end thereof. These devices are generally of the reusable type and require cleaning and refilling prior to each use. In these devices there is generally no provision to avoid the creation of a vacuum within the bottle as fluid is drawn therefrom by an infant. The absence of such provision is particularly detrimental, since the vacuum impedes the free flow of contents from the bottle and results in flatulence and the excessive ingestion of air by the infant.

In an effort to avoid the shortcomings of conventional nursing bottles such as that described above, various types of dispensing devices have been developed. These devices provide various arrangements to eliminate the creation of a vacuum therein during nursing and also, in many cases, provide disposable, prepackaged units which alleviate the need for cleaning and refilling. Some of these prior art devices incorporate seal arrangements which are internally confined within the nipple or associated structure which must be broken prior to nursing the infant. The mechanisms utilized to accomplish this are often complex thereby causing manufacturing difficulties. Quite often, actuation of these mechanisms requires direct finger contact of the nurser nipple by the operator, thereby opening the way to possible contamination thereof prior to use by the infant. A further defect of prior internal seal breaking mechanisms is that they break their associated seals in such a manner as to allow inadvertent cutoff of fluid flow by the seal material due to the fact that no means is provided to maintain the seal material out of the path of fluid flow once pressure is removed from the seal breaking mechanism, as by removal of the operator's finger pressure.

In addition to the above noted difficulties which have hampered commercial acceptance of prior art dispensable, prepackaged nurser units, such units have occasionally incorporated collapsible portions which are relatively unprotected thus resulting in leakage and contamination prior to end use. In the event such units collapse at or near the bottoms thereof, as had been the case with some prior art arrangements, it is difficult to store them in an upright condition which is often desirable at both point of sale and in the home.

SUMMARY OF THE INVENTION

It is, accordingly, a principal object of this invention to provide an infant nursing dispenser incorporating internal seal means which may be broken by the operator without contaminating the nipple portion thereof.

It is a further object of the present invention to provide an infant nursing dispenser incorporating an arrangement for positively maintaining broken seal material out of the fluid flow path into the nipple during nursing to prevent clogging thereof.

Still another object of the present invention is to provide an infant nursing dispenser incorporating a collapsible fluid retaining wall and an inexpensive means whereby such wall is protected prior to and during dispenser use and which functions as a support for the dispenser for storage purposes.

Yet another object of the present invention is to provide a method of packaging a fluid foodstuff in an infant nursing dispenser in a quick, efficient and inexpensive manner.

DESCRIPTION OF DRAWINGS

The above noted and other objects of this invention will be understood from the following description taken with reference to the drawings wherein:

FIG. **1** is an elevational view, in partial cross-section, of an assembled infant nursing dispenser constructed in accordance with the teachings of the present invention.

FIGS. **2** and **3** are enlarged, cross-sectional, elevational views illustrating details of the infant nursing dispenser of the present invention in differing stages of the operation thereof.

FIG. **4** is a sectional view taken on plane **4—4** of FIG. **3.**

FIG. **5** is an exploded perspective view illustrating the order in which selected elements of the infant nursing dispenser of FIG. **1** are assembled during manufacture.

FIG. **6** is a fragmentary perspective view of an alternative form of infant nursing dispenser constructed in accordance with the teachings of the present invention.

DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

Referring now to FIG. **1**, the dispenser incorporating the teachings of the present invention includes a container or body portion which is generally designated by means of reference **10.** Body portion **10** comprises shell elements **12** and **14** sealingly secured together by flanges **16** and **18,** respectively, thereon. The shell element **12** is completely closed, except for the open side thereof formed with the flange **16.** The shell element **14** has an aperture or orifice **20** in the end thereof opposite the side formed with the flange **18.** Thus, when the shell elements **12** and **14** are secured together, they define a container having only one aperture **20** opening thereinto. Through this aperture, as will become apparent subsequently, fluid can be both introduced and exhausted from the body portion **10.**

The shell elements **12** and **14** are of such relative flexibilities that the element **12** is adapted to collapse into the element **14** when fluid is withdrawn from the container **10.** Specifically, the element **12** is very flexible so that it will readily collapse upon the creation of a vacuum within the container, whereas the element **14** is quite rigid relative to the element **12.** The materials from which the elements **12** and **14** are fabricated may take various forms without departing from the spirit of the invention. In a preferred form, both elements are constructed of laminated polypropylene having different degrees of rigidity. Examples of other materials from which the element **12** may be formed are: polyallomer; coated aluminum foil; and nylon polylaminate. Examples of other materials of which the element **14** may be satisfactorily fabricated are: polyallomer; steel foil, aluminum; or coated paper board. Depending on

the materials used, various techniques may be employed for joining the flanges **16** and **18** in sealed relationship. For example, where one or both of the elements **12** and **14** are fabricated of a thermoplastic material, joining may be accomplished by employing sealing techniques of the following types: heat, thermo impulse, radio frequency, or ultrasonic. Where the elements **12** and **14** are fabricated of very thin thermoplastic material, the utilization of techniques, such as ultrasonics, subjecting the elements to a minimum of heat has the advantage that flow of the material and weakening of the juncture is avoided. Spin welding may also be advantageously employed where the elements are formed of thermoplastic material.

Once the container **10** has been formed and filled with fluid through the aperture **20,** the aperture is closed by means of a seal cap **22.** As may most readily be seen with reference to FIGS. **2** and **5,** seal cap **22** includes a housing or cup element **24** which is closed at the bottom thereof. A first flange **26** is integrally connected to the housing **24** at the open end thereof so that the first flange **26** extends radially outwardly from the housing about the full periphery thereof. The upper surface of the first flange **26,** as viewed in the drawings, along with the inner surface of integrally formed circular side wall **28** define a radially extending niche **30** which communicates with the interior of housing **24.** The purpose of radial extending niche **30** will be brought out in greater detail below. Extending radially outwardly from the upper end of circular side wall **28** is a second flange **32.** Second flange **32** is adapted to sealingly engage the upper surface of inwardly turned wall **34** of container **10,** said inwardly turned wall defining orifice **20.** The seal cap **22** is preferably of unitary, molded construction. A material which has been found suitable for use in fabrication of seal cap **22** is polypropylene. However, the seal cap may be formed of other readily rupturable material such as: nylon, Mylar, polyallomer, aluminum or steel foil, or polypropylene-coated paper. After the interior of container **10** has been cleaned as by means of high pressure steam and filled with desired foodstuff, seal cap **22** is secured in the illustrated position by being spin welded in place in a nitrogen atmosphere.

The next principal component to be secured into position is the piercing element **40** which includes a circular top wall **42** and a depending circular side wall **44** which is adapted to be snapped over and secured to the container neck portion **46** as by means of cooperating indents and detents formed on the neck portion and the piercing element circular side wall. Connected to circular side wall **42** and defining a central opening in the piercing element **40** is an inner circular side wall **48** which is adapted to be positioned against seal cap circular side wall **28** in the manner illustrated. A plurality of support elements **50** are connected to the bottom of inner circular side wall **48.** As may be seen most clearly with reference to FIGS. **3** and **5,** support elements **50** extend inwardly and then downwardly so that they are positioned adjacent to first flange **26** and housing **24** of seal cap **22.** At their respective bottoms support elements **50** are integrally attached to a piercing element base member **52** which is adapted to seat upon the bottom horizontal wall of cup element or housing **24.** Connected to the enlarged central portion of base member **52** are a plurality of upwardly extending piercing members **54.** Piercing members **54** are of relatively thin construction at their points of connection with base member **52,** gradually increasing in thickness as the piercing members proceed upwardly therefrom. At their respective upper ends piercing members **54** terminate in outwardly extending piercing points **56** which are adapted to be positioned on seal cap first flange **26** when piercing element **40** is positioned on container **10,** (FIG. **2**).

Piercing members **54** are staggered with respect to support elements **50** so that the piercing members are in registry with slots **58** defined by support elements **50.** See, in particular, FIG. **5** in this regard. If desired, outwardly extending piercing points **56** may be frangibly interconnected to piercing element inner circular side wall **48** as by means of score lines. However, in the illustrated embodiment, the only point of interconnection of the piercing members **54** is at their respective lower ends to piercing element base member **52.** The piercing element **40** is preferably of molded one piece construction and may suitably be formed of high temperature polypropylene or glass-filled polypropylene.

After piercing element **40** has been snapped into position over container **10** and seal cap **22,** a subassembly comprising an actuator element **60,** a nipple **62,** and a lock ring **64,** is positioned over the piercing element **40.** Lock ring **64** includes a top wall **66** and a circular side wall **68** depending downwardly therefrom. Projecting inwardly from side wall **68** at the bottom thereof is a locking rib **70** which extends all the way around the inner periphery of the side wall. A central aperture is formed in lock ring top wall **66** and the top wall is turned downwardly as at **72** to form a detent extending all the way about the aperture. Materials suitable for construction of the lock ring **64** are high temperature polypropylene or glass-filled polypolyene.

The nipple **62,** which comprises an element of the abovementioned subassembly, includes a hollow body portion **74** and an annular flange **76.** An annular groove **78** is formed in the body portion **74** to accomodate therein lock ring circular detent **72.** The nipple **62** is constructed of sufficiently soft resilient material to permit deformation thereof as it is snapped into position with respect to lock ring **64.** In a preferred embodiment, pure gum, non-toxic, heat resistant rubber may be utilized in the construction of a nipple; however, it is to be understood that other suitable materials may be utilized in the fabrication thereof, such as: ethylene-vinyl-acetate, low density polyethylene, and latex. The nipple is perforated as at **82** in the usual manner.

A second annular groove **82** is formed in the bottom of the nipple flange **76.** Second annular groove **82** accomodates therein a circular support plate **84** which comprises a portion of the third and final element of the subassembly, i.e., actuator element **60.** The actuator element circular support plate **84** is positioned within second annular groove **82** after the nipple **62** has been positioned with respect to lock ring **64** with the three subassembly elements cooperating in an obvious manner to form a liquid-tight seal therebetween. A throughbore **86** is formed in support plate **84** with a plurality of downwardly extending columns **88** being secured to support plate **84** about the periphery of the throughbore in the manner illustrated. At their lowermost ends columns **88** are secured to an apertured ring **90** at spaced intervals so as to provide open spaces therebetween.

After the three element subassembly has been formed, the subassembly is placed into position over piercing element **40** in the manner illustrated in FIG. **2.** To accomplish this locking rib **70** or lock ring **64** is snapped into position within a first cooperating annular groove **92** formed along the outer periphery of the piercing element. With the three element subassembly in such position, apertured ring **90** of actuator element **60** is in engagement with all of upwardly extending piercing members **54.** At their respective points of engagement with ring **90** each of the piercing members **54** has a cammed surface formed thereon which corresponds to the configuration of the apertured ring **90** at that point. This cooperating shoulder or cam arrangement is important since it provides a positive means whereby inward movement of piercing members **54** due to any internal pressure which may be present within container or body portion **10** is prevented. The ring **90,** as well as the remainder of actuator element **60,** is constructed of relatively rigid material such as high temperature polypropylene or glass-filled polypropylene.

After the three element subassembly comprising actuator element **60,** nipple **62,** and lock ring **64,** has been positioned in the manner illustrated in FIG. **2,** a flexible overwrap **94** of polypropylene film or the like is heat sealed or otherwise secured to container or body portion **10** about the periphery thereof so that nipple **62** and the structure associated therewith is protected from possible contamination from external sources. The respective elements of the present invention remain in the relative positions illustrated in FIG. **2** until dispensing of the foodstuff in the container **10** is desired.

With the present arrangement communication between the interior of nipple **62** and the interior of container **10** may be readily accomplished by the application of a downward pressure upon lock ring **64.** Sufficient pressure in this direction results in the downward movement of the lock ring, the nipple **62** and the actuator element **60** so that these parts assume the respective positions illustrated in FIG. **3.** Downward movement of locking rib **70** with respect to first cooperating annular groove **92** of the piercing element is facilitated by the cooperating downwardly cammed surfaces of the groove and locking rib. These downwardly cammed surfaces are designated by means of reference numberals **92***a* and **70***a* respectively. Downward movement of lock ring **64** continues until the locking rib **70** thereof enters into a second cooperating annular groove **96** formed on the piercing element **40.** Once the locking rib has entered this second cooperating annular groove upward movement of the lock ring is prevented due to the cooperating shoulders formed at the top of locking rib **70** and that portion of piercing element **40** which protrudes outwardly to define the upper extent of second cooperating annular groove **96.**

As previously stated, the downward movement of lock ring **64** causes a corresponding downward movement of actuator element **60.** As the actuator element **60** proceeds downwardly apertured ring **90** thereof continually bears against piercing members **54** forcing the piercing points **56** thereof in a downwardly and outwardly direction until they assume the positions illustrated in FIGS. **3** and **4.** This movement of the piercing members **54** is restrained only by the seal cap **22** since the piercing members may freely move outwardly through the slots **58** formed in piercing element **40.** In this manner, upon application of sufficient downward force on lock ring **64** the downward and outward movement of piercing members **54** causes the seal cap material to rupture thereby establishing communication between the interior of container **10** and nipple **62.** Fluid flow out of the container and into the nipple may then be had as indicated by the arrows in FIG. **3** through the rupture formed within the seal cap **22,** the open spaces between downwardly extending columns **88,** and through the throughbore **86** formed in the actuator element **60.**

Due to the fact that locking rib **70** of lock ring **64** is maintained within second cooperating annular groove **96** of piercing element **40,** the piercing members **54** will retain their respective positions illustrated in FIG. **3** by virtue of the fact that apertured ring **90** of the actuator element **60** is continually maintained in engagement therewith. This assures that the holes formed in seal cap **22** by the piercing members will remain relatively unobstructed by the ruptured seal cap material. The foodstuff contained within nipple **62** will then be free to flow outwardly through perforation **80** formed in the nipple. It should be noted from the foregoing description that the nipple **62** need not be contacted to break the seal cap. In this manner the sterile condition of the nipple is maintained until actual insertion into the infant's mouth. If desired, downward movement of lock ring **64** may actually be occasioned by means of one or more of the operator's fingers with the relatively thin overlap **94** remaining in position. Alternatively, however, the overwrap **94** may be removed prior to depression of the lock ring.

Referring now to FIG. **6** an alternative form of lock ring **64***a* and piercing element **40***a* are illustrated. In this arrangement, the lock ring and piercing element wall **44***a* are provided with cooperating screw threads **98** and **100,** respectively. The lowermost portion of lock ring screw thread **98** is positioned in operative association with the upper portion of screw thread **100** until dispensing is desired. At that time, the lock ring **64***a* is rotated clockwise so that the cooperating threads cause the lock ring to assume a lower position with respect to piercing element wall **44***a.* This lowering movement causes the downward and outward movement of piercing members **54,** as in the embodiment shown in FIGS. **1–5,** by virtue of their interaction with the actuator element (not shown) disposed in operative relationship with lock ring **64***a.*

Returning once again to FIG. **1,** a support means is provided in operative association with container **10** to enable the container to be stood in an upright condition as well as to provide some degree of protection for relatively thin walled shell element **12** which collapses upon removal of foodstuff from the interior of the container. The support means comprises a section of polyallomer coated paper board which has been shaped to form a circular side wall **102,** turned inwardly at the bottom as at **104,** and crimped at the upper extremity thereof around flanges **16** and **18** to provide a circular shoulder portion **106.** In addition to providing support and protection for the container **10,** the support means may accomodate suitable labels on the circular side wall **102** thereof to provide information regarding the product. The inwardly turned portion **104** provides a simple and inexpensive means whereby a desired de-

gree of strength and rigidity may be imparted to the remainder of the support means.

From the foregoing detailed description, it is believed apparent that the present invention enables the attainment of the objects initially set forth herein. In addition, it is noted that the invention provides a nurser capable of heat sterilization after filling and assembly. This ability is provided, in part, by the provision of the piercing element **40** and the disposition which it assumes within the seal cap **22.** Through this disposition the piercing element functions to maintain the seal cap in desired position against compression responsive to pressure within the container **10.** Such pressure, necessarily results upon heating of the container during sterilization. It should be understood, however, that the invention is not intended to be limited to the details of the illustrated embodiments, but rather is defined by the accompanying claims.

I claim as my invention:

1. Apparatus for dispensing a prepared fluid foodstuff comprising, in combination:

a container defining an interior adapted to hold a fluid foodstuff and having a fluid outlet;

frangible seal means covering said fluid outlet in a fluid-tight manner, said means including a housing extending into said container;

piercing means including a plurality of piercing members positioned within said housing, said members being hingedly connected to a common base member seated within said housing and each comprising an elongated body curved at the free end thereof in a direction radially outwardly of said base member and terminating in a point, and wherein said members are movable from a first position adjacent to said seal means to a second position extending through said housing, said piercing members being adapted to rupture said frangible seal means when moving from said first position to said second position;

a soft nipple secured to said container over said frangible seal means and defining an interior; and

means relatively movable with respect to said container and disposed at least partially externally of said nipple in operative association with said piercing means and adapted to move said piercing members from said first position to said second position whereby fluid communication is established between the interior of said container and the interior of said nipple.

2. The apparatus of claim **1** wherein said means relatively movable with respect to said container comprises an actuator element depending from said nipple and in communication with the interior of said nipple and a separate element disposed exteriorly of said nipple and adapted to secure said nipple to said container.

3. The apparatus of claim **2** wherein said separate element comprises a lock ring having a top wall having an aperture formed therein and a circular side wall depending from said top wall, said nipple extending through said aperture in sealed engagement with said top wall, and said lock ring side wall and said piercing means having cooperating interconnecting means formed thereon permitting relative movement therebetween.

4. The apparatus of claim **3** wherein said cooperating interconnecting means includes a locking rib on said lock ring side wall and a plurality of grooves formed in said piercing means selectively engageable by said locking rib whereby said lock ring may assume a plurality of positions with respect to said piercing means.

5. The apparatus of claim **3** wherein said cooperating interconnecting means comprises a screw thread arrangement formed on said lock ring side wall and said piercing means.

6. The apparatus of claim **1** wherein said means relatively movable with respect to said container includes an actuator element depending from said nipple and in communication with the interior of said nipple and a lock ring sealingly engaged around said nipple, said actuator element, said nipple, and said lock ring being adapted to move together with respect to said piercing means.

7. The apparatus according to claim **6** wherein said nipple has an annular groove formed in the interior wall thereof and wherein said actuator element comprises a support plate disposed within said annular groove and defining a throughbore, said actuator element further comprising a plurality of spaced columns depending from said support plate about said throughbore and a member connected to the free ends of said spaced columns and engageable with said plurality of piercing members.

8. The apparatus according to claim **7** wherein said piercing means includes a side wall disposed in communication with the exterior of said container, said side wall having two spaced annular grooves formed thereon, and wherein said lock ring includes a side wall having an inwardly extending rib formed thereon selectively engageable with each of said spaced annular grooves, said actuation member being adapted to move toward said piercing means base plate and urge the free pointed ends of said piercing members outwardly and downwardly through said housing when said rib cooperatively engages one of said annular grooves.

9. The apparatus according to claim **8** wherein said actuator member and said piercing members have cooperating cammed shoulder surfaces formed thereon which are in engagement when said piercing members are disposed within said housing to prevent inward movement of the piercing members under the influence of pressures exerted within the interior of said container.

10. The apparatus of claim **1** wherein said container comprises a first collapsible shell connected to a relatively rigid second shell by means of cooperating flanges on said shells, said second shell having the fluid outlet formed therein, a support member having a circular side wall having a top end and a bottom end disposed about said first shell, said top end being secured about said cooperating flanges and said bottom and being disposed below said first shell to support said container.

11. The apparatus of claim **10** wherein said support member is constructed of polyallomer coated paperboard material.

12. Apparatus for confining and containing a fluid for thermal processing, storage and selective dispensing, said apparatus comprising:

a container defining an interior adapted to hold a fluid, said container having an opening therein;

a flexible, frangible seal covering said opening to hermetically seal said container, said seal having an area extending over said opening;

a piercing member extending over said seal, said member being normally disposed in juxtaposition to said seal to reinforce the area of said seal extending over said opening against distortion responsive to pressure created within said container upon the thermal processing of a fluid contained therein and, upon selective external compression, being adapted to rupture said seal; and,

means securing said piercing member in juxtaposition to said seal and against substantial displacement responsive to pressure created within said container upon the thermal processing of a fluid contained therein.

13. Apparatus according to claim **12,** wherein:

said seal is concave in the area thereof extending over said opening; and,

said piercing member comprises a cagelike portion extending into and in juxtaposition with the area of said seal extending over said opening and outwardly deflectable elements extensible through said area to effect the rupture of said area responsive to the application of selective external pressure to the piercing member.

* * * * *