

[54] **DIET FEEDING CONTAINER**

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[22] Filed: **Apr. 12, 1973**

[21] Appl. No.: **350,439**

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

[51] Int. Cl. **A61j 9/00**

[58] Field of Search 215/11 R, 11 B, 11 C, 42, 215/46 A, 55

[56]

References Cited

UNITED STATES PATENTS

3,276,884	10/1966	Barnby.....	215/11 C X
3,358,864	12/1967	Meierhaefer.....	215/11 C
3,586,196	6/1971	Barton et al.	215/11 C

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[57]

ABSTRACT

A liquid diet feeding container assembly is disclosed which includes a container member such as a bottle having an upstanding neck portion which is sealed with a thin frangible metallic seal overlying the open mouth of the neck portion and which carries a screw cap overlying the seal. The cap contains tubular delivery means such as a nipple protruding outwardly therefrom and projection means depending from the underside thereof. The depending projection ruptures the seal when the cap is tightened into operative position, and deformable spacer means are provided which intervene between the cap and the upstanding neck portion of the container or seal and prevent contact of the projection with the frangible seal during shipment and storage. The spacer means are deformed when the cap is tightened into position to permit delivery of the liquid diet.

8 Claims, 4 Drawing Figures

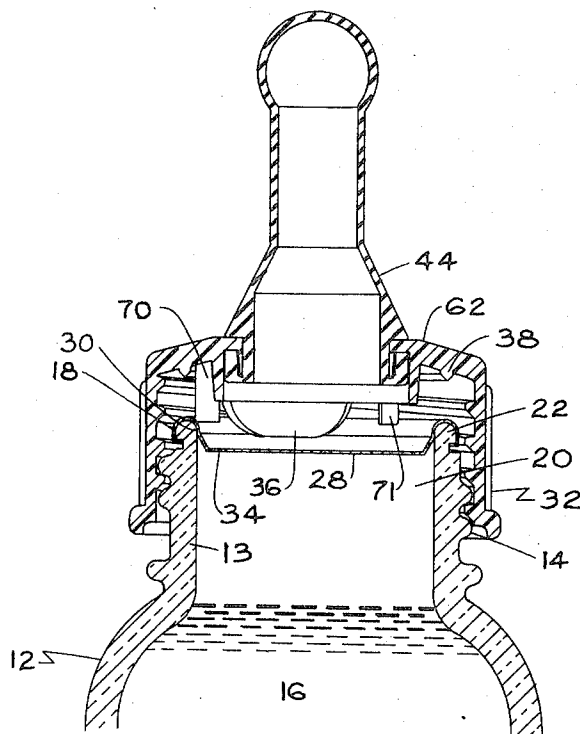


FIGURE 1

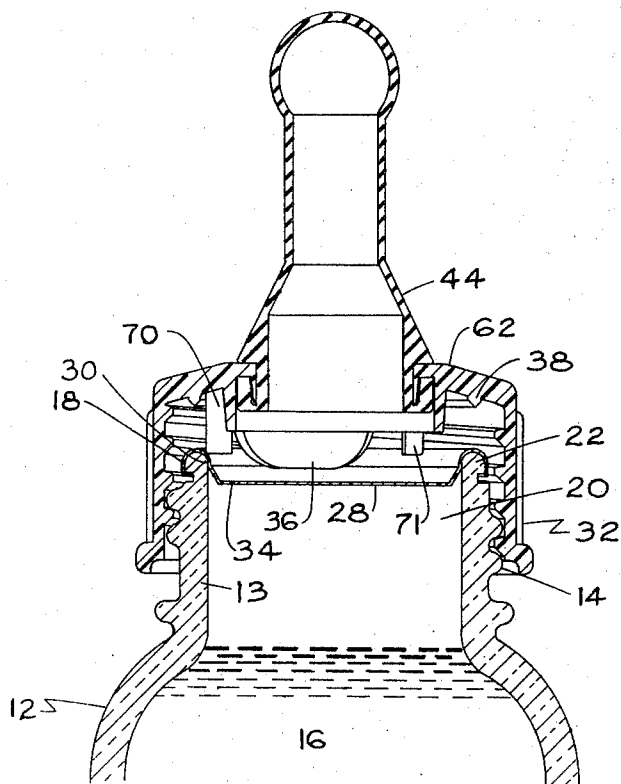


FIGURE 2

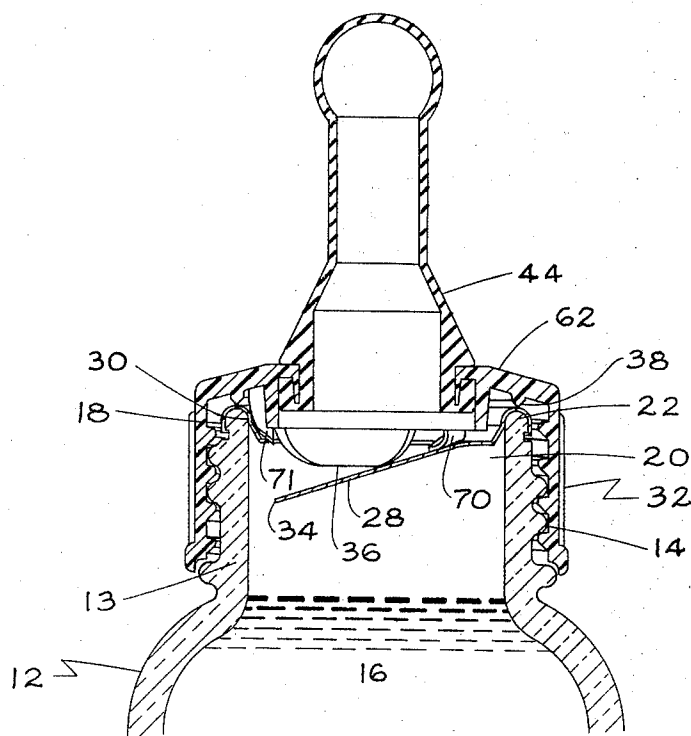


FIGURE 3

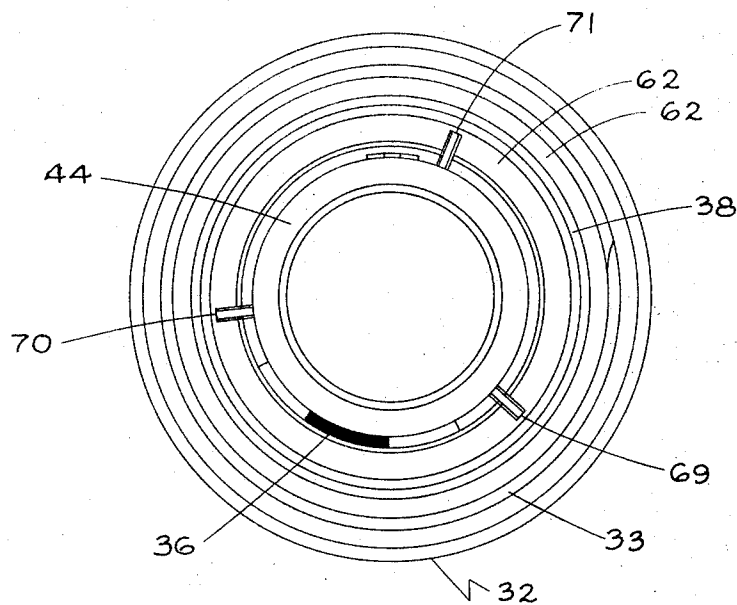
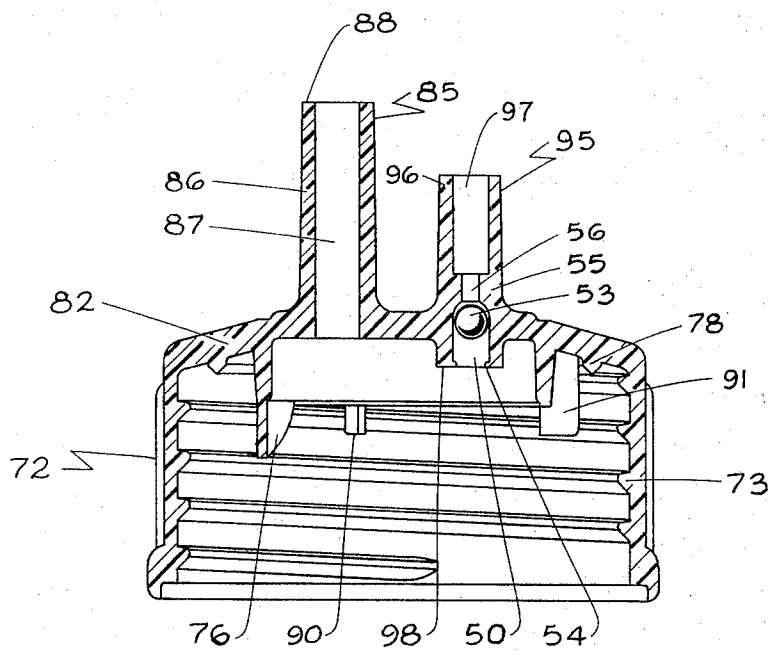


FIGURE 4



DIET FEEDING CONTAINER

FIELD OF THE INVENTION

This invention relates generally to containers for the feeding of liquid diets such as infant nursers and containers for gavage feeding of malnourished patients or premature infants. More particularly, it refers to closures for such containers.

DESCRIPTION OF THE PRIOR ART

U.S. Pat. No. 3,586,196 patented June 22, 1971 by the same Raymond W. Barton and Joe Thomas Herron who are identified as co-inventors of the present invention, refers to a pre-filled sterile infant nurser closed with a frangible metal seal over which a nipple assembly is threaded. For delivery of the sterile contents of the container, the cap is simply rotated to engage the threads in seated position whereupon the projection on the underside of the threaded cap ruptures the frangible metal seal and permits delivery of the liquid contents of the container. The present invention provides spacer means between the cap and the container or seal which prevent accidental rupture of the seal during shipping and handling.

SUMMARY OF THE INVENTION

The nurser, which is the subject of U.S. Pat. No. 3,586,196 cited above, is widely used in hospital nurseries. In assembling these nursers during manufacture, it has been the practice to partially thread the nipple assembly cap onto the bottle so that the probe depending from the other side thereof abuts lightly against the frangible metal seal and is in position for rupture thereof when the cap is threaded fully into position in the nursery. This arrangement necessitates the use of rather elaborate protective cartoning to prevent accidental rupture of the seal and loss of the contents or bacteriological contamination thereof through rough handling of the containers during shipment. Special handling in warehousing has also been necessary, such as limiting stack height, etc.

One object of the present invention is to provide a modified cap and nipple assembly containing spacer means to prevent accidental rupture of the metallic seal means and thereby simplify cartoning and facilitate warehousing and handling. A modified form of nurser, including use of the spacer means of the present invention is also provided according to which a bottle very similar to the nursing bottle is employed which is pre-filled and sealed at the factory in the same way as the nurser, but which has a modified threaded cap for attachment of a gavage tube for use in administering nasogastric feeding of malnourished patients.

According to preferred embodiments of the present invention, the spacer means comprise a plurality of elongated plastic posts which frictionally engage the inner portion of the neck of the container, or seal where it overlies the neck, and prevent the probe from contacting the frangible seal. The posts are of light construction and are readily deformed when sufficient rotational force is applied to the threaded cap to seat it into position and rupture of the frangible metal seal. When in the deformed position, the spacers do not interfere with the seating of the nipple ring against the top of the bottle nor prevent the depending cap projection from rupturing the seal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial vertical sectional view showing the upstanding threaded neck portion of the container showing the intact frangible metallic seal with the nipple cap partially threaded onto the container and the depending projection means supported in close proximity to the metallic seal by the spacer posts.

FIG. 2 is a partial vertical section similar to FIG. 1 having the nipple cap in seated position ready for use and the frangible metallic seal ruptured and the spacer posts deformed.

FIG. 3 is a plan view from below of the nipple cap shown in FIGS. 1 and 2 illustrating a preferred arrangement of the spacer posts.

FIG. 4 is a partial vertical sectional view of a modified form of the cap shown in FIGS. 1 and 2 having a vertical fitting for attachment of a gavage tube instead of a nipple, and an air vent.

DETAILED DESCRIPTION OF THE INVENTION

In the following description like numbers refer to like features of the nurser shown in U.S. Pat. No. 3,586,196 cited above of which the present invention is an improvement.

In FIG. 1 the container for the liquid diet is generally shown by the numeral 12 and the liquid diet contained therein by the numeral 16. The upstanding neck portion of the container 13 is threaded as shown at 14. The open mouth 20 of the upstanding neck portion is closed by a frangible seal means 18 overlying the top marginal rim 22 of the upstanding neck portion 13. The seal bears score means 34 on the underside of the seal means in circumferential arrangement inward from the upstanding neck portion 13. The embodiment of the invention shown in FIG. 1 bears a nipple 44 seated in the transverse wall portion 62 of the screw cap 32. Annular projection means 36 depends from the underside of the transverse wall portion 62 of the cap 32. The foregoing features are part of the invention which is the subject of U.S. Pat. No. 3,586,196.

Still referring to FIG. 1, deformable spacer means 70 and 71 also depend from the transverse wall portion 62 of the screw cap 32. The screw cap 32 shown in FIG. 1 is of molded plastic and spacer means 70 and 71 comprise posts of relative thin elongated form. Seal means 18 is a thin metal cap overlying the top marginal rim 22 of the upstanding neck portion 13 of the container 12. The transverse thin wall 28 of seal means 18 is reinforced in recessed position within the open mouth 20 of container 12 by an annular wall portion 30 extending around the inside of the neck portion 13. Spacer means 70 and 71 are shown in FIG. 1 in frictional engagement with the annular wall portion 30 of seal means 18.

The dimensions of the posts 70 and 71 are not critical except that they should be thin enough to bend readily when cap 32 is tightly threaded onto the upstanding neck portion 13 of container 12. Also, they should be long enough for frictional engagement with the annular wall portion of the inside of the neck 13 or seal means 30 adjacent the top marginal rim 22 of container 12 to support depending projection means 36 above the thin wall portion 28 of seal means 18. In the embodiment of the invention shown in FIG. 1, the transverse wall portion 28 of seal means 18 is recessed 0.162 inches within the top marginal rim 22 of the upstanding neck portion 13 of container 12. The depending projection means 36

is 0.30 inches in length measured from annular ridge 38 which depends from the underside of the transverse wall portion 62 of cap 32 and seats against seal means 18 where it overlies the top marginal rim 22 of the neck 13 of container 12 when cap 32 is fully threaded for delivery of the liquid formula 16 through nipple 44. The spacer posts 70 and 71 in the embodiment shown in FIG. 1 are 0.21 inches in length measured from annular ridge 38.

In assembly of cap 32 onto the threads 14 of the upstanding neck portion 13 of container 12 during manufacture, a torque of about ½ inch pound is applied which is sufficient for frictional engagement of posts 70 and 71 with annular wall portion 30 of seal means 18 as shown in FIG. 1. The thickness of the posts is such that they are not appreciably deformed by a torque of up to 2 inch pounds.

FIG. 2 shows the same embodiment of the invention as FIG. 1 after cap 32 has been fully tightened onto threads 14 so that annular ridge 38 is seated against seal means 18 where it overlies the top marginal rim 22 of neck portion 13 of container 12. Thin wall 28 of seal means 18 has been ruptured along the line of score means 34 by projection means 36. Posts 70 and 71 are shown in deformed position. In the preferred embodiment shown in FIG. 1 and FIG. 2 a torque of from 10 to 15 inch pounds is sufficient to tighten the cap and rupture the seal as shown in FIG. 2.

Referring again to FIG. 1, an alternative embodiment of the invention which is not shown employs posts similar to 70 and 71 but of somewhat narrower dimension and longer in length so that they rest against the thin wall portion 28 of seal means 18 outward from score means 34 rather than being in frictional engagement with the annular wall portion 30 of seal means 18 as shown in FIG. 1. Other variations will occur to those skilled in the art.

FIG. 3 is a plan view from the bottom of the threaded cap 32 of the assembly pictured in FIGS. 1 and 2. Again like numbers refer to like features. In this drawing, a preferred arrangement of the deformable spacer posts 69, 70, and 71 is shown. It is preferred, but not essential, to employ three posts in symmetrical spaced circumferential arrangement as shown in FIG. 3. The posts are circumferentially arranged inwardly from annular ridge 38. A minimum of three deformable spacer posts in symmetrical arrangement as shown in FIG. 3 is preferred to insure proper alignment of cap 32 on container 12 during assembly and tightening for use. With this arrangement, coincident alignment of the vertical axis of the threaded screw cap 32 with the vertical axis of container 12 is insured. When only one or two posts are employed, threaded cap 32 has a tendency to become canted from the vertical when assembled onto the threaded upstanding neck portion 13 of container 12. A multiplicity of more than three posts may be employed but there is no advantage to having more than three posts if the material from which they are made has sufficient rigidity to prevent abutment of projection means 36 against the thin wall portion 28 of seal means 18. Injection molded polypropylene is a satisfactory material for construction of the threaded screw cap 32 embodying spacer posts 69, 70, and 71 as an integral portion thereof. Where a more resilient material is employed, more than three spacer posts may be desirable to afford the necessary support. It is not necessary that

spacer posts 69, 70, and 71 be made of the same material as the threaded screw cap 32.

FIG. 4 is a vertical sectional view of another embodiment of the present invention. It constitutes a modified version of the threaded screw cap of the nipple assembly indicated by the numeral 32 in FIGS. 1-3 in which a vertical upstanding spout for attachment of a gavage tube and air vent replace the nipple. The threaded screw cap is otherwise identical to that shown in FIGS. 1-3 so that it may be threaded onto similar sterile filled and sealed liquid diet containing containers of the type referred to with reference to FIGS. 1-3. The threaded screw cap is generally indicated by the numeral 72 in FIG. 4, the internal threads being indicated by the numeral 73. Annular projection means 76 depends from transverse wall portion 82 of cap 72 as do deformable spacer means 90 and 91. Spacer means 90 and 91 are circumferentially arranged spaced inwardly from annular ridge 78 which depends from the transverse wall portion 82 of cap 72. Three spacer posts are employed.

Vertical spout means for attachment of a gavage tube (not shown) is generally shown by numeral 85 and the air vent by numeral 95. Spout means 85 is generally tubular in character being comprised of elongated side walls 86 enclosing an annular space 87 which communicates with the interior of threaded cap 72 through the transverse wall portion 82 thereof. It terminates at its upper end in a top marginal rim 88 and is adapted for receiving a gavage tube. Air vent 95 is generally similar in construction but shorter in length so as not to interfere with attachment of a gavage tube to spout means 85. Air vent 95 is generally tubular in character having wall portion 96 enclosing an annular space 97 communicating through the transverse wall portion 82 of cap 72 with the interior thereof. The tubular housing of air vent 95 is elongated in form in FIG. 4 so that an air filter may be housed therein. Annular wall 96 of air vent 95 terminates in a lower marginal rim 98 at the underside of transverse wall portion 82 of screw cap 72. Lower marginal rim 98 circumscribes an open mouth portion 50 within which the loose fitting ball 53 is housed. The diameter of annular space 97 is constricted at the lower open mouth portion 50 thereof, and also at a position above ball 53 by internal ridges shown by 54 and 55 in wall 96 of air vent 95. Ball 53 is thus housed within a chamber formed by walls 96 and ridges 54 and 55 of air vent 95.

When in use, cap 72 is tightly threaded onto a container similar to that shown by the numeral 12 in FIGS. 1 and 2 which is filled with sterile liquid diet 16 and sealed with seal means 18. Depending projection means 76 ruptures thin wall 28 along score means 34 as shown in FIG. 2 forming a communication between liquid diet 16 contained within container 12 and spout means 85 and air vent 95. The entire assembly is then inverted permitting delivery of liquid contents 16 through spout means 85 to a gavage tube (not shown) connected thereto. Ball 53 of air vent 95 comes to rest in blocking relation over constriction 56 in annular space 97 of air vent 95, preventing loss of liquid diet therethrough. A steady flow of liquid diet 16 through spout means 85 is insured by the passage of air upward through air vent 95 when in the inverted position to equalize the pressure within and without container 12 during use.

What is claimed is:

1. In a liquid diet feeding container assembly which includes a container member for the liquid diet having an upstanding neck portion terminating in a top marginal rim circumscribing an open mouth portion, seal means comprising a relatively thin wall closing the upper end of the neck portion extending transversely across the entire inside of said neck portion generally in a plane spaced inwardly from the outer end of the neck portion so as to be recessed within said neck portion, and a cap received on said neck portion having a transverse wall portion overlying said seal means with annular projection means depending from the underside of said transverse wall portion, tubular means on said cap for delivery of said liquid diet, said thin wall being frangible on application of concentrated pressure thereto by said projection means when said cap is secured into position for delivery of said liquid diet, the improvement which comprises deformable spacer means intervening between said cap and the upstanding neck portion of said container said spacer means preventing contact of said projection means with said frangible thin wall until deformed.

2. The container assembly of claim 1 wherein said spacer means depends from the transverse wall portion of said cap.

3. The container assembly of claim 2 wherein said spacer means is in frictional engagement with the inside surface of the neck portion of said container.

4. The container assembly of claim 2 wherein said

seal means closing the upper end of the neck portion of said container is a thin metal cap overlying the top marginal rim of the neck portion of said container having the transverse thin wall portion thereof reinforced in recessed position by an annular wall portion extending around the inside of the neck portion of the container adjacent to top marginal edge thereof wherein said spacer means is in frictional engagement with the annular wall portion of said thin metal cap.

5. The container assembly of claim 4 wherein the transverse thin wall portion of said seal means has substantially circular score means spaced inwardly from and concentric with the annular wall portion thereof and said spacer means when in the support position rests upon said transverse thin wall portion outward from said score means.

6. The container assembly of claim 2 wherein the transverse wall portion of said cap and said spacer means depending therefrom are molded plastic and said spacer means comprises a post of relatively thin elongated form.

7. The container assembly of claim 6 wherein said spacer means comprises a multiplicity of posts in circumferential arrangement with respect to one another.

8. The container assembly of claim 7 wherein said spacer means comprises three posts in equidistant relationship to each other.

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