

1

2

3,115,980

FORMULA CONTAINER AND NIPPLE CAP
David Norman De Woskin, 29 Chaminade Drive,
St. Louis, Mo.

Filed Mar. 2, 1962, Ser. No. 176,932

4 Claims. (Cl. 215—11)

This invention relates generally to improvements in a container and dispenser, and more particularly to improvements in a combination of a can with a nipple attachment adapted for feeding infants and the like.

Heretofore in the preparation of typical infant formulae, cow's milk was boiled and diluted, or concentrated or dired milk was diluted to the proper strength in sterile vessels and the formula, after having been prepared, was measured into sterile bottles. Alternatively, the diluted formula prior to sterilization was divided into the proper number of bottles and the formula in the bottles was then sterilized for a suitable length of time. Such formula preparation required considerable effort and specialized equipment, and there was always the danger of contamination.

In feeding infants milk formulae and other fluids, it is apparent that considerable handling and preparation of materials under aseptic conditions are needed. For new mothers or in families where considerable care must be devoted to other children, formula preparation is a difficult, time-consuming problem and one with which most mothers would be happy to eliminate in order to provide time for other interesting or needed pursuits and activities.

It is a major objective of the present invention to avoid the disadvantages mentioned above by packaging the sterile formula in sealed cans that are capable of storage in a compact space and which may be merchandised through customary retail store outlets.

An important object is realized by providing a lightweight, inexpensive, disposable, single-service container for one-time machine filling of infant formula which is sealable after loading at the processing plant, and which is adapted for use as a direct dispenser for the food upon attachment of a sterile nipple unit.

Another important object is achieved by the provision of a nipple attachment that includes a cover detachably connected to the can, and a nipple carried by the cover in an opening therethrough, the nipple having a resilient portion compressible between the cover and can lid to provide a liquid seal upon connection of the cover.

Other important advantages are afforded by providing a resilient flange on the nipple which extends outwardly of the cover opening and extends between the cover and can lid, the flange having a down-turned peripheral lip that sealingly engages the can lid about the hole punched in the lid.

Another important objective is realized by the provision of an air vent between the nipple and cover that operates automatically upon the formation of a vacuum in the can to enable the passage of air to the interior of the nipple close to the lid and to its punched hole in order to replace the volume of formula withdrawn from the can by the infant, and thereby equalize inside and outside pressures to afford regular and easy liquid flow.

Still another important objective is provided by the structural arrangement that provides a clearance between the nipple and the peripheral margin defining an opening in which the nipple is disposed, and by providing a vent in a resilient nipple flange extending outwardly from the margin and located between the cover and can lid, such vent being disposed inwardly of a peripheral lip on the resilient flange which provides a seal with the cover and lid about the hole punched in the can lid. The vent

has one end in communication with the interior of the nipple while the other end is normally closed by the cover. The resilient flange is movable away from the cover inwardly of the sealing lip when a vacuum is formed inside of the can so as to open the vent automatically to enable the inward flow of air.

Another important object is realized by the structural arrangement and connection of the nipple with the cover so as to permit a limited axial movement of the nipple within the cover opening so as to enable flexible movement of the resilient flange toward and away from the cover in the manner described previously incident to closing or opening the air vent, and yet provide a connection by which the nipple is securely yet detachably carried by the cover.

Yet another important objective is achieved by the provision of a nipple attachment that will afford the functional results described above.

Another important object is to provide a combined can and dispenser and a nipple attachment per se which are simple and durable in construction, economical to manufacture and assemble, efficient in operation, and which can be utilized by anyone with little or no instruction.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawing, in which:

FIG. 1 is a top plan view of the nipple attachment; FIG. 2 is a cross-sectional view of the nipple attachment and can as seen along line 2—2 of FIG. 1;

FIG. 3 is an enlarged cross-sectional view of the nipple attachment showing the air vent open, and

FIG. 4 is a cross-sectional view of the nipple attachment disconnected from the can.

Referring now by characters of reference to the drawing, and first to FIG. 2, it is seen that the container in which the prepared formula is packed consists of a can generally indicated at 10. As will be understood, the can 10 includes a lid 11 extending across and closing one end of the can. Specifically, the lid 11 is sealed to the rim of the can 10 to provide a peripheral bead 12. The contents or formula referred to at 13 is maintained in sterile condition within the sealed can from the time it is filled at the processing plant to the time the can is opened for use.

In order to utilize the formula incident to feeding an infant, the can lid 11 is punctured to provide an outlet hole 14. Preferably, this hole 14 is formed in the approximate center of the lid 11. When the can 10 is inverted, the formula 13 can flow from the can through the hole 14.

A nipple unit indicated at 15 can be selectively attached to the can 10 in order that the infant may be fed directly from the can. This nipple unit 15 is of a type that can be easily sterilized.

The nipple 15 includes a cover 16 constructed of a plastic material having a certain degree of resiliency. The cover has an integral down-turned peripheral hook portion 17 that is adapted to snap under and receive the bead rim 12 formed on the can 10. In attaching the cover 16, the peripheral portion 17 is located on top of the bead rim 12 and the cover 16 simply pressed in a direction toward the can 10. Because of the resilient character of the plastic material comprising the cover 16, the peripheral portion 17 will spread sufficiently to receive the bead rim 12 and automatically snap under such bead rim 12 to hold the cover 16 securely in place. Of course, the cover 16 can be readily removed simply by pushing upward and outwardly on the peripheral cover

3

portion 17 so that the portion 17 spreads sufficiently to release the bead rim 12.

In addition, the cover 16 includes a substantially horizontal portion 20 overlying the can lid 11 in spaced relation. An opening defined by a peripheral margin 21 is formed centrally through the horizontal portion 20 of cover 16. For reasons which will later appear, the center opening defined by margin 21 is aligned directly above the lid hole 14.

A nipple 22 is carried by cover 16 and is disposed in the opening defined by margin 21. The nipple 22 is constructed of a rubber material as is conventional. The tip of the nipple 22 is provided with a small hole 23 through which the formula can be withdrawn by the infant during feeding.

More particularly, the base of the nipple 22 is provided with an annular groove 24 in which the cover 16 is located. It will be importantly noted that there is a slight clearance or space 25 between the margin 21 and the nipple 22 such as would permit the passage of air.

An annular shoulder 26 is provided above the cover 16 adapted to engage the top surface of the horizontal portion 20 adjacent the margin 21 to limit downward movement of the nipple 22. Furthermore, the nipple includes a resilient peripheral flange 27 extending outwardly of the margin 21 below the horizontal portion 20 to cover 16. It will be noted that the vertical distance between the shoulder 26 and the peripheral flange 27 is sufficiently greater than the thickness of the cover portion 20 received in the annular groove 24 so as to permit a limited axial movement of the nipple 22 relative to cover 16, for reasons which will later appear.

Integrally formed at the outermost edge of resilient flange 27 is a peripheral lip 30. The lip 30 extends downwardly below that portion of the flange 27 located inwardly of such lip 30.

When the nipple unit 15 is attached to the can, the resilient flange 27 and integral lip 30 are located between the cover 16 and the lid 11. More particularly, the lip 30 is compressed to provide a liquid seal with the lid 11 at point of contact indicated by reference numeral 31 to provide a liquid seal with the cover 16 at the point indicated by reference numeral 32. That portion of the resilient flange 27 located inwardly of the lip 30 is spaced above the lid 11 to provide a compartment, again for reasons which will later appear upon further description of parts.

Formed in the resilient flange 27 inwardly of the peripheral lip 30 at diametrically opposite sides of the nipple 22 are a pair of small vents 33. One end of each vent 33 communicates directly with the interior of the nipple and specifically with the space provided between the flange 27 and lid 11. Under normal static pressure conditions, the upper surface of flange 27 inwardly of the peripheral seal 32 provided by lip 30 lies flat against the underside of cover 16 so that the cover 16 effectively closes the other ends of the vents 33. The vents 33 are closed also when internal pressure exceeds static pressure as is caused by the infant biting or squeezing the nipple but not sucking.

When a vacuum is formed inside the can 10 as a result of the suction caused by the infant during feeding, the resilient flange 27 moves downward and as permitted by the space above the lid 11 inwardly of the lip 30 as permitted by the space between the upper surface of the margin 21 and the nipple shoulder 26. During this action, the top surface of the flange 27 inwardly of the peripheral seal 32 moves away from the cover 16 to open the vents 33. It is seen that air can then flow between the cover 16 and nipple shoulder 26, through the clearance 25 and hence through the vents 33 into the interior of the nipple immediately adjacent the lid 11 and the lid hole 14. This air replaces the volume vacated by the formula as it is withdrawn by the feeding infant, equalizes the inside

4

and outside pressures, and thereby provides a constant flow requiring little or no effort on the part of the infant.

As soon as the vacuum inside the can is removed, or in other words the pressure conditions are equalized, the resilient flange 27 will move back toward the cover 16 so that the cover 16 effectively closes the vents 33.

It is thought that the usage and functional results of the can and nipple unit have become fully apparent from the foregoing detailed description of parts, but for completeness of disclosure such usage will be briefly described. It will be assumed that the formula 13 has been packed and sealed under sterile conditions within the can 10, and that the nipple unit 15 has been assembled so that it is ready for use.

The first step is for the user to puncture a hole 14 into lid 11 of can 10. Then, the cover 16 is placed over the lid 11 and the peripheral hook portion is pressed into attachment with the bead rim 12. Automatically, the resilient lip 30 is deformed, and compressed so as to provide a peripheral liquid seal 31 with the lid 11 about the hole 14, and to provide a peripheral liquid seal 32 with the cover 16.

Under normal static conditions wherein the pressure conditions inside and outside the can 11 are equalized, the resilient flange 27 is pressed tightly against the underside of the cover 16 so that the vents 33 are closed.

The item is now ready to feed the infant. The user merely inverts the can and inserts the nipple 22 into the infant's mouth. The formula 13 will flow through the lid hole 14 and through the nipple 22 in response to sucking or feeding action.

As the infant feeds and the formula 13 flows from the can 10, a suction is created which will cause that portion of the resilient flange 27 located inwardly of the lip 30 to move away from the cover 16, whereby to open the vents 33 and permit the passage of air into the can to replace the volume of formula 13 withdrawn from the can by the infant and equalize pressure conditions inside and outside the can. Of course, it will be realized that the liquid cannot flow out of the vents 33 because the suction condition within the can causes only an inward flow of air. As soon as the pressure conditions are equalized, the resilient flange will move back against the cover 16 to close the vents 33 automatically.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. A device of the character described:
 - (a) a container,
 - (b) a lid fixedly sealed to the container to provide a bead rim, the lid being provided with a hole,
 - (c) a cover having a downturned peripheral portion detachably connected to the bead rim, the cover being disposed over and spaced from the lid and being provided with an opening defined by a peripheral margin, the opening being aligned with the lid hole,
 - (d) a nipple carried by the cover in the opening, the nipple being spaced from the margin to provide an air passage,
 - (e) the nipple including a resilient flange extending outwardly of the opening and extending between the cover and lid, said flange being spaced above the lid for a distance outwardly of the lid hole to provide a compartment therebetween,
 - (f) the flange having a peripheral lip sealingly engaging the cover and sealingly engaging the lid about the lid hole to provide a liquid seal upon attachment of the cover, the lip providing the periphery of the compartment, the lip being spaced inwardly from the bead rim and the outer periphery of the lid,
 - (g) the flange being provided with a vent inwardly of

5

6

- the lip, yet above the lid and outwardly of the lid hole, the vent communicating with the compartment, the flange having an upper surface sealingly engaging the cover inwardly of the lip to close the vent,
- (h) the resilient flange flexing in the compartment away from the cover when a vacuum is formed inside of the container so as to open the vent to enable an inward flow of air.
2. A device of the character described:
- (a) a container,
- (b) a lid sealed to the container, the lid being provided with a hole,
- (c) a cover having a peripheral portion detachably connected to the container, the cover being disposed over and spaced from the lid and being provided with an opening defined by a peripheral margin,
- (d) a nipple carried by the cover in the opening, the nipple being spaced from the margin to provide an air passage,
- (e) the nipple including a resilient flange extending outwardly of the opening and extending between the cover and lid,
- (f) the flange having a peripheral lip sealingly engaging the cover and sealingly engaging the lid to provide a liquid seal upon attachment of the cover to place the lid hole in communication with the nipple,
- (g) the flange being provided with a vent inwardly of the lip, yet above the lid, the vent communicating with the interior of the nipple, the flange having an upper surface in which the vent is formed sealingly engaging the cover to close the vent, the flange flexing away from the cover when a vacuum is formed in the container so as to open the vent to enable an inward flow of air.
3. A device of the character described:
- (a) a container,
- (b) a lid fixedly sealed to the container, the lid being provided with a hole,
- (c) a cover having a downturned peripheral portion detachably connected to the container, the cover being disposed over and spaced from the lid and being provided with an opening defined by a peripheral margin,
- (d) a nipple carried by the cover in the opening, the nipple being spaced from the margin to provide an air passage,
- (e) the nipple including a resilient flange extending outwardly of the opening and extending between the cover and lid, said flange having at least a portion spaced above the lid for a distance outwardly of the lid hole to provide a compartment therebetween,
- (f) the flange having a peripheral lip sealingly engaging the cover and sealingly engaging the lid to provide a liquid seal upon attachment of the cover to place the lid hole in communication with the nipple,

- (g) the flange being provided with a vent inwardly of the lip, yet above the lid, the vent communicating with the compartment, the flange having an upper surface in which the vent is formed sealingly engaging the cover to close the vent,
- (h) the resilient flange flexing in the compartment away from the cover when a vacuum is formed inside of the container so as to open the vent to enable an inward flow of air.
4. A device of the character described:
- (a) a container,
- (b) a lid fixedly sealed to the container, the lid being provided with a hole,
- (c) a cover having a downturned peripheral portion detachably connected to the container, the cover being disposed over and spaced from the lid and being provided with an opening defined by a peripheral margin,
- (d) a nipple carried by the cover in the opening, the nipple being spaced from the margin to provide an air passage,
- (e) the nipple including a resilient flange extending outwardly of the opening and extending between the cover and lid, said flange being spaced above the lid for a distance outwardly of the lid hole to provide a compartment therebetween,
- (f) the flange having a peripheral lip sealingly engaging the cover and sealingly engaging the lid about the lid hole to provide a liquid seal upon attachment of the cover, the lip being spaced inwardly from the outer periphery of the lid,
- (g) the flange being provided with a vent inwardly of the lip, yet above the lid, the vent communicating with the compartment, the flange having an upper surface in which the vent is formed sealingly engaging the cover inwardly of the lip to close the vent,
- (h) the resilient flange flexing in the compartment away from the cover when a vacuum is formed inside of the container so as to open the vent to enable an inward flow of air.

References Cited in the file of this patent

UNITED STATES PATENTS

2,497,197	Allen	Feb. 14, 1950
2,525,745	Wycoff	Oct. 10, 1950
2,624,485	Boston	Jan. 6, 1953
2,741,385	Raiche	Apr. 10, 1956
2,774,500	Budiani	Dec. 18, 1956
2,796,062	Tupper	June 18, 1957
2,816,548	Tupper	Dec. 17, 1957
2,931,731	Pohjola	Apr. 5, 1960

FOREIGN PATENTS

324,194	Great Britain	Jan. 23, 1930
285,291	France	Aug. 31, 1952