

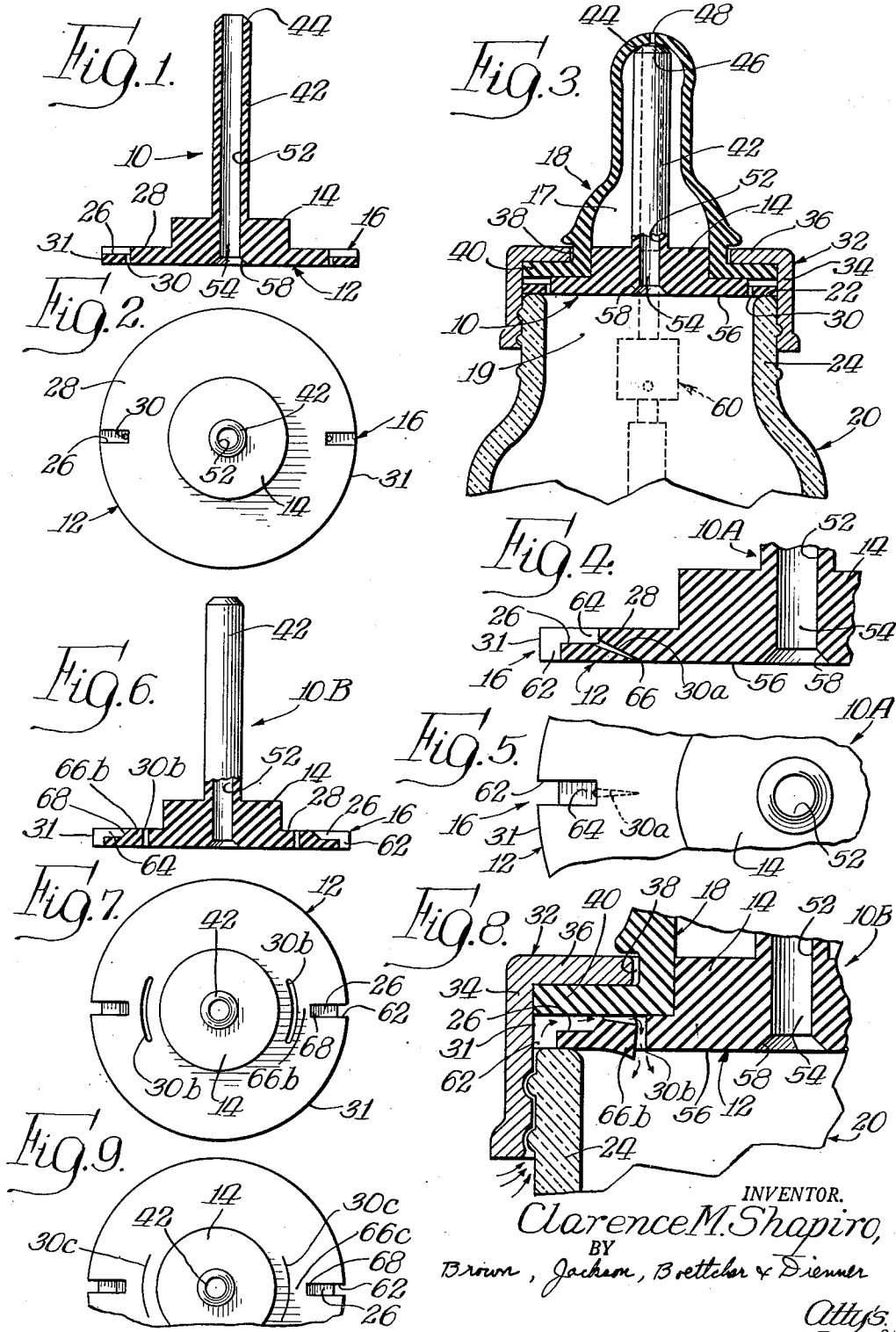
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C. M. SHAPIRO

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NURSING DEVICE

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INVENTOR.
Clarence M. Shapiro,
BY
Brinn, Jackson, Bretcher & Diemer
Attys.
8.

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NURSING DEVICE

Clarence M. Shapiro, Chicago, Ill.

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This invention relates to a novel nursing device for use with existing types of nursing bottles having a nipple and an annular cap for securing the nipple across the open end of the bottle.

Many of the conventional nursing bottles presently in use consist of a glass or a plastic bottle having a neck and wide mouth with the neck being provided on its exterior surface with a screw thread or other interengaging means. An annular cap having a vertical wall and a horizontally directed flange is provided with an internal thread on the vertical wall portion for cooperation with the external thread on the neck of the bottle. The nipple which is adapted to be used with said cap and bottle consists generally of an upstanding nipple portion having a feeding or nursing hole, or holes, at its uppermost end and of a configuration simulating the nipple of the human breast. The lower, or breast, portion of the nipple is rounded outwardly and has at its lower end a radially outwardly extending flange which is adapted to be clamped by its margin between the horizontally extending flange of the cap and the top surface of the neck of the bottle. The nipple is adapted to be filled with liquid from the bottle during the feeding operation in order to provide a continuous source of the liquid. However, a full nipple frequently leads to an over abundant flow causing choking, gagging, air-colic and waste of liquid.

As is known, these conventional artificial nipples, formed of plastic or rubber, do not provide a feeding action comparable to that of the human breast, since, in the human breast, the nipple is not filled with liquid as in the case of artificial nipples because the human nipple comprises a covering and outlet and flexible duct through which milk is sucked.

An object of the present invention is to provide an improved artificial nursing nipple by association with said nipple of my nursing device, which nipple and nursing device, together, more closely simulate the human nipple and the natural duct feeding system thereof.

In accomplishing the foregoing object I provide a flexible tubular duct leading from the interior of the bottle to the nursing aperture in the nipple so that the conventional nipple itself merely comprises a soft resilient covering and an outlet for the resilient duct, thereby closely simulating natural feeding from the breast. In this fashion the feeding or nursing apertures are not open to, or in communication with a filled nipple, so that the possibility of too much flow of liquid with its resultant disadvantages is substantially eliminated. In the preferred form of the resilient tubular duct, its upper end conforms to the inner surface of the nipple and abuts thereagainst around the feeding apertures.

A further object of the invention is to assure the continued flow of liquid from the nursing bottle through the fluid duct when the infant sucks on the nipple. Sucking on the nipple will produce a vacuum in the bottle which, if not relieved, stops the flow of liquid and pre-

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vents the child from receiving sufficient nourishment. By this invention I positively assure the breaking of any such vacuum so that an even and continuous flow of liquid is made possible with minimum effort on the part of the infant.

In accomplishing the foregoing object of relieving vacuum, I provide a one-way valve action which permits the entry of atmospheric air to break the vacuum and which prevents the outward flow of liquid from the bottle through the air passageway means. In the preferred form of the invention this one-way valve action is provided by a resilient portion in the base of the device of my invention.

My invention includes a further advantage, namely, a base portion which renders easy the association therewith of a valve and tube arrangement which is illustrated in the copending application of myself and August J. Braun, Serial No. 254,296, filed November 1, 1951. The present invention is also an improvement on the structure shown in my copending application Serial No. 254,839, filed November 5, 1951.

A further object of the invention is the provision of a nursing device in the form of an attachment which is readily associated with a variety of different forms of artificial nipples and which will not work loose therefrom when placed in use, regardless of the vigor with which the infant manipulates the nipple. However, it is a further advantage of the device that it is readily dissociated from the nipple by the mother when such dissociation is desired for cleaning purposes.

It is a further advantage of the invention that it may be readily cleaned and sterilized and is of such form and construction that the cost of production, both in materials and in labor, is minimized.

Other objects and advantages of the present invention will become apparent, or be obvious, from the following detailed description of preferred embodiments of the invention and from the accompanying drawings in which:

Figure 1 is a vertical cross section of the device of my invention;

Figure 2 is a top plan view of the device of Figure 1, the small air passageways being shown larger than in actual use in order that they may be readily seen;

Figure 3 is a fragmentary, vertical, sectional view of the device of Figure 1 associated with a conventional bottle, nipple and cap, the dotted outline in said figure indicating how a further attachment described in the copending application of myself and August J. Braun, referred to above, may be associated with the device;

Figure 4 is an enlarged, fragmentary, vertical sectional view of the base portion of the device shown in Figure 1 with the air passageway means being of a modified form;

Figure 5 is a fragmentary, top plan view of the modification of Figure 4;

Figure 6 is a vertical cross section of another form of the invention with portions shown in elevation;

Figure 7 is a top plan view of the device of Figure 6;

Figure 8 is a fragmentary, enlarged, vertical cross section of the device of Figure 6 shown associated with a conventional nursing bottle, cap and nipple, said device being in a position of use wherein vacuum within the bottle is being relieved; and

Figure 9 is a fragmentary plan view of a modification of the device shown in Figure 7.

Referring now to the drawings, particularly Figures 1, 2 and 3, the reference numeral 10 indicates generally the nursing device of my invention which comprises a disk-like base portion, indicated generally by the reference numeral 12, an axial extension 14 of said base portion, and a pair of air passageway means, indicated generally by the reference numerals 16. A single air passageway

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means, or more than two, spaced apart equally, may be employed. The axial extension 14 of the base portion is of a diameter permitting it to be frictionally gripped within the open end of a nipple, indicated generally by the reference numeral 18, and to separate the space 17 within the nipple from the interior of the body. The base portion is of a diameter permitting it to extend across the open end, or mouth, 19 of a bottle, indicated generally by the reference numeral 20 and to seat by its margin on the top surface 22 of the wall defining the neck, or upper end, 24 of the bottle.

Each air passageway means 16 comprises a groove 26 in the top surface 28 of the base portion 12, together with an opening 30 extending downwardly from the inner end of said groove 26, said opening communicating between the groove 26 and the interior of the bottle 20. The groove 26 extends inwardly, preferably radially inwardly, from the side edge 31 of the base portion 12. The diameter of the base portion 26 is such that it fits within the threaded cap, indicated generally by the reference numeral 32, of the bottle 20 and has sufficient side clearance with the vertical wall 34 of said cap that air may pass along between the inner side of the vertical wall 34 and the threaded neck 24 of the bottle 20 and reach the air passageway means 16 which extends from the edge 31 of the base portion inwardly to the interior of the bottle. The horizontal flange 36 of the annular cap 32 fits within a channel 38 at the lower portion of the nipple 18 where said lower portion connects with the flange 40 of the nipple.

Extending upwardly from the axial extension 14 of the base portion 12 of device 10 is means defining a resilient, or elastic, tubular duct 42 the upper end 44 of which is formed to conform with the inner, upper surface of the nipple 46 about the nursing aperture, or apertures, 48, so as to abut thereagainst around said aperture, or apertures, and to separate the space 17 within the nipple 18 from the duct 42 and the interior of the bottle 20. Preferably, the means defining the resilient duct is formed integrally with the axial extension 14, and said axial extension, duct 42 and base portion 12 preferably are all formed of a resilient or elastic material. The opening, or what might be called the "duct," 52 communicates with an opening 54, the latter extending through the center of the base portion 12 and its axial extension 14. It will be observed that the bottom surface 56 of the base portion 12 is planar except where, as at 58, it tapers inwardly toward the central opening 54. The taper renders easy the insertion of a metal tube and sliding valve structure such as is indicated generally at 60 in dotted outline in Figure 3 and as is clearly described and shown in the copending application of myself and August J. Braun, referred to above.

When the device 10 is to be put into use, it is first inserted within the nipple 18 by inserting the axial extension 14 into the open end of the nipple so that the resilient tubular duct 42 abuts against the inner, upper surface of the nipple 18 around the feeding aperture, or hole, 48. The base portion 12 fits against the flange 40 of the nipple and the nipple and device are then inserted through the opening in the annular cap 32 and the cap, together with the nipple 18 and device 10, is threaded into place on the neck of the bottle 20. The opening 52 of the resilient duct 42 therefore provides direct fluid communication between the interior of the bottle and the nursing apertures 48 in the nipple, without the nipple being completely filled with milk. As the infant sucks on the nipple 18, there is no swallowing of air from the space 17 within the nipple 18. Continued sucking tends to produce a partial vacuum within the interior of the bottle 20. However, air at atmospheric pressure may enter the interior of the bottle 20 by flowing between the threaded neck 24 of the bottle and the vertical wall 34 of the annular cap 32 and along the side edge 31 of the base portion 12 of my device 10 and thence inwardly

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through the slot or groove 26 and through the opening 30 to the interior of the bottle. Consequently, an even flow of fluid of the proper volume may be sucked by the infant through the fluid duct and the nursing aperture, or apertures, 48 in the nipple with no collapsing of the nipple 18. The structure resulting from the combination of the nipple 18 and the device 10 closely simulates the shape and feel of the human nipple.

Referring now to Figures 4 and 5, there is shown a modification of the air passageway means 16. In addition to the grooves 26, there are also vertically extending grooves 62 in the edge 31 of the base portion 12. The openings or passageways 30a, however, instead of being substantially vertical as shown in Figures 1 through 3 and instead of being of substantially uniform diameter throughout, taper inwardly and downwardly from the inner end 64 of groove 26 in communicating with the interior of the bottle. The diameter of the passageways 30a where they come to the lower surface 56 of the base portion 12 is such that they normally tend to be closed, or substantially so, so that the resilient material of the base portion 12 at those points forms a one-way valve structure which prevents flow of liquid from the interior of the bottle upwardly through the passageways 30a. But, upon the existence of partial vacuum within the bottle, the resilient parts 66 of the base portion 12 at the lower end of openings 30a are stretched or moved by atmospheric air pressure to open up the passageways 30a. Ample relief of the partial vacuum is provided without providing a structure which will leak fluid from the bottle.

With the device 10A of Figures 4 and 5, the operation, in conjunction with the nipple, cap and bottle, is substantially the same as in the case of the device 10 of Figures 1 through 3, except for the valve action noted and except that there is additionally provided the vertical grooves 62 to further assure an adequate flow of atmospheric air to the interior of the bottle even if the cap is threaded on to the bottle too tightly.

Referring now to Figures 6, 7 and 8, the device in modified form is referred to generally by the reference numeral 10B. Those portions of the device which are the same as those shown in Figures 1 through 3 have the same reference numerals applied, while the differing portions either carry a different reference numeral or the same reference numerals as in Figures 1, 2 and 3 with the suffix "b" added. The principal difference resides in the air passageway means 16. Openings or passageways 30b consisting of a slot through the base portion 12 are employed in place of the openings or passageways 30 or 30a of Figures 1 and 4, respectively. Each slot 30b preferably is arcuate with its center of curvature being the central axis of the device 10. The slots 30b are spaced from the inner ends 64 of the grooves 26 and are disposed generally crosswise of said radial grooves. The inner ends 64 are upwardly tapered or beveled as at 68 so that atmospheric air pressure tends to be directed onto the top surface 28 at those parts of the base portion 12 indicated by the reference numeral 66b which are disposed between the tapered portions 68 and the slots 30b. When partial vacuum tends to form in the interior of the bottle 20, atmospheric air pressure passing through the groove 26 and up its tapered inner end 68 flexes the resilient part 66b of the base portion 12 downwardly as viewed in Figures 6 and 8 sufficiently to permit the flow of atmospheric air pressure to the slots 30 and thence through the base portion and then into the interior of the bottle 20. The direction of the air and the flexing of portion 66b is illustrated best in Figure 8. At such time as partial vacuum ceases to exist within the bottle 20, the resilient parts 66b of the base portion 12 move upwardly to their normal position against the under surface of the flange 40 of nipple 18, thereby providing a one-way valve action preventing loss of liquid from the bottle.

In Figure 9 the structure is essentially the same as that

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in Figures 6 through 8, with the exception that in place of slots 30b there are substituted slits 30c. The flexing action of the resilient parts 66b between the inner end of the grooves 26 and said slits 30c is like that described above with respect to Figures 6 through 8.

Both the slots 30b and slits 30c permit adjacent portions of the base to yield to the finger and thumb of the person who is removing the device, so that the thumb and finger may grip the axial extension 14 for easily withdrawing the device 10 from the nipple 18 when so desired.

While I have described preferred forms of the invention, it will be appreciated that changes may be made therein without departing from the scope of the invention. By way of example, I may employ a single air passageway means, instead of a plurality of them, in the various forms of the invention. Therefore, I do not intend to be limited to the particular forms shown and described, except insofar as the appended claims are so limited.

I claim:

1. A nursing device for use with a nursing bottle having a nipple with a nursing aperture therein and an annular cap for securing the nipple across the open end of the bottle, said device being usable with the bottle and the nipple during nursing and comprising a base portion, air passageway means in said base portion extending inwardly from its edge and providing communication between the interior and exterior of said bottle, said air passageway means normally being blocked by a resilient yieldable part of said base portion with said yieldable part moving in response to atmospheric air pressure to unblock the air passageway means when vacuum develops in the bottle, an axial extension on said base portion having a diameter permitting it to be frictionally gripped within the open end of said nipple for separating the space within the nipple from the interior of the bottle, an opening through said base portion and its axial extension adapted to provide communication between the interior of said bottle and the aperture in the nipple.

2. The device of claim 1 wherein said yieldable resilient part of said base portion which normally blocks said air passageway is disposed at the end of said passageway adjacent the interior of the bottle.

3. The device of claim 1 wherein the air passageway means includes a slit through said base portion disposed inwardly from the edge of said base portion, and wherein the resilient yieldable part of the base portion is positioned between said slit and that portion of the air passageway means which extends inwardly from the edge of the base portion.

4. The device of claim 1 wherein the air passageway means includes a curved slot through said base portion disposed inwardly from the edge of said base portion, and wherein the resilient yieldable part of the base portion is positioned between said curved slot and that portion of the air passageway means which extends inwardly from the edge of the base portion.

5. The device of claim 4 wherein the curved slot is arcuate and has its center corresponding to the center of the base portion and wherein that portion of the air passageway means extending inwardly from the edge of the base portion lies along a radius of the base portion.

6. A nursing device for use with a nursing bottle having a nipple and an annular cap for securing a nipple across the open end of the bottle, said device being usable with the bottle and the nipple during nursing and comprising a disk-like base portion adapted to fit within said annular cap and to seat by its outer margin on the open end of the bottle beneath the nipple, a vertically extending groove in the vertical edge of said base portion adapted to provide air clearance, with respect to said cap, a groove in the top surface of said base portion extending inwardly from the first mentioned groove a distance greater than the thickness of the bottle wall at its

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open end, an air passageway extending downwardly through said base portion to establish communication between the opposite surfaces of said base portion, said passageway accommodating the passage of atmospheric air from said second mentioned groove to the interior of the bottle to relieve vacuum therein, an axial extension on said base portion having a diameter permitting it to be frictionally gripped within the open end of the nipple for separating the space within the nipple from the interior of said bottle, an opening through said base portion and its axial extension, resilient tubular means connected with said axial extension and adapted to extend freely into said nipple, said resilient tubular means being adapted to provide direct communication between the interior of the bottle and the feeding hole of the nipple and to seal the space within the nipple from the interior of said tubular means and the interior of the bottle.

7. A nursing device for use with a nursing bottle having a nipple with a nursing aperture therein and an annular cap for securing the nipple across the open end of the bottle, said device being usable with the bottle and the nipple during nursing and comprising a base portion, air passageway means in said base portion extending inwardly from its edge, said air passageway means being inclined inwardly and downwardly through the base portion and establishing communication between the interior and exterior of the bottle, said air passageway means normally being blocked by a resilient yieldable part of said base portion with said yieldable part moving in response to atmospheric air pressure to unblock the air passageway means when vacuum develops in the bottle, an axial extension on said base portion having a diameter permitting it to be frictionally gripped within the open end of said nipple for separating the space within the nipple from the interior of the bottle, and an opening through said base portion and its axial extension adapted to provide communication between the interior of the bottle and the aperture in the nipple.

8. A nursing device for use with a nursing bottle having a nipple and an annular cap for securing a nipple across the open end of the bottle, said device being usable with the bottle and the nipple during nursing and comprising a disc-like base adapted to fit within the annular cap and to seat by its outer margin on the open end of the bottle beneath the nipple, a vertically extending groove in the vertical edge of said base adapted to provide air clearance with respect to the cap, a groove in the top surface of said base extending inwardly from the first mentioned groove a distance greater than the thickness of the bottle wall at its open end and tapering upwardly to the top surface of said base, said grooves communicating with atmospheric air to the exterior of the bottle, an air passageway extending downwardly through said base to establish communication between the opposite surfaces of said base, said air passageway comprising a curved slot spaced from the inner end of the second mentioned groove and disposed generally cross-wise with respect to said grooves, the portion of said base lying between the inner end of the second mentioned groove and said curved slot being resilient and flexible, said portion of said base normally engaging the lower surface of the nipple to block off communication between said grooves and said curved slot, said portion of said base being responsive to the pressure differential between said grooves and the interior of the bottle when vacuum exists in the bottle to flex away from the nipple and accommodate and establish communication between said grooves and said curved slot to relieve vacuum in the bottle, an axial extension on said base having a diameter permitting it to be frictionally gripped within the open end of the nipple for separating the space within the nipple from the interior of the bottle, an opening through said base and its axial extension, and resilient tubular means connected with said axial extension and adapted to extend into the nipple to establish direct communica-

tion between the interior of the bottle and the feeding hole of the nipple.

9. A nursing device for use with a nursing bottle having a nipple and an annular cap for securing a nipple across the open end of the bottle, said device being usable with the bottle and the nipple during nursing and comprising a disc-like base adapted to fit within the annular cap and to seat by its outer margin on the open end of the bottle beneath the nipple, a vertically extending groove in the vertical edge of said base adapted to provide air clearance with respect to the cap, a groove in the top surface of said base extending inwardly from the first mentioned groove a distance greater than the thickness of the bottle wall at its open end, an air passageway extending downwardly through said base from the inner end of said second mentioned groove to the underside of said base, said base at the lower surface thereof including a resilient part normally closing said passageway adjacent its lower end, said grooves and said passageway communicating with atmospheric air to the exterior of the bottle, said resilient part of said base being responsive to the pressure differential between said grooves and passageway and the interior of the bottle when vacuum exists in the bottle to flex and accommodate

opening of said passageway to relieve vacuum in the bottle, an axial extension on said base having a diameter permitting it to be frictionally gripped within the open end of the nipple for separating the space within the nipple from the interior of the bottle, an opening through said base and its axial extension, and resilient tubular means connected with said axial extension and adapted to extend into the nipple to establish direct communication between the interior of the bottle and the feeding hole of the nipple.

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