Aug. 31, 1965 J. J. SHOMOCK ETAL 3,203,569

NIPPLE VALVE

Filed Nov. 5, 1964

Fig. 1

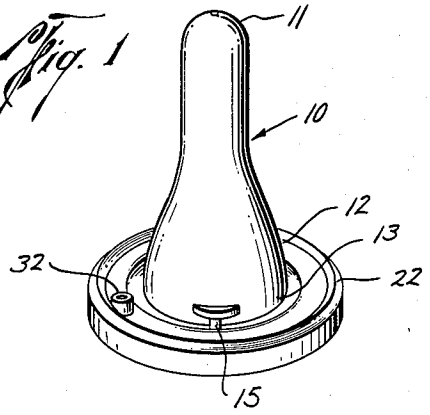


Fig. 2

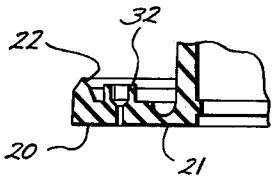


Fig. 3

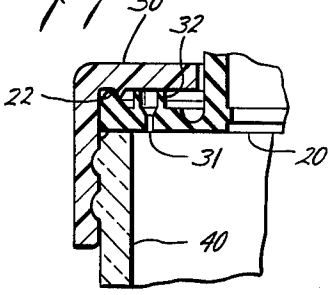


Fig. 4

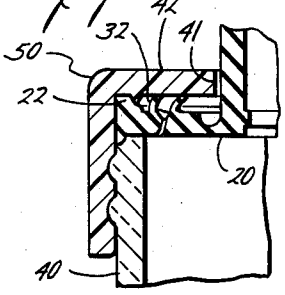


Fig. 5

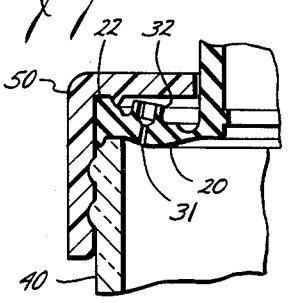


Fig. 6

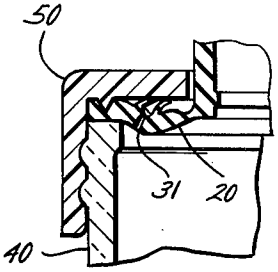


Fig. 2A

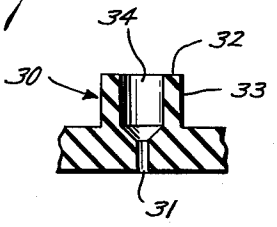
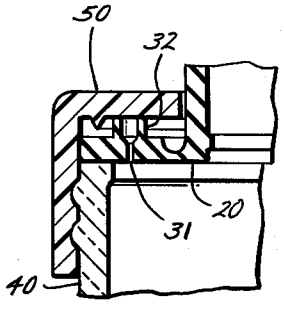


Fig. 7



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3,203,569

NIPPLE VALVE

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4 Claims. (Cl. 215—11)

This invention pertains to nipples, and more specifically to nipples used in conjunction with wide-mouthed bottles and a screw cap in the artificial feeding of infants.

When a nurser is being used by an infant, on evacuation of the nurser's contents a vacuum tends to build up in the interior of the nurser. Numerous attempts have been made to overcome this pressure reduction. Otherwise the baby will be caused to suck air with resulting internal disturbances to the child.

Most modern day devices utilize valve means including a perforation in the flange portion of the nipple, allowing outside air to flow into the interior of the nurser, thereby eliminating the vacuum. These devices oftentimes utilize the pressure, exerted by screwing the cap, to regulate the size of the vent passage through the nipple flange, thereby controlling leakage as well as vacuum combat. For example, see U.S. Patent No. 2,942,746.

In spite of these efforts difficulty still exists in accomplishing the dual necessity of adjusting the size of the vent passage and preventing the clogging of same. It is believed that such difficulty may result from present devices requiring a portion of the screw cap to bite into the nipple flange, thereby varying the size of the aperture. Therefore, this invention has as its prime object the presentation of a nipple having unique valve means permitting vacuum relief.

A further object is the accomplishing of vacuum relief with readily regulatable means for distorting the passageway of air flowing through said valve means.

These and other desirable objects will become more obvious on considering the appended description, claims and drawings, in which:

FIGURE 1 is a perspective of the nipple of this invention;

FIGURE 2 is a section through the flange portion of the nipple of FIGURE 1;

FIGURE 2A is an expanded view of the valve portion of FIGURE 2;

FIGURE 3 is a sectional view of the nipple, bottle, and cap, the cap covering the entry into the flange without distorting same;

FIGURE 4 is a sectional view showing the nipple, bottle and screw cap assembly, the cap distorting the nipple, but the nipple being unflexed; and

FIGURE 5 shows the same articles of FIGURE 4, but the nipple flexing to allow vacuum relief.

FIGURES 6 and 7, comparable to FIGURES 5 and 6 respectively, utilizing a nipple not having a peripheral ridged flange.

Considering now, FIGURE 1, the nipple is seen to include a hollow tubular barrel generally indicated at **10**. At the upper end of the barrel is the slightly enlarged tip portion **11**. Of course, the tip is usually perforated for the evacuation of fluids. The barrel is joined at its lower end to radial flange **20**. Below tip **11**, barrel **10** flares outwardly to form shoulder **12**. The barrel is then reduced in diameter, as at **13**, which portion joins flange **20**. Underneath shoulder **12** may be a plurality of lugs **14** each having associated therewith spacer bar **15**. The lug is used to position the nipple with respect to a screw cap by resting atop thereof, said cap being centrally perforated. The spacer bars radially space the nipple from said screw cap and allow air to pass therebetween and eventually to pass through the valve means hereinafter discussed to relieve the vacuum buildup within the interior of a nurser.

FIGURE 2 shows nipple flange **20** to have a reduced web portion **21** adjacent the juncture of flange **20** to barrel **10**. This reduced portion expeditiously permits the flange to flex when any vacuum causes a pressure gradient to exist thereacross.

At the outer periphery of flange **20** may be upstanding annular bead or ridge **22**, see FIGURES 1–5. This ridge, as disclosed in presently pending U.S. application Serial No. 160,501, may be utilized with bottles having a rabbeted upper outer periphery but, however, is not the subject of this invention, in as much as the valve means contemplated could be utilized with a nipple having no such ridge, see FIGURES 6 and 7.

Intermediate ridge **22** and web **21** will be seen the heart of this invention, namely valve **30** (see especially FIGURE 2A). Flange **20** will be seen to be vertically perforated, as at **31**. Surrounding the upper limits of perforation **31**, is cylindrical flange extension **32**, having side wall **33**, defining a hollow interior space **34**. This space **34** is reduced in cross-sectional area at its lower reaches until it approximates and joins with perforation **31**, forming a continuous opening through flange **20** and extension **30**.

Consider now FIGURES 3, 4 and 5 showing operation of the nipple when assembled with a bottle and a screw cap, said bottle being designated **40** and the cap **50**. Bottle **40** is exteriorly threaded near its top for mating with a standard interiorly threaded screw cap designated **50**, said cap having a central perforation **41**, see FIGURE 4, in its top **42** for accommodating the barrel portion of nipple **10**. It is believed that many presently used nursers having a perforated flange for vacuum relief, utilize pressure exerted by the undersurface of the cap against the nipple flange to regulate the size of the vent hole. Usually, the cap's undersurface includes an annular bead which bites into the upper surface of the nipple flange. Some leakage difficulties have been encountered in that the cap must be screwed onto the bottle to a sufficient degree to cause the cap bead to bite into the nipple flange thus causing rubber flow and resulting regulation of the vent hole size. Thus, if the cap is not screwed on sufficiently, an air gap will exist between the undersurface of the cap top and the upper surface of the nipple flange even during non-use with the possibility of leakage. Yet, oftentimes bead-nipple interaction is desirable in that such interaction is effective in fixing the nipple flange with respect to the bottle. A further problem exists when the nipple may be constructed of material other than rubber, such as certain plastics. Sufficiently greater pressure must be exerted on said latter mentioned materials in order to cause any regulation of vent-hole size by flow. For example, vinyl resinous compounds producing a reading on the Shore "A" scale in the range between 50–65 have performed satisfactorily utilizing the improved valve means presented herein. FIGURES 3–5 show, in sequence: (1) the unflexed nipple when the cap **50** is screwed onto bottle **40** just sufficiently to block the upper entrance into cavity **34**; (2) the cap threads further meshing with the bottle threads causing distortion of aperture **31** and the continuous conduit through flange **20**, the flange being unflexed; and (3) the same relative position as in FIGURE 4 except that the flange **20** is being flexed, by vacuum build up within the container, thus permitting air to enter cavity **34**, down into the container, thereby equalizing pressure. By varying the pressure exerted by cap **50** on the nipple flange the distortion to the conduit leading through the nipple flange may be varied, thereby regulating the effective size of the vent path through said flange. Since the effective size of the vent path determines the ability of the device to equalize the

inner and outer pressures, the presence of the distortable extension of the nipple flange provides an effective means for combatting vacuum buildup, especially helpful when the nipple is constructed of plastic materials such as vinyl resins. FIGURES 6 and 7 depict a similar series of operations utilizing a nipple not having an annular ridge, such as **22**, around the flange's periphery.

In summation, the nipple of this invention includes a perforated flange having an upwardly extending cylindrical extension, the inner cavity thereof being an extension of and communicating with said perforations. Such an extension, being distortable, provides an effective means affixed to a nursing bottle and acted upon by a screw cap, for permitting venting of the nurser's interior, such venting overcoming any vacuum produced within said nurser's interior caused by usage thereof.

While this invention has been described in terms of a principal embodiment, this is not to say that numerous modifications thereof are not possible without departing from the spirit of the invention, the only limitations thereon being the following appended claims in which we claim:

1. A nipple comprising a generally tubular barrel and an annular radially-extending flange affixed to one end thereof, a first passageway through said flange, and a second passageway communicating with said first passageway, said second passageway being at least partially encompassed by a vertically-extending thin-walled deformable extension of said flange.

2. The nipple of claim **1** wherein said flange is substantially less resilient than said extension thereof, and the upper walls of said extension, when not deformed, are of substantially uniform thickness.

3. In a nurser, the combination of:

a bottle,

a cap, said cap having means for affixing same to said bottle,

a nipple having a barrel portion and an annular flange affixed to said barrel, said flange being positioned atop said bottle by said cap when said cap is mated with said bottle, said flange including means for venting the interior of said bottle, said venting means including a passageway through said flange, a second passageway communicating with said first passageway, said second passageway being at least partially encompassed by vertically-extending, cylindrically configured deformable walls.

4. The nurser of claim **3** wherein said first and second passageways are collinear when said walls are not deformed, and said passageways are not collinear when said walls are deformed.

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