

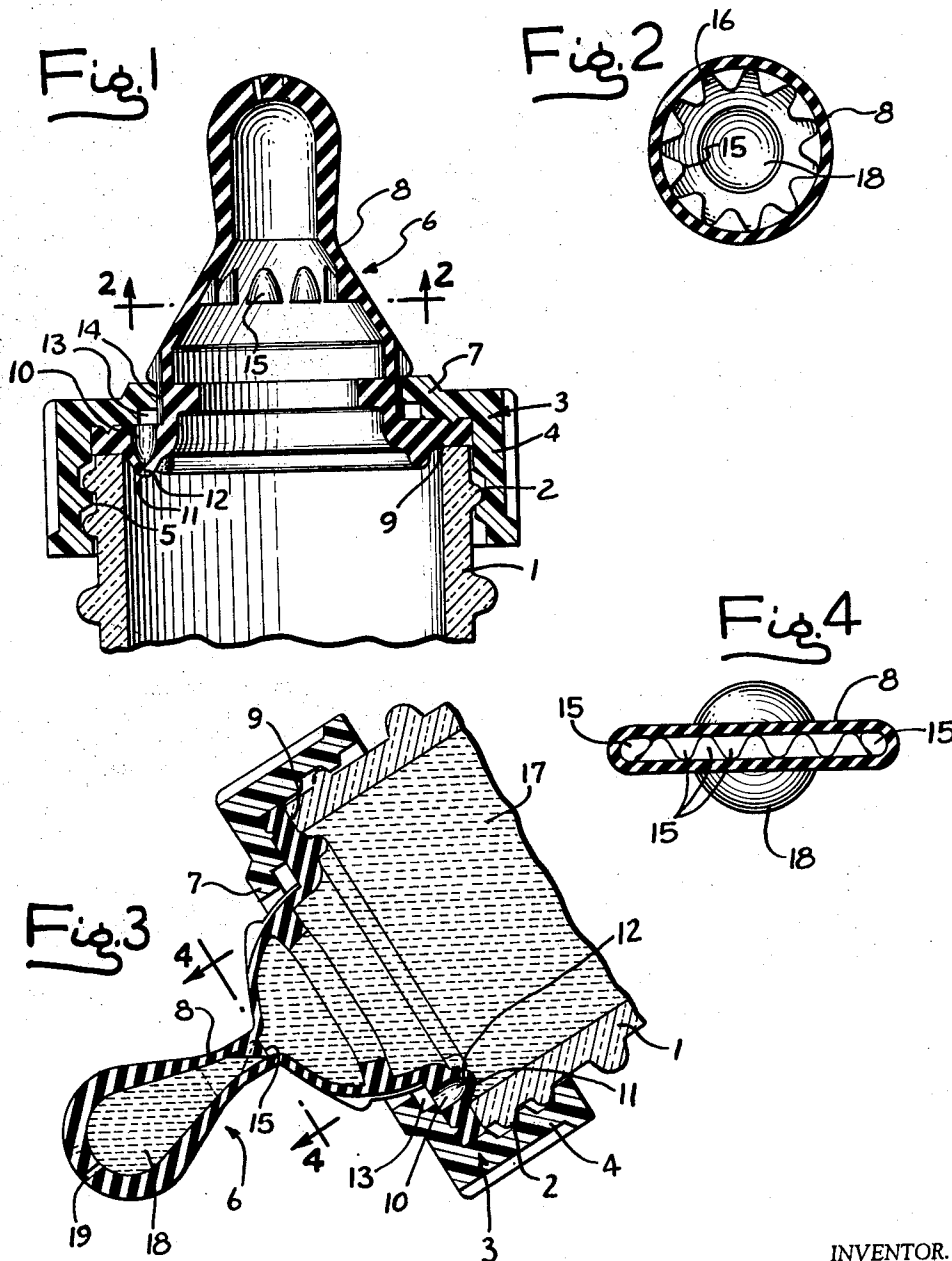
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NIPPLE FOR BABY NURSING BOTTLE

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NIPPLE FOR BABY NURSING BOTTLE

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This invention relates to improvements in a nipple for baby nursing bottles and refers particularly to a baby bottle nipple which needs no separate valve.

When a baby is fed from a nursing bottle, the bottle is tipped or tilted in a substantially inverted position, that is, with the mouth extending downwardly, so that the liquid baby food can flow, by gravity, from the bottle into the bulbous portion of the nipple. In the act of feeding, the baby's lips squeeze the bulbous portion of the nipple and simultaneously the baby sucks upon the nipple. By squeezing the bulbous portion of the nipple, the liquid food in said bulbous portion is subjected to pressure and said pressure tends to displace the major portion of the liquid back into the bottle. By the sucking action, however, reduced pressure is established at the small feeding openings in the nipple and a small quantity of the liquid moves through said openings into the baby's mouth. The quantity of liquid delivered to the baby per cycle of squeezing and sucking is quite small and requires the child to exert considerable effort to satisfy his hunger.

To facilitate this feeding operation, it has heretofore been the practice to furnish a valve in the base of the nipple which is in the nature of a check valve. In the feeding operation, when the baby pressurizes the liquid in the nipple, the valve closes and prevents backflow of liquid into the bottle and, hence, the liquid in the nipple is delivered into the baby's mouth both by the squeezing or pressurizing of the nipple by the baby's lip and also by the sucking action. Accordingly, an increase in food quantity delivered to the baby per cycle of squeezing and sucking is materially increased.

Heretofore, such nipple valves have comprised an element separate from the nipple and usually comprised metal devices, frequently made of stainless steel. The valve constructions being small and having delicately operating parts is relatively costly and, in addition, requires extreme care in cleaning.

The present invention contemplates a nipple which is so constructed as not to require a separate valve and might be referred to as a valveless nipple except that in its intrinsic construction, integral parts of the nipple function in the manner of a nipple having a separate valve.

Accordingly, one of the important features of the present construction resides in the provision of a nipple which has all of the advantages of a valved nipple but may be constructed at a materially reduced cost.

Another feature of the invention resides in a nipple construction which requires no separate nipple valve and, hence, eliminates the care and labor necessary to keep the usual separate valve clean.

Other objects, advantages and features of the present invention will be apparent from the accompanying drawing and following detailed description.

In the drawings,

Fig. 1 is a sectional view through a nursing bottle having a nipple, also shown in section, embodying the concepts of the present invention.

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

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Fig. 3 is a view similar to Fig. 1 with the bottle tilted into feeding position and with the bulbous portion of the nipple compressed, as by the lips of an infant.

Fig. 4 is a transverse section taken on line 4—4 of Fig. 3.

Referring in detail to the drawing, 1 indicates the neck portion of a conventional nursing bottle which carries threads 2 integrally formed upon the neck. A nipple-retaining cap 3 comprises an annular flange 4 which carries threads 5 engageable with the bottle threads 2 which serves to retain a nipple 6 upon the mouth of the bottle. The cap 3 is centrally apertured to receive the nipple 6 and carries an inwardly extending annular retaining flange 7.

The nipple 6 comprises a bulbous portion 8 and a flange portion 9, the latter resting on the mouth of the bottle and being retained thereon under pressure by the cap-retaining flange 7 which may be drawn downwardly upon the nipple flange by the engagement of the threads 2 and 5.

In order to vent the bottle, as the liquid supply carried therein is depleted, the flange 9 is provided with a vent opening 10 which is closed at its lower side by a tip 11 provided with a slit 12. The upper portion of the vent opening 10 communicates with an annular space 13 provided beneath flange 7, which, in turn, communicates with opening 14 provided between flange 7 and the nipple 6. The latter opening communicates with the atmosphere and thus any vacuum established in the bottle may be broken.

The present invention, however, is not concerned with the specific venting arrangement shown and contemplates any suitable type of venting means heretofore commonly employed.

The vital feature of the present invention resides in the configuration of the interior wall of the bulbous portion of the nipple and specifically to the serrations or teeth 15 carried circularly upon said inner wall intermediate the nipple flange 9 and the feeding end of the nipple. The nipple 6 is constructed of the usual flexible, resilient material customarily used for baby bottle nipples, that is, a relatively soft, pliant rubber or rubber-like material, and the serrations or teeth are formed of the same material, being integral with the nipple.

The teeth 15 are generally triangular in section and are interspaced with substantially reciprocal generally triangular spaces 16. In effect, a sectional view of the series of teeth and spaces, as shown in Fig. 2, resembles a sine curve on a circular axis.

The important considerations concerning the teeth 15 is that they be as flexible and resilient as the remaining portion of the nipple, which in itself is flexible and resilient, and that the teeth 15, in section, be substantially conformable or interfitting with the spaces 16.

The function of the serrations or teeth can best be explained by reference to Figs. 3 and 4. In Fig. 3, it will be noted that the bottle is tilted, as in the feeding position. In this position liquid baby food 17 carried in the bottle flows downwardly by gravity into the nipple. During feeding, the nipple, specifically the bulbous portion 8 thereof, is positioned between the lips of the child, and upon contraction of the child's lips, the nipple is squeezed. The contraction of the child's lips is essentially along lines connecting the child's lips and, hence, the major squeezing force tends to flatten the nipple intermediate its length.

In thus flattening the nipple, a quantity of liquid is entrapped in the feeding end of the nipple, as shown best at 18 in Fig. 3. The teeth 15 and 16 are disposed in the zone where the squeezing force of the child's lips occurs and, hence, the opposite teeth and spaces are moved toward each other. As the squeezing action proceeds, the

teeth 15 interdigitate, that is, the juxtaposed teeth 15 move into the juxtaposed spaces 16, as shown best in Fig. 4, thereby substantially closing communication between the feeding end of the nipple and the bottle. Further contraction of the child's lips thereby pressurizes the liquid 18 and coupled with the sucking action established by the child, the liquid 18 is discharged through small feeding openings 19 into the child's mouth.

To gain his breath, the child's lips relax and, hence, the resilient nipple returns to its normal position and a new charge 18 of liquid enters the feeding end of the nipple. The cycle is thus completed and is repeated throughout the feeding period.

Of course, it is desirable that the teeth 15 be brought to interdigitated relationship to close communication between the bottle and feeding end of the nipple with as little effort on the part of the child as is possible. It has been found that the teeth adjacent the ends of the flattened nipple, as viewed in Fig. 4, are distorted when the nipple is squeezed. By the use of an odd number of teeth the hinging action at the ends of the flattened nipple occurs by the exertion of the least effort. When this desired hinging occurs a distorted tooth appears at each end and, hence, the upper or lower number of teeth must exceed the lower or upper row, respectively, by one tooth.

Of course, the device would operate with an even number of teeth, but to effect a complete closing of communication would require a greater effort on the part of a child. Hence, although an even number of teeth could conceivably be used, an odd number is preferred. Further, the number of teeth employed also plays a part in effecting the effort required for a complete closing of communication. If too few teeth are employed, the wall of the nipple becomes stiffened because the teeth become too large and because the number of interdigitated teeth are few, complete closing can only be effected by relatively great effort. On the other hand if too large a number of teeth are employed, the side walls of the nipple must be brought to very close proximity before interdigitation occurs. This requires greater effort because to hinge the ends of the flattened nipple requires that the nipple material be bent around a small radius of curvature. As to the axial length of the teeth the same considerations obtain—if the teeth are too long they act as reinforcing ribs for the nipple walls and, hence, said walls resist flexure to an undesired degree. If the teeth are too short, an adequate surface area between contacting teeth may not be obtained.

These considerations, as to the number of teeth and their size are not critical in the sense that a predetermined number of teeth of specific size must be used, but rather these considerations are factors only in the efficiency of the device and with predetermined nipple material, conventional nipple material being satisfactory, anyone skilled in the art can readily determine the most efficient construction.

I claim as my invention:

1. A nipple for a baby's nursing bottle which comprises a hollow bulbous portion and a flanged portion for seating upon the mouth of a nursing bottle, a hollow feeding portion carried at the end of the bulbous portion, a ring of teeth carried on the inner wall of the bulbous portion intermediate its length between the feeding portion and the remaining portion of the nipple, said teeth extending inwardly from said inner wall and being interspersed by spaces which conform in section substantially with the section of the teeth, said teeth interdigitating and substantially closing communication between the feeding portion of the nipple and the bottle upon exertion of a squeezing force to move opposite teeth and spaces toward each other, the teeth being integral with the bulbous portion, and the bulbous portion and teeth being constructed of a flexible, resilient material.

2. A nipple for a baby's nursing bottle which comprises a hollow bulbous portion and a flanged portion for

seating upon the mouth of a nursing bottle, a hollow feeding portion carried at the end of the bulbous portion, an endless ring of teeth carried on the inner wall of the bulbous portion, said teeth extending inwardly from said inner wall, the plane of the ring being transverse to the length of the nipple and being disposed between the feeding portion and the remaining portion of the nipple, said teeth being interspersed by spaces which conform in section substantially with the section of the teeth, said teeth interdigitating and substantially closing communication between the feeding portion of the nipple and the bottle upon exertion of a squeezing force to move opposite teeth and spaces toward each other, the teeth being integral with the bulbous portion, and the bulbous portion and teeth being constructed of a flexible, resilient material.

3. A nipple for a baby's nursing bottle which comprises a hollow bulbous portion and a flanged portion, a hollow feeding portion carried at the end of the bulbous portion, a ring of teeth carried on the inner wall of the bulbous portion intermediate its length between the feeding portion and the remaining portion of the nipple, said teeth being interspersed by spaces which conform in section substantially with the section of the teeth and being of restricted length relative to the length of the bulbous portion, said teeth interdigitating and substantially closing communication between the feeding portion of the nipple and the bottle upon exertion of a squeezing force to move opposite teeth and spaces toward each other, the teeth being integral with the bulbous portion, and the bulbous portion and teeth being constructed of a flexible, resilient material.

4. A nipple for a baby's nursing bottle which comprises a hollow bulbous portion and a flanged portion, the wall of the bulbous portion being thinner intermediate its length than at its extremities, a hollow feeding portion carried at the end of the bulbous portion, an annular ring of teeth carried on the relatively thin portion of the inner wall of the bulbous portion intermediate its length, said teeth extending inwardly from said inner wall and being interspersed by spaces which conform in section substantially with the section of the teeth, said teeth interdigitating and substantially closing communication between the feeding portion of the nipple and the bottle upon exertion of a squeezing force to move opposite teeth and spaces toward each other, the teeth being integral with the bulbous portion, and the bulbous portion and teeth being constructed of a flexible, resilient material.

5. A nipple for a baby's nursing bottle which comprises a hollow bulbous portion and a flanged portion for seating upon the mouth of a nursing bottle, a hollow feeding portion carried at the end of the bulbous portion, a ring comprising an odd number greater than one of teeth carried on the inner wall of the bulbous portion intermediate its length between the feeding portion and the remaining portion of the nipple, said teeth extending inwardly from said inner wall and being interspersed by spaces which conform in section substantially with the section of the teeth, said teeth interdigitating and substantially closing communication between the feeding portion of the nipple and the bottle upon exertion of a squeezing force to move opposite teeth and spaces toward each other, the teeth being integral with the bulbous portion, and the bulbous portion and teeth being constructed of a flexible, resilient material.

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