

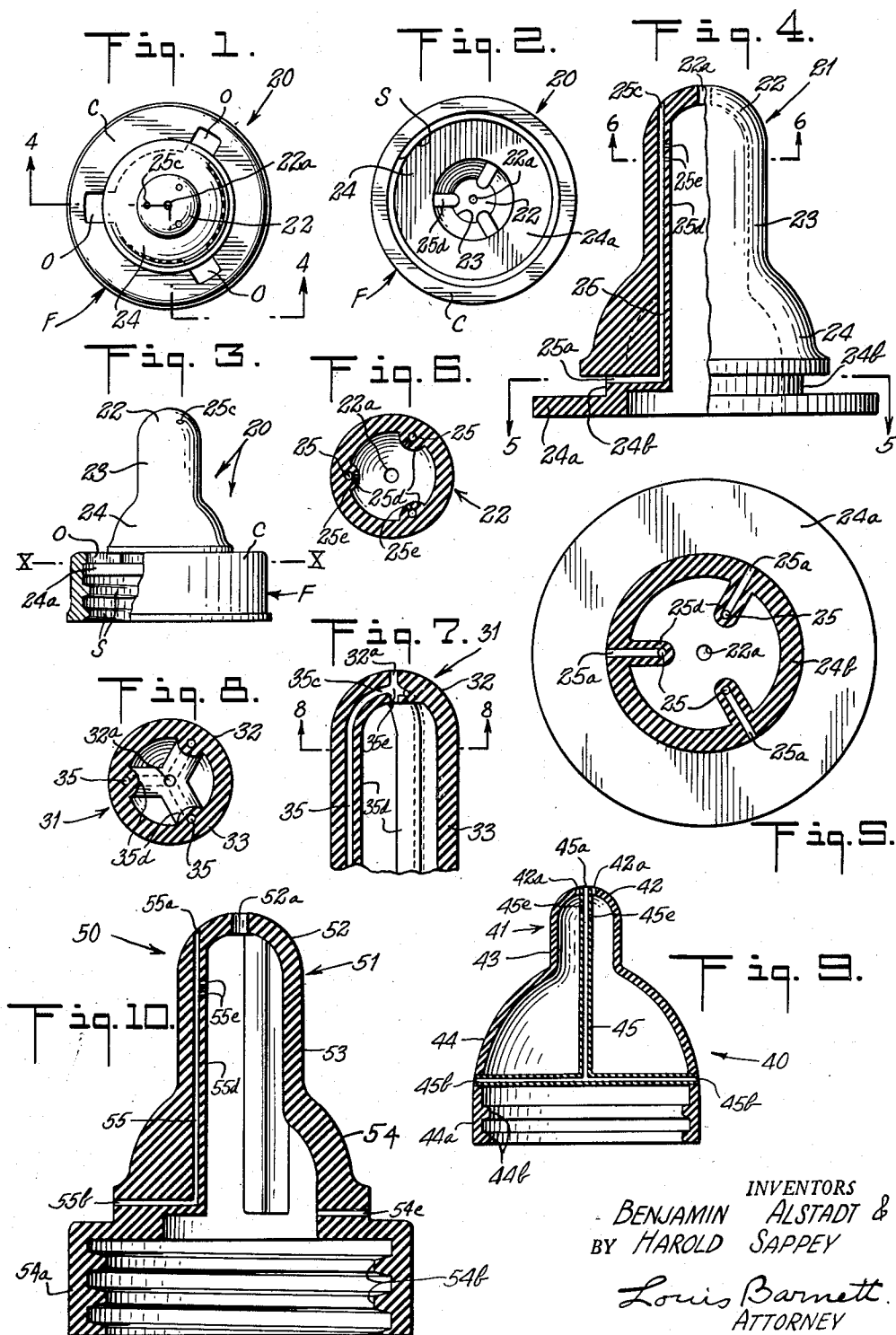
March 23, 1954

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2,672,870

LIQUID FEEDING NIPPLE CONSTRUCTION

Filed Jan. 17, 1952



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2,672,870

LIQUID FEEDING NIPPLE CONSTRUCTION

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Application January 17, 1952; Serial No. 266,924

14 Claims. (Cl. 128—252)

1

This invention relates to liquid feeding nipple constructions as used on nursing bottles for infants, animal feeding and the like, and more particularly is directed to improved nipple constructions for the purposes fully described in our copending applications for Letters Patent Ser. Nos. 147,242 now Pat. No. 2,582,950 and 235,792, filed March 2, 1950 and July 5, 1951, respectively, and to an improved method of feed therewith.

Among the objects of the invention is to generally improve nipple constructions for use on infant's nursing bottles or animal liquid feeding means and method of the character described, which constructions shall comprise few and simple parts forming rugged structures capable of withstanding rough usage, which shall be cheap to manufacture, which shall be practically non-collapsible in use, which shall be easy to keep in sanitary and hygienic condition, which shall have an effect similar to an aspirator and produce an aerated feeding liquid, which shall be reliable in operation, which shall be readily adaptable to be incorporated in various types of feeding means, and which constructions and method shall be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists of steps of the method of manufacture and features of construction, combination of elements and arrangement of parts which will be exemplified in the method and feeding nipples hereinafter described and of which the scope of the application will be indicated in the claims following.

In the accompanying drawing in which possible illustrative embodiments of the invention are shown, Figs. 1, 2 and 3 are top and bottom plan and front elevational views, respectively, of an improved liquid feeding nipple construction with a demountable coupling fitting embodying the invention, such for example as adapted to be releasably secured on an infant's nursing bottle, Fig. 3 being partly broken to expose the connection of the bottom portion of the nipple construction assembled with the coupling fitting.

Fig. 4 is an enlarged sectional view of the improved nipple construction shown in Fig. 3 removed from the coupling fitting and corresponding to a cut taken along lines 4—4 in Fig. 1, showing spaced apart air passageways each having an inlet end terminating adjacent the base edge of the nipple bottom portion and midway openings or bypasses communicating each air passage with the path of the liquid flow within the nipple.

2

Figs. 5 and 6 are cross-sectional views taken on lines 5—5 and 6—6 in Figs. 4, respectively, showing the structural formation through the neck and bottom portions of the nipple, respectively, taken transversely the length of the spaced apart air passageways, the walls of the latter forming internal ribs for the nipple structure.

Fig. 7 is a fragmentary cross-sectional view of neck and teat portions of a modified nipple construction embodying the invention showing air passageways in merged formation with the through opening forming the path of the nipple liquid flow.

Fig. 8 is a sectional view taken on line 8—8 in Fig. 7 showing the air passageways in section and the through opening on the inside of the nipple.

Fig. 9 is a sectional elevational view of another modified nipple construction having an integral bottle coupling fitting portion embodying the invention formed with a centrally disposed air tube or conduit having inlets in the breast portion thereof and midway openings or by-passes in a wall thereof communicating with the path of the liquid flow surrounding said tube, and

Fig. 10 is a sectional view like Fig. 4 showing another modification of nipple construction embodying the invention having an integral bottle coupling fitting portion and provided with air vents for the bottle, the latter not shown.

Referring in detail to the drawing, 20 denotes an improved liquid feeding means including a coupling fitting, F for screw mounting a nipple 21 formed of a flexible material, such as gum or synthetic rubber, or other suitable substances, having elastic properties constructed to embody the invention adapted to be mounted on a threaded open end of a nursing bottle of any suitable conventional type (not shown) in the well understood manner.

Nipple 21 as seen in Figs. 1 to 6 may comprise a teat portion or free end forming a hollow head portion 22 extending from a tubular or sleeve neck 23, the latter being interposed between said teat portion 22 and a hollow base bottom portion or breast 24. Said teat portion 22, neck 23 and breast 24 may, if desired as here shown, be integrally formed in the construction of nipple 21.

Teat portion 22 as seen from Figs. 2, 4 and 6 may be made as a substantially hollow hemispherical shaped structure having one or more through-openings 22a to permit flowing liquid from the interior of teat portion 22 therethrough, as hereinafter described. Said nipple 21 may

terminate the bottom or breast portion 24 thereof in a radially extending flange 24a provided to extend as a wall of an annular recess or groove 24b, said flange 24a and groove 24b serving as clamp attachment means on the mouth of a feeding bottle (not shown) through coupling fitting F' in the well understood manner, and as is clear from Figs. 1 to 4.

As seen in Figs. 2 and 4 said nipple 21 may also be provided with uniformly spaced apart elongated continuous air-passageways or conduits 25 which may be integrally formed with the interior wall structure thereof to extend substantially the length of teat portion 22, neck 23 and breast 24.

Said passageways 25 may each terminate in an inlet end 25a, as for example, in a wall of said annular groove 24b, above said flange 24a, that is, just above a plane X—X, as is clear from Figs. 3 and 4, to align with clearance cut outs or opening O, provided in coupling fitting F' and spaced to conform with the position of inlet ends 25a, so that the latter, have practically free communication with the exterior atmosphere. Said nipple passageways 25 each may also be provided with an outlet end 25c terminating at the teat portion 22, and as shown in Figs. 1 and 4 at a spaced distance from said teat portion through-openings 22a.

Through-openings 22a serve to permit the flow of liquid contents of the feeding means through nipple 21, and where said feeding means is used for infants, from a feeding bottle into the child's mouth, said teat portion 22 then being in sucking position in the well understood manner. Passageways 25 then provide direct communication of the outlets 25c thereof within the child's mouth with the surrounding air independent of the contents of such nursing bottle and liquid flow therefrom except as will hereinafter be described.

Coupling fitting F' besides being provided with clearance cutouts O in an integrally formed nipple retaining collar portion C, has a rim portion thereof removably secured to occupy said annular groove 24b as shown in the assembly in Figs. 1 to 3. Said coupling fitting F' may also be provided with an integrally formed flanged screwed portion S to clamp rim bottom of said nipple flange 24a on the conventional rim bead of a nursing bottle when mounting on the latter liquid feeding means 20 through nipple 21 of which the path of liquid flows.

Liquid feeding means 20 so far described may be like nipple constructions covered in our co-pending application Ser. No. 147,242 now granted as Patent No. 2,582,950 on January 22, 1952. However in the present application there is provided additional improved structural features and combinations and arrangement of elements for permitting new and unexpected results heretofore never attained in this highly developed field.

To this end, rib wall 25d of air passageway or conduit 25 may be pierced or otherwise perforated with a by-pass or spaced apart by-passes 25e along a mid-portion of said wall 25d inwardly of said outlet 25c, so that when suction is applied to the teat portion 22 in the mouth not only will air be drawn through each of the passageways 25 but also liquid from the path of flow through nipple 21 will be partly diverted into outlet ends of passageways 25 to mix with the passing air flow.

After constructing nipple 21 as described above with at least one passageway 25 provided with

a by-pass or by-passes 25e as shown in Fig. 4, a practical application of the invention may be carried out. Nipple 21 is first simply mounted by suitable means such as coupling fitting F, on a feeding bottle containing a milk formula, water or any other feeding liquid. Then on inserting said nipple 21 into an infant's mouth whereby teat portion 22 having a through opening or several small openings 22a and said passageway outlets 25c positioned within the mouth cavity, the infant's lips will close about nipple neck 23 and against breast 24 with passageway inlets 25a communicating with the free atmosphere.

When sucking by the infant commences, the liquid will flow from the bottle in an even stream through each of said nipple openings 22a simultaneously with atmospheric air flowing through passageways 25 into the mouth cavity. This flow of air between the atmosphere and mouth cavity is substantially free and unimpeded so that after the completion of each suck there is sufficient air supplied in the mouth cavity tending to compensate for the usual partial vacuum created within the bottle without requiring release of the flow connection between the nipple and the lips.

The flow of air through each air-passageway 25 with each by-pass 25e gives an effect similar to an aspirator and produces an aeration of the liquid, passing from outlet 25c into the mouth as well as liquid drawn directly through each nipple opening 22a from the bottle, the portion of passageway 25 between by-pass 25e and outlet 25c serving as a mixing chamber for the by-passing flow of liquid and air intake into the mouth.

When sufficient liquid flows into the throat to initiate a swallowing reflex, the liquid will pass down the esophagus and any excess of air in the mouth cavity will be taken care of through the respiratory system. The aerated liquid portion drawn into the mouth has been found to have a more desirable and pleasing taste than liquid milk products that have not been aerated, as for example, liquid milk products are especially made more palatable by said aspirated aeration.

In practicing the invention with nipple 21 in maintaining the above described communication of air between the free atmosphere and the infant's mouth during suckling, the infant will eagerly take liquid food from a bottle contentedly and in relaxed mood so as to minimize often present nervous tension to which gastric disturbances and distress are attributed.

A modified form of the invention is shown in Figs. 7 and 8. In this latter construction teat end or head portion 32 and tubular or sleeve neck 33 have rib wall 35d through which air passageways or conduits 35 extend in a manner similar to air passageways 25 in nipple 21 above described. However, instead of providing by-passes 25e, as in nipple 21, outlets 35c of the passageways 35 merged directly into through opening 32a, that is, air is mixed with the entire flow of feeding liquid to aerate same, the junction of each outlet 35c with through opening 32a serving as a mixing chamber 35e. Otherwise improved nipple construction embodying the invention may be made as shown in Figs. 7 and 8 and function in the same manner as described above for nipple 21.

A further modification is shown in Fig. 9, in which feeding means construction 40, is seen to comprise nipple 41, having teat 42, the latter being provided with suitable through openings 42a,

an integrally formed neck 43, and a breast 44 having coupling extension 44a therefrom. The latter may be provided on an interior side thereof with a bottle-engaging bend or thread 44b. However, instead of providing passageways 25 as in nipple 21, feeding means construction 40 may be made with an interior extending air supply tube or conduit 45 which passes from said teat 42 through neck 43 and out through spaced apart portions of breast 44; said tube 45 having an outlet end 45a terminating at teat 42 adjacent said openings 41a, and inlet ends 45b terminating at the breast just above coupling extension 44a.

Like nipple conduits 25 above described, nipple 41 may be pierced or otherwise perforated with a by-pass or spaced apart by-passes 45e along a midportion thereof inwardly from outlet end 45a, said by-pass or by-passes 45e serving for the same purpose as described above for by-passes 25e of nipple conduit 25.

Since infants have a varying range of suckling characteristics, to better practice the invention for use under practically all conditions nipple 21 shown in Figs. 1 to 6, and as modified in Figs. 7 and 8, or nipple 41 shown in Fig. 9 may also each be provided with any form of suitable venting means for the bottle contents.

Such additional venting means is shown in Fig. 10 incorporated in nipple construction 50.

The latter may be made similar to nipple 21 described above with a nipple 51, a teat 52 having through openings 52a, neck 53, breast 54, passageways 55 each terminating in an outlet end 55a and an inlet end 55b with by-pass or by-passes 55e in wall 55d of each passageway 55. Said nipple breast 54 may, if desired, be made with an integral coupling extension 54a, having an interior side thereof formed with a thread 54b to fit companion threads on the mouth of the feeding bottle in the well understood manner. To admit air into the bottle as may be required, nipple breast 54 may be provided with one or more vents 54c which will allow air to trickle into the bottle as liquid is drawn or sucked out thereof during feeding.

In practicing the method embodying the invention it is seen that on sucking said improved nipple teats to draw a main flow of liquid from a bottle, air is drawn concurrently from the atmosphere, and portion of the flowing liquid is also diverted and aerated and delivered in the mouth in addition to said main flow.

The novel improved method of infant feeding embodying the invention will now be apparent and is seen to comprise the steps of feeding a liquid from a nursing bottle through a nipple by mouth suction while simultaneously maintaining free communication of atmospheric air within the mouth cavity, that is, concurrently drawing air from the atmosphere outside the mouth into the region of mouth suction within said cavity.

Nipples 31, 41 and 51, that is like those constructed as shown in Figs. 7 to 10 will each operate in the same manner as described above for nipple 21. It is to be understood that the various modifications of the air passageways, and with or without bottle venting means with aspirator means may be utilized in any type of nipples without departing from the scope of the invention.

It has been found that favorable results are obtained in the forms shown when through openings, for example, such as 22a are of the usual size, that is, so that an intermittent drip of liquid will take place when the bottle is inverted

with said nipple opening thereof below the liquid level in the bottle and the air passageways for example, such as 25 are each of approximately .018 inch, and provided with spaced apart by-passes each .010 inch in diameter.

It is thus seen that there are provided an improved method of infant feeding and liquid feeding nipple constructions in which the objects of the invention are achieved and which are well adapted to meet all conditions of practical use.

As various possible embodiments may be made in the above invention and as various changes might be made in the embodiments and method above set forth, it is understood that all the above matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention we claim as new and desire to secure by Letters Patent:

1. A nursing nipple having a hollow perforated head of the character described comprising an elastic tubular wall structure for drawing a liquid flow from a bottle therethrough, said wall structure formed with an elongated air conduit partitioned from said liquid flow within the nipple for communicating an exterior side of said nipple head with the atmosphere, and aspirator means incorporated in said wall structure for diverting at least a portion of said drawn liquid flow from the bottle into said air conduit to mix and aerate said liquid flow portion within said conduit.

2. A nursing nipple of the character described comprising an elastic tubular wall structure terminated by a perforated head for passing a flow of liquid from a bottle therethrough, said wall structure formed with an elongated air conduit having both an inlet and outlet communicating with the exterior of the nipple, said conduit being partitioned from said liquid flow within the tubular structure with a by-pass for providing an aspirator action to permit diverting at least a portion of said passing liquid flow into the conduit.

3. A nursing nipple of the character described comprising a tubular wall structure terminated by a perforated head for passing a flow of liquid from a bottle therethrough, and an elongated air conduit contained within the nipple having both an inlet and outlet communicating with the exterior of the nipple, said conduit outlet being located in the region of the perforated head, and aspirator means incorporated in a midportion of said conduit in the path of said passing liquid flow for diverting at least a portion thereof into the conduit.

4. An infant's nursing nipple having a hollow perforated head for drawing a liquid flow from a bottle therethrough comprising a wall structure, an elongated air conduit supported by said wall structure partitioned from said liquid flow and extending to communicate a region of said head within the infant's mouth with the atmosphere external to the nipple when the latter is in suckling position, and by-passing means incorporated in said wall structure communicating the conduit with said drawn liquid flow to provide an aerated flow of liquid from a conduit portion between said by-passing means and said nipple head region.

5. A nursing nipple of the character described comprising an elastic tubular wall structure terminated by a perforated sucking head for passing a flow of liquid from a bottle therethrough, an elongated air conduit extending lon-

gitudinally in said wall structure and having an outlet end in the nipple exterior region of said perforated sucking head, said air conduit having an inlet end communicating the conduit with the exterior of the nipple when said sucking head is in a child's mouth, and by-passing aspirator means incorporated in a midportion of a wall of said conduit at a spaced distance from said inlet end along the path of said passing liquid flow for diverting at least a part thereof for aerating said diverted liquid flow.

6. A nursing nipple of the character described comprising a perforated hollow teat portion; a neck extending from said teat portion; said neck being interposed between the teat portion and a flexible walled hollow dome shaped breast; spaced apart air-passageways extending longitudinally of the nipple and through wall portions of said breast, neck and teat portions; said air-passageways each having an inlet on said breast and outlet on said teat portion communicating with the exterior of the nipple; and by-passing aspirator means incorporated in a wall portion of each of said air-passageways between said inlet and outlet thereof for communicating the conduit with said teat portion hollow.

7. An infant's nursing nipple having a wall structure comprising a perforated hollow head portion wherethrough a liquid flow passes, a tubular neck extending from said head portion interposed between the latter and a breast portion, an elongated air conduit supported by said wall structure partitioned from said liquid flow communicating a region of said head within the infant's mouth with the external atmosphere outside the infant's mouth when said nipple is in suckling position, said air conduit having an inlet end on the breast beyond the infant's lip sucking position and an outlet end in the region of said nipple perforated head, and by-passing means integrally formed in said wall structure between said inlet and outlet end communicating said conduit with passing liquid flow through the nipple hollow head portion.

8. The nursing nipple defined in claim 6 in which an inner side of said wall structure includes bracing ribs through which said air-passageways extend, with said by-passing aspirator means integrally formed therewith.

9. The infant's nursing nipple defined in claim 7 in which said elongated air conduit has a midportion thereof detached from said wall structure and disposed in the stream of said liquid flow, said by-passing means being integrally formed with said conduit midportion.

10. An infant's nursing nipple of the character described comprising a tubular wall structure terminated by a perforated head for passing a liquid flow from a bottle therethrough, an elongated air conduit extending within the nipple having both an inlet and outlet communicating with the exterior of the nipple, said conduit outlet being located in the region of the per-

forated head within the infant's mouth when in suckling position, said conduit inlet being located exteriorly beyond the infant's lip sucking position, said conduit having a midportion thereof detached from said wall structure and disposed in the stream of said liquid flow, and by-passing aspirator means incorporated in the detached midportion between said outlet and inlet for diverting at least a part of said passing liquid flow into said midportion for aerating thereof.

11. A nursing nipple of the character described comprising a perforated hollow teat portion, a tubular neck extending from said teat portion, said neck being interposed between the teat portion and a flexible walled hollow dome shaped breast, an elongated air conduit having an inlet end on said breast, said conduit extending through said tubular neck and terminating in an outlet end on said teat portion, and by-passing aspirator means incorporated as an integral part of said air conduit between said inlet and outlet.

12. A nursing nipple as defined in claim 11 which includes bottle venting means incorporated in said breast.

13. In an infant's feeding nipple having a perforated hollow teat portion; an intermediate tubular neck and a dome shaped breast portion; the latter terminating in means for mounting the nipple on the mouth of a feeding bottle for passing liquid flow therefrom into the infant's mouth through said nipple when in suckling position; an air conduit communicating an inlet end thereof positioned on the nipple to lie exteriorly of the mouth when in said suckling position with an outlet end thereof positioned in the region of said teat portion within the mouth, said air conduit being partitioned off from said liquid flow through the nipple; and aspirator means carried by said air conduit having a by-pass communicating the conduit with said passing liquid flow for diverting at least a portion of said liquid flow into the conduit between said inlet end and outlet end for aeration.

14. A nursing nipple of the character described comprising a perforated hollow teat portion, a tubular neck extending from said teat portion, said neck being interposed between the teat portion and a flexible walled hollow dome shaped breast, an elongated air conduit having an inlet end on said breast, said conduit extending through said tubular neck and terminating in an outlet end on said teat portion, and aspirator means incorporated as an integral part of said perforated hollow teat portion and the conduit outlet.

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