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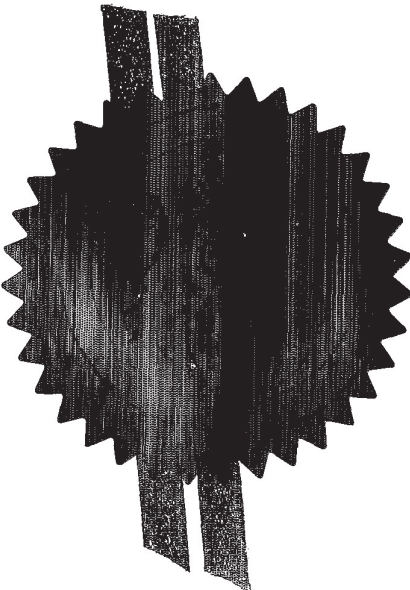
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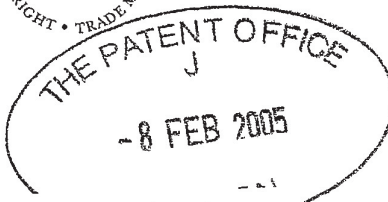
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0502599.4

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Jackel International Limited
Dudley Lane
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Patents ADP number (*if you know it*):

If the applicant is a corporate body, give the country/state of its incorporation:

7204746001
United Kingdom

3. Title of the invention:

Feeding Teat

4. Name of your agent (*if you have one*):

Kilburn & Strode
20 Red Lion Street
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Signature(s): *K. Gwyno Roberts*

Date: 8.2.05

12. Name, e-mail address, telephone, Fax and/or mobile number, if any, of a contact point for the applicant:

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DUPLICATE

Feeding Teat

The invention relates to a feeding teat especially for an infant's feeding bottle.

5 Current developments in feeding teats concentrate on making them more similar to the human breast, but various problems exist in known teats. For example teats such as that described in US6745912 B2 (Pigeon) including a series of parallel annular grooves on the inner surface of the nipple which allows stretching of the nipple but only in a constrained direction, and with the
10 risk of flow blockage if the nipple collapses.

In addition, efforts are continuing to provide valved feeding bottles, in particular to allow air ingress to the teat. It is believed that this reduces the risk of colic which can otherwise occur as a result of negative pressure building up
15 in the feeding bottle. Various known arrangements include slit valves of various types, however these are frail and difficult to machine. In another approach described in German patent DE19716535 a teat is provided with an inner annular resilient flange at its base which rests on a bottle rim when screwed down by a collar. Upon a negative pressure building up inside the
20 drinking vessel the flange lifts from the vessel rim and air passes up through the collar and between the flange and the vessel rim. In a similar arrangement described in European patent application EP151862 a teat includes a downwardly depending cylindrical flange at its base which seals against the inner top face of a vessel neck when deformed by being screwed down by a
25 collar. Again a negative pressure inside the vessel lifts the flange away from the vessel neck so that air flows through the collar and between the neck and the flange into the vessel to relieve the pressure differential. Such arrangements rely on the correct amount of screw pressure being applied by the user on fixing the teat which can give rise to varied levels of valving between

uses. Furthermore the introduction of a circumferential flange increases material costs.

5 The invention is set out in the claims. Because of the provision of a helical flow formation on the inner face of the teat, continuous flow of liquid is allowed even when the teat collapses via the helical flow path while allowing extension of the teat and in particular a rotational or torsional extension.

10 Embodiments of the invention will now be described, by way of example, with reference to the drawings, of which:

Fig. 1 which is a cross-sectional side view of a teat and vessel according to the present invention;

Fig. 2a is a perspective view showing a teat valve in a first, closed configuration;

15 Fig. 2b is a perspective view showing a teat valve in a second, open configuration;

Fig. 3 is a partial perspective view of the underside of the teat, showing a lip valve;

20 Fig. 4a is an exploded perspective view showing assembly steps for a drinking vessel according to the invention;

Fig. 4b is a perspective view showing a first detail of an assembled vessel according to the present invention; and

Fig. 4c is a perspective view showing a second detail of an assembled vessel according to the present invention.

25

Referring to Fig. 1, it will be seen that a teat assembly 40 is mounted on an infant drinking vessel 12. The teat assembly 40 includes a teat 10 having a teat portion 14 forming a nipple having drink apertures 15 at its upper end, a base portion 16 mountable to the drinking vessel and an areola region 18

therebetween. The teat 10 is textured and shaped to mimic the human breast and can, for example have skin-like texture varying between the teat portion, areola region and base portion, similar to the human breast. The teat can indeed be coloured to mirror human skin colour including ethnic skin colours.

5 The shape of the teat is also similar to the human breast, the base portion 16 being shaped like a breast and having a wide, domed configuration. The areola portion 18 rises from the base portion 16 to the teat portion 14 at an angle to the horizontal, that is to say, with a component of inclination parallel to the teat portion 14, allowing better pursing by the infant so that they can close their lips
10 effectively around the teat, and again mimicking the human breast such that the experience of the infant is as similar as possible to the natural experience of breast feeding.

The teat 10 is formed from an elastomer with walls of decreasing thickness
15 from the base portion 16 through to the teat 14 providing a more realistic flexing characteristic. The areola portion 18 further includes undulating grooves 20 forming, in cross-section, a wavy profile on the inner surface of the areola portion 18 and extending circumferentially. In the embodiments shown three such grooves are formed adjacent one another providing a bellows action
20 as well as flexing in a direction perpendicular to the flow direction and increasing the flexibility especially in conjunction with the decreasing wall thickness providing a more natural stretching characteristic. Yet further, the teat can be textured on its outer and/or inner surface to enhance operation or realism of the teat as appropriate.

25 The teat portion 14 projects generally perpendicular to the mouth of the vessel 12 and is elongate for example of length 20mm, again to mimic the extension of the human nipple during breast feeding. The teat portion has a generally rectangular cross-section with wall thickness 1.8mm and diameter 13mm. A

tight pitch helical groove 22 of groove depth 0.9mm (half the wall thickness) having for example three turns and 3mm pitch is moulded or otherwise formed around the inner cylindrical vertical surface of the teat portion 14 to form a flow passage even when the teat portion is collapsed, for example under biting pressure from an infant. In addition the helical groove allows rotational or torsional extension of the teat portion in the range of 5-6mm and flexing parallel perpendicular to the flow direction, again more closely mimicking the human breast.

At the tip of the teat portion the apertures 15 comprise a variable flow valve, where the flow can either be selected by choosing a teat with appropriate apertures or a two or three crossed slit configuration can be provided allowing the infant to regulate flow. For example referring to Figs. 2a and 2b, a teat 200 includes a teat portion 202 with a slit valve 204. As can be seen from Fig. 2b when pressure is applied in the longitudinal direction of the slit, for example bite pressure, the slit valve opens allowing fluid flow by application of compression and distortion pressure.

The teat assembly 40 is formed in a two-shot moulding process with elastomer forming the teat 10 and polypropylene forming a screw collar 30 which is integrally formed with the teat 10. As a result a resilient, cheaply and easily manufactured integral assembly is provided.

The screw collar 30 includes an internally threaded cylindrical portion 32 and a downwardly domed peripheral portion 34 surrounding it and extending from an upper end of the cylindrical portion 32. The domed portion 34 includes a horizontal outward annular flange 35 of thicker cross-section at its base. The teat 10 is over-moulded onto the screw collar 30 and the domed portion 34 terminates at a central circular orifice corresponding with an outer face of the

neck 28 of the vessel 12, the over-moulded portion of the teat extending inwardly slightly from this position and terminating in a downwardly depending cylindrical flange 41.

5 As a result the screw collar provides structural strength and a strong screw fit, but the resilient material of the teat portion 40 provides sealing. In particular the threaded cylindrical portion 32 of the screw collar screws on to the outwardly threaded neck 28 of the vessel 12 and the top, innermost edge of the domed portion 34 abuts the outer face of the neck 28. Because the teat material
10 10 overhangs the inner edge 39 of the domed portion 34, when the teat assembly 40 is screwed down, the overhanging portion seals against the top rim of the neck 28 and the downward cylindrical flange 41 forms an elastomer sealing ring sealing against the top inner face of the vessel neck 28. The teat
15 10 includes a vent passage 26 through the elastomer material and substantially at the periphery. A discontinuous flap or lip valve portion 23 projects down from the flange 41 in a portion of the periphery only in the vicinity of the vent passage 26.

Because of the resilience of the flange portion, when an infant sucks on the
20 teat, reducing pressure within the vessel, the lip valve 23 will flex away from the neck 28 of the vessel 12. In the region of the vent 26 in the teat 10, this allows venting between the interior of the vessel and atmosphere through the teat. Referring to Fig. 3 the lip valve 24 can be seen viewed from the underside. In the embodiment shown it will be seen that a passage 25 actually
25 passes through the lip valve, communicating with the vent passage 26. In that case the aperture to the passage 25 will seal against the inner face of the vessel in the sealed configuration and unseal to provide a passage. Alternatively the slit valve 24 can comprise a flap which flexes away from the interior surface to allow communication with a vent passage as described above.

The teat assembly 40 also has a positive engagement stop providing tactile feedback to ensure that the teat assembly is corrected tightened on the vessel and allows the lip valve to seal effectively. Referring to Figs. 4a to 4c, for example, it will be seen that a vessel 400 receives a handle portion 402 and a teat screw collar 404, corresponding to the screw collar 30 described above but with the elastomer teat 10 removed for the purposes of clarity of understanding.

The handle portion 402 includes a cut-out portion 406 which cooperates with projections 408a, 408b on the vessel to locate the handle portion in a predetermined position. The handle portion is placed over the vessel and located in the desired orientation and then the collar 404, including an internal thread portion allowing mounting on the vessel 400 is screwed into position as described above, securing the handle portion 402 in place.

As can best be seen in Fig. 4b, the collar portion 404 includes an internal lug 410 which projects inwardly from the inner face and engages against a stop feature on the screw threaded portion of the vessel 400 formed by the projections 408a, 408b such that the teat 10 "clicks" into a desired position. As a result a controlled compression on the lip valve 24 is obtained such that a consistent and repeatable valving action is obtained on each use. In particular the projections 408a, 408b are separated by a recess, 408c best seen in Fig. 4c. When the collar 404 is screwed into place the lug 410 passes over the projection 408b which has a ramp towards the recess 408c. After the lug 410 has ridden up the ramp it drops into the recess 408c and is obstructed from further movement by the planar face of the projection 408a. The lug 410 further prevents the collar 404 from being unscrewed by virtue of its engagement with the abutting face of the projection 408b. However the lug 410 and projection 408b have chamfered or radiussed abutting faces such that,

on application of sufficient unscrewing pressure, the lug 410 rides over the chamfered face of the projection 408b and then down the ramp allowing the collar to be fully unscrewed.

5 In operation the vessel is filled with drinking liquid and the teat assembly 40 is screwed on until positive engagement is detected (for example a discernable “click”) meaning that it is correctly fitted. When the infant then drinks from the vessel the pressure difference pulls the lip valve 24 away from the inner face of the neck 28 of the vessel 12 allowing venting through vent passage 26
10 and hence reducing the risk of colic. Because of the provision of the lip valve there is no requirement for providing slits and a natural, robust and resilient valve assembly is provided. Furthermore, the valve is formed during the moulding operation and requires no secondary operation for its formation providing commercial and manufacturing benefits. Yet further as a single vent
15 passage is provided at one point on the teat, the risk of leakage is reduced, especially as the vent passes through the teat rather than around the vessel neck.

It will be appreciated that the vessel and teat assembly can be formed from any
20 appropriate material and in any appropriate manner, for example by co-moulding or two-shot moulding. The vessel and teat can adopt any appropriate dimensions and the teat portion can have any appropriate configuration for example an orthodontic configuration. Furthermore features can be implemented in other types of drinking vessel cover as appropriate. For
25 example the lip valve can be implemented in a trainer cup cover, a sports bottle or other vessel closures capable of forming a partial vacuum in a vessel in use.

Claims

1. A feeding teat having a continuous helical flow formation on an inner surface thereof.
- 5 2. A teat as claimed in claim 1 in which the helical flow formation comprises a helical groove.
- 10 3. A feeding teat as claimed in claim 1 or claim 2 comprising a base portion and a teat portion, in which the helical flow formation is provided in the teat portion.
- 15 4. A teat as claimed in any preceding claim in which the flow formation is a groove and has a depth of approximately half of the wall thickness.
5. A teat as claimed in any preceding claim in which the helical flow formation pitch is approximately 3mm.
- 20 6. A feeding teat including an areola region and having a plurality of undulating grooves on an inner surface of the areola region.
- 25 7. A drinking vessel cover comprising a flange portion arranged to seal against a vessel flow orifice wall, in which the cover includes an air vent passage therethrough and the flange portion includes a deformable portion associated with the vent passage and arranged to deform away from the flow orifice wall under negative pressure to allow air venting through the vent passage.

8. A drinking vessel cover as claimed in claim 7 in which the deformable portion comprises a lip valve.
- 5 9. A drinking vessel cover as claimed in claim 8, in which the lip valve comprises a flap.
- 10 10. A drinking vessel cover as claimed in claim 8, in which the lip valve comprises a tube having a tube passage communicating with the vent passage and a tube opening closed against the orifice wall in a sealed position.
- 15 11. A drinking vessel cover as claimed in any of claims 7 to 10 in which the flange portion is arranged to engage an inner surface of the flow orifice wall.
- 20 12. A drinking vessel cover as claimed in any of claims 7 to 11 further including a positive engagement formation for indicating correct connection to a feeding vessel.
- 25 13. A drinking vessel cover as claimed in any of claims 7 to 12 comprising a feeding teat.
14. A drinking vessel cover comprising a peripheral rim having a circumference and a deformable portion projecting from a portion of the circumference of the rim to form a valve portion arranged to seal against a vessel flow orifice wall to close a vent passage and arranged to deform away from the flow orifice wall under negative pressure to allow air venting through the vent passage.

15. A drinking vessel cover as claimed in claim 14 having the features of a teat or drinking vessel cover as claimed in any of claims 1 to 13.

5 16. A vessel including a teat or drinking vessel cover as claimed in any preceding claim.

17. A teat, drinking vessel cover or vessel substantially as herein described with reference to the drawings.

FIG. 1

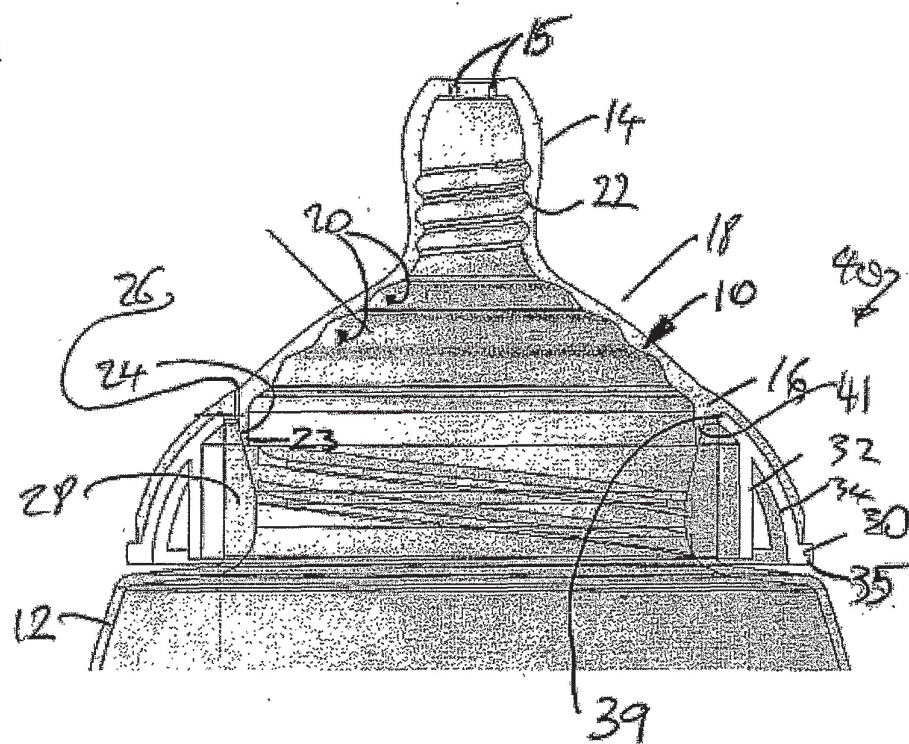
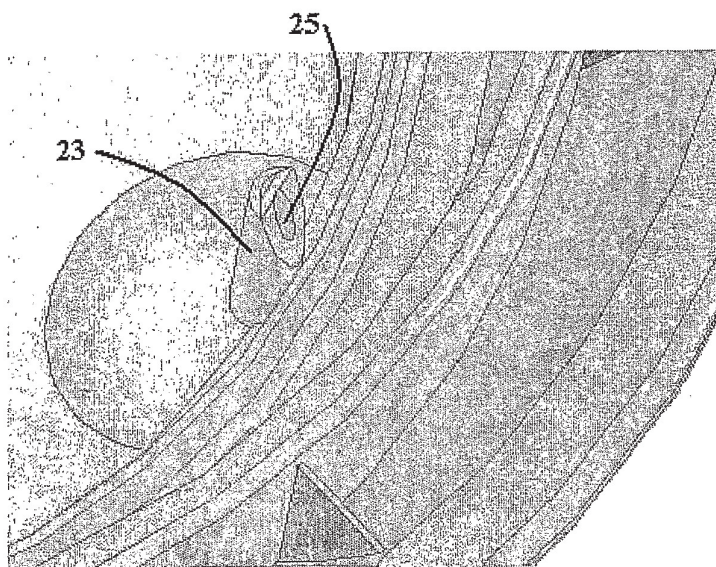


FIG. 3





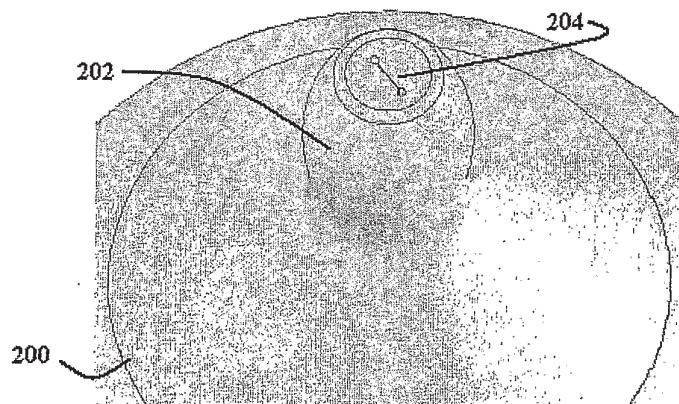
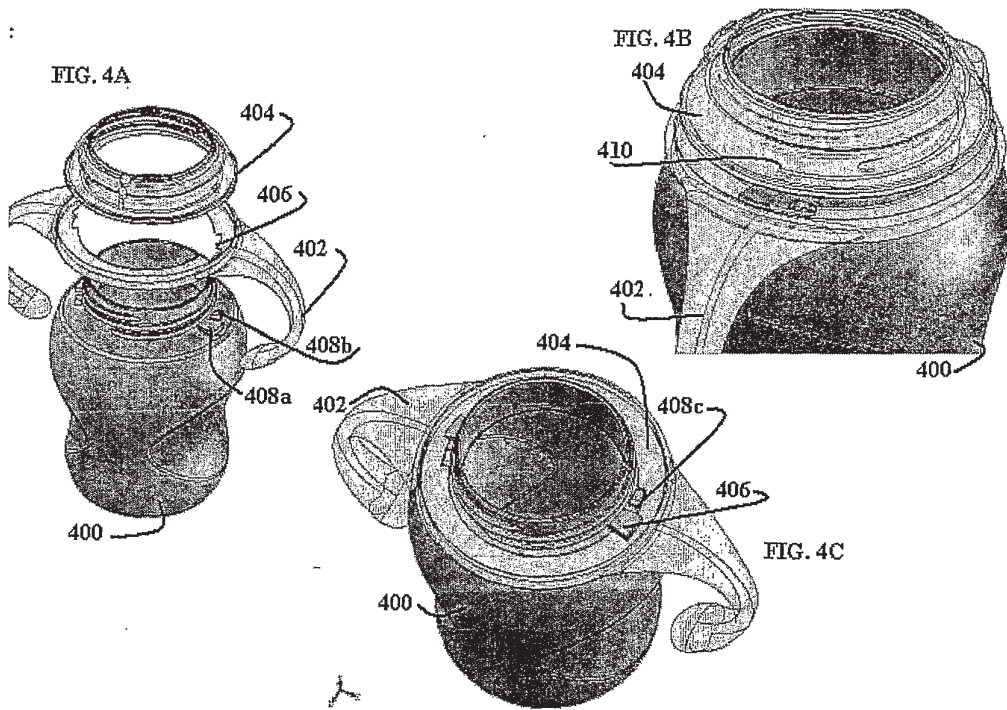


FIG. 2A

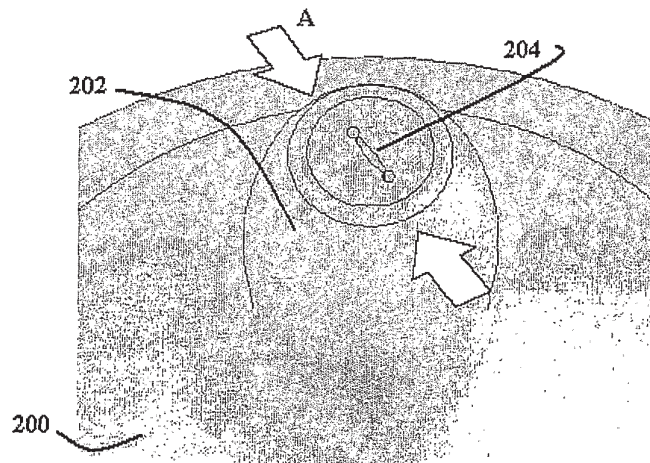


FIG. 2B

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