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(71) Applicant(s)
Playtex Products, Inc.

(72) Inventor(s)
Randolph, Ross Steven

(74) Agent / Attorney
Phillips Ormonde & Fitzpatrick, Level 22 367 Collins Street, Melbourne, VIC, 3000

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(71) Applicant *(for all designated States except US)*: **PLAYTEX PRODUCTS, INC.** [US/US]; 300 Nyala Farms Road, Westport, CT 06880 (US).

(72) Inventor: **RANDOLPH, Ross, Steven**; 1 Timber Court, Rockaway, NJ 07866 (US).

(74) Agent: **RUGGIERO, Charles, N., J.**; Ohlandt, Greeley, Ruggiero & Perle, L.L.P., One Landmark Square, 10th Floor, Stamford, CT 06901 (US).

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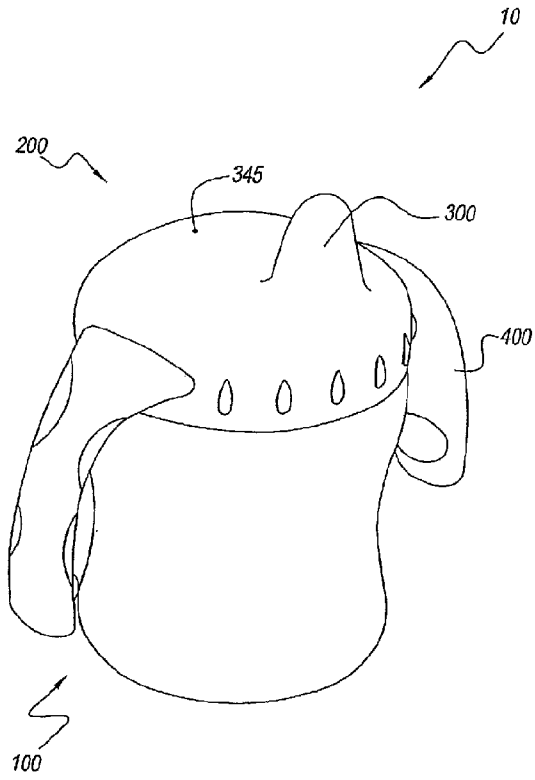

(57) Abstract: A cup (100) is provided in figure 1 having a lid (200) with a spout (300) defined by walls tapered towards a distal end of the spout. The lid has handles (400) extending therefrom that are preferably formed of a first and second material having different Shore A hardnesses to define a rigid portion and a gripping portion.

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CUP ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to cups. More particularly, the present invention relates to infant cup assemblies.

2. Description of the Prior Art

Cups designed especially for use by infants or children are known. Such cups may include orifices that are intended to reduce spillage of fluid from the cup. These cups have drinking orifices and separate air vents, which allow the user to drink from the orifice without creating excessive vacuum in the cup.

However, drinking orifices and air vents are liable to leak liquid stored in the cup between feedings, or if dropped during use. Drinking orifices and the surrounding lid structure through which the orifices are disposed, have a lasting effect on the child's lip placement which can impact the child's ability to feed and swallow.

Certain cups have been developed that use valving mechanisms at the orifice and at the air vent. These valves respond to suction generated during feeding to open and allow liquid to pass through the orifice and to allow air to enter the air vent when a vacuum is developed in the interior of the cup. Patents disclosing such valves include U.S. Patent No. 5,079,013 to Belanger, U.S. Patent No. 6,422,415 to Manganiello, U.S. Patent No. 6,050,445 to Manganiello and U.S. Patent No. RE 37,016 to Morano, which are commonly assigned or licensed to the assignee of the present application. Applicant hereby incorporates the disclosure of these patents by reference.

Other cups designed for use by infants or children are intended to facilitate the gripping of the cup by the infant. Contemporary devices often employ gripping structures that are formed on the surface of the bottle.

A baby bottle with an outer surface that has been adapted to provide handles intended to allow infants and children to better grip the bottle, is disclosed in U.S. Patent 5,215,203 to Malcolm. The bottle has at least two sets of handles that are formed integrally with the bottle by a plurality of recesses extending vertically along a substantial length of the bottle. The recesses have either side walls that converge towards each other as they extend towards a central longitudinal axis of the bottle or side walls that are parallel to each other. The lobe shaped handles resulting from the converging side walls and the rectangular shaped handles resulting from the parallel side walls, allow an infant or child to partially grasp or hold the handles. The disclosed bottles provide limited assistance to infants or children because they do not allow for a complete or nearly complete closure of the infants hands around the handles.

A reference herein to a patent document or other matter which is given as prior art is not to be taken as an admission that that document or matter was, in Australia, known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

Accordingly, there is a need for cups having lids and orifices that facilitate use by children, including promoting proper lip closure around the orifice. There is a further need for cups having handles, which facilitate gripping and grasping by infants, and motivate infants to use such handles. There is also a need for handles on cups having sufficient strength to withstand use by children.

SUMMARY OF THE INVENTION

It is a desired outcomeof the present invention to provide a cup assembly that reduces or eliminates leakage and spillage.

It is another desired outcome of the present invention to provide such a cup assembly that facilitates use of the spout.

It is yet another desired outcome of the present invention to provide such a cup assembly that facilitates generation of a suction force and promotes improved flow-rate through the orifice.

It is still another desired outcome of the present invention to provide such a cup that promotes proper lip closure.

It is a further desired outcome of the present invention to provide such a cup assembly that promotes better lip approximation.

It is another further desired outcome of the present invention to provide such a cup assembly that assists infants and children in holding the cup assembly.

It is yet a further desired outcome of the present invention to provide such a cup assembly that promotes better hand-to-mouth coordination.

It is still a further desired outcome of the present invention to provide such a cup assembly that promotes independent cup drinking in the child.

These and other desired outcomes and advantages of the present invention are provided by a lid for a cup comprising a lid body removably securable to the cup and a spout having an orifice, a front wall and a rear wall. The spout is secured to the lid body, and the front and rear walls are convex defining a substantially ellipsoidal shape. The front wall has a first radius of curvature, the rear wall has a second radius of curvature, and the first and second radii of curvature are equal. The first and second radii of curvature are between about 3.0 inches to about 7.0 inches.

In another aspect of the invention, a lid for a cup is provided which comprises a lid body removably securable to the cup, a spout having distal and proximal ends, and an orifice. The spout is secured to the lid body. The spout has a distal cross-sectional area A_1 at the distal end and a proximal cross-sectional area A_2 at the proximal end. The spout also has a height h. The spout has a rate of change of cross-sectional area equal to $(A_2-A_1)/h$ of between about 0.1 to about 1.0.

In another aspect of the invention, a cup assembly is provided which comprises a cup defining an inner volume; a lid threadingly securable to the cup; and a spout having distal and proximal ends, an orifice, top, front and rear walls, and first and second side walls. The spout is secured to the lid. The orifice is disposed through the top wall and is in fluid communication with the inner volume when the lid is secured to the cup. The top wall has an upwardly arcuate shape. The front wall has an outwardly convex shape and is inwardly tapered toward the distal end. The rear wall is inwardly tapered

toward the distal end. The first side wall is inwardly tapered toward the distal end at a first taper angle. The second side wall is inwardly tapered toward the distal end at a second taper angle. The first taper angle equals the second taper angle.

In another aspect of the invention, a cup assembly is provided which comprises a cup defining an inner volume; a lid removably securable to the cup; and a spout having distal and proximal ends, an orifice, a front wall and a rear wall. The spout is secured to the lid and the orifice is in fluid communication with the inner volume. The front wall is inwardly tapered toward the distal end at a first taper angle of between about 5° to about 15°, and the rear wall is inwardly tapered toward the distal end at a second taper angle of between about 5° to about 15°.

In another aspect of the invention, a cup assembly is provided which comprises a cup defining an inner volume; a lid removably securable to the cup; and a spout having an orifice and distal and proximal ends. The spout is secured to the lid and the orifice is in fluid communication with the inner volume. The spout has a distal depth d_1 at the distal end, a proximal depth d_2 at the proximal end, and a height h. The spout has a rate of change of depth equal to $(d_2-d_1)/h$ of between about 0.1 to about 0.7.

In another aspect of the invention, a cup assembly is provided which comprises a cup defining an inner volume; a lid removably securable to the cup; and a spout having an orifice and distal and proximal ends. The spout is secured to the lid and the orifice is in fluid communication with the inner volume. The spout has a distal width w_1 at the distal end and a proximal width w_2 at the proximal end. The spout has a height h. The spout has a rate of change of width equal to $(w_2-w_1)/h$ of between about 0.1 to about 0.6.

The spout can have a distal width of between about 0.5 inches to about 0.9 inches, and a distal depth of between about 0.1

inches to about 0.25 inches. The spout can have a proximal width of between about 0.8 inches to about 1.2 inches, and a proximal depth of between about 0.25 inches to about 0.75 inches.

The spout can have the first side wall inwardly tapered toward the distal end at a first taper angle of between about 5° to about 18°, and the second side wall inwardly tapered toward the distal end at a second taper angle of between about 5° to about 18°. The front wall can be inwardly tapered toward the distal end at a third taper angle of between about 5° to about 15°, and the rear wall can be inwardly tapered toward the distal end at a fourth taper angle of between about 5° to about 15°. The spout can have the top wall with an upwardly convex shape with a third radius of curvature between about 0.25 inches to about 0.5 inches. The spout can have a height between about 0.8 inches to about 1.8 inches.

There can also be a flow control valve in fluid communication with the orifice, the vent hole and the inner volume, with the valve limiting flow from the inner volume through the orifice. The spout can have an ellipsoidal cross-sectional area. The spout can have a distal end, and can be inwardly tapered toward the distal end. The spout can have a top wall, with the orifice being disposed through the top wall, and with the top wall having an upwardly dome-like shape.

Other and further desired outcomes, advantages and features of the present invention will be understood by reference to the following.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a front perspective view of a cup assembly of the present invention;

Figure 2 is a rear view of the cup assembly of Figure 1;

Figure 3 is a top view of the cup assembly of Figure 1;

Figure 4 is a front view of the flow control valve for the cup assembly of Figure 1;

Figure 5 is a top perspective view of the cup of Figure 1;

Figure 6 is a front view of the lid of Figure 1;

Figure 7 is a side view of the lid of Figure 1;

Figure 8 is a bottom perspective view of the lid of Figure 1;

Figure 9 is a front perspective view of the lid of Figure 8 without a gripping portion;

Figure 10 is a front view of the lid of Figure 9 without the gripping portion;

Figure 11 is a side view of the lid of Figure 9 without the gripping portion;

Figure 12 is a bottom view of the lid of Figure 9 without the gripping portion;

Figure 13 is a front view of an alternative embodiment of the lid of Figure 8 without a gripping portion;

Figure 14 is a bottom perspective view of another alternative embodiment of the lid of Figure 8 without a gripping portion;

Figure 15 is a front view of a prior art PLAYTEX® conventional lid;

Figure 16 is a side view of the prior art PLAYTEX® conventional lid of Figure 15;

Figure 17 is a top view of the prior art PLAYTEX® conventional lid of Figure 15;

Figure 18 is a front view of a prior art GERBER® conventional lid;

Figure 19 is a side view of the prior art GERBER® conventional lid of Figure 18; and

Figure 20 is a top view of the prior art GERBER® conventional lid of Figure 18.

DESCRIPTION OF THE INVENTION

Referring to the drawings and, in particular, Figs. 1 through 4, there is shown a preferred embodiment of a cup assembly of the present invention,

generally represented by reference numeral 10. Cup assembly 10 has a cup or container 100, a cap or lid 200, a spout 300 extending from the lid, and a valve or flow control element 700 (Fig. 4).

Referring to Fig. 5, cup 100 has a substantially cylindrical shape defining an inner volume 105. Cup 100 has a top portion 110 having an open end 115, a middle portion 140 and a bottom portion 160. Middle portion 140 can have a diameter that is smaller than the diameter of top portion 110 or bottom portion 160 to provide an hour-glass like shape. Alternative shapes can also be used for cup 100, such as, for example, tapered.

Top portion 110 has an outer surface 120 with threads 125 formed thereon. The preferred embodiment has threads 125 for removably engaging lid 200 with cup 100. However, alternative engagement structures or methods can also be used to engage lid 200 with cup 100, such as, for example, a snap fit. Cup 100 is preferably transparent or semi-transparent, which provides for visual indication of the contents and amount within the cup, and also can encourage or promote use by a child through visual stimulation. Cup 100 can also be opaque.

Referring to Figs. 1 through 8, lid 200 has a center member or lid body 210, an annular flange 250, spout 300 (which will be described later in greater detail), an air vent 345 and handles 400. Center member 210 has an upper surface 220 and a lower surface 230. Preferably, center member 210 has a circular shape. More preferably, center member 210 has an upwardly convex or dome-like shape. However, alternative shapes can also be used for center member 210, such as, for example, flat or concave. Annular flange 250 extends downwardly from the outer circumference of center member 210 to provide a sealing or mating surface between lid 200 and cup 100.

Annular flange 250 has an outer surface 260 and an inner surface 270. Outer surface 260 preferably has gripping structures 265 secured thereto. In the preferred embodiment, gripping structures 265 are a number or series of tear-drop shaped projections formed integrally with outer surface 260 of flange

250. Preferably, gripping structures 265 are equi-distantly spaced apart. Alternative shapes, designs and/or patterns for gripping structures 265 can also be used to facilitate removable engagement of lid 200 with cup 100, such as, for example, bubbles or wave-like grooves or ridges. Inner surface 270 has threads 275 secured thereto. Threads 275 mate with threads 125 of cup 100 to removably engage the cup with the lid 200. However, as described above, alternative engagement structures or methods can be used.

Lower surface 230 of center member 210 has a liquid mating surface 235 and a vent mating surface 240. Mating surfaces 235, 240, are preferably adjacent to, or incorporated into, spout 300 and air vent 345, so as to frictionally engage flow control valve 700 and place the valve in fluid communication with the spout and air vent. In the preferred embodiment, mating surfaces 235, 240 are cylindrical channels integrally molded with center member 210 below spout 300 and below air vent 345, respectively. Cylindrical channels 235, 240 have a size and shape to mate with flow control valve 700. Preferably, cylindrical channels 235, 240 have an inner size and shape to engage with flow control valve 700. Lower surface 230 can also have a valve securing member 245, which engages with a corresponding structure on flow control valve 700 to orientate and/or assist in holding the valve in position. In the preferred embodiment, valve securing member 245 is a substantially planar, arcuate member extending orthogonally from lower surface 230 of lid 200.

Flow control element or valve mechanism 700 has first valve portion or stack 730 and second valve portion or stack 732 connected together by substrate 738. Each valve portion 730, 732 has a lower portion 726, an upper portion 728 and valve faces 736 bearing slits. Each valve portion 730, 732 is configured to frictionally engage cylindrical channels 235, 240, respectively, and place flow control valve 700 in fluid communication with spout 300 and air vent 345, respectively.

Flow control element 700 preferably has a concave shaped valve face 736 of valve portions 730 and 732, and, in conjunction with the attendant curved shape of slits, provides superior fluid flow rate through the slit over existing valve configurations. U.S. Patent No. 5,079,013 to Belanger, U.S. Patent No. RE 37,016 to Morano, U.S. Patent No. 6,050,445 to Manganiello and U.S. Patent No. 6,422,415 to Manganiello depict examples of valves that are usable with the present invention. Additionally, alternative flow control mechanisms and valves can also be placed in fluid communication with spout 300 and/or air vent 345 to provide a resistance to flow or an inhibitor to spillage and shakeout, absent a sucking force, including a separate pair of stack valves that individually mate with cylindrical mating surfaces 235, 240.

Handles 400 are preferably a pair of handles that extend curvingly downward from annular flange 250 toward bottom portion 160 of cup 100. Preferably, handles 400 extend substantially down in proximity to bottom portion 160 of cup 100. Handles 400 are preferably diametrically opposed along annular flange 250. Handles 400 have a proximal end 450 where the handle is connected to flange 250, and a distal end 455. Handles 400 have a length and width that allow an infant or child to fully grasp the handles and preferably allow closure of the entire hand around the handles. Handles 400 preferably extend at least half way down cup 100. Handles 400 have a curvature and shape that provides for sufficient space between the handles and cup 100 for the hand of the infant or child when holding the handles. Preferably, handles 400 are separated from cup 100 at distal end 455 a sufficient distance to allow the infant or child's hand to pass between the distal end and the cup. The size, shape and positioning of handles 400 promote better hand-to-mouth coordination for the child or infant.

Handles 400 have a rigid portion 420, a gripping portion 460 and a gripping abutment 480. Gripping portion 460 is an area or portion of handle 400 that is more flexible, resilient and/or softer than rigid portion 420, to facilitate grasping and holding of the handle by the infant or child. In the

preferred embodiment, gripping portion 460 is molded from a different material than rigid portion 420 to provide for the difference in flexibility, resiliency and softness. The different materials have different levels of hardness or Shore A Hardness. Preferably, rigid portion 420 and the remaining parts of lid 200, i.e., center member 210, annular flange 250 and spout 300, are made of the same material and more preferably are integrally molded with each other.

Rigid portion 420 is preferably molded from a rigid material, such as, for example, a polypropylene. Preferably, gripping portion 460 is molded from a flexible, resilient and/or softer material, such as, for example, a thermoplastic elastomer (TPE). The TPE of gripping portion 460 preferably has a lower hardness or Shore A Hardness than the hardness or Shore A Hardness of rigid portion 420. While the preferred embodiment has rigid portion 420 made of a first material and gripping portion 460 made of a second material, the present disclosure contemplates more than two materials, such as, for example, the rigid portion being a plurality of materials and/or the gripping portion being a plurality of materials.

Handle 400 has an upper or over-surface 402 and a lower or under-surface 404. Gripping portion 460 is preferably formed along under-surface 404 and substantially covers the under-surface. More preferably, gripping portion 460 substantially covers under-surface 404 and wraps around sides 405 of handles 400 to partially cover the over-surface 402. In the preferred embodiment, gripping portion 460 partially wraps around over-surface 402 and has ends 406, 407 with a wave-like shape, which facilitates grasping of the handles 400. The wave-like shape of ends 406, 407 further accommodates varying sizes of hands and varying positioning of hands on handles 400. Gripping abutment 480 is formed along the under-surface 404 of handle 400 near distal end 455 and further facilitates grasping of the handle. Preferably, gripping abutment 480 is a circular or semi-spherical projection.

Gripping portion 460 provides an infant or child with a different texture or feel, as compared to rigid portion 420. This provides textural stimulus for the use of handles 400. Preferably, gripping portion 460 has a different color than the color of rigid portion 420 to provide a visual stimulus for the use of handles 400. Other visual and textural stimuli can also be further provided on handles 400 to further motivate the child to utilize the handles, such as, for example, decorations or embossments. In the preferred embodiment, rigid portion 420 and gripping portion 460 are opaque. However, either or both of rigid portion 420 and gripping portion 460 can be transparent or semi-transparent. The transparency or semi-transparency of lid 100 provides for visual indication of the contents and amount within the cup, and also can encourage or promote use by a child through visual stimulation.

Referring to Figs. 6 through 12, preferably a first material is molded, and more preferably injection molded, to form rigid portion 420 of handles 400, as well as center member 210, annular flange 250 and spout 300 of lid 200. To provide for a flow path for a second material which is more flexible, resilient and/or softer (with a lower hardness or Shore A Hardness) and to facilitate bonding of the first material of rigid portion 420 with the second material, the rigid portion preferably has an outer or first wall 425, an inner or second wall 430 and a center or third wall 435.

Outer wall 425 and inner wall 430 are substantially equidistantly spaced apart and connected by center wall 435. Preferably, center wall 435 is substantially perpendicular or orthogonal to outer and inner walls 425, 430 to define a generally U-shaped channel 440. Channels 440 are preferably formed by outer, inner and center walls 425, 430, 435 along opposing sides of rigid portion 420. The molding process for lid 200 and handles 400 is preferably a two-shot injection molding technique using a first material, such as polypropylene, for rigid portion 420, and a second material, such as TPE, for gripping portion 460.

Preferably, there is at least one rib 445 formed in channel 440. More preferably, there are two ribs 445 in each channel 440. Ribs 445 provide additional strength and integrity to handles 400. Ribs 445 are preferably formed in channels 440 in proximity to proximal end 450 of handles 400. Preferably, ribs 445 are generally parallel to outer and inner walls 425, 430 and have a shape or curvature that is similar to the shape or curvature of channel 440. The shape, size and positioning of ribs 445 preferably reduce flow resistance and further facilitate flow of the second material into and along or through the channel 440. Ribs 445 increase the surface contact area between the first and second materials, and improve the bonding between the first and second materials of rigid portion 420 and gripping portion 460.

In the preferred embodiment, outer wall 425 of rigid portion 420 has a wave-like shape so that gripping portion 460 has a corresponding wave-like shape along handles 400. To form gripping abutment 480, a semi-circular projection 485 is formed in center wall 435 along distal end 455 of the rigid portion 420. The second material is molded over the projection 485 to form gripping abutment 480. Rigid portion 420 has an end wall 490 formed in distal end 455, which provides further rigidity to handle 400, improves the bonding between the rigid portion and the gripping portion 460, and provides a terminus for the flow of the second material of the gripping portion. Preferably, end wall 490 is substantially perpendicular to outer and center walls 425, 435.

In the preferred embodiment, inner wall 430 extends only partially along handle 400. However, alternatively, inner wall 430 can fully extend along handle 400. Also, in the preferred embodiment, channels 440 are disposed on opposing sides of rigid portion 420 and run partially along the rigid portion. However, the present disclosure contemplates any number of channels 400, which may be disposed in various orientations and positions along rigid portion 420.

Referring to Figs. 13 and 14, alternative embodiments of lid 200 with rigid portions 1320, 1420, respectively, are shown. Features of Figs. 13 and 14 similar to the features of the preferred embodiment of Figs. 1 through 12, have the same reference numerals. The rigid portion 1320 of Fig. 13 has channel 440 formed by outer, inner and center walls 425, 430, 435. But the channels 440 do not have ribs disposed at proximal end 450, compared to the preferred embodiment shown in Figs. 9 through 12.

The rigid portion 1420 of Fig. 14 has outer wall 425 formed orthogonally with a center wall 1435. But rigid portion 1420 does not have an inner wall secured to center wall 1435 and does not form a channel along rigid portion 1420, such as in the preferred embodiment. Rigid portion 1420 also does not have an end wall at distal end 455, such as in the preferred embodiment. Rigid portion 1420 has a number or series of apertures or holes 1450 formed through center wall 1435. In contrast, the center wall 435 of rigid portion 420 of the preferred embodiment, does not have apertures, and provides a generally planar solid bottom surface of channel 440 along the flow path of the second material of gripping portion 460. Apertures 1450 of rigid portion 1420 create orthogonal contact surfaces along center wall 1435 between the rigid portion and the gripping portion 460, and the second material of the gripping portion flows through the apertures.

In the preferred embodiment, handles 400 are a pair of handles integrally formed on opposing sides of lid 200 with a space provided at distal ends 455 of the handles. However, it is contemplated by the present disclosure for alternative numbers and positions of handles 400 to be used. It is further contemplated by the present disclosure for handles 400 to be integrally formed with cup 100 at bottom portion 160 of the cup to provide a separation or space from the cup in proximity to lid 100 or for the handles to be integrally formed with the cup at both the top and bottom portions 110, 160. It is also contemplated by the present disclosure for handles 400 to be a separate structure that is secured to cup 100 and/or lid 200, and/or removably

secured, such as, for example, a handle ring having handles 400 extending therefrom. It is also contemplated by the present disclosure that gripping portion 460 is formed with, or secured to, rigid portion 420 in other ways, such as, for example, friction fit or adhesive.

During the molding process, an unexpected and significant result occurred with the use of ribs 445 disposed in channels 440, as compared to rigid portions 1320, and 1420 that did not have ribs. It was discovered that ribs 445 prevented sink marks from developing in gripping portion 460 when the second material was molded into and through channels 440. In rigid portions 1320, 1420, sink marks developed in the area of proximal end 450, which distorted the intended shape of gripping portion 460 and had a significant negative impact on the strength and integrity of handles 400.

Additionally, during the molding process, an unexpected and significant result occurred with the use of channels 440 and the generally planar bottom surface (center wall 435) along the flow path of the second material of gripping portion 460, as compared to rigid portion 1420, which has apertures 1450 formed through center wall 1435. It was discovered that channels 440 and the generally planar solid bottom surface of center wall 435 significantly improved the flow of the second material through channels 440, resulting in an improved bond between the rigid and gripping portions 420, 460, and further provided for a smoother outer surface of the gripping portion.

Referring to Figs. 3 and 6 through 12, spout 300 has a front wall 310, a rear wall 320, a first side wall 330, a second side wall 340 and a top wall 350. Top wall 350 has a number of holes 360 formed therethrough. Front wall 310, rear wall 320, first and second side walls 330, 340 and top wall 350 are integrally molded, and define a spout volume 305 that is in fluid communication with inner volume 105 of cup 100 (through flow control valve 700) and with holes 360. In this embodiment, two holes 360 are shown but other numbers of holes can also be used.

Top wall 350 has an upwardly convex or arcuate shape and forms chamfered edges with front and rear walls 310, 320 and first and second side walls 330, 340. Top wall 350 has a radius of curvature r_1. Preferably, radius of curvature r_1 is from about 0.25 inches to about 0.5 inches, more preferably from about 0.35 inches to about 0.40 inches, and most preferably about 0.38 inches.

Front wall 310 has an outwardly convex shape with a radius of curvature r_2. Rear wall 320 has an outwardly convex shape, in the opposite direction of front wall 310, with a radius of curvature r_3. Preferably, radius of curvature r_2 is from about 3.0 inches to about 7.0 inches, more preferably from about 4.0 inches to about 6.0 inches, and most preferably about 5.0 inches. Preferably, radius of curvature r_3 is from about 3.0 inches to about 7.0 inches, more preferably from about 4.0 inches to about 6.0 inches, and most preferably about 5.0 inches. Preferably, radius of curvature r_2 and radius of curvature r_3 are equal. The periphery of front wall 310 and the periphery of rear wall 320 have arcuate shapes and are preferably aligned so that first sidewall 330 and second sidewall 340 are essentially chamfered edges of spout 300. Preferably, front and rear walls 310, 320 define an ellipsoidal cross-sectional shape for spout 300.

Spout 300 has a distal end 370, a proximal end 380 and a height h_1. Distal end 370 of spout 300 has a width w_1 and a depth d_1. Proximal end 380 of spout 300 has a width w_2 and a depth d_2. Preferably, height h_1 is from about 0.80 inches to about 1.80 inches, more preferably from about 1.0 inches to about 1.40 inches, and most preferably about 1.20 inches. Preferably, width w_1 is from about 0.50 inches to about 0.90 inches, more preferably from about 0.60 inches to about 0.70 inches, and most preferably about 0.69 inches. Preferably, width w_2 is from about 0.80 inches to about 1.20 inches, more preferably from about 0.90 inches to about 1.10 inches, and most preferably about 0.97 inches. Preferably, depth d_1 is from about 0.10 inches to about 0.25 inches, more preferably from about 0.15 inches to

about 0.22 inches, and most preferably about 0.20 inches. Preferably, depth d_2 is from about 0.25 inches to about 0.75 inches, more preferably from about 0.40 inches to about 0.60 inches, and most preferably about 0.56 inches.

Front and rear walls 310, 320 are inwardly tapered toward distal end 370. Preferably, front and rear walls 310, 320 are inwardly tapered along a substantially straight line or constant slope. Front wall 310 has an angle of taper α_1. Rear wall 320 has an angle of taper α_2. Preferably, taper angle α_1 is from about 5° to about 15°, more preferably from about 10° to about 14°, and most preferably about 13.5°. Preferably, taper angle α_2 is from about 5° to about 15°, more preferably from about 10° to about 14°, and most preferably about 13.5°. Taper angle α_1 and taper angle α_2 are preferably equal.

First and second side walls 330, 340 are inwardly tapered toward distal end 370. Preferably, first and second side walls 330, 340 are inwardly tapered along a straight line or constant slope. First side wall 330 has an angle of taper β_1. Second side wall 340 has an angle of taper β_2. Preferably, taper angle β_1 is from about 5° to about 18°, more preferably from about 10° to about 15°, and most preferably about 12°. Preferably, taper angle β_2 is from about 5° to about 18°, more preferably from about 10° to about 15°, and most preferably about 12°. Taper angle β_1 and taper angle β_2 are preferably equal.

During consumer testing of cup assembly 10, unexpected and significant results occurred from the use of spout 300, as compared to the contemporary spout designs for the PLAYTEX® and GERBER® spouts shown in Figs. 15 through 20. It was discovered that spout 300 performed significantly better with marked improvement in consumer preference and ease of use by infants, compared to both the PLAYTEX® and GERBER® spouts.

The testing included infants between the ages of six (6) months and eighteen (18) months who were provided separate cups having spout 300, the

PLAYTEX® spout and the GERBER® spout, for equal periods of times. Consumer preference was tested and the use of the cups and spouts was observed by the parent(s), including the ease with which the infants were able to use the cups and spouts, and the generation of preferred flow rates.

Spout 300 rated higher than the PLAYTEX® and GERBER® spouts at %80 confidence for being easier for the infant to use. Spout 300 rated higher than the PLAYTEX® spout at %80 confidence for preference of the flow-rate achieved by the infant. Cup assembly 10 rated higher than the PLAYTEX® spout at %95 confidence for ease of drinking. These results are of statistical and practical significance.

The embodiment of spout 300 tested had a change in widths w_1, w_2 of 0.97 inches – 0.69 inches = 0.28 inches over a height h_1 of 1.20 inches, resulting in a rate of change of spout width of 0.23. In contrast, the PLAYTEX® spout had a change in widths of 1.30 inches – 0.75 inches = 0.55 inches over a height of 0.875 inches, resulting in a rate of change of spout width of 0.62. The GERBER® spout had a change in widths of 1.30 inches – 0.75 inches = 0.55 inches over a height of 0.90 inches, resulting in a rate of change of spout width of 0.61.

It was discovered based on the consumer data that the parameter of rate of change of spout width, and, in particular, a lower rate of change of widths w_1, w_2 from distal end 370 to proximal end 380 of 0.23, as compared to the rate of change for the PLAYTEX® and GERBER® spouts of 0.62 and 0.61, respectively, was a contributing cause in facilitating the use of spout 300 by the infant. In particular, the lower rate of change of widths w_1, w_2 of spout 300 promoted lip closure by the infant and facilitated generation of a suction force for achieving a preferred flow-rate.

Based on the consumer data, it was determined that the rate of change of spout widths w_1, w_2 should preferably be between about 0.10 to about 0.60, more preferably between about 0.20 to about 0.30, and most preferably be about 0.23.

Additionally, it was further discovered from the consumer data that the arcuate shape of top wall 350 with chamfered edges along the transition areas between the top wall and the front and rear walls 310, 320 and first and second side walls 330, 340, further facilitated the movement of the infant's lips along spout 300, for proper lip approximation resulting in further promotion of lip closure. In contrast, the PLAYTEX® and GERBER® spouts had substantially flat top walls with sharper edges along the transition areas between the top wall and the adjoining walls.

The embodiment of spout 300 tested had a change in depths d_1, d_2 of 0.56 inches – 0.20 inches = 0.36 inches over a height h_1 of 1.20 inches, resulting in a rate of change of spout depth of 0.30. In contrast, the PLAYTEX® spout had a change in depths of 1.00 inches – 0.30 inches = 0.70 inches over a height of 0.875 inches, resulting in a rate of change of spout depth of 0.80. The GERBER® spout had a change in depths of 0.90 inches – 0.25 inches = 0.65 inches over a height of 0.90 inches, resulting in a rate of change of spout depth of 0.72.

It was discovered from the consumer data that the parameter of rate of change of spout depth, and, in particular, a lower rate of change of depths d_1, d_2 from distal end 370 to proximal end 380 of 0.30, as compared to the rate of change for the PLAYTEX® and GERBER® spouts of 0.80 and 0.72, respectively, was a contributing cause in facilitating the use of spout 300 by an infant. In particular, the lower rate of change of depths d_1, d_2 of spout 300 promoted lip closure by the infant and facilitated generation of a suction force for achieving a preferred flow-rate.

Based on the consumer data, it was determined that the rate of change of spout depths d_1, d_2 should preferably be between about 0.10 to about 0.70, more preferably between about 0.25 to about 0.50, and most preferably be about 0.30.

Also, it was discovered from the above unexpected and significant results that the parameter of rate of change of spout cross-sectional area,

and, in particular, a lower rate of change of cross-sectional area of spout 300, promoted lip closure by the infant, which facilitated generation of a suction force for achieving a preferred flow-rate. The embodiment of spout 300 tested had an ellipsoidal cross-sectional shape. The area A_1 for an ellipse is equal to Π^*a^*b, where a is the radius of the major axis and b is the radius of the minor axis.

Spout 300 has a cross-sectional area A_1 at distal end 370 of about $\Pi^*(w_1/2)^*(d_1/2)$. Spout 300 has a cross-sectional area A_2 at proximal end 380 of about $\Pi^*(w_2/2)^*(d_2/2)$. The rate of change of cross-sectional areas A_1, A_2 of spout 300 is $(\Pi^*(w_1/2)^*(d_1/2) - \Pi^*(w_2/2)^*(d_2/2))/h_1 = 0.27$. In contrast, the PLAYTEX® spout had spout cross-sectional areas of about 0.75 inches * 0.30 inches = 0.225 sq. inches at the distal end, and about 1.30 inches * 1.00 inches = 1.30 sq. inches at the proximal end. Over a height of 0.875 inches, the PLAYTEX® spout had a rate of change in spout cross-sectional area of about 1.229. The GERBER® spout had spout cross-sectional areas of about 0.750 inches * 0.250 inches = 0.1875 sq. inches at the distal end, and 1.300 inches * 0.900 inches = 1.170 sq. inches at the proximal end. Over a height of 0.900 inches, the GERBER® spout had a rate of change in spout cross-sectional area of about 1.092.

It was discovered from the consumer data that the lower rate of change of spout cross-sectional areas A_1, A_2 from distal end 370 to proximal end 380 of 0.27, as compared to the rate of change of spout cross-sectional areas for the PLAYTEX® and GERBER® spouts of 1.229 and 1.092, respectively, was a contributing cause in facilitating the use of spout 300 by an infant.

Based on the consumer data, it was determined that the rate of change of spout cross-sectional areas A_1, A_2 should preferably be between about 0.10 to about 1.0, more preferably between about 0.20 to about 0.50, and most preferably be about 0.27.

The embodiment of spout 300 tested had taper angles α_1, α_2 for front and rear walls 310, 320 of about 13.5° each, compared to corresponding

overall taper angles for the PLAYTEX® spout of about 18° and 34°, and for the GERBER® spout of about 16° and 24°. It was discovered based on the consumer data that the parameter of spout taper angles and, in particular, the smaller taper angles α_1, α_2 for front and rear walls 310, 320, was a contributing cause in facilitating the use of spout 300 by an infant, promoting lip closure, and facilitating generation of a suction force for achieving the preferred flow-rate. The smaller taper angles α_1, α_2 for front and rear walls 310, 320 further facilitated the movement of the infant's lips along spout 300 for proper lip approximation resulting in further promotion of lip closure. It was further discovered that the use of a constant slope for taper angles α_1, α_2 for front and rear walls 310, 320, also facilitated the use of spout 300 by an infant.

Based on the consumer data, it was determined that the taper angles α_1, α_2 should preferably be between about 5° to about 15°, more preferably between about 10° to about 14°, and most preferably be about 13.5°.

The embodiment of spout 300 tested had taper angles β_1, β_2 for first and second side walls 330, 340 of about 12° each, compared to corresponding overall taper angles for the PLAYTEX® spout of about 12° and 12°, and for the GERBER® spout of about 20° and 20°. It was discovered from the consumer data that the parameter of side spout taper angles, and, in particular, smaller taper angles β_1, β_2 for first and second side walls 330, 340 was a contributing cause in facilitating the use of spout 300 by an infant, promoting lip closure, facilitating generation of a suction force for achieving the preferred flow-rate, and further facilitating the movement of the infant's lips along spout 300 for proper lip approximation resulting in further promotion of lip closure. It was further discovered that the use of a constant slope for taper angles β_1, β_2 for first and second side walls 330, 340, also facilitated the use of spout 300 by an infant.

Based on the consumer data, it was determined that the taper angles β_1, β_2 should preferably be between about 5° to about 18°, more preferably between about 10° to about 15°, and most preferably be about 12°.

The embodiment of spout 300 tested had front and rear walls 310, 320 that were outwardly convex to form an ellipsoidal cross-sectional shape, compared to the PLAYTEX® and GERBER® spouts which had rear walls that were concave. Additionally, front and rear walls 310, 320 had radii of curvature r_2, r_3 of 5.0 inches. It was discovered from the consumer data that the parameters of the shape of the front and rear walls 310, 320 and the radii of curvature r_2, r_3 of the front and rear walls, were contributing causes in facilitating the use of spout 300 by an infant, promoting lip closure, and facilitating generating a suction force for achieving the preferred flow-rate.

Based on the consumer data, it was determined that the radii of curvature r_2, r_3 should preferably be between about 3.0 to about 7.0, more preferably between about 4.0 to about 6.0, and most preferably be about 5.0 inches.

The shape of spout 300, including top wall 350 being arcuate; front wall 310 being outwardly convex and inwardly tapered; rear wall 320 being inwardly tapered; and first and second side walls 330, 340 being inwardly tapered at substantially equal angles providing symmetry to the spout, was determined to promote better lip approximation and lip closure for reducing liquid loss. The shape of spout 300 provides for better transitioning between bottle-feeding and cup drinking. Earlier promotion of lip closure in a child's life through the use of spout 300, assists in developing the necessary lip closure for stripping boluses from a spoon and maintaining lip closure for chewing. It was discovered based on the consumer data that various combinations of the above-described parameters were contributing factors in facilitating the use of spout 300 by an infant, promoting lip closure, and facilitating generation of a suction force for achieving the preferred flow-rate.

The present invention having been thus described with particular reference to the preferred forms thereof, it will be obvious that various changes and modifications may be made therein without departing from the spirit and scope of the present invention as defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A lid for a cup including:

a lid body removably securable to said cup; and

a spout having an orifice, a front wall and a rear wall, said spout being secured to said lid body,

wherein said front and rear walls are convex defining a substantially ellipsoidal shape,

wherein said front wall has a first radius of curvature,

wherein said rear wall has a second radius of curvature,

wherein said first and second radii of curvature are substantially equal, and 2. The lid of claim 1, wherein said first and second radii of curvature are about 5.0 inches.

3. The lid of any one of the preceding claims, wherein said spout has a distal end and a proximal end, wherein said distal end has a distal width of between about 0.5 inches to about 0.9 inches and a distal depth of between about 0.1 inches to about 0.25 inches, and wherein said proximal end has a proximal width of between about 0.8 inches to about 1.2 inches and a proximal depth of between about 0.25 inches to about 0.75 inches.

4. The lid of claim 3, wherein said distal width is about 0.69 inches and said distal depth is about 0.20 inches, and wherein said proximal width is about 0.97 inches and said proximal depth is about 0.56 inches.

5. The lid of any one of the preceding claims, wherein said spout has first and second side walls, wherein said first side wall is inwardly tapered toward said distal end at a first taper angle of between about 5° to about 18°, and wherein said second side wall is inwardly tapered toward said distal end at a second taper angle of between about 5° to about 18°.

6. The lid of claim 5, wherein said first taper angle is about 12° and said second taper angle is about 12°.

7. The lid of any one of the preceding claims, wherein said front wall is inwardly tapered toward said distal end at a third taper angle of between about 5° to about15°, and wherein said rear wall is inwardly tapered toward said distal end at a fourth taper angle of between about 5° to about 15°.

8. The lid of claim 7, wherein said third taper angle is about 13.5° and said fourth taper angle is about 13.5°.

9. The lid of any one of the preceding claims, wherein said spout has a top wall with an upwardly convex shape, and wherein said top wall has a third radius of curvature between about 0.25 inches to about 0.5 inches.

10. The lid of claim 9, wherein said third radius of curvature is about 0.38 inches.

11. The lid of any one of the preceding claims, wherein said spout has a height between about 0.8 inches to about 1.8 inches.

12. The lid of claim 11, wherein said height is about 1.20 inches.

13. A lid for a cup including:

a lid body removably securable to said cup; and

a spout having distal and proximal ends and an orifice, said spout being secured to said lid body,

wherein said spout has a distal cross-sectional area A_1 at said distal end,

wherein said spout has a proximal cross-sectional area A_2 at said proximal end,

wherein said spout has a height h, and

wherein said spout has a rate of change of cross-sectional area equal to $(A_2-A_1)/h$ of between about 0.1 to about 1.0.

14. The lid of claim 13, wherein said rate of change of cross-sectional area is about 0.27.

15. The lid of any one of claims 13-14, wherein said spout further comprises a front wall and a rear wall, and wherein said front and rear walls are convex.

16. The lid of claim 15, wherein said front wall has a first radius of curvature, wherein said rear wall has a second radius of curvature, and wherein said first and second radii of curvature are substantially equal.

17. The lid of claim 16, wherein said first and second radii of curvature are between about 3.0 to about 7.0.

18. The lid of claim 17, wherein said first and second radii of curvature are about 5.0 inches.

19. The lid of any one of claims 13-18, wherein said distal end has a distal width of between about 0.5 inches to about 0.9 inches and a distal depth of between about 0.1 inches to about 0.25 inches, and wherein said proximal end has a proximal width of between about 0.8 inches to about 1.2 inches and a proximal depth of between about 0.25 inches to about 0.75 inches.

20. The lid of claim 19, wherein said distal width is about 0.69 inches and said distal depth is about 0.20 inches, and wherein said proximal width is about 0.97 inches and said proximal depth is about 0.56 inches.

21. The lid of any one of claims 13-20, wherein said spout further includes first and second side walls, wherein said first side wall is inwardly tapered toward said distal end at a first taper angle of between about 5° to about 18°, and wherein said second side wall is inwardly tapered toward said distal end at a second taper angle of between about 5° to about 18°.

22. The lid of claim 21, wherein said first taper angle is about 12° and said second taper angle is about 12°.

23. The lid of any one of claims 13-22, wherein said spout further includes front and rear walls, wherein said front wall is inwardly tapered toward said

distal end at a third taper angle of between about 5° to about 15°, and wherein said rear wall is inwardly tapered toward said distal end at a fourth taper angle of between about 5° to about 15°.

24. The lid of claim 23, wherein said third taper angle is about 13.5° and said fourth taper angle is about 13.5°.

25. The lid of any one of claims 13-24, wherein said spout has a top wall with an upwardly convex shape, and wherein said top wall has a third radius of curvature between about 0.25 inches to about 0.5 inches.

26. The lid of claim 25, wherein said third radius of curvature is about 0.38 inches.

27. The lid of claim 23, wherein said spout has a height between about 0.8 inches to about 1.8 inches.

28. The lid of claim 27, wherein said height is about 1.20 inches.

29. A cup assembly including:

a cup defining an inner volume;

a lid threadingly securable to said cup; and

a spout having distal and proximal ends, an orifice, top, front and rear walls, and first and second side walls, said spout being secured to said lid, said orifice being disposed through said top wall and in fluid communication with said inner volume when said lid is secured to said cup,

wherein said front wall has an outwardly convex shape and is inwardly tapered toward said distal end,

wherein said rear wall is inwardly tapered toward said distal end,

wherein said first side wall is inwardly tapered toward said distal end at a first taper angle,

wherein said second side wall is inwardly tapered toward said distal end at a second taper angle, and

wherein said first taper angle substantially equals said second taper angle.

30. The cup assembly of claim 29, wherein said top wall has an upwardly arcuate shape.

31. The cup assembly of any one of claims 29-30, wherein said rear wall is at least partially outwardly convex.

32. The cup assembly of any one of claims 29-31, wherein said spout further includes chamfered edges disposed between said top wall, said front wall, said rear wall, said first side wall and said second side wall.

33. The cup assembly of any one of claims 29-32, wherein said lid has an upwardly dome-like shape.

34. The cup assembly of any one of claims 29-33, wherein said distal end has a distal width of about 0.69 inches and a distal depth of about 0.20 inches, and wherein said proximal end has a proximal width of about 0.97 inches and a proximal depth of about 0.56 inches.

35. The cup assembly of any one of claims 29-34, wherein said height is about 1.20 inches.

36. The cup assembly of any one of claims 29-35, wherein said lid has a vent hole formed therein, said vent hole being in fluid communication with said inner volume.

37. The cup assembly of claim 36, further comprising a flow control valve in fluid communication with said orifice and said inner volume, wherein said valve limits flow from said inner volume through said orifice.

38. The cup assembly of claim 37, wherein said lid has a lower surface with a first mating member and a second mating member, said first mating member

being disposed under said spout and placing said valve in fluid communication with said orifice, and said second mating member being disposed under said vent hole and placing said valve in fluid communication with said vent hole.

39. A cup assembly including:

a cup defining an inner volume;

a lid removably securable to said cup; and

a spout having distal and proximal ends, an orifice, a front wall and a rear wall, said spout being secured to said lid and said orifice being in fluid communication with said inner volume,

wherein said front wall is inwardly tapered toward said distal end at a first taper angle of between about 5° to about 15°, and wherein said rear wall is inwardly tapered toward said distal end at a second taper angle of between about 5° to about 15°.

40. The cup assembly of claim 39, wherein said first taper angle is about 13.5° and said second taper angle is about 13.5°.

41. The cup assembly of any one of claims 39-40, wherein said spout further includes first and second side walls, wherein said first side wall is inwardly tapered toward said distal end at a third taper angle of between about 5° to about 18°, and wherein said second side wall is inwardly tapered toward said distal end at a fourth taper angle of between about 5° to about 18°.

42. The cup assembly of claim 41, wherein said third taper angle is about 12° and said fourth taper angle is about 12°.

43. The cup assembly of any one of claims 39-42, wherein said distal end has a distal width of between about 0.5 inches to about 0.9 inches and a distal depth of between about 0.1 inches to about 0.25 inches, and wherein said proximal end has a proximal width of between about 0.8 inches to about 1.2 inches and a proximal depth of between about 0.25 inches to about 0.75 inches.

44. The cup assembly of claim 43, wherein said distal width is about 0.69 inches and said distal depth is about 0.20 inches, and wherein said proximal width is about 0.97 inches and said proximal depth is about 0.56 inches.

45. The cup assembly of any one of claims 39-44, wherein said spout has a top wall with an upwardly convex shape, and wherein said top wall has a first radius of curvature between about 0.25 inches to about 0.5 inches.

46. The cup assembly of claim 45, wherein said first radius of curvature is about 0.38 inches.

47. The cup assembly of any one of claims 39-46, wherein said spout has a height between about 0.8 inches to about 1.8 inches.

48. The cup assembly of claim 47, wherein said height is about 1.20 inches.

49. The cup assembly of any one of claims 39-48, wherein said front and rear walls are convex.

50. The cup assembly of claim 49, wherein said front wall has a second radius of curvature, wherein said rear wall has a third radius of curvature, and wherein said second and third radii of curvature are substantially equal.

51. The cup assembly of claim 50, wherein said second and third radii of curvature are between about 3.0 inches to about 7.0 inches.

52. The cup assembly of claim 51, wherein said second and third radii of curvature are about 5.0 inches.

53. The cup assembly of any one of claims 39-52, further comprising a flow control valve in fluid communication with said orifice and said inner volume, wherein said valve limits flow from said inner volume through said orifice.

54. The cup assembly of any one of claims 39-53, further including at least one handle.

55. The cup assembly of claim 54, wherein said handle has a rigid portion and a gripping portion, said rigid portion being formed from a first material, said gripping portion being formed from a second material, and said first and second materials being integrally molded, and wherein said first material has a higher Shore A hardness than said second material.

56. A cup assembly including:

a cup defining an inner volume;

a lid removably securable to said cup; and

a spout having an orifice and distal and proximal ends, said spout being secured to said lid and said orifice being in fluid communication with said inner volume,

wherein said spout has a distal depth d_1 at said distal end and a proximal depth d_2 at said proximal end,

wherein said spout has a height h, and

wherein said spout has a rate of change of depth equal to $(d_2-d_1)/h$ of between about 0.1 to about 0.7.

57. The cup assembly of claim 56, wherein said rate of change of depth is about 0.30.

58. The cup assembly of any one of claims 56-57, wherein said, spout has a distal width w_1 at said distal end and a proximal width w_2 at said proximal end, and wherein said spout has a rate of change of width equal to $(w_2-w_1)/h$ of between about 0.1 to about 0.6.

59. The cup assembly of claim 58, wherein said rate of change of width is about 0.23.

60. The cup assembly of any one of claims 56-59, wherein said spout further includes front and rear walls, wherein said front wall is inwardly tapered toward

said distal end at a first taper angle of between about 5° to about 15°, and wherein said rear wall is inwardly tapered toward said distal end at a second taper angle of between about 5° to about 15°.

61. The cup assembly of claim 60, wherein said first taper angle is about 13.5° and said second taper angle is about 13.5°.

62. The cup assembly of any one of claims 56-61, wherein said spout further includes first and second side walls, wherein said first side wall is inwardly tapered toward said distal end at a third taper angle of between about 5° to about 18°, and wherein said second side wall is inwardly tapered toward said distal end at a fourth taper angle of between about 5° to about 18°.

63. The cup assembly of claim 62, wherein said third taper angle is about 12° and said fourth taper angle is about 12°.

64. The cup assembly of any one of claims 56-63, wherein said distal depth d_1 is between about 0.1 inches to about 0.25 inches and said proximal depth d_2 is between about 0.25 inches to about 0.75 inches.

65. The cup assembly of claim 64, wherein said distal depth d_1 is about 0.20 inches, and wherein said proximal depth d_2 is about 0.56 inches.

66. The cup assembly of claim 58, wherein said distal width w_1 is between about 0.5 inches to about 0.9 inches and said proximal width w_2 is between about 0.8 inches to about 1.2 inches.

67. The cup assembly of claim 66, wherein said distal width w_1 is about 0.69 inches, and wherein said proximal width w_2 is about 0.97 inches.

68. The cup assembly of any one of claims 56-67, wherein said spout has a top wall with an upwardly convex shape, and wherein said top wall has a first radius of curvature between about 0.25 inches to about 0.5 inches.

69. The cup assembly of claim 68, wherein said first radius of curvature is about 0.38 inches.

70. The cup assembly of any one of claims 56-69, wherein said spout has a height between about 0.8 inches to about 1.8 inches.

71. The cup assembly of claim 70, wherein said height is about 1.20 inches.

72. The cup assembly of claim 60, wherein said front and rear walls are convex defining a substantially ellipsoidal shape.

73. The cup assembly of claim 72, wherein said front wall has a second radius of curvature, wherein said rear wall has a third radius of curvature, and wherein said second and third radii of curvature are substantially equal.

74. The cup assembly of claim 73, wherein said second and third radii of curvature are between about 3.0 inches to about 7.0 inches.

75. The cup assembly of claim 74, wherein said second and third radii of curvature are about 5.0 inches.

76. The cup assembly of any one of claims 56-75, further including a flow control valve in fluid communication with said orifice and said inner volume, wherein said valve limits flow from said inner volume through said orifice.

77. The cup assembly of any one of claims 56-76, further including at least one handle.

78. The cup assembly of claim 77, wherein said handle has a rigid portion and a gripping portion, said rigid portion being formed from a first material, said gripping portion being formed from a second material, and said first and second materials being integrally molded, and wherein said first material has a higher Shore A hardness than said second material.

79. A cup assembly including:

a cup defining an inner volume;

a lid removably securable to said cup; and

a spout having an orifice and distal and proximal ends, said spout being secured to said lid and said orifice being in fluid communication with said inner volume,

wherein said spout has a distal width w_1 at said distal end and a proximal width w_2 at said proximal end,

wherein said spout has a height h, and

wherein said spout has a rate of change of width equal to $(w_2-w_1)/h$ of between about 0.1 to about 0.6.

80. The cup assembly of claim 79, wherein said rate of change of width is about 0.23.

81. The cup assembly of any one of claims 79-80, wherein said spout further includes front and rear walls, wherein said front wall is inwardly tapered toward said distal end at a first taper angle of between about 5° to about 15°, and wherein said rear wall is inwardly tapered toward said distal end at a second taper angle of between about 5° to about 15°.

82. The cup assembly of claim 81, wherein said first taper angle is about 13.5° and said second taper angle is about 13.5°.

83. The cup assembly of any one of claims 79-82, wherein said spout further includes first and second side walls, wherein said first side wall is inwardly tapered toward said distal end at a third taper angle of between about 5° to about 18°, and wherein said second side wall is inwardly tapered toward said distal end at a fourth taper angle of between about 5° to about 18°.

84. The cup assembly of claim 83, wherein said third taper angle is about 12° and said fourth taper angle is about 12°.

85. The cup assembly of any one of claims 79-84, wherein said distal width w_1 is between about 0.5 inches to about 0.9 inches and said proximal width w_2 is between about 0.8 inches to about 1.2 inches.

86. The cup assembly of claim 85, wherein said distal width w_1 is about 0.69 inches, and wherein said proximal width w_2 is about 0.97 inches.

87. The cup assembly of any one of claims 79-86, wherein said spout has a top wall with an upwardly convex shape, and wherein said top wall has a first radius of curvature between about 0.25 inches to about 0.5 inches.

88. The cup assembly of claim 87, wherein said first radius of curvature is about 0.38 inches.

89. The cup assembly of any one of claims 79-88, wherein said spout has a height between about 0.8 inches to about 1.8 inches.

90. The cup assembly of claim 89, wherein said height is about 1.20 inches.

91. The cup assembly of claim 81, wherein said front and rear walls are convex defining a substantially ellipsoidal shape.

92. The cup assembly of claim 91, wherein said front wall has a second radius of curvature, wherein said rear wall has a third radius of curvature, and wherein said second and third radii of curvature are substantially equal.

93. The cup assembly of claim 92, wherein said second and third radii of curvature are between about 3.0 inches to about 7.0 inches.

94. The cup assembly of claim 93, wherein said second and third radii of curvature are about 5.0 inches.

95. The cup assembly of any one of claims 79-94, further comprising a flow control valve in fluid communication with said orifice and said inner volume, wherein said valve limits flow from said inner volume through said orifice.

96. The cup assembly of any one of claims 79-95, further comprising at least one handle.

97. The cup assembly of claim 96, wherein said handle has a rigid portion and a gripping portion, said rigid portion being formed from a first material, said gripping portion being formed from a second material, and said first and second materials being integrally molded, and wherein said first material has a higher Shore A hardness than said second material.

98. A lid for a cup, substantially as herein described with reference to any one of the drawings of embodiments of the invention./

99. A cup assembly, substantially as herein described with reference to any one of the drawings of embodiments of the invention.

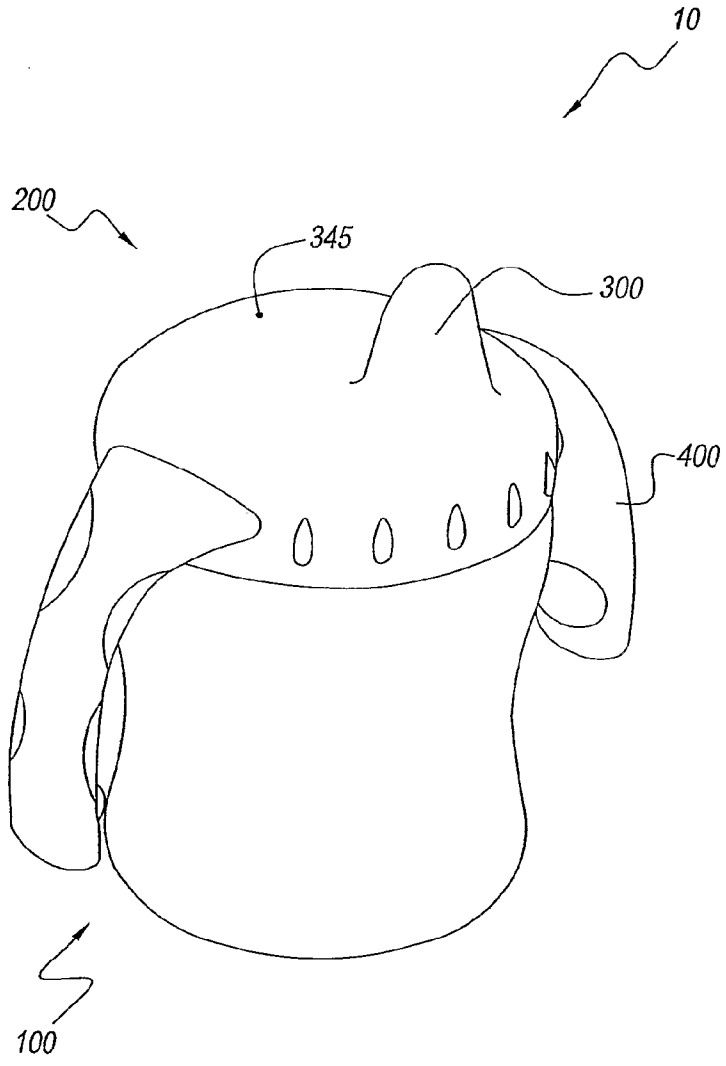
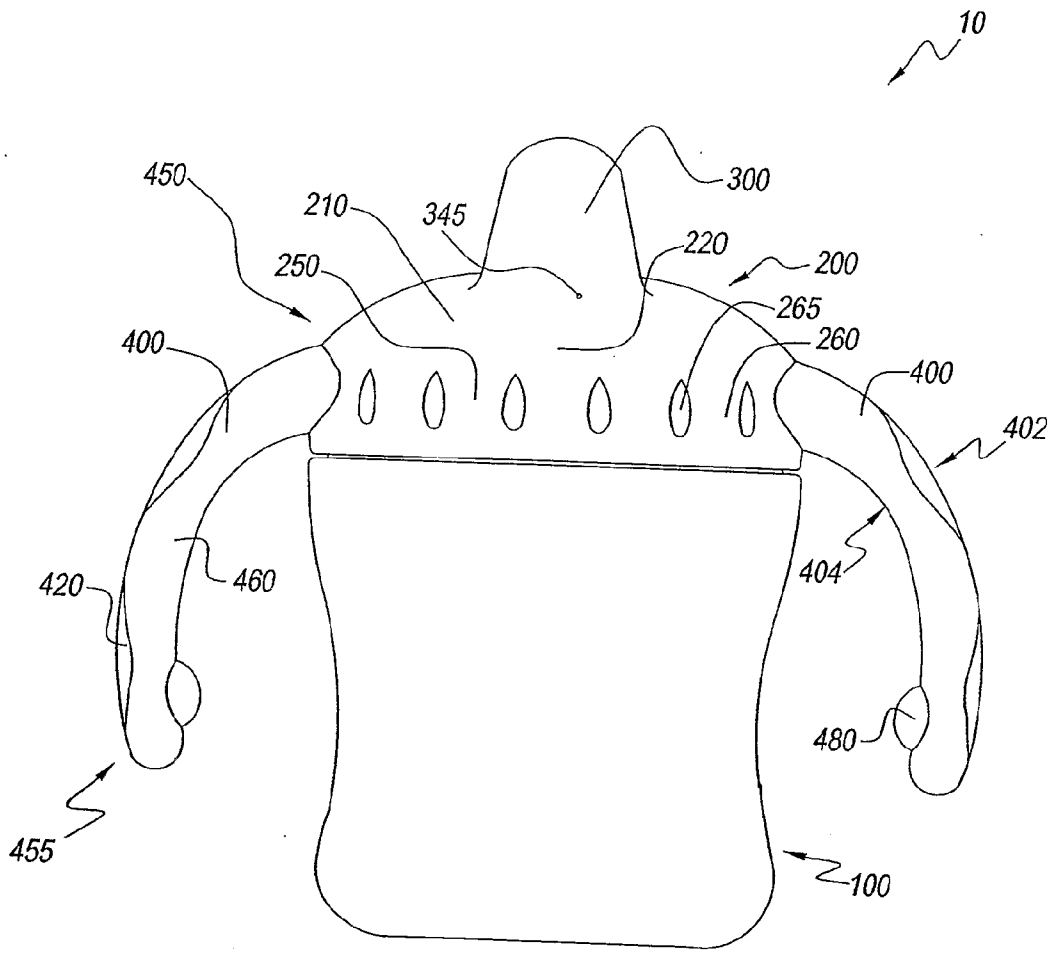


Fig. 1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100

Fig. 2

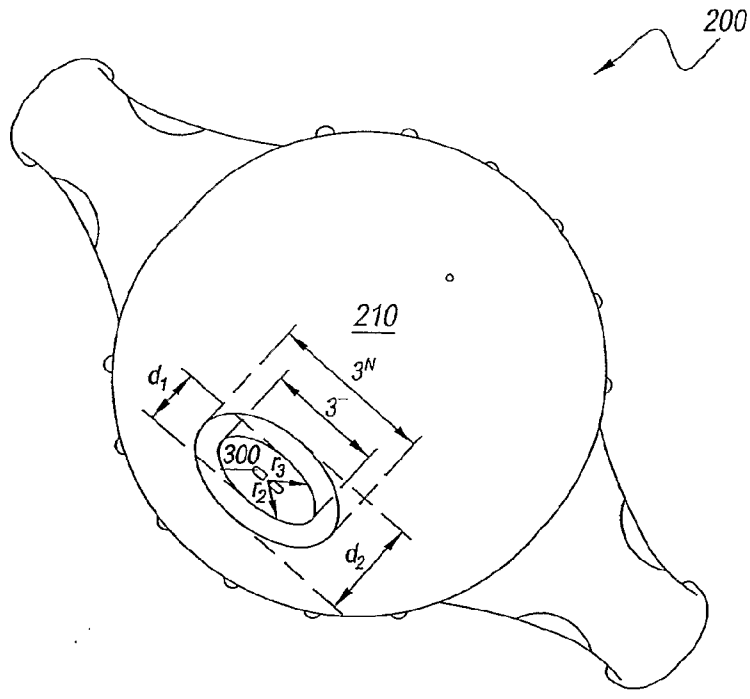

Fig. 3

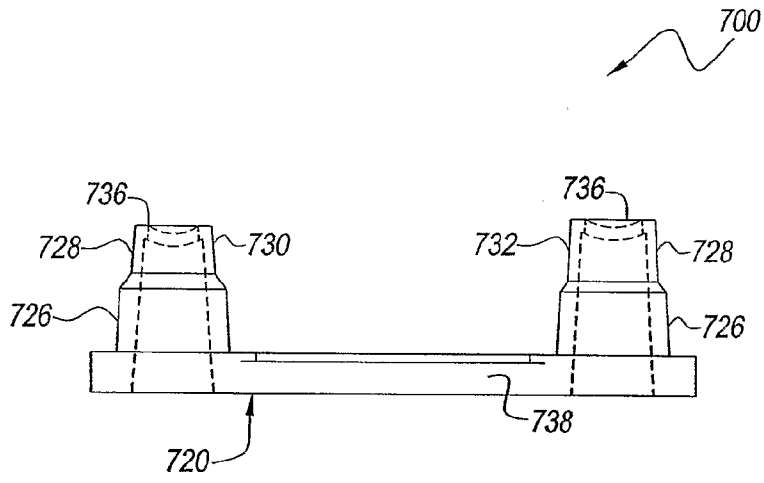

Fig. 4

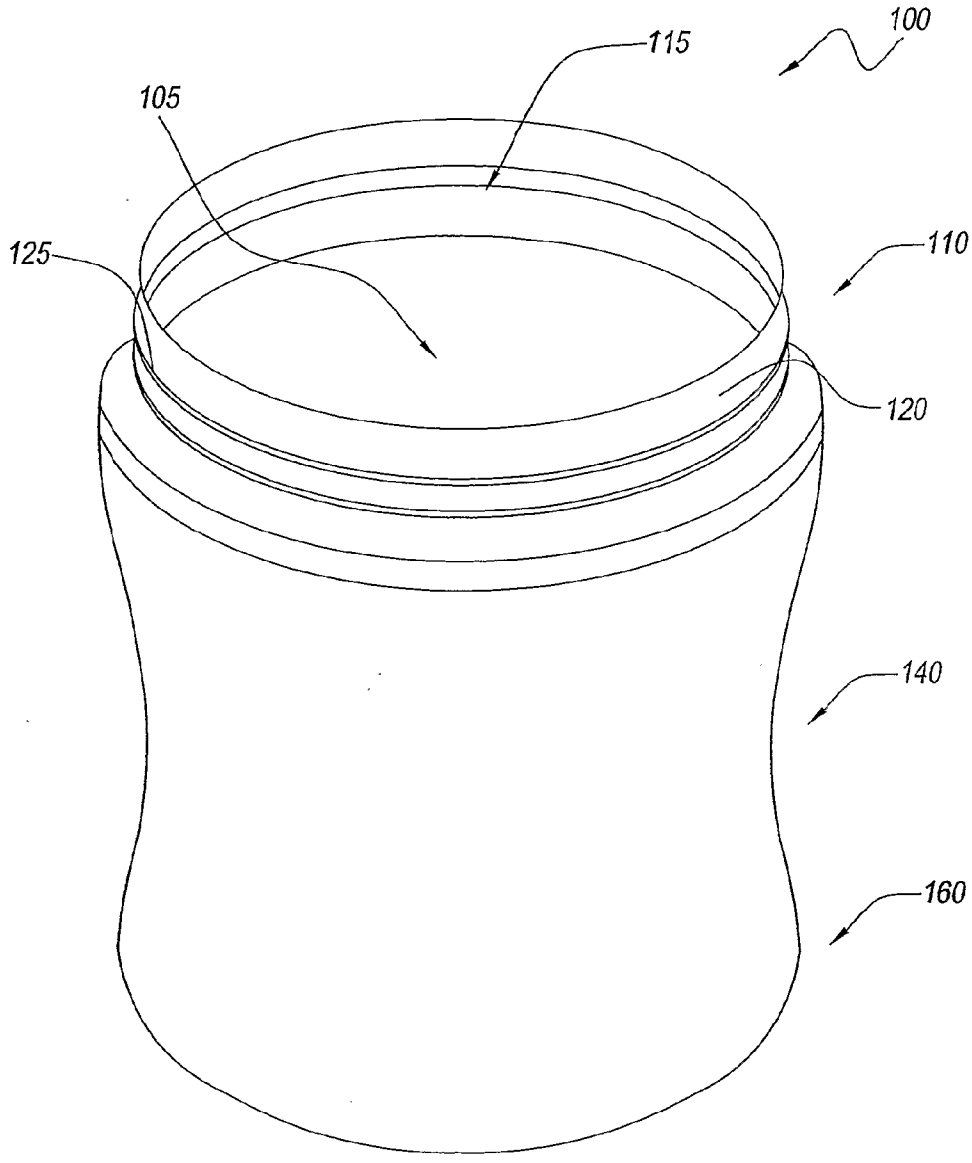

Fig. 5

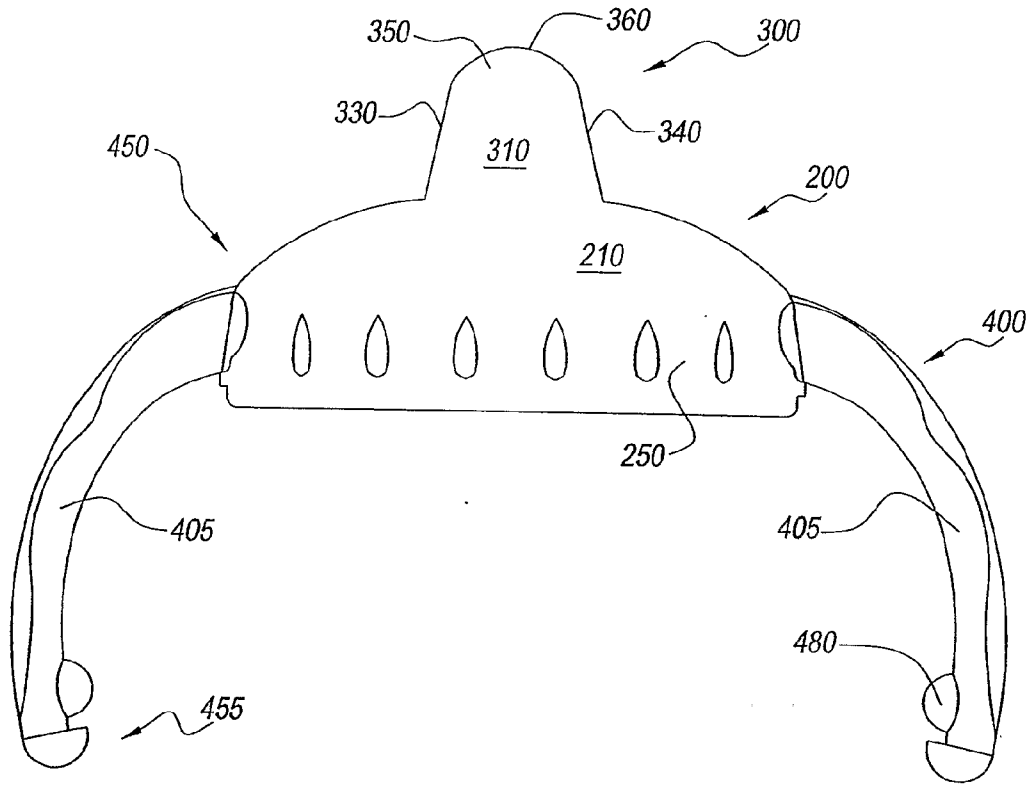

Fig. 6

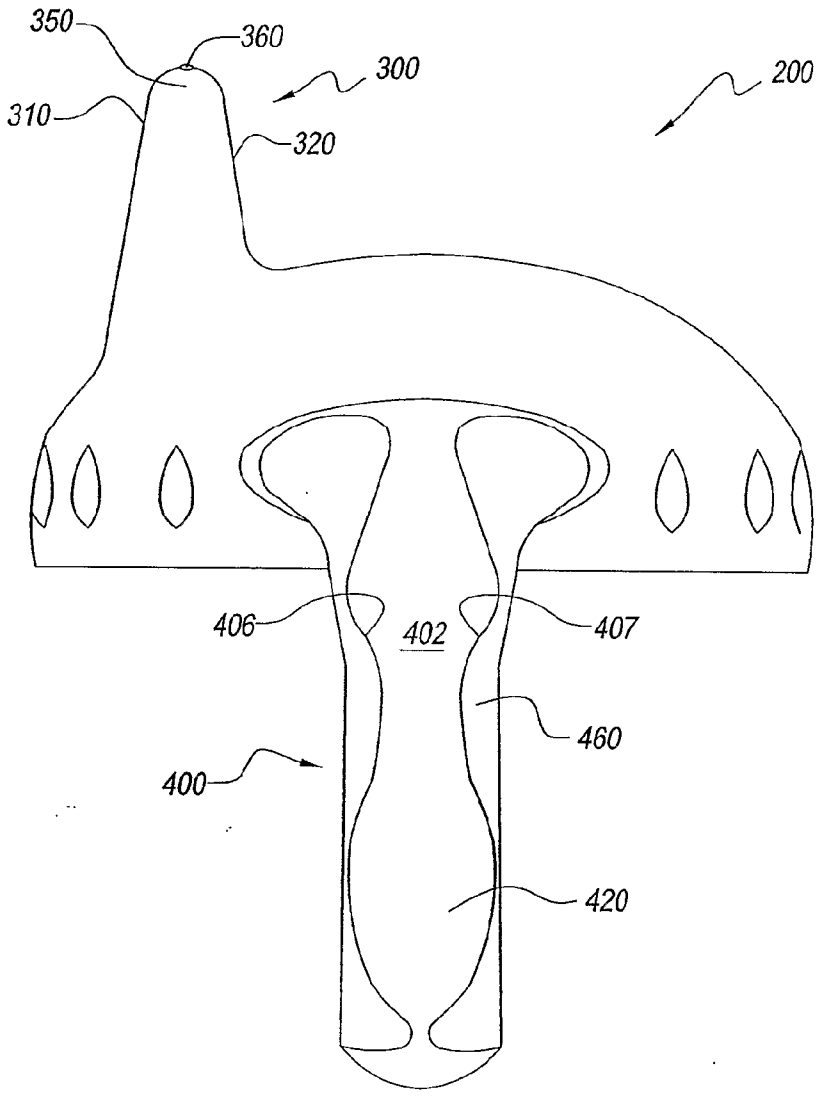

Fig. 7

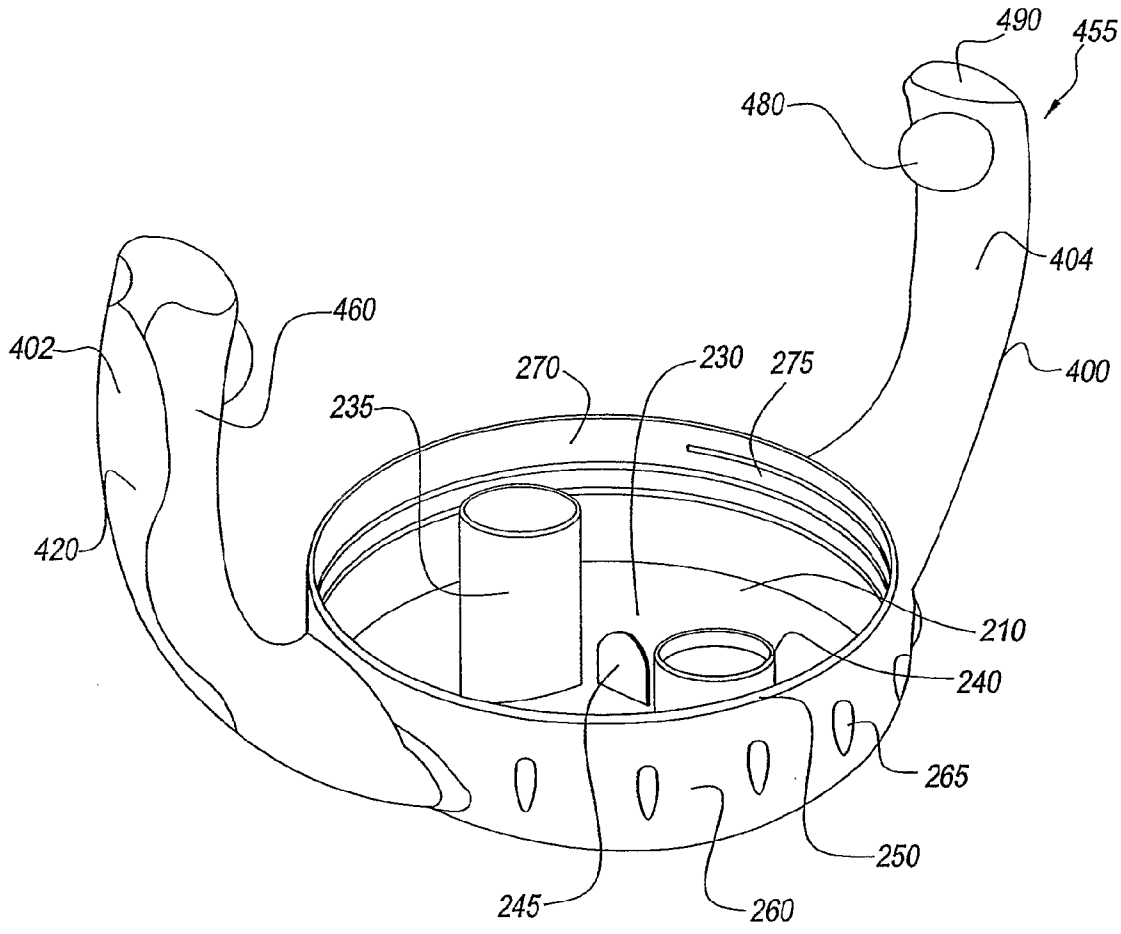
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Fig. 8

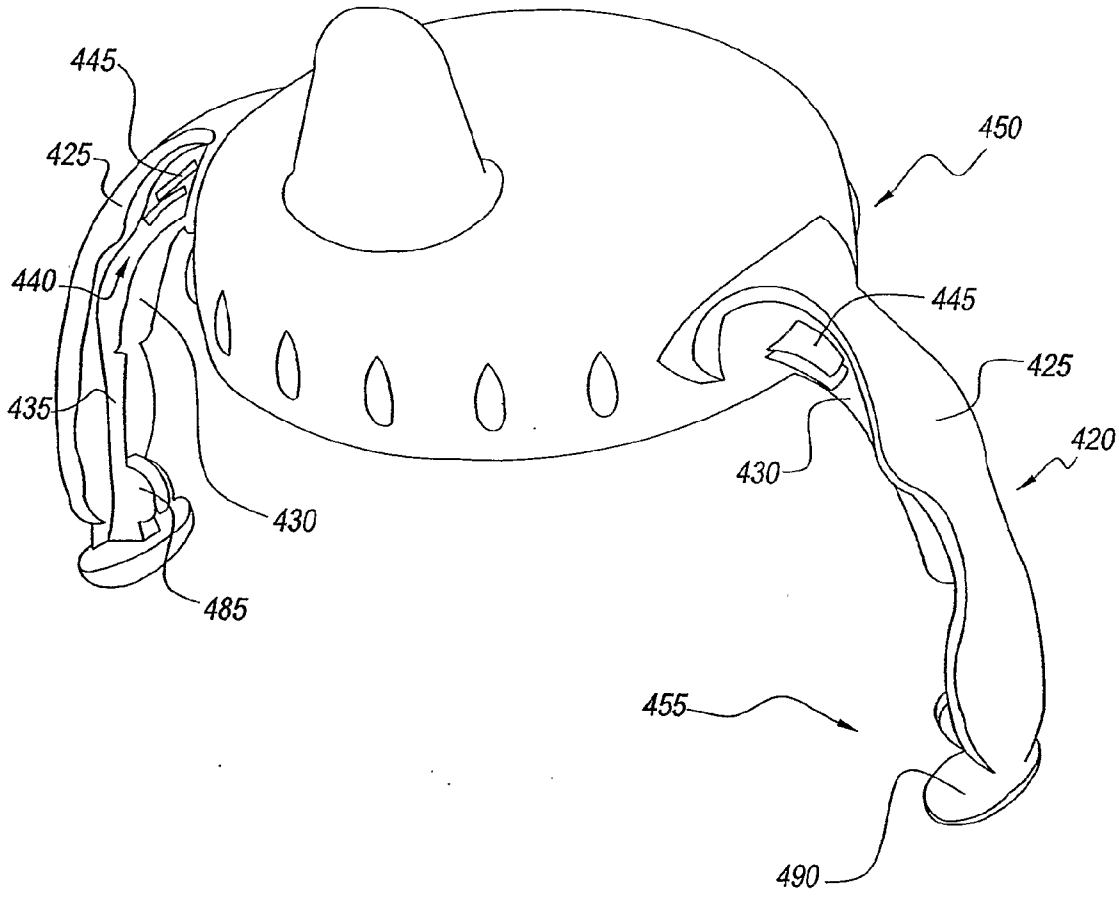
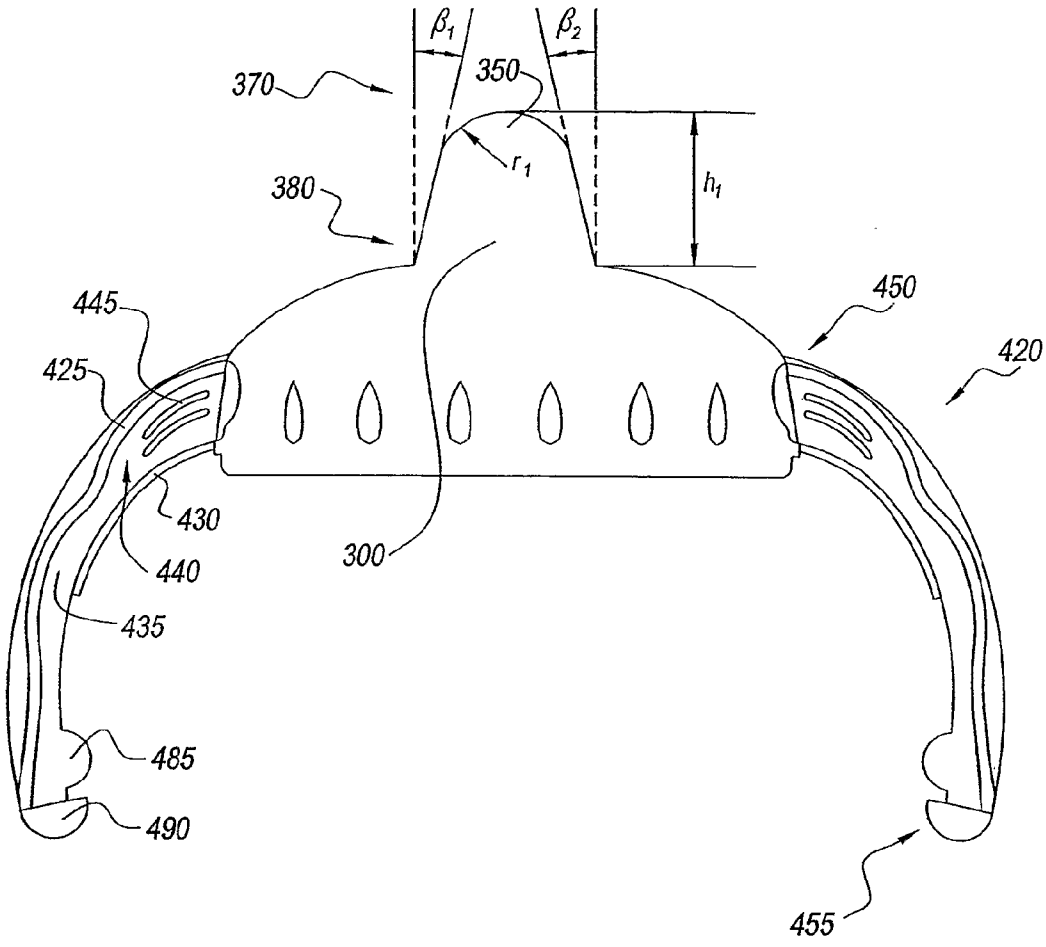


Fig. 9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h_1
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420
425
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440
300
435
485
490
455

Fig. 10

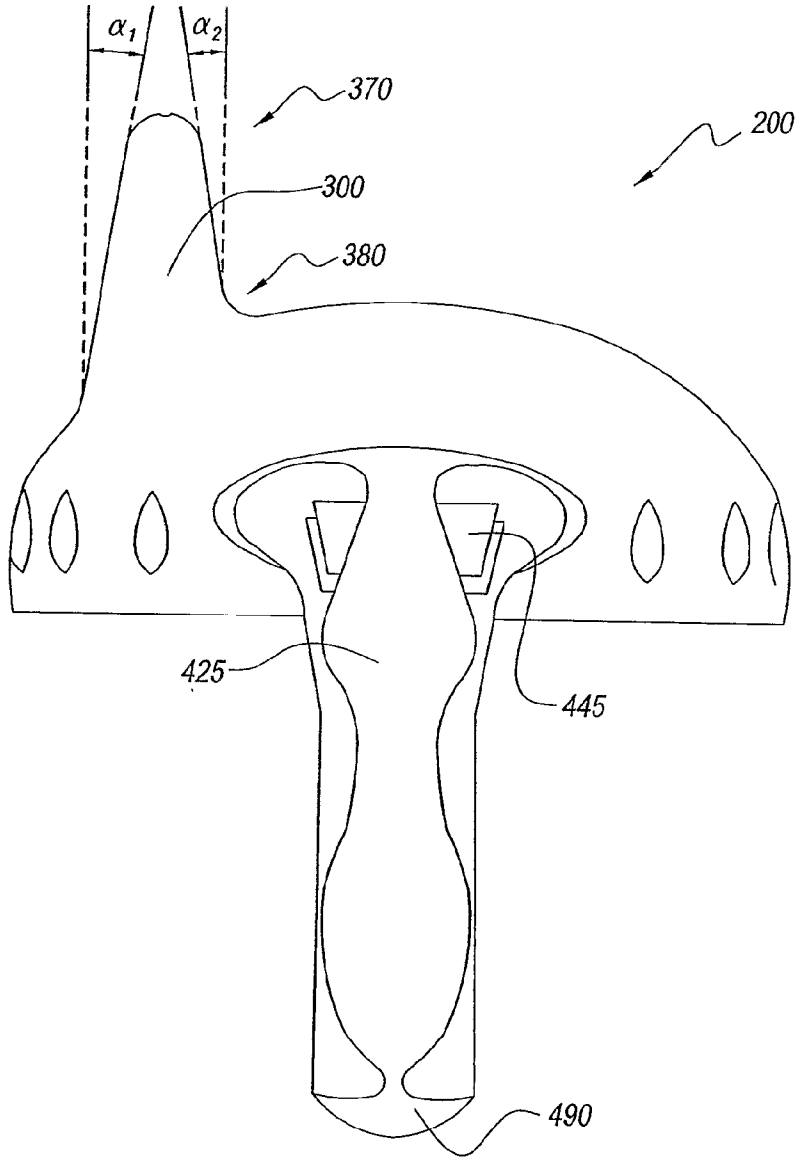

Fig. 11

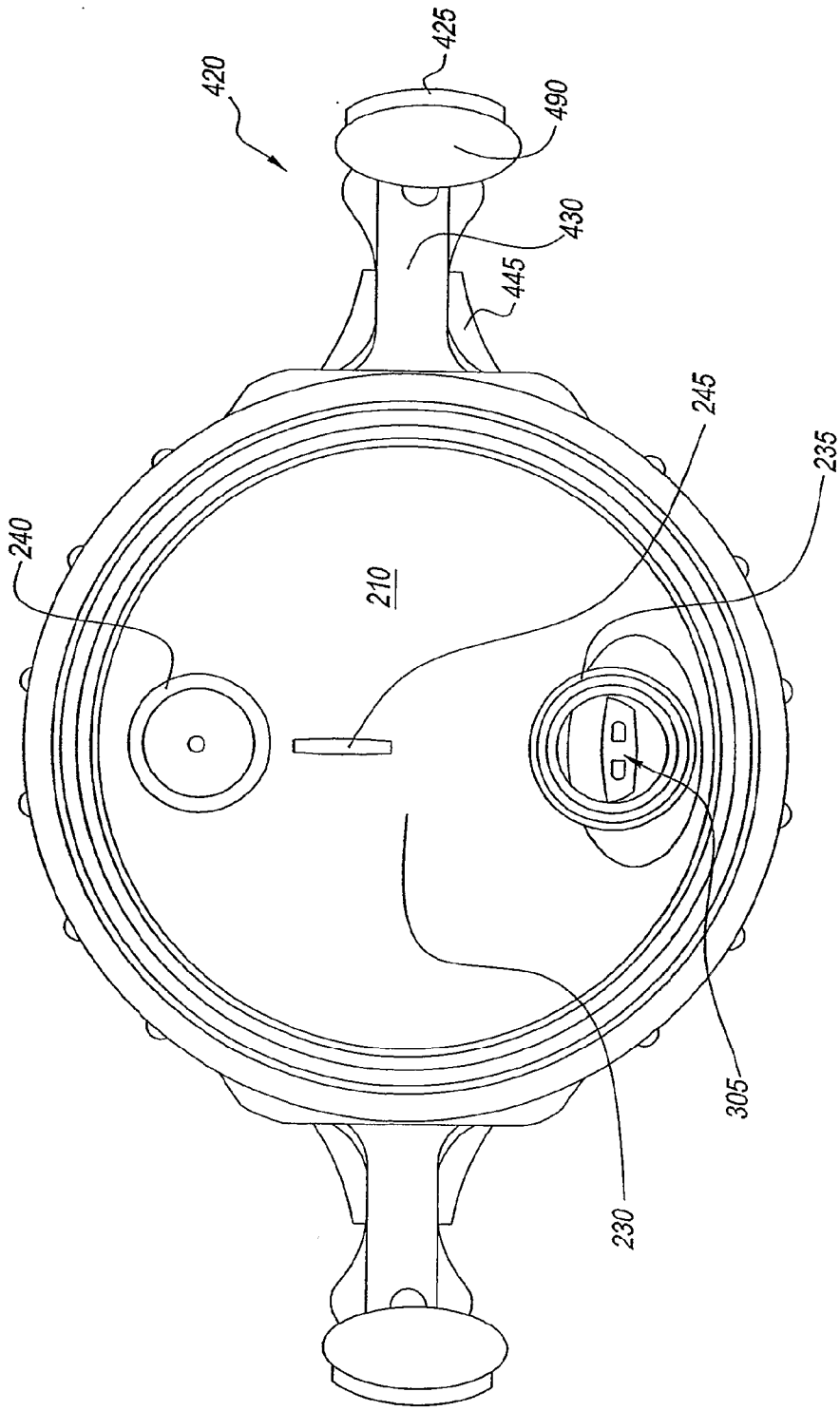

Fig. 12

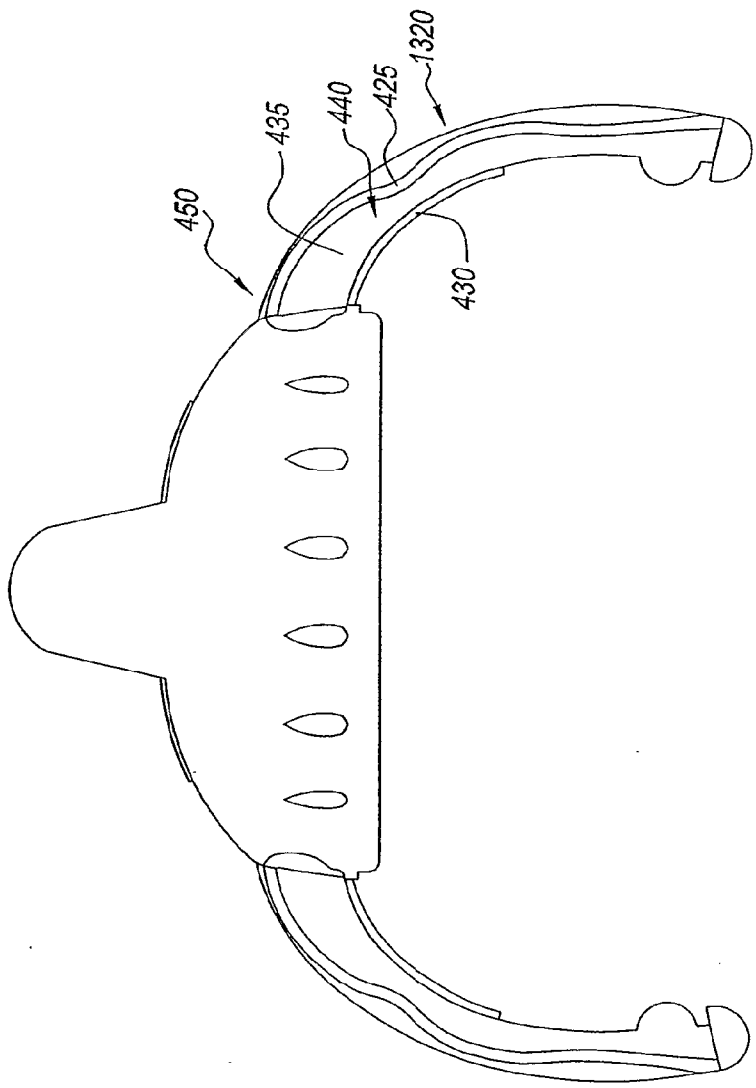

Fig. 13

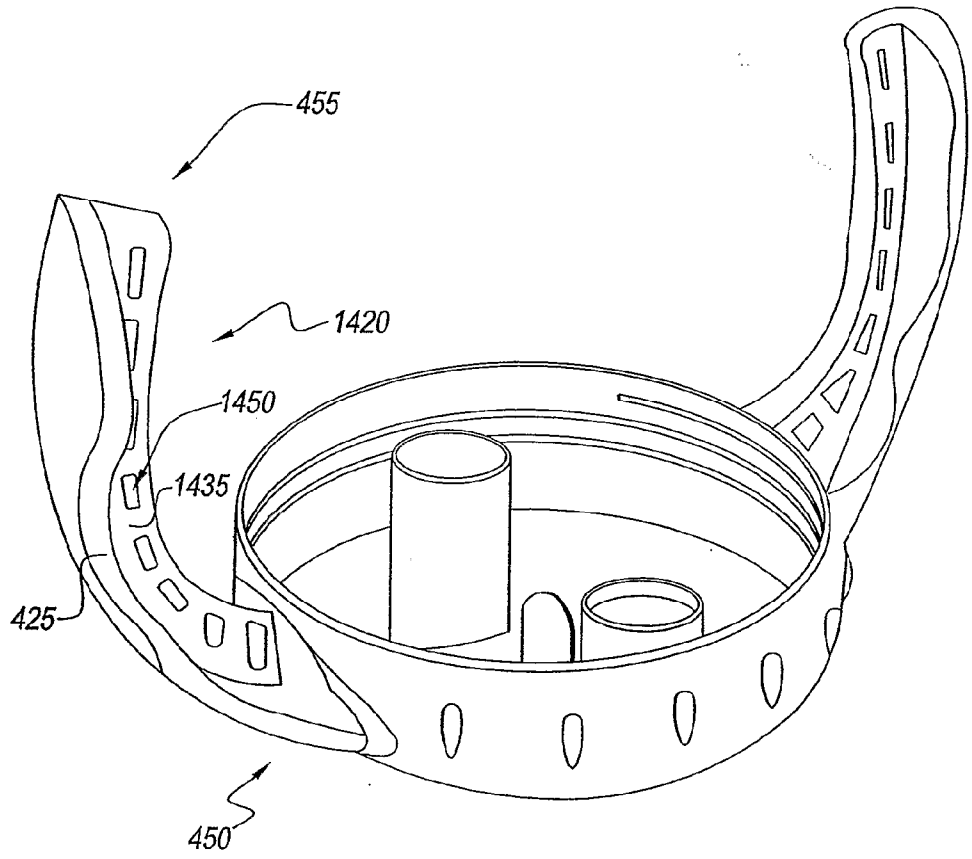

Fig. 14

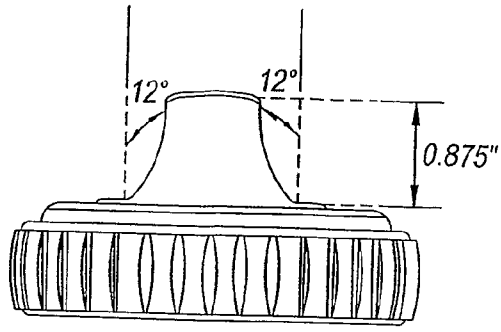

Fig. 15
(Prior Art)

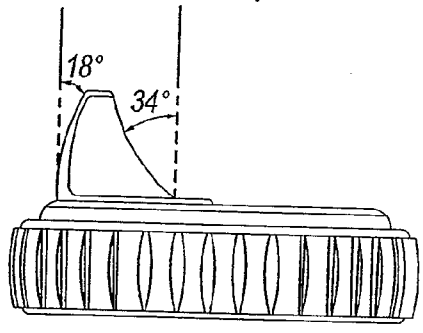

Fig. 16
(Prior Art)

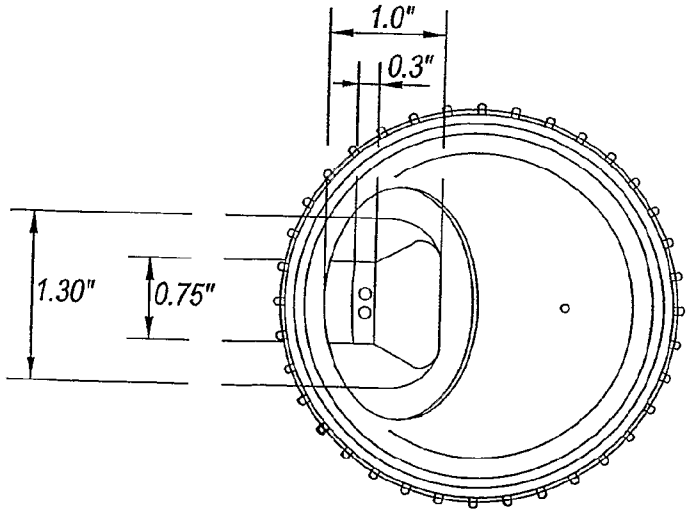

Fig. 17
(Prior Art)

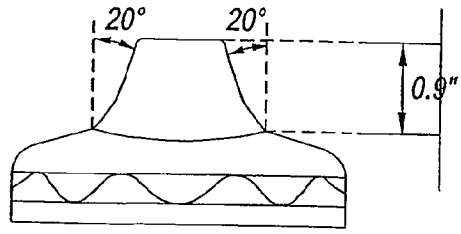

Fig. 18
(Prior Art)

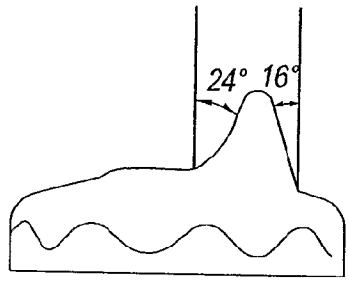

Fig. 19
(Prior Art)

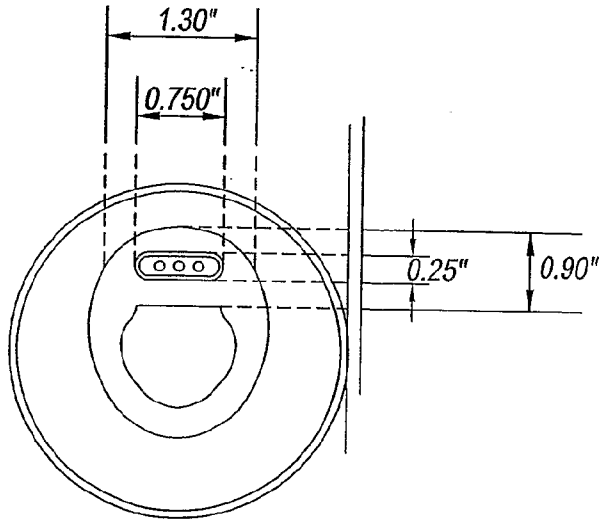

Fig. 20
(Prior Art)