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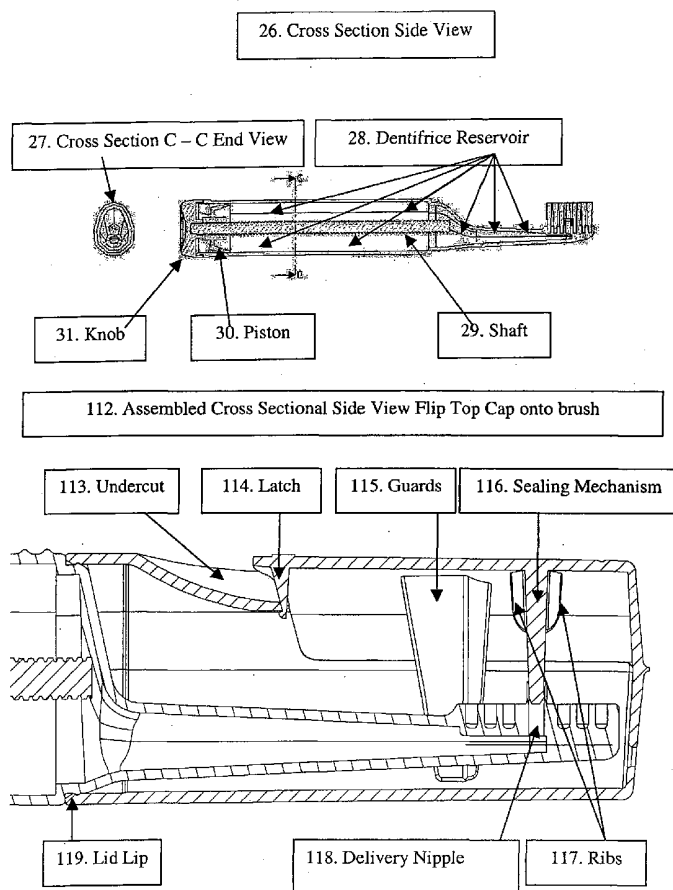
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(54) Title: DISPOSABLE TOOTHBRUSH AND DENTIFRICE COMBINATION UNIT



(57) **Abstract:** A disposable toothbrush and dentifrice combination unit that allows for dentifrice to be stored internally in the entire body, neck and head (28) of the unit and for dispensing dentifrice onto the toothbrush bristles by turning a knob (31). The dentifrice is extruded through a central delivery nipple (118) on the brush head by forward action of a piston (30) along a threaded shaft (29). The body has a non-circular internal cross-section (27) and the piston (30) has a corresponding shape. The central nipple (118) is initially sealed with a thin internal membrane until the consumer pierces the membrane. A flip-top cap includes a sealing mechanism (116) which seals the nipple (118) thus allowing the unit to be sealed and stopping the dentifrice from drying out and also preventing any accidental extrusion of dentifrice.

Complete Specification Standard Patent**Invention Title**

Disposable Toothbrush and Dentifrice Combination Unit

5

Inventors

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Detailed Description

10 The following statement is a full description of this invention:

This invention relates to the combining of a toothbrush and toothpaste into one combined and compact unit. This device will address the need for a convenient method of brushing your teeth that is portable and compact, particularly while away from home, but can be used as an everyday brush. This device also eliminates the need for toothpaste tubes,

15 toothbrush and toothpaste holders or containers.

A typical embodiment of this disposable toothbrush and dentifrice combination unit is displayed and comprising of and by reference, to numerical figures 1 thought to 25 (identified as fig) and the individual numerical item numbers (identified as ref. and identifying individual parts within a figure), contained herein and the device is described as follows:

20

A toothbrush, whose entire internal head, neck and body cavity are able to be loaded with toothpaste, dentifrice or gel for cleaning teeth. Consisting of a handle or body which is a near isosceles shape, with rounded edges (refer fig 1 & 2). It has a storage section with a surrounding wall section to define the storage chamber or reservoir, within which

25 dentifrice is contained. The body is open at one end to receive the knob. The brush delivery nipple, head, neck, body and knob receiver may be moulded in one entire section.

A toothbrush head section that has a plurality of bristles that extend from the brush head.

30 The head section also has a dentifrice storage section, with a surrounding wall section

that defines the storage chamber. This section is a seamless continuation of the body's dentifrice reservoir.

35 The brush head may be a continuation of the above-mentioned brush body or detachable, the head section internally and externally seamlessly morphs to the body section in one continuous piece.

The preferred embodiment for sealing the delivery nipple is via the flip top cap and is described as follows:

40 A typical embodiment of the flip top cap is displayed and comprising of and by reference, to numerical figures 14 through to 22 (identified as fig) and the individual numerical item numbers (identified as ref. and identifying individual parts within a figure), contained therein and the device is described as follows:

When the flip top cap is used no membrane or plug is required.

45 A flip top cap, which is used to cover the head of a toothbrush and seal in the dentifrice contained therein. Consisting of a body (ref 88. & 93.) that fits onto the handle of the brush and a lid (ref 86., 84., 99. & 110.)

50 The flip top cap is secured in place by a lip, groove and stop guide mechanism on the exterior of the brush body near the neck and a lip and stop guide on the internal face of the leading edge of the cap (ref 77.). The internal lip and stop guide of the head cap exists around the entire interior circumference of the head cap. The groove and stop guide, exist around the entire exterior circumference of the body.

55 The installed brush head cap is displayed in figure 19, 20, 21 and 22. In fig 22 the lid lip mechanism can be seen (ref 119.).

60 The lid (ref 86.) is held onto the body by way of a hinge (ref 75. & 105.) which allows the lid to move up or down. During the lid closing movement, the lid edges are guided into position by mating with the lip groove edges (ref 90.) on the body. This ensures proper alignment and sealing.

In the closed position the lid is held in position by a latch (ref 87. & 114.) located on the lid. The latch is flexible and has a hook on the end, which interfaces with the end of the finger undercut (ref 113.) portion of the body thus securing it in place, but still allowing
65 the lid to be flipped open as desired by placing your finger into the finger undercut (ref 113.) and lifting upwards.

The lid also has a sealing mechanism (ref 81., 96., 102., 108., & 116.) which seals the dentifrice. This is achieved by placing the sealing mechanism into the internal core of the
70 delivery nipple described in PR0380. The sealing mechanism has a circular protrusion, which interfaces with the internal wall section of the delivery nipple creating a seal. The sealing mechanism is reinforced by ribs (ref 117.) around it's base.

The flip top cap is installed onto the device by the following steps. The cap in the flipped
75 open position is put onto the body of the device so that the lid lip (ref 119.) interfaces at its seated position. The lid portion of the flip top cap is then lowered into position so that the latch mechanism (ref 114.) interfaces with the end portion of the undercut (ref 113.). In this closed position the sealing mechanism is interfacing with the internal wall of the delivery nipple, thus creating a seal. The device is removed in by flipping the lid (ref 86.)
80 open and then pulling the flip top cap it off the device's body.

The lid portion of the flip top lid also has guards (fig 17, ref 85.). These prevent the removal of the flip top cap from the device without opening the lid first. This prevents the sealing mechanism from being bent by improper removal. The guards, when in place, fit
85 around the tooth brush head of the device.

A third alternative method of sealing the delivery nipple is described as follows:

Another alternate method of sealing the delivery nipple is by the insertion of a tapered plug (Fig 23) into the internal wall section of the delivery nipple. The plug has a pull-tab
90 (ref 121., 124.) for easy removal from the delivery nipple.

A fourth alternative method of sealing the delivery nipple is described as follows:

The back of the brush head contains a slidable sealer (fig 24 & 25) which is a separate part (ref 127., 132.) that sits in a groove (ref 131.) on the brush head and can be slid up and down to cover and uncover the internal delivery nipple wall section, thus sealing and
95 unsealing the flow of dentifrice to the delivery nipple as desired and these positions are aided by stop notches (ref 133.).

There is a round knob (ref 3. & fig 8) that has an interior one way locating lug and or clip fastening (ref 25. & 37. & 41.) mechanism. This mechanism enables the knob to snap onto the end of the handle thus sealing the handle end (fig 7), but still allowing the knob
100 to be turned in this location. There is a threaded shaft that mate's into the knob (fig 5 & 7). This occurs by way of a tapered male octagonal spigot (ref 21.) end section on the threaded shaft. This end section, by way of interference fit, couples with the female tapered octagonal cavity (ref 20. & 44.) located in the centre of the knob.

105 The knob (fig 8) is located onto the body via a one-way snap on mechanism (ref 18. & 25. & 37. & fig 7) contained in the exterior of the body and the interior of the knob. The knob has an interior leading edge that is an angled tapered one way lip that hooks itself into a groove or seat on the body. Just behind the interior leading edge, the knob has a square recess that sits on a mirror image protrusion existing on the brush body. The
110 recess and lip exist around the entire interior circumference of the knob (fig 7 & ref 18.). The protrusion and groove exist around the entire exterior circumference of the brush body (fig 7 & 8).

The bodies end section has a square protrusion and a square groove or seat, within which
115 the interior face of the knob's lip and recess mates with the bodies lip and groove (ref 18. & 19. and fig 7). This method fastens the knob onto the open end of the body (ref 37. & fig 3), but still allows the knob and threaded shaft to be rotated.

This rotation will cause the forward movement of the piston (ref 15.) that is engaged via
120 its internal female thread, on the threaded shaft, to move along the threaded shaft (ref 14.). Thus, an internal piston may be moved from the knob end of the body, to the head end of the body, by the turning of the external knob.

In another version the knob (fig 7) has a detent groove pattern that allows the forward
125 movement of the piston and then a slight backward motion of the piston at the end of
each stroke. This stops pressure building up within the brush body.

The one-way snap on action of the fastening mechanism, discourages the knob from
being pushed or pulled off. The knob exterior is of such an angle and has exterior grooves
130 to aid gripping and turning during actuation but discourages the user from pulling the
knob off (ref 16. and fig 7 & 8).

The threaded shaft (ref 14. & 22. & 29. & 39.) physically communicates with the knob.
This is via the threaded shaft's tapered male octagonal interference fitting spigot (ref 21.
& 40.) at one end, with the knob's female tapered octagonal receiver (ref 20.), located in
135 the centre of the knob. The other end of the threaded shaft is free floating, surrounded by
dentifrice and not attached or fixed to any wall section. The threaded shaft self-centres as
the piston travels down the shaft.

The threaded shaft and knob configuration is such that it allows the piston (ref 15.) to be
140 pushed over the octagonal spigot portion of the shaft, onto the tapered threaded portion,
of the threaded (ref 21. & 22.) shaft during assembly.

The knob is pushed on thereafter (fig 4), onto the male octagonal spigot portion of the
threaded shaft. The clearance between the internal face of the knob and the piston (ref 30.
& 31. & fig 7) is such that, generally only forward motion of the piston during initial
145 knob rotation is allowed.

The tapered male octagonal spigot end (ref 21.) of the threaded shaft is smaller in exterior
diameter than the threaded portion of same shaft (ref 14. & 22.). This allows the easy
placement of the piston onto the threaded shaft during assembly, since the internal piston
thread diameter (ref 23.), which is located in the piston's centre, is also larger than the
150 tapered male octagonal spigot end of the threaded shaft. After the piston is assembled
over the octagonal spigot portion of the shaft, it is then located onto the tapered starting
thread (ref 22.), on the threaded shaft. This results in correct piston location, without

having to wind the piston down any length of the threaded shaft to get it into the start position (fig 4 & 5 & ref 38.).

155

There is a piston that has an internal female thread in its centre (ref 23.), which engages and moves along the threaded shaft. The piston thread is the mating thread for the threaded shaft.

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The piston has a specially angled flange (ref 24.) that grips the internal body reservoir wall (ref 30.). As the piston travels down through the internal brush body reservoir, the piston creates hydraulic pressure forcing the dentifrice to be extruded out of the toothbrush head's delivery nipple opening. The piston will not rotate or spin, due to the near isosceles shape, of the toothbrush handle or body. The piston shape is the same as the bodies internal near isosceles shape, with rounded edges. The piston flange angle is such so as to soak up any required draft or manufacturing variance in the interior of the body wall, and provides structural strength so the piston flange will not "lip out" or fail;

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An internal tapered flange (ref 17.) is located at the internal face of the open portion of the toothbrush body end where the knob clips on. The flange morphs smoothly from a round shape to accommodate the knob, to the main bodies near isosceles shape; thus both internal shapes are accommodated seamlessly in one continuous piece (fig 1 & 2 & 3 & 9). This internal tapered flange allows the piston to be guided into the correct position during assembly and initial knob actuation. The circular brush body end portion is larger in external and internal diameter than the near isosceles shape portion of the brush body. This size difference provides clearance for the piston to be put in place, onto the internal tapered flange and accommodates the knob.

175

180

During the assembly process, the knob, piston and threaded shaft are assembled together into one combination unit (fig 3 & 4 & 5 & 7). This knob, piston and threaded shaft unit are installed into the open end of the brush body cavity (fig 3 & 5) and fastened by the above-mentioned one-way locking mechanism (fig 7). The brush reservoir is filled with dentifrice (ref 28.) just before the knob, piston and threaded shaft unit is installed. No dentifrice comes out of the delivery nipple (ref 33.) due to the flip top cap, delivery membrane or plug still being in place (ref 34.).

185 When in this position the knob is free to rotate but will not come off the end of the brush body. This seals the open end of the brush body, but allows the forward activation of the piston. Figure 5 shows the assembled toothbrush and toothpaste combination unit in a cross sectional view, without the head cap.

190 The knob (fig 8) is of such construction that it allows the device to stand on its knob end for display, storage or after use purposes. The knob also has directional arrows (ref 4. & fig 8) to designate the required direction of rotation to activate the forward motion of the piston.

195 The brush body at the circular end, near the mating flange (ref 8.) has small stabilising feet, located on the exterior bottom surface of the brush body. The feet enable the brush to lie on its back with bristles in the air, without the brush rolling onto its side during storage, display or after use. Thus the feet provide brush stability, while at rest.

200 This device has a simple and inventive assembly progression as per claim three (fig 3 & 4) due to the internal construction and design of this device. This assembly progression results in the device being entirely sealed, fully loaded with dentifrice and fully assembled ready for use in a simple manner.

205 A third method of sealing delivery nipple (ref 10. & fig 6) which is located in the middle of the bristle configuration, is via a thin plastic membrane which can be initially opened by the piercing of the thin membrane, to allow the extrusion of the dentifrice onto the bristle area. The membrane (ref 34.) is located inside the delivery nipple (ref 10. & 33.). It is located between the end of the brush head dentifrice reservoir (ref 35.) and the
210 bottom of the delivery nipple (fig 6 & ref 34.). This membrane creates a thin wall section between the dentifrice reservoir and the delivery nipple. This membrane is punctured just before use, which then allows dentifrice to be extruded out of the delivery nipple.

215 This membrane means that paste can be contained in a tamper-proof manner and allows
for filling along the entire head, neck and body of the brush (ref 2. & 6. & 7. & 28.). Thus
when the device is loaded with dentifrice and the knob, threaded shaft and piston
combination unit is put in place the entire device is fully assembled and sealed (fig 5 &
9), except for the installation of the head cap. The user punctures this membrane with the
provided piercing tool provided, creating a membrane flap, which allows the free flow of
220 dentifrice from then on (fig 12). The construction of the plastic membrane is such that it
is a D shape (but it may be without limitation any other shape(s)). This allows for the
breaking of the seal along the thin semi circle portion of the D shape and a flap hinge is
formed by the thicker straight line portion of the D shaped membrane. By this manner the
punctured membrane will stay in place and act as a flap. The inventive membrane
225 increases the device shelf life and provides anti-tamper features thus increasing user
acceptance.

The delivery nipple is externally round and has an internal tapered flange, which guides
the piercing tool into rupturing position, down into the interior of the delivery nipple. The
230 delivery nipple is not as high as the bristles but does protrude above the brush head face
section (fig 6 & 12). The delivery nipple is soft and flexible, not hard and stiff to protect
the user's teeth.

A piercing tool (fig 11) that has a flat head (ref 65.) and side flat wing portions (ref 63. &
235 64.) on both sides for finger gripping (ref 60.) This allows easy grip and control of the
device. The tool also has a circular body section and a circular elongated shaft section
that tapers down to a central piercing point (ref 62.).

A toothbrush head that has pre-moulded bristle holes, which means such holes do not
240 need to be formed by drilling to allow tufting, thus eliminating a manufacturing process.
A special bristle hole configuration and layout that forms a bristle tube around the
delivery nipple to guide the dentifrice upward onto the top of the bristles (ref 10. & 32.)

A brush head cap (Fig 10) to cover the head portion when not in use. This is required
245 when the membrane or plug method is used to seal the delivery nipple. The head cap is a
near isosceles shape, the same shape as the brush body. It is removable and replaceable,
as required, to prevent contamination of the bristles from pollutants. It also may create an
airtight seal to prevent the dentifrice from drying out and is convenient for storage. The
cap is secured in place by a lip, groove and stop guide mechanism on the exterior of the
250 brush body near the neck (ref 7.) and a lip and stop guide on the internal face of the
leading edge of the cap (ref 54.). The internal lip and stop guide of the head cap exists
around the entire interior circumference of the head cap. The groove and stop guide, exist
around the entire exterior circumference of the body.

The installed brush head cap is displayed in figure 9 and (ref 50.).

255 An indicator window is provided on the side of the toothbrush body so one can observe
the amount of dentifrice remaining, this may but put in place by moulding, translucency,
printing or labelling.

260 All the parts of the device can be made from suitable food grade plastics or suitable
substitute material thus increasing economic viability of such a device.

Description of Inventive Device Diagrams

To aid understanding the follow discourse will explain the individual figures that are used
265 in my detailed description. I now refer to figures 1 through to figure 25, by complete
figure references, which show the inventive device, the claims or principals contained
and embodied therein.

The exterior of the device is displayed in figure 1, in angled side views and the bristles,
body, knob, directional arrows, delivery nipple, head, neck and mating flange can be
270 seen.

Figure 2 shows the device exterior from a top, rear, side and front view. The delivery
nipple position is noted and bristle configuration can be observed.

Figure 3 shows the device with an exploded view of the rear assembly of the device. Here
the threaded shaft, piston, knob, tapered flange, lip and seat are identified.

275 Figure 4 shows the interior view regarding the order of assembly, on how the piston, threaded shaft (male) and knob (female) may be assembled and also identifies tapered male and female octagonal, the tapered threaded lead in, the internal piston thread, the piston flange and the locating lug or lip.

Figure 5 shows various cross-sectional's of the assembled device and identifies the
280 dentifrice reservoir and identifies the reservoir, shaft, piston, knob and cross sectional end view.

Figure 6 shows a close up of the brush head and identifies the bristle configuration. A cross sectional of the brush head identifying the delivery nipple, delivery membrane, the brush head portion of the dentifrice reservoir, the bristles and the extent to which the
285 delivery nipple protrudes past the brush head face is also shown. For the flip top cap or plug

While figure 7 shows a close up of the knob, piston, and threaded shaft assembled into the body in the starting position. The fastener, piston, shaft, tapered octagonal interface and knob are identified. Noteworthy here is the inventive fastening mechanism.

290 Figure 8 shows various views of the knob and the knob interior and exteriors are identified. Also shown are the end and a cross sectional view of the knob.

Figure 9 displays the fully assembled device, complete with the brush head cap. For orientations purposes the knob and body are identified.

Figure 10 displays various views of the brush head cap, and side, top end and cross-
295 sectional views as well as the internal lip are identified.

Figure 11 shows the puncture tool in side, top, front and angled views. The finger grips, body and tapered piercing mechanism are identified.

Figure 12 displays the brush head portion with the puncture tool inserted from a top, cross sectional side and angled view.

300 Figure 13 shows a close up view of the brush stabilising feet and displays an angled view of the external shape or profile of the invention. The brush body, cap, body end, feet and external profile are noted.

The following diagrams explain the flip top cap, slidable sealer and plug variations to
305 sealing the delivery nipple.

Figure 14 shows the exterior of the device, in angled side views and the hinge, ventilation holes, finger undercut and internal lip can be seen.

Figure 15 shows the device exterior from a top, side, end and cross sectional (A-A) view. The sealing mechanism and finger-undercut positions are noted.

310 Figure 16 shows the flip top cap assembled into or onto the device. Top, side and end views are noted.

Figure 17 shows the device unassembled and in the flipped open position. The guards, lid, latch, body, lip edges and finger undercut can be seen.

315 Figure 18 shows the device unassembled and in the flipped open position from a top, side, end and cross sectional view. The sealing mechanism is noted.

Figure 19 shows the flip top cap assembled onto the device and in the flipped open position from a top, side, and cross sectional end view. Here the toothbrush head of the device is noted.

320 Figure 20 shows a close up of the head section of Figure 19. The flip top cap can be seen assembled onto the device and in the flipped open position from a top and side view. Here the hinge and catch are noted.

Figure 21 shows the flip top cap assembled onto the device in a side on, cross-sectional view.

325 Figure 22 shows a close up of the head section of Figure 21. The flip top cap can be seen assembled onto the device. Here the lid lip and sealing mechanism ribs can be seen.

Figure 23 shows the tapered plug that can be used to seal the delivery nipple. The tapered plug shaft and plug pull-tab can be seen.

Figure 24 and 25 shows the slidable sealer mechanism.

330 **Claims**

The claims defining the invention are as follows:

1. A Toothbrush and Dentifrice Combination device constructed entirely of a plastic or similar type material comprising of a hollow toothbrush with an interior entirely filled
335 with dentifrice, which is extruded through one central brush head delivery nipple on to the brush head bristles, the bristle holes are moulded into the brush head and the configuration of the bristles around the delivery nipple is such that they act as a funnel to ensure the dentifrice is guided up onto the top of the brush bristles, the dentifrice is extruded by the hand actuation rotation of a knob, the knob sits in a lip and groove arrangement at the end of the brush body, the internal knob face has a
340 centrally attached threaded shaft, the shaft has a non-round piston engaged on the thread which moves forward along the internal brush body wall by rotating the knob which rotates the threaded shaft, the piston which has leading edges, that interface with the internal brush body wall, thus displacing the dentifrice which escapes out of
345 the delivery nipple, onto the bristles, the device will stand up on the flat face of the knob in a stable manner and the device will sit on it's back due to feet located on two sides of the brush body thus stopping it from rolling onto its side when placed down after use, the devices shape is a near isosceles triangle which is an ergonomic size and makes using and gripping the device easy and comfortable, a Disposable Toothbrush and Dentifrice Combination device substantially as herein described with reference to
350 the accompanying drawings.
2. A flip top cap comprising of hollow cylindrical push on cover for the brush head with a plastic hinged movable flap that has a centrally located tapered shaft that inserts into the interior of the delivery nipple thus sealing the dentifrice delivery nipple when
355 moved into a closed position and the flip top head cap cannot be removed without first flipping open the lid of the flip top cap due, to the tapered arms on the inside of the moveable lid that wrap around the base of the brush head, the cap is guided into the correct position onto the brush by internal grooves and mating lips on the in the inside of the cap and exterior of the brush body and the movable lid on the flip top
360 cap is guided into the correct closed position by the internal grooves and mating lips

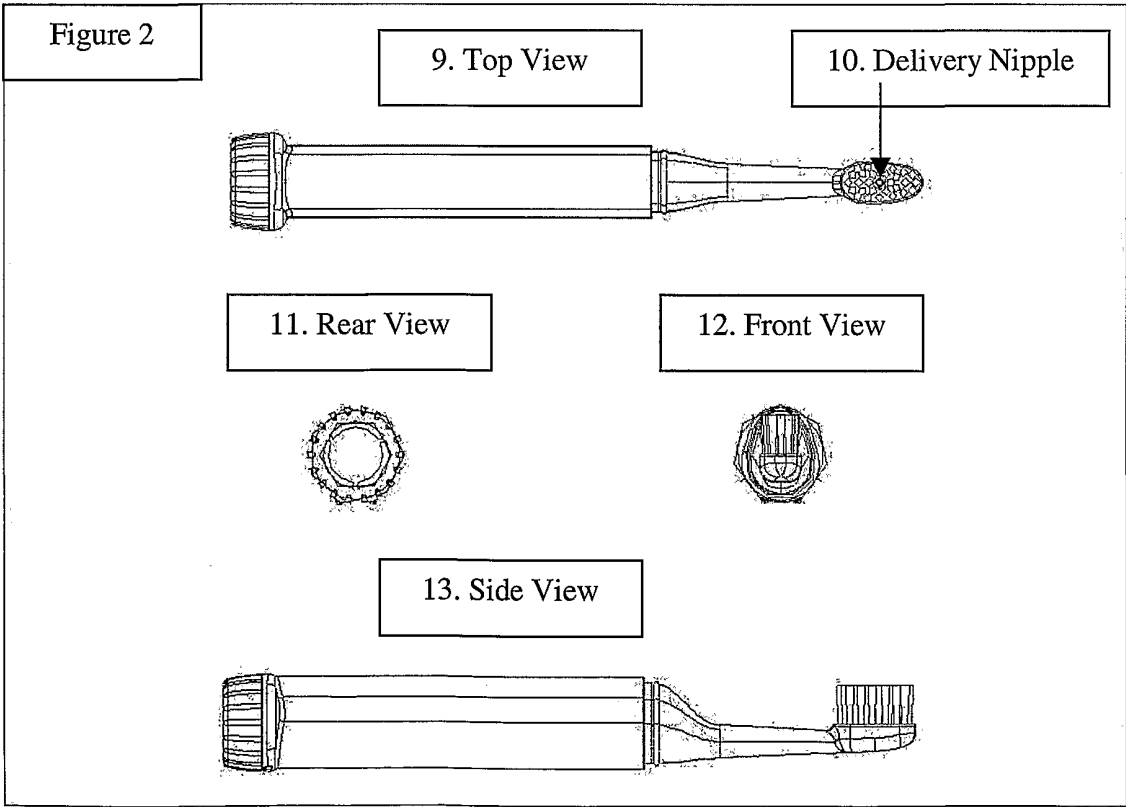
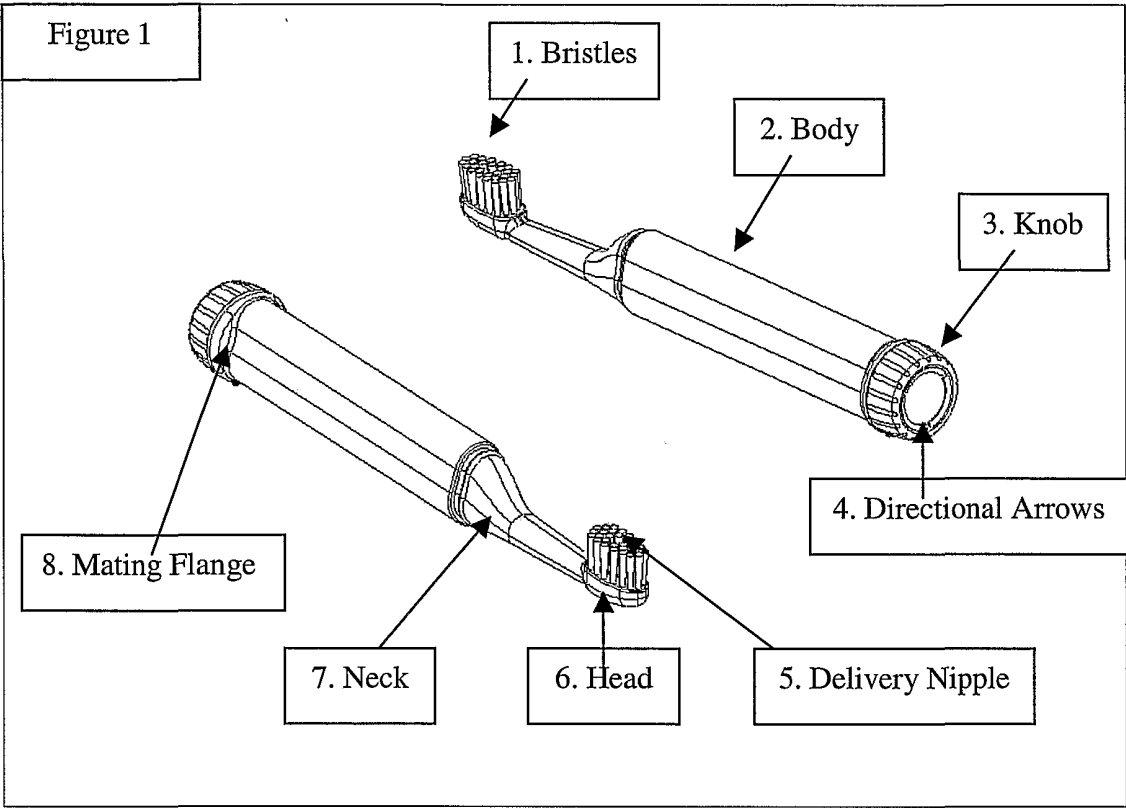
on the in the inside edges of the flip top cap lid and exterior edges of the flip top cap body so that the tapered shaft that seals the dentifrice is correctly aligned for proper sealing and the closed position of the flip top cap lid is maintained by a flexible arm on the flip top cap lid with a lip on it's end that hooks under a wall section on the flip top cap body, the lid is opened by inserting a finger into the undercut section of the movable lid, flipping it up and then removed by pulling the flip top cap off the brush head and it is replaced in reverse order of this, the flip top cap allows the device to be sealed after each successive use thus stopping the dentifrice from drying out, maintaining a hygienic seal when not in use and preventing any accidental extrusion of paste at any time, this is particularly important during air travel due to the air pressures involved which can result in paste being extruded due to air pressure.

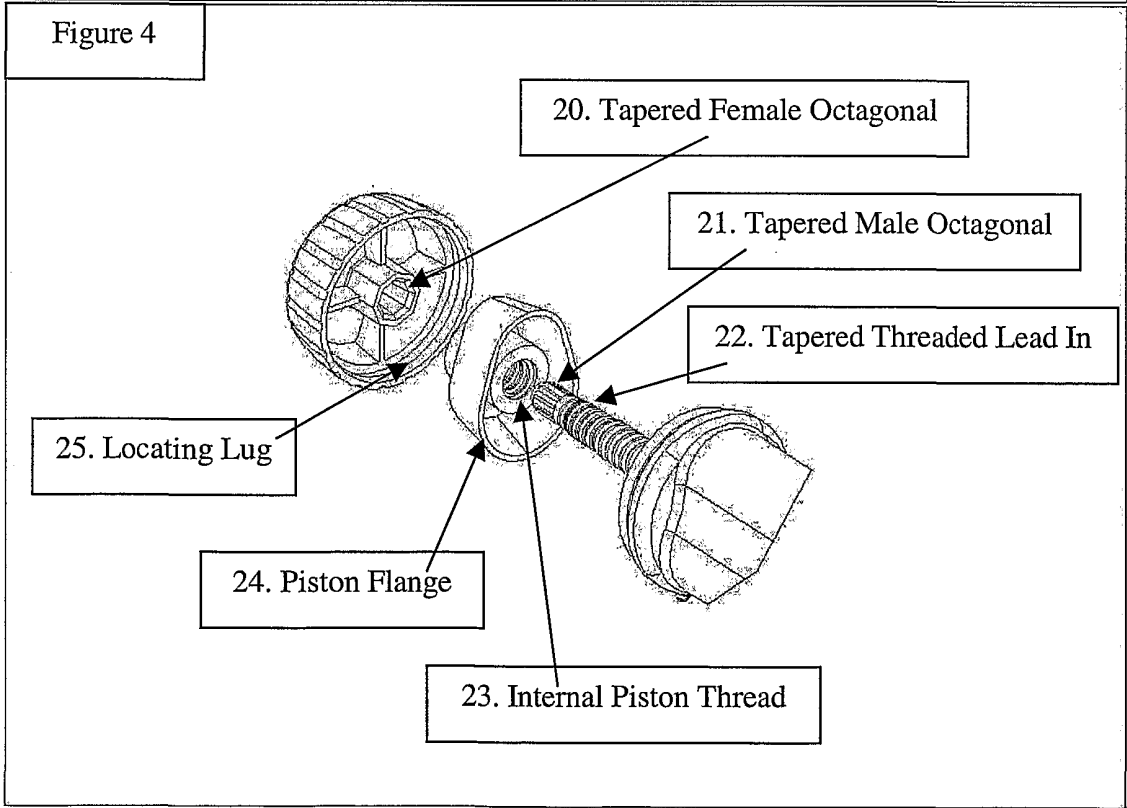
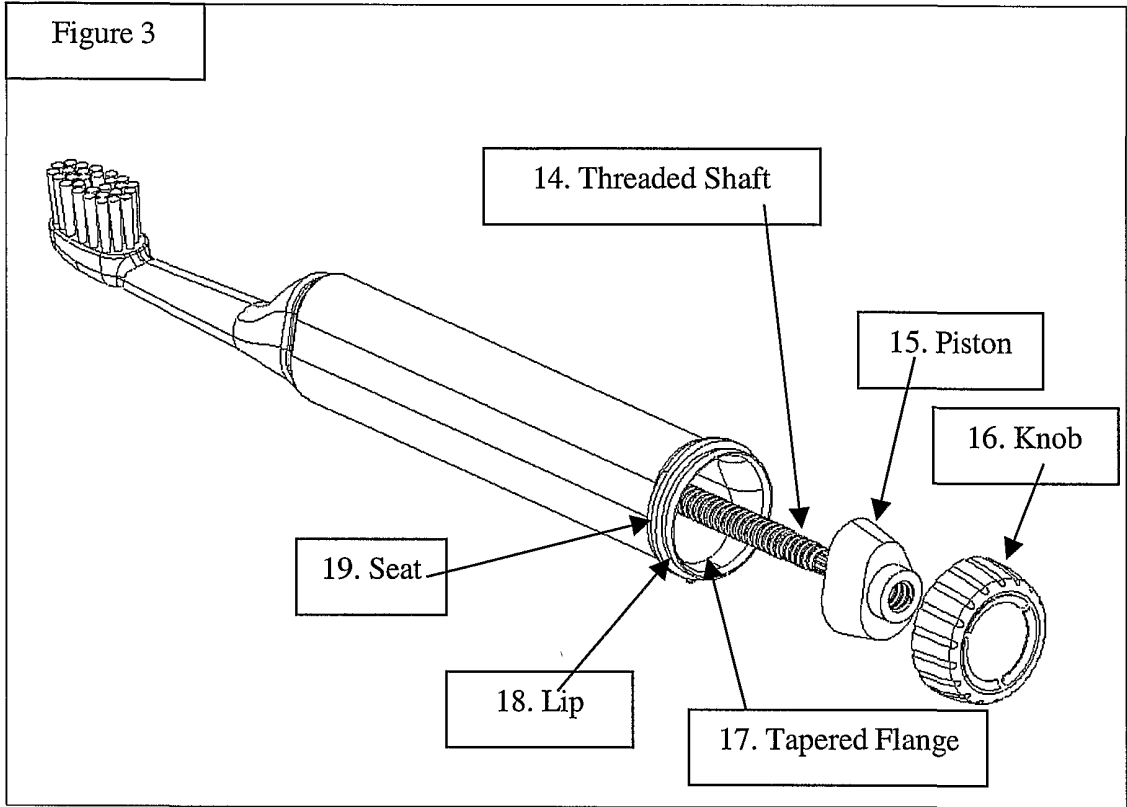
3. The Toothbrush and Dentifrice Combination device as per claim one allows dentifrice to be loaded into the entire head, neck and handle cavity thus maximising the amount of dentifrice contained within, this is accomplished by the inventive construction, assembly order and design of the device as follows; the delivery nipple is sealed via the flip top cap or the membrane or the slidable sealer or the sealing plug, the entire device is then filled with dentifrice, since the piston's female centrally threaded opening is larger than the threaded shaft's shoulder, the piston can be placed over the threaded shaft shoulder onto the tapered lead in portion of the thread on the threaded shaft, so that the shaft shoulder is then pressed (tapered interface fit held in place with small barbs) into the internal female cavity recess face of the knob, this complete sub assembly comprising of the piston, threaded shaft and knob is then placed into the internal body of the brush from the rear, the piston is guided into position by the body's tapered internal lead in and the face of the knob edge is pressed over a lip on the body to be seated into a groove on the internal face of the knob, thus sealing the entire unit and completing the assembly process.

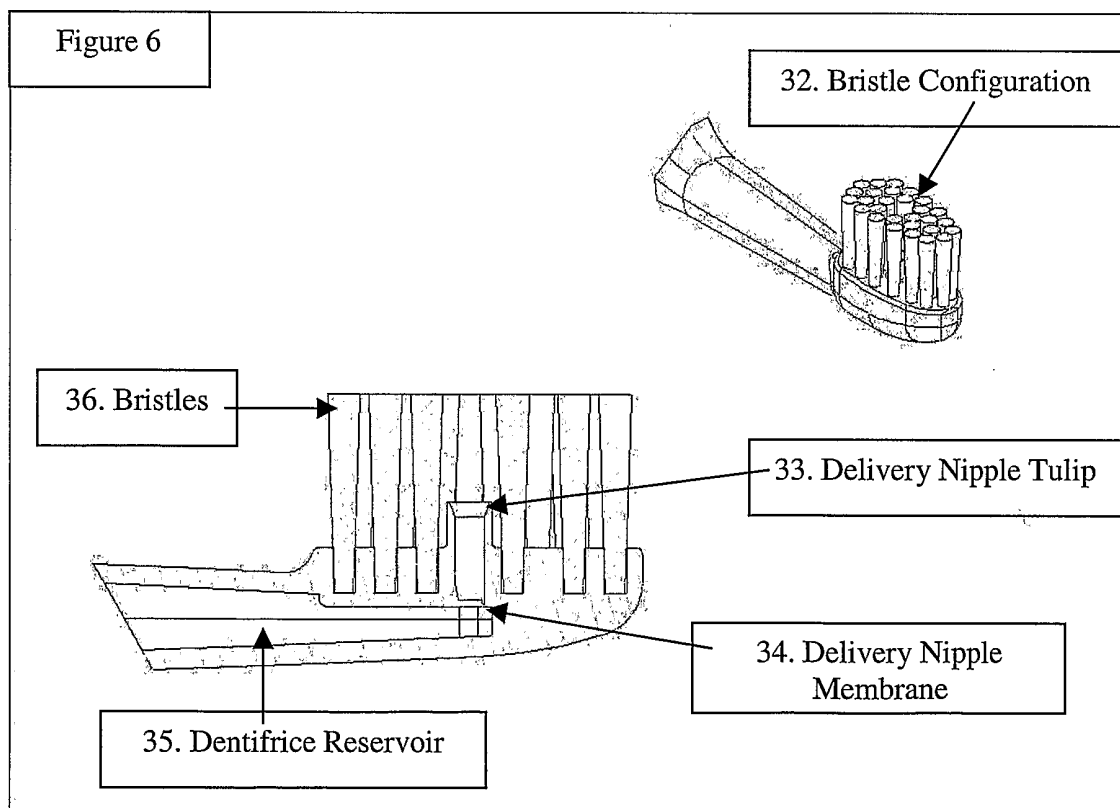
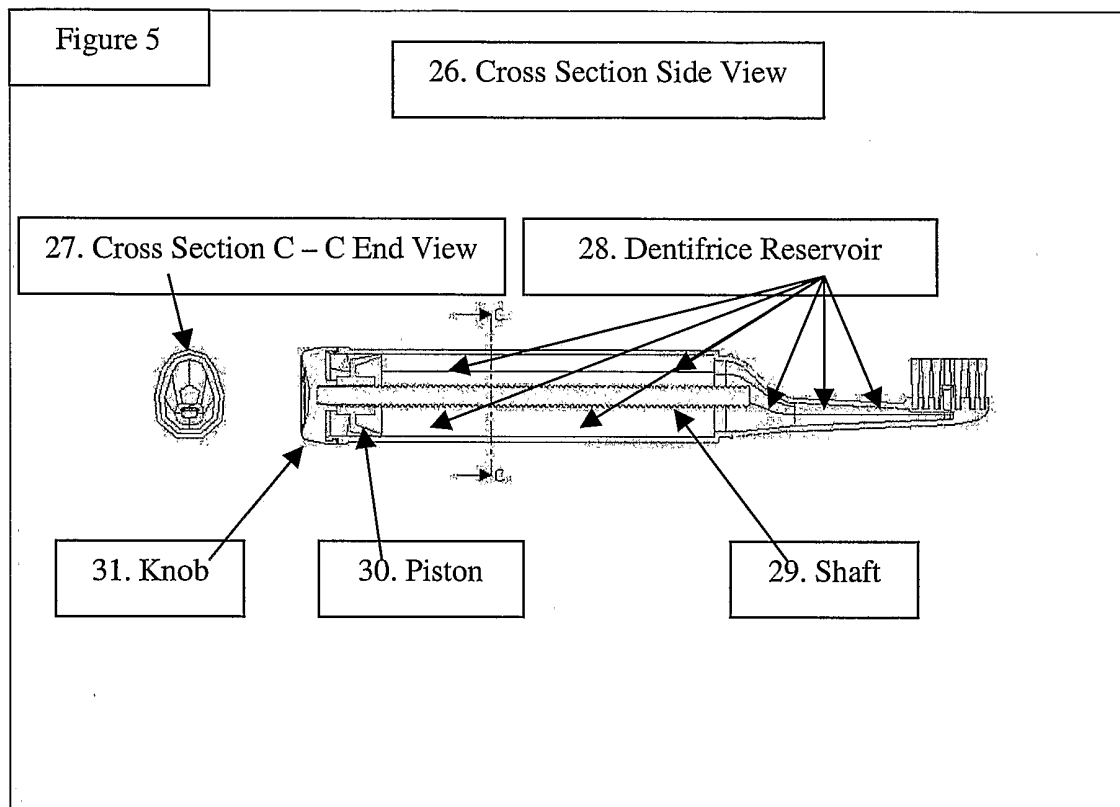
4. A Toothbrush and Dentifrice Combination device as per claim one with a variation, instead of the flip top cap of claim two, the device can include a delivery nipple membrane which is formed as a "D" shaped flash during the moulding process the membrane is located at the base of the delivery nipple, the material on the straight side of the "D" shape is thicker than the curved portion so that when the membrane is

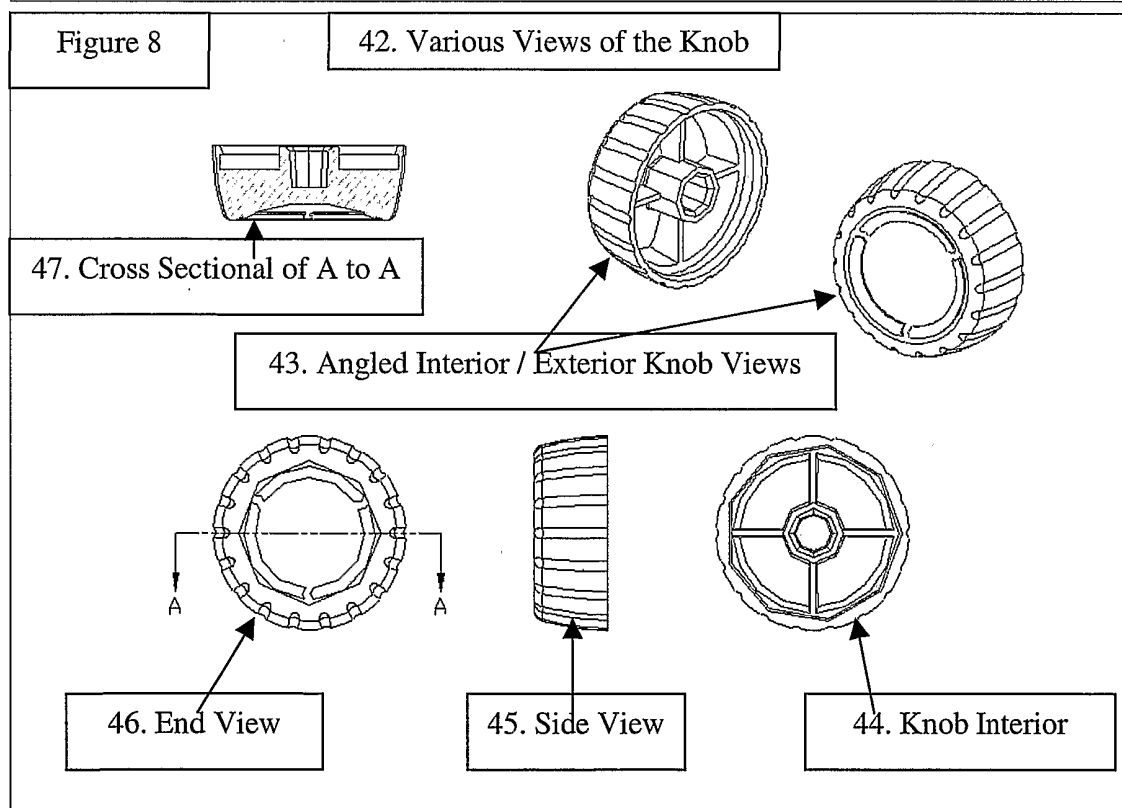
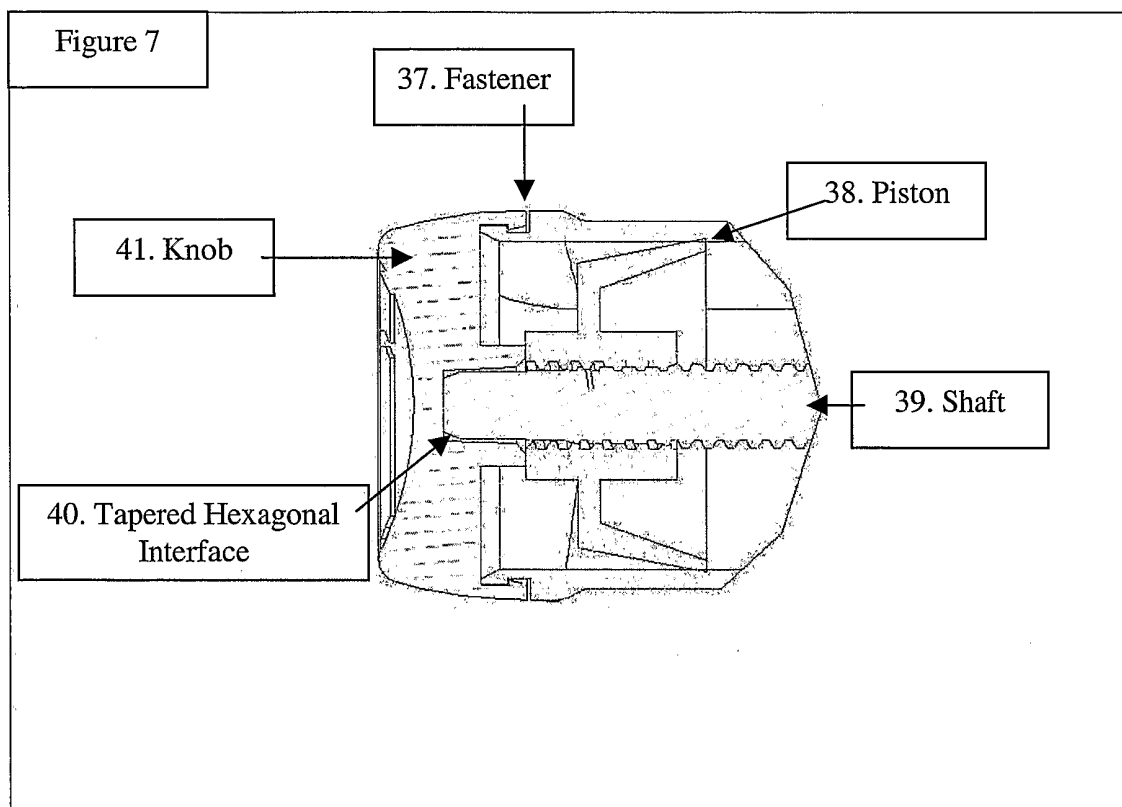
punctured using a puncture tool the material on the straight side of the "D" shape does not tear and acts as a hinge so the membrane becomes a valve flap during use.

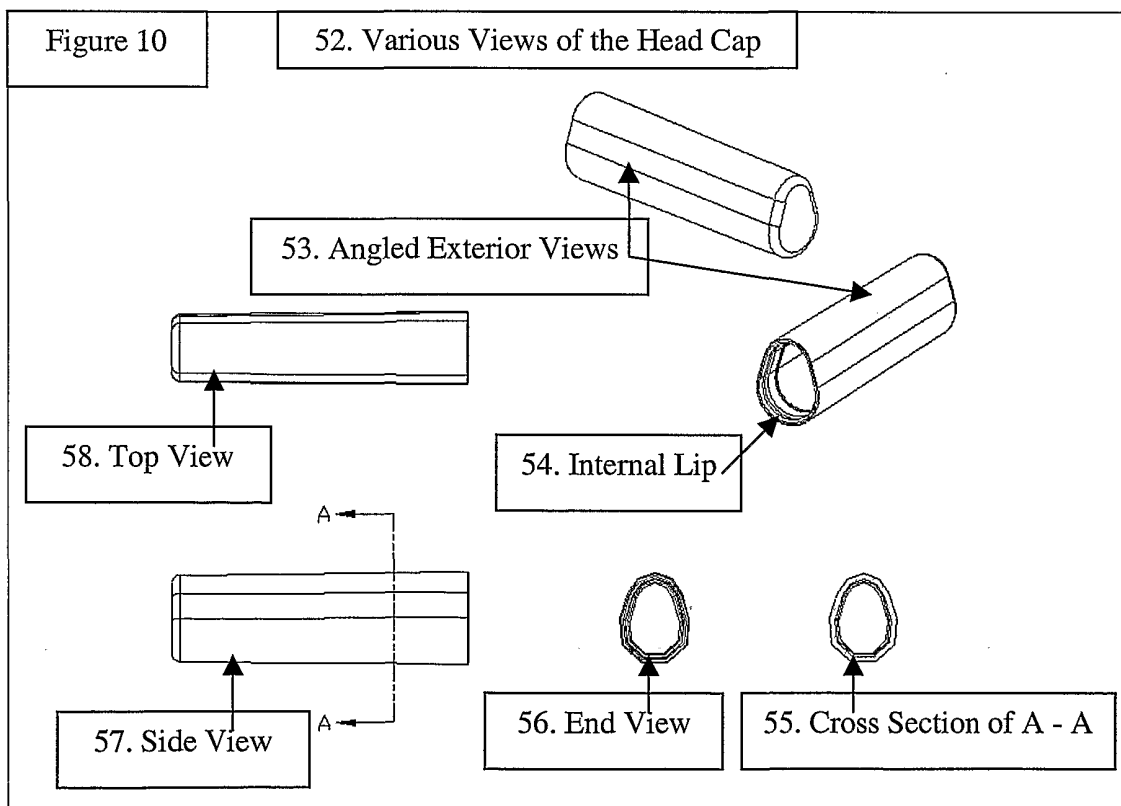
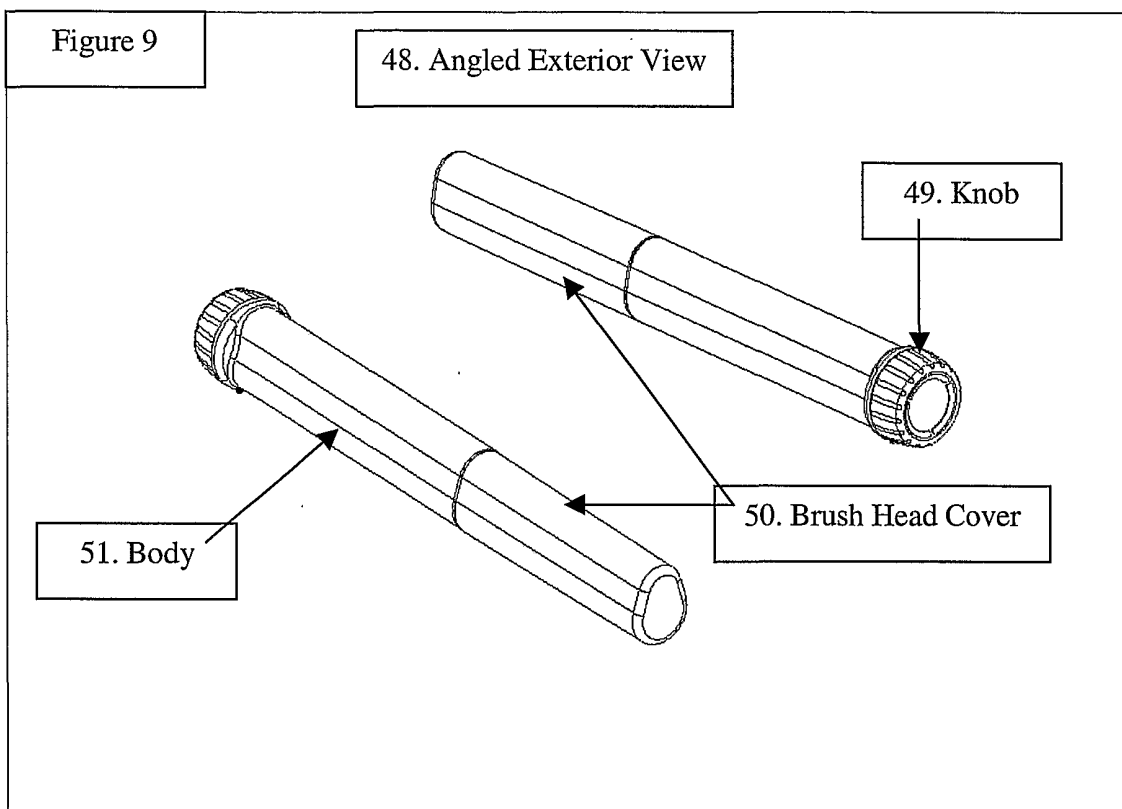
- 395 5. The toothbrush and dentifrice combination device as per claim one, two and three uses minimal parts, the devices body, head, delivery membrane (in a variation), delivery nipple, bristle holes and body lip flange and groove may be made in one continuous piece or the head may be detachable to allow the body to be replaced.
- 400 6. A Toothbrush and Dentifrice Combination device as per claim one (in a variation) where a portion of the back of the brush head is separate slidable part that sits in a tongue and groove on the brush head and the back of the brush head portion can be slid up and down to allow the internal delivery nipple wall section to be blocked and unblocked at the internal base of the delivery nipple, thus sealing and unsealing the flow of dentifrice to the delivery nipple as desired. Or it may have a plug installed to seal the delivery nipple, the plug is manually removed before use.
- 405 7. A Toothbrush and Dentifrice Combination device as per claim one which can be assembled by snapping or pushing the components together, no other means of affixing the parts together for assembly is required, thus reducing the requirement for human intervention or specialised equipment during assembly and resulting in an assembly that cannot be pulled apart easily thus increasing the devices safety and economy.
- 410 8. A Toothbrush and Dentifrice Combination device as per claim one which has a unique shaped piston that will not rotate internally, thus removing the need for an internal piston guide to stop the piston from rotating instead of moving forward.
- 415 9. A Toothbrush and Dentifrice Combination device as per attached diagrams Fig 1 to 25 inclusive.











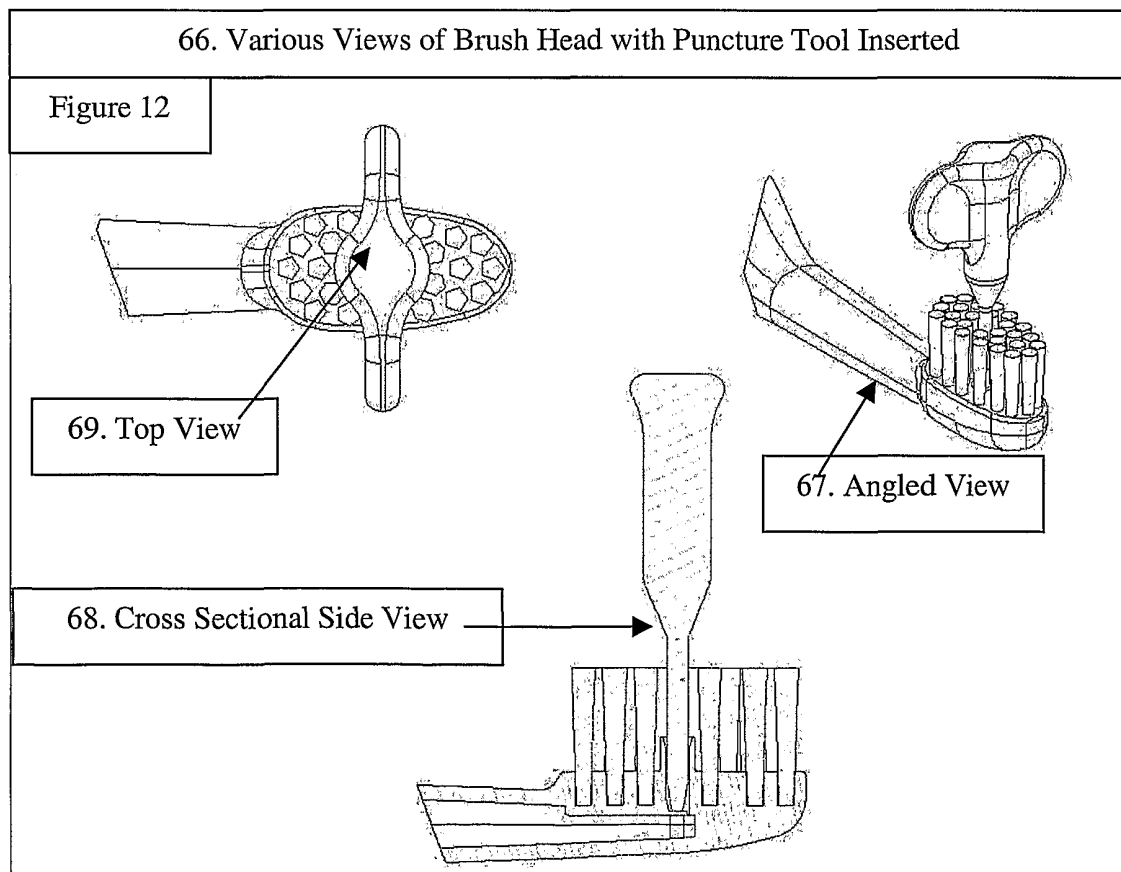
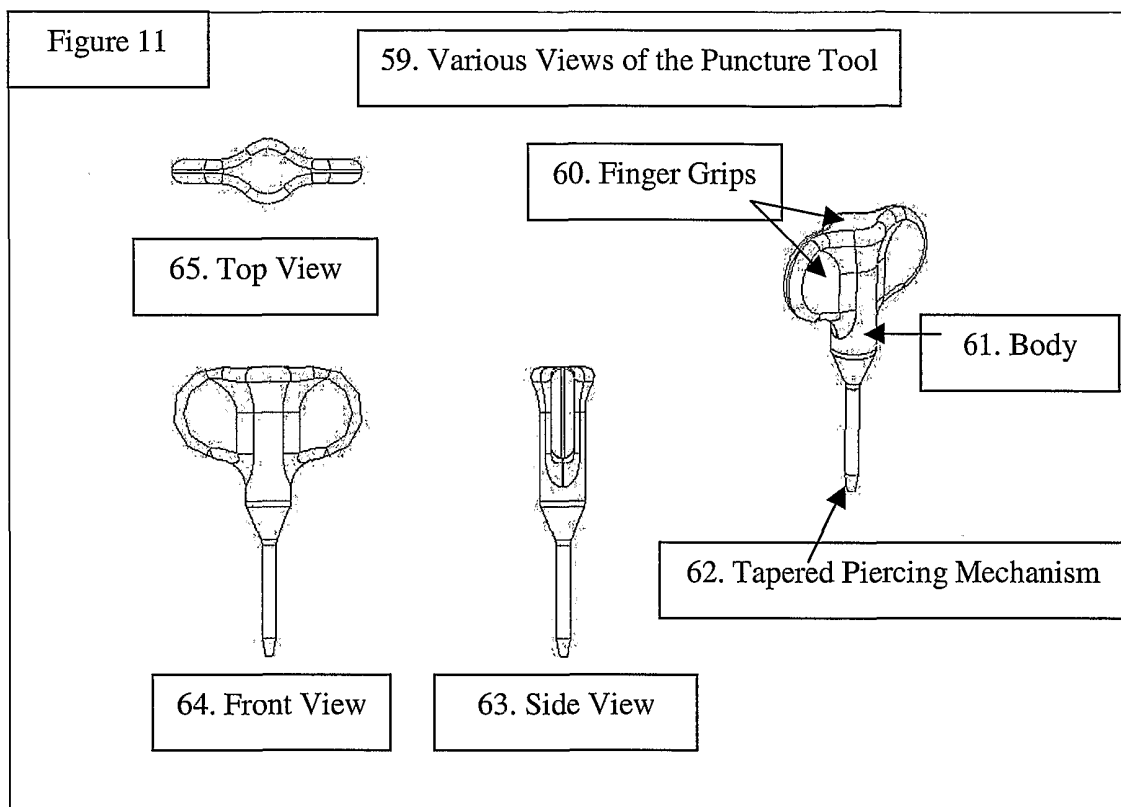


Figure 13

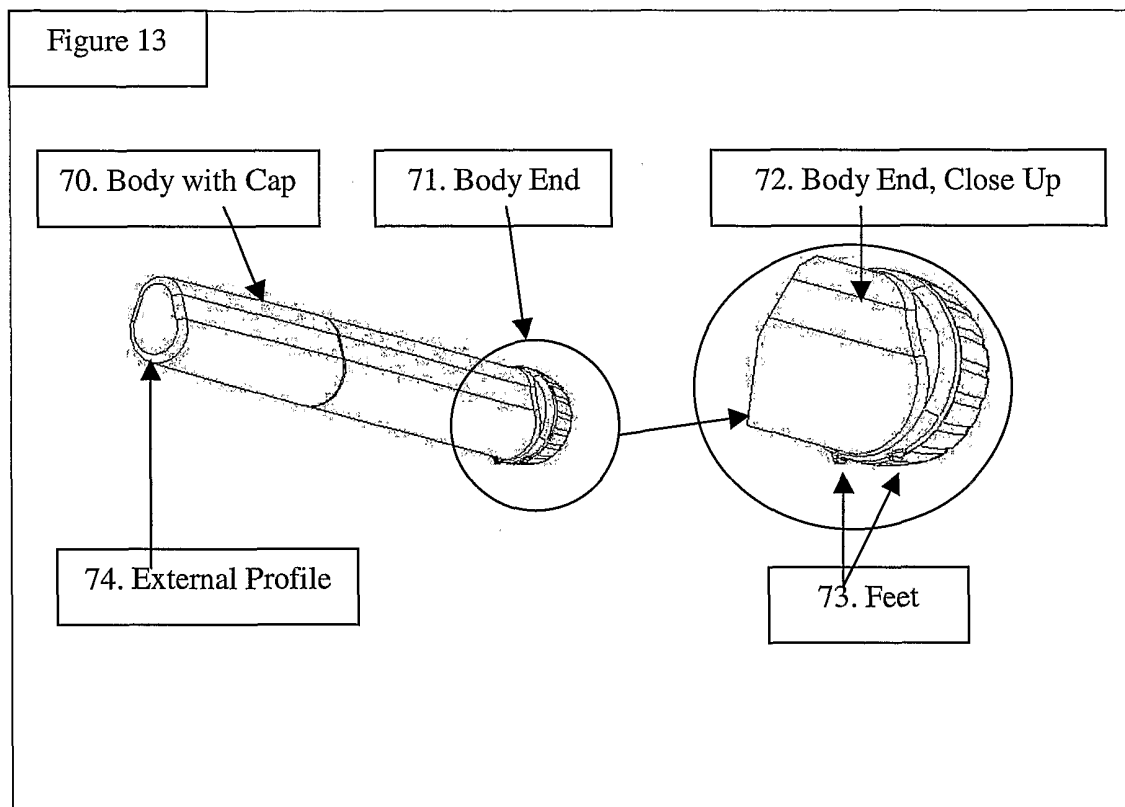


Figure 14

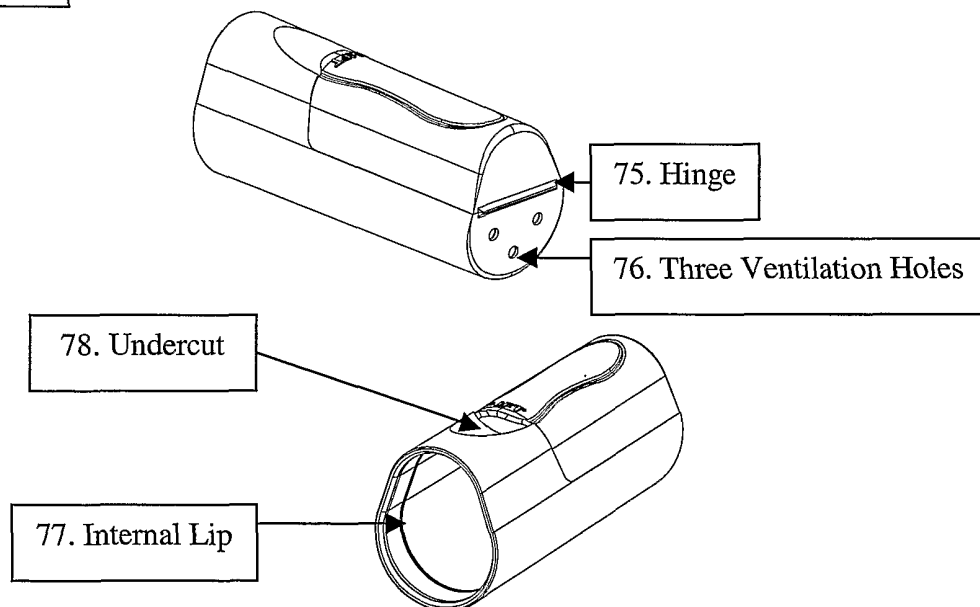


Figure 15

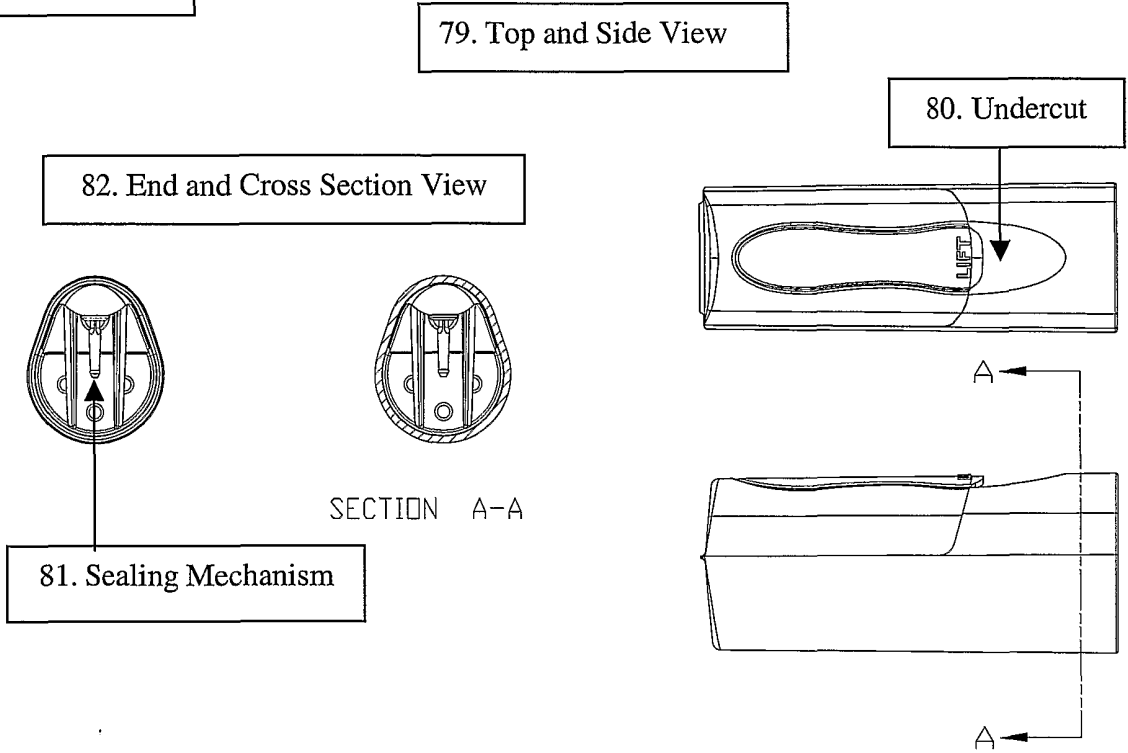
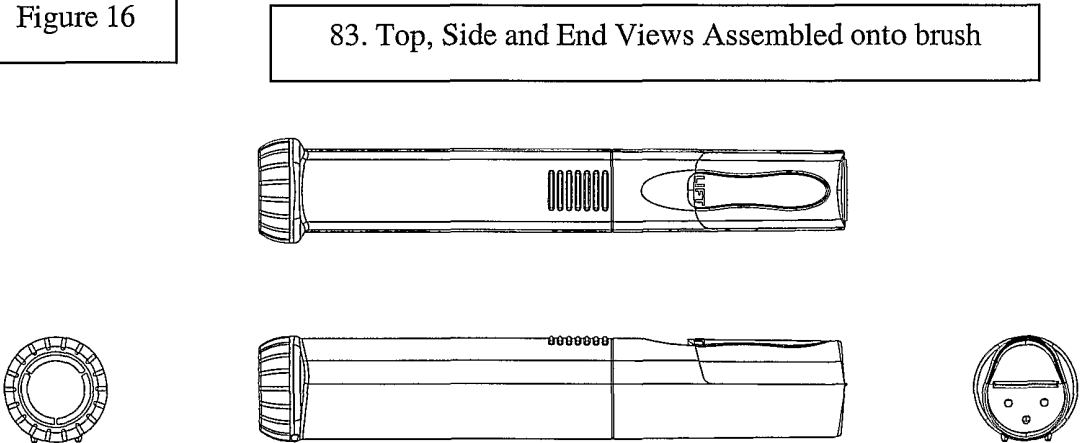


Figure 16



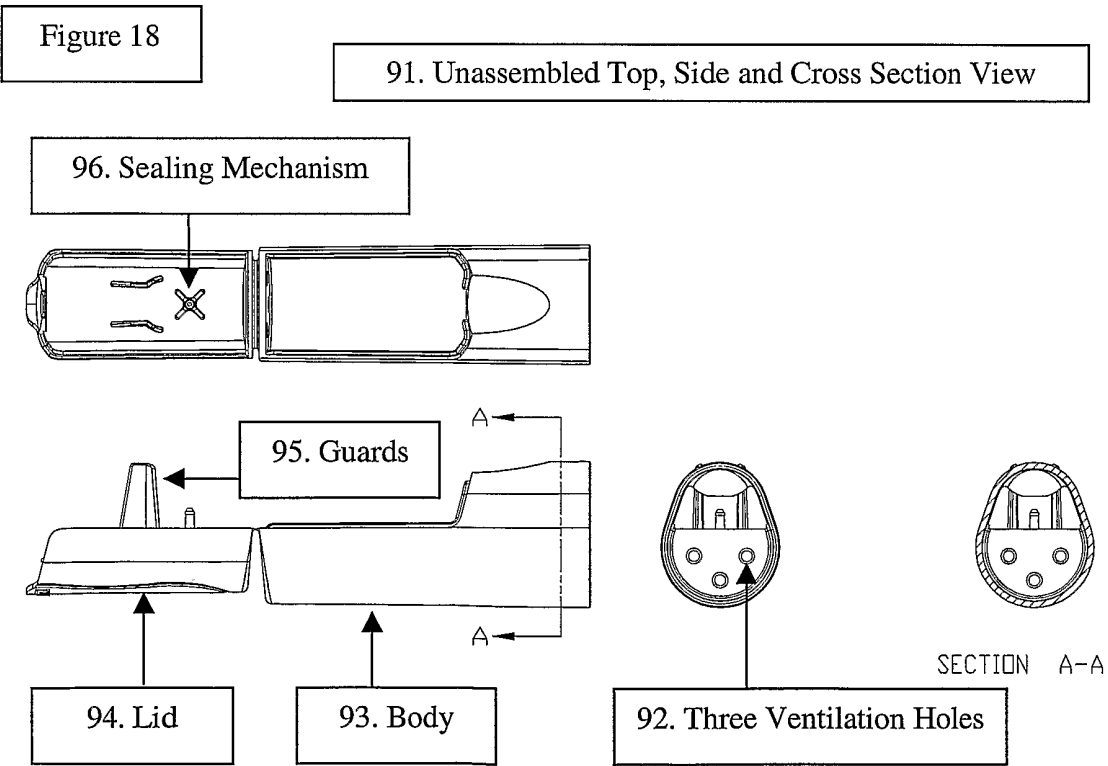
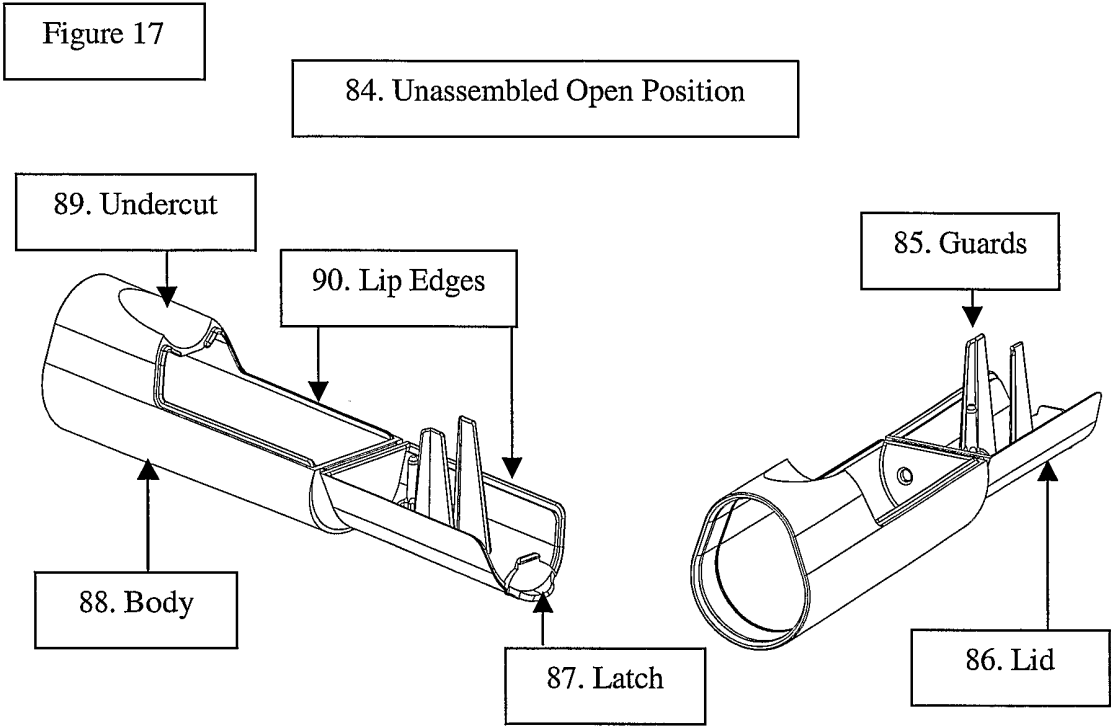


Figure 19

97. Top and Side Views Flip Top Cap assembled onto brush

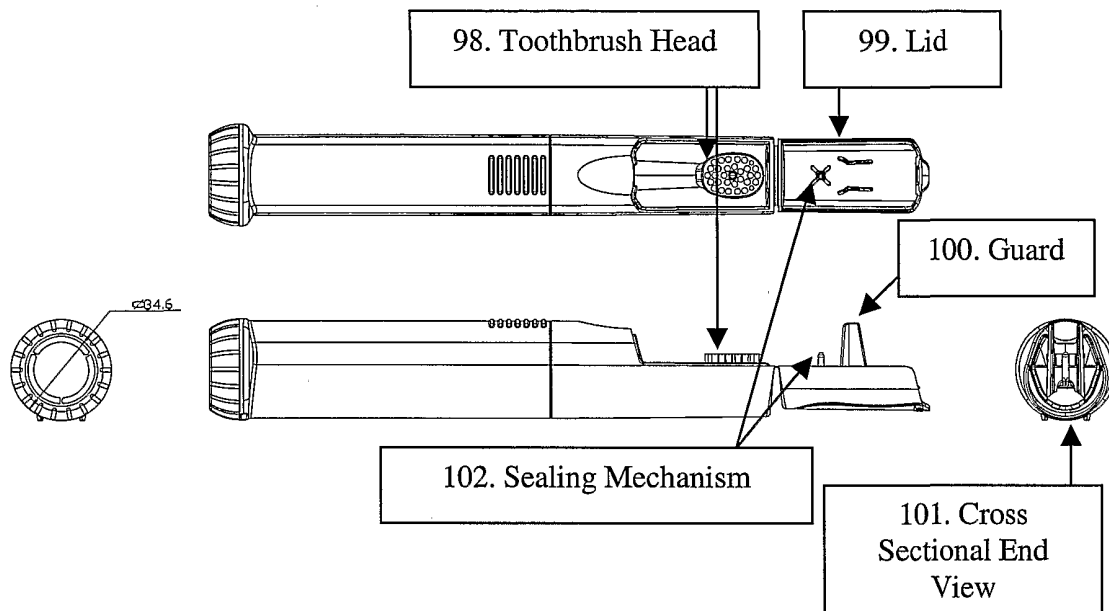


Figure 20

103. Top and Side Views Flip Top Cap onto brush with Lid Open - Enlarged

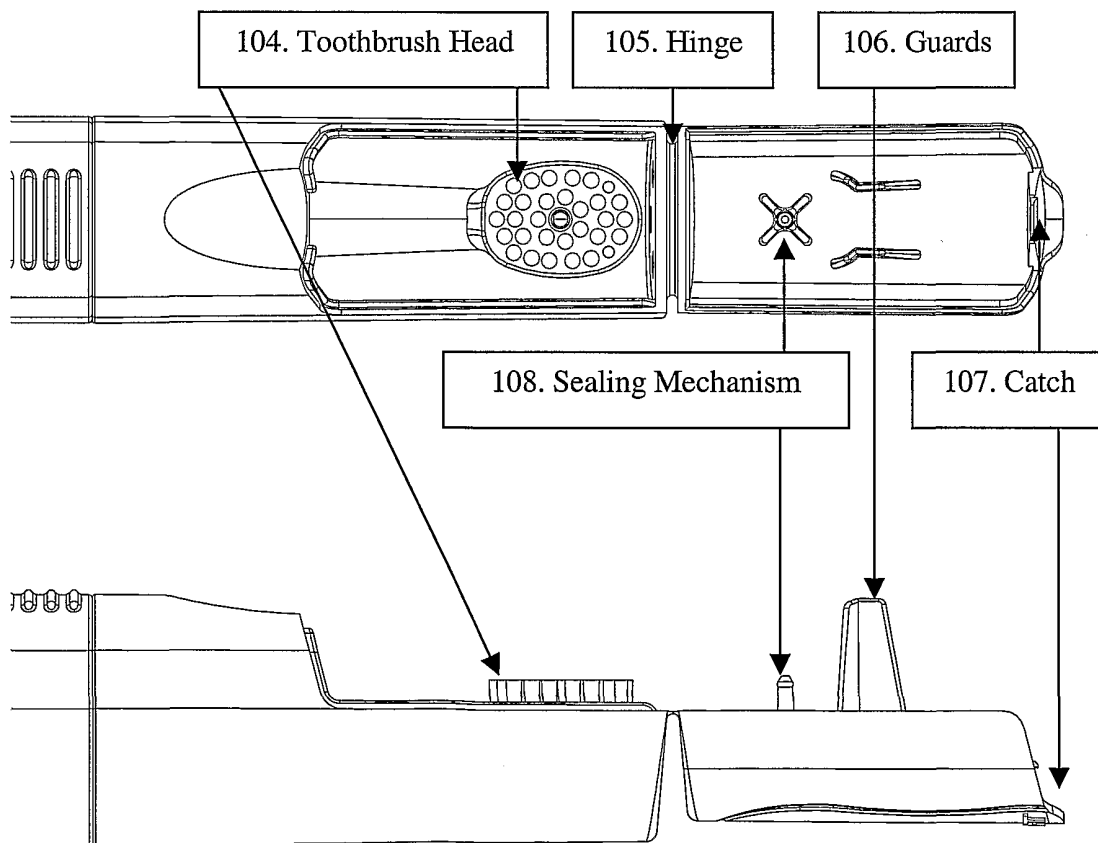


Figure 21

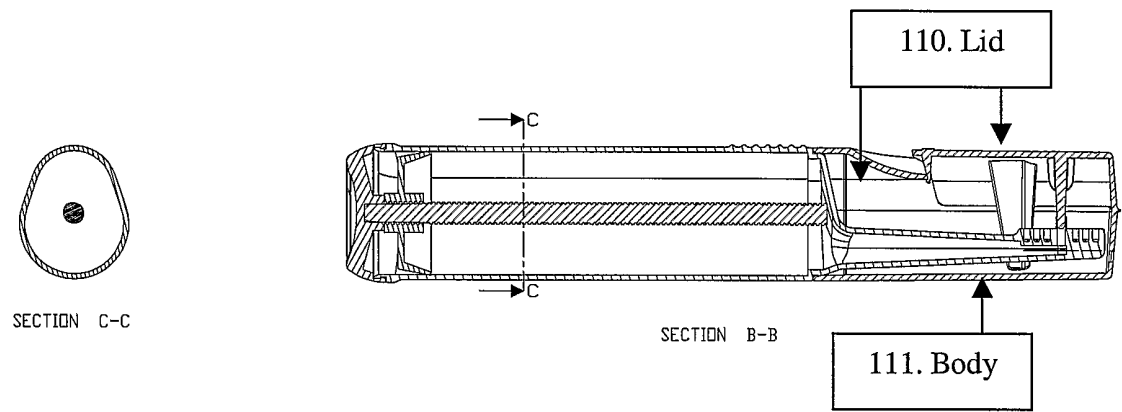


Figure 22

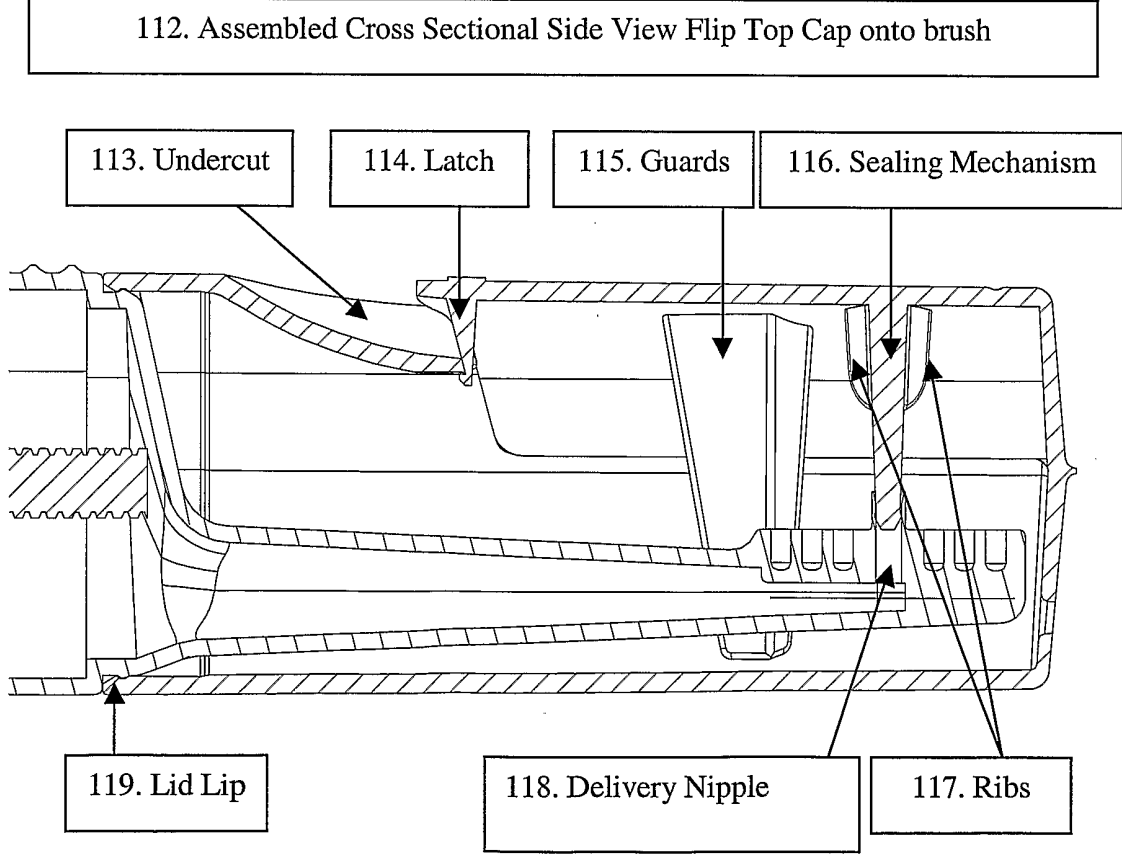


Figure 23

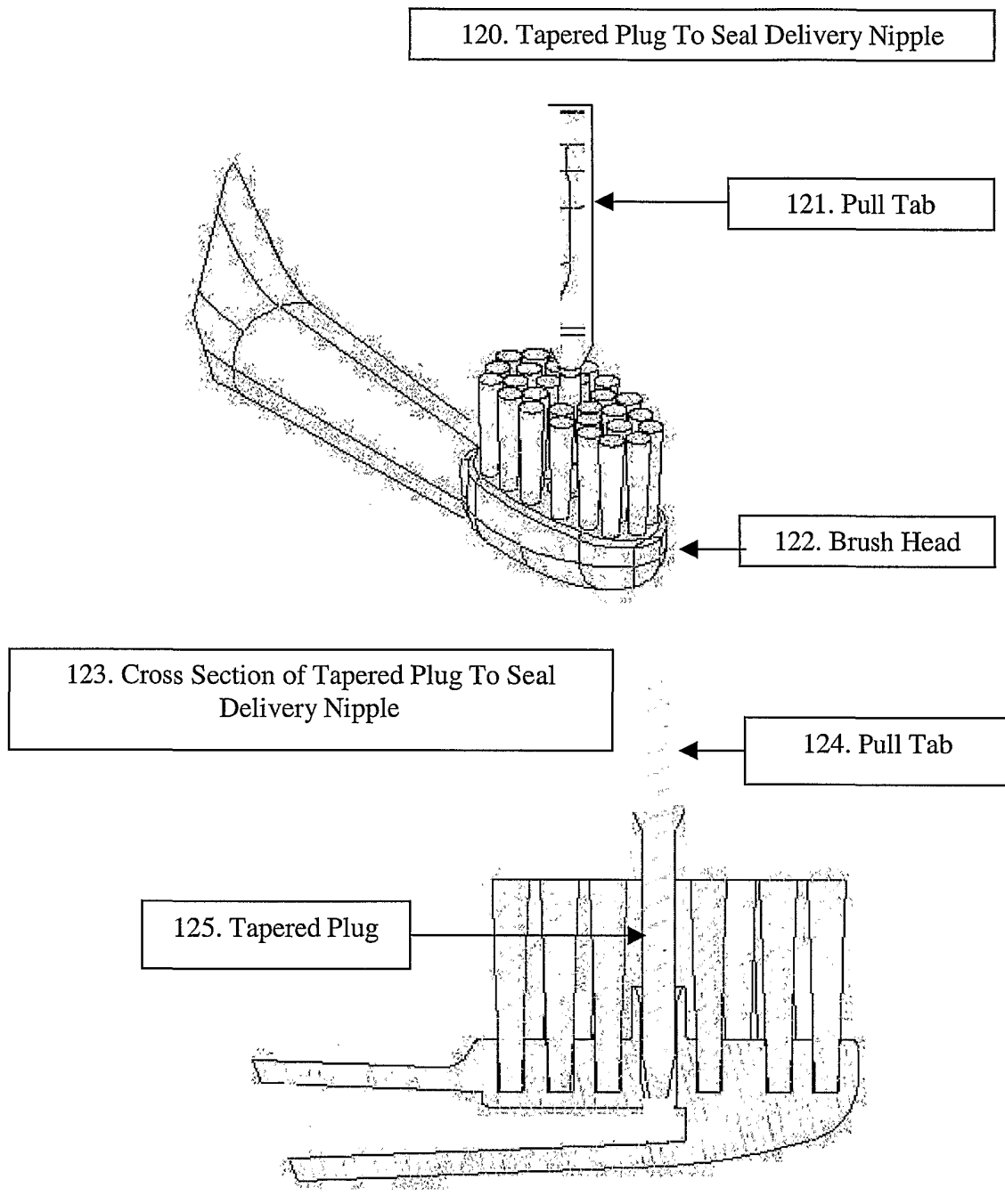


Figure 24

126. Slidable Sealer - Cross Sectional View

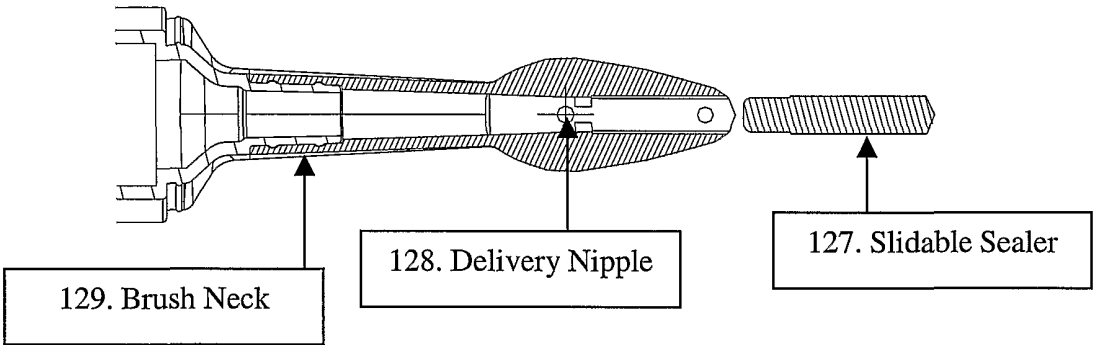
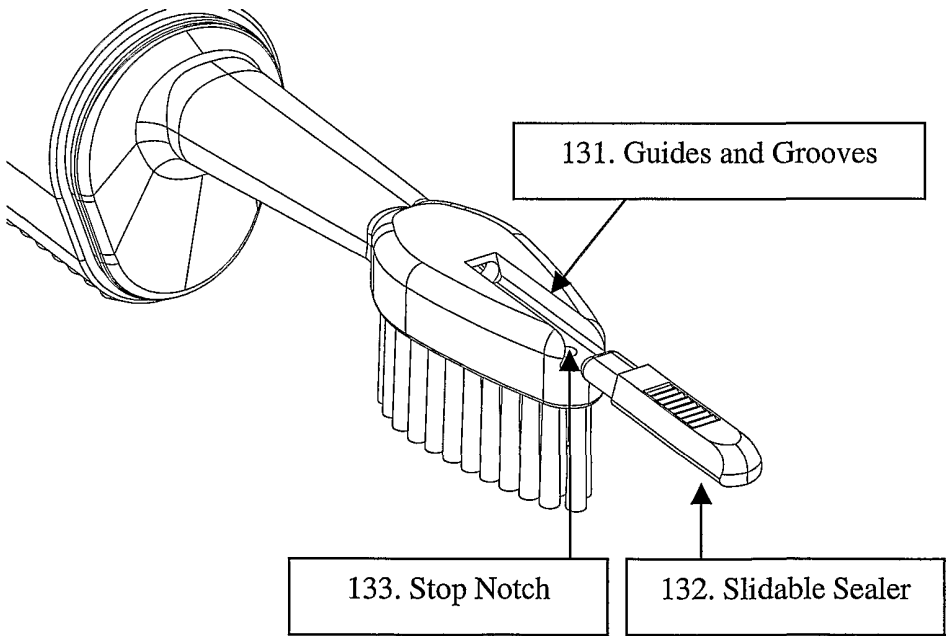


Figure 25

130. Slidable Sealer – External View



INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/01203

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: A46B 9/04, 11/02, 15/00, 17/00, 17/04; A47K 5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Derwent World Patent Index: Keywords: tooth brush , oral brush, dentifrice, paste, gel, toothpaste.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BE 1000391 A7 (PAPAGEORGIOU) 22 November 1988 See figures	2
A	DE 3312392 A1 (VESELY) 6 October 1983 See figure D	1-8
A	US 4521128 A (O'NEAL) 4 June 1985 Whole document	1-8

☒ Further documents are listed in the continuation of Box C
 ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

7 November 2001

Date of mailing of the international search report

12 NOV 2001

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/01203

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2205486 A (MEAD) 14 December 1988 Whole document	1-8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/01203

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See supplementary sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claims 1, 3 - 8 are directed to a disposable toothbrush and toothpaste combination unit including a non-round brush body, a flat face on the knob, feet located on two sides of the brush body and the near isosceles triangular shape to prevent the unit from rolling. It is considered that the combinations of the features which prevent the unit from rolling comprises a first "special technical feature".
2. Claim 2 is directed to a flip top cap for disposable toothbrushes and dentifrice combination unit, the cap including a hinged movable flap that has a tapered shaft that inserts into the interior of the delivery nipple. It is considered that the cap construction comprises a second "special technical feature".

These groups are not so linked as to form a single general inventive concept, that is, they do not have any common inventive features, which define a contribution over the prior art. The common concept linking together these groups of claims is disposable toothbrush and dentifrice combination unit which has a delivery nipple in the brush head.. However this concept is not novel in the light of the citations listed herein this report. Therefore these claims lack unity a posteriori.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU01/01203

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
BE	1000391	NONE					
DE	3312392	EP	132459				
US	4521128	AU	10308/83	CA	1198859	JP	58183109
GB	2205486	NONE					
END OF ANNEX							