



(51) International Patent Classification:

B05B 11/00 (2006.01) **B05B 11/04** (2006.01)

(21) International Application Number:

PCT/EP2017/080105

(22) International Filing Date:

22 November 2017 (22.11.2017)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1619750.1 22 November 2016 (22.11.2016) GB
1619830.1 23 November 2016 (23.11.2016) GB

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— without international search report and to be republished
upon receipt of that report (Rule 48.2(g))

(54) Title: DISPENSE TIP AND DISPENSER APPARATUS

(57) Abstract: There is disclosed a retractable or self-closing dispense tip, particularly suited for dispensing viscous liquid. A retractable dispense tip is disclosed which comprises a hollow tube configured to collapse inwards under a resilient bias to close the tube. Also disclosed is a self-closing dispense tip comprising a hollow tube, wherein an end region of the tube is configured to close the tube under a resilient bias, the end region being responsive to positive pressure internal to said hollow tube to open the tube against the resilient bias. Other proposals comprise a mesh for controllably dispensing a viscous liquid, wherein the mesh is configured to inhibit the passage through the mesh of a viscous liquid incident on the mesh under ambient pressure, and to permit the passage of the liquid through the mesh responsive to a positive pressure on the liquid. Also disclosed are dispenser apparatuses comprising such dispensing tips.



Dispense tip and dispenser apparatus

Field

The present invention relates to a dispense tip and dispenser apparatus. In particular, but not exclusively, the present invention relates to a dispense tip and dispense apparatus for dispensing a viscous liquid such as a lubricant.

Background

Dispenser apparatus for dispensing a viscous liquid such as a lubricant are well known and amongst other things comprise "squeeze to use" containers in which the sides of a container are squeezed to compress the container body in order to expel lubricant from the container body. Such known dispenser apparatus may spill the contents if knocked over or dislodged and contents may even leak from the dispenser apparatus through its dispense tip. Such spillage and leakage causes unwanted "mess" and inadvertent dispensing of the viscous contents. Moreover, in order to avoid unwanted spillage or dispensing careful opening and closing of the dispenser apparatus is necessary, for example, and often requires the use of both hands.

Aspects and embodiments in accordance with the present invention were devised with the foregoing in mind.

Summary

Viewed from a first aspect there is provided a retractable dispense tip comprising a hollow tube wherein a wall of said hollow tube is configured to collapse inwards under a resilient bias to close said tube. Typically said hollow tube is a cylinder comprising a continuous wall. Optionally, said hollow tube may have a polygonal cross-section and be configured such that one or more walls of a polygon cross-section hollow tube collapse inwards under a resilient bias to close the polygon cross-section hollow tube.

Suitably, the retractable dispense tip is made of silicone or other similar resilient material. Such a retractable dispensing tip may provide a self-cleaning "nib" for a container storing a viscous liquid such as a lubricant.

The retractable dispense tip may be opened against the resilient bias by a positive pressure internal to the hollow tube.

Viewed from a second aspect there is provided a dispenser apparatus comprising a retractable dispense tip such as described above and a collapsible or squeezable container

for storing a viscous liquid. The retractable dispense tip may be disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus. In use, the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the retractable dispense tip such that the tip may be opened against the resilient bias by that positive pressure to dispense container contents. Typically, the positive pressure is conveyed via the container contents themselves.

By collapsing inwards on itself the dispense tip is protected from the external environment thereby avoiding contamination and providing for a cleaner and more hygienic dispensing of contents.

Viewed from a third aspect there is provided a self-closing dispense tip comprising a hollow tube, wherein at one end of said hollow tube an end region wall is configured to close said hollow tube under a resilient bias, said end region wall responsive to positive pressure internal to said hollow tube to open said hollow tube against said resilient bias. Typically, the end region wall comprises two parts configured to form complementary flat surfaces urged together under said resilient bias to close said hollow tube. Such complementary flat surfaces when urged together under said resilient bias take the general form of a nib. Generally, the hollow tube is a cylinder comprising a continuous wall configurable at said end region as described in the foregoing.

Optionally, said hollow tube may have a polygonal cross-section and be configured such that one or more walls of a polygon cross-section hollow tube collapse at one end towards each other under a resilient bias to close the polygon cross-section hollow tube.

Suitably, the self-closing dispense tip is made of silicone or other similar resilient material. Such a self-closing dispense tip may be easier to clean than conventional tips. For example, it may be simple to “wipe” clean the tip.

Viewed from a fourth aspect there is provided a dispenser apparatus comprising a self-closing dispense tip such as described above and a collapsible or squeezable container for storing a viscous liquid. The self-closing dispense tip may be disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus. In use the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the retractable dispense tip such that the tip may be opened against a resilient bias by that positive pressure to dispense container contents. Typically, the positive pressure is conveyed via the container contents themselves.

Viewed from a fifth aspect there is provided a dispense head comprising a mesh for controllably dispensing a viscous liquid, wherein said mesh is configured to inhibit the passage of a viscous liquid incident on said mesh under ambient pressure through said mesh and permit the passage of said viscous liquid incident on said mesh through said mesh responsive to a positive pressure on said incident viscous liquid. Viscous liquid having passed through the mesh then be wiped from the surface of the mesh in order to leave a substantially clean and viscous liquid free mesh surface.

Viewed from a sixth aspect there is provided a dispenser apparatus comprising a dispense head comprising a mesh such as described above and a collapsible or squeezable container for storing a viscous liquid. The dispense head may be disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus. In use the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the dispense head such that the viscous liquid may pass through the mesh in order to dispense container contents. Typically, the positive pressure is conveyed by the container contents themselves.

Viewed from a seventh aspect there is provided a dispenser apparatus comprising: an outer bottle and an inner bottle, said inner bottle having an interior configured to contain a viscous liquid, said inner bottle being slidably movable with respect to said outer bottle, and a dispense pump arranged to be actuatable by movement of said inner bottle with respect to said outer bottle, said dispense pump comprising a chamber for receiving said viscous liquid from said inner bottle, said apparatus further comprising first and second closable openings, wherein said first closable opening is arranged to provide fluid communication between said interior of said inner bottle and said chamber, said first closable opening being configured to open responsive to a negative pressure generated in said chamber to allow viscous fluid to enter said chamber, wherein said second closable opening is arranged to provide fluid communication between said chamber and an exterior of the apparatus in order to dispense viscous liquid from said apparatus, said second closable opening being configured to close responsive to said negative pressure generated in the chamber.

The second closable opening may be arranged at a dispense end of the apparatus. This assists in keeping the closable opening or dispensing tip clean because the closable opening cuts off the supply of viscous liquid at the actual dispense end of the apparatus and can be easily wiped clean. There is no portion of conduit between the closable opening and dispensing end in which residual fluid can remain and subsequently leak out.

Optionally, the first and second closable openings may comprise one-way valves. The first closable opening may comprise a ball valve. This is readily available and effective one-way valve.

The second closable opening may comprise a retractable dispense tip as described above or a self-closing dispense tip as described above. These arrangements have the effects described above.

Optionally, the apparatus may further comprise a viscous fluid in the inner bottle. Moreover, the apparatus may further comprise a wiper element or a collapsible bag.

In general terms a dispenser apparatus such as described above may be described as an airless dispenser. Operation of the dispense pump causes a lower pressure in the chamber which causes the first closable opening to open and viscous liquid to flow into the chamber. Furthermore, a negative pressure in the chamber also causes the second closable opening to close, thereby inhibiting the ingress of air into said dispense apparatus and also inhibiting the accidental or unwanted egress of said viscous liquid from said container when it is not in use.

Optionally, the ball valve may be replaced by a closure element such as the retractable dispense tip or self-closing dispense tip or other suitable closure.

List of figures

One or more embodiments in accordance with the present invention will now be described, by way of example only, and with reference to the drawings in which:

figure 1 is a statement of objectives;

figure 2 is a statement of the problems to be solved;

figure 3 is a statement of the next steps;

figure 4 is an illustration of various dispenser tips applied to conventional containers;

figure 5 is an illustration and commentary on a retractable nib embodiment;

figure 6 is an illustration and commentary on an self-closing nib embodiment;

figure 7 is illustration and commentary on a wipe clean mesh embodiment;

figure 8 is a statement of a totally new concept;

figure 9 is a statement of objectives to be achieved;

figure 10 is illustration and commentary of a single hand pump bottle embodiment;

figure 11 is cut away illustration of a single hand pump bottle in simple line drawing and rendering;

figure 12 is illustration of a product incorporating a single hand pump bottle;

figure 13 is illustration of the retractable nib embodiment in its closed configurations;

figure 14 is illustration of the retractable nib embodiment in its open configuration;

figure 15 is a cross-section line drawing of the retractable nib embodiment;

figure 16 is an illustration of the mesh dispense head embodiment;

figure 17 is a cross-section line drawing of the mesh dispense head embodiment;

figure 18 is a cross-section line drawing of the self-closing dispense tip;

figure 19 is an illustration of the self-closing dispense tip embodiment in its closed configuration;

figure 20 is illustration from a another perspective of the self-closing dispense tip embodiment in its closed configuration;

figure 21 is a cross-section line drawing of the single hand pump bottle embodiment; and

figure 22 is an illustration of a product incorporating the single hand pump embodiment.

Description

Turning now to figure 13 an embodiment of the retractable nib is illustrated. A dispense apparatus 100 comprises a squeezable container 102 at one end of which is a dispense head 104. The dispense head comprises a silicone nib arrangement 106. The nib arrangement comprises a "nipple" 108 having a tubular configuration which is configured such that in its quiescent state or resting state the walls of the tube collapse inwards. Such a quiescent or resting state configuration may be achieved by suitable geometry of the nipple 108. As can be seen from figure 13 the exit of the nipple 108 is tucked within the tube itself in its quiescent state thereby resisting contamination of the dispensing tip and also keeping any viscous liquid that may be at the end of the nipple to be retained within it. Thus, buildup of viscous liquid may be inhibited.

Figure 14 illustrates the nipple 108 in its dispensing configuration in which configuration the nipple is configured as an open dome such that it is wider at its lower portion, 110, than at its opening 112. Forming the nipple 108 of a resilient material will cause it to collapse in on itself since the thicker lower portion 110 is likely to contain great energy such that it will collapse to return to a rest state when pressure is removed from liquid inside the container 102.

The cross-section illustrated in figure 15 shows the open and closed states superimposed upon each other and illustrates the inward turning of the wall of the nipple 108.

Figure 16 is an illustration of an embodiment incorporating a mesh head. Dispenser apparatus 120 comprises a squeezable container 122 and a dispense head 124. The dispense head comprises a mesh dispense tip 126 wherein the mesh comprises apertures sized to inhibit the egress of a viscous liquid from squeezable container 122 in its resting state. When pressure is applied to the viscous liquid stored in squeezable container 122, i.e. by squeezing container 122, the size of the mesh apertures permit passage of the viscous liquid. In use when the mesh is saturated with viscous liquid it can be wiped on to a user's hand or body. Consequently, each time dispensing apparatus 120 is used its dispense head is in effect cleaned by the wiping motion.

Figure 17 illustrates in cross-section the relatively low profile of the mesh head such that they may be fitted close to it thereby saving on manufacturing materials, storage space including shelf display space, and transport costs.

Turning now to figure 18, there is illustrated the self-closing nib embodiment in cross-section. Dispenser apparatus 130 comprises a squeeze to use container 132 having at one end a hollow tube 134 configured with a tip 136 closed by the sidewalls of the tube 134 being drawn together. Typically the tip 134 is made of a resilient material, for example silicone, and the sidewalls are thickened as they are drawn together so that they contact one another.

Figure 19 illustrates the self-closing nib arrangement for a first perspective and figure 20 illustrates the self-closing from a second perspective.

Turning now to figure 21 the single hand pump embodiment is illustrated in cross-section. The single hand pump dispense apparatus 140 includes an outer bottle 142 and an inner bottle 144. A wiper element 146 sits atop a viscous liquid 148 disposed in the inner bottle 144. An actuator element 150 is formed at the top of the inner bottle 144 and is suitable for a user to apply thumb or finger pressure to move the inner bottle 144 inwards with respect to outer bottle 142. A pump arrangement 152 is disposed at the dispense end of the single hand pump apparatus.

The pump arrangement comprises a valve ball 154, a pump piston 156, a pump cap 158 and a pump body 160. The pump also includes a pump spring 162 and a pump clip 164 to clip the pump to an inner cap 166. The pump also includes a silicone valve nib 168 and an outer cap 170.

Actuation of the actuator 152 moves inner bottle 144 downwards with respect to outer bottle 142 which causes certain components of the pump arrangement 152 to be moved downwards. Wiper element 146 follows movement of the liquid 148 downwards with the movement of the inner bottle 144. Releasing actuator 150 causes inner bottle 144 to be moved upwards by the action of spring 162 thereby creating a slightly lower pressure in pump chamber 172. Such lower pressure causes ball valve 154 to be slightly unseated thereby permitting the egress of viscous liquid 148 from inner bottle 144 into pump chamber 172. The movement of viscous liquid 148 into pump chamber 172 in effect primes the pump for its second cycle.

A second actuation causes inner bottle 144 to be moved downwards onto pump arrangement 152 again and causes the pump to be moved against spring 162 causing the liquid in the pump chamber 172 to be forced to self-closing nib 168 and to be dispensed from the dispensing apparatus. Release of actuator 150 causes inner bottle 144 to be moved back away from the spring thereby creating a further negative pressure in the pump chamber causing further ingress of viscous liquid 148 into the pump chamber 172 ready for further actuation to dispense viscous liquid from dispense tip 168.

Viewed from a different perspective, a more detailed explanation of Figure 21 is as follows. A single hand pump dispense apparatus 140 includes an outer bottle or outer container 142 and an inner bottle or inner container 144. The interior space of the inner bottle 144 acts as a reservoir for containing a viscous liquid 148. A wiper element or follower piston 146 is slidably received within the inner bottle 144 and sits atop the viscous liquid 148. The wiper element 146 has seal elements 146a and 146b arranged around the upper and lower peripheries of the wiper element 146, which seal against the interior surface of the inner bottle 144.

An actuator element 150 is formed at the top of the inner bottle 144 and is suitable for a user to apply thumb or finger pressure to move the inner bottle 144 with respect to outer bottle 142 towards a dispense end of the dispense apparatus 140. The actuator element 150 has protrusions 153 which extend into the interior of the inner bottle 144 and prevent the wiper 146 from being pushed too far or jamming in the top of the inner bottle 144. A pump arrangement 152 is disposed at the dispense end of the single hand dispense apparatus 140.

The pump arrangement 152 comprises a pump body 160 having a pump chamber 172 which is formed as a recess in the pump body 160 and is open to the underside of the pump body

160. The pump body 160 is secured to the bottom of the inner bottle 144 and effectively forms the base of the inner bottle 144. The pump body 160 is secured by means of a snap or interference fit.

A pump cap 158 is arranged over the opening of the pump chamber 172 and is secured to the pump body by means of a snap fit, although it should be appreciated that other ways of securing the pump cap 158 could be used. A pump piston 156 is slidably disposed in the pump chamber 172.

An inlet conduit 174 passes through the wall of the pump body which defines the top of the pump chamber 172. The inlet conduit 174 provides fluid communication between the interior of the inner bottle 144 and the pump chamber 172 and acts as an inlet, allowing viscous liquid 148 to pass from the interior of the inner bottle into the pump chamber 172. The inlet conduit 174 is closeable by a valve ball 154 and tapers or narrows as it passes from the pump chamber 172 to the interior of the inner bottle 144 in order to retain the valve ball 154 within the inlet conduit 174. The valve ball 154 is biased into the inlet conduit 174 by means of a ball spring to keep the inlet conduit 174 closed when the pump arrangement 152 is not being actuated.

An outlet conduit 180 is formed through pump piston 156. An outlet tube 182 is arranged in outlet conduit 180 and extends from the pump piston 156, through an aperture formed in the pump cap 158, to a dispense tip or nib 168. The outlet tube 182 provides fluid communication between the pump chamber 172 and dispense tip 168. The dispense tip 168 acts as a one-way valve, i.e. only allowing viscous liquid 148 to be dispensed from the apparatus 140 but not allowing fluid to enter the apparatus 140.

The outlet tube 182 is connected to a pump clip 164. The pump clip 164 has an upwardly extending tubular element 184 which is slidably received within a further tubular element which downwardly extends from the pump cap 158 such that the pump clip 164 can reciprocally move relative to the pump cap 158. A pump spring 162 biases the pump clip 164 away from the pump cap 158.

The pump clip 164 is secured to an inner cap 166 which, in turn, is secured to the outer bottle 142. The dispense tip 168 protrudes through an opening in the inner cap 166.

In use, a user applies thumb or finger pressure to actuator element 150 which causes the inner bottle 144 and the pump body 160 and pump cap 158 to move relative to the outer

bottle 142 (and relative to the remaining features of the pump arrangement 152) towards a dispense end of the dispense apparatus 140. The outer bottle 142 is connected via the inner cap 166, the pump clip 164 and the outlet tube 182 to the pump piston 156. Therefore, the inner bottle 144 and pump body 160 move relative to the pump piston 156. In particular, the pump body 160 is moved towards the pump piston 156, expelling any fluid contained in the pump chamber 172 from dispense apparatus 140 via dispense tip 168. As the pump body 160 is moved towards the pump piston 156, positive pressure is exerted on the valve ball 154 from within the pump chamber 172 such that it closes the inlet conduit 174 during the downward stroke of the inner bottle 144 and pump body 160.

When pressure is released from actuator element 150, the inner bottle 144, pump body 160 and pump cap 158 are urged back to their starting position, i.e. away from the dispense end of the dispense apparatus 140, by pump spring 162. This creates a partial vacuum or slight negative pressure in pump chamber 172. This negative pressure pulls valve ball 154 away from inlet conduit 174 against the action of ball spring 178 and viscous liquid 148 is drawn into pump chamber 172. The negative pressure also causes the dispense tip 168 to close thereby prevent the ingress of air or the unwanted escape of any viscous liquid from the apparatus 140. As the pump chamber 172 fills with viscous fluid 148, this, in turn, creates a slight negative pressure in the interior of the inner bottle, which causes the wiper element 146 to slide down the inside of the inner bottle 144 to reduce the effective size of the interior of the inner bottle 144. Vents 151 are formed in actuator element 150 to prevent a vacuum being created in the space inside the inner bottle 144 above the wiper element 146.

The first use of the apparatus 140 primes the pump chamber 172 with viscous liquid 148. If a user applies pressure to actuator element 150 a second or subsequent times, the process described above repeats itself. However, this time the pump chamber 172 is primed with viscous liquid 148 and so further actuations of the apparatus discharge viscous liquid from the device until the supply of viscous liquid 148 runs out. During subsequent actuations of the apparatus 140, the wiper element 146 gradually makes its way towards the bottom of the interior of the inner bottle 144 until it contacts the pump body when all viscous liquid has been used.

In the illustrated embodiment, the inner bottle 144, as well as other components, have a generally cylindrical or tubular shape, but it should be appreciated that these components can be shaped differently in other embodiments.

The pump arrangement 152 has been described with reference to a wiper element type system, but it should be realised that selected features from the arrangement can be adapted for use with other types of pump systems, such as with a collapsible bag type airless dispense apparatus.

It should be noted that directional terms, such as “up”, “down”, “top”, “bottom”, “under”, “left” and “right”, etc. have been used solely for the convenience of the reader in order to aid in the reader’s understanding of the illustrated embodiments, and that the use of these directional terms in no way limits the illustrated features to a specific orientation.

As used herein any reference to “one embodiment” or “an embodiment” means that a particular element, feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of the phrase “in one embodiment” or the phrase “in an embodiment” in various places in the specification are not necessarily all referring to the same embodiment.

As used herein, the terms “comprises,” “comprising,” “includes,” “including,” “has,” “having” or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, “or” refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

In addition, use of the “a” or “an” are employed to describe elements and components of the invention. This is done merely for convenience and to give a general sense of the invention. This description should be read to include one or at least one and the singular also includes the plural unless it is obvious that it is meant otherwise.

In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

The scope of the present disclosure includes any novel feature or combination of features disclosed therein either explicitly or implicitly or any generalisation thereof irrespective of whether or not it relates to the claimed invention or mitigate against any or all of the problems addressed by the present invention. The applicant hereby gives notice that new claims may be formulated to such features during prosecution of this application or of any

such further application derived therefrom. In particular, with reference to the appended claims, features from dependent claims may be combined with those of the independent claims and features from respective independent claims may be combined in any appropriate manner and not merely in specific combinations enumerated in the claims.

Claims

1. A retractable dispense tip comprising a hollow tube wherein a wall of said hollow tube is configured to collapse inwards under a resilient bias to close said tube.
2. A dispenser apparatus comprising a retractable dispense tip according to claim 1 and a collapsible or squeezable container for storing a viscous liquid, wherein the retractable dispense tip is disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus such that in use, the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the retractable dispense tip such that the tip may be opened against the resilient bias by that positive pressure to dispense container contents.
3. A self-closing dispense tip comprising a hollow tube, wherein at one end of said hollow tube an end region wall is configured to close said hollow tube under a resilient bias, said end region wall responsive to positive pressure internal to said hollow tube to open said hollow tube against said resilient bias.
4. A dispenser apparatus comprising a self-closing dispense tip according to claim 3 and a collapsible or squeezable container for storing a viscous liquid, wherein the self-closing dispense tip may be disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus such that in use the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the retractable dispense tip such that the tip may be open against a resilient bias by that positive pressure to dispense container contents.
5. A dispense head comprising a mesh for controllably dispensing a viscous liquid, wherein said mesh is configured to inhibit the passage of a viscous liquid incident on said mesh under ambient pressure through said mesh and permit the passage of said viscous liquid incident on said mesh through said mesh responsive to a positive pressure on said incident viscous liquid.
6. A dispenser apparatus comprising a dispense head comprising a mesh according to claim 5 and a collapsible or squeezable container for storing a viscous liquid, wherein the dispense head may be disposed at one end of the dispenser apparatus in order to provide for the egress of viscous liquid from the dispenser apparatus such that in

use the walls of the container may be squeezed to create a positive pressure internal of the container that is conveyed to the dispense head such that the viscous liquid may pass through the mesh in order to dispense container contents.

7. A dispenser apparatus comprising:

an outer bottle and an inner bottle, said inner bottle having an interior configured to contain a viscous liquid, said inner bottle being slidably movable with respect to said outer bottle, and

a dispense pump arranged to be actuatable by movement of said inner bottle with respect to said outer bottle, said dispense pump comprising a chamber for receiving said viscous liquid from said inner bottle,

said apparatus further comprising first and second closable openings, wherein said first closable opening is arranged to provide fluid communication between said interior of said inner bottle and said chamber, said first closable opening being configured to open responsive to a negative pressure generated in said chamber to allow viscous fluid to enter said chamber,

wherein said second closable opening is arranged to provide fluid communication between said chamber and an exterior of the apparatus in order to dispense viscous liquid from said apparatus, said second closable opening being configured to close responsive to said negative pressure generated in the chamber.

8. A dispenser apparatus according to claim 7, wherein the second closable opening is arranged at a dispense end of the apparatus.

9. A dispenser apparatus according to claim 7 or 8, wherein the first and second closable openings comprise one-way valves.

10. A dispenser apparatus according to any one of claims 7 to 9, wherein the first closable opening comprises a ball valve.

11. A dispenser apparatus according to any one of claims 7 to 10, wherein the second closable opening comprises a retractable dispense tip according to claim 1 or a self-closing dispense tip according to claim 3.

12. A dispenser apparatus according to any one of claims 7 to 11, further comprising a viscous fluid in the inner bottle.

13. A dispenser apparatus according to any one of claims 7 to 12, further comprising a wiper element or a collapsible bag.

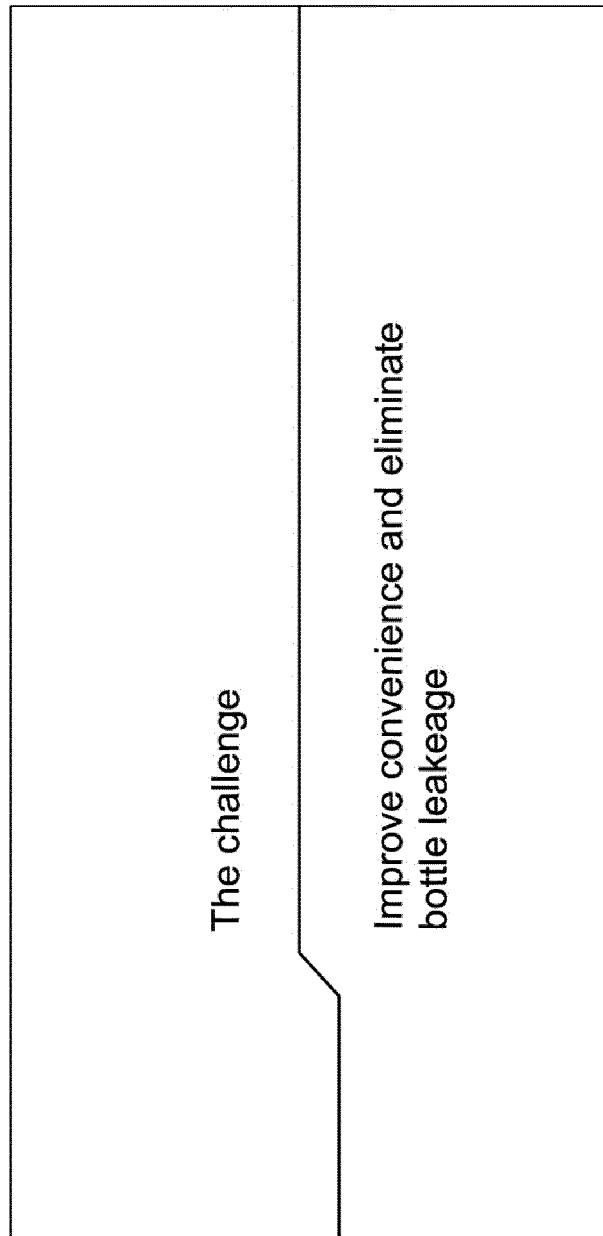


FIG 1

What is the problem?

- Bottles of lubricant have been prone to spilling
- Usage and testing suggests that there is scope for design improvement
- Nerudia have targeted the problem of spillage, unwanted 'mess' and inadvertent dispensing
- Focusing on the idea of single handed use and self cleaning nib designs

FIG 2

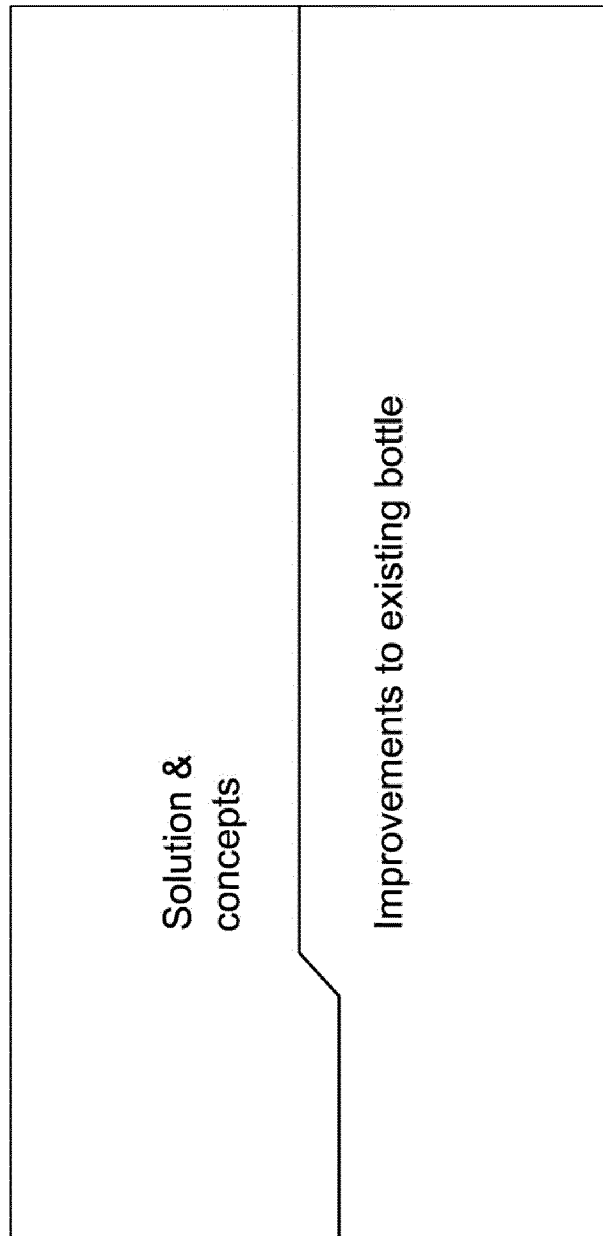


FIG 3

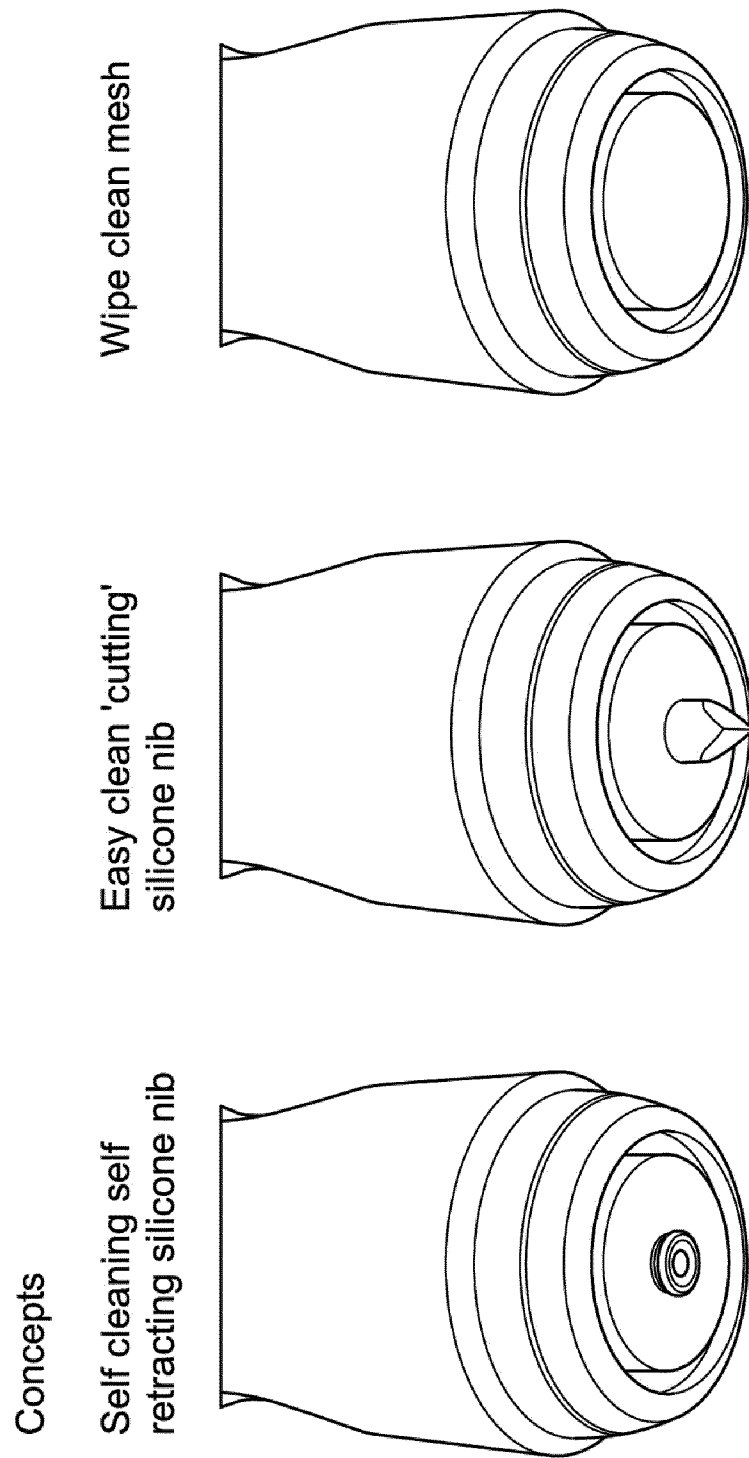
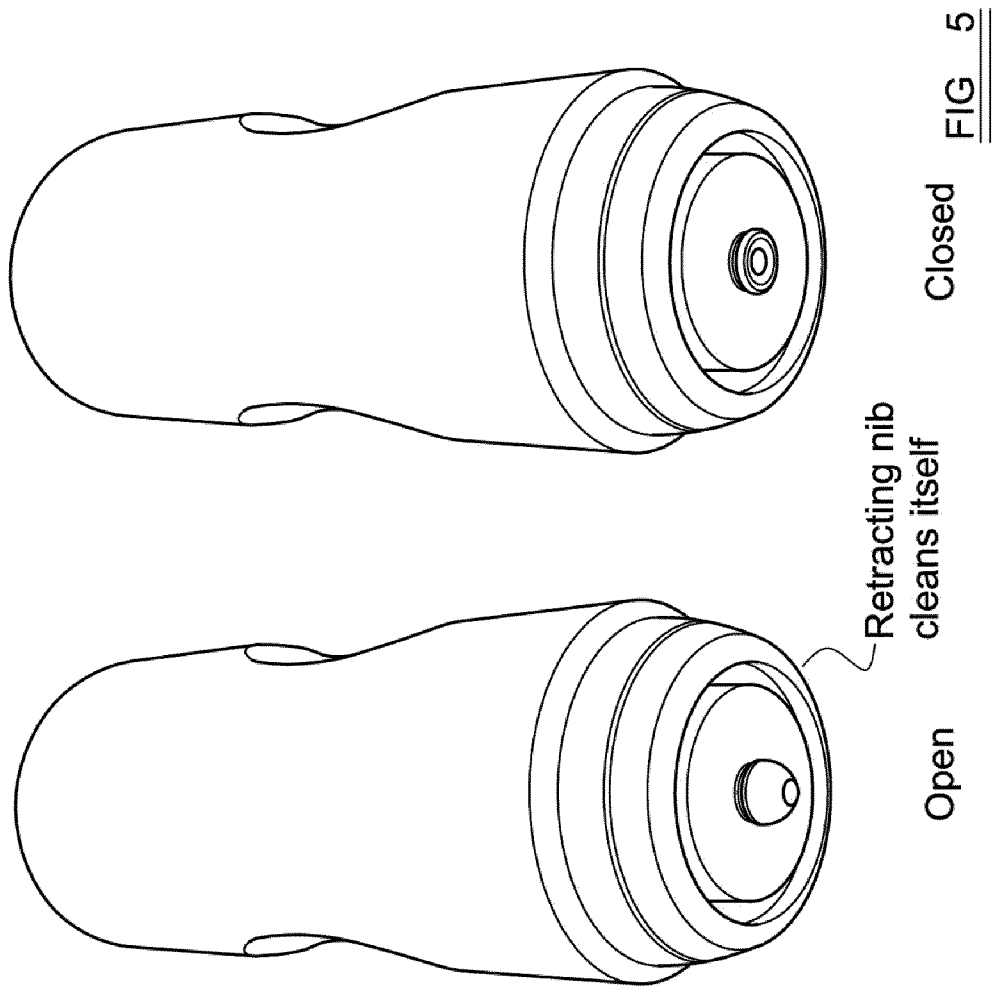


FIG 4



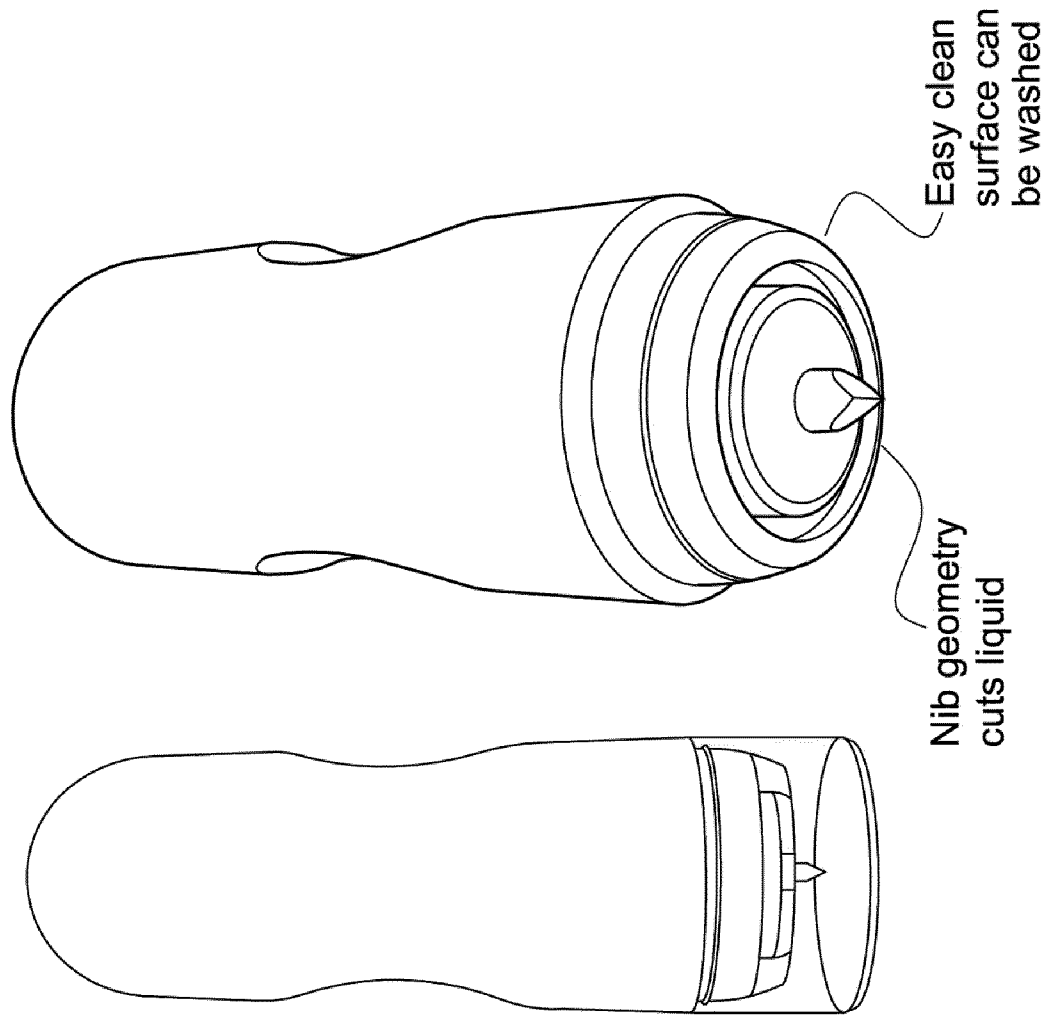
Concept 1 - Self cleaning nib

Specially designed geometry enables the nib to 'open and close' when dispensing product

The open and close motion causes the nib to tuck in on itself and remove any excess product

This prevents product build-up and requires no cleaning

The design can be easily incorporated into the current design at a low cost

FIG. 6

Concept 2 - Easy clean nib

The exposed nib presents an easy clean surface that can be run under a tap to remove any product build-up

The geometry cuts the liquid flow and prevents spillage

The design can be easily incorporated into the current bottle design at a low cost

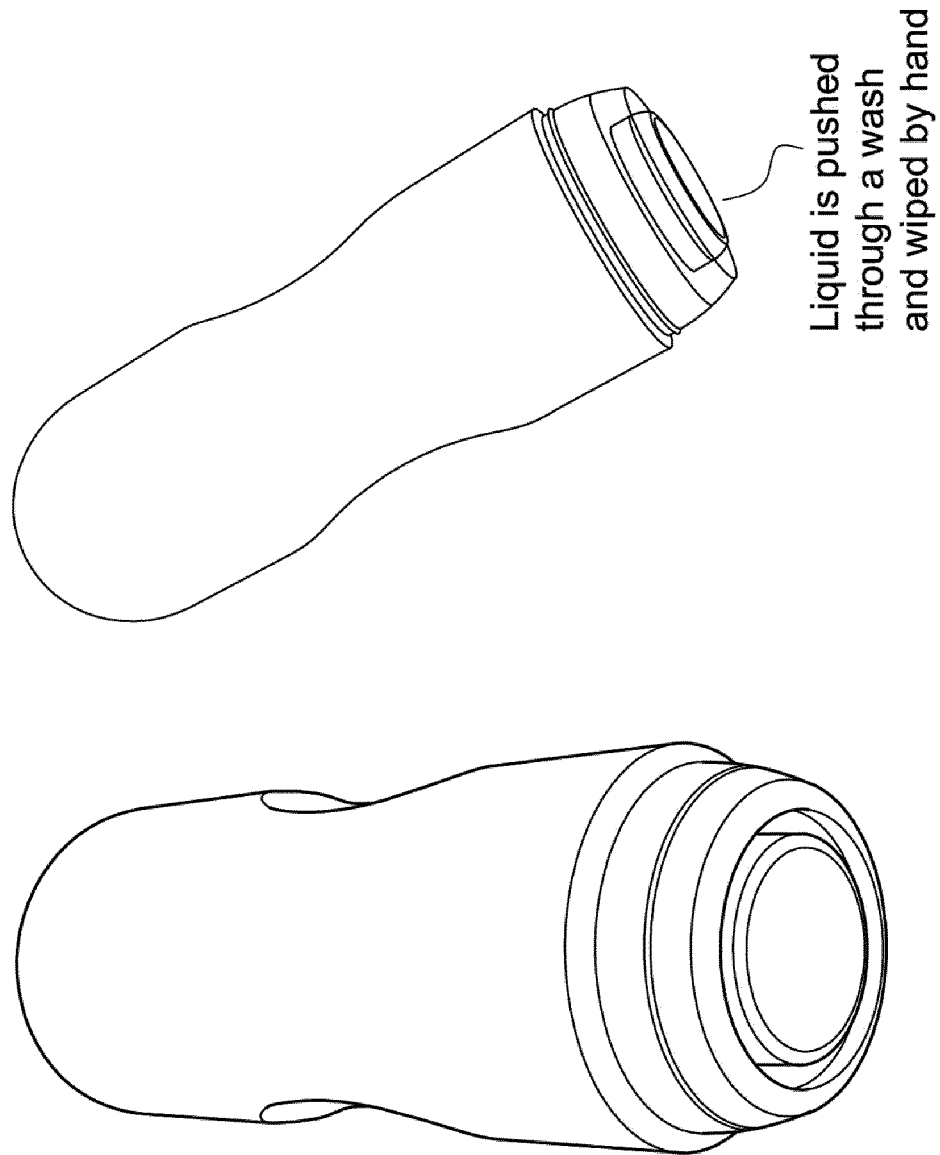
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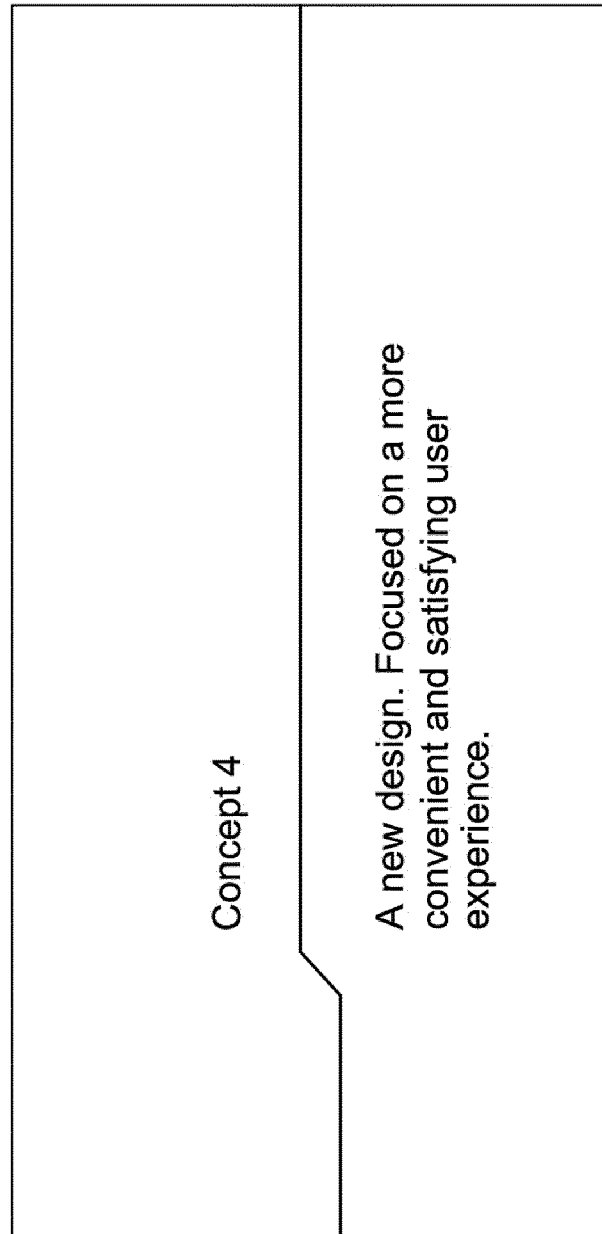
FIG 7**Concept 3 - Wipe clean mesh**

Product is dispersed through mesh pad

When the pad is saturated the product can be wiped away onto the users hand

By nature of function the product is cleaned each time it is used. The wiping motion cleans the surface
The design can be easily incorporated into the current bottle design at a low cost

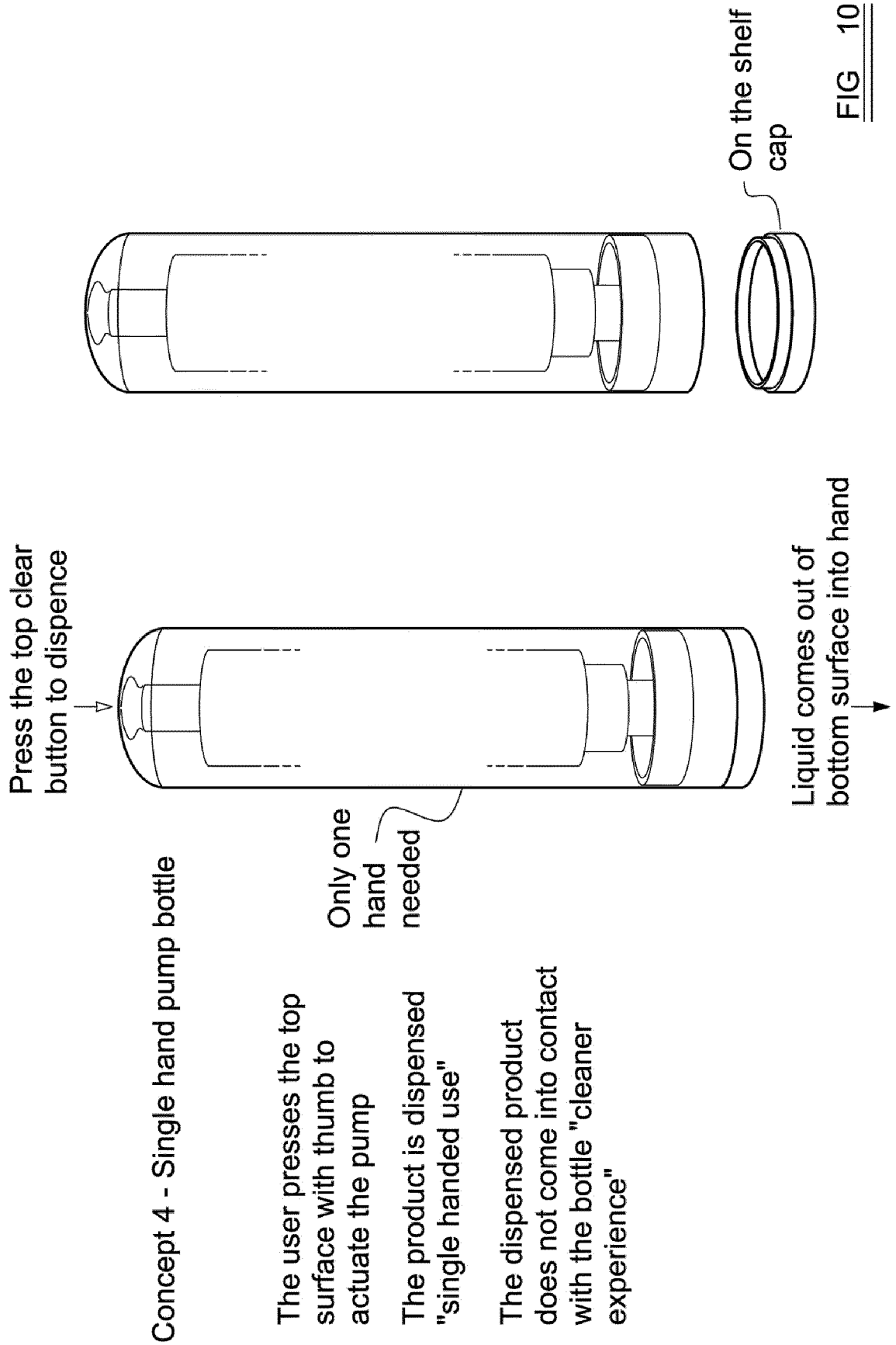


FIG 8

Topics we have focused on

- Single handed use
- Spill free design
- Any orientation dispensing
- Carefree use for the user 'no need to deal with spills after use'
- Full dispensing of product
- A cleaner experience

FIG 9



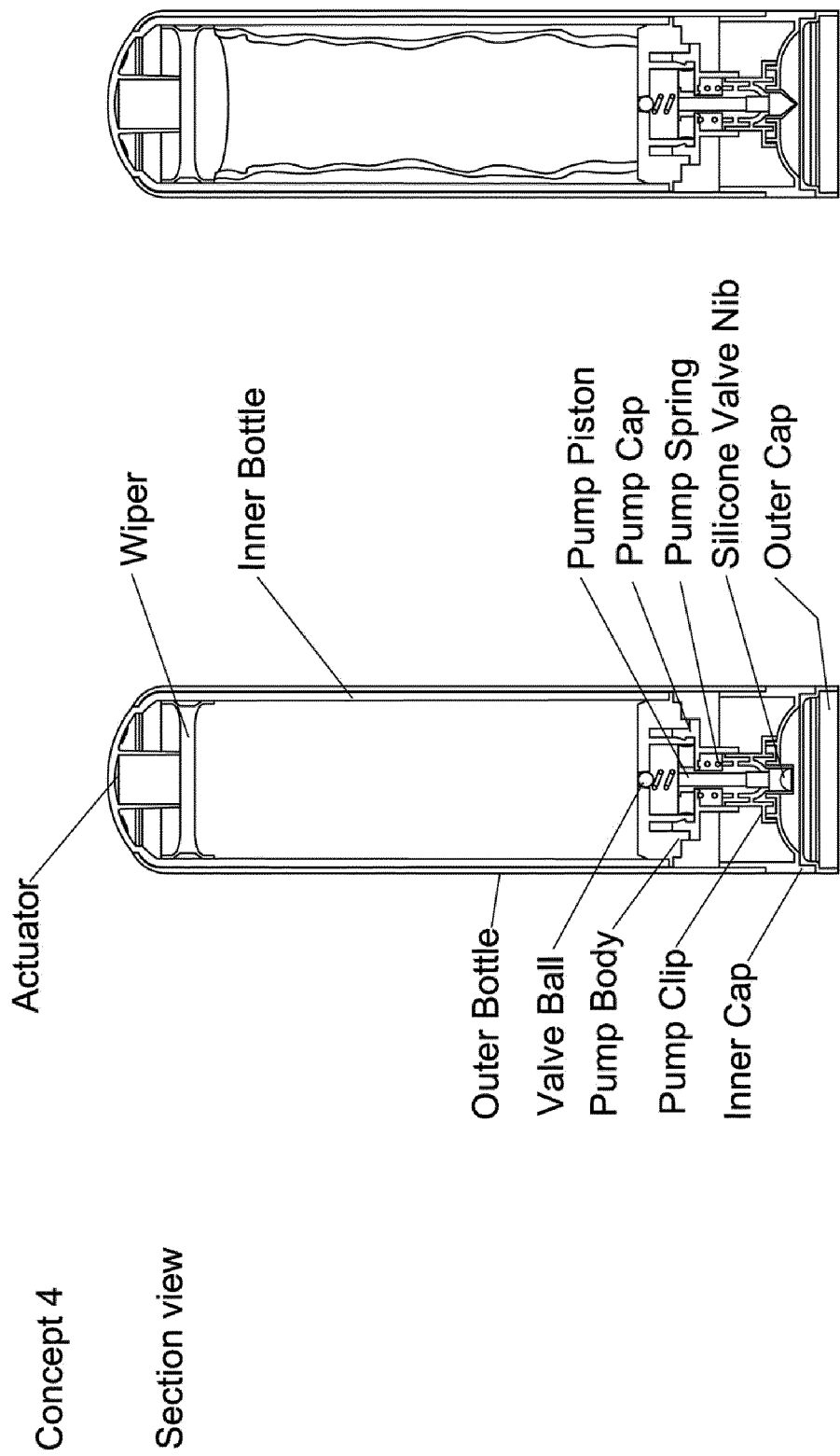


FIG 11

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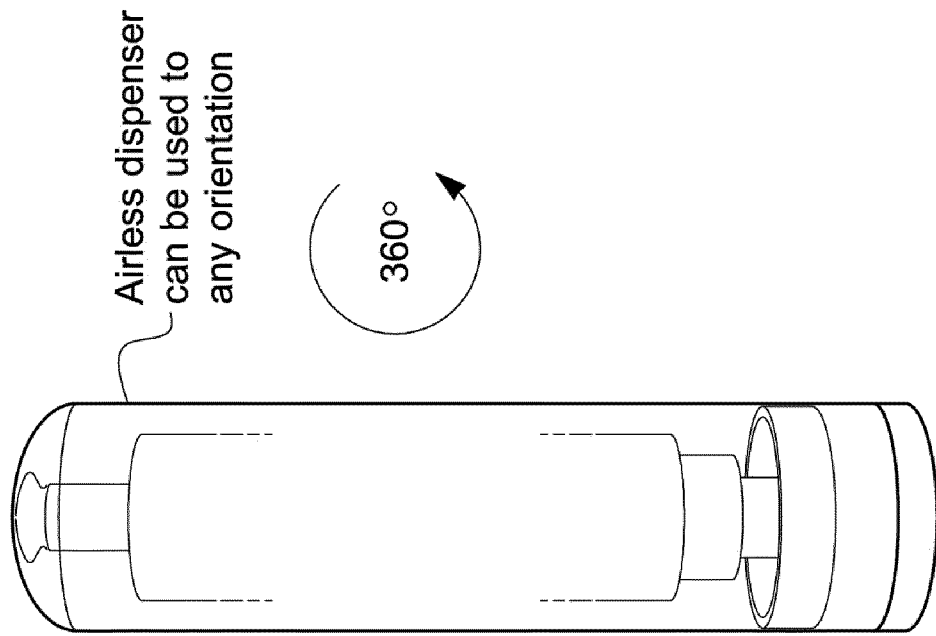
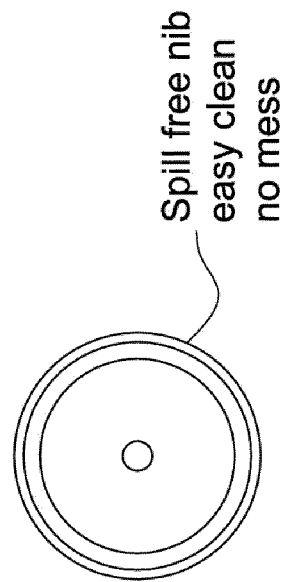
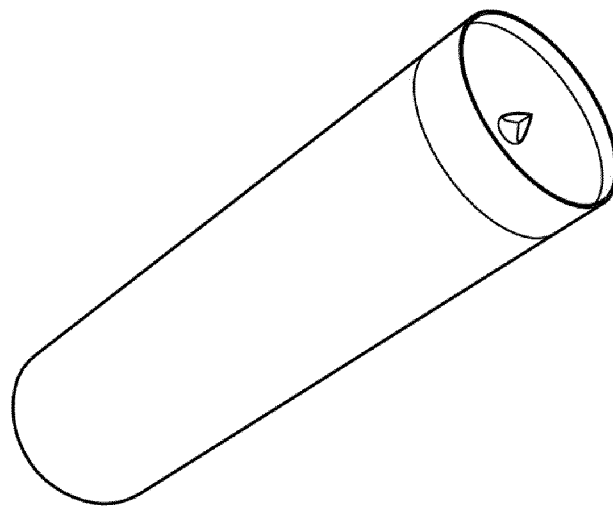


FIG 12



Concept 4

Airless dispenser can be used in any orientation

The airless dispenser ensures minimal product waste

The self sealing nib prevents leakage

The product has no need for a cap

Spill free nib
easy clean
no mess

FIG 13

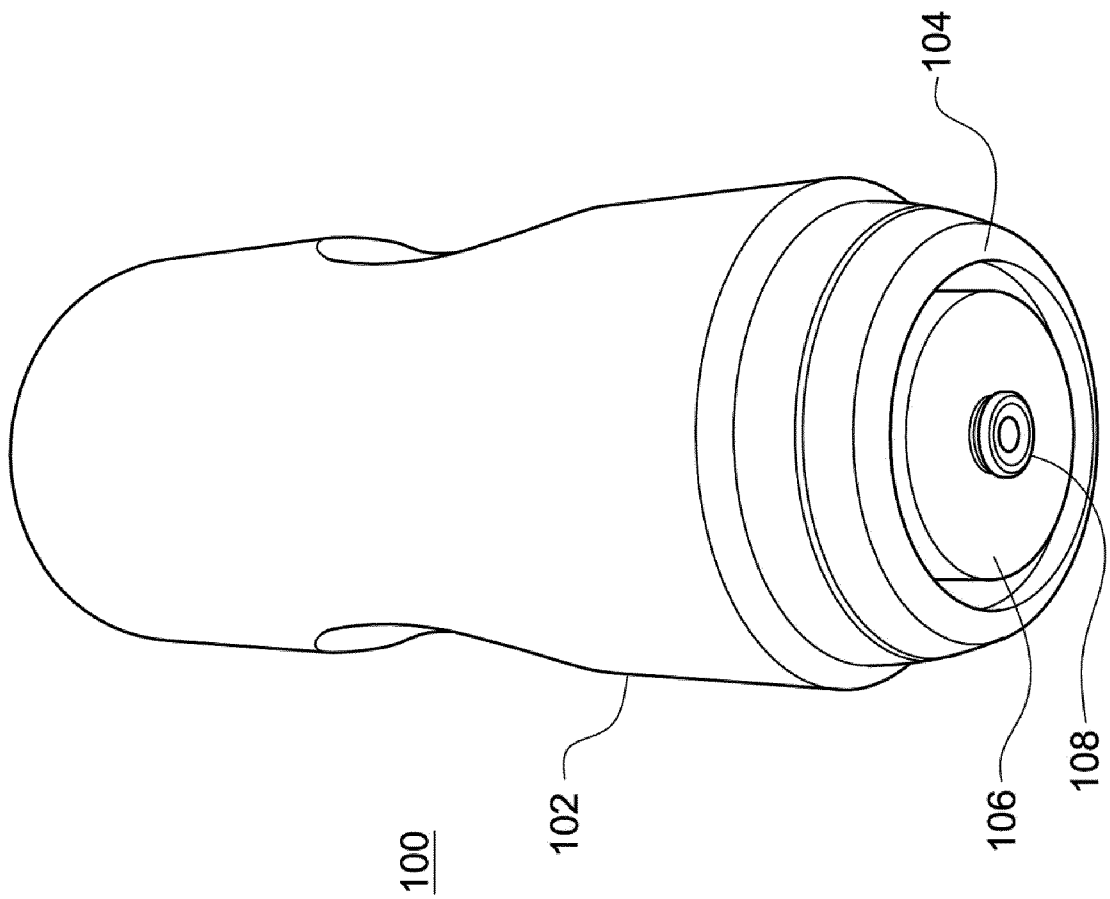
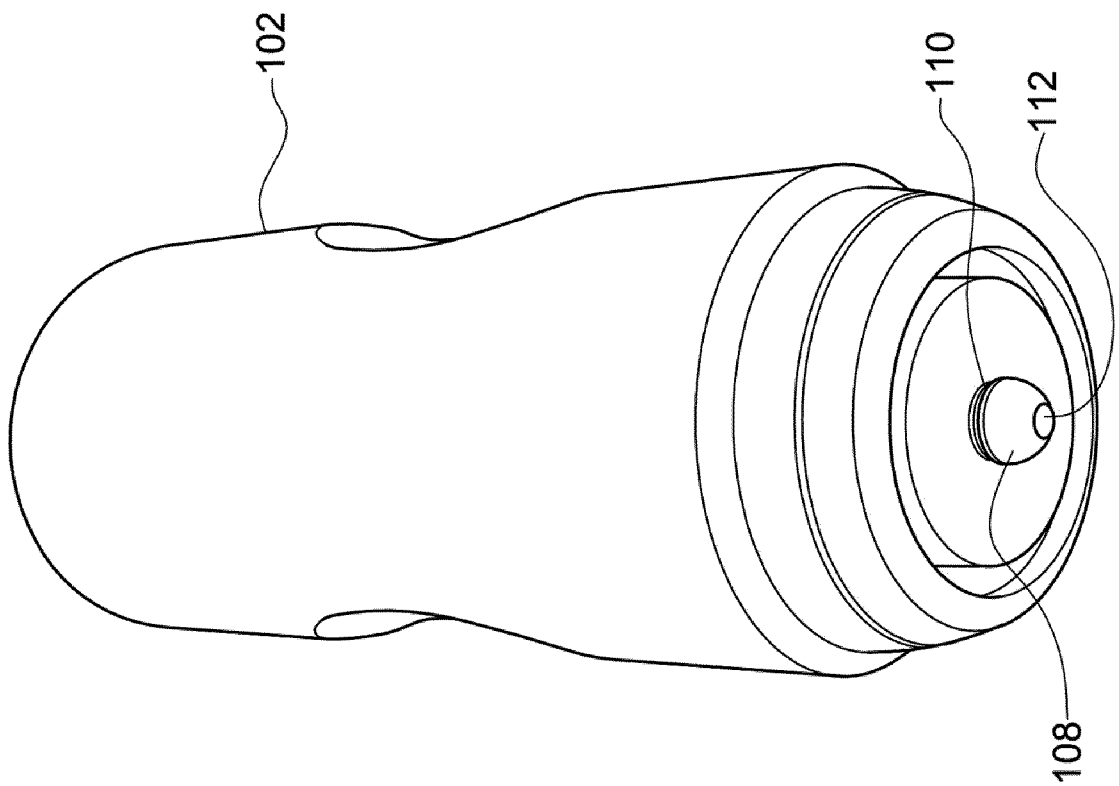


FIG 14



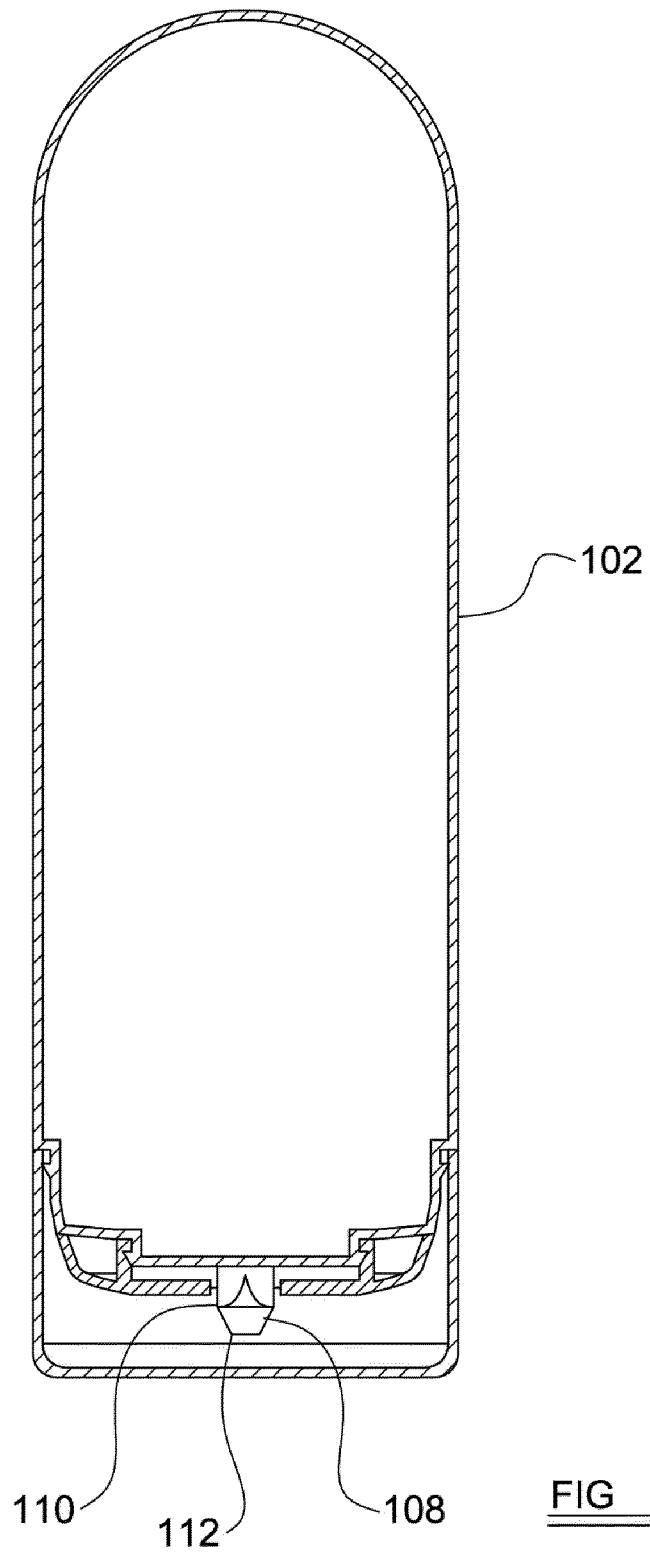
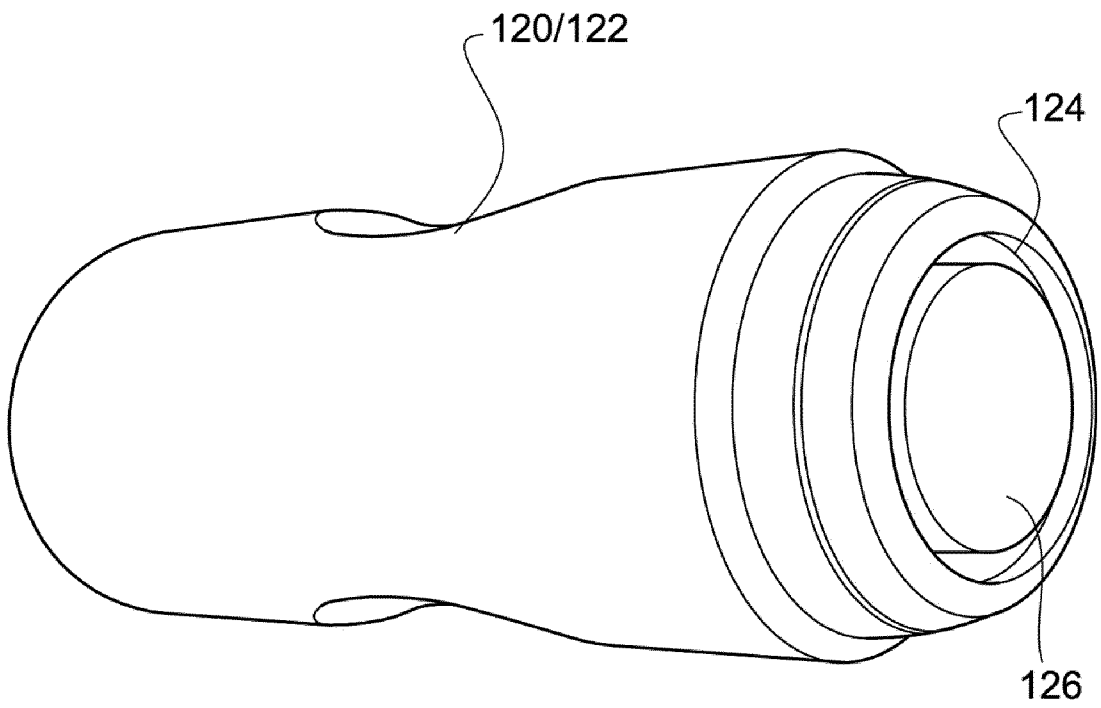


FIG 15

FIG 16



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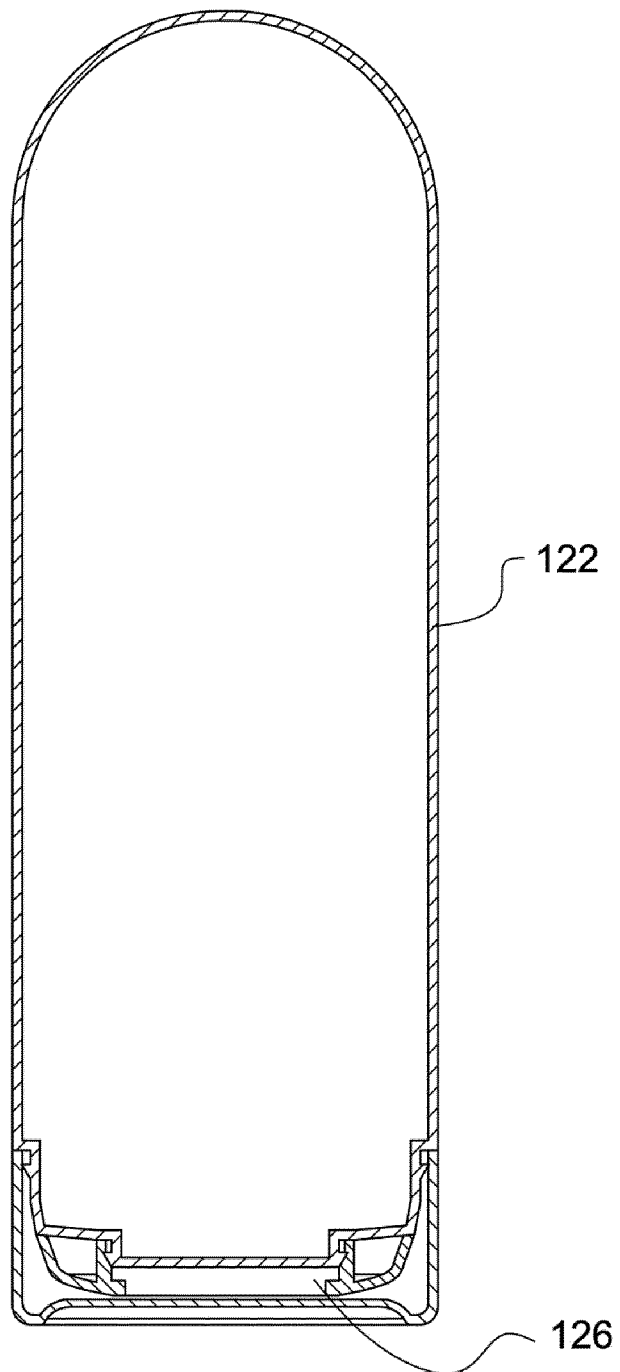


FIG 17

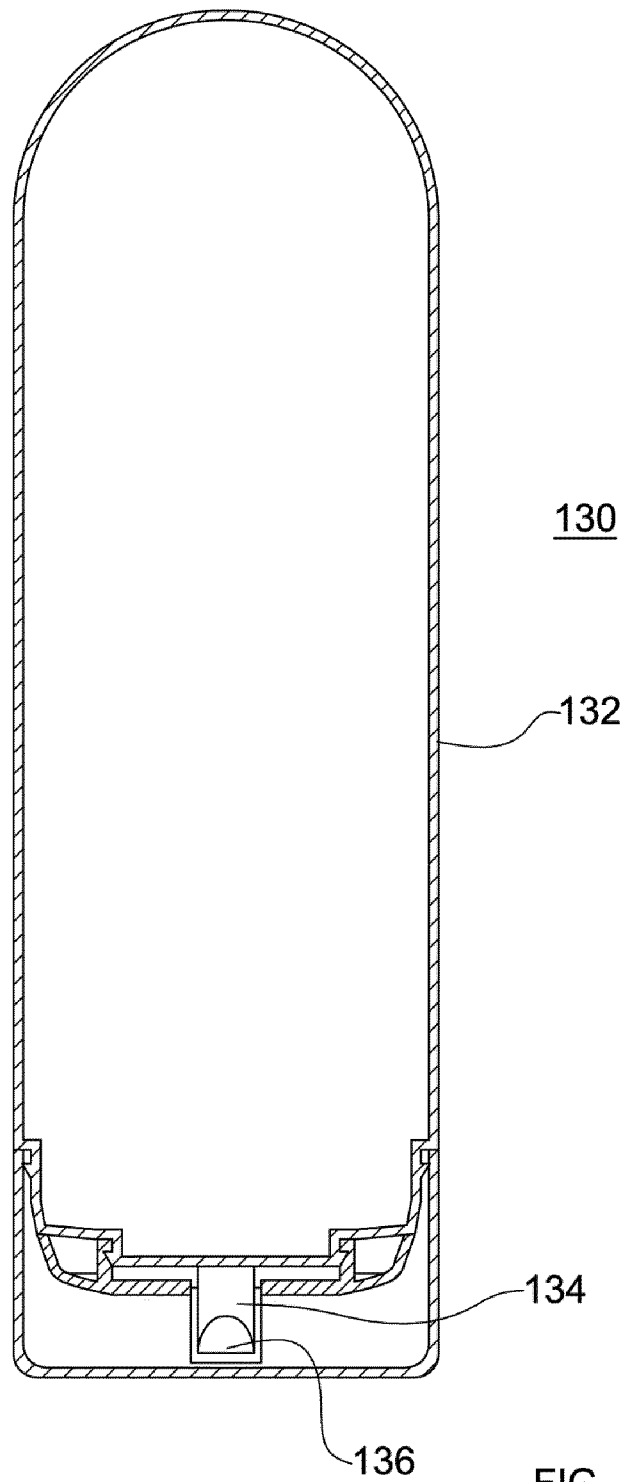


FIG 18

FIG 19

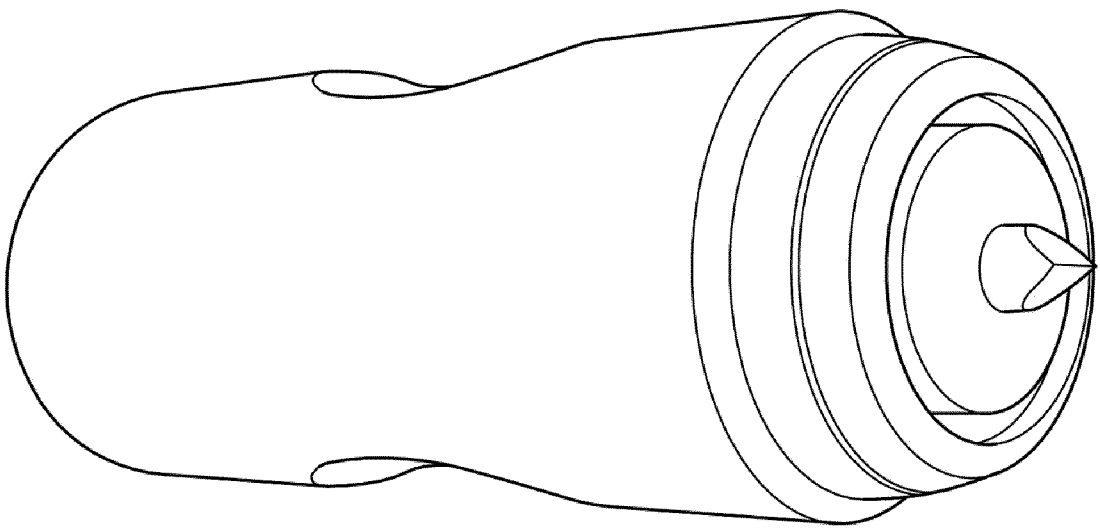
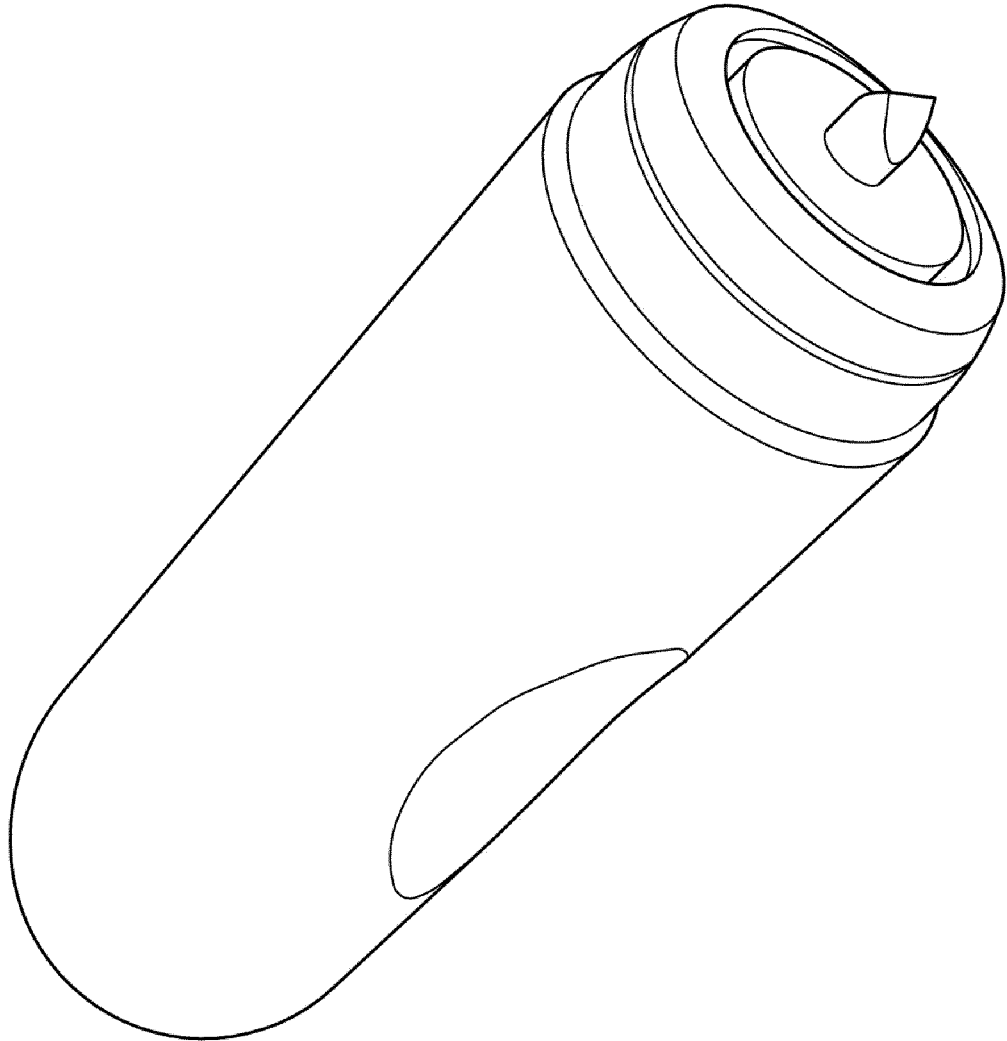
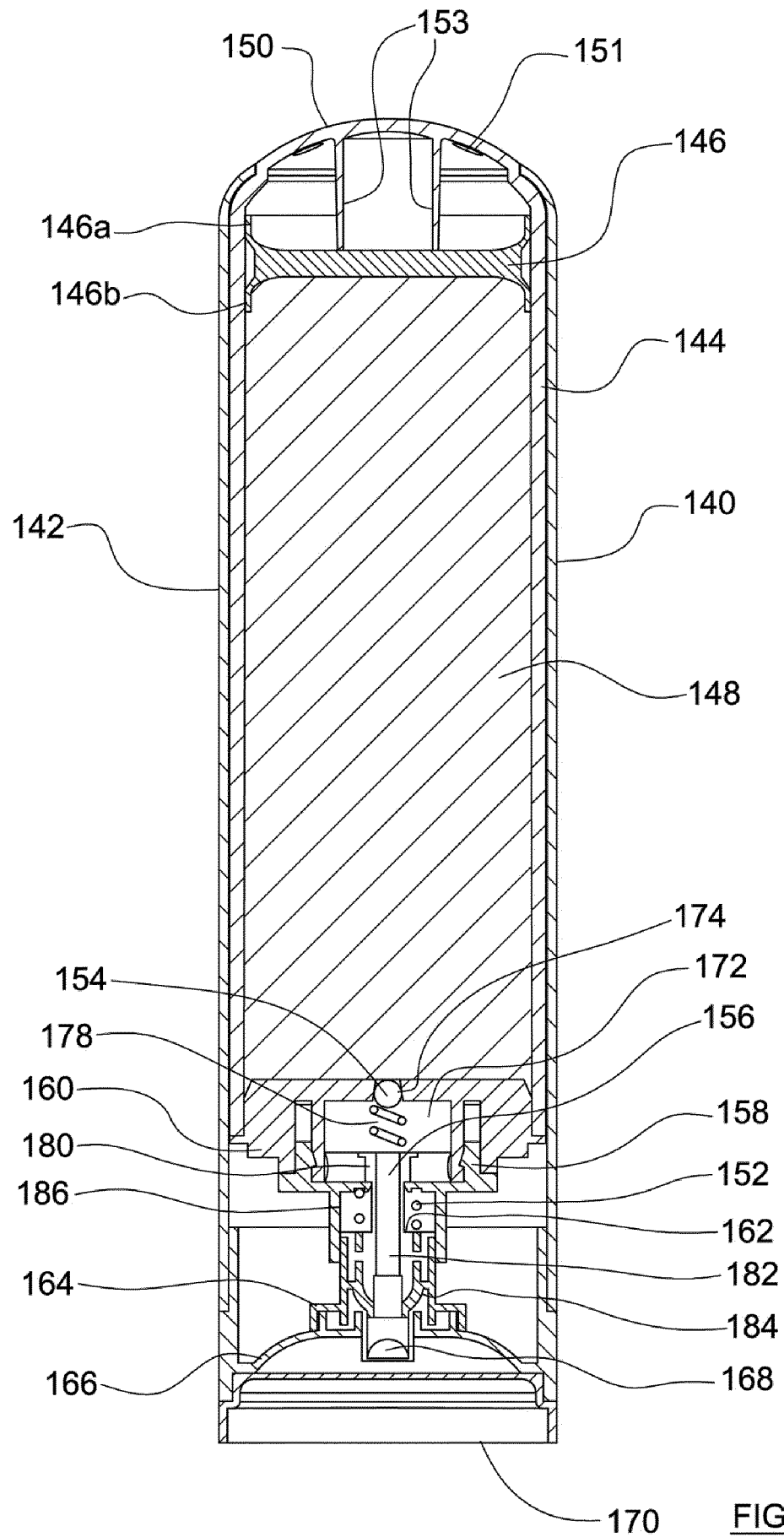


FIG 20



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SUBSTITUTE SHEET (RULE 26)

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FIG 22

