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(54) DISPENSER FOR STORING AND ADVANCING A PRODUCT

(57) A dispenser (100) with a hollow body (110), a sleeve (120), a cap (130) and sealing element (140) is disclosed. The hollow body (110) is open at both ends (111, 113) with sealing surfaces (116a, 116b) proximal to a first end (111). The sleeve (120) is fixed to and extends beyond the hollow body (110). The sleeve (120) is arranged with a complementary region (125) proximal to the sealing surfaces (116a, 116b). The cap (130) has a closed end (131) and an opposed open end (133) defined by a wall (132) with an irregular surface (135) proximal to the open end (133). A sealing element (140) is located in a cavity (150) defined by the sealing surfaces (116a, 116b) of the hollow body (110), the complementary region (125) of the sleeve (120) and the irregular surface (135) of the cap (130). The sealing element (140) is arranged with sets of surfaces (141, 142) that are in contact with respective surfaces (127, 125) of the sleeve (120) and the body (110) at all times and is further in contact with a third set of surfaces when the cap (130) is attached to the sleeve (120).

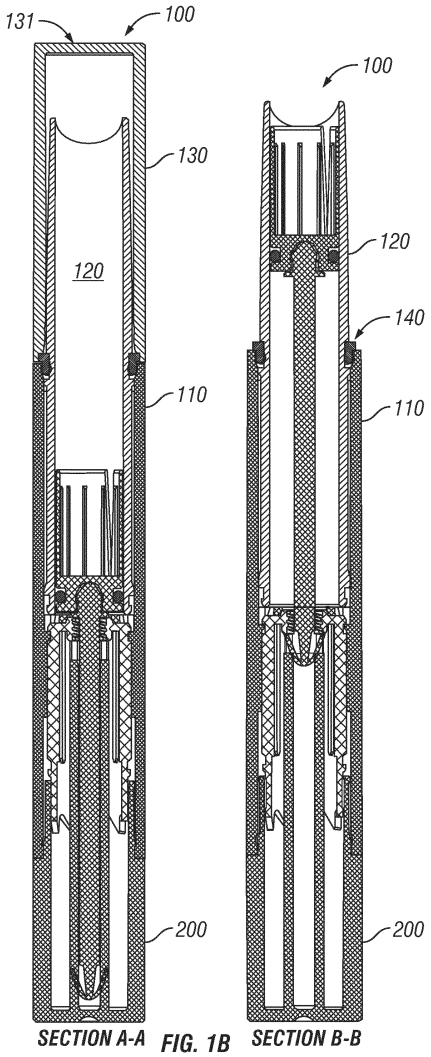


FIG. 1B

EP 3 434 143 A1

Description

Technical Field

[0001] The present dispenser relates, in general, to a container suitable for storing and controllably advancing a product from within the container.

Background

[0002] Commercially available traditional lipstick cartridges are arranged with covers which are held to and removable from the cartridge. Recently introduced formulations for lipsticks include volatile silicones. While available cartridge type assemblies are generally sufficient to keep the cover in place, such arrangements permit evaporation of the volatile silicones from the lipstick products stored in the cartridge.

[0003] Accordingly, there may be a need to provide an improved and consistently reproducible dispenser for increasing the useful life of lipsticks and other products that contain one or more volatile components while still providing easy access and controllable advancement of a product stored in the body of the cartridge.

Summary

[0004] An embodiment of a dispenser includes a hollow body, a sleeve, a cap and a sealing element. The hollow body is open at each end and has an inner surface with an engagement feature located between the opposed ends. The hollow body has sealing surfaces proximal to one of the open ends. The sleeve is fixed to and extends beyond the hollow body. The sleeve has opposed open ends and an outer surface with a complimentary region. The cap has a closed end and an opposed open end defined by a wall with an irregular surface proximal to the open end. The sealing element is located in a cavity defined by the sealing surfaces of the hollow body, the complimentary region of the sleeve and the irregular surface of the cap.

[0005] The dispenser is further arranged with a cup located in the sleeve. Some embodiments of the cup include an outer surface that defines a channel that receives a second sealing element. The second sealing element is made from a compliant material and is arranged to interfere with opposed surfaces of the sleeve and the cup. In the illustrated embodiments, the second sealing element is arranged in the shape of a torus. However, the shape of the second sealing element is not so limited. When provided in the shape of a torus, the radius of a cross-section of the torus should be long enough to provide interference regions along opposed surfaces of the cup and the sleeve. These opposed interference regions further prevent unintentional evaporation or outgassing of any number of volatile ingredients contained in a product housed in the sleeve. These additional seals are separate from and not affected by separation of the wall of the cap from the combination of the sleeve and the body. The additional or supplemental seals add to the effectiveness of the improved dispenser to increase the useful life of product formulations that contain volatile silicones or other ingredients that outgas and or evaporate when exposed to air at atmospheric pressure.

[0006] An alternative embodiment of the dispenser includes a cup with an annularly arranged and integral feature that slidingly contacts an opposed surface of the sleeve to provide either an alternative moveable seal between the cup and the sleeve or a supplemental seal. An alternative seal is characterized by a moveable element that remains in contact with the sleeve as the cup and the product supported therein is controllably advanced or retracted along the longitudinal axis of the dispenser. Such an alternative seal may be provided in addition to the second sealing element and the first sealing element.

Brief Description of the Drawings

[0007] Embodiments of the dispenser can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the structures and principles of operation of the assemblies.

FIG. 1A includes top, front and bottom views of an embodiment of a dispenser.

FIG. 1B includes cross-sectional views of the dispenser of FIG. 1A in the direction of line A - A and in the direction of line B - B.

FIG. 1C includes an exploded view of the components of the dispenser introduced in FIG. 1A and FIG. 1B.

FIG. 2A includes top, front, bottom and side views of the sleeve illustrated in FIG. 1B and FIG. 1C.

FIG. 2B includes cross-sectional views in the direction of lines A - A and B - B, respectively, and a perspective view of the sleeve illustrated in FIG. 1B, FIG. 1C and FIG. 2A.

FIG. 3A includes top, front and bottom views of the hollow body illustrated in FIG. 1A, FIG. 1B and FIG. 1C.

FIG. 3B includes cross-sectional views in the direction of lines A - A and B - B, respectively, and a perspective view of the hollow body illustrated in FIG. 1A, FIG. 1B, FIG. 1C and FIG. 3A.

FIG. 4A includes top, front and bottom views of the cap illustrated in FIG. 1A, FIG. 1B and FIG. 1C.

FIG. 4B includes a perspective view of the cap illustrated in FIG. 1A, FIG. 1B, FIG. 1C and FIG. 4A.

FIG. 4C includes a cross-sectional view in the direction of line A - A of the cap illustrated in FIG. 4A.

FIG. 4D includes a detailed view of surfaces along the inner surface of the wall of the cap as illustrated in FIG. 4C.

FIG. 5 includes top, front, and bottom plan views as well as a perspective and a cross-sectional view of an embodiment of the sealing element of FIG. 1B and FIG. 1C.

FIG. 6 includes top, front, side, and bottom plan views as well as perspective and cross-sectional views in the direction of line A - A and line B - B of the cup illustrated in FIG. 1B and FIG. 1C.

FIG. 7 includes rear, top, front, and side plan views as well as a cross-sectional view of a second sealing element illustrated in FIG. 1B and FIG. 1C.

FIG. 8 includes a cross-sectional view of the dispenser illustrated in FIG. 1A, FIG. 1B, and FIG. 1C with detailed views of a first interface and a second interface.

FIG. 9 includes top, front, bottom, perspective, and cross-sectional views as well as a detailed view of an embodiment of the rod illustrated in FIG. 1B and FIG. 1C.

FIG. 10 includes top, front, side, bottom, perspective and cross-sectional views of an embodiment of the driver illustrated in FIG. 1B and FIG. 1C.

FIG. 11 includes top, front, side, bottom, perspective and cross-sectional views of an embodiment of the manipulator illustrated in FIG. 1B and FIG. 1C.

FIG. 12 includes a cross-sectional view of an alternative embodiment of a dispenser with a detailed view of an alternative second interface.

Overview of Embodiments

[0008] Aspects of an improved dispenser are described generally before addressing the illustrated embodiments. The illustrations include exemplary embodiments of the components of the improved dispenser assembly. Particular or select components may be interchanged in some circumstances to accommodate varied assembly practices. For example, it may be desirable to load the product from one end of the sleeve rather than the other end of the sleeve.

[0009] When it is desirable to fill the cup and volume of the sleeve from the open end that extends beyond the hollow body, the improved dispenser may be arranged with a modified hollow body absent a cross member and a second sealing element located between the cup and the inward surface of the sleeve. As indicated, the cup may have an integral structure such as a band that is arranged along its perimeter to interfere with the inner surface of the sleeve. One or more such bands or extensions may extend from the cup to provide supplemental interference seals to prevent evaporation of the product into the hollow body beyond the cup.

[0010] The improved dispenser may be used to provide for extended storage as well as temporary access to cosmetic products containing pigments, oils, waxes and emollients. As indicated, some of these products may contain one or more volatile components and or water that easily evaporate. While described in association with the storage and use of a cosmetic product such as a lip stick, it should be understood that alternative products such as a glue stick may be provided in the dispenser.

[0011] In the illustrated embodiments, the dispenser is assembled from a hollow body, a sleeve that extends beyond

the hollow body, a cap that covers the extended portion of the sleeve (and removable attaches to the sleeve) and a sealing element located in a cavity defined by the sleeve, the hollow body and the cap. Respective complementary features arranged along the outer surface(s) of the sleeve and the inner surface of the hollow body keep the sleeve fixed along interior surfaces of the body. Additional complementary surfaces arranged along the outer surface of the sleeve and the inner surface of the hollow body keep a sealing element fixed in the cavity at an end of the hollow body.

[0012] As illustrated, the hollow body, sleeve, cap and sealing element share a central longitudinal axis along the length of the dispenser from a base end to the cap end. In the example embodiments, the dispenser is cylindrically shaped with the sleeve connected to and extending from an open end of the hollow body. Respective complementary features arranged along the outer surface(s) of the sleeve and the inner surface of the body keep the sleeve fixed to the body.

[0013] The improved dispenser can achieve increased useful storage times for products provided in the dispenser. The increased useful storage times are achievable as long as the cap is reengaged with the sleeve after use. The increased storage times are achievable even after the dispenser has been removed from point of sale packaging and after a portion of the product stored within the dispenser has been used.

[0014] The cap has a closed end and an opposed open end defined by a wall with an irregular surface proximal to the open end. The irregular surface of the cap interferes with respective surfaces of the sealing element.

[0015] In addition, when the cap is engaged with the sleeve, the irregular surface of the cap forms a recess between the respective surfaces of the sealing element that are in contact and compressed by the cap. The recess opposes a leading edge of the chamfered surface of the sealing element and provides a space for local displacement of the sealing element.

[0016] Furthermore, the cap includes a rounded edge or transition between an end face and the irregular surface. In the illustrated embodiments the node and the transition are characterized by a rounded surface with a radius having a length such that the repeated contact of the cap against the complementary surfaces of the sealing element is not detrimental to the integrity of the sealing element. Stated another way, the rounded surfaces of the cap do not permanently mar or otherwise damage the sealing element. Moreover, rounded surfaces increase the area of contact of the cap and the sealing element when accompanied by compression.

[0017] As described, the hollow body is arranged with sealing surfaces proximal to a location where the sleeve extends from the hollow body. One of the provided sealing surfaces abuts an end face of the wall of the cap. This sealing surface also abuts the sealing element and more particularly a surface of the base of the sealing element opposed to a junction or corner in a channel of the sleeve.

[0018] A separate and distinct sealing surface of the body faces and interferes with at least a portion of the stem of the sealing element. In the illustrated embodiments, the body is further arranged with a transition surface located between the respective sealing surfaces.

[0019] The sealing element is seated between surfaces of a channel along an outer surface of a sleeve when the sleeve is fixed to the hollow body. The sealing element is also in contact with surfaces of the hollow body. The sealing element is made from a compliant material and arranged to provide compressive interference with the cap when the cap is engaged with the sleeve and at other times along opposed surfaces of the sleeve and the hollow body. The cavity is substantially but not entirely filled by the sealing element. That portion of the cavity not entirely filled by the sealing element is available to receive displaced material of the sealing element when the sealing element is compressed by adjacent surfaces of the dispenser.

[0020] The sealing element has an irregular, generally L-shaped, cross-section. In the illustrated embodiments, the L-shape is inverted such that the base extends over a portion of an end face of the hollow body. The base of the cross-section of the sealing element has a chamfered edge along an outermost surface. The chamfered edge enables the endmost portion of the wall of the cap to contact and compress the outermost surface of the sealing element. An outer wall of the sealing element traverses a dimension of the element from the stem to the base. The outer wall abuts the outer surface of the sleeve. A base of the L-shaped sealing element includes a first axially arranged surface that extends radially from an edge that abuts a corner of a channel in the outer surface of the sleeve. The first axially arranged surface extends beyond the channel in the sleeve to receive a node of the irregular surface of the cap. A second or opposed outer surface of the stem of the sealing element abuts an inner wall of the hollow body. A second axially arranged surface of the sealing element abuts a sealing surface of the hollow body. The base of the L-shaped sealing element has an outermost surface between the first and second axially arranged surfaces. The base portion of the sealing element and the cap are arranged such that a portion of the irregular surface of the cap interferes and compresses the outermost wall of the sealing element in a direction toward the longitudinal axis or center of the dispenser (or radially inward). The stem of the cross-section of the sealing element includes at least a portion that is raised or extends from the opposed surfaces of the stem. For example, in an illustrated embodiment of the sealing element the cross-section at an end portion of the stem is substantially round with a sufficiently long radius that ensures opposed interference regions where the sealing element is compressed by opposed surfaces of the sleeve and the hollow body, respectively.

[0021] As described, the sealing element is arranged to abut at least two surfaces of the sleeve. The surfaces of the

sleeve that abut the sealing element intersect at a junction or corner of a channel. That is, the sealing element has respective adjacent surfaces that abut the surfaces of the sleeve proximal to the junction or corner of the channel.

[0022] As further described, the sealing element is compressed along substantially orthogonal surfaces by a curved node along an irregular surface of the cap and an inward facing surface of the cap when the cap is engaged to the sleeve. The edge of the cap proximal to the outermost surface of the sealing element is also curved so that repetitive removal and replacement of the cap does not damage the sealing element proximal to that location.

[0023] As also described, a stem of the sealing element is in contact with and compressed by opposed surfaces of the body and the sleeve partially defining a cavity proximal to the open end of the cap and a complementary end of the hollow body.

[0024] As arranged in the illustrated embodiment, the sealing element has a first end and a second end opposed to the first end. The first end has a first set of adjacent surfaces that contact respective surfaces of the sleeve and a second set of surfaces that contact respective surfaces of the cap. The second end of the sealing element has opposed contact surfaces that contact respective surfaces of the body and the sleeve. The sealing element is further arranged with a second set of adjacent surfaces that contact respective surfaces of the body.

[0025] The sealing element may be molded from nitrile butadiene rubber or NBR. NBR is a synthetic rubber copolymer of acrylonitrile and butadiene. The polymer's properties vary with the composition of acrylonitrile. Generally, the polymer's resistance to oils, fuels and other chemicals increases with higher percentages of nitrile. Conversely, the polymer's flexibility decreases with such increases in the percentages of acrylonitrile. NBR retains its flexibility over a wide range of temperatures for long periods of time. Most applications requiring resistance to solvents and flexibility over a wide range of temperatures include an acrylonitrile percentage of about 30%.

[0026] An improved seal is created by the interference regions or seals between the cap and the sealing element as well as the interference regions or seals between the sleeve, the body and the sealing element. When the cap is engaged with the sleeve, an irregular surface proximal to an end wall at the open end of the cap interferes or compresses the sealing element at first and second interference regions thereby providing additional seals.

[0027] A first interference region is defined by contact and compression between a local node in the irregular surface of the cap and a substantially planar surface of the sealing element. Opposed forces that result from the compression of the sealing element at the first interference region are in a direction substantially parallel to the longitudinal axis of the dispenser.

[0028] A second interference region is defined by contact between an annular portion of the irregular surface of the cap and the outermost surface of the sealing element. Opposed forces that result from compression of the sealing element at the second interference region are in a direction that radiates substantially orthogonally from the longitudinal axis of the dispenser.

[0029] Third and fourth interference regions are defined by contact between the stem portion of the sealing element and opposed surfaces of the sleeve and the hollow body. Opposed forces that result from the compression at the respective third and fourth interference regions are in a direction that radiates substantially orthogonally from the longitudinal axis of the dispenser.

[0030] In addition to the interference regions where the sealing element is compressed, the sealing element is arranged to substantially but not entirely fill the cavity formed by the sleeve, the hollow body and the cap near the interface of the cap and the body. Stated another way, a portion of the cavity defined by the sleeve, the hollow body and the cap remains unfilled even when the sealing element is present in the cavity. The unfilled portions of the cavity enable deformation of the sealing element at these locations.

[0031] The sealing element has adjacent and substantially orthogonal surfaces that abut a junction of the channel in the outer surface of the sleeve. In addition, a stop surface that extends radially in a direction from the longitudinal axis of the dispenser toward the external surfaces of the hollow body and the cap abuts a face surface of the wall of the hollow body. The relative location of the face surface with respect to the junction between the adjacent and substantially orthogonal surfaces of the channel in the opposed sleeve coupled with the shape and size of the sealing element ensure that the sealing element remains fixed and in contact with the adjacent surfaces of the channel and the body. By fixing the location, shape and size of the sealing element and controlling the relative location of engagement features on the opposed surfaces of the sleeve and the cap the relative tightness of the interference fits can be controlled.

[0032] The interference regions where the sealing element is compressed and remaining regions where the sealing element is in contact or close abutment with the surfaces defining the cavity provide a substantially air-tight set of seals proximal to the location where the sleeve extends from the hollow body.

[0033] Embodiments of the dispenser may be arranged to be filled or loaded with a product from a first or top end. Alternative embodiments may be filled or loaded from an opposed or base end of the dispenser.

[0034] A top loading embodiment of the dispenser provides first and second sealing elements that together with surfaces of the cap, sleeve, cup and body encapsulate a product loaded in the cup and the sleeve in an air-tight manner.

[0035] In this regard, the cup is located within the sleeve and has an outward surface with surfaces that compliment respective inward facing surfaces of the sleeve. A second sealing element may be arranged in a second cavity formed

by the complimentary surfaces of the cup and the sleeve. The second sealing element is made from a compliant material such as but not limited to NBR. The second sealing element is arranged to interfere or contact at least opposed surfaces of the cup and the sleeve.

[0036] Alternative embodiments may be arranged with a single sealing element with a supplemental or additional interference fit at a separate location between the cup and the sleeve. The sealing element in the cavity defined by the sleeve, the body and the cap provides a first substantially air-tight interface. The supplemental or additional interference fit between the cup and the sleeve provides a second substantially air-tight interface.

[0037] However embodied, the improved dispenser reliably and repeatedly provides a substantially air-tight enclosure that prolongs the useful life of lipsticks or other products that may be formulated with one or more volatile silicones or other compounds that evaporate or outgas at atmospheric pressure over typical temperatures that the products provided in the improved dispenser are likely to encounter.

[0038] The cap, sleeve, body and base elements can be made of thermoplastic polymers such as acrylonitrile butadiene styrene (ABS). A rod, screw and biasing element enclosed within the base element and responsible for moving the cup along the longitudinal axis of the dispenser can be made of various plastics including polyoxymethylene (POM). The cup can be made of other plastics including, for example, polybutylene terephthalate (PBT).

[0039] It should be noted that elements described in association with different embodiments may be combined as may be desired.

Detailed Description of Illustrated Embodiments

[0040] FIG. 1A includes top, front (side) and bottom plan views and FIG. 1B includes respective cross-sectional views of an embodiment of a dispenser **100.** As shown in the front plan view of FIG. 1A, the dispenser **100** includes a hollow body **110** with a manipulator **200** extending from a base end and a cap **130** attached to a sleeve **120** (hidden from view in FIG. 1A at an opposed end of the hollow body **110.** Each of the hollow body **110,** the manipulator **200** and the cap **130** are cylindrically shaped and arranged about a central or longitudinal axis **102.**

[0041] As illustrated in FIG. 1A and Section A - A of FIG. 1B, the cap **130** has a closed end **131** and an opposed open end that abuts an uppermost surface of the hollow body **110.** The cap **130** has a closed end **131** or face with a chamfered edge about the perimeter at the top end of the dispenser **100.** The cap **130** is otherwise hollow with an annular wall that surrounds that portion of a sleeve **120** that is coupled within and that extends beyond the hollow body **110.** The inner surface of the annular wall of the cap **130** is arranged with one or more structures or features proximal to the open end that are located to encounter and readily engage or disengage complimentary surfaces or features provided along an outer surface of the sleeve **120** outside of the hollow body **110** as may be desired. An inward facing surface of the wall of the cap closely interferes with and engages a series of nubs **129** (FIG. 2A, FIG. 2B) distributed radially along an outward facing surface of the sleeve **120.** The cap **130** can be manually disengaged from the sleeve **120** of the dispenser **100** by grasping the cap **130** and one or both of the hollow body **110** and the manipulator **200** and applying opposed external forces along directions substantially parallel to the longitudinal axis **102** of the dispenser **100.**

[0042] The hollow body **110** is further illustrated and described in association with the various views presented in FIG. 3A and FIG. 3B. The sleeve **120** is further illustrated and described in association with the various views presented in FIG. 2A and FIG. 2B. The cap **130** is further illustrated and described in association with the embodiments presented in FIG. 4A - FIG. 4D.

[0043] As illustrated in FIG. 1A and Section A - A and Section B - B of FIG. 1B, the manipulator **200** has a closed end and an opposed or open end that extends beyond the lower most end and into a volume defined by the hollow body **110.** A complementary annularly arranged recess along the inward facing surface of the wall of the hollow body **110** closely interferes with and engages an annular ring that extends radially away from a central axis of the manipulator **200.** The base or manipulator **200** has a closed end with a chamfered edge about the perimeter end that defines the opposed end of the dispenser **100.** The surface **201** (FIG. 11) at the closed end of the manipulator **200** may be arranged with one or more designs or features. In the illustrated embodiment, the surface **201** has a centrally located circular depression. As illustrated in the cross-sectional views in FIG. 1B, the manipulator **200** is arranged with an extension or annular wall **220** with features located along the outward facing surface that permanently engage respective features arranged along an inner wall or surface of the hollow body **110.** These respective complementary features of the manipulator **200** and the hollow body **110** permit rotation of the manipulator **200** in both clockwise and anti-clockwise rotations about the longitudinal axis **102** of the dispenser **100.**

[0044] As can be observed in FIG. 1B, the manipulator **200** is further arranged with a centrally located shaft **230** that extends from the inner surface of the closed end of the manipulator **200** beyond the annular wall **220** which respectively extends beyond the base portion **210.** As illustrated in FIG. 1C and FIG. 11, the shaft **230** has an oblong shape with opposed flat side walls located between arcuate or rounded end portions. As can be observed in FIG. 1B, the centrally located shaft **230** receives and guides complementary planar surfaces of a rod **400.**

[0045] Section A - A of FIG. 1B shows the dispenser **100** with the rod **400** in a first or retracted position. In contrast,

Section B - B of FIG. 1B shows the dispenser **100** with the cap **130** removed and with the rod **400** in a second or fully extended position.

[0046] As illustrated in FIG. 1B, a driver **300** is fixedly arranged in a volume defined by the hollow body **110** proximal to and extending beyond an open end of the intermediate portion **220** (FIG. 11) of the manipulator 200. The driver **300** is arranged with a centrally located threaded opening, the threads of which complement the respective threads arranged along opposed portions of a shaft of the rod **400.** In some arrangements, a lubricant may be applied to the surface of the threads in the centrally located threaded opening of the driver. In some other arrangements, a lubricant may be applied to the surface of the threaded portion of the rod **400.** In still other alternative arrangements one or more lubricants may be applied along surface of both the driver **300** and the rod **400.** The driver **300** is illustrated and further described in association with the various views of FIG. 10. The rod **400** is illustrated and further described in association with the views of FIG. 9.

[0047] Similarly, a lubricant may be applied along the inner facing surface of the sleeve **120** to permit the abutting surface or surfaces of the cup **160** to move with reduced friction and consequently less resistance along the sleeve **120.** Accordingly, rotation of the manipulator **200** about the longitudinal axis **102** of the dispenser **100** in a first direction results in the rotation and translation of the rod **400** and the cup **160** along the longitudinal axis **102** such that the cup **160** advances toward an opening in the sleeve **120.** When the cap **130** is removed from the dispenser **100** and when a product is fixed within the volume defined by the cup **160,** the product, which may be a cosmetic such as a lipstick, a glue stick, etc., can be advanced beyond the opposed open end of the sleeve **120.** Conversely, rotation of the manipulator **200** about the longitudinal axis **102** of the dispenser **100** in a second direction, opposite of the first direction, results in translation of the rod **400,** the cup **160** and remaining product in the cup **160** in a direction toward the manipulator **200.** As a result, the product provided in the dispenser **100** can be controllably adjusted via rotation of the manipulator **200** to extend and/or retract a product inserted and fixed to the cup **160.** With the cap **130** removed, such a product can be extended such that a desired portion of the product extends beyond the sleeve **120.** When so extended, an operator of the dispenser **100** can apply the product to one or more surfaces, as may be desired, before controllably retracting the product into the volume of the sleeve **120** by rotating the manipulator **200** with respect to the hollow body **110.** Thereafter and as described, the operator may reengage the open end of the cap **130** over the exposed portion of the sleeve **120.**

[0048] In some arrangements (not shown) an adhesive may be applied along the inner surfaces of the cup **160** and/or along the outer surface of the product over a distance corresponding roughly to the length of the cup along the longitudinal axis **102** of the dispenser **100** to fix or hold the product in the cup **160.** Such an adhesive may be cured or treated with one or more of temperature, ultraviolet radiation, pressure etc.

[0049] As illustrated in the cross sectional views of FIG. 1B, a first sealing element **140** is located in a channel defined by an outer surface of the sleeve **120** and an opposed inward facing surface of the hollow body **110.** As described, the first sealing element is made from a material that compresses to form an interference fit in the channel. In addition, the first sealing element **140** is arranged to abut an end surface of the hollow body **110** and an opposed surface of a channel arranged in the outward facing surface of the sleeve **120.** Furthermore, the first sealing element **140** is arranged with a base end that extends radially beyond the outer surface of the sleeve **120** to provide additional surfaces for the wall of the cap **130** to compress when the cap **130** is fixedly engaged with the sleeve **120.** A first interface or interface region is located at the junction formed by the opposed end faces of the wall of the cap **130** and the wall of the hollow body **110** which junction overlaps or is in registration with the channel in the sleeve **120.**

[0050] As further shown in the cross-sectional views of FIG. 1B, a second sealing element **170** is located in a channel defined by an outward facing surface near the base of the cup **160.** The second sealing element **170** is also made from a material that compresses when in contact with the surfaces of the channel and the inward facing surface of the wall of the sleeve **120.** When appropriately arranged, the second sealing element **170** interferes with and compresses along opposed surfaces of the channel in the cup **160** as well as with the intersecting wall of the channel and the opposed inward facing surface of the sleeve **120,** while also permitting the cup **160** to be advanced and retracted within the volume of the hollow sleeve **120.** The second sealing element **170** substantially prevents and may eliminate the passage of volatile compounds that may be outgassing from a product in the cup **160** of the dispenser **100** beyond the cup **160** in a direction toward the manipulator **120.**

[0051] When the cap **130** is disengaged from the sleeve **120,** the first sealing element remains fixed in the channel in the sleeve **120** and is in contact with opposed surfaces that are substantially orthogonal to the longitudinal axis **102** of the dispenser **100** as well as with opposed surfaces that are substantially parallel to the longitudinal axis **102.** Accordingly, the first interface region is characterized by at least surface to surface contact between the first sealing element **140** and corresponding surfaces of the sleeve **120** and the hollow body **110** over four areas.

[0052] When the cap is engaged with the sleeve, the first sealing element **140** is in contact with and further compressed by adjacent curved surfaces of the wall of the cap **130.** In the closed configuration, the first interface region is further characterized by at additional surface to surface contact with the wall of the cap **130** and corresponding surfaces of the first sealing element. Thus, the combination of the cap **130** and the first sealing element **140** and the complementary surfaces of the sleeve **120** and the hollow body **110** substantially prevent and may eliminate passage of volatile com-

pounds or even water vapor when a water based product is provided in the cup **160** from escaping from the dispenser **100.**

[0053] FIG. 1C includes an exploded view of the components of the dispenser **100** introduced in the plan views of FIG. 1A and the cross-sectional views of FIG. 1B. The cap **130,** sleeve, **120,** first sealing element **140,** cup **160** and the second sealing element **170** are shown along the left-most side of FIG. 1C. In the illustrated embodiment, a first end of the sleeve **120** enters the hollow body **110** through end **111** and complimentary features arranged along the outer surface of the sleeve **120** and the inward facing surface of the hollow body **110** engage each other as an end face of the sleeve **120** abuts a central member of the hollow body **110.**

[0054] As further shown in FIG. 1C, the manipulator **200,** driver **300,** hollow body **110** and threaded rod **400** are illustrated along the right-most side of FIG. 1C. In the illustrated embodiment, the driver **300** is inserted at the open opposed end **113** into the volume of the hollow body **110.** Complementary structures arranged along the outer surface of the driver **300** and the inward facing surface of the hollow body **110** guide the driver **300** into fixed engagement with the hollow body **110** as a ring and the end surface of the driver **300** closely abut a recess and spokes of the central member of the hollow body **110.**

[0055] A head end **412** of the threaded rod **400** is introduced through open end **113** of the hollow body **110** such that the head end **412** extends beyond the threaded opening in the driver **300** and the head end **412** engages a seat **610** in the base end of the cup **160.** The shaft **230** of the manipulator **200** is aligned with the opposed end of the threaded rod **400** and the fins **414** thereof are deflected or biased inward by the wall of the shaft **230.** The shaft **230** and the annularly arranged wall of the extension portion **220** of the manipulator **200** enter the hollow body **110** from opposed end **113** and are advanced such that features along the outward facing surface of the extension portion **220** are guided by complementary structures along the inward facing surface of the driver **300.** As further indicated in FIG. 1C., the wall of the extension portion **220** advances between the outward facing surface of the driver **300** and the inward facing surface of the hollow body **110** until complementary structures arranged along the extension portion **220** and the inward facing surface of the hollow body **110** engage one another proximal to the end **113.**

[0056] FIG. 3A includes top, front and bottom views of the hollow body **110** illustrated in FIG. 1A, FIG. 1B and FIG. 1C. The top plan view illustrates the uppermost end wall **111** of the hollow body **110** and the spokes and inner ring of the central member. The bottom plan view illustrates an opposed end wall and an opposed surface of the spokes and inner ring of the central member. The top and bottom plan views of FIG. 3A further show that the central member forms a centrally located hole which permits passage of the threaded rod **400** from a first side to an opposed side of the interior of the hollow body **110.** The central member traverses the volume of the hollow body **110** approximately midway between end **111** and opposed end **113.**

[0057] FIG. 3B includes cross-sectional views in the direction of lines A - A and B - B, respectively, and a perspective view of the hollow body **110** illustrated in FIGs. 1A - 1C and FIG. 3A. As illustrated in Section A - A of FIG. 3B, the observable portion of the inner surface **112** is arranged with an annular engagement feature or transverse appendage **115,** which engages a complementary annular recess in the outer surface of the driver **300.** A guide member is arranged along the length of the observable portion of the inner surface **112** substantially parallel to the longitudinal axis **102** of the dispenser **100.** The guide member extends from a partial transverse appendage nearly to the end **111** of the hollow body. The guide member of the hollow body **110** is received in a channel formed by opposed complementary guide members **176b** arranged on the outer surface of the sleeve **120.** The guide members **176b,** which form opposed openings proximal to guide ends **172,** direct the complementary guide member of the hollow body **110** to parallel guide members **176a** further arranged along the outer surface of the sleeve **120.**

[0058] As illustrated in Section B - B of FIG. 3B, the inner surface **112** of the hollow body **110** varies proximal to end **113** to receive and engage an annular appendage arranged along the outer surface of the extension portion **220** of the manipulator **200.** Similarly, the inner surface **112** of the hollow body is shaped or contoured proximal to end **111** to receive the sleeve **120** and a portion of the first sealing element **140.** An end face of the hollow body forms a first annular sealing surface **116a** with a radial sealing surface **116b** connected to the sealing surface **116a** by a chamfered annular transition surface **117.** As further illustrated in Section B - B of FIG. 3B, a guide member is arranged along the length of the observable portion of the inner surface **112** substantially parallel to the longitudinal axis **102** of the dispenser **100.** The guide member extends from a corresponding transverse appendage approximately half the distance to end **113** of the hollow body **110.** This guide member of the hollow body **110** is received in a channel formed by opposed complementary guide members **314** arranged along the surface of the driver **300.** The guide members **314** direct the complementary guide member of the hollow body **110** to properly orient the driver **300** in the hollow body **110.**

[0059] In the illustrated embodiment presented in the various views of FIG. 2A and FIG. 2B, the sleeve **120** is a hollow cylinder that is tapered at a first open end **121** and not tapered at an opposed open end **123.** The outer surface **122** of the sleeve **120** is arranged with an annular guide **174** with a chamfered leading edge and an adjacent channel **175.** The chamfered leading edge enables easy introduction of the open end **123** to the volume enclosed by the hollow body **110.** The adjacent channel **175** provides an optional engagement surface for fixedly engaging the sleeve **120** in the hollow body **110.** The outer surface **122** further includes an annular recess or channel or complementary region **124** arranged approximately midway along the length between end **121** and opposed end **123.** The channel **124** receives a stem

portion of the first sealing element **140.** The channel or complementary region **124** is defined by an annular transverse surface **125** and an adjacent annular surface **127** that intersect each other at junction **126.**

[0060] A set of nubs or pips **129** are arranged annularly about the surface **122** proximal to the channel **124.** The nubs **129** engage an annular recess arranged along the inner surface of the wall of the cap **130** when the open end of the cap **130** is placed over the sleeve **120.**

[0061] As also observed in FIG. 2A and FIG. 2B, the sleeve **120** is arranged with an annular guide or band **177** that contact and slide along the inward facing surface **112** of the hollow body **110** with guide element **176.** As further observed in FIG. 1B, the annular guide or band **177** forms a border of the cavity where the sealing element **140** is located. The guide element **176** includes a first portion **176b** with opposed appendages that extend beyond the surface **122** at that get closer to each other as they traverse the length of the sleeve **120** from end **123** toward a second portion **176a.** This second portion **176a** is characterized by opposed appendages that are substantially parallel to each other and parallel with the longitudinal axis **102** of the dispenser **100.**

[0062] As observed in the various views illustrated in FIG. 5, the first sealing element **140** is generally shaped like a ring with a cross-section shaped like an inverted letter L. The inner diameter of the first sealing element **140** is arranged to contact the base or intersecting surface **127** of the channel **124** in the outer surface of the sleeve **120.** As shown in the various views, in addition to the inward facing surface **141,** the base portion of the inverted L has an adjacent surface **142,** a chamfered edge **143,** an outer most surface **144** and an adjacent surface **146** that is opposed to and substantially parallel with the surface **142.** As further shown in the illustrated embodiment, the stem portion of the first sealing element **140** is characterized by an end that is arranged to provide a substantially round outer surface.

[0063] FIG. 4A includes top, front and bottom plan views of the cap **130** illustrated in FIGs. 1A - 1C. In the illustrated embodiment, the cap **130** is cylindrically shaped with a closed end **131** and an opposed open end **133.** A chamfered edge connects the surface at the closed end **131** to the wall **132** of the cap **130.** At the opposed open end **133** of the cap **130,** as can be observed in Section A - A, the inner surface of the wall **132** is irregularly shaped with those portions of the inner surface closest to the closed end shaped to closely contact the outer surface **122** of the sleeve **120** and the nubs or pips **129** extended therefrom. As further shown in FIG. 4C and in detail A of FIG. 4D, the irregularly shaped wall **132** includes a first section or region **135** characterized by a protruding node and a recess with a curved transition surface or region **137** that connects the first section **135** with an end face **138** of the cap **130.**

[0064] FIG. 7 includes rear, top, front, and cross-sectional views of the second sealing element **170** illustrated in FIG. 1B and FIG. 1C. As previously described the second sealing element **170** may be constructed using a compliant or compressible material that is resilient to environments where outgassing volatile compounds may be present. In the illustrated embodiment, the second sealing element **170** is shaped like a torus or doughnut. Consequently, as illustrated in the cross-sectional view, the remaining portion of the second sealing element **170** is characterized by a opposed circles in a plane that intersects a central axis (not shown).

[0065] As illustrated in FIG. 1B, the inner diameter of the second sealing element **170** is such that the surface contacts the outer facing intersecting surface **167** of the channel **165** in the base of the cup **160.** In addition, the diameter of the second sealing element **170** is large enough to contact at least a portion of the inward facing surface **128** of the sleeve **120.**

[0066] FIG. 6 includes top, front, side, bottom, perspective and cross-sectional views of the cup **160** illustrated in FIG. 1B and FIG. 1C. As illustrated the cup **160** has an open end opposed to a base. An annular recess or channel **165** is formed in the outer facing surface near the base of the cup **160.** As observed in the bottom plan view, a multiple surfaced seat **610** is provided about the center of the base portion to fixedly receive a head portion **412** of the threaded rod **400.** The wall **161** of the cup **160** is characterized by opposed elongate openings that enable the cup **160** to flex outwardly when a product having a diameter slightly larger than the distance between opposed ribs **615** is introduced at the open end and pressed into the cup **160.** The elongate ribs **615,** which extend along the inner facing surface of the cup **160,** provide an evenly distributed axial force in the direction of the longitudinal or central axis of the cup **165** against an appropriately sized cylinder of a product pressed or otherwise introduced in the cup **160.**

[0067] As further illustrated in FIG. 6, the annular ring or band **605** adjacent to the base surface forming the seat **610** has a diameter that slidably contacts the inward facing surface **128** of the sleeve. Additionally, at least a portion of the outer surface **162** of the wall of the cup **160** slidably contacts the inward facing surface **128** of the sleeve **120.** As described above, the surfaces of the channel **165** when contacted by and compressively deforming the second sealing element **170** increase the surface area of the annular seals provided by the cup **160** in the sleeve **120.** Consequently, when assembled as illustrated in the cross-sectional views of FIG. 1B, the dispenser **100** substantially prevents the escape of water vapor and/or volatile compounds that could outgas from a product stick in the cup **160.**

[0068] FIG. 9 includes top, front, bottom, perspective, and cross-sectional views as well as a detailed view of an embodiment of the rod **400** illustrated in FIG. 1B and FIG. 1C. In the illustrated embodiment, the rod **400** is an elongate member with a head end **412** and an opposed end with a set of fins **414** located at the opposed end. An annular band or stop **415** is located proximal to the head portion **412** and separates a threaded mid-portion or shaft **410** of the rod **400** from the head portion **412.** As described, the head portion **412** is arranged to fit and fixedly connect the rod **400** to the seat **610** in the base end of the cup **160.** The annular stop **415** prevents the rod **400** from being advanced beyond

the central member of the hollow body **110** when the dispenser **100** is in a first or delivered condition. An opposed surface of the annular stop **415** provides additional support when advancing the cup **160** along the inner surface **128** of the sleeve **120.**

[0069] As illustrated in the perspective view in FIG. 9, the threaded mid-portion **410** of the rod **400** is arranged with opposed flat surfaces that contact complementary opposed flat surfaces inside the shaft **230** of the manipulator **200.**

[0070] Opposed fins **414,** which are deflected or biased by the elongate curved edges of the shaft **230** when the rod **400** is advanced into the shaft **230** of the manipulator **200,** remain deflected and biased toward one another and the central axis of the dispenser **100** until the rod **400** is rotationally advanced by the manipulator **200** such that the open end of the cup **160** and a product cylinder or stick (not shown) fixed therein nearly reach the tapered end **121** of the sleeve **120.** As illustrated in Section B - B of FIG. 1B, such advancement of the rod **400** causes a portion of the opposed fins **414** to exit the open end of the shaft **230** where the fins **414** expand to contact an annular surface of the driver **300** near the threaded opening at the closed end of the driver **300.**

[0071] FIG. 10 includes top, front, side, bottom, perspective and cross-sectional views of an embodiment of the driver **300** illustrated in FIG. 1B and FIG. 1C. The driver **300** is a hollow cylinder with a partially closed first end **311** and an opposed open end **312.** As illustrated the partially closed end **311** has a circular opening the inner wall of which is threaded to complement the external threads arranged along the shaft of the rod **400.**

[0072] The driver **300** is arranged with external structures that enable the driver **300** to be fixed in the hollow body **110.** These external structures include opposed guides **314** which are angled with respect to the length of the driver **300** over a first portion and substantially parallel to each other and the longitudinal axis **102** of the dispenser **100** over a second portion. As described the opposed guides **314** are arranged to receive and align the driver **300** with the complementary guide member arranged along the inward facing surface **112** of the hollow body **110** as illustrated in Section B - B of FIG. 3B.

[0073] External structures further include appendages **315** and annular ribs **317** which are in registration with the over the second portion of the opposed guides **314.** The appendages **315** and the annular ribs **317** are spaced from each other to form a transverse channel for engaging the complementary transverse member of the hollow body **110.** The irregular end surface **313** at the open end **312** provides one border of a channel for alternative embodiments (not shown) that use a spring biased pushbutton to rotate a threaded rod through the driver **300.**

[0074] Internal structures of the driver **300** include guides **319** that are evenly distributed along the inward facing surface of the driver **300.** The guides **319** extend lengthwise along the inner surface of the driver **300** from the interface with the partially closed or first end **311** and form a channel in which the shaft **230** of the manipulator **200** is located. As described, the manipulator **200** can be rotated clockwise and anticlockwise to advance and/or retract the cup **160** and consequently a product stick or cylinder supported by the cup **160.** During such rotation the shaft **230** remains in the channel formed by the guides **319.**

[0075] FIG. 11 includes top, front, side, bottom, perspective and cross-sectional views of an embodiment of the manipulator **200** illustrated in FIG. 1B and FIG. 1C. As illustrated, the manipulator **200** comprises a base **210** and an extension portion or section **220.** The base **210** is a hollow cylinder with a closed end **211** with a chamfered edge along the perimeter of the base **210** and an opposed open end **231.** The extension portion **220** shares an inner surface of the manipulator **200** with the base **210** and provides a wall with an external surface that has a shorter diameter than the diameter of the base **210.** The outer surface of the extension portion **220** has bands or rings arranged to enable rotation of the manipulator **200** with respect to the hollow body **110** while maintaining permanent engagement of the manipulator **200** to the hollow body **110.**

[0076] As further illustrated in the various views of FIG. 11, a centrally located oblong shaft **230** extends from and is supported by the base **210.** The shaft **230** extends beyond the extension portion **220** of the manipulator **200.** The shaft **230** receives and supports a substantially portion of the length of the rod **400.** As shown in FIG. 1B, the head portion **412,** stop **415** and a relatively short section of the shaft of the threaded rod **400** extend beyond the oblong shaft **230** of the manipulator **200.** As further illustrated, the shaft **230** is arranged such that the wall has opposed flat sides for closely contacting complementary flat sides along the shaft of the rod **400.** The opposed flat sides of the shaft **230** are connected by curved portions at opposed ends. An appendage or appendages arranged along the length of the outer facing surface of the wall of the shaft **230** may be arranged to encounter the guides **319** along the inner surface of the driver **300.** As the manipulator **200** rotates within the driver **300,** contact between the appendages and the guides **319** may provide a desired rotational resistance to such movement.

[0077] FIG. 8 includes a cross-sectional view of an embodiment of a dispenser similar to the dispenser **100** illustrated in FIG. 1A, FIG. 1B, and FIG. 1C. The cross-sectional view further includes detailed views of a first interface and a second interface. A first interface is generally defined by the junction or intersection where the open end of the cap **130** abuts the wall of the hollow body **110.** As described, this junction or interface is located in registration with a complementary region or channel **124** of the outer surface of the sleeve **120.** As also described the first sealing element **140** is arranged in a cavity to form multiple interference regions or seals **802, 804** within the junction.

[0078] As shown in FIG. 8, the complementary region or channel **124** of the sleeve **120** includes an intersecting surface

125 and is bordered at one end by a substantially orthogonal surface **127.** The intersecting surface **125** and the substantially orthogonal surface **127** intersect at junction **126.** The surfaces **125, 127** and the junction **126** contact surface **141** and surface **142** of sealing element **140.** The complementary region or channel **124** and more particularly intersecting surface **125** deformedly compresses a portion of the rounded end of the stem portion of the sealing element **140.** The intersecting surface **125** of the sleeve **120** compresses the sealing element **140** with a force acting along a vector that is substantially orthogonal to the longitudinal axis **102** of the dispenser **100** and directed toward the hollow body **110.**

[0079] An end portion of the hollow body **110** overlaps a portion of the complementary region or channel **124** defined by the sleeve **120.** A sealing surface **116b** opposed to the intersecting surface **125** of the sleeve deformedly compresses an opposed portion of the rounded end of the stem portion of the sealing element **140.** The sealing surface **116b** compresses the sealing element **140** with a force acting along a vector that is substantially orthogonal to the longitudinal axis **102** of the dispenser **100** and directed toward the center of the dispenser **100.** As further shown in the detail, the cavity formed by the corresponding surfaces of the sleeve **120** and hollow body **110** extends beyond the rounded portion of the stem of the sealing element **140** to provide relief for deformed material of the sealing element **140.**

[0080] As previously described and as observed in the detail of the first interface, the complementary region or channel **124** of the sleeve **120** is opposed by an irregular surface **135** of the wall **132** of the cap **130** and further opposed by contoured surfaces **116** of the hollow body **110.** The irregular surface **135** of the cap provides a rounded node or protrusion that compresses the sealing element **140** with a force acting along a vector that is substantially parallel to the longitudinal axis **102** of the dispenser **100** and directed toward the hollow body **110** and the manipulator **200.** In addition, the irregular surface **135** provides an adjacent recess that corresponds to the chamfered surface **147** of the sealing element. The adjacent recess and the gap between the cap **130** and the sleeve **120** provide relief for the compressed sealing element to deform or encroach into these portions of the cavity at the first interface.

[0081] A curved transition surface **137** between the irregular surface **135** and the end surface **138** of the cap **130** compresses the outermost surface **144** of the sealing element **140** with a force acting along a vector that is substantially orthogonal to the longitudinal axis **102** of the dispenser **100.** The curved transition surface **137** provides an additional recess that may receive deformed material of the sealing element **140** and assists the irregular surface **135** and the surface **127** of the sleeve **120** in forming a seal where the surface **146** of the sealing element **140** abuts the sealing surface **116a** of the hollow body.

[0082] As further illustrated in the detail of the first interface in FIG. 8, a portion of the length of surface **146** of the base portion of the sealing element **140** is in contact with a portion of sealing surface **116a** of the hollow body **110.** In addition, a portion of surface **142** of the sealing element **140** is in contact with the surface **127** of the sleeve **120.** These opposed surfaces **127, 116b** contact and may compress the opposed ends of the base portion of the sealing element **140.** When compressed, the surface **127** provides a force acting along a vector that is parallel to the longitudinal axis **102** of the dispenser **100** in a direction toward the hollow body **110.** Conversely, when compressed, the surface **116a** provides a force acting along a vector that is parallel to the longitudinal axis **102** of the dispenser **100** in a direction toward the cap **130.**

[0083] The lower most of the two detailed views in FIG. 8 illustrates a second interface proximal to the base of the cup **160** and the inner surface **128** of the sleeve **120.** As illustrated in the detail, a channel **165** in the base of the cup **160** is defined by an intersecting surface **167** and adjacent surfaces that extend from outer surface of the cup **160** to the intersecting surface **167.** The sealing element **170** is located within and compressed by at least three surfaces at the interface. As shown, the intersecting surface **167** and at least one adjacent surface of the cup **160** compress the sealing element **170** with the inner surface **128** of the sleeve **120** further compressing the sealing element **170.** When appropriately sized, the sealing element **170** may further contact and/or be compressed by an adjacent surface of the channel **165** that further defines the channel **165.** At each location where interference between the surrounding surfaces and the sealing element **170** occurs and the sealing element **170** is deformed, the contact area between the sealing element **170** and the respective surfaces increases. As a result the effectiveness of the seal(s) so formed is increased.

[0084] In the illustrated embodiment, the second interface in the lower-most detail of FIG. 8 is depicted at the delivery or fully retracted position with the cup **160** shown abutting the cross member of the hollow body **110.** At this location, engagement member **115** of the hollow body **110** is in engagement with a complementary region **815** arranged in the sleeve **120.** However, as shown in FIG. 1B and as previously described, it should be understood that the second interface travels along the inner surface **128** of the sleeve as the cup **160** is controllably advanced and retracted by rotation of the manipulator **200** and corresponding linear translation of the rod **400** along the longitudinal axis **102** of the dispenser **100.** As depicted in FIG. 8, the outward facing surface **162** of the cup **160** is not in contact with the opposed inner surface **128** of the sleeve. It should be understood that in preferred embodiments of the dispenser **100** the outer surface **162** of the cup **160** is in close contact with the inner surface **128** of the sleeve at one or more locations. Such contact does not prohibit translation of the cup **160** along the longitudinal axis **102** of the dispenser **100.**

[0085] For example, as illustrated in the detail of FIG. 12, an alternative embodiment of a second interface reveals that the annular outer wall of the base of the cup **160** may be in close contact with the sleeve **120** over an interference region **510.** In this alternative arrangement, the sealing element **170** is absent from the channel **165.** In addition, as shown in the corresponding cross-sectional view, an insert or secondary cap **505** is deployed to further seal the tapered

end of the sleeve **120** under the cap **130.** The insert **505** is removable and may be discarded and/or returned to provide additional seals to prolong the useful life of a product arranged in the cup **160.**

[0086] It should be noted that the term "comprising" does not exclude other elements or features and the article "a" or "an" does not exclude a plurality. Also elements described in association with different embodiments may be combined.

Reference Symbols in the Drawings

100	dispenser	146	surface(s)
102	longitudinal axis	160	cup
110	body	161	wall
111	end	162	surface (outer)
112	surface (inner)	165	channel
113	base end	167	surface
115	engagement feature	170	sealing element
116	sealing surface(s)	172	guide
117	transition surface	174	guide
120	sleeve	175	channel
121	end	176a	guide member
122	surface (outer)	176b	guide member
123	end	177	guide (annular)
124	complementary region	200	manipulator
125	surface (annular)	210	base
126	junction	211	end
127	surface (annular)	220	extension portion
128	surface	230	shaft
129	nub	231	end
130	cap	300	driver
131	end (closed)	311	end
132	wall	312	end
133	end (open)	313	irregular surface
135	surface (irregular)	314	guide
137	transition (edge)	315	appendage(s)
138	face	317	annular rib(s)
140	sealing element	319	guide(s)
141	surface	400	rod
142	surface	410	threaded portion
143	chamfer	412	head portion
144	surface	414	fin(s)

415	stop
505	insert
510	interference region
605	band
610	seat
615	rib(s)
802	interference region(s)
804	interference region(s)
815	complementary region

Claims

1. A dispenser (100), comprising:

a hollow body (110) having a first end (111) and an opposed base end (113), the hollow body (110) having an inner surface (112) with an engagement feature (115) located between the first end (111) and the opposed base end (113), the hollow body (110) further having sealing surfaces (116a, 116b) proximal to the first end (111);
a sleeve (120) fixed to and extending beyond the hollow body (110), the sleeve (120) having a first end (121), an opposed end (123), and an outer surface (122) with a complementary region (124);
a cap (130) having a closed end (131) and an opposed open end (133) defined by a wall (132) with an irregular surface (135) proximal to the opposed open end (133); and
a sealing element (140) located in a cavity (150) defined by the sealing surfaces (116a, 116b) of the hollow body (110), the complementary region (124) of the sleeve (120) and the irregular surface (135) of the cap (130).

2. The dispenser (100) of claim 1, wherein the hollow body (110), the sleeve (120), the cap (130) and the sealing element (140) are arranged about a longitudinal axis (102) of the dispenser (100).

3. The dispenser (100) of claim 1, wherein the sealing element (140) is made from a compliant material.

4. The dispenser (100) of claim 1, wherein the sealing surfaces (116a, 116b) include a surface (116b) that abuts the wall (132) of the cap (130).

5. The dispenser (100) of claim 4, wherein the surface (116b) that abuts the wall (132) of the cap (130) also abuts the sealing element (140).

6. The dispenser (100) of claim 1, wherein at least one of the sealing surfaces (116a, 116b) is annularly arranged and interferes with the sealing element (140).

7. The dispenser (100) of claim 1, wherein the irregular surface (135) of the cap (130) interferes with respective surfaces (142, 144) of the sealing element (140); and
wherein the sealing element (140) is compressed by opposed surfaces (116b, 125) of the hollow body (110) and the sleeve (120).

8. The dispenser (100) of claim 7, wherein the irregular surface (135) of the cap (130) opposes respective surfaces (142, 144) of the sealing element (140).

9. The dispenser (100) of claim 1, wherein the body (110) comprises at least one transition surface (117) located between respective sealing (116a, 116b) surfaces.

10. The dispenser (100) of claim 1, wherein the cap (130) comprises a transition surface (137) located between an end face (138) and the irregular surface (135).

11. The dispenser (100) of claim 1, wherein a portion of the cavity defined by the sealing surfaces (116a, 116b) of the hollow body (110), the complementary region (124) of the sleeve (120) and the irregular surface (135) of the cap (130) remains unfilled.

12. The dispenser (100) of claim 1, wherein the complementary region (124) of the sleeve (120) includes a surface (125) that interferes with the sealing element (140).

13. The dispenser (100) of claim 12, wherein the sealing element (140) is arranged to abut at least two surfaces (125, 127) of the sleeve (120), wherein the at least two surfaces (125, 127) of the sleeve intersect at a junction (126); and wherein the sealing element (140) has complementary surfaces (141, 142) that abut the at least two surfaces of the sleeve (125, 127) proximal to the junction (126).

14. The dispenser (100) of claim 1, wherein the sealing element (140) is compressed along substantially orthogonal surfaces (142, 144) by the cap (130) when the cap (130) is engaged to the sleeve (120).

15. The dispenser (100) of claim 1, further comprising:

a cup (160) located in the sleeve (120), the cup (160) including an outer surface (162) that defines a channel (165); and
a second sealing element (170) defined by the cup (160), wherein the second sealing element (170) is arranged

to interfere with at least opposed surfaces (128, 167) of the sleeve (120) and the cup (160).

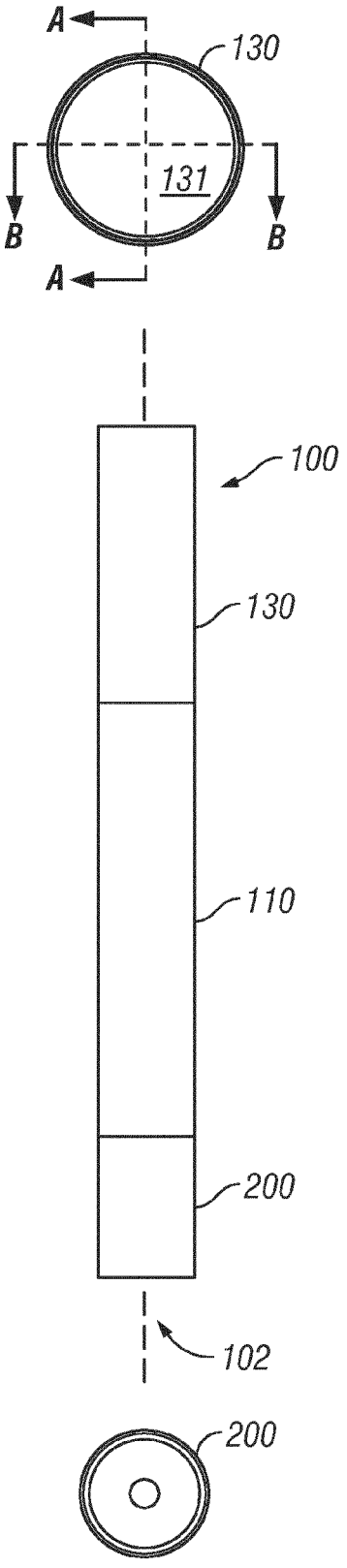
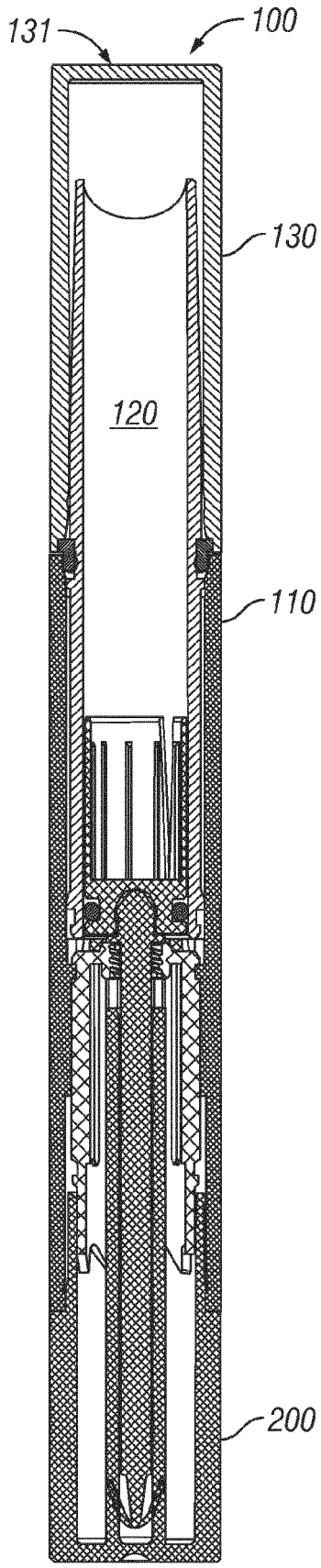
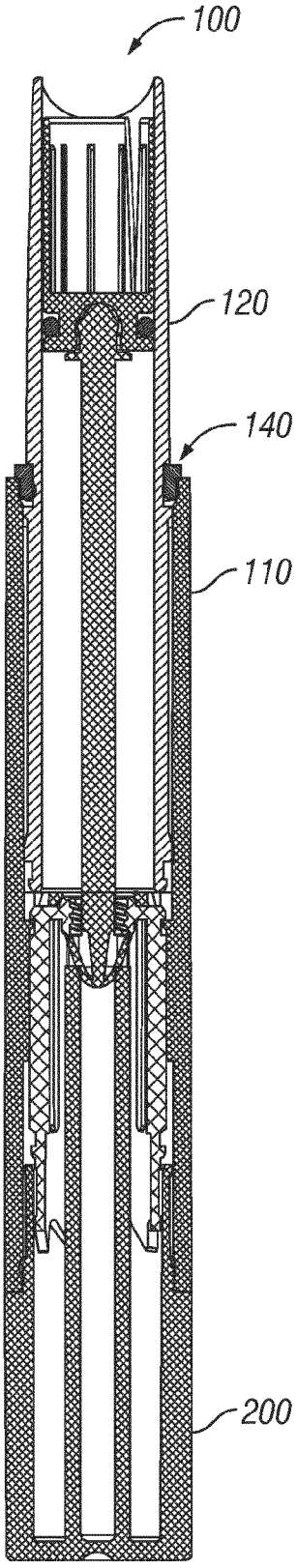


FIG. 1A



SECTION A-A



SECTION B-B

FIG. 1B

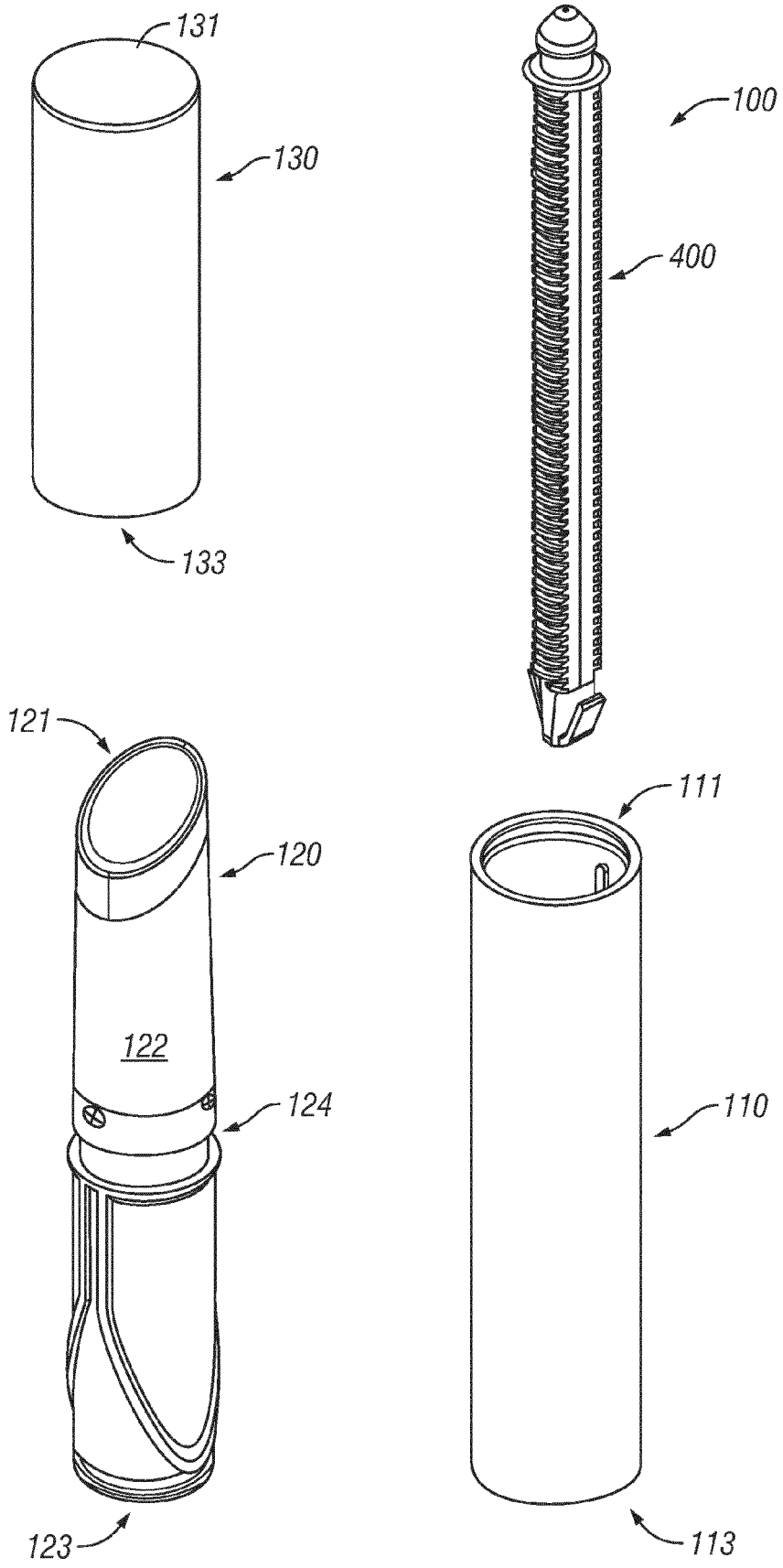


FIG. 1C

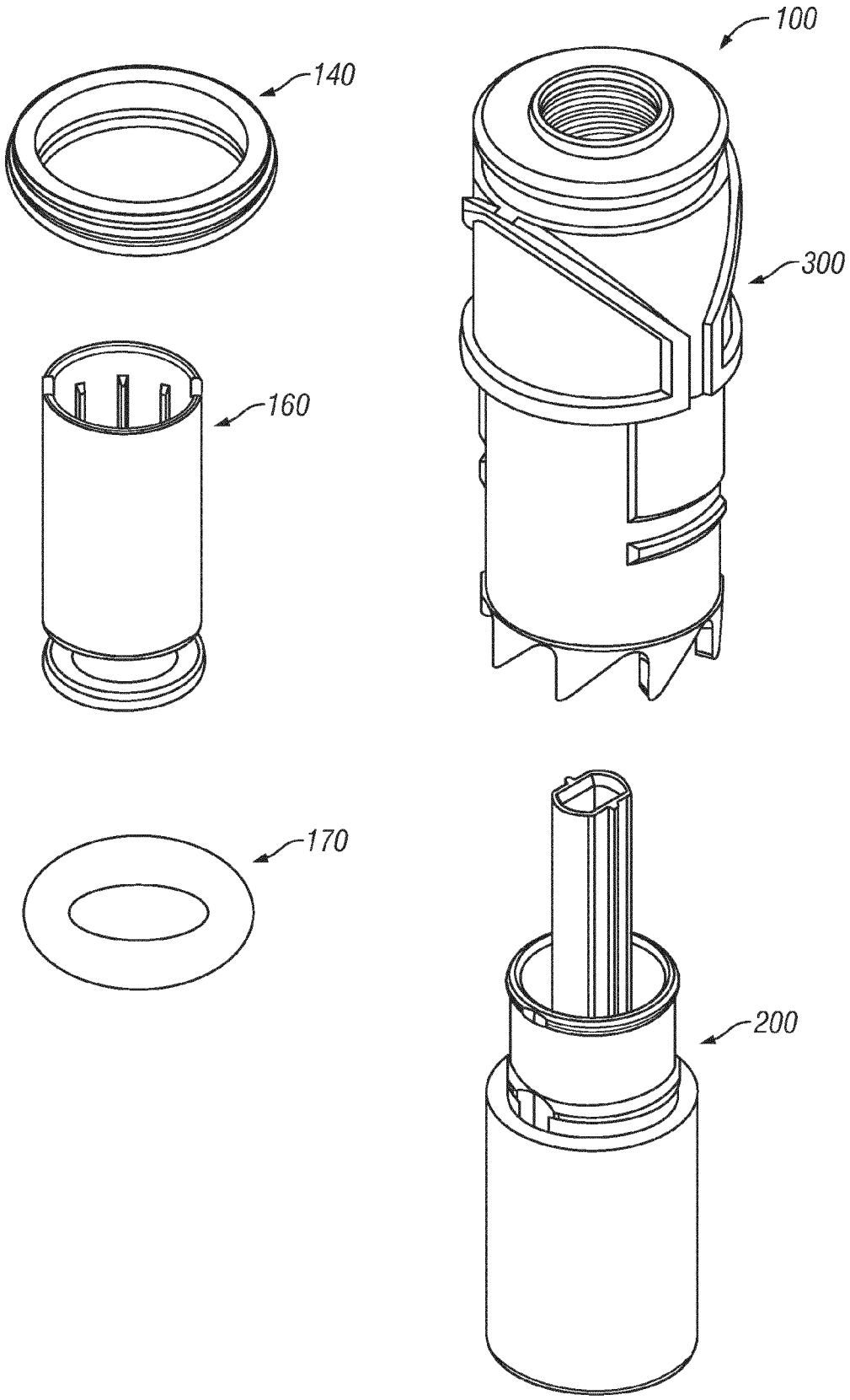


FIG. 1C
(Cont'd)

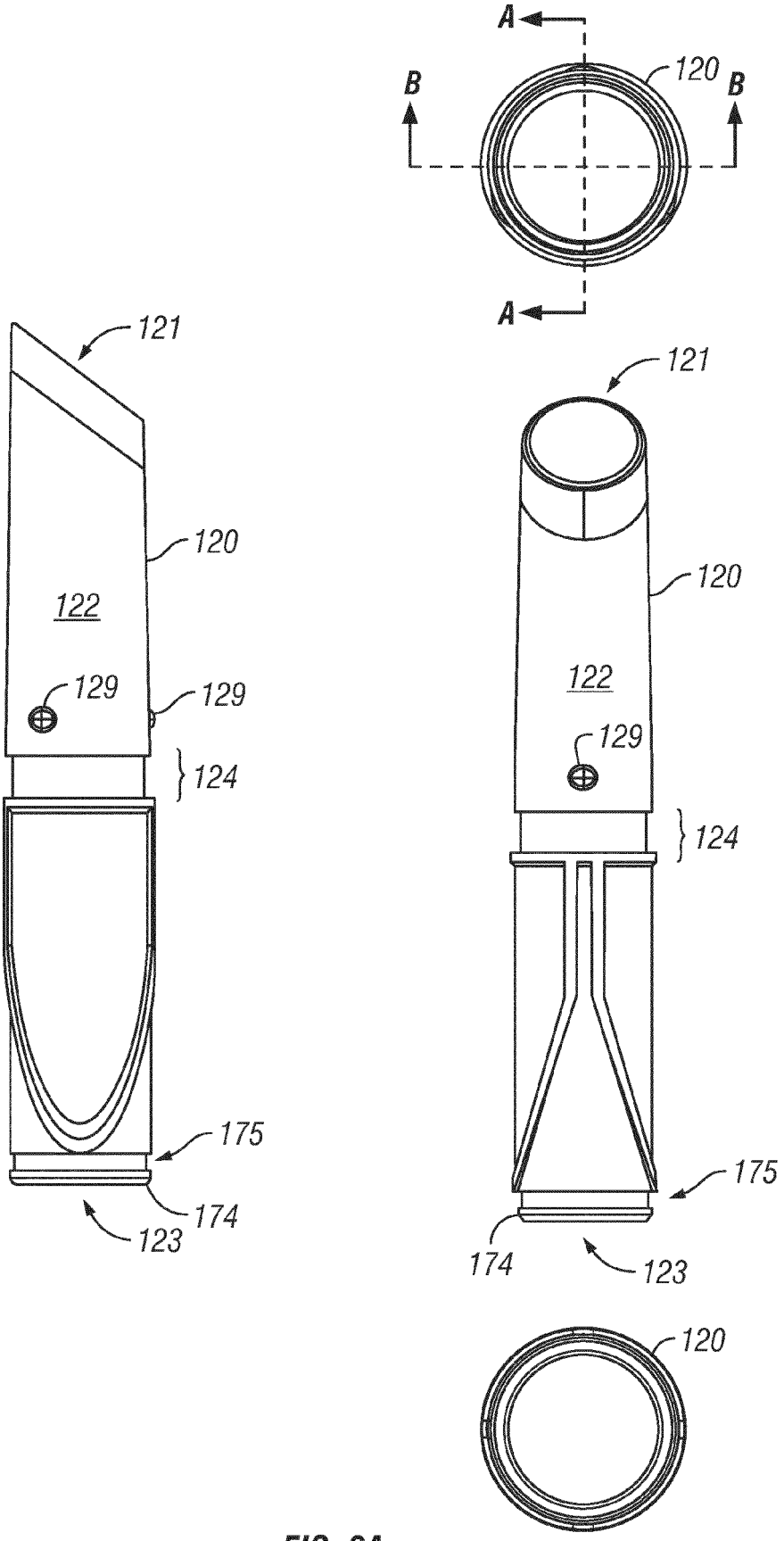

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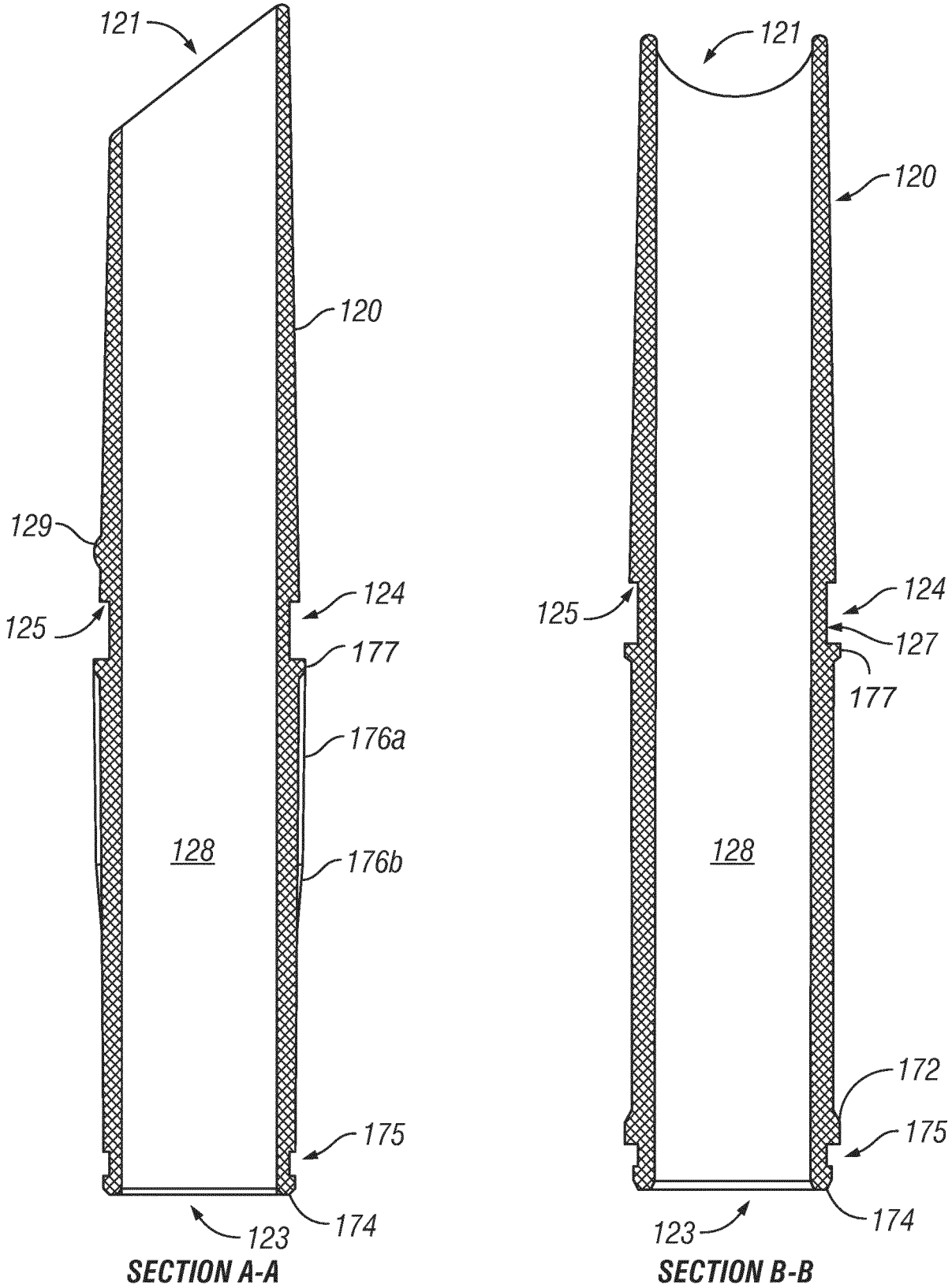
FIG. 2A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SECTION A-A
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172
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SECTION B-B

FIG. 2B

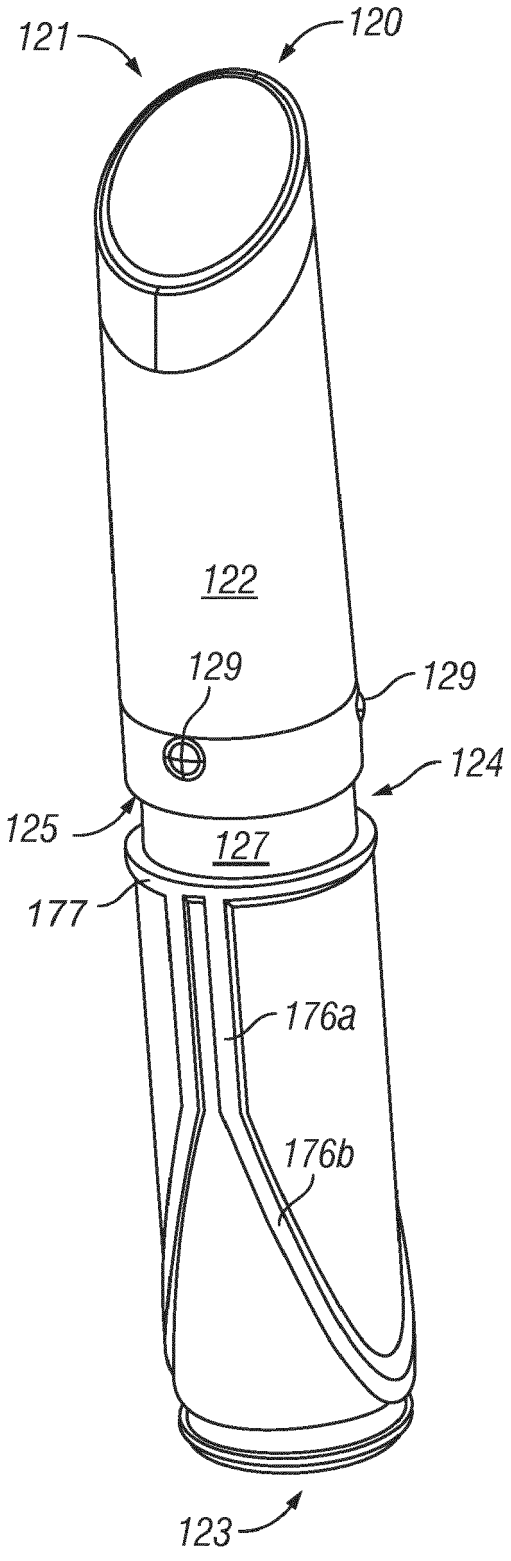


FIG. 2B
(Cont'd)

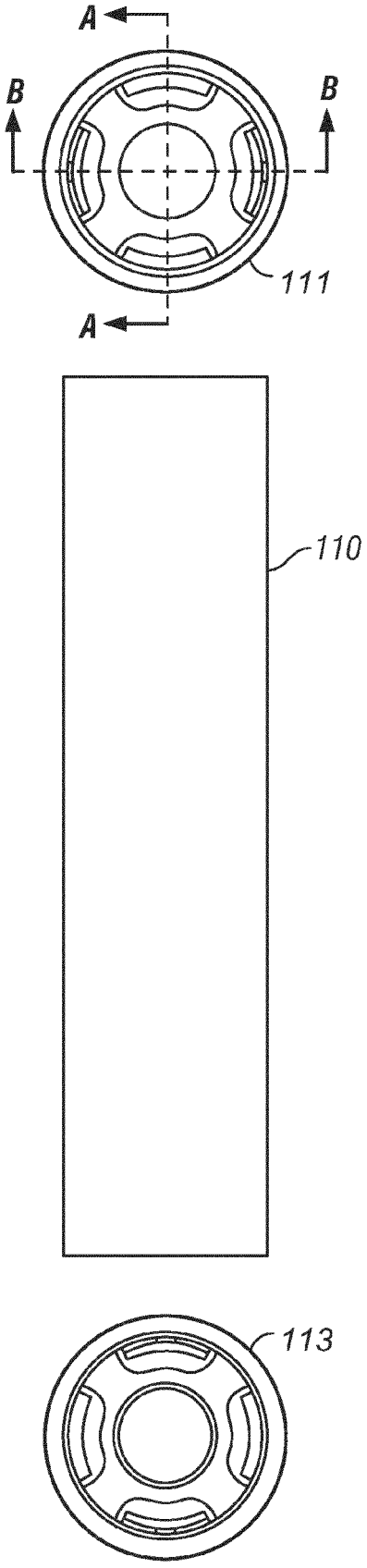


FIG. 3A

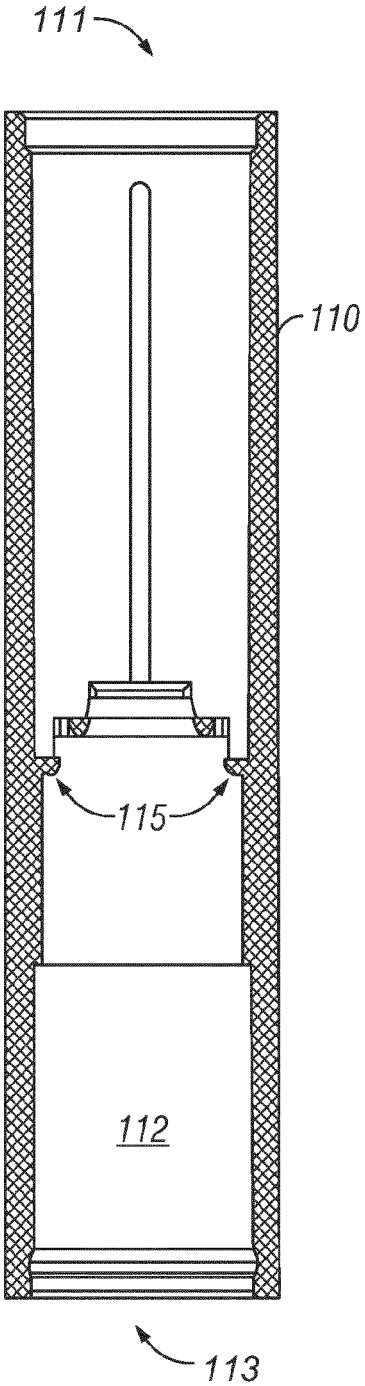


FIG. 3B

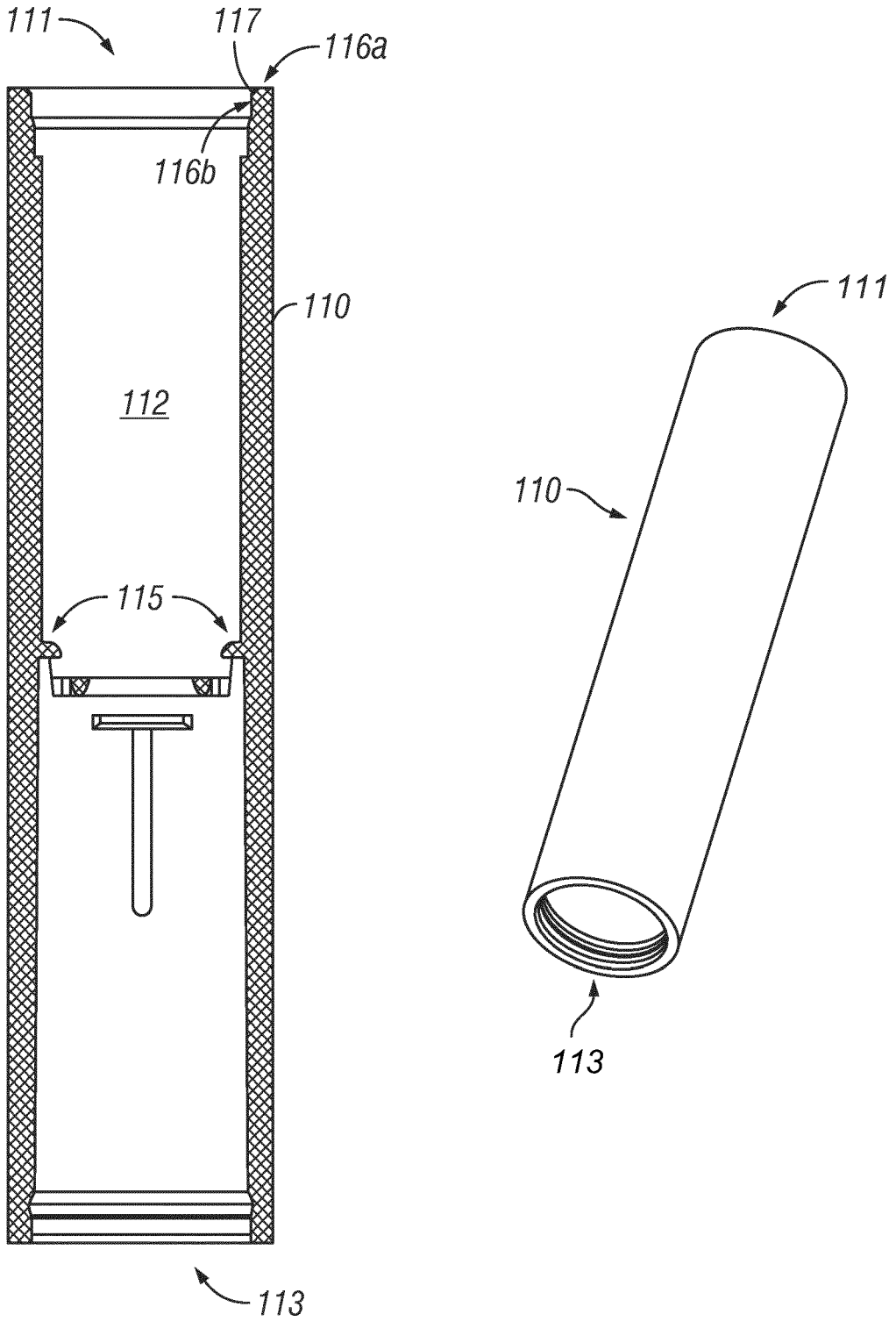


FIG. 3B
(Cont'd)

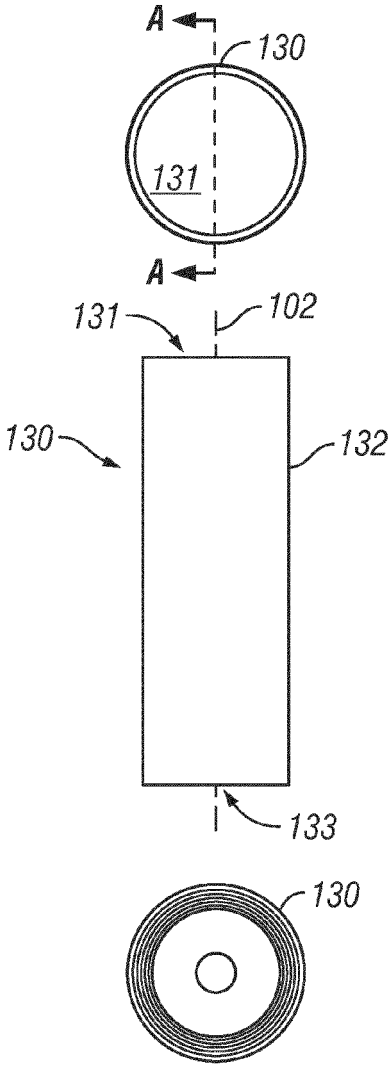


FIG. 4A

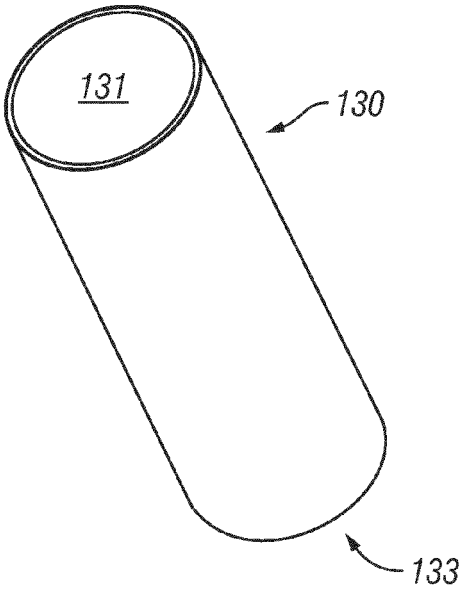
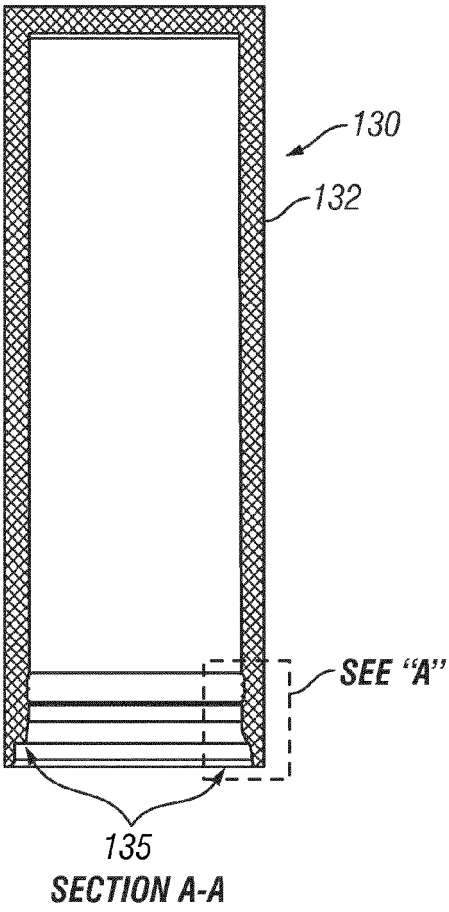
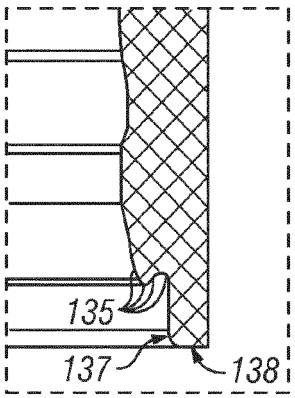


FIG. 4B



SECTION A-A

FIG. 4C



DETAIL "A"

FIG. 4D

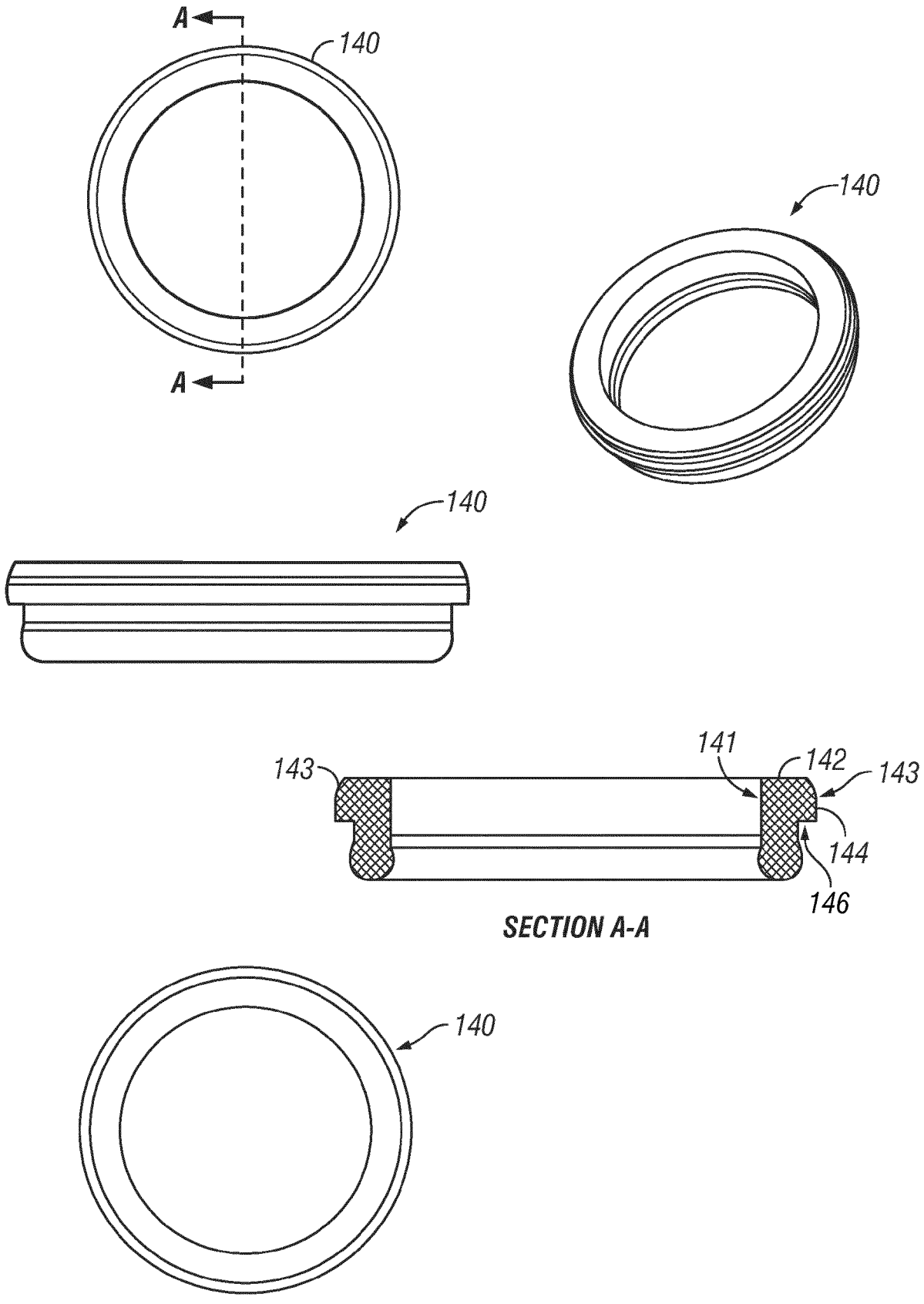


FIG. 5

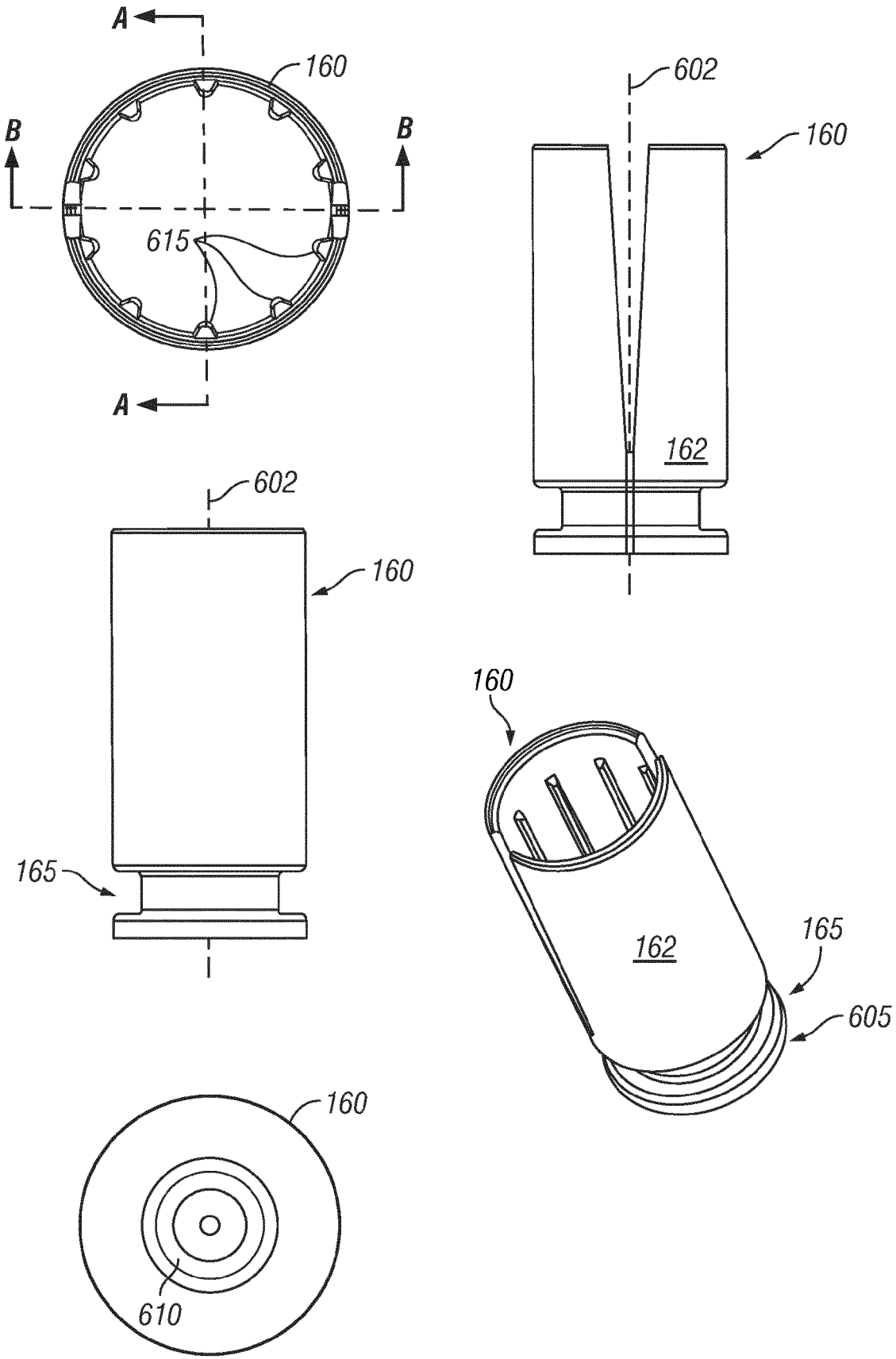


FIG. 6

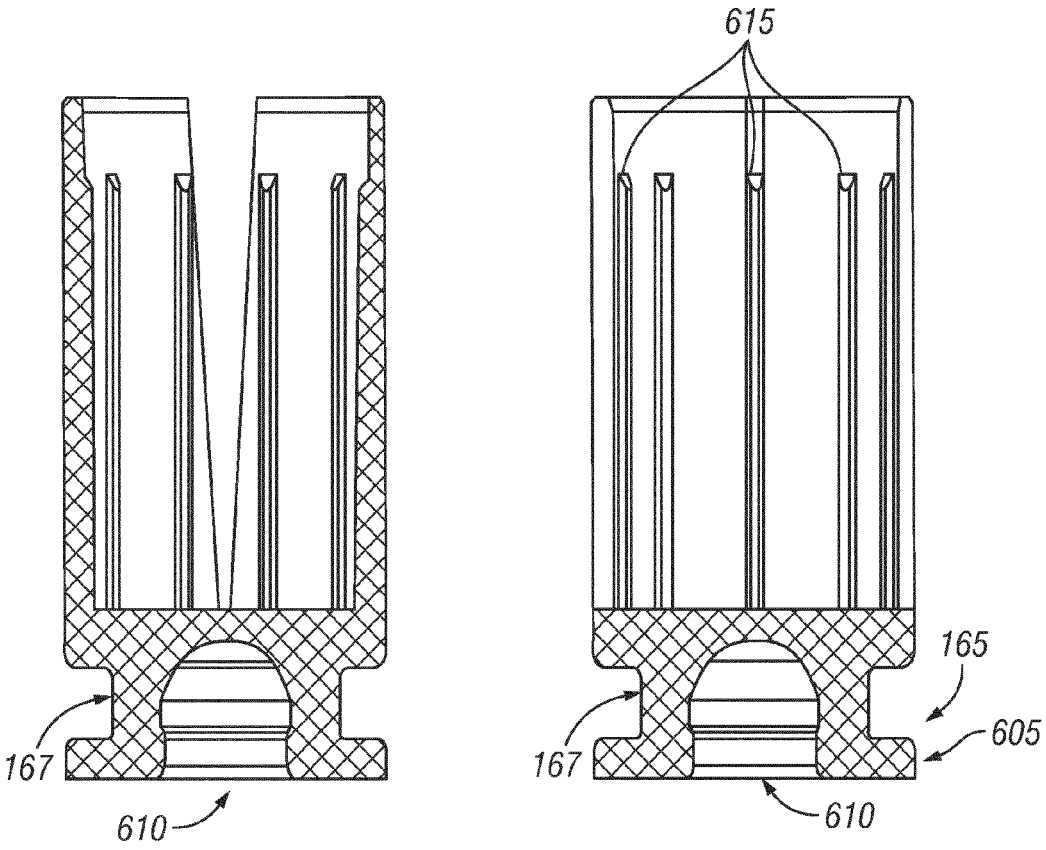


FIG. 6
(Cont'd)

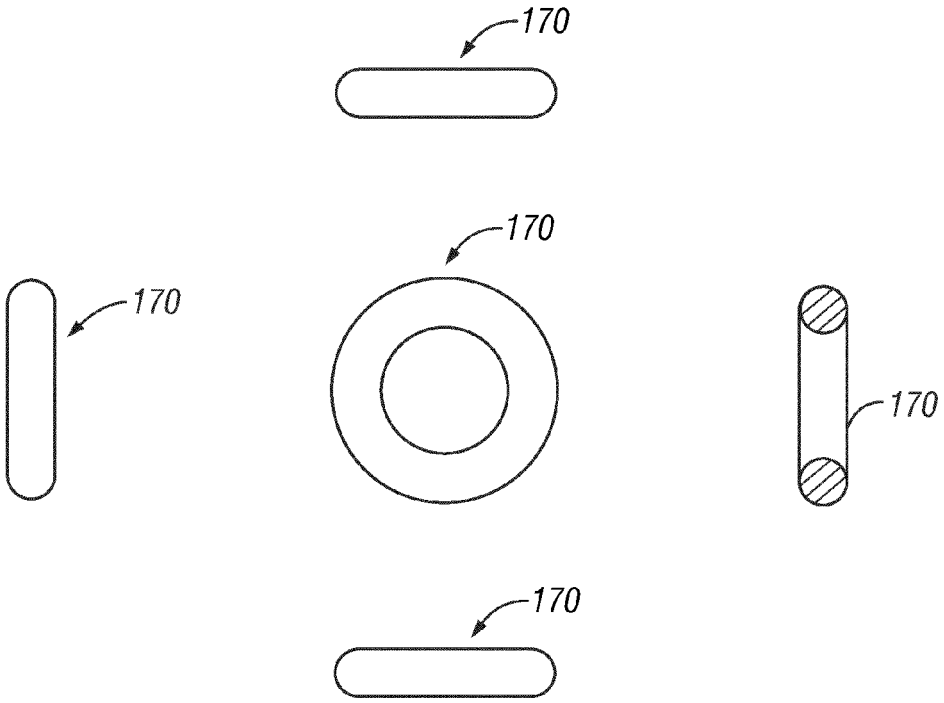


FIG. 7

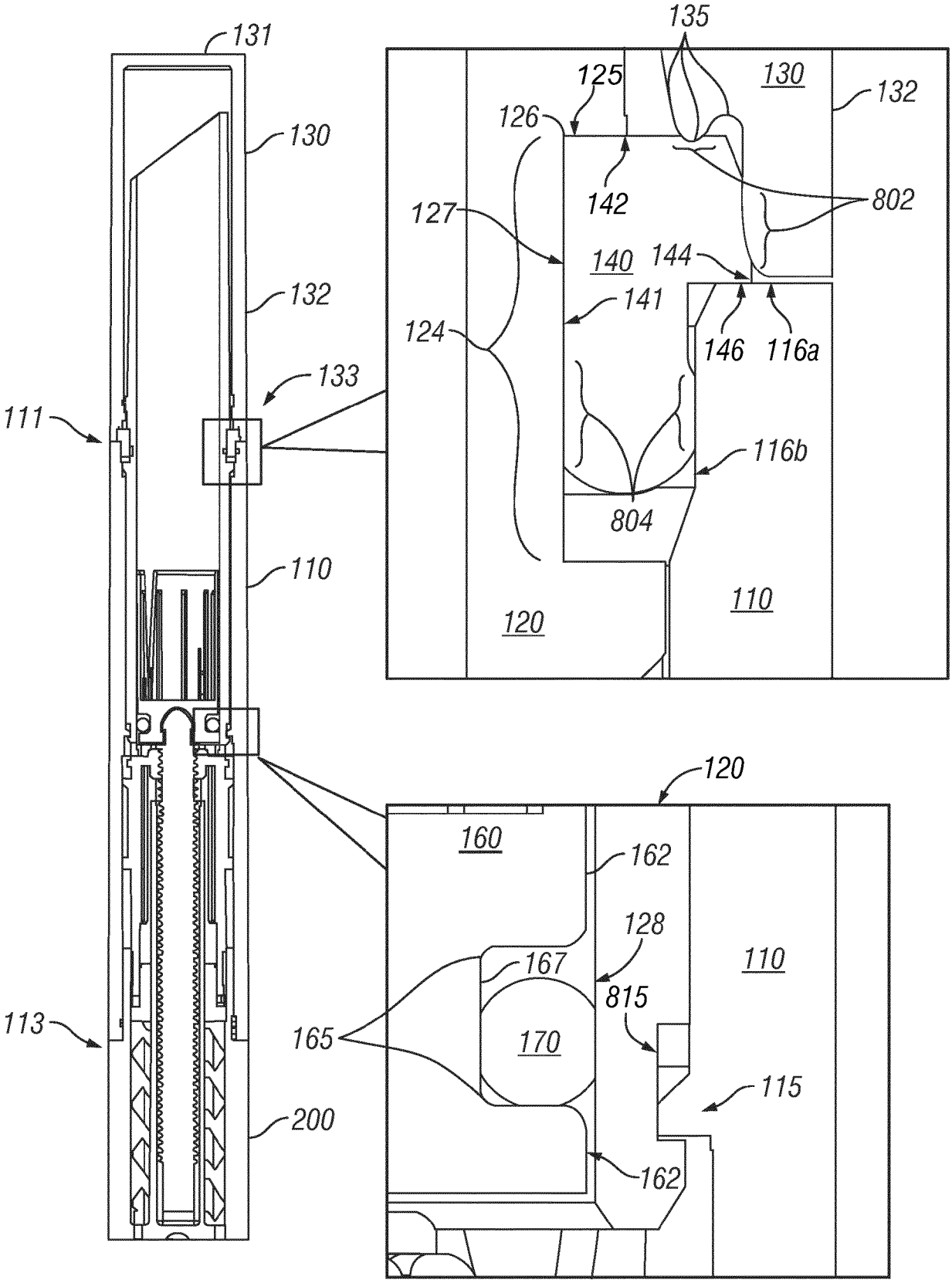

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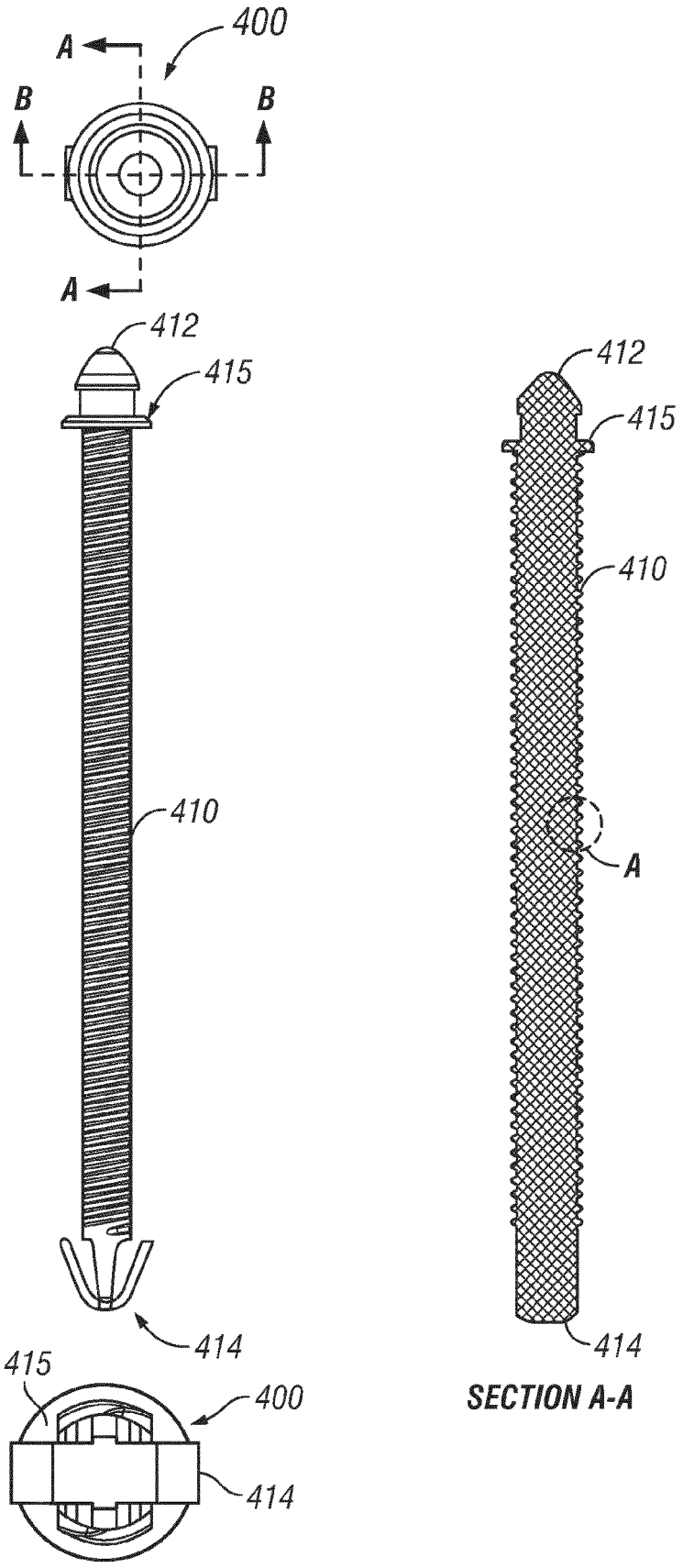
FIG. 8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SECTION A-A

FIG. 9

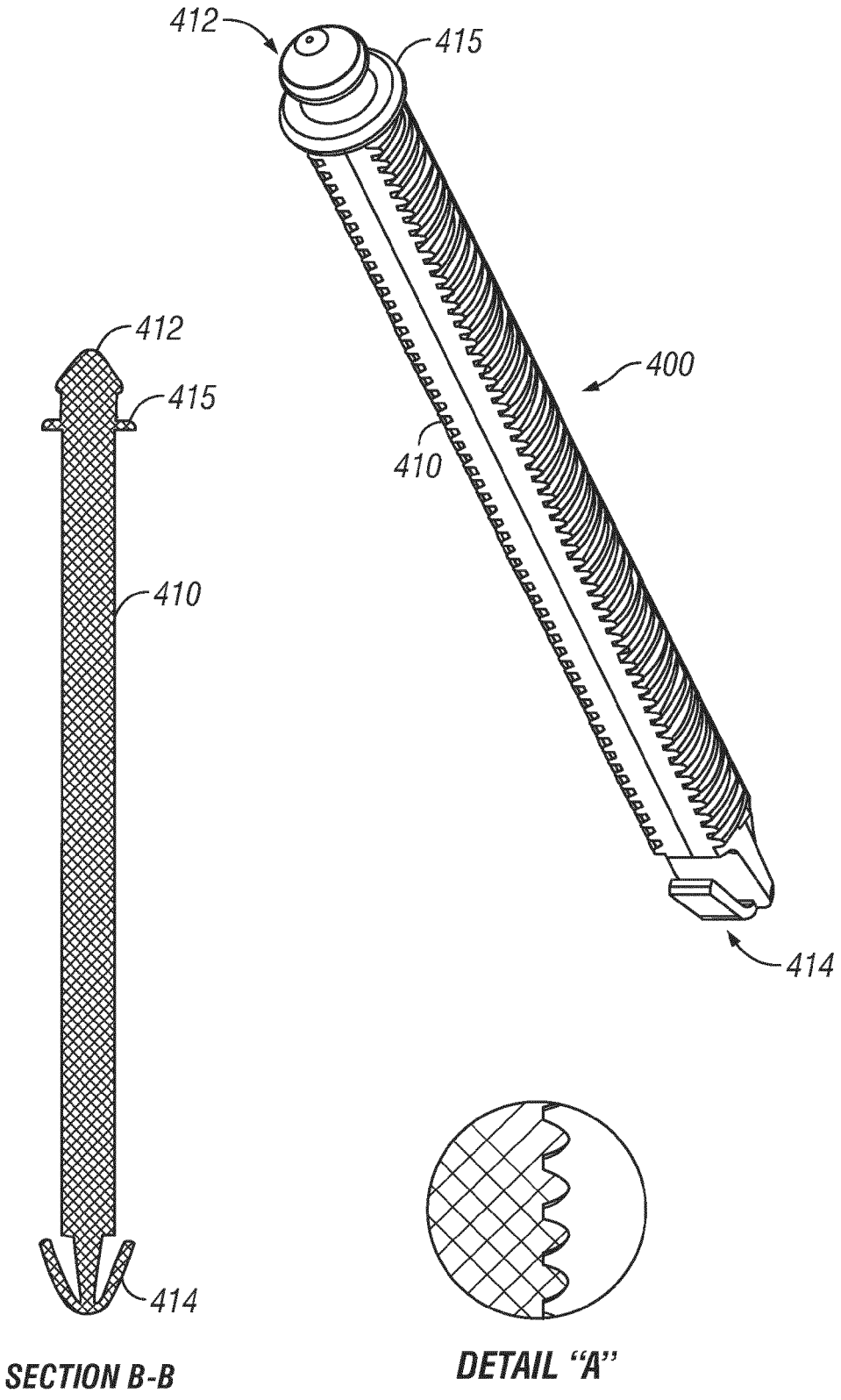


FIG. 9
(Cont'd)

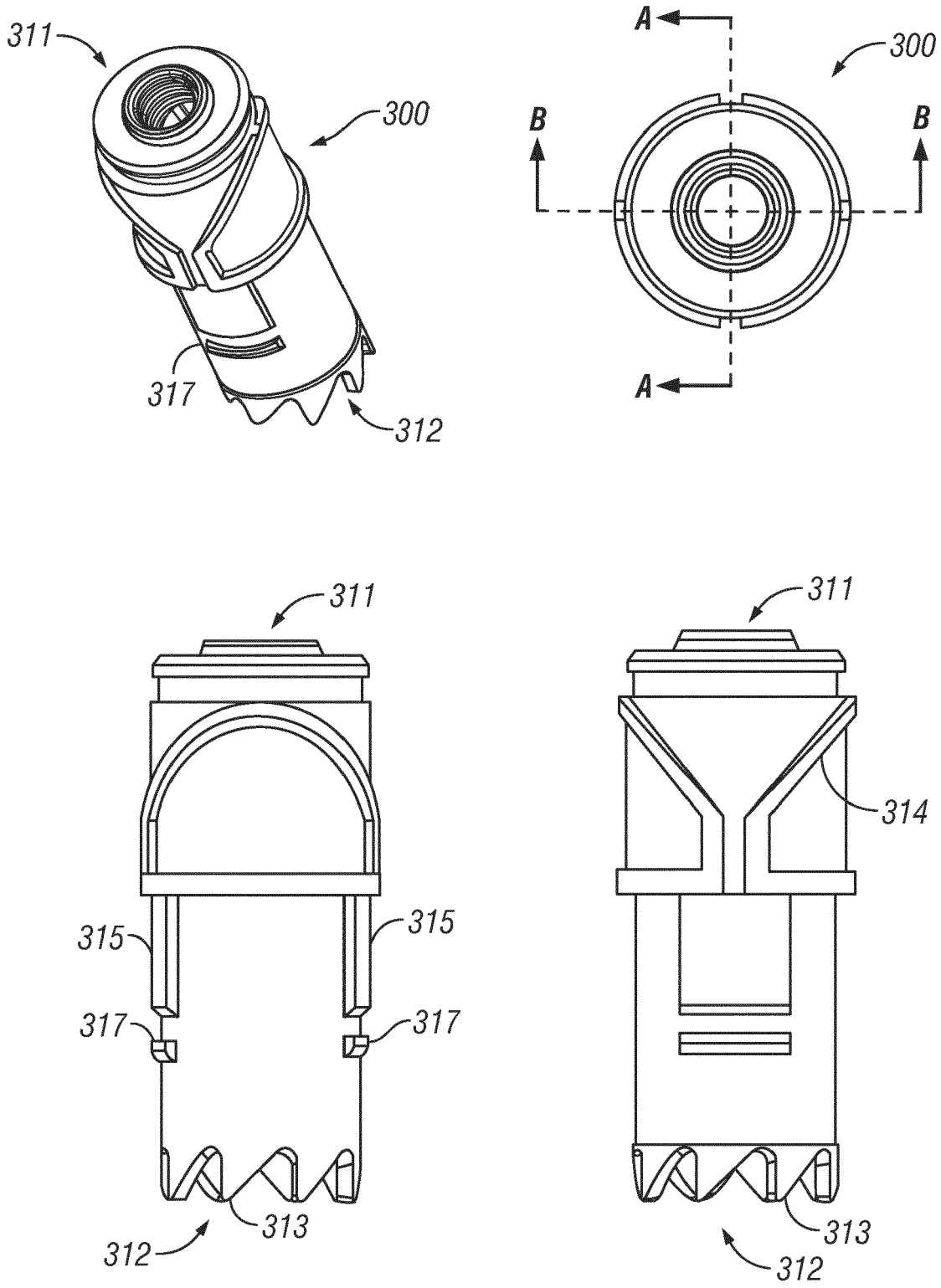


FIG. 10

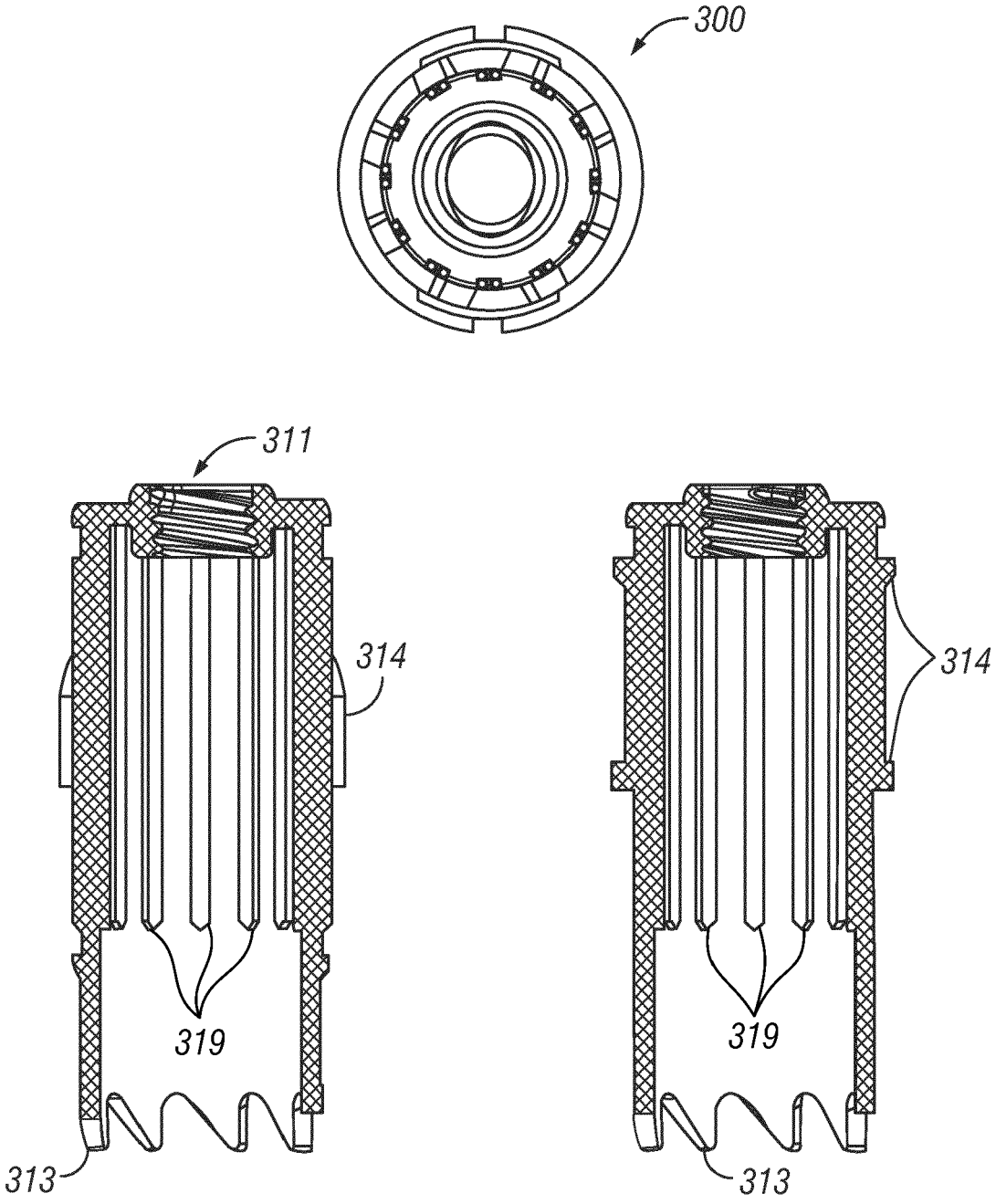


FIG. 10
(Cont'd)

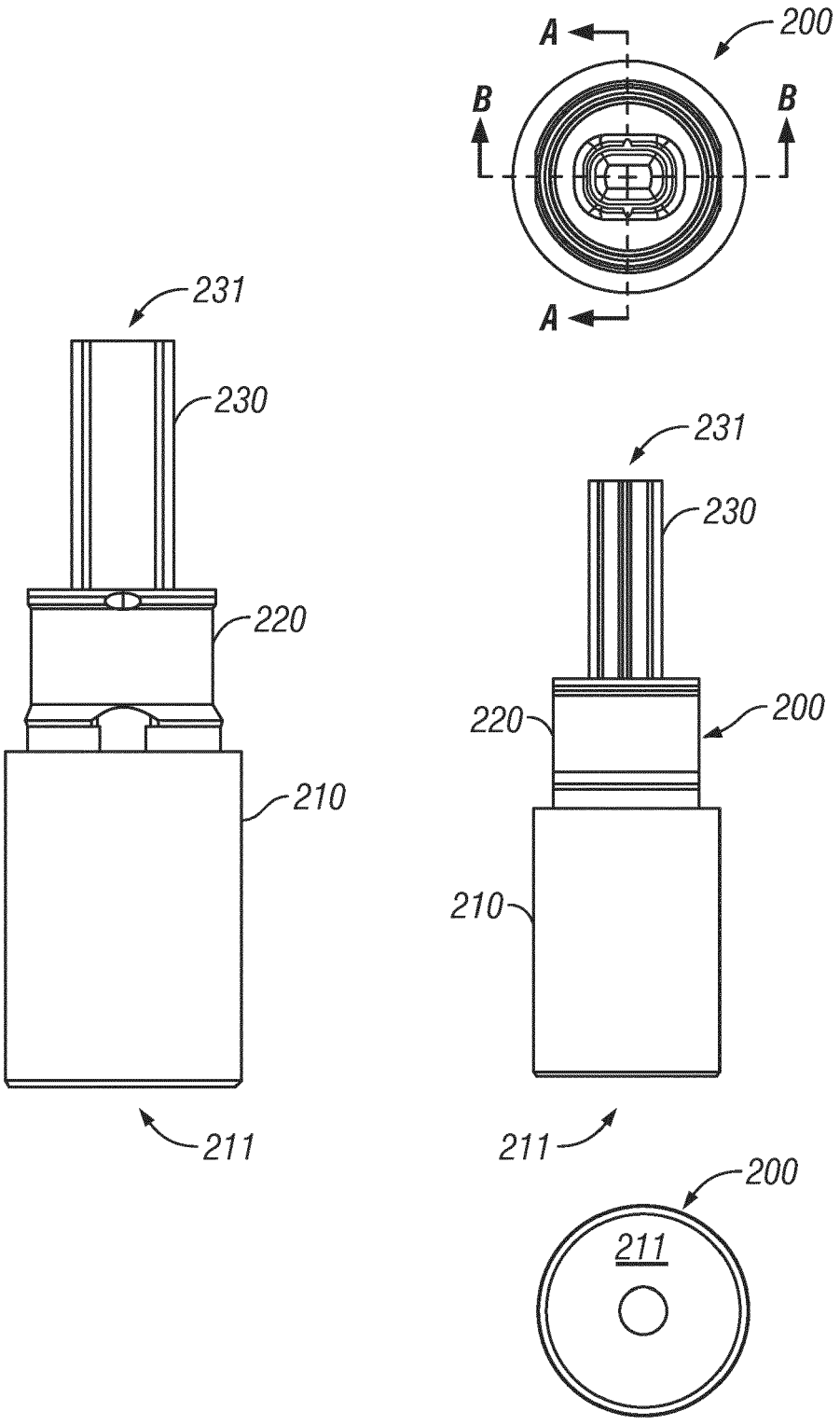
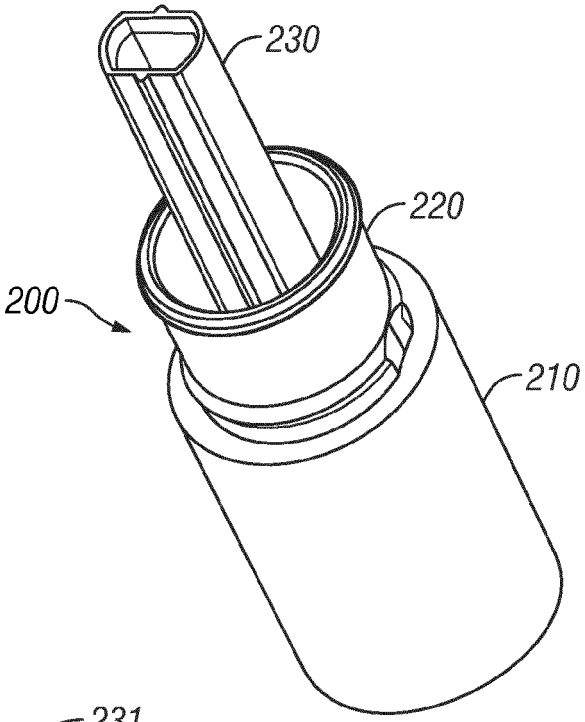
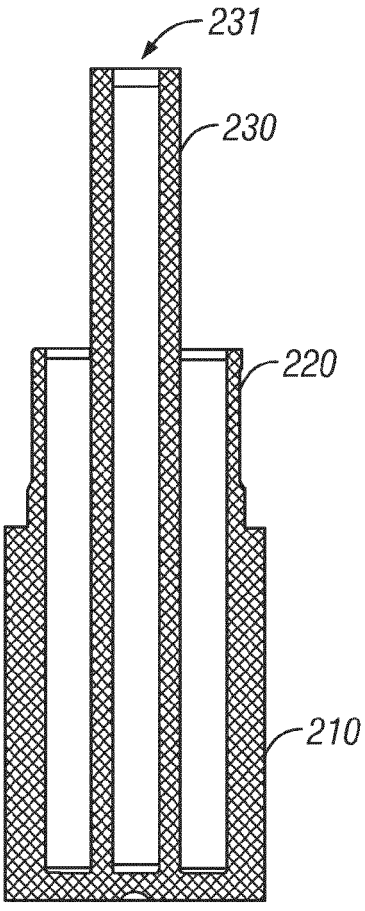
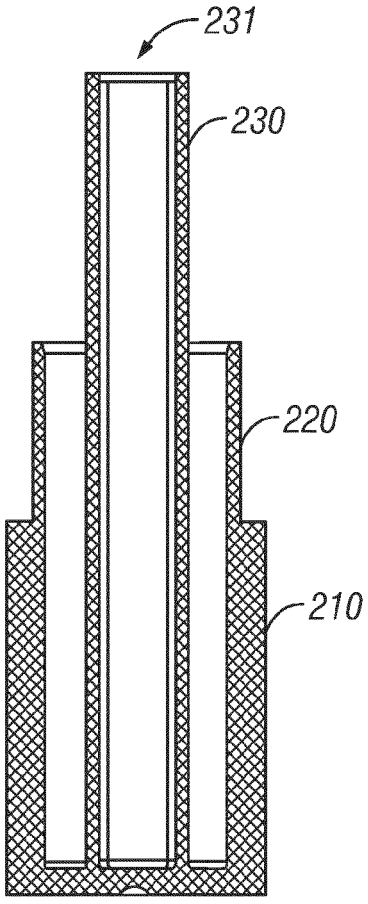


FIG. 11





SECTION A-A



SECTION B-B

FIG. 11
(Cont'd)

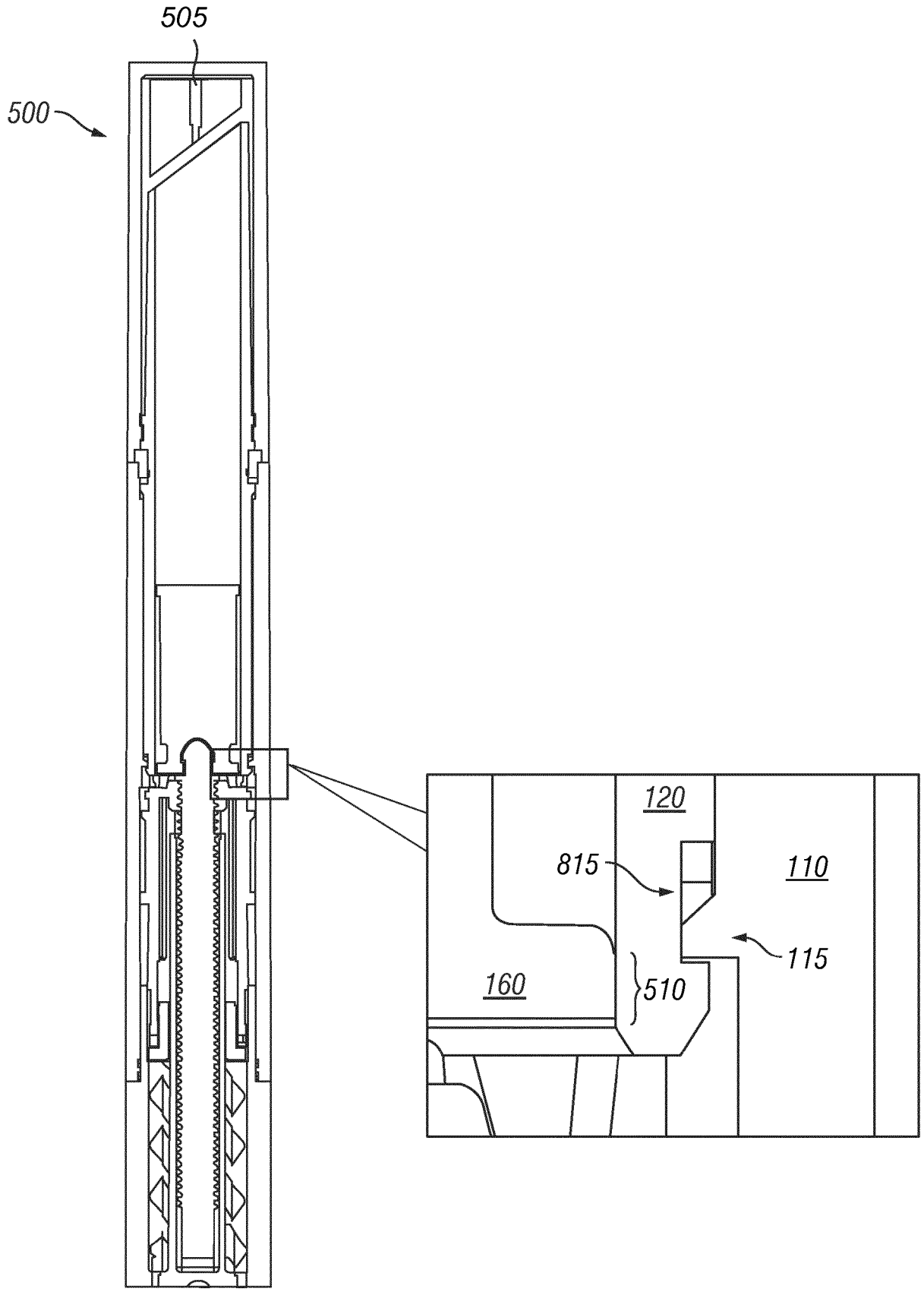


FIG. 12

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European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 18 18 5846

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 984 920 A (O'NEILL R KEVIN [US]) 15 January 1991 (1991-01-15) * column 2, line 32 - column 3, line 8; figures 1,2 *	1,2,4,5, 7-14	INV. A45D40/00
X	FR 2 997 828 A1 (COSMOGEN SAS [FR]) 16 May 2014 (2014-05-16) * page 8, line 1 - page 10, line 35; figures 2, 3a, 4a, 4b *	1-14	
A	WO 2013/065952 A1 (CHOI MIN-CHEOL [KR]) 10 May 2013 (2013-05-10) * the whole document *	1-15	
A	WO 2015/091483 A1 (OREAL [FR]) 25 June 2015 (2015-06-25) * the whole document *	1-15	
A	US 2002/146274 A1 (ROBERTS KEITH [US]) 10 October 2002 (2002-10-10) * the whole document *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A45D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 October 2018	Fidalgo Marron, B

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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18-10-2018

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