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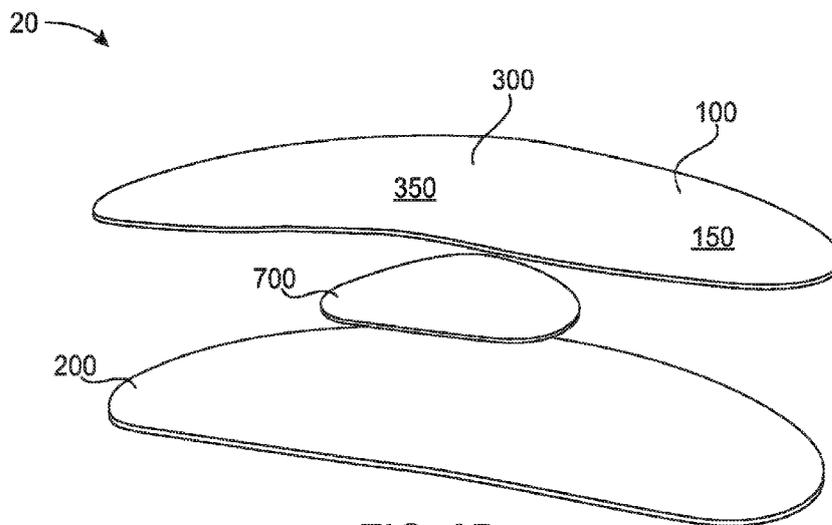


FIG. 3B

(57) Abstract: The present disclosure provides devices for preventing or absorbing fluid (e.g., sweat) and/or odors from the intergluteal cleft of a subject. In some embodiments, the present disclosure provides devices for treating or preventing hemorrhoids and methods of using same.

## SWEAT PAD AND METHODS OF USING SAME

## PRIORITY CLAIM

**[0001]** This application claims priority to U.S. Patent Application No. 14/970,831, filed on December 16, 2015, the entire contents of each of which are incorporated herein by reference and relied upon.

## TECHNICAL FIELD

**[0002]** The present disclosure relates to devices for absorbing a bodily fluid (e.g., sweat), relieving pain and/or itching, and/or relieving one or more symptoms of hemorrhoids.

## BACKGROUND

**[0003]** Sweating and itching around the anus is a common occurrence, and can be embarrassing to those who suffer from it and its other symptoms. Hemorrhoids are also common, and often impart itching, pain, swelling and bleeding. Other conditions, such as proximal decubitus ulcers, also include symptoms emanating from the anal or perianal regions. Surgical interventions are associated with increased risks of infection and other complications. In addition, some conditions (e.g., early stage hemorrhoids) are not indicated for surgical correction, yet are associated with extreme discomfort for many subjects. A need exists for non-surgical treatments for these and other similar conditions.

## SUMMARY

**[0004]** The present disclosure provides devices for absorbing a bodily fluid (e.g., sweat), relieving pain and/or itching, and/or relieving one or more symptoms of hemorrhoids. In some embodiments, the device is placed adjacent to (e.g., in contact with) an existing hemorrhoid, or adjacent to (e.g., in contact with) a location of a subject where a hemorrhoid is likely to form. In some embodiments, the device absorbs fluid (e.g., sweat) when placed adjacent to (e.g., in contact with) skin of a subject.

**[0005]** In some embodiments, the present disclosure provides an absorbent device comprising a first layer including a body-facing surface containing an anti-stick material; a second layer disposed opposite the first body-facing surface; and a third layer disposed between the first and second layers and comprising an absorbent material, wherein at least a portion of the first layer includes a contour that substantially deviates from a plane.

**[0006]** In other embodiments, the present disclosure provide an absorbent device comprising a first, body-facing layer comprising a plurality of dimples; a second layer disposed opposite the first layer; and an inner core disposed between the first, body-facing layer and the second layer.

**[0007]** In some embodiments, the present disclosure provides methods of treating or preventing a hemorrhoid in a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of a subject.

**[0008]** In some embodiments, the present disclosure provides methods of absorbing a fluid proximal to an anus of a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of a subject.

**[0009]** In some embodiments, the present disclosure provides methods of reducing or eliminating itching proximal to an anus of a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of a subject.

**[0010]** These and other embodiments are described in greater detail below.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** FIG. 1A shows a perspective view of the top side of one embodiment of a device according to the present technology.

**[0012]** FIG. 1B shows a perspective view of the bottom side of the device of FIG. 1A.

**[0013]** FIG. 2 shows a perspective and cross-sectional view of the device of FIGs. 1A and 1B.

**[0014]** FIG. 3A shows a perspective view of another embodiment of a device according to the present technology.

- [0015]** FIG. 3B shows an expanded perspective view of the device of FIG. 3A.
- [0016]** FIG. 4 shows a perspective view of another embodiment of a device according to the present technology.
- [0017]** FIG. 5 shows a perspective and cross-sectional view representative of various embodiments of devices according to the present technology.
- [0018]** FIG. 6 shows a perspective view of another embodiment of a device according to the present technology.
- [0019]** FIG. 7A shows a perspective view of another embodiment of a device according to the present technology.
- [0020]** FIG. 7B shows a perspective view of the device of FIG. 7A part-way through being folded into a usable configuration.
- [0021]** FIG. 7C shows a perspective view of the device of FIGs. 7A and 7B after being folded into a usable configuration.
- [0022]** FIG. 8 shows a perspective and cross-sectional view of the device of FIGs. 7A-7C.
- [0023]** FIG. 9 shows a perspective view of another embodiment of a device according to the present technology.
- [0024]** FIG. 10 shows a cross-sectional view of the device of FIG. 9.
- [0025]** FIG. 11 shows a perspective view of another embodiment of a device according to the present technology.
- [0026]** FIG. 12A shows a perspective view of another embodiment of a device according to the present technology.
- [0027]** FIG. 12B shows another perspective view of the device of FIG. 12A.
- [0028]** FIG. 12C shows a side perspective view of the device of FIGs. 12A-12B.
- [0029]** FIG. 12D shows a top view of the device of FIGs. 12A-12C.
- [0030]** FIG. 12E shows a bottom view of the device of FIGs. 12A-12D.

**[0031]** FIG. 12F shows a cross-sectional perspective view of the device of FIGs. 12A-12E.

**[0032]** FIG. 13A shows a perspective view of another embodiment of a device according to the present technology.

**[0033]** FIG. 13B shows a user grasping a removal tab of the device of FIG. 13A.

**[0034]** FIG. 13C shows a variation of the device of FIGs. 13A-13B having more than one removal tab.

**[0035]** FIG. 13D shows a user grasping a removal tab of the device of FIG. 13B.

#### DETAILED DESCRIPTION

**[0036]** Certain specific details are set forth in the following description and in Figures 1A-13D to provide a thorough understanding of various embodiments of the technology. For example, several embodiments of devices for treating or preventing hemorrhoids are described in detail below. The present technology, however, may be used in conjunction with other therapies, such as a surgical procedure, topical application of medicaments, and the like. Other details describing well-known structures and systems often associated with devices for application to skin or adjacent to skin have not been set forth in the following disclosure to avoid unnecessarily obscuring the description of the various embodiments of the technology. A person of ordinary skill in the art, therefore, will accordingly understand that the technology may have other embodiments with additional elements, or the technology may have other embodiments without several of the features shown and described below with reference to Figures 1A-13D.

#### 1. Selected Embodiments of Devices for Absorbing Fluid from Skin of a Subject

**[0037]** Generally, devices of the present disclosure absorb fluid (e.g., sweat) from skin of a subject. In some embodiments, the skin includes skin proximal to the subject's anus (e.g., at least in part in the subject's intergluteal cleft). Accordingly, in some embodiments, devices according to the present disclosure are configured to be placed, at least in part, in a subject's intergluteal cleft (e.g., proximal to the subject's anus such as

perianal tissue). In some embodiments, the fluid includes blood, sweat, feces, urine and/or pus.

**[0038]** In some embodiments, a device according to the present disclosure is sized such that the portion most proximal to the subject's anus (e.g., a portion that is in contact with perianal skin) is proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0039]** Referring now specifically to FIGs. 1A-1B and 2, a device 10 according to one embodiment of the present disclosure comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. At least a portion of the first layer 100 includes a contour 300 that deviates from a plane (e.g., from a flat planar surface).

**[0040]** The first layer 100 is oriented on the device 10 to be in contact with or adjacent to the subject. The first layer 100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate through the first layer 100. In some embodiments, the first layer 100 comprises cotton. The first layer 100 includes a surface (e.g., a body-facing surface) 150. The surface 150 may include a coating, such as a waxy coating, to prevent the first layer 100 from adhering to the subject's skin too strongly. In some embodiments, the surface 150 includes a texture. In some embodiments, the texture increases the adherence of the device 10 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[0041]** In some embodiments, the first layer 100 further includes one or more informational markings 400 for providing information to the subject. For example, the informational markings 400 may indicate which side of the device 10 should be in contact with the subject's skin.

**[0042]** In some embodiments, the first layer 100 further includes one or more orientation markings 500 for indicating to the subject how the device 10 should be oriented upon application. For example, as shown in FIG. 1A, the orientation markings 500 may include a line indicating the midline of the device 10 which should be aligned parallel to the intergluteal cleft.

**[0043]** The contour portion 300 of the first layer 100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the first layer 100. For example, as shown in FIG. 1A, the contour portion 300 substantially protrudes from the first layer 100. In some embodiments, such as that shown in FIG. 1A, the contour portion 300 protrudes from the first layer 100 to form a generally spheroid shape. In other embodiments, the contour portion 300 forms a different shape, such as a disc, a mound, a cone, a teardrop, or a combination thereof. In other embodiments, the contour portion 300 substantially recedes from the first layer 100, for example to form a dent or divot in the first layer 100. The contour portion 300 includes a surface 350 that may optionally include a texture similar to that described with respect to surface 150 of the first layer 100. In other embodiments, the surface 350 does not include a texture, even in embodiments where surface 150 includes a texture. In some embodiments, the contour portion 300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0044]** The second layer 200 of the device 10 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow the fluid to penetrate through the second layer 200. In some embodiments, the second layer 200 comprises cotton. As shown in FIG. 1B, the second layer 200 of the device 10 includes a second surface 250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 200 to mechanical- or fluid-driven degradation. In some embodiments, the second surface 250 includes a texture. In some embodiments, the texture increases the adherence of the device 10 to the skin of the subject, for example to improve handling and manipulation of the device 10 during application. In some embodiments, the texture includes one or more dimples.

**[0045]** The second layer 200 may include a second contour portion 600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the second layer 200). For example, as shown in FIG. 1B, the second contour portion 600 may recede from a planar surface defined by the remainder of the second layer 200 such that an indentation is formed in the second layer 200. The second contour portion 600 includes a surface 650

that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 10 during application.

**[0046]** In some embodiments, the second layer 200 further includes one or more informational markings 450 for providing information to the subject. For example, the informational markings 450 may indicate where the subject might apply pressure to properly install the device 10 in an intergluteal cleft.

**[0047]** In some embodiments, the second layer 200 further includes one or more graphical indicators 550 for indicating to the subject how the device 10 should be oriented upon application. For example, as shown in FIG. 1B, the orientation markings 550 may indicate a central zone indicating the center of the device 10, which should ideally be aligned with the anus of the subject upon application.

**[0048]** The first layer 100 and the second layer 200 may be secured to each other around the periphery by any suitable means known to those of skill in the art. In one embodiment, shown in FIG. 1B, the first layer 100 and the second layer 200 are joined together by a seam or seal 255. In some embodiments, for example when the first layer 100 and/or the second layer 200 comprise cotton, the seam or seal 255 may be a physical joint (e.g., a sewn seam) or a chemical joint (e.g., an adhesive-enabled seal). In some embodiments, the first layer 100 and the second layer 200 are joined together by heat and/or compression.

**[0049]** In some embodiments, the device 10 includes a cross-sectional shape defined by the first layer 100, the second layer 200 and the contour 300. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 10, subjects' comfort, etc. In some embodiments, the cross-sectional shape is substantially round, ovoid, rod-shaped, or polygonal. For example and without limitation, the cross-sectional shape may include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the

foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[0050]** As shown in FIG. 2, the embodiment of FIGs. 1A-1B includes a third layer 700 disposed between the first layer 100 and the second layer 200. The third layer 700 includes a filler material 750 for absorbing fluids and/or delivering an active agent to the subject upon application of the device 10 in the subject's intergluteal cleft. In some embodiments, the third layer 700 occupies the entire space between the first layer 100 and the second layer 200. In other embodiments, such as the one shown in FIG. 2, the filler material 750 comprises only a portion of the third layer 700 (e.g., occupies only a portion of the space between the first layer 100 and the second layer 200). In such embodiments, the remainder of the space between the first layer 100 and the second layer 200 not occupied by the filler material 750 may comprise a second filler material 800, which may be a relatively firm, structurally supportive material like cotton or a foam, for securing the filler material 750 in a desired location within the device 10. For example, as shown in FIG. 2, the third layer 700 may comprise an absorbent material 750 such as cotton, located substantially within the non-planar contour portion 300 of the first layer 100. To ensure the absorbent material 750 remains substantially in that location within the device 10, the third layer 700 further includes a second filler material 800 which is significantly more rigid than the absorbent material 750. In use, the more rigid second filler material 800 substantially prevents the absorbent material 750 from being forced out of its original location within the device 10 by, for example, physical forces exerted by a subject's gluteal muscles on the device 10.

**[0051]** In another embodiment, shown in FIGs. 3A-3B, a device 20 according to the present disclosure comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. At least a portion of the first layer 100 includes a contour 300 that deviates from a plane (e.g., from a flat planar surface).

**[0052]** General features of the first layer 100, the second layer 200, and the third layer 700 are substantially as described above with respect to FIGs. 1A-2.

**[0053]** A third layer 700 is disposed between the first layer 100 and the second layer 200, substantially in alignment with the contour portion 300 of the first layer 100. In some embodiments, the contour portion 300 of the first layer 100 is formed at least in part by the presence of the third layer 700 between the first layer 100 and the second layer 200.

**[0054]** In some embodiments, such as that shown in FIGs. 3A-3B, the third layer 700 comprises a shape that is substantially discoid. For example, the third layer 700 may be a round or circular pouch containing an absorbent material (as described above with respect to FIGs. 1A-2) that is secured between the first layer 100 and the second layer 200, causing the contour portion 300 of the first layer 100 to adopt a substantially discoid shape.

**[0055]** In another embodiment, shown in FIGs. 4-5, the first layer 100 and second layer 200 may be a continuous or semi-continuous form (e.g., without a flattened seam or seal 255 as shown in FIG. 1B) to form a device 30 having rounded edges. In such embodiments, the contour portion 300A may adopt any desired shape including, for example, a recessed cavity. The first layer 100, second layer 200, and/or the contour portion 300A may each include a surface 150, a surface 250 (not shown due to perspective) and/or a surface 350, respectively, as described above with respect to other embodiments. In some embodiments, the contour portion 300A is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0056]** As shown in FIG. 5, the second layer 200 may include a contour portion 300B in addition to, or instead of, the contour portion 300A of the first layer 100. In embodiments including contour portions 300A/300B in both the first layer 100 and the second layer 200, respectively, the two contour portions 300A/300B may have an identical shape. In other embodiments (not shown), the two contour portions 300A/300B may have a substantially similar shape, or substantially different shapes. In some embodiments, the contour portion 300A/300B is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0057]** The device 30 may include an inner core 700. Any remaining space between the first layer 100 and the second layer 200 may be filled with an absorbent filler material

800. In such embodiments, the absorbent filler material 800 acts to draw fluid into the device 30 through the first layer 100 and/or the second layer 200 and eventually to the inner core 700, for example along moisture paths 900.

**[0058]** In any embodiment disclosed herein, the inner core 700 (also referred to as the third layer 700 in various embodiments) may include a hygroscopic material 750, such as cotton or any other aqueous absorbent material or combination of materials. The inner core 700 may include an active agent 760. In some embodiments, the active agent 760 is a deodorant. In some embodiments, the active agent 760 is an antibacterial agent. In some embodiments, the active agent 760 is a hemorrhoid relief agent (e.g., disaccharide polysulfide). In some embodiments, the active agent 760 is a numbing agent (e.g., a topical anesthetic such as benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine (alternatively referred to as amethocaine). In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, and a hemorrhoid relief agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[0059]** In another embodiment, shown in FIG. 6, a device 40 according to the present disclosure comprises a substantially bulbous head portion 42 and a substantially narrow tail portion 44. In such embodiments, the tail portion 44 enables safe and efficient handling of the device 40, for example between a subject's thumb and forefinger, while remaining discreet after application within the subject's intergluteal cleft.

**[0060]** The device 40 may include a first layer 100, a second layer 200, and a contour portion 300, similar to those shown and described above with respect to FIGs. 1A-5. General features of the first layer 100, the second layer 200, and the contour portion 300, including surfaces 150, 250 and 350, are substantially as described above with respect to other illustrated embodiments.

**[0061]** As shown in FIGs. 7A-7C, another embodiment of a device 50 according to the present disclosure includes a foldable crease 55 along a length of the device 50 for enabling efficient packaging of the device 50. In such embodiments, the device 50

includes a bifurcated first layer 100A/100B comprising an absorbent material and an optional coating (e.g., a waxy coating) suitable for direct contact with skin. Each of the bifurcated first layers 100A and 100B may include a surface 150A/150B. The surfaces 150A/150B may have properties similar to those described above with respect to surface 150 in other embodiments.

**[0062]** The device 50 also includes a bifurcated contour portion 300A/300B which, after folding is complete (e.g., as shown in FIG. 7C), has properties substantially similar to contour portion 300 in other embodiments described herein. More specifically, each of contour portions 300A/300B may have a surface 350A/350B that includes a texture, such as a plurality of dimples. In some embodiments, the bifurcated contour portion 300A/300B, after the device 50 is folded as shown in FIG. 7C, is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0063]** When ready for use, the subject folds the device 50 along foldable crease 55 until the contour portion 300A is in contact with and/or continuous with the contour portion 300B, according to a progression shown in FIG. 7A to FIG. 7B to FIG. 7C. The resulting folded device 50 (FIG. 7C) is then inserted within the intergluteal cleft such that the contour portion 300A/300B is in contact with the perianal tissue. When in position, the foldable crease 55 imparts a hinged outward force (e.g., a residual hinged spring force) which further enhances the stability of the device 50 in its installed position within the intergluteal cleft.

**[0064]** As shown in FIG. 8, the device 50 may include a bifurcated second layer 200A/200B disposed opposite the bifurcated first layer 100A/100B. The bifurcated second layer 200A/200B may be substantially the same as second layer 200 as described above with respect to other embodiments. For example, bifurcated second layer 200A may include a surface 250A, and bifurcated second layer 200B may include a surface 250B (not shown due to perspective) similar to or identical to second surface 250 described elsewhere in the present disclosure.

**[0065]** Similarly, the bifurcated contour portions 300A/300B may each include an inner core 700A/700B, which may each be substantially similar to inner core 700 described

in connection with other embodiments disclosed herein. For example, inner core 700A/700B may include a hygroscopic material 750A/750B and optionally an active agent 760A/760B, all encapsulated in a permeable barrier layer 740A/740B. In some embodiments, an absorbent material 800A/800B is disposed between the permeable barrier layer 740A/740B and the first layer 100A/100B and optionally between the permeable barrier layer 740A/740B and the second layer 200A/200B.

**[0066]** An optional active agent 760A/760B may be included within the hygroscopic material 750A/750B. In some embodiments, active agent 760A is the same as the active agent 760B. In other embodiments, the active agent 760A is different than the active agent 760B.

**[0067]** In yet another embodiment, shown representatively in FIGs. 9-10, a device 60 according to the present disclosure comprises first layer 100 including a surface 150. The surface 150 includes at least one valley 152 and at least one plateau 154 for controlling flow of fluid into the device 60. In this embodiment, the device 60 also optionally includes a pair of adhesive areas 156 for providing additional adherence to the subject's skin upon application.

**[0068]** As shown in FIG. 10, the plateau portion(s) 154 may include a hydrophobic coating 158 which may attenuate the first layer 100 material's innate aqueous permeability properties. The valley(s) 152, in contrast, may not include the hydrophobic coating 158, enabling relatively easier permeability of fluids through the first layer 100 and/or the second layer 200 and into the third layer 700. In FIG. 10, this relative permeability difference between the plateau portions 154 and the valley portion(s) 152 is represented by moisture paths 900.

**[0069]** As in other embodiments, the third layer 700 may include a hygroscopic material 750 and optionally an active agent 760.

**[0070]** In yet another embodiment, shown representatively in FIG. 11, a device 70 according to the present technology comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. Each of the first layer 100 and the second layer 200

may include a surface 150 and a surface 250, respectively, which may have properties similar to those described above in connection with other disclosed embodiments.

**[0071]** The first layer 100 includes a contour portion 300A, which may additionally include one or more pillars 360A and one or more cavities 370A between the pillars 360A. Fluid absorbed by the contour portion 300A may thus cause the pillars 360A to expand radially, and the cavities 370A to shrink accordingly.

**[0072]** The second layer 200 includes a contour portion 300B, which may additionally include one or more pillars 360B and one or more cavities 370B between the pillars 360B. Fluid absorbed by the contour portion 300B may thus cause the pillars 360B to expand radially, and the cavities 370B to shrink accordingly.

**[0073]** In such embodiments, the first layer 100 and the second layer 200, and especially contour portions 300A/300B, may absorb substantial amounts of fluid without substantially expanding (e.g., without a diameter D of the combined contour portions 300A/300B substantially increasing). In some embodiments, the contour portion 300A/300B is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0074]** Referring now generally to FIGs. 12A-12F, the present disclosure provides another embodiment of a device 80 for absorbing a fluid from skin of a subject. In such embodiments, the device 80 is formed of a substantially uniform sheet of material. The device 80 comprises a top surface 8100 which includes a contour portion 8300. The top surface 8100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate into the device 80. In some embodiments, the top surface 8100 comprises cotton. The top surface 8100 includes a surface (e.g., a body-facing surface) 8150. The surface 8150 may include a coating, such as a waxy coating, to prevent the top surface 8100 from adhering to the subject's skin too strongly. In some embodiments, the surface 8150 includes a texture. In some embodiments, the texture increases the adherence of the device 80 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[0075]** In some embodiments, the top surface 8100 further includes one or more informational markings 8400 for providing information to the subject. For example, the informational markings 8400 may indicate which side of the device 80 should be in contact with the subject's skin.

**[0076]** In some embodiments, the top surface 8100 further includes one or more orientation markings 8500 for indicating to the subject how the device 80 should be oriented upon application. For example, as shown in FIG. 12D, the orientation markings 8500 may include a line indicating the midline of the device 80 which should be aligned parallel to the intergluteal cleft.

**[0077]** The contour portion 8300 of the top surface 8100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the top surface 8100, or deviates from the contour of the remaining portions of the top surface 8100. For example, as shown in FIG. 12A, the contour portion 8300 substantially protrudes from the top surface 8100. In some embodiments, such as that shown in FIG. 12A, the contour portion 8300 protrudes from the top surface 8100 to form a generally spheroid shape. In other embodiments, the contour portion 8300 forms a different shape, such as a disc, a mound, a cone, a teardrop, or a combination thereof. In other embodiments, the contour portion 8300 substantially recedes from the top surface 8100, for example to form a dent or divot in the top surface 8100. The contour portion 8300 includes a surface 8350 that may optionally include a texture similar to that described with respect to surface 8150 of the top surface 8100. In other embodiments, the surface 8350 does not include a texture, even in embodiments where surface 8150 includes a texture. In some embodiments, the contour portion 8300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0078]** The bottom surface 8200 of the device 80 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow the fluid to penetrate through the bottom surface 8200. In some such embodiments, the bottom surface 8200 comprises cotton. As shown in FIGs. 12B and 12E, the bottom surface 8200 of the device 80 includes a second surface 8250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 8200 to

mechanical- or fluid-driven degradation. In such embodiments, the coating prevents fluid from penetrating from the interior of the device 80 through the bottom surface 8200 (e.g., trapping absorbed fluid within the device 80). In some embodiments, the second surface 8250 includes a texture. In some embodiments, the texture increases the adherence of the device 80 to the skin of the subject, for example to improve handling and manipulation of the device 80 during application and/or removal. In some embodiments, the texture includes one or more dimples.

**[0079]** The bottom surface 8200 may include a second contour portion 8600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the bottom surface 8200) or deviates from the contour of the remaining portions of the bottom surface 8200. For example, as shown in FIG. 12B, the second contour portion 8600 may recede from a planar surface defined by the remainder of the bottom surface 8200 such that an indentation is formed in the bottom surface 8200. The second contour portion 8600 includes a surface 8650 that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 80 during application and/or removal.

**[0080]** In some embodiments, the bottom surface 8200 further includes one or more informational markings 8450 for providing information to the subject. For example, the informational markings 8450 may indicate a midline of the device 80 and/or may indicate where the subject might apply pressure to properly install the device 80 in an intergluteal cleft.

**[0081]** In some embodiments, the bottom surface 8200 further includes one or more graphical indicators 8550 for indicating to the subject how the device 80 should be oriented upon application. For example, as shown in FIG. 12E, the orientation markings 8550 may indicate a central zone indicating the center of the device 80, which should ideally be aligned with the anus of the subject upon application.

**[0082]** The device 80 may additionally include an inner core 8700. Any remaining space between the top surface 8100 and the bottom surface 8200 may be filled by the

inner core 8700. In such embodiments, the inner core 8700 may comprise an absorbent material such as cotton, located substantially within the contour portion 8300, 8600 of the device 80. The inner core 8700 may include an active agent such as a deodorant and/or an antibacterial agent.

**[0083]** In any embodiment disclosed herein, the inner core 8700 (also referred to as the third layer 8700 in various embodiments) may include a hygroscopic material, such as cotton or any other aqueous absorbent material or combination of materials. The inner core 8700 may include an active agent. In some embodiments, the active agent is a deodorant. In some embodiments, the active agent is an antibacterial agent. In some embodiments, the active agent is a hemorrhoid relief agent (e.g., disaccharide polysulfide). In some embodiments, the active agent is a numbing agent (e.g., a topical anesthetic such as benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine (alternatively referred to as amethocaine). In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[0084]** In some embodiments, the device 80 includes a cross-sectional shape defined by the top surface 8100, the bottom surface 8200, the inner core 8700, and the contour portions 8300, 8600. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 80, subjects' comfort, etc. For example, as shown in FIG. 12F, the cross-sectional shape may be an arched dome-like shape having a substantially uniform thickness. For example and without limitation, the cross-sectional shape may alternatively include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[0085]** Any device disclosed herein may additionally include one or more creases. As used herein, the term “crease” refers to an indentation, fold, or overlapping region of the material. In some embodiments, a crease 8055 may include only a portion of the thickness of the material (e.g., a crease in only one layer of a multilayer device). In other embodiments, a crease may extend through the entire thickness of the device (e.g., through all layers of a multilayer device). In some embodiments, the creases enable the device to absorb substantially more fluid from skin of the subject than a comparably sized and shaped device that does not include creases, or alternatively includes fewer creases or creases of smaller dimension (e.g., length, width, volume and/or surface area).

**[0086]** In some embodiments, the creases are formed by converting (e.g., molding) a substantially flat piece of the sheet of material to form a contoured shape, such as that generally shown in any one of FIGs. 1A-12F. For example, in the embodiment shown in FIGs. 12A-12F, the device 80 includes at least four creases 8055. In other embodiments, the device 80 includes at least two creases 8055, such as about three creases 8055, about four creases 8055, about five creases 8055, about six creases 8055, about seven creases 8055, about eight creases 8055, about nine creases 8055, about ten creases 8055, or more than about ten creases 8055.

**[0087]** Referring now generally to FIGs. 13A-13D, the present disclosure provides another embodiment of a device 90 for absorbing a fluid from skin of a subject. In such embodiments, the device 90 is formed of a substantially uniform sheet of material. The device 90 comprises a top surface 9100 which includes a contour portion 9300. The top surface 9100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate into the device 90. In some embodiments, the top surface 9100 comprises cotton. The top surface 9100 includes a surface (e.g., a body-facing surface) 9150. The surface 9150 may include a coating, such as a waxy coating, to prevent the top surface 9100 from adhering to the subject's skin too strongly. In some embodiments, the surface 9150 includes a texture. In some embodiments, the texture increases the adherence of the device 90 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[0088]** In some embodiments, the top surface 9100 further includes one or more orientation markings 9500 for indicating to the subject how the device 90 should be oriented upon application. For example, the orientation markings 9500 may include a line indicating a midline of the device 90 which should be aligned parallel to or, as specifically shown in FIGs. 13A-13D, perpendicular to the intergluteal cleft.

**[0089]** The contour portion 9300 of the top surface 9100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the top surface 9100, or deviates from the contour of the remaining portions of the top surface 9100. For example, the contour portion 9300 may substantially protrude from the top surface 9100. In some embodiments, the contour portion 9300 protrudes from the top surface 9100 to form a generally spheroid shape. In other embodiments, the contour portion 9300 forms a different shape, such as a disc, a mound, a cone, a teardrop, or a combination thereof. In other embodiments, the contour portion 9300 substantially recedes from the top surface 9100, for example to form a dent or divot in the top surface 9100. The contour portion 9300 includes a surface 9350 that may optionally include a texture similar to that described with respect to surface 9150 of the top surface 9100. In other embodiments, the surface 9350 does not include a texture, even in embodiments where surface 9150 includes a texture. In some embodiments, the contour portion 9300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[0090]** The bottom surface 9200 of the device 90 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow the fluid to penetrate through the bottom surface 9200. In some such embodiments, the bottom surface 9200 comprises cotton. The bottom surface 9200 of the device 90 includes a second surface 9250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 9200 to mechanical- or fluid-driven degradation. In such embodiments, the coating prevents fluid from penetrating from the interior of the device 90 through the bottom surface 9200 (e.g., trapping absorbed fluid within the device 90). In some embodiments, the second surface 9250 includes a texture. In some embodiments, the texture increases the adherence of the device 90 to the skin of the subject, for example to improve handling and manipulation of the device 90 during

application and/or removal. In some embodiments, the texture includes one or more dimples.

**[0091]** The bottom surface 9200 may include a second contour portion 9600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the bottom surface 9200) or deviates from the contour of the remaining portions of the bottom surface 9200. For example, the second contour portion 9600 may recede from a planar surface defined by the remainder of the bottom surface 9200 such that an indentation is formed in the bottom surface 9200. The second contour portion 9600 includes a surface 9650 that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 80 during application and/or removal.

**[0092]** The device 90 includes one or more removal tabs 9900, for example integrated with or attached to the bottom surface 9200. The one or more removal tabs 9900 enable the user to more easily remove the device 90 after use, for example when the device 90 has absorbed fluid. In some embodiments, shown representatively in FIG. 13A, the device 90 includes a single removal tab 9900 connected to the bottom surface 9200 at or near the center of the bottom surface 9200 (e.g., within the second contour portion 9600). To remove such an embodiment from an intergluteal cleft, the user grasps the removal tab 9900 with his or her hand H and pulls the removal tab 9900 in a direction generally away from the intergluteal cleft.

**[0093]** Alternatively, the device 90 may include more than one removal tab 9900, such as two removal tabs 9900. In such embodiments, the two removal tabs 9900 may be connected to the device 90 at any suitable location, preferably symmetrically opposed in relation to the center of the device 90. For example, as shown representatively in FIGs. 13C-13D, one removal tab 9900a may be attached to one edge E of the bottom surface 9200, while a second removal tab 9900b may be attached to a generally opposite edge E' of the bottom surface 9200. To remove such an embodiment from an intergluteal cleft, the user grasps the first removal tab 9900a, the second removal tab 9900b, or both removal tabs 9900a, 9900b with his or her hand H, and pulls in a direction generally away from the intergluteal cleft.

**[0094]** In some embodiments, the bottom surface 9200 further includes one or more informational markings 9450 for providing information to the subject. For example, the informational markings 9450 may indicate a midline of the device 90 and/or may indicate where the subject might apply pressure to properly install the device 90 in an intergluteal cleft.

**[0095]** In some embodiments, the bottom surface 9200 further includes one or more graphical indicators 9550 for indicating to the subject how the device 90 should be oriented upon application. For example, the orientation markings 9550 may indicate a central zone indicating the center of the device 90, which should ideally be aligned with the anus of the subject upon application.

**[0096]** The device 90 may additionally include other features described with respect to the embodiments shown in FIGs. 1-12F, such as an inner core identical to or similar to the inner core 8700 of device 80. As described with respect to device 80, the optional inner core of device 90 may include an active agent such as a deodorant, an antibacterial agent, a hemorrhoid relief agent, and/or a numbing agent. In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[0097]** In some embodiments, the device 90 includes a cross-sectional shape defined by the top surface 9100, the bottom surface 9200, the inner core 9700, and the contour portions 9300, 9600. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 90, subjects' comfort, etc. For example, as shown in FIGs. 13A-13D, the cross-sectional shape may be an arched dome-like shape having a substantially uniform thickness. For example and without limitation, the cross-sectional shape may alternatively include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the

foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[0098]** Device 90 may also include one or more creases 9055, which may optionally include only a portion of the thickness of the material (e.g., a crease in only one layer of a multilayer device). In other embodiments, the one or more crease 9055 may extend through the entire thickness of the device 90. In some embodiments, the crease(s) 9055 enable the device 90 to absorb substantially more fluid from skin of the subject than a comparably sized and shaped device that does not include creases, or alternatively includes fewer creases or creases of smaller dimension (e.g., length, width, volume and/or surface area).

**[0099]** In some embodiments, the crease(s) 9055 are formed by converting (e.g., molding) a substantially flat piece of the sheet of material to form a contoured shaped, such as that generally shown in any one of FIGs. 13A-13D. The device 90 may include a single crease 9055, or alternatively may include at least two creases 9055, such as about three creases 9055, about four creases 9055, about five creases 9055, about six creases 9055, about seven creases 9055, about eight creases 9055, about nine creases 9055, about ten creases 9055, or more than about ten creases 9055.

**[00100]** In some embodiments, the present disclosure provides an absorbent device comprising a first layer including a body-facing surface containing an anti-stick material; a second layer disposed opposite the first body-facing surface; and a third layer disposed between the first and second layers and comprising an absorbent material. In some embodiments, at least a portion of the first layer includes a contour that substantially deviates from a plane. In some embodiments, the third layer further includes an inner core comprising a hygroscopic material. In some embodiments, the inner core is separated from the absorbent material by a barrier material. In some embodiments, the inner core further includes an active agent. In some embodiments, the active agent comprises a deodorant and/or an antibacterial agent. In some embodiments, the first layer includes a graphic element for providing application information to a user. In some embodiments, the second layer includes a graphic element for providing application information to a user. In some embodiments, the second layer includes a graphic element for providing application

information to a user. In some embodiments, the body-facing surface includes a plurality of dimples. In some embodiments, the body-facing surface does not include an adhesive portion. In some embodiments, the contour that substantially deviates from a plane is spheroid.

**[00101]** In other embodiments, the present disclosure provides an absorbent device comprising a first, body-facing layer comprising a plurality of dimples; a second layer disposed opposite the first layer; and an inner core disposed between the first, body-facing layer and the second layer. In some embodiments, the first, body-facing layer does not include an adhesive portion. In some embodiments, the inner core layer comprises an absorbent material and optionally an active agent. In some embodiments, the absorbent material comprises cornstarch. In some embodiments, the active agent comprises a deodorant and/or antibacterial agent. In some embodiments, at least one of the first, body-facing layer and the second layer includes a graphic element for providing application information to a user.

2. Selected Embodiments of Methods of Treating or Preventing Perianal Sweating and/or Itching

**[00102]** Devices disclosed herein may be used to absorb fluid (e.g., sweat, blood, feces, urine and/or pus) from skin (e.g., perianal skin) of a subject. In such embodiments, the method may include applying a device as diagnosed herein to the intergluteal cleft of a subject such that at least a portion of the device is in contact with skin proximal to the subject's anus (e.g., intergluteal skin).

**[00103]** In some embodiments, the present disclosure provides a method of absorbing a fluid proximal to an anus of a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of the subject. In some embodiments, the step of placing the device further includes placing the device in contact with perianal skin of the subject. In some embodiments, the method further comprises leaving the device in contact with skin of the subject for a period of time sufficient to absorb a fluid from the skin of the subject. In some embodiments, the fluid includes sweat, blood, feces, urine and/or pus. In some embodiments, the method further comprises removing

the device after the period of time. In some embodiments, the device is removed within 24 hours of the step of placing the device within the intergluteal cleft.

**[00104]** Sweating and itching are common co-symptoms and, as such, methods of the present disclosure may simultaneously or substantially simultaneously absorb a fluid (e.g., sweat, blood, feces, urine and/or pus) from skin of the subject and reduce or eliminate itching proximal to the subject's anus. In other embodiments, the method reduces or eliminates itching without absorbing a fluid from skin proximal to the subject's anus, for example when the subject experiences itching but not fluid secretion. In any of these embodiments, the method comprises placing a device as disclosed herein at least partially within an intergluteal cleft of the subject. In some embodiments, the step of placing the device further includes placing the device in contact with perianal skin of the subject. In some embodiments, the method further comprises leaving the device in contact with skin of the subject for a period of time sufficient to reduce or eliminate the itching. In some embodiments, the method further comprises removing the device after the period of time. In some embodiments, the device is removed within 24 hours of the step of placing the device within the intergluteal cleft.

**[00105]** In some embodiments, the method of absorbing fluid proximal to the anus comprises placing the device at least partially within the intergluteal cleft of the subject before fluid is present near the anus (e.g., before onset of sweating and/or itching symptoms). In such embodiments, the fluid may be absorbed by the device to substantially or completely prevent sweating and/or itching symptoms.

**[00106]** In other embodiments, the present disclosure provides a method of preventing recurrence of itching in a subject. In such embodiments, the method comprises placing a device as disclosed herein at least partially within an intergluteal cleft of the subject. In some embodiments, the step of placing the device further includes placing the device in contact with perianal skin of the subject. In some embodiments, the method further comprises leaving the device in contact with skin of the subject for a period of time sufficient to reduce or eliminate the itching. In some embodiments, the method further comprises removing the device after the period of time. In some embodiments, the device is removed within 24 hours of the step of placing the device within the intergluteal cleft.

**[00107]** In any embodiments disclosed herein, the device may be inserted at least partially within the subject's intergluteal cleft and, after a period of time sufficient to absorb fluid from the intergluteal cleft, removed and discarded. If needed, a second, unused device as disclosed herein may be inserted at least partially within the subject's intergluteal cleft to absorb additional intergluteal fluid.

**[00108]** In some embodiments, the method further absorbs and/or neutralizes odors, for example by use of a device as disclosed herein that includes an antibacterial active agent.

**[00109]** In some embodiments, the method provides intergluteal fluid absorption sufficient to reduce, minimize, or prevent intergluteal fluid from contacting the subject's clothing (e.g., undergarment and/or outer wear).

**[00110]** In any embodiment disclosed herein, the fluid may comprise sweat.

**[00111]** In any embodiment disclosed herein, the fluid may consist essentially of sweat.

**[00112]** In any embodiment disclosed herein, the fluid may consist of sweat.

**[00113]** In some embodiments, the present disclosure provides a method of absorbing fluid (e.g., sweat) from an intergluteal cleft of a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of a subject. In some embodiments, the device is placed in contact with perianal tissue of the subject and/or in contact with a hemorrhoid of the subject.

### 3. Selected Embodiments of Devices for Treating or Preventing Hemorrhoids in a Subject

**[00114]** In other embodiments, devices of the present disclosure treat or prevent hemorrhoids in a subject. In such embodiments, the device is configured to be placed, at least in part, in a subject's intergluteal cleft. In some embodiments, the device is configured to be placed in contact with a hemorrhoid to at least partially relieve a symptom of the hemorrhoid, such as itching, bleeding, burning, pain and/or swelling. In some embodiments, the device is configured to be placed in contact with a hemorrhoid to

prevent progression (e.g., worsening) of the hemorrhoid. In other embodiments, the device is configured to be placed in contact with at least a portion of the subject's perianal tissue to prevent emergence of a hemorrhoid.

**[00115]** Referring now specifically to FIGs. 1A-1B and 2, a device 10 for treating or preventing hemorrhoids in a subject comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. At least a portion of the first layer 100 includes a contour 300 that deviates from a plane (e.g., from a flat planar surface).

**[00116]** The first layer 100 is oriented on the device 10 to be in contact with or adjacent to the subject. The first layer 100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate through the first layer 100. In some embodiments, the first layer 100 comprises cotton. The first layer 100 includes a surface (e.g., a body-facing surface) 150. The surface 150 may include a coating, such as a waxy coating, to prevent the first layer 100 from adhering to the subject's skin too strongly. In some embodiments, the surface 150 includes a texture. In some embodiments, the texture increases the adherence of the device 10 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[00117]** In some embodiments, the first layer 100 further includes one or more informational markings 400 for providing information to the subject. For example, the informational markings 400 may indicate which side of the device 10 should be in contact with the subject's skin.

**[00118]** In some embodiments, the first layer 100 further includes one or more orientation markings 500 for indicating to the subject how the device 10 should be oriented upon application. For example, as shown in FIG. 1A, the orientation markings 500 may include a line indicating the midline of the device 10 which should be aligned parallel to the intergluteal cleft.

**[00119]** The contour portion 300 of the first layer 100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the first layer 100. For example, as shown in FIG. 1A, the contour portion 300 substantially protrudes from the first layer 100. In some embodiments, such as that shown in FIG. 1A, the contour portion

300 protrudes from the first layer 100 to form a generally spheroid shape. In other embodiments, the contour portion 300 forms a different shape or cross-sectional profile, such as a disc, a mound, a cone, a teardrop, a polygon, a quadrilateral (e.g., a rectangle, a square, a trapezoid, a rhombus, a parallelogram, etc.), a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a truncated polygon, a tapered configuration of any of the foregoing, or a combination thereof (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners). In other embodiments, the contour portion 300 substantially recedes from the first layer 100, for example to form a dent or divot in the first layer 100. The contour portion 300 includes a surface 350 that may optionally include a texture similar to that described with respect to surface 150 of the first layer 100. In other embodiments, the surface 350 does not include a texture, even in embodiments where surface 150 includes a texture. In some embodiments, the contour portion 300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00120]** The second layer 200 of the device 10 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow moisture to penetrate through the second layer 200. In some embodiments, the second layer 200 comprises cotton. As shown in FIG. 1B, the second layer 200 of the device 10 includes a second surface 250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 200 to mechanical- or fluid-driven degradation. In some embodiments, the second surface 250 includes a texture. In some embodiments, the texture increases the adherence of the device 10 to the skin of the subject, for example to improve handling and manipulation of the device 10 during application. In some embodiments, the texture includes one or more dimples.

**[00121]** The second layer 200 may include a second contour portion 600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the second layer 200). For example, as shown in FIG. 1B, the second contour portion 600 may recede from a planar surface defined by the remainder of the second layer 200 such that an indentation is

formed in the second layer 200. The second contour portion 600 includes a surface 650 that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 10 during application.

**[00122]** In some embodiments, the second layer 200 further includes one or more informational markings 450 for providing information to the subject. For example, the informational markings 450 may indicate where the subject might apply pressure to properly install the device 10 in an intergluteal cleft.

**[00123]** In some embodiments, the second layer 200 further includes one or more graphical indicators 550 for indicating to the subject how the device 10 should be oriented upon application. For example, as shown in FIG. 1B, the orientation markings 550 may indicate a central zone indicating the center of the device 10, which should ideally be aligned with the anus of the subject upon application.

**[00124]** The first layer 100 and the second layer 200 may be secured to each other around the periphery by any suitable means known to those of skill in the art. In one embodiment, shown in FIG. 1B, the first layer 100 and the second layer 200 are joined together by a seam or seal 255. In some embodiments, for example when the first layer 100 and/or the second layer 200 comprise cotton, the seam or seal 255 may be a physical joint (e.g., a sewn seam) or a chemical joint (e.g., an adhesive-enabled seal). In some embodiments, the first layer 100 and the second layer 200 are joined together by heat and/or compression.

**[00125]** In some embodiments, the device 10 includes a cross-sectional shape defined by the first layer 100, the second layer 200 and the contour 300. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 10, subjects' comfort, etc. In some embodiments, the cross-sectional shape is substantially round, ovoid, rod-shaped, or polygonal. For example and without limitation, the cross-sectional shape may include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the

foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[00126]** As shown in FIG. 2, the embodiment of FIGs. 1A-1B includes a third layer 700 disposed between the first layer 100 and the second layer 200. The third layer 700 includes a filler material 750 for absorbing fluids and/or delivering an active agent to the subject upon application of the device 10 in the subject's intergluteal cleft. In some embodiments, the third layer 700 occupies the entire space between the first layer 100 and the second layer 200. In other embodiments, such as the one shown in FIG. 2, the filler material 750 comprises only a portion of the third layer 700 (e.g., occupies only a portion of the space between the first layer 100 and the second layer 200). In such embodiments, the remainder of the space between the first layer 100 and the second layer 200 not occupied by the filler material 750 may comprise a second filler material 800, which may be a relatively firm, structurally supportive material like cotton or a foam, for securing the filler material 750 in a desired location within the device 10. For example, as shown in FIG. 2, the third layer 700 may comprise an absorbent material 750 such as cotton, located substantially within the non-planar contour portion 300 of the first layer 100. To ensure the absorbent material 750 remains substantially in that location within the device 10, the third layer 700 further includes a second filler material 800 which is significantly more rigid than the absorbent material 750. In use, the more rigid second filler material 800 substantially prevents the absorbent material 750 from being forced out of its original location within the device 10 by, for example, physical forces exerted by a subject's gluteal muscles on the device 10.

**[00127]** In another embodiment, shown in FIGs. 3A-3B, a device 20 for treating or preventing hemorrhoids in a subject comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. At least a portion of the first layer 100 includes a contour 300 that deviates from a plane (e.g., from a flat planar surface).

**[00128]** General features of the first layer 100, the second layer 200, and the third layer 700 are substantially as described above with respect to FIGs. 1A-2.

**[00129]** A third layer 700 is disposed between the first layer 100 and the second layer 200, substantially in alignment with the contour portion 300 of the first layer 100. In some embodiments, the contour portion 300 of the first layer 100 is formed at least in part by the presence of the third layer 700 between the first layer 100 and the second layer 200.

**[00130]** In some embodiments, such as that shown in FIGs. 3A-3B, the third layer 700 comprises a shape that is substantially discoid. For example, the third layer 700 may be a round or circular pouch containing an absorbent material (as described above with respect to FIGs. 1A-2) that is secured between the first layer 100 and the second layer 200, causing the contour portion 300 of the first layer 100 to adopt a substantially discoid shape.

**[00131]** In another embodiment for treating or preventing hemorrhoids in a subject, shown in FIGs. 4-5, the first layer 100 and second layer 200 may be a continuous or semi-continuous form (e.g., without a flattened seam or seal 255 as shown in FIG. 1B) to form a device 30 having rounded edges. In such embodiments, the contour portion 300A may adopt any desired shape including, for example, a recessed cavity. The first layer 100, second layer 200, and/or the contour portion 300A may each include a surface 150, a surface 250 (not shown due to perspective) and/or a surface 350, respectively, as described above with respect to other embodiments. In some embodiments, the contour portion 300A is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00132]** As shown in FIG. 5, the second layer 200 may include a contour portion 300B in addition to, or instead of, the contour portion 300A of the first layer 100. In embodiments including contour portions 300A/300B in both the first layer 100 and the second layer 200, respectively, the two contour portions 300A/300B may have an identical shape. In other embodiments (not shown), the two contour portions 300A/300B may have a substantially similar shape, or substantially different shapes. In some embodiments, the contour portion 300A/300B is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00133]** The device 30 may include an inner core 700. Any remaining space between the first layer 100 and the second layer 200 may be filled with an absorbent filler material 800. In such embodiments, the absorbent filler material 800 acts to draw fluid into the device 30 through the first layer 100 and/or the second layer 200 and eventually to the inner core 700, for example along moisture paths 900.

**[00134]** In any embodiment disclosed herein, the inner core 700 (also referred to as the third layer 700 in various embodiments) may include a hygroscopic material 750, such as cotton or any other aqueous absorbent material or combination of materials. The inner core 700 may include an active agent 760. In some embodiments, the active agent 760 is a deodorant. In some embodiments, the active agent 760 is an antibacterial agent. In some embodiments, the active agent 760 is a hemorrhoid relief agent (e.g., disaccharide polysulfide). In some embodiments, the active agent 760 is a numbing agent (e.g., a topical anesthetic such as benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine (alternatively referred to as amethocaine). In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, and a hemorrhoid relief agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[00135]** In another embodiment for treating or preventing hemorrhoids in a subject, shown in FIG. 6, a device 40 according to the present disclosure comprises a substantially bulbous head portion 42 and a substantially narrow tail portion 44. In such embodiments, the tail portion 44 enables safe and efficient handling of the device 40, for example between a subject's thumb and forefinger, while remaining discreet after application within the subject's intergluteal cleft.

**[00136]** The device 40 may include a first layer 100, a second layer 200, and a contour portion 300, similar to those shown and described above with respect to FIGs. 1A-5. General features of the first layer 100, the second layer 200, and the contour portion 300, including surfaces 150, 250 and 350, are substantially as described above with respect to other illustrated embodiments.

**[00137]** As shown in FIGs. 7A-7C, another embodiment of a device 50 for treating or preventing hemorrhoids in a subject includes a foldable crease 55 along a length of the device 50 for enabling efficient packaging of the device 50. In such embodiments, the device 50 includes a bifurcated first layer 100A/100B comprising an absorbent material and an optional coating (e.g., a waxy coating) suitable for direct contact with skin. Each of the bifurcated first layers 100A and 100B may include a surface 150A/150B. The surfaces 150A/150B may have properties similar to those described above with respect to surface 150 in other embodiments.

**[00138]** The device 50 also includes a bifurcated contour portion 300A/300B which, after folding is complete (e.g., as shown in FIG. 7C), has properties substantially similar to contour portion 300 in other embodiments described herein. More specifically, each of contour portions 300A/300B may have a surface 350A/350B that includes a texture, such as a plurality of dimples. In some embodiments, the bifurcated contour portion 300A/300B, after the device 50 is folded as shown in FIG. 7C, is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00139]** When ready for use, the subject folds the device 50 along foldable crease 55 until the contour portion 300A is in contact with and/or continuous with the contour portion 300B, according to a progression shown in FIG. 7A to FIG. 7B to FIG. 7C. The resulting folded device 50 (FIG. 7C) is then inserted within the intergluteal cleft such that the contour portion 300A/300B is in contact with the perianal tissue and/or a hemorrhoid. When in position, the foldable crease 55 imparts a hinged outward force (e.g., a residual hinged spring force) which further enhances the stability of the device 50 in its installed position within the intergluteal cleft.

**[00140]** As shown in FIG. 8, the device 50 may include a bifurcated second layer 200A/200B disposed opposite the bifurcated first layer 100A/100B. The bifurcated second layer 200A/200B may be substantially the same as second layer 200 as described above with respect to other embodiments. For example, bifurcated second layer 200A may include a surface 250A, and bifurcated second layer 200B may include a surface 250B (not shown due to perspective) similar to or identical to second surface 250 described elsewhere in the present disclosure.

**[00141]** Similarly, the bifurcated contour portions 300A/300B may each include an inner core 700A/700B, which may each be substantially similar to inner core 700 described in connection with other embodiments disclosed herein. For example, inner core 700A/700B may include a hygroscopic material 750A/750B and optionally an active agent 760A/760B, all encapsulated in a permeable barrier layer 740A/740B. In some embodiments, an absorbent material 800A/800B is disposed between the permeable barrier layer 740A/740B and the first layer 100A/100B and optionally between the permeable barrier layer 740A/740B and the second layer 200A/200B.

**[00142]** An optional active agent 760A/760B may be included within the hygroscopic material 750A/750B. In some embodiments, active agent 760A is the same as the active agent 760B. In other embodiments, the active agent 760A is different than the active agent 760B.

**[00143]** In yet another embodiment for treating or preventing hemorrhoids in a subject, shown representatively in FIGs. 9-10, a device 60 according to the present disclosure comprises first layer 100 including a surface 150. The surface 150 includes at least one valley 152 and at least one plateau 154 for controlling flow of fluid into the device 60. In this embodiment, the device 60 also optionally includes a pair of adhesive areas 156 for providing additional adherence to the subject's skin upon application.

**[00144]** As shown in FIG. 10, the plateau portion(s) 154 may include a hydrophobic coating 158 which may attenuate the first layer 100 material's innate aqueous permeability properties. The valley(s) 152, in contrast, may not include the hydrophobic coating 158, enabling relatively easier permeability of aqueous fluids through the first layer 100 and/or the second layer 200 and into the third layer 700. In FIG. 10, this relative permeability difference between the plateau portions 154 and the valley portion(s) 152 is represented by moisture paths 900.

**[00145]** As in other embodiments, the third layer 700 may include a hygroscopic material 750 and optionally an active agent 760.

**[00146]** In yet another embodiment for treating or preventing hemorrhoids in a subject, shown representatively in FIG. 11, a device 70 according to the present technology

comprises a first layer 100 and a second layer 200 disposed opposite the first layer 100. Each of the first layer 100 and the second layer 200 may include a surface 150 and a surface 250, respectively, which may have properties similar to those described above in connection with other disclosed embodiments.

**[00147]** The first layer 100 includes a contour portion 300A, which may additionally include one or more pillars 360A and one or more cavities 370A between the pillars 360A. Fluid absorbed by the contour portion 300A may thus cause the pillars 360A to expand radially, and the cavities 370A to shrink accordingly.

**[00148]** The second layer 200 includes a contour portion 300B, which may additionally include one or more pillars 360B and one or more cavities 370B between the pillars 360B. Fluid absorbed by the contour portion 300B may thus cause the pillars 360B to expand radially, and the cavities 370B to shrink accordingly.

**[00149]** In such embodiments, the first layer 100 and the second layer 200, and especially contour portions 300A/300B, may absorb substantial amounts of fluid without substantially expanding (e.g., without a diameter D of the combined contour portions 300A/300B substantially increasing). In some embodiments, the contour portion 300A/300B is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00150]** Referring now generally to FIGs. 12A-12F, another embodiment of a device 80 for treating or preventing hemorrhoids in a subject is formed of a substantially uniform sheet of material. The device 80 comprises a top surface 8100 which includes a contour portion 8300. The top surface 8100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate into the device 80. In some embodiments, the top surface 8100 comprises cotton. The top surface 8100 includes a surface (e.g., a body-facing surface) 8150. The surface 8150 may include a coating, such as a waxy coating, to prevent the top surface 8100 from adhering to the subject's skin too strongly. In some embodiments, the surface 8150 includes a texture. In some embodiments, the texture increases the adherence of the device 80 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[00151]** In some embodiments, the top surface 8100 further includes one or more informational markings 8400 for providing information to the subject. For example, the informational markings 8400 may indicate which side of the device 80 should be in contact with the subject's skin.

**[00152]** In some embodiments, the top surface 8100 further includes one or more orientation markings 8500 for indicating to the subject how the device 80 should be oriented upon application. For example, as shown in FIG. 12D, the orientation markings 8500 may include a line indicating the midline of the device 80 which should be aligned parallel to the intergluteal cleft.

**[00153]** The contour portion 8300 of the top surface 8100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the top surface 8100, or deviates from the contour of the remaining portions of the top surface 8100. For example, as shown in FIG. 12A, the contour portion 8300 substantially protrudes from the top surface 8100. In some embodiments, such as that shown in FIG. 12A, the contour portion 8300 protrudes from the top surface 8100 to form a generally spheroid shape. In other embodiments, the contour portion 8300 forms a different shape, such as a disc, a mound, a cone, a teardrop, or a combination thereof. In other embodiments, the contour portion 8300 substantially recedes from the top surface 8100, for example to form a dent or divot in the top surface 8100. The contour portion 8300 includes a surface 8350 that may optionally include a texture similar to that described with respect to surface 8150 of the top surface 8100. In other embodiments, the surface 8350 does not include a texture, even in embodiments where surface 8150 includes a texture. In some embodiments, the contour portion 8300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00154]** The bottom surface 8200 of the device 80 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow the fluid to penetrate through the bottom surface 8200. In some such embodiments, the bottom surface 8200 comprises cotton. As shown in FIGs. 12B and 12E, the bottom surface 8200 of the device 80 includes a second surface 8250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 8200 to

mechanical- or fluid-driven degradation. In such embodiments, the coating prevents fluid from penetrating from the interior of the device 80 through the bottom surface 8200 (e.g., trapping absorbed fluid within the device 80). In some embodiments, the second surface 8250 includes a texture. In some embodiments, the texture increases the adherence of the device 80 to the skin of the subject, for example to improve handling and manipulation of the device 80 during application and/or removal. In some embodiments, the texture includes one or more dimples.

**[00155]** The bottom surface 8200 may include a second contour portion 8600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the bottom surface 8200) or deviates from the contour of the remaining portions of the bottom surface 8200. For example, as shown in FIG. 12B, the second contour portion 8600 may recede from a planar surface defined by the remainder of the bottom surface 8200 such that an indentation is formed in the bottom surface 8200. The second contour portion 8600 includes a surface 8650 that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 80 during application and/or removal.

**[00156]** In some embodiments, the bottom surface 8200 further includes one or more informational markings 8450 for providing information to the subject. For example, the informational markings 8450 may indicate a midline of the device 80 and/or may indicate where the subject might apply pressure to properly install the device 80 in an intergluteal cleft.

**[00157]** In some embodiments, the bottom surface 8200 further includes one or more graphical indicators 8550 for indicating to the subject how the device 80 should be oriented upon application. For example, as shown in FIG. 12E, the orientation markings 8550 may indicate a central zone indicating the center of the device 80, which should ideally be aligned with the anus of the subject upon application.

**[00158]** The device 80 may additionally include an inner core 8700. Any remaining space between the top surface 8100 and the bottom surface 8200 may be filled by the

inner core 8700. In such embodiments, the inner core 8700 may comprise an absorbent material such as cotton, located substantially within the contour portion 8300, 8600 of the device 80. The inner core 8700 may include an active agent such as a deodorant and/or an antibacterial agent.

**[00159]** In any embodiment disclosed herein, the inner core 8700 (also referred to as the third layer 8700 in various embodiments) may include a hygroscopic material, such as cotton or any other aqueous absorbent material or combination of materials. The inner core 8700 may include an active agent. In some embodiments, the active agent is a deodorant. In some embodiments, the active agent is an antibacterial agent. In some embodiments, the active agent is a hemorrhoid relief agent (e.g., disaccharide polysulfide). In some embodiments, the active agent is a numbing agent (e.g., a topical anesthetic such as benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine (alternatively referred to as amethocaine). In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[00160]** In some embodiments, the device 80 includes a cross-sectional shape defined by the top surface 8100, the bottom surface 8200, the inner core 8700, and the contour portions 8300, 8600. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 80, subjects' comfort, etc. For example, as shown in FIG. 12F, the cross-sectional shape may be an arched dome-like shape having a substantially uniform thickness. For example and without limitation, the cross-sectional shape may alternatively include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[00161]** Any device disclosed herein may additionally include one or more creases. As used herein, the term “crease” refers to an indentation, fold, or overlapping region of the material. In some embodiments, a crease 8055 may include only a portion of the thickness of the material (e.g., a crease in only one layer of a multilayer device). In other embodiments, a crease may extend through the entire thickness of the device (e.g., through all layers of a multilayer device). In some embodiments, the creases enable the device to absorb substantially more fluid from skin of the subject than a comparably sized and shaped device that does not include creases, or alternatively includes fewer creases or creases of smaller dimension (e.g., length, width, volume and/or surface area).

**[00162]** In some embodiments, the creases are formed by converting (e.g., molding) a substantially flat piece of the sheet of material to form a contoured shape, such as that generally shown in any one of FIGs. 1A-12F. For example, in the embodiment shown in FIGs. 12A-12F, the device 80 includes at least four creases 8055. In other embodiments, the device 80 includes at least two creases 8055, such as about three creases 8055, about four creases 8055, about five creases 8055, about six creases 8055, about seven creases 8055, about eight creases 8055, about nine creases 8055, about ten creases 8055, or more than about ten creases 8055.

**[00163]** Referring now generally to FIGs. 13A-13D, the present disclosure provides another embodiment of a device 90 for absorbing a fluid from skin of a subject. In such embodiments, the device 90 is formed of a substantially uniform sheet of material. The device 90 comprises a top surface 9100 which includes a contour portion 9300. The top surface 9100 may be formed of any material suitable for direct contact with skin and allows moisture to penetrate into the device 90. In some embodiments, the top surface 9100 comprises cotton. The top surface 9100 includes a surface (e.g., a body-facing surface) 9150. The surface 9150 may include a coating, such as a waxy coating, to prevent the top surface 9100 from adhering to the subject's skin too strongly. In some embodiments, the surface 9150 includes a texture. In some embodiments, the texture increases the adherence of the device 90 to the skin of the subject. In some embodiments, the texture includes one or more dimples.

**[00164]** In some embodiments, the top surface 9100 further includes one or more orientation markings 9500 for indicating to the subject how the device 90 should be oriented upon application. For example, the orientation markings 9500 may include a line indicating a midline of the device 90 which should be aligned parallel to or, as specifically shown in FIGs. 13A-13D, perpendicular to the intergluteal cleft.

**[00165]** The contour portion 9300 of the top surface 9100 deviates from a plane (e.g., from a flat planar surface) with respect to the remaining portions of the top surface 9100, or deviates from the contour of the remaining portions of the top surface 9100. For example, the contour portion 9300 may substantially protrude from the top surface 9100. In some embodiments, the contour portion 9300 protrudes from the top surface 9100 to form a generally spheroid shape. In other embodiments, the contour portion 9300 forms a different shape, such as a disc, a mound, a cone, a teardrop, or a combination thereof. In other embodiments, the contour portion 9300 substantially recedes from the top surface 9100, for example to form a dent or divot in the top surface 9100. The contour portion 9300 includes a surface 9350 that may optionally include a texture similar to that described with respect to surface 9150 of the top surface 9100. In other embodiments, the surface 9350 does not include a texture, even in embodiments where surface 9150 includes a texture. In some embodiments, the contour portion 9300 is sized proportional to the subject's size (e.g., the subject's height, weight, BMI, waist circumference, etc.).

**[00166]** The bottom surface 9200 of the device 90 may be formed of any durable material, optionally suitable for direct contact with skin, and which may allow the fluid to penetrate through the bottom surface 9200. In some such embodiments, the bottom surface 9200 comprises cotton. The bottom surface 9200 of the device 90 includes a second surface 9250 which, in some embodiments, may include a coating (e.g., a waxy coating) to improve the integrity of the second layer 9200 to mechanical- or fluid-driven degradation. In such embodiments, the coating prevents fluid from penetrating from the interior of the device 90 through the bottom surface 9200 (e.g., trapping absorbed fluid within the device 90). In some embodiments, the second surface 9250 includes a texture. In some embodiments, the texture increases the adherence of the device 90 to the skin of the subject, for example to improve handling and manipulation of the device 90 during

application and/or removal. In some embodiments, the texture includes one or more dimples.

**[00167]** The bottom surface 9200 may include a second contour portion 9600 which, in some embodiments, includes a contour that substantially deviates from a plane (e.g., from a planar surface defined at least in part by the remainder of the bottom surface 9200) or deviates from the contour of the remaining portions of the bottom surface 9200. For example, the second contour portion 9600 may recede from a planar surface defined by the remainder of the bottom surface 9200 such that an indentation is formed in the bottom surface 9200. The second contour portion 9600 includes a surface 9650 that may optionally include a texture, such as one or more dimples, to improve handling and manipulation of the device 80 during application and/or removal.

**[00168]** The device 90 includes one or more removal tabs 9900, for example integrated with or attached to the bottom surface 9200. The one or more removal tabs 9900 enable the user to more easily remove the device 90 after use, for example when the device 90 has absorbed fluid. In some embodiments, shown representatively in FIG. 13A, the device 90 includes a single removal tab 9900 connected to the bottom surface 9200 at or near the center of the bottom surface 9200 (e.g., within the second contour portion 9600). To remove such an embodiment from an intergluteal cleft, the user grasps the removal tab 9900 with his or her hand H and pulls the removal tab 9900 in a direction generally away from the intergluteal cleft.

**[00169]** Alternatively, the device 90 may include more than one removal tab 9900, such as two removal tabs 9900. In such embodiments, the two removal tabs 9900 may be connected to the device 90 at any suitable location, preferably symmetrically opposed in relation to the center of the device 90. For example, as shown representatively in FIGs. 13C-13D, one removal tab 9900a may be attached to one edge E of the bottom surface 9200, while a second removal tab 9900b may be attached to a generally opposite edge E' of the bottom surface 9200. To remove such an embodiment from an intergluteal cleft, the user grasps the first removal tab 9900a, the second removal tab 9900b, or both removal tabs 9900a, 9900b with his or her hand H, and pulls in a direction generally away from the intergluteal cleft.

**[00170]** In some embodiments, the bottom surface 9200 further includes one or more informational markings 9450 for providing information to the subject. For example, the informational markings 9450 may indicate a midline of the device 90 and/or may indicate where the subject might apply pressure to properly install the device 90 in an intergluteal cleft.

**[00171]** In some embodiments, the bottom surface 9200 further includes one or more graphical indicators 9550 for indicating to the subject how the device 90 should be oriented upon application. For example, the orientation markings 9550 may indicate a central zone indicating the center of the device 90, which should ideally be aligned with the anus of the subject upon application.

**[00172]** The device 90 may additionally include other features described with respect to the embodiments shown in FIGs. 1-12F, such as an inner core identical to or similar to the inner core 8700 of device 80. As described with respect to device 80, the optional inner core of device 90 may include an active agent such as a deodorant, an antibacterial agent, a hemorrhoid relief agent, and/or a numbing agent. In some embodiments, the active agent is two or more or three or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent. In some embodiments, the active agent comprises a deodorant, an antibacterial agent, a hemorrhoid relief agent and a numbing agent.

**[00173]** In some embodiments, the device 90 includes a cross-sectional shape defined by the top surface 9100, the bottom surface 9200, the inner core 9700, and the contour portions 9300, 9600. The cross-sectional shape may be chosen to enhance ease of use (e.g., installation and/or removal) of the device 90, subjects' comfort, etc. For example, as shown in FIGs. 13A-13D, the cross-sectional shape may be an arched dome-like shape having a substantially uniform thickness. For example and without limitation, the cross-sectional shape may alternatively include a circle, an oval, a rod, a rectangle, a square, a trapezoid, a rhombus, a parallelogram, a triangle, a hexagon, a pentagon, a heptagon, an octagon, a nonagon, a squircle, a portion of any of the foregoing (e.g., a semi-circle), a tapered configuration of any of the foregoing, or a combination of two or more of any of the

foregoing (e.g., a cross-sectional profile including a quadrilateral portion and one or more protruding finger-like portion from one of the quadrilateral lengths and/or corners).

**[00174]** Device 90 may also include one or more creases 9055, which may optionally include only a portion of the thickness of the material (e.g., a crease in only one layer of a multilayer device). In other embodiments, the one or more crease 9055 may extend through the entire thickness of the device 90. In some embodiments, the crease(s) 9055 enable the device 90 to absorb substantially more fluid from skin of the subject than a comparably sized and shaped device that does not include creases, or alternatively includes fewer creases or creases of smaller dimension (e.g., length, width, volume and/or surface area).

**[00175]** In some embodiments, the crease(s) 9055 are formed by converting (e.g., molding) a substantially flat piece of the sheet of material to form a contoured shaped, such as that generally shown in any one of FIGs. 13A-13D. The device 90 may include a single crease 9055, or alternatively may include at least two creases 9055, such as about three creases 9055, about four creases 9055, about five creases 9055, about six creases 9055, about seven creases 9055, about eight creases 9055, about nine creases 9055, about ten creases 9055, or more than about ten creases 9055.

**[00176]** In some embodiments, the present disclosure provides an absorbent device comprising a first layer including a body-facing surface containing an anti-stick material; a second layer disposed opposite the first body-facing surface; and a third layer disposed between the first and second layers and comprising an absorbent material. In some embodiments, at least a portion of the first layer includes a contour that substantially deviates from a plane. In some embodiments, the third layer further includes an inner core comprising a hygroscopic material. In some embodiments, the inner core is separated from the absorbent material by a barrier material. In some embodiments, the inner core further includes an active agent. In some embodiments, the active agent comprises one or more of: a deodorant, an antibacterial agent, and a hemorrhoid relief agent. In some embodiments, the first layer includes a graphic element for providing application information to a user. In some embodiments, the second layer includes a graphic element for providing application information to a user. In some embodiments, the second layer

includes a graphic element for providing application information to a user. In some embodiments, the body-facing surface includes a plurality of dimples. In some embodiments, the body-facing surface does not include an adhesive portion. In some embodiments, the contour that substantially deviates from a plane is spheroid.

**[00177]** In other embodiments, the present disclosure provides an absorbent device comprising a first, body-facing layer comprising a plurality of dimples; a second layer disposed opposite the first layer; and an inner core disposed between the first, body-facing layer and the second layer. In some embodiments, the first, body-facing layer does not include an adhesive portion. In some embodiments, the inner core layer comprises an absorbent material and optionally an active agent. In some embodiments, the absorbent material comprises cornstarch. In some embodiments, the active agent comprises one or more of: a deodorant, an antibacterial agent, and a hemorrhoid relief agent. In some embodiments, at least one of the first, body-facing layer and the second layer includes a graphic element for providing application information to a user.

#### 4. Selected Embodiments of Methods of Treating or Preventing Hemorrhoids in a Subject

**[00178]** Devices disclosed herein may be used to treat or prevent a hemorrhoid in a subject. In such embodiments, the method may include applying a device as diagnosed herein to the intergluteal cleft of a subject such that at least a portion of the device is in contact with the hemorrhoid.

**[00179]** In some embodiments, the method comprises placing the device at least partially within the intergluteal cleft of the subject before a hemorrhoid develops (e.g., before onset of hemorrhoid-related pain and/or itching symptoms). In some embodiments, the subject is at increased risk of developing hemorrhoids. In some embodiments, the subject has one or more hemorrhoid risk factors: constipation, low fiber diet, high fat diet, obesity, sedentary lifestyle, dehydration, alcoholism, pregnancy, recent childbirth, diarrhea, damage or atrophy of pelvic floor muscle (e.g., from recent surgery, pregnancy or childbirth), heart disease, liver disease, age of 50 years or older, and/or family history of hemorrhoids.

**[00180]** In other embodiments, the method comprises providing a device as disclosed herein to a subject in need of treatment or prevention of hemorrhoids, and instructing the subject to insert the device at least partially within the intergluteal cleft.

**[00181]** In some embodiments, the method results in an attenuation of one or more symptoms associated with the hemorrhoid, such as pain, itching, and/or swelling.

**[00182]** In some embodiments, the method results in a downgrade of the hemorrhoid grade. For example, a grade 3 hemorrhoid of a subject may, after treatment according to the present disclosure, be reduced to a grade 2 hemorrhoid.

**[00183]** In other embodiments, the method results in a delay (e.g., a substantial delay) in the need for a clinical procedure to remove the hemorrhoid. In some embodiments, the clinical procedure is selected from the group consisting of: rubber band ligation, sclerotherapy, cauterization, hemorrhoidectomy, hemorrhoidal dearterialization, and stapled hemorrhoidopexy.

**[00184]** In yet other embodiments, a method of treating a hemorrhoid as disclosed herein further excludes a clinical intervention to treat the hemorrhoid. In some embodiments, the clinical intervention is selected from the group consisting of: rubber band ligation, sclerotherapy, cauterization, hemorrhoidectomy, hemorrhoidal dearterialization, and stapled hemorrhoidopexy.

**[00185]** In some embodiments, the present disclosure provides a method of treating or preventing a hemorrhoid in a subject, the method comprising placing a device as disclosed herein at least partially within an intergluteal cleft of a subject. In some embodiments, the device is placed in contact with a hemorrhoid of the subject and/or in contact with perianal tissue of the subject. In some embodiments, the device includes a numbing agent (e.g., a topical anesthetic such as benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine (alternatively referred to as amethocaine)).

**[00186]** As one of skill in the art will recognize, other indications include similar symptoms to those of a hemorrhoid, and are even confused with a hemorrhoid diagnosis. Accordingly, any method disclosed herein may also be used to treat and/or prevent one or

more symptoms associated with a disorder other than hemorrhoids. In some embodiments, the disorder is one or more of: fissures, fistulae, abscesses, colorectal cancer, rectal varices, itching, rectal bleeding, colitis, inflammatory bowel disease, diverticular disease, and angiodysplasia.

## EXAMPLES

**[00187]** Example 1. An absorbent device comprising: a first layer including a body-facing surface containing an anti-stick material; a second layer disposed opposite the first body-facing surface; and a third layer disposed between the first and second layers and comprising an absorbent material, wherein at least a portion of the first layer includes a contour that substantially deviates from a plane.

**[00188]** Example 2. The device of Example 1, wherein the third layer further includes an inner core comprising a hygroscopic material.

**[00189]** Example 3. The device of Example 2, wherein the inner core is separated from the absorbent material by a barrier material.

**[00190]** Example 4. The device of Example 2 or Example 3, wherein the inner core further includes an active agent.

**[00191]** Example 5. The device of Example 4, wherein the active agent comprises one or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent.

**[00192]** Example 6. The device of any preceding Example, wherein the first layer includes a graphic element for providing application information to a user.

**[00193]** Example 7. The device of any preceding Example, wherein the second layer includes a graphic element for providing application information to a user.

**[00194]** Example 8. The device of any preceding Example, wherein the second layer includes a graphic element for providing application information to a user.

**[00195]** Example 9. The device of any preceding Example, wherein the body-facing surface includes a plurality of dimples.

**[00196]** Example 10. The device of any preceding Example, wherein the body-facing surface does not include an adhesive portion.

**[00197]** Example 11. The device of any preceding Example, wherein the contour that substantially deviates from a plane is spheroid.

**[00198]** Example 12. The device of any preceding Example, wherein the second layer further comprises one or more removal tabs.

**[00199]** Example 13. The device of any preceding Example, wherein the first layer further comprises one or more creases.

**[00200]** Example 14. An absorbent device comprising: a first, body-facing layer comprising a plurality of dimples; a second layer disposed opposite the first layer; and an inner core disposed between the first, body-facing layer and the second layer.

**[00201]** Example 15. The device of Example 14, wherein the first, body-facing layer does not include an adhesive portion.

**[00202]** Example 16. The device of Example 14 or Example 15, wherein the inner core layer comprises an absorbent material and optionally an active agent.

**[00203]** Example 17. The device of Example 16, wherein the absorbent material comprises cornstarch.

**[00204]** Example 18. The device of Example 16 or Example 17, wherein the active agent comprises one or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent.

**[00205]** Example 19. The device of any one of Examples 14 to 18, wherein at least one of the first, body-facing layer and the second layer includes a graphic element for providing application information to a user.

**[00206]** Example 20. The device of any one of Examples 14 to 18, wherein the second layer further comprises one or more removal tabs.

**[00207]** Example 21. The device of any one of Examples 14 to 18, wherein the first layer further comprises one or more creases.

**[00208]** Example 22. A method of treating or preventing a hemorrhoid in a subject, the method comprising placing a device according to any one of Examples 1 to 13 at least partially within an intergluteal cleft of a subject.

**[00209]** Example 23. The method of Example 22, wherein the step of placing the device further includes placing the device in contact with a hemorrhoid of the subject and/or in contact with perianal tissue of the subject.

**[00210]** Example 24. A method of treating or preventing a hemorrhoid in a subject, the method comprising placing a device according to any one of Examples 14 to 21 at least partially within an intergluteal cleft of a subject.

**[00211]** Example 25. The method of Example 24, wherein the step of placing the device further includes placing the device in contact with a hemorrhoid of the subject and/or in contact with perianal tissue of the subject.

**[00212]** Example 26. A method of absorbing a fluid proximal to an anus of a subject, the method comprising placing a device according to any one of Examples 1 to 13 at least partially within an intergluteal cleft of a subject.

**[00213]** Example 27. The method of Example 26, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

**[00214]** Example 28. A method of absorbing a fluid proximal to an anus of a subject, the method comprising placing a device according to any one of Examples 14 to 21 at least partially within an intergluteal cleft of a subject.

**[00215]** Example 29. The method of Example 28, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

**[00216]** Example 30. A method of preventing, reducing or eliminating itching proximal to an anus of a subject, the method comprising placing a device according to any one of Examples 1 to 13 at least partially within an intergluteal cleft of a subject.

**[00217]** Example 31. The method of Example 30, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

**[00218]** Example 32. A method of preventing, reducing or eliminating itching proximal to an anus of a subject, the method comprising placing a device according to any one of Examples 14 to 21 at least partially within an intergluteal cleft of a subject.

**[00219]** Example 33. The method of Example 32, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

## CONCLUSION

**[00220]** The above detailed descriptions of embodiments of the technology are not intended to be exhaustive or to limit the technology to the precise form disclosed above. Although specific embodiments of, and examples for, the technology are described above for illustrative purposes, various equivalent modifications are possible within the scope of the technology, as those skilled in the relevant art will recognize. For example, while steps are presented in a given order, alternative embodiments may perform steps in a different order. The various embodiments described herein may also be combined to provide further embodiments.

**[00221]** From the foregoing, it will be appreciated that specific embodiments of the invention have been described herein for purposes of illustration, but well-known structures and functions have not been shown or described in detail to avoid unnecessarily obscuring the description of the embodiments of the technology. Where the context permits, singular or plural terms may also include the plural or singular term, respectively.

**[00222]** Moreover, unless the word “or” is expressly limited to mean only a single item exclusive from the other items in reference to a list of two or more items, then the use of “or” in such a list is to be interpreted as including (a) any single item in the list, (b) all of the items in the list, or (c) any combination of the items in the list. Additionally, the term “comprising” is used throughout to mean including at least the recited feature(s) such that any greater number of the same feature and/or additional types of other features are not precluded. It will also be appreciated that specific embodiments have been described herein for purposes of illustration, but that various modifications may be made without deviating from the technology. Further, while advantages associated with certain embodiments of the technology have been described in the context of those embodiments,

other embodiments may also exhibit such advantages, and not all embodiments need necessarily exhibit such advantages to fall within the scope of the technology. Accordingly, the disclosure and associated technology can encompass other embodiments not expressly shown or described herein.

**[00223]** Unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise', 'comprising', and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to". Words using the singular or plural number also include the plural and singular number, respectively. Additionally, the words "herein," "above," and "below" and words of similar import, when used in this application, shall refer to this application as a whole and not to any particular portions of the application.

**[00224]** The term "treatment" in relation a given disease or disorder, includes, but is not limited to, inhibiting the disease or disorder, for example, arresting the development of the disease or disorder; relieving the disease or disorder, for example, causing regression of the disease or disorder; or relieving a condition caused by or resulting from the disease or disorder, for example, relieving, preventing or treating symptoms of the disease or disorder. The term "prevention" in relation to a given disease or disorder means: preventing the onset of disease development if none had occurred, preventing the disease or disorder from occurring in a subject that may be predisposed to the disorder or disease but has not yet been diagnosed as having the disorder or disease, and/or preventing further disease/disorder development if already present.

**[00225]** The description of embodiments of the disclosure is not intended to be exhaustive or to limit the disclosure to the precise form disclosed. While the specific embodiments of, and examples for, the disclosure are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the disclosure, as those skilled in the relevant art will recognize.

**[00226]** Specific elements of any foregoing embodiments can be combined or substituted for elements in other embodiments. Furthermore, while advantages associated with certain embodiments of the disclosure have been described in the context of these

embodiments, other embodiments may also exhibit such advantages, and not all embodiments need necessarily exhibit such advantages to fall within the scope of the disclosure.

**[00227]** From the foregoing, it will be appreciated that specific embodiments of the invention have been described herein for purposes of illustration, but that various modifications may be made without deviating from the scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

## CLAIMS

I/We claim:

1. An absorbent device comprising:
  - a first layer including a body-facing surface containing an anti-stick material;
  - a second layer disposed opposite the first body-facing surface; and
  - a third layer disposed between the first and second layers and comprising an absorbent material,wherein at least a portion of the first layer includes a contour that substantially deviates from a plane.
2. The device of claim 1, wherein the third layer further includes an inner core comprising a hygroscopic material.
3. The device of claim 2, wherein the inner core is separated from the absorbent material by a barrier material.
4. The device of claim 2 or claim 3, wherein the inner core further includes an active agent.
5. The device of claim 4, wherein the active agent comprises one or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent.
6. The device of any preceding claim, wherein the first layer includes a graphic element for providing application information to a user.
7. The device of any preceding claim, wherein the second layer includes a graphic element for providing application information to a user.

8. The device of any preceding claim, wherein the second layer includes a graphic element for providing application information to a user.
9. The device of any preceding claim, wherein the body-facing surface includes a plurality of dimples.
10. The device of any preceding claim, wherein the body-facing surface does not include an adhesive portion.
11. The device of any preceding claim, wherein the contour that substantially deviates from a plane is spheroid.
12. The device of any preceding claim, wherein the second layer further comprises one or more removal tabs.
13. The device of any preceding claim, wherein the first layer further comprises one or more creases.
14. An absorbent device comprising:
  - a first, body-facing layer comprising a plurality of dimples;
  - a second layer disposed opposite the first layer; and
  - an inner core disposed between the first, body-facing layer and the second layer.
15. The device of claim 14, wherein the first, body-facing layer does not include an adhesive portion.
16. The device of claim 14 or claim 15, wherein the inner core layer comprises an absorbent material and optionally an active agent.

17. The device of claim 16, wherein the absorbent material comprises cornstarch.
18. The device of claim 16 or claim 17, wherein the active agent comprises one or more of: a deodorant, an antibacterial agent, a hemorrhoid relief agent, and a numbing agent.
19. The device of any one of claims 14 to 18, wherein at least one of the first, body-facing layer and the second layer includes a graphic element for providing application information to a user.
20. The device of any one of claims 14 to 18, wherein the second layer further comprises one or more removal tabs.
21. The device of any one of claims 14 to 18, wherein the first layer further comprises one or more creases.
22. A method of treating or preventing a hemorrhoid in a subject, the method comprising:
  - placing a device according to any one of claims 1 to 13 at least partially within an intergluteal cleft of a subject.
23. The method of claim 22, wherein the step of placing the device further includes placing the device in contact with a hemorrhoid of the subject and/or in contact with perianal tissue of the subject.
24. A method of treating or preventing a hemorrhoid in a subject, the method comprising:

- placing a device according to any one of claims 14 to 21 at least partially within an intergluteal cleft of a subject.
25. The method of claim 24, wherein the step of placing the device further includes placing the device in contact with a hemorrhoid of the subject and/or in contact with perianal tissue of the subject.
26. A method of absorbing a fluid proximal to an anus of a subject, the method comprising:  
placing a device according to any one of claims 1 to 13 at least partially within an intergluteal cleft of a subject.
27. The method of claim 26, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.
28. A method of absorbing a fluid proximal to an anus of a subject, the method comprising:  
placing a device according to any one of claims 14 to 21 at least partially within an intergluteal cleft of a subject.
29. The method of claim 28, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.
30. A method of preventing, reducing or eliminating itching proximal to an anus of a subject, the method comprising:  
placing a device according to any one of claims 1 to 13 at least partially within an intergluteal cleft of a subject.
31. The method of claim 30, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

32. A method of preventing, reducing or eliminating itching proximal to an anus of a subject, the method comprising:
  - placing a device according to any one of claims 14 to 21 at least partially within an intergluteal cleft of a subject.
  
33. The method of claim 32, wherein the step of placing the device further includes placing the device in contact with perianal skin of the subject.

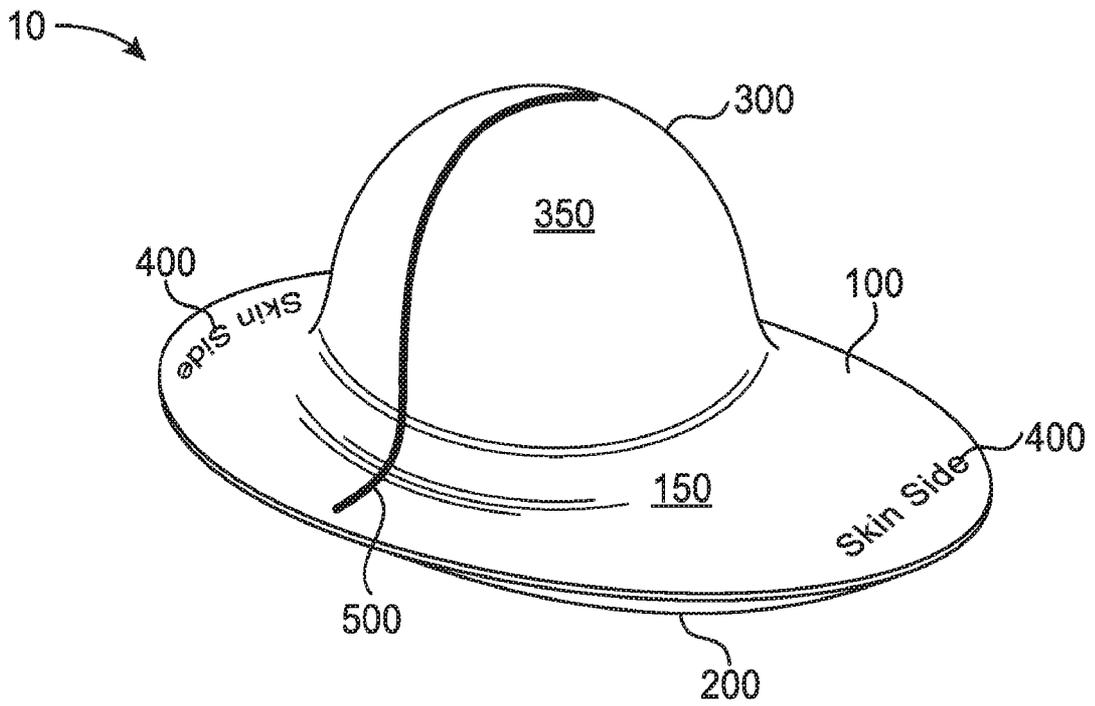


FIG. 1A

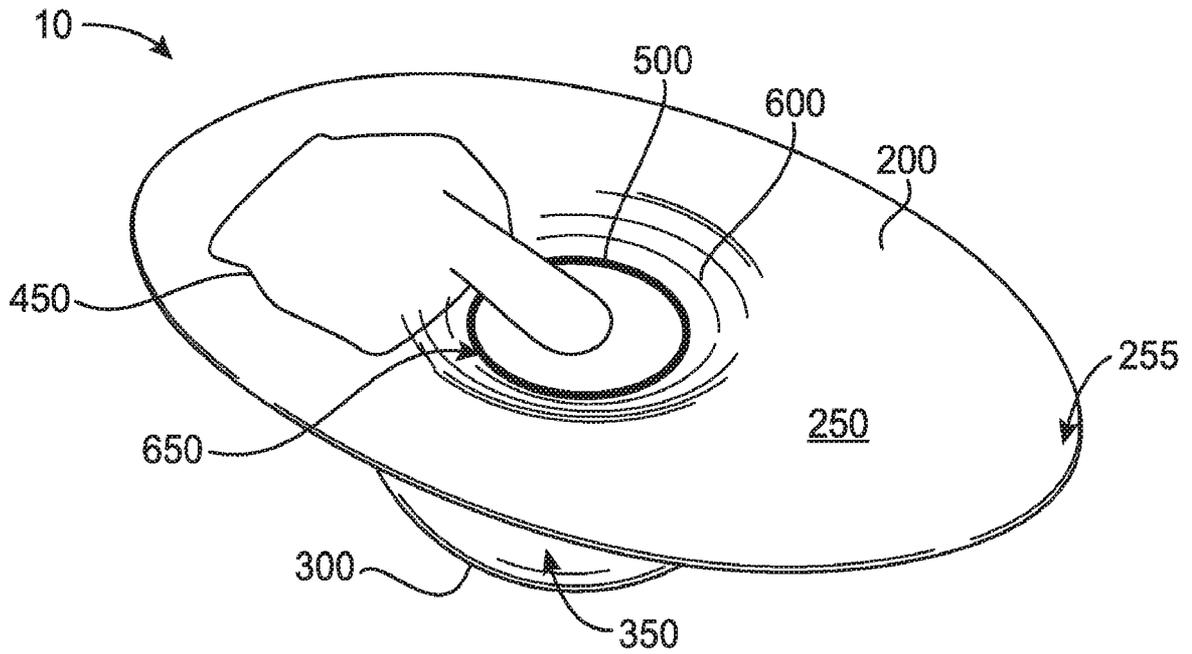


FIG. 1B

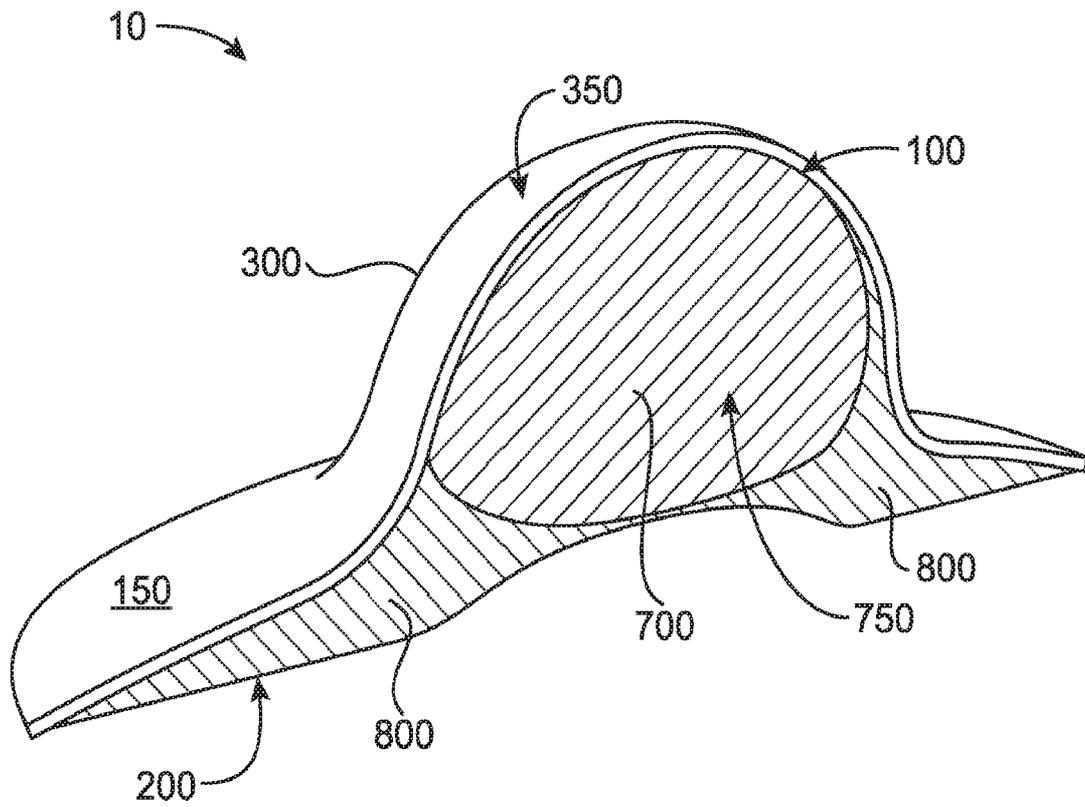


FIG. 2

3/14

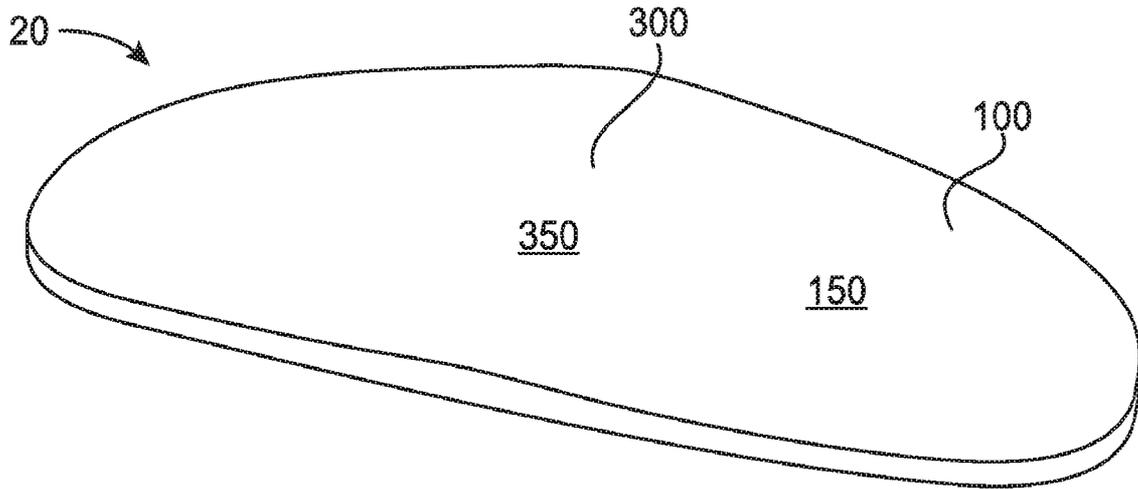


FIG. 3A

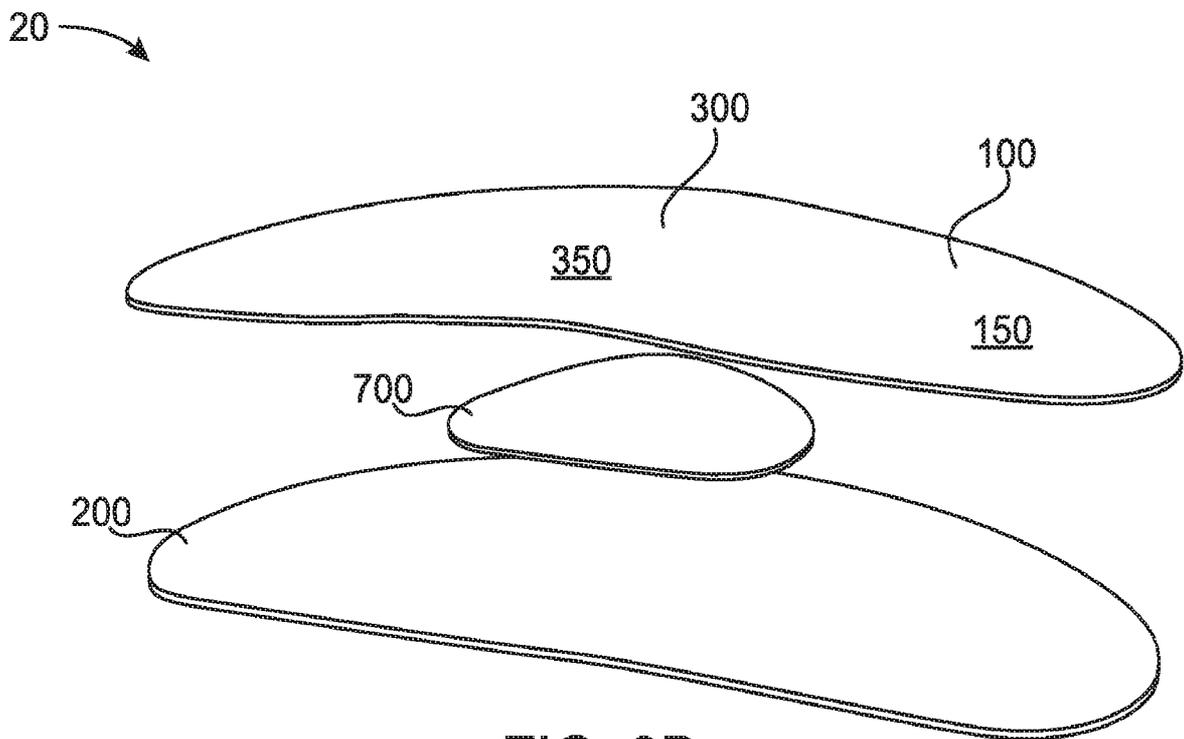


FIG. 3B

4/14

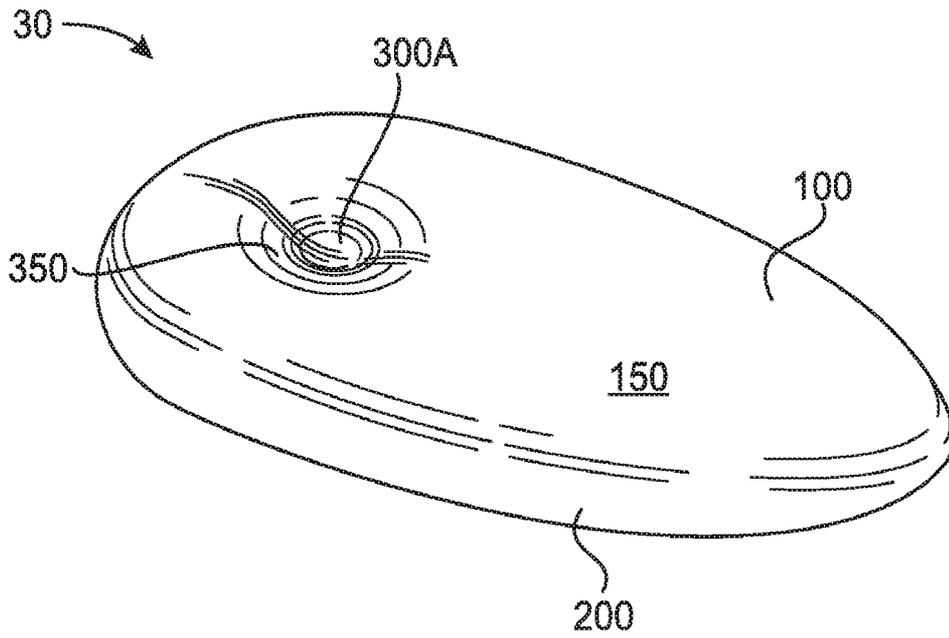


FIG. 4

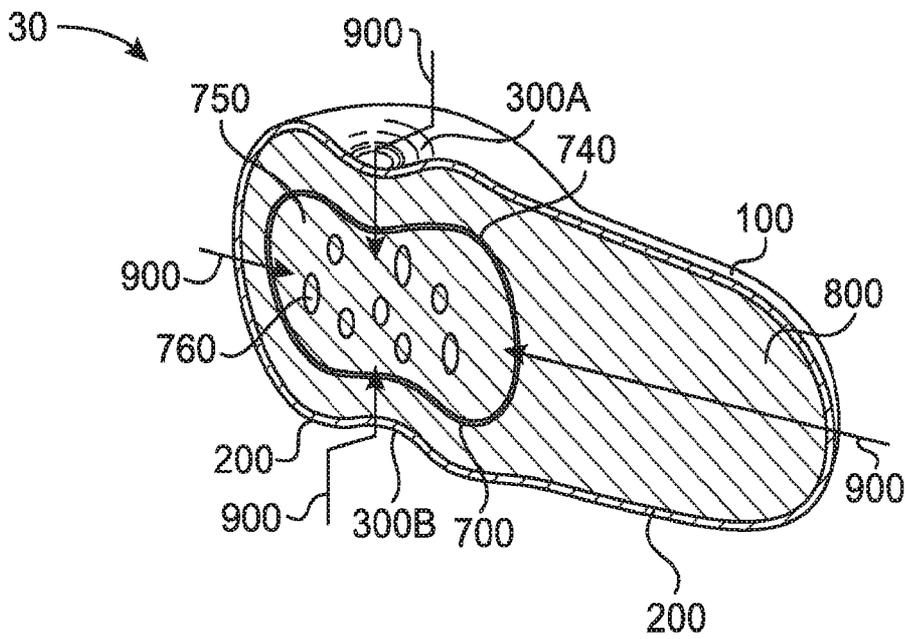


FIG. 5

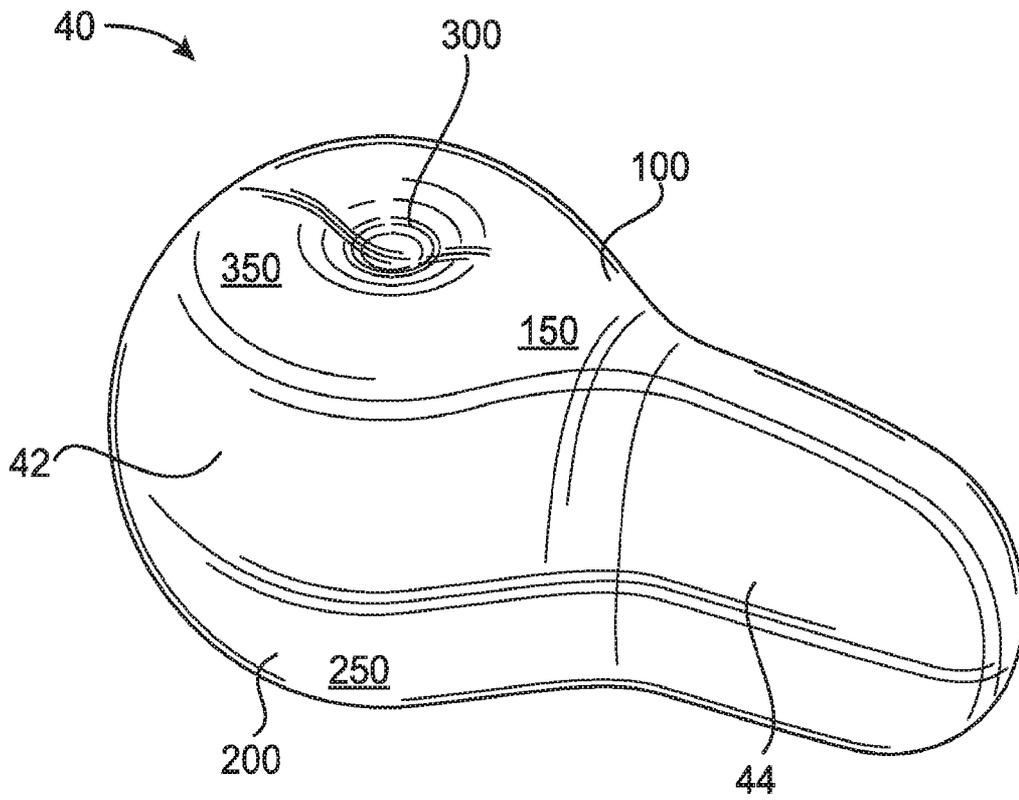


FIG. 6

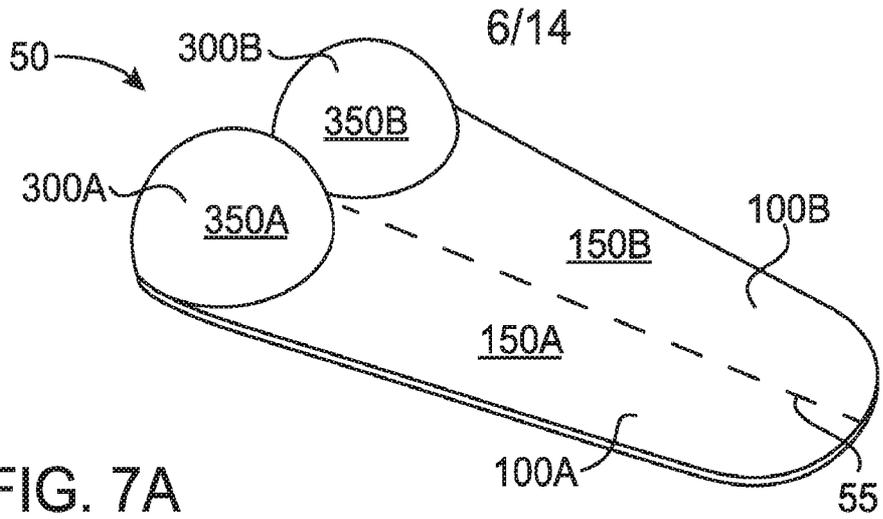


FIG. 7A

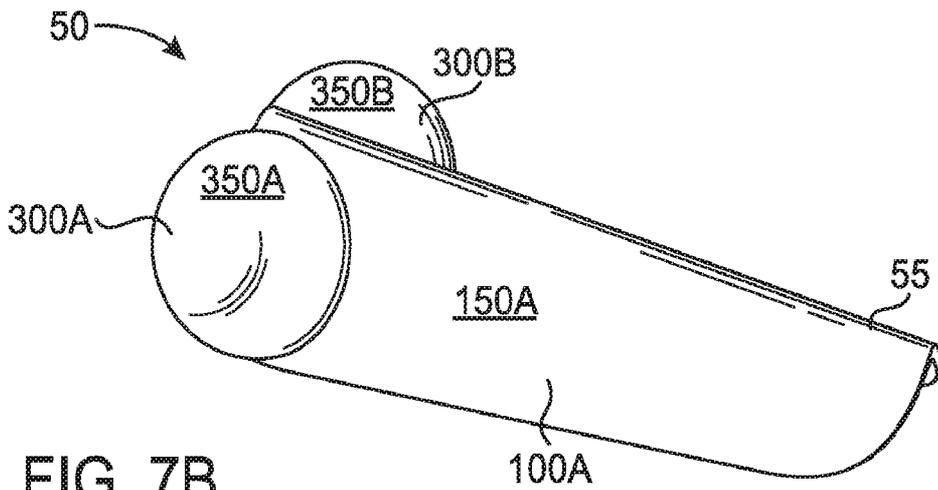


FIG. 7B

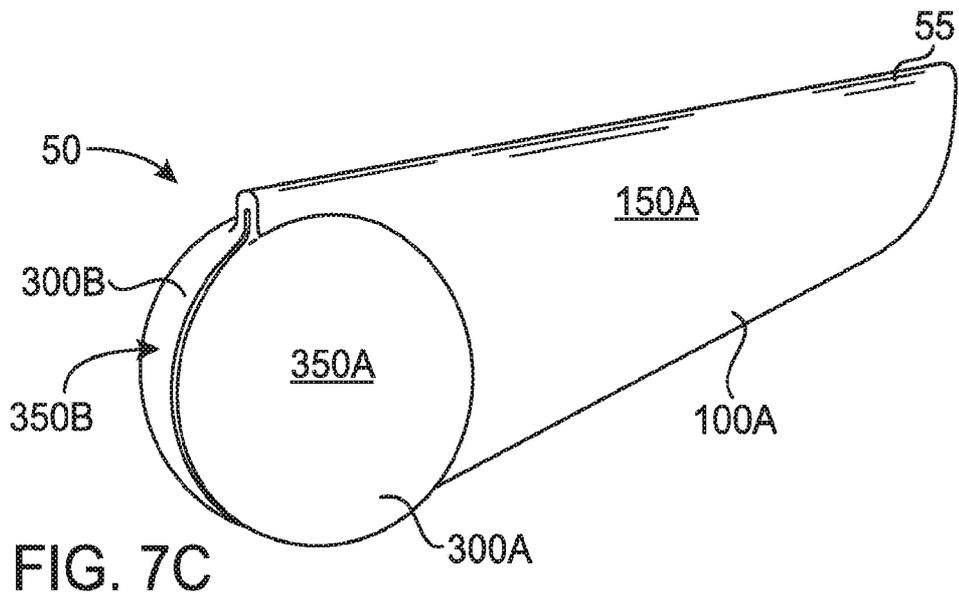


FIG. 7C

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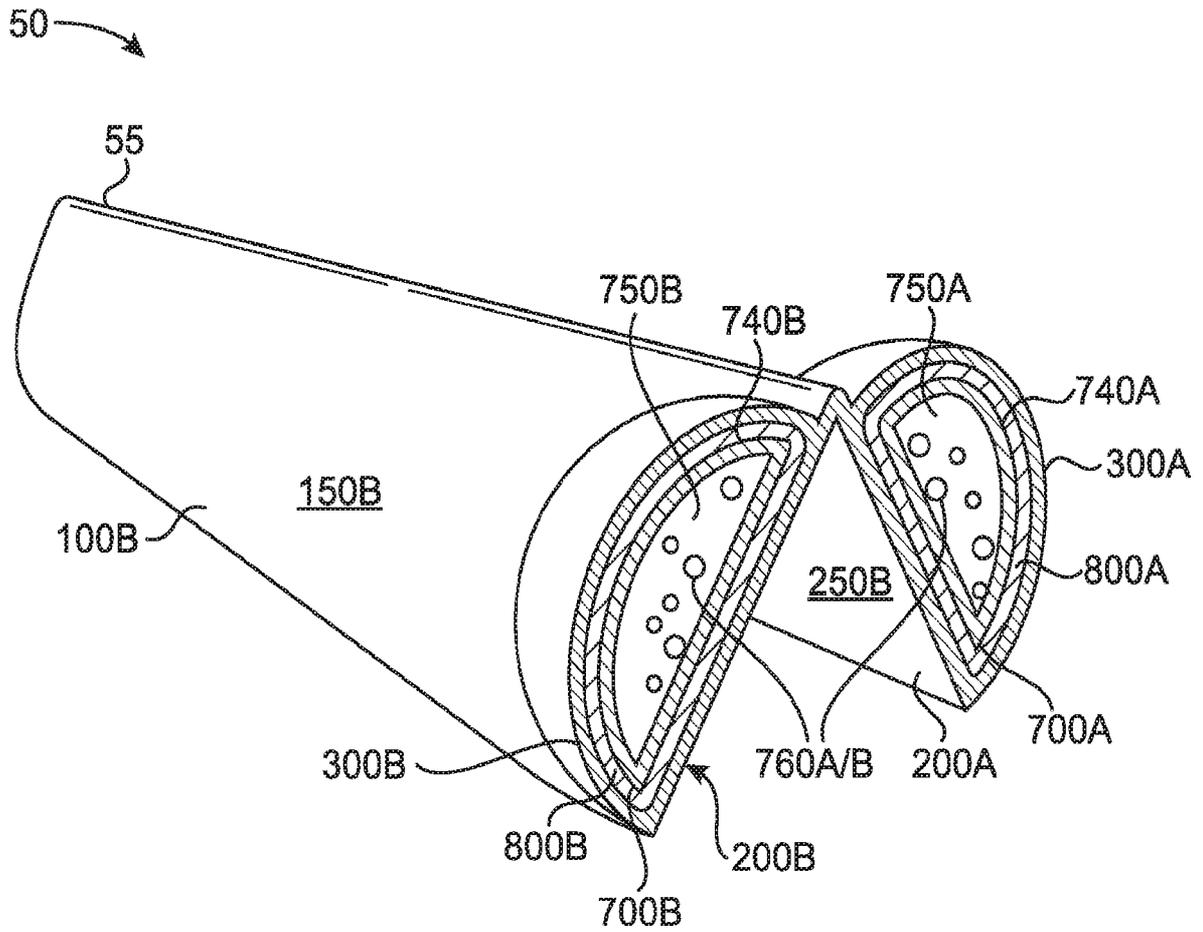


FIG. 8

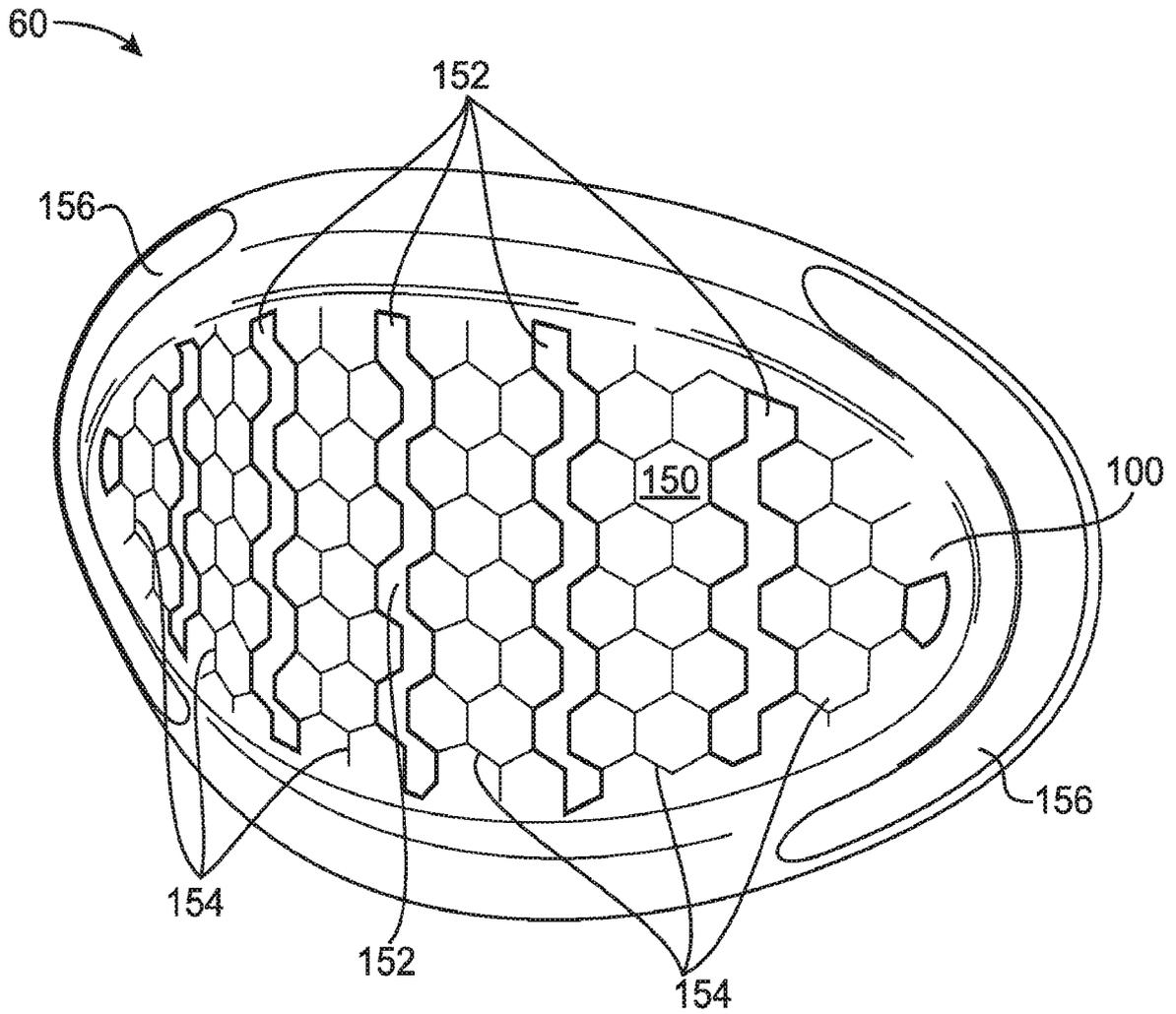


FIG. 9

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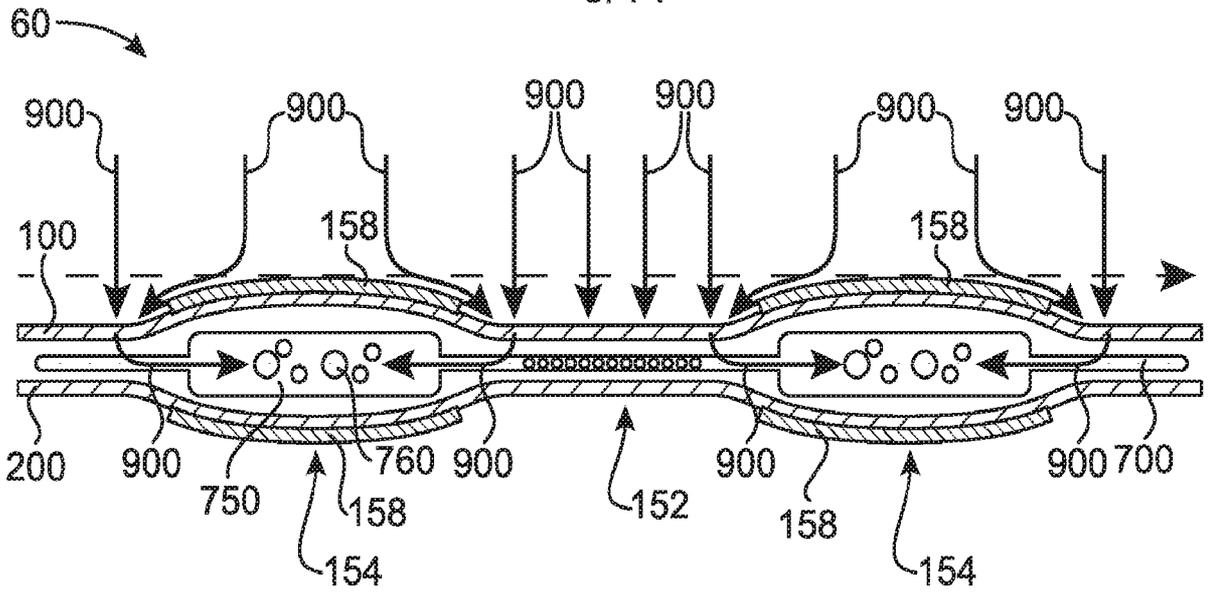


FIG. 10

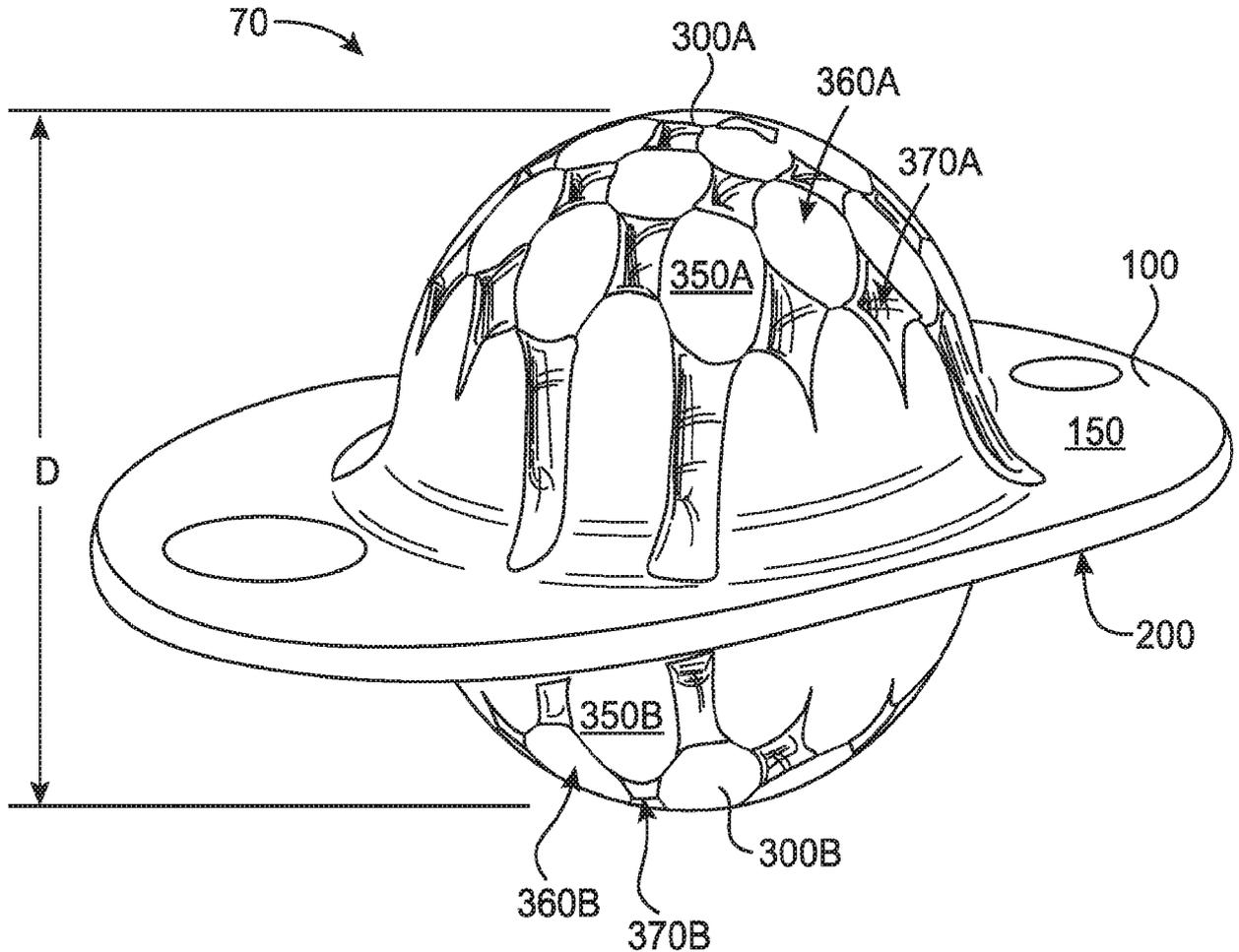


FIG. 11

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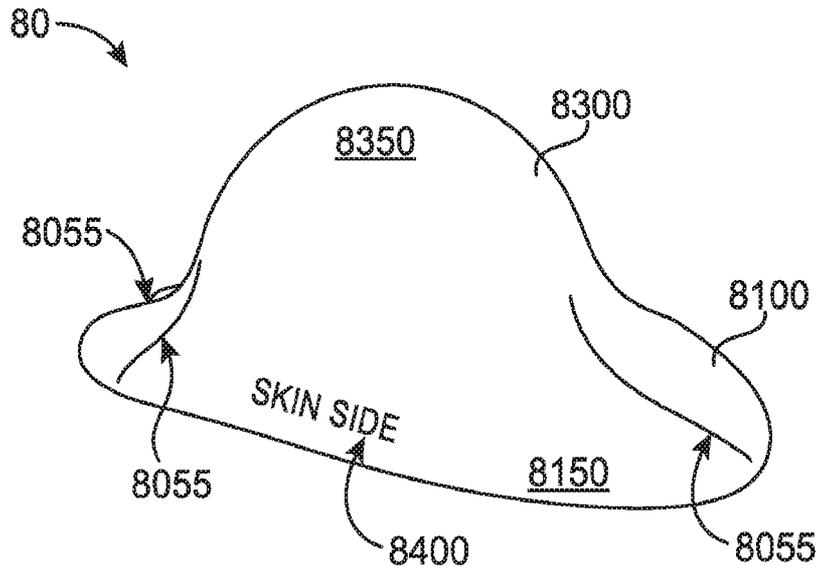


FIG. 12A

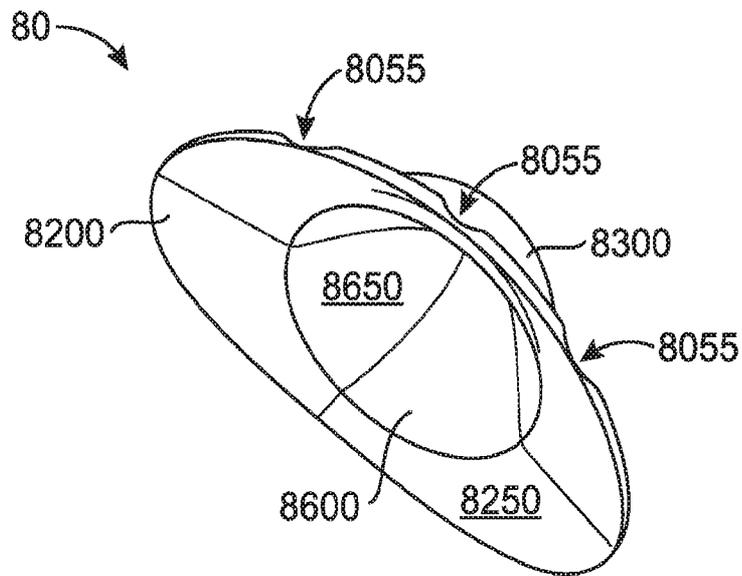


FIG. 12B

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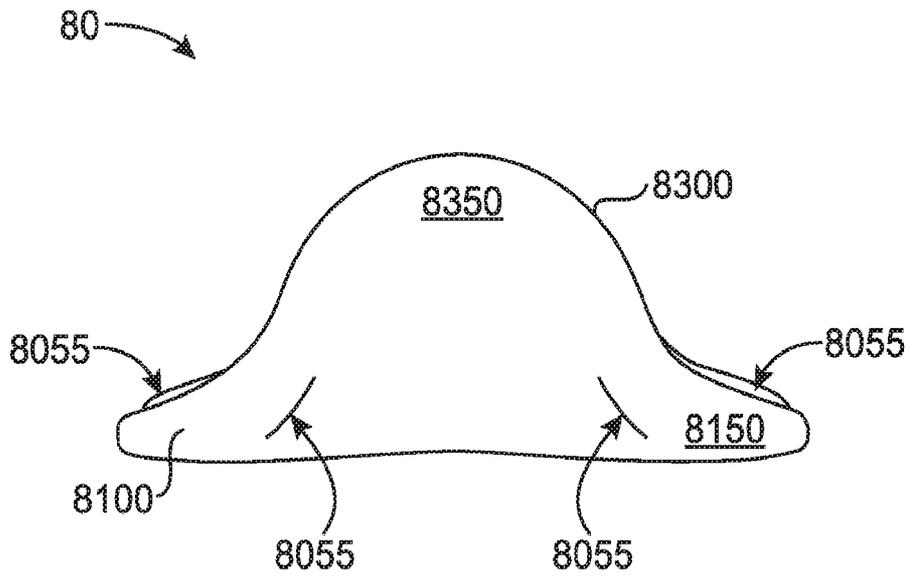


FIG. 12C

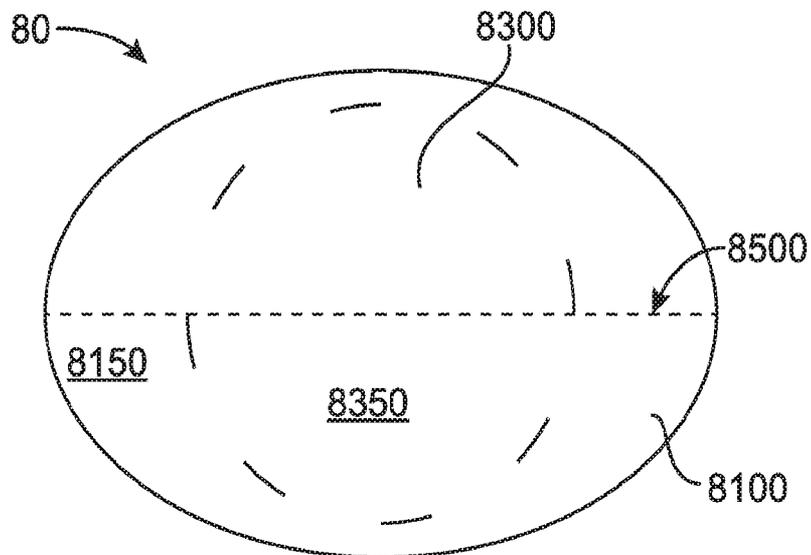


FIG. 12D

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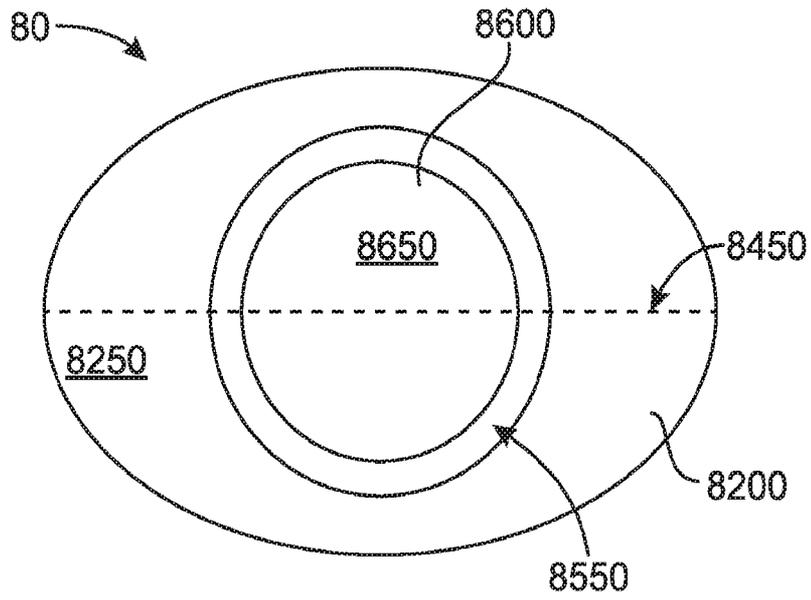


FIG. 12E

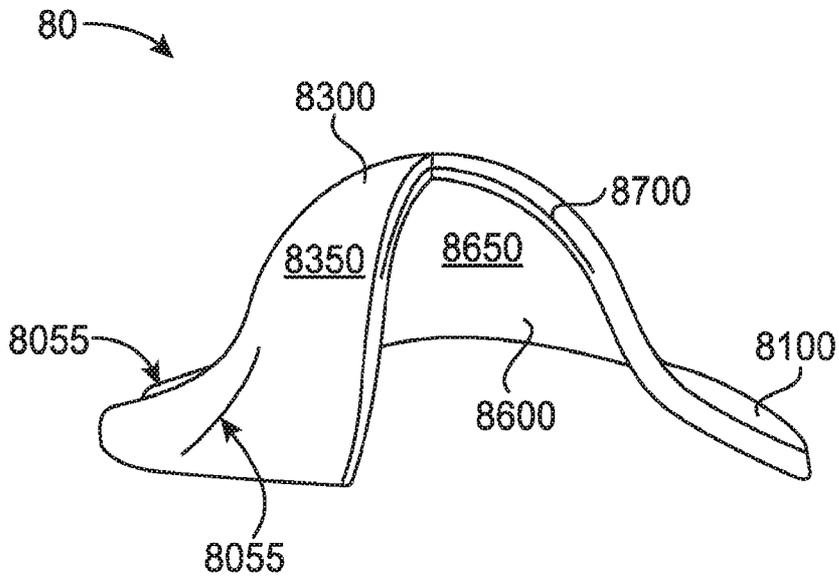


FIG. 12F

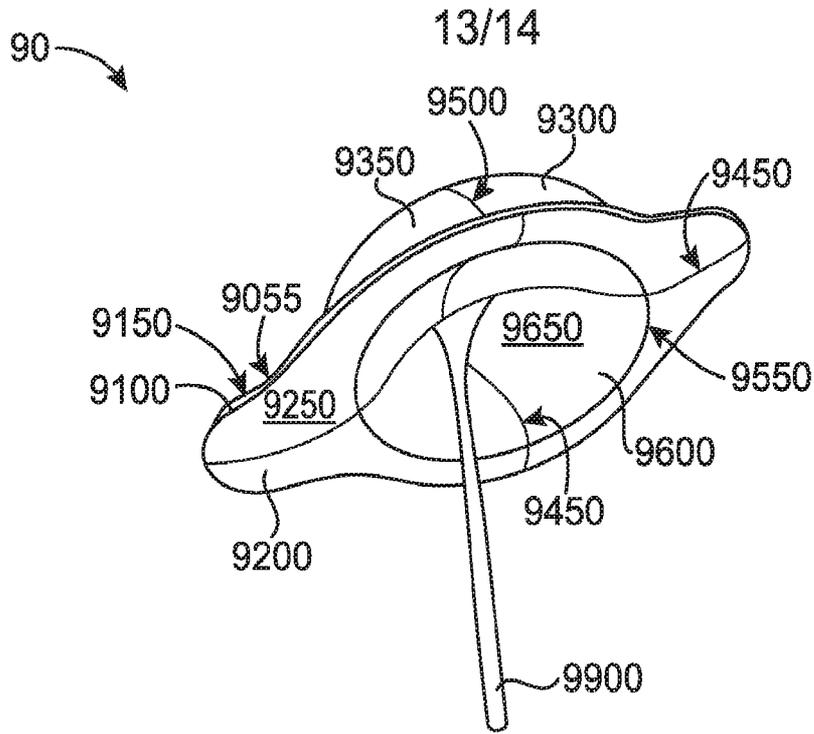


FIG. 13A

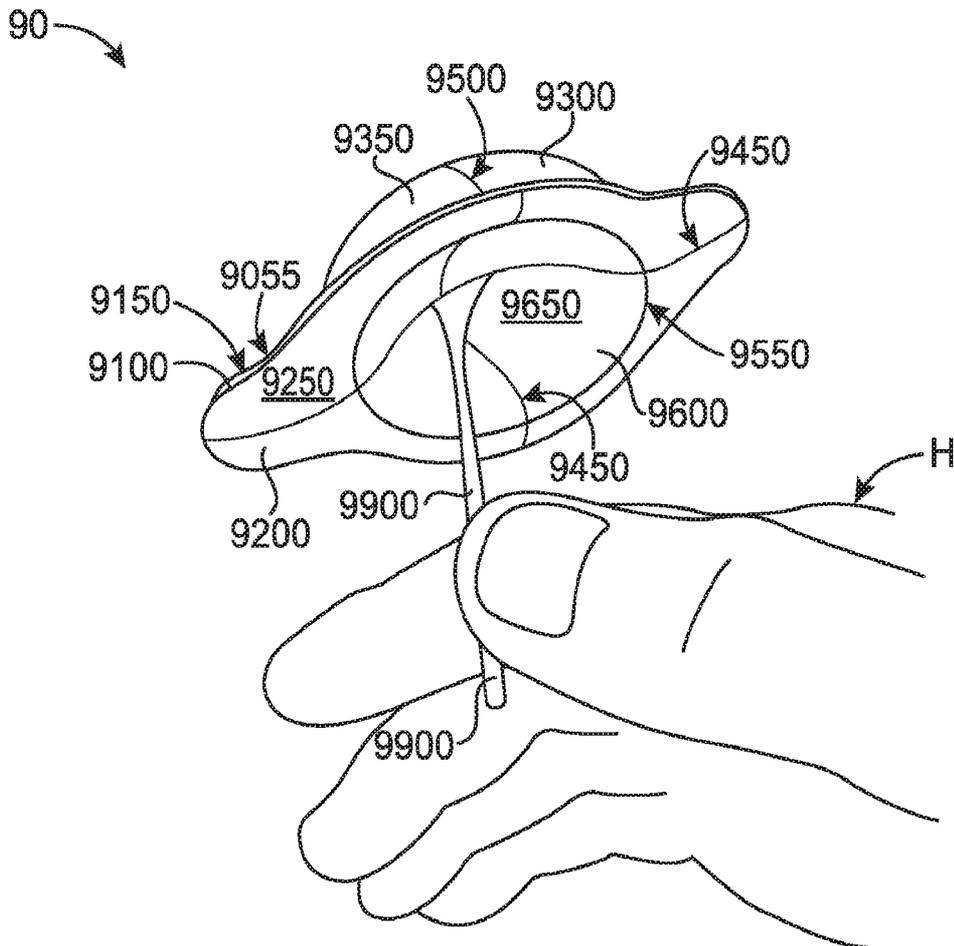


FIG. 13B

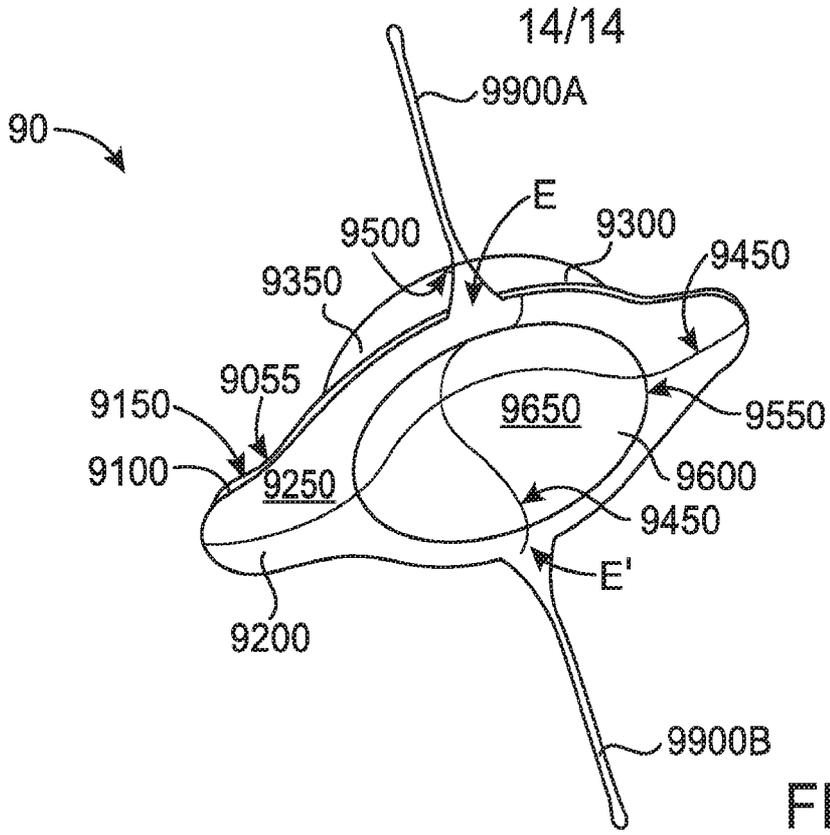


FIG. 13C

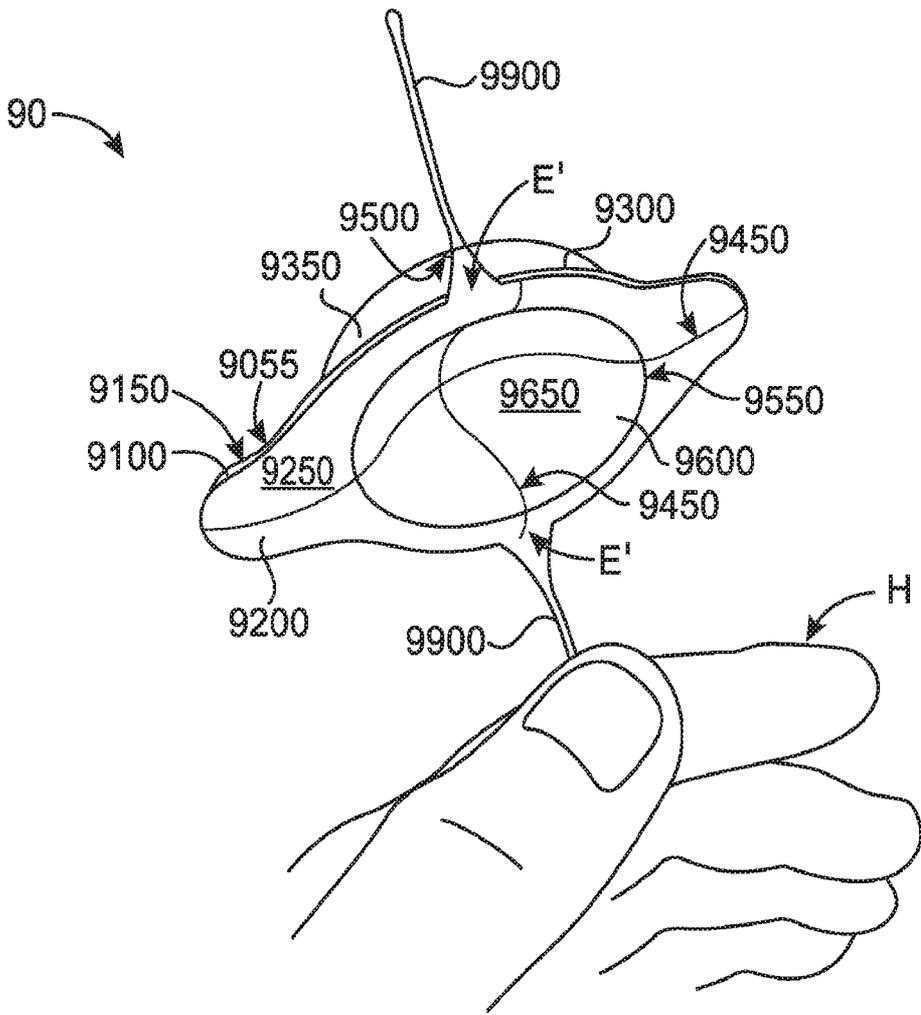


FIG. 13D

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US16/61970

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(8) - A61F 13/15, 13/47, 13/51, 13/53, 13/84 (2016.01) CPC - A61F 13/15, 13/15203, 13/15707, 13/47, 13/47236, 13/511, 13/51104, 2013/15715, 2013/00217 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC(8) - A61F 13/15, 13/47, 13/51, 13/53, 13/84 (2016.01); CPC - A61F 13/15, 13/15203, 15/15577, 13/15634, 13/15707, 13/47, 13/47236, 13/511, 13/51104, 13/5116, 13/53, 13/5323, 13/84, 13/84, 13/8405, 2013/15715, 2013/15008, 2013/15024, 2013/15113 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); EBSCO; ACS; Google Scholar: absorbent, hygroscopic, layers, anti-stick, contour, non-planar, dimple, texture		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7,429,689 B2 (CHEN, FJ et al.) 30 September 2008; abstract; figure 1A; column 4, lines 24-27; column 6, lines 25-36; column 14, lines 49-52; column 15, lines 60-61; column 20, lines 58-67; column 21, lines 1-3; column 33, lines 4-16, 57-58; column 35, lines 56-65; column 43, lines 57-64; column 44, lines 1-5, 53-64	1-3, 4/2-3, 5/4/2-3
X -- Y	US 2014/0121624 A1 (KIMBERLY-CLARK WORLDWIDE, INC.) 01 May 2014; figure 5; abstract; paragraphs [0083], [0102], [0135], [0154], [0158], [0221]	14-15, 16/14-15 -- 17/16/14-15
Y	US 8,252,335 B2 (MARACCINI, PA) 28 August 2012; column 1, lines 17-20; column 5, lines 30-34; claims 1, 11	17/16/14-15
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 29 December 2016 (29.12.2016)		Date of mailing of the international search report <b>06 FEB 2017</b>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300		Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US16/61970

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

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

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.: 6-13, 18-33  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

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

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

- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.