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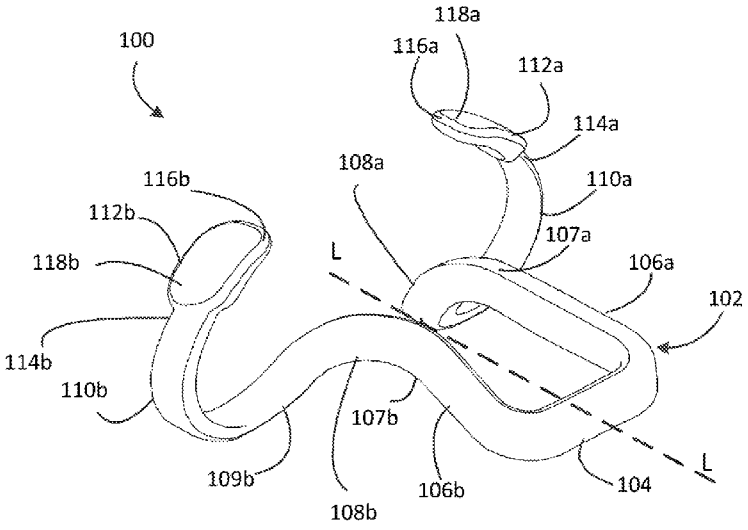

Figure 1A

(57) Abstract: A nasal dilator device comprises a substantially U-shaped body including a central portion arranged to span a septum of a nose when worn by a user and first and second leg members extending from the central portion in a first plane. The device further comprises a first cantilever rib member extending outward from the U-shaped body in a second plane and a second cantilever rib member extending outward from the U-shaped body in a third plane, wherein the first and second cantilever rib members extend away from each other. The device further comprises a first intermediate section connecting an end of the first leg member to a proximal end of the first cantilever rib member, wherein the first intermediate section extends between the first plane and second plane and a second intermediate section connecting an end of the second leg member to a proximal end of the second cantilever rib member, wherein the second intermediate section extends between the first plane and the third plane.

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Nasal dilator devices

Technical Field

[1] Described embodiments generally relate to nasal dilator devices for facilitating respiration. Some embodiments relate to nasal dilator devices to be fitted to the nose to facilitate or improve respiration during sleeping and/or sporting activities and/or for general day-to-day wear. Some embodiments relate to nasal dilator devices including filtration mechanisms to filter airflow during respiration and other embodiments relate to nasal dilator devices including agent delivery mechanisms for delivery of fragrances and/medicaments to the nose during respiration.

Background

[2] Nasal dilator devices are worn by users to dilate their nasal cavities when sleeping and/or partaking in sporting activities to thereby facilitate respiration. However, many nasal dilator devices are uncomfortable to wear and/or become easily dislodged from a user's nose during such activities.

[3] It is desired to address or ameliorate one or more shortcomings of prior nasal dilator devices, or to at least provide a useful alternative thereto.

[4] Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

[5] Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present disclosure as it existed before the priority date of each claim of this application

Summary

Some embodiments relate to a nasal dilator device comprising: a substantially U-shaped body including: a central portion arranged to span a septum of a nose when worn by a user; and first and second leg members extending from the central portion in a first plane; a first cantilever rib member extending outward from the U-shaped body in a second plane; a second cantilever rib member extending outward from the U-shaped body in a third plane; wherein the first and second cantilever rib members extend away from each other; a first intermediate section connecting an end of the first leg member to a proximal end of the first cantilever rib member, wherein the first intermediate section extends between the first plane and second plane; and a second intermediate section connecting an end of the second leg member to a proximal end of the second cantilever rib member, wherein the second intermediate section extends between the first plane and the third plane.

In some embodiments, the first and second cantilever rib members may be arcuate cantilever rib members, each having a curvature along its length. In some embodiments, the first and second intermediate sections are arcuate intermediate sections, each having a curvature along its length.

The first and second intermediate sections may be arranged, in use, to extend along a length of the septum and the first and second cantilever rib members may be each arranged, in use, to extend from a floor of a respective nasal orifice to an inner wall of the nostrils.

In some embodiments, the first and second intermediate portions may extend obtusely from the ends of the first and second leg members. The second and third planes may be converging planes. In some embodiments, the first and second cantilever rib members may exhibit an elongate arched profile which approximates at least a portion of one of a circle, ellipse or parabola.

In some embodiments, the first and second leg members may be inclined towards each other such that a relatively greater distance is provided between the first and second leg members towards the central portion to accommodate a columella of a nose when donned by the user. In some embodiments, the first and second intermediate sections may be inclined away from each other to assist in urging the respective first and second cantilever rib members against inner walls of respective nostrils when worn by the user.

The first and second cantilever rib members may comprise respective first and second nostril engaging elements for engaging with an inner wall of a respective nostril. The first and second nostril engaging elements may be disposed at distal ends of the first and second cantilever rib members, respectively. Enlarged pads may be disposed on the first and second nostril engaging elements to engage with inner walls of the nostrils.

In some embodiments, the nasal dilator device may further comprise a first and second releasable attachment mechanism for releasably attaching the first and second cantilever rib members, respectively, to the U-shaped body. For example, the releasable attachment mechanisms may be arranged to releasably attach the first and second nostril engaging elements to the first and second leg members, respectively. In some embodiments, the releasable attachment mechanisms may be arranged to releasably attach the first and second nostril engaging elements to the first and second intermediate sections, respectively.

The releasable attachment mechanisms may each comprise an arm and a socket arranged to receive and engage the arm. A stopper may be disposed at an end of the arm to hinder the arm from withdrawing from the socket. In one embodiment, the arms may be disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the sockets may be disposed on the first and second leg members. In another embodiment, the arms may be disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the sockets may be disposed on the first and second intermediate sections. In another embodiment, the sockets may be

disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the arms may be disposed on the first and second leg members. In another embodiment, the sockets may be disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the arms may be disposed on the first and second intermediate sections.

In some embodiments, a capsule may be provided within the socket and may be arranged to be activated by the arm when the arm is received by the socket. The capsule may include at least one of a medicament or compound. The arm may comprise a coating disposed thereon arranged to release a scent in response to abrasion of the coating. An aperture may be disposed in each of the first and second nostril engaging elements. The aperture may be arranged to receive at least one of a compound, a medicament, and a capsule comprising a medicament or compound emanating a scent.

Some embodiments relate to a nasal dilator device a nasal dilator device comprising: a substantially U-shaped body including: a central portion arranged to span a septum of a nose when worn by a user; and first and second leg members extending from the central portion in a first plane; a first closed loop structure extending outward from a longitudinal axis of the U-shaped body in a second plane and defining a first aperture; a second closed loop structure extending outward from a longitudinal axis of the U-shaped body in a third plane and defining a second aperture; wherein the first and second closed loop structures extend away from each other; a first intermediate section connecting an end of the first leg member to a proximal end of the first loop structure, wherein the first intermediate section extends between the first plane and second plane; and a second intermediate section connecting an end of the second leg member to a proximal end of the second loop structure, wherein the second intermediate section extends between the first plane and the third plane.

In some embodiments, the first loop structure may comprise a first flange portion and the second loop structure may comprise a second flange portion, wherein the first and second flange portions are arranged to form a seal with the walls nasal passage in use.

In some embodiments, the first and second loop structures may each comprise a filter spanning the first and second apertures defined by the first and second loop structures. The filters may be arranged to snap fit into the first and second loop structures. The filters may be welded to the first and second loop structures.

In some embodiments, the first and second intermediate sections are arcuate intermediate sections, each having a curvature along its length. The first and second intermediate portions may extend obtusely from the ends of the first and second leg members.

The first and second intermediate sections may be arranged, in use, to extend along a length of the septum and the first and second loop structures may be each arranged, in use, to extend from a floor of a respective nasal orifice along an inner wall of the nostrils such that the first and second apertures are aligned with a nasal passage of the nose.

In some embodiments, the second and third planes may be converging planes.

The first and second leg members may be inclined towards each other such that a relatively greater distance is provided between the first and second leg members towards the central portion to accommodate a columella of a nose when donned by the user. The first and second intermediate sections may be inclined away from each other to assist in urging the respective first and second loop structures against inner walls of respective nostrils when worn by the user.

In some embodiments, the nasal dilator device may further comprise a film disposed on a surface of the nasal dilator and a removable seal provided on the film to mitigate release of a compound from the film.

In some embodiments, the nasal dilator device may further comprise an overmould disposed on at least one of the central portion, the leg members, the intermediate sections and the arcuate cantilever rib members. The overmould may be infused with a compound, a medicament, a fragrance or an aroma. The nasal dilator device may be composed of a substrate material infused with a medicament, a fragrance or an aromatic agent.

In some embodiments, the central portion comprises a tab extending in a direction substantially opposite to the first and second leg members to assist with insertion, removal and/or placement of the nasal dilator device. The tab may be removeable from the nasal dilator device.

Some embodiments relate to a nasal dilator device comprising a substantially U-shaped body including: a central portion arranged to span a septum of a nose when worn by a user; and first and second leg members extending from the central portion; first and second cantilever rib members extending outward from a longitudinal axis of the U-shaped body and away from one another; a first intermediate section connecting an end of the first leg member to a proximal end of the first cantilever rib member; and a second intermediate section connecting an end of the second leg member to a proximal end of the second cantilever rib member; wherein the first and second leg members are arranged, in use, to extend inward of respective nasal orifices along the septum, the first and second intermediate sections are arranged, in use, to extend along a length of the septum behind the columella and alar fibrofatty tissue of the nose and the first and second cantilever rib members are each arranged, in use, to extend from a floor of the respective nasal orifices to an inner wall of the nostrils.

Brief Description of Drawings

[6] Embodiments are described in further detail below, by way of example, with reference to the accompanying drawings, in which:

[7] Figure 1A is front perspective view of a nasal dilator device according to some embodiments;

[8] Figure 1B is a further front perspective view of the nasal dilator device of Figure 1A;

[9] Figure 1C is a front view of the nasal dilator device of Figure 1A;

[10] Figure 1D is a rear perspective view of the nasal dilator device of Figure 1A;

[11] Figure 1E is a partial side view of the nasal dilator device of Figure 1A;

[12] Figure 2 is a front perspective view of a nasal dilator device including fin-like structures disposed thereon, according to some embodiments;

[13] Figure 3A is a perspective view of a user donning the nasal dilator device of Figures 1A to 1E;

[14] Figure 3B is a side view of the user of Figure 3A;

[15] Figure 4A is a rear perspective view of a nasal dilator device according to some embodiments;

[16] Figure 4B is a front perspective view of the nasal dilator device of Figure 4A;

[17] Figure 4C is a front view of the nasal dilator device of Figure 4A in a closed configuration;

[18] Figure 4D is a front view of the nasal dilator device of Figure 4A in a partially closed configuration;

[19] Figure 5 is a front perspective view of a user donning the nasal dilator device of Figures 4A to 4D;

[20] Figure 6A is a front view of a nasal dilator device in a partially closed configuration, wherein the nasal dilator device includes a capsule, according to some embodiments;

[21] Figure 6B is a front view of a nasal dilator device of Figure 6A in a closed configuration;

[22] Figure 7A is a front view of a nasal dilator device including a film according to some embodiments;

[23] Figure 7B is a front perspective view of the nasal dilator device of Figure 7A;

[24] Figure 8A is a front perspective view of a nasal dilator device according to some embodiments;

[25] Figure 8B is a further front perspective view of the nasal dilator device of Figure 8A;

[26] Figure 8C is a top view of the nasal dilator device of Figure 8A;

[27] Figure 9 is a rear perspective view of a nasal dilator device with an attachable filter, according to some embodiments; and

[28] Figure 10 is a rear perspective view of a nasal dilator device including a filter, according to some embodiments.

Description of Embodiments

[29] Described embodiments generally relate to nasal dilator devices for facilitating respiration. Some embodiments relate to nasal dilator devices to be fitted to the nose to facilitate or improve respiration during sleeping and/or sporting activities and/or for general day-to-day wear. Some embodiments relate to nasal dilator devices including filtration mechanisms to filter airflow during respiration and other embodiments relate to nasal dilator devices including agent delivery mechanisms for delivery of fragrances and/medicaments to the nose during respiration.

[30] Referring to Figure 1A to 1E, there is illustrated a nasal dilator device, generally indicated at 100 and substantially symmetrical about a longitudinal axis L, according to some embodiments. The nasal dilator device 100 comprises a generally U-shaped body 102 having a central portion 104 and first and second leg members, 106a and 106b, respectively, extending from the central portion 104 in a first plane P1.

[31] The nasal dilator device comprises a first intermediate section 108a extending from an end 107a of the first leg member 106a and a second intermediate section 108b extending from an end 107b of the second leg member 106b. In some embodiments, and as depicted in Figures 1A to 1E, the first and second intermediate portions 108a, 108b, may be curved or arcuate along their length. In other embodiments, the first and second intermediate portions 108a, 108b may be substantially straight along their length or may comprise a plurality of angled or arcuate portions. For example, the first and second intermediate portions 108a, 108b may extend obtusely from the first and second ends 107a, 107b, for example, substantially at an angle of between approximately 95° and 130° to the longitudinal axis. For example, the first and intermediate sections 108a, 108b may deviate by approximately 100° from the longitudinal axis.

[32] Referring again to Figures 1A to 1E, the nasal dilator device 100 comprises a first rib member 110a projecting from the first intermediate section 108a in a second plane P2 and a second rib member 110b projecting from the second intermediate

section 108b in a third plane P3. In some embodiments, the first and second rib members 110a, 110b may project substantially outward or laterally of the longitudinal axis of the U-shaped body 102. For example, the first and second rib members 110a, 110b may be cantilever rib members that extend from the first and second intermediate sections 108a, 108b, respectively outwardly from the longitudinal axis and away from one another in a substantially cantilever manner. In some embodiments, the first and second rib members 110a, 110b may be arcuate rib members 110a, 110b or arcuate cantilever rib members 110a, 110b.

[33] In some embodiments, the first and second rib members 110a, 110b may exhibit an elongate arched or bow-like profile which may approximate at least a portion of a circle, ellipse or parabola. For example, the first and second rib members 110a, 110b may extend arcuately along the second and third planes, P2 and P3, respectively in a direction substantially toward the first plane P1.

[34] The first and second rib members 110a, 110b may be flexible and resiliently biased away from the first and second intermediate sections 108a, 108b, respectively, to allow the first and second rib members 110a, 110b to be compressed for insertion into the nose of a user and to reform once placed inside the nose to thereby dilate the nostrils as discussed in more detail below with reference to Figures 3A and 3B. As best depicted in Figures 1A and 1B, the first intermediate section 108a may extend or transition between the first plane P1 and the second plane P2 to interconnect the end 107a of the first leg member 106a to a proximal end 109a of the first rib member 110a and the second intermediate section 108b may extend or transition between the first plane and the third plane to interconnect the end 107b of the second leg member 106b to a proximal end 109b of the second rib member 110b.

[35] In some embodiments, the configuration of the first and second intermediate sections 108a, 108b may be associated with an orientation or location of the first and second rib members 110a, 110b with respect to the U-shaped body 104. For example, the configuration of the first and second intermediate sections 108a, 108b may dictate or define an angle between the first plane P1 and the second plane P2 and between the

first plane P1 and the third plane P3, respectively. The second and third planes, P2 and P3, may each form an acute angle, a right angle, or substantially right angle or an obtuse angle with the first plane P1. For example, the second and third planes P2 and P3, may be converging planes and may each form an obtuse angle of approximately 95° to 130° with the first plane P1 such that the first and second intermediate sections 108a 108b take the form of obtuse arcuate sections. In some embodiments, the first, second and third planes, P1, P2, P3 may be different from each other and in some embodiments, the second and third planes, P2, P3 may be the same plane and may be different to the first plane P1.

[36] The first and second intermediate sections 108a, 108b may be inclined away from or diverge from one another to assist in urging the respective first and second rib members 110a, 110b against inner walls of respective nostrils when worn by the user.

[37] As depicted in Figures 1A to 1E, the first and second rib members 110a, 110b, of the nasal dilator device 100 may comprise respective first and second nostril engaging elements, 112a and 112b, disposed at distal ends 114a, 114b, of the first and second arcuate rib members 110a, 110b, respectively, for engaging with inner walls of respective nostrils when worn by a user. In some embodiments, the first and second nostril engaging elements, 112a, 112b may comprise relatively large surface areas 116a, 116b with respect to the first and second arcuate rib members 110a, 110b.

[38] In some embodiments, the first and second nostril engaging elements 112a, 112b may have pads 118a, 118b, disposed thereon, to engage with the inner walls of the nostrils. For example, the pads 118a, 118b may be disposed on the relatively large major surface areas 116a, 116b of the nostril engaging elements, 112a and 112b and may be enlarged with respect to the first and second arcuate rib members 110a, 110b, and/or the nostril engaging elements, 112a and 112b.

[39] Referring now to Figures 2, there is illustrated a nasal dilator device, generally indicated at 200, according to some embodiments. The nasal dilator device 200 may comprise similar components and elements to those of nasal dilator device 100 depicted

in Figures 1A to 1E and accordingly those similar components and elements are denoted like numerals.

[40] In some embodiments, as depicted in Figure 2, the pads 118a, 118b of the nasal dilator device 200 may be composed of a relatively soft overmould material, for example a polymer material such as thermoplastic elastomer (TPE) and/or may be provided with a series of protrusions, fins or fin-like structures 220 to provide a comfortable and/or grippable surface for engaging with the inner walls of the nostrils. In some embodiments, such an overmould material may be provided on at least a portion of the rib members 110a, 110, and/or on at least a portion of the intermediate sections 108a, 108b.

[41] The nasal dilator device 100, 200 may be configured to be orientated in a manner such that the first and second nostril engaging elements 112a, 112b may be positioned at a junction of the greater alar cartilage and lateral nasal cartilage, providing improved support for dilation of the nasal passage 308, as discussed in more detail with reference to Figures 3A and 3B below.

[42] Figure 3A is a perspective view of a user, generally indicated at 300, wearing or donning the nasal dilator device 100 of Figure 1A and Figure 3B is a cross sectional view taken along a midline A-A of the nose of the user of Figure 3A.

[43] As depicted in Figures 3A and 3B, the nasal dilator device 100 is configured to be orientated such that the central portion 104 spans a septum 302, and in particular, a columella 310 (the terminal section or fleshy external end of the septum) of a nose 304 and is positioned toward a tip 306 of the nose 304 and the first and second leg members 106a, 106b extend inward, along a nasal passage 308. For example, the first and second leg members 106a, 106b, may extend inward at an angle of approximately 30 to 40 degrees to a midline A-A of the nose 304. The first and second intermediate sections 108a, 108b may extend along a length of the septum 302 behind the columella 310 and the fibrofatty tissue 305 or bulbous region around the base of the nostrils 314 and the first and second rib members 110a, 110b, each may extend from a floor 312 of

the nasal passage 308 behind the columella 310 and the fibrofatty tissue 305 or bulbous region around the base of the nostrils 314 to an inner wall (not shown) of the nostrils 314. In this way, the nasal dilator device 100 may be securely retained within the nose 304 with little or no pinching of or pressure being exerted on the septum 302. Furthermore, the ergonomic shape of the intermediate portions 108a, 108b allows the nasal dilator device to sit within the nose in a manner that may accommodate various shapes and sizes of noses, including those having hanging columellas 310.

[44] In some embodiments, the first and second rib members 110a, 110b of the nasal dilator device 100 are composed of a flexible material and are generally squeezed or compressed by a user into a compressed state to allow insertion into the nasal passages 308 of the nose 304. The first and second rib members 110a, 110b may be biased to reform or revert to a natural uncompressed state and once inserted into the nasal passage 308, the first and second rib members 110a, 110b may each exert an outward force on the inner wall (not shown) of the nostril 314 and on the floor 312 of the nose 304, to thereby dilate the nasal passage 308. Thus, as opposed to exerting pressure on the septum 302 to dilate the nasal passage 308, the intermediate portions 108a, 108b, of nasal dilator device 100 are effective to cause the first and second rib members 110a, 110b to use the floor 312 of the nose 304 as a support structure for dilation of the nostrils 314. By using the floor 312 of the nose 304 as a support structure or anchor from which the first and second rib members 110a, 110b may launch or push off from, any pinching or exertion of force on the septum may be mitigated or avoided and a more comfortable and natural or anatomical fit may be achieved.

[45] The nasal dilator device 100 is configured to cooperate with internal contours of the nose 304 and sit securely and comfortably in the nose, whilst mitigating obstruction of air flow through the nasal passage 308. For example, the rib members 110a, 110b, may be curved or arcuate along their length to correspond with the internal contours of the nose 304 and provide a more comfortable fit. In some embodiments, the first and second leg members 106a, 106b may be inclined toward each other or converge such that a relatively greater distance is provided between the first and second

leg members 106a, 106b towards the central portion 104 in order to accommodate the columella 310 and to assist in holding the nasal dilator device 100 in place when worn.

[46] Referring now to Figures 4A to 4D, there is illustrated a nasal dilator device, generally indicated at 400, according to some embodiments. The nasal dilator device 400 may comprise similar components and elements to those of nasal dilator device 100 depicted in Figures 1A to 1E and accordingly those similar components and elements are denoted like numerals.

[47] In addition to those similar components and elements of nasal dilator device 100, nasal dilator device 400 may comprise a first and second releasable attachment mechanism 402a and 402b, respectively. The first and second releasable attachment mechanism 402a, 402b may comprise mating or interlocking components and may be employed to releasably attach the first and second rib members, 110a and 110b, respectively, to the U-shaped body 102, to thereby define first and second adjustable looped structures, 411a, and 411b, respectively.

[48] In some embodiments, the first and second releasable attachment mechanisms 402a, 402b may comprise respective arms 404a, 404b, such as pins or ratchets, extending from respective reverse or inner surfaces 406a, 406b of the first and second nostril engaging elements 112a, 112b. The first and second releasable attachment mechanisms 402a, 402b may comprise respective sockets 408a, 408b for receiving and/or engaging the respective arms 404a, 404b. The first and second releasable attachment mechanisms 402a, 402b may be configured to allow a user to selectively adjust a degree of dilation or expansion and contraction of the first and second rib members 110a and 110b with respect to the U-shaped body 102.

[49] For example, and as best illustrated in Figures 4C and 4D, the arms 404a, 404b may include at least one of or a series of serrations, detents or protrusions 410 arranged to engage with at least one of or a series of grooves or ridges 412 provided on or within the sockets 408a, 408b. For example, the grooves or ridges 412 may extend

downwardly from a upper jaw portion 414 of the sockets 408a, 408b and/or may extend upwardly from a lower jaw portion 416.

[50] Application of sufficient force by a user to the first and second releasable attachment mechanisms 402a, 402b may be effective to move the arms 404a, 404b with respect to the sockets 408a, 408b and overcome a restrictive force between the detents 410 and the grooves 412 to allow the detents 410 and/or the grooves 412 to deform and the degree or level of dilation to be adjusted. The engagement of the detents 410 with the grooves 412 may provide a sufficient restrictive force to hold the arms 404a, 404b fixed when provided in the nose 304, as depicted in Figure 5.

[51] The arms 404a, 404b may comprise stoppers 414 at their ends to prevent or hinder the arms 404a, 404b from disengaging from or withdrawing from the respective sockets 408a, 408b. For example, application of a relatively large pulling force may be sufficient to cause the arms 404a, 404b to withdraw from the sockets 408a, 408b. In some embodiments, the stoppers 414 may be arrow shaped.

[52] In some embodiments, the sockets 408a, 408b may be disposed on the first and second intermediate sections 108a, 108b and extend therefrom towards the respective arms 404a, 404b. The releasable attachment mechanisms 402a, 402b may be arranged to releasably attach or lock the first and second nostril engaging elements 112a, 112b to the first and second intermediate sections 108a, 108b.

[53] In other embodiments, the sockets 408a, 408b may be disposed on the first and second leg members 106a, 106b and extend therefrom towards the respective arms 404a, 404b. The releasable attachment mechanisms 402a, 402b may be arranged to releasably attach or lock the first and second nostril engaging elements 112a, 112b to the first and second leg members 106a, 106b.

[54] In other embodiments, the sockets 408a, 408b may be disposed on the first and second rib members 110a, 110b and extend therefrom towards the respective arms 404a, 404b. The attachment mechanisms 402a, 402b may be arranged to releasably

attach or lock the first and second nostril engaging elements 112a, 112b to the first and second rib members 110a, 110b.

[55] In other embodiments, the first and second releasable attachment mechanisms 402a, 402b may comprise respective sockets 408a, 408b, extending from the respective reverse or inner surfaces 406a, 406b, of the first and second nostril engaging elements 112a, 112b and respective arms 404a, 404b extending from the first and second intermediate sections 108a, 108b, the first and second leg members 106a, 106b, or the first and second rib members 110a, 110b.

[56] As illustrated in Figure 3C, the arms 404a, 404b may be fully or substantially fully inserted into the respective sockets 408a, 408b to enable the nasal dilator device 400 to adopt or assume a fully closed or substantially fully closed state, to thereby tighten or contract the looped structures 411a, 411b.

[57] As illustrated in Figure 3D, the arms 404a, 404b may be partially inserted into the sockets 408a, 408b to enable the nasal dilator device 400 to adopt or assume a partially closed state, to provide for looser or less tight looped structures 411a, 411b and accommodate variations in nasal passage sizes.

[58] Referring to Figures 6A and 6B, there is depicted a nasal dilator device 600 according to some embodiments. The nasal dilator device 600 may comprise similar components and elements to those of nasal dilator device 400 depicted in Figures 4A to 4D and accordingly those similar components and elements are denoted like numerals.

[59] The nasal dilator device 600 comprises at least one capsule 602 disposed within respective sockets 408a, 408b. The capsule 602 may include an agent such as a medicament and/or a fragrance or aromatic agent. As depicted in Figure 6B, the arms 404a, 404b are configured to activate, pierce or burst the capsules 602 to release the agent, medicament and/or fragrance or aromatic agent when inserted into the sockets 408a, 408b. In this way, the medicament and/or fragrance or aromatic agent is released only when the capsule 602 is activated, pierced or burst, thereby increasing a longevity

or "shelf-life" and/or protecting the integrity of the medicament and/or aromatic agent. For example, the agent may be an aromatic scent such as an essential oil blend or synthetic fragrance blend to provide an olfactory and/or physiological response such as decongesting the nasal passages 318, promoting relaxation, promoting sleepiness, suppressing appetite or a medicament such as a drug to reduce pain such as a migraine.

[60] Referring to Figures 7A and 7B, there is depicted the nasal dilator device 700 according to some embodiments. The nasal dilator device 700 may comprise similar components and elements to those of nasal dilator device 400 depicted in Figures 4A to 4D and accordingly those similar components and elements are denoted like numerals. The nasal dilator device 700 comprises at least one coating or film 702 arranged to release a fragrance, aroma or medicament. In some embodiments, the film 702 is arranged to release a fragrance, aroma or medicament in response to abrasion, such as scratching, scraping. The film 702 may be provided with an outer cover, seal or strip 704 to protect the film 702 from unintended abrasion, as depicted in Figures 7A and 7B at two separate stages of removal from the nasal dilator device 400.

[61] In other embodiments, the coating or film 700 may be arranged to release a fragrance, aroma or medicament in response to the removal or peeling off of the outer cover, strip or seal 704. In some embodiments, a fragrance, aroma or medicament may be provided or retained between two strips or films 702 forming a blister.

[62] The coating or film 702 may be comprise a polymer or a fibre. The coating or film 702 may be in the form of a "scratch and sniff" technology or peel off technology.

[63] In some embodiments, as depicted in Figures 7A and 7B, the coating or film 702 may be disposed on a surface of at least one of the attachment mechanisms 402a, 402b, such as on an inner surface of the looped structures 411a, 411b. In other embodiments, the coating or film 702 may be disposed on the central portion 102, the first and second leg members 106a, 106b, the first and second intermediate sections 108a, 108b, the rib members 110a, 110b, and/or the first and second nostril engaging elements 112a, 112b.

[64] In some embodiments, an aperture (not shown) is disposed in each of the first and second nostril engaging elements and is arranged to receive an agent, a compound, a medicament, a capsule, and/or a housing or compact arranged to receive an agent, medicament and/or a fragrance or aromatic agent. The agent may be absorbed by the inner walls of the nostrils transdermally and/or may be absorbed by mucosa in the nostrils 314.

[65] Referring to Figures 8A and 8B, there is depicted a nasal dilator device, generally indicated at 800 and substantially symmetrical about a longitudinal axis L, according to some embodiments. The nasal dilator device 800 may comprise a generally U-shaped body 802 having a central portion 804 and first and second leg members, 806a and 806b, respectively, extending from the central portion 804 in a first plane P1.

[66] The nasal dilator device 800 comprises a first intermediate section 808a extending from an end 807a of the first leg member 806a and a second intermediate section 808b extending from an end 807b of the second leg member 806b. In some embodiments, and as depicted in Figures 8A and 8B, the first and second intermediate portions 808a, 808b, may be curved or arcuate along their length. In other embodiments, the first and second intermediate portions 808a, 808b may be substantially straight along their length or may comprise a plurality of angled or arcuate portions. For example, the first and second intermediate portions 808a, 808b may extend obtusely from the first and second ends 807a, 807b, for example, substantially at an angle of between approximately 95° and 130° to the longitudinal axis.

[67] As depicted in Figures 8A to 8C, the nasal dilator device 800 comprises a first loop structure 811a projecting from the first intermediate section 808a in a second plane P2 and a second loop structure 811b projecting from the second intermediate section 808b in a third plane P3. In some embodiments, the first and second loop structures 811a, 811b may project substantially outward or lateral of the longitudinal axis of the generally U-shaped body 802 and away from one another. In some

embodiments, the looped structure 811a, 811b may exhibit an elongate arched or curved profile which may substantially take the form of a circle, ellipse or parabola.

[68] In some embodiments, the first intermediate section 808a may extend or transition between the first plane P1 and the second plane P2 to interconnect the end 807a of the first leg member 806a to a proximal end 809a of the first loop structure 811b and the second intermediate section 808b may extend or transition between the first plane P1 and the third plane P3 to interconnect the end 807b of the second leg member 806b to a proximal end 809b of the second loop structure 811b.

[69] In some embodiments, the configuration of the first and second intermediate sections 808a, 808b may be associated with an orientation or location of the first and second loop structures 811a, 811b with respect to the U-shaped body 804. For example, the configuration of the first and second intermediate sections 808a, 808b may dictate or define an angle between the first and second planes, P1 and P2 and between the first and third planes, P1 and P3, respectively. The second and third planes, P2 and P3, may each form an acute angle, a right angle, or substantially right angle or an obtuse angle with the first plane P1. For example, the second and third planes P2 and P3, may be converging planes or intersecting planes and may each form an obtuse angle of approximately 95° to 130° with the first plane P1 such that the first and second intermediate sections 108a 108b take the form of obtuse arcuate sections. In some embodiments, the first, second and third planes, P1, P2, P3 may be different from each other and in some embodiments, the second and third planes, P2, P3 may be the same plane and may be different to the first plane P1.

[70] In some embodiments, the first and second leg members 806a, 806b may be inclined toward each other or converge such that a relatively greater distance is provided between the first and second leg members 806a, 806b towards the central portion 804 in order to accommodate the columella 310 and to assist in holding the nasal dilator device 800 in place when worn.

[71] In some embodiments, the first and second intermediate sections 808a, 808b may be inclined away from or diverge from one another to assist in urging the respective first and second loop structures 811a, 811b against inner walls of the nose when worn by the user.

[72] In some embodiments, the first and second looped structures 811a and 811b may comprise first and second flanged portions, 812a and 812b, respectively. For example, the flanged portions 812a and 812b may provide additional compliance to the looped structures 811a, 811b. In some embodiments, the first and second flanged portions 812a and 812b may be comprise an overmould material, for example, flexible TPE, to thereby provide an improve sealing of the looped structures 811a and 811b to the nasal orifices.

[73] Referring to Figure 9, there is depicted the nasal dilator device 900 according to some embodiments. The nasal dilator device 900 may comprise similar components and elements to those of nasal dilator device 800 depicted in Figures 8A to 8C and accordingly those similar components and elements are denoted like numerals.

[74] The first and second loop structures 811a, 811b, of the nasal dilator device 900 may be each arranged to receive a filter 902a, and 902b, respectively. The filters 902a, 902b, may be arranged or configured to span apertures defined by the first and second loop structures 811a, 811b.

[75] The filters 902a, 902b may be composed of a fine woven mesh or an open celled porous material, such as a foam or compressed fibre. The filters 902a, 902b may be employed to filter out airborne particles such as bacteria, dust, pollens, and/or other allergens.

[76] In some embodiments, as depicted in Figure 9, the filters 902a, 902b, may be replaceable and may be arranged to be removeably connected to the first and second loop structures 811a, 811b respectively. For example, the filters 902a, 902b, may be

configured to "snap-fit" into the first and second loop structures 811a, 811b respectively.

[77] Referring to Figure 10, there is depicted the nasal dilator device 1000 according to some embodiments. The nasal dilator device 1000 may comprise similar components and elements to those of nasal dilator device 800 depicted in Figures 8A to 8C and accordingly those similar components and elements are denoted like numerals

[78] The filters 1002a, 1002b of the nasal dilator device 1000 may be fixed to the first and second loop structures 811a, 811b respectively. For example, the filters 1002a, 1002b may be integrally formed with the first and second looped structures 811a, 811b or may be welded or ultrasonically welded to the first and second loop structures 811a, 811b.

[79] In some embodiments, the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000 may comprise an overmould disposed on at least one of the central portion, the leg members, the sections and the rib members. The overmould may be infused with a medicament and/or fragrance.

[80] In some embodiments, the nasal dilator devices 100, 200, 400, 600, 700, 800, 900, 1000 may comprise a tab (not shown) extending outward from the central portion in a direction substantially opposite to the first and second leg members to assist with insertion, removal and/or placement of the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000. The tab (not shown) may be removeable from the nasal dilator device, for example, by tearing the tab along a perforated line connecting the tab to the central portion 104, 804.

[81] The U-shaped body 102, 802, the intermediate sections 108a, 108b, 808a, 808b, the rib members 110a, 110b, and the looped structure 811a, 811b may be composed of a polymer material such as thermoplastic elastomer (TPE) and/or thermoplastic polypropylene (PP). In some embodiments, the U-shaped body 102 and/or the intermediate sections 108a, 108b may are configured to be more rigid than

the rib members 110a, 110b. For example, the U-shaped body 102 and/or the intermediate sections 108a, 108b and/or the rib members 110a, 110b may be composed of different materials or materials having differing hardness or stiffness. In some embodiments, the relative flexibility of the rib members 110a, 110b with respect to the U-shaped body 102 and/or the intermediate sections 108a, 108b may be derived from the length and/or thickness of the rib members 110a, 110b.

[82] In some embodiments, an overall width of the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000 may be in a range of approximately 20mm to 35mm when fully closed and approximately 25mm to 40mm when fully open, a length of the central portion 102, 802 may be in a range of approximately 5mm to 10mm, a length of the leg members 106a, 106b, 806a, 806b may be within a range of approximately 5mm to 12mm, and a length of the intermediate sections 108a, 108b, 808a, 808b may be in a range of approximately 7mm to 15mm and the rib members 110a, 110b, 810a, 810b may be in a range of approximately 15mm to 30mm. For example, in one embodiment, the overall width of the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000 may be 25mm when fully closed, 27.4mm when open and the length of the leg members 106a, 106b, 806a, 806b may be 14.6mm. In another embodiment, the overall width of the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000 may be 27.2mm when fully closed, 29.3mm when open and the length of the leg members 106a, 106b, 806a, 806b may be 17.5mm. In another embodiment, the overall width of the nasal dilator device 100, 200, 400, 600, 700, 800, 900, 1000 may be 29mm when fully closed, 31.6mm when open and the length of the leg members 106a, 106b, 806a, 806b may be 20.4mm.

[83] It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the above-described embodiments, without departing from the broad general scope of the present disclosure. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

Claims

1. A nasal dilator device comprising:

a substantially U-shaped body including:

a central portion arranged to span a septum of a nose when worn by a user; and

first and second leg members extending from the central portion in a first plane;

a first cantilever rib member extending outward from the U-shaped body in a second plane;

a second cantilever rib member extending outward from the U-shaped body in a third plane;

wherein the first and second cantilever rib members extend away from each other;

a first intermediate section connecting an end of the first leg member to a proximal end of the first cantilever rib member, wherein the first intermediate section extends between the first plane and second plane; and

a second intermediate section connecting an end of the second leg member to a proximal end of the second cantilever rib member, wherein the second intermediate section extends between the first plane and the third plane.

2. The nasal dilator device of claim 1, wherein the first and second cantilever rib members are arcuate cantilever rib members, each having a curvature along its length.

3. The nasal dilator device of any preceding claim, wherein the first and second intermediate sections are arcuate intermediate sections, each having a curvature along its length.

4. The nasal dilator device of any preceding claim, wherein the first and second intermediate sections are arranged, in use, to extend along a length of the septum and

the first and second cantilever rib members are each arranged, in use, to extend from a floor of a respective nasal orifice to an inner wall of the nostrils.

5. The nasal dilator device of any preceding claim, wherein the first and second intermediate portions extend obtusely from the ends of the first and second leg members.

6. The nasal dilator device of any preceding claim, wherein the second and third planes are converging planes.

7. The nasal dilator device of any preceding claim, wherein the first and second cantilever rib members exhibit an elongate arched profile which approximates at least a portion of one of a circle, ellipse or parabola.

8. The nasal dilator device of any preceding claim, wherein the first and second leg members are inclined towards each other such that a relatively greater distance is provided between the first and second leg members towards the central portion accommodate a columella of a nose when donned by the user.

9. The nasal dilator device of any preceding claim, wherein the first and second intermediate sections are inclined away from each other to assist in urging the respective first and second cantilever rib members against inner walls of respective nostrils when worn by the user.

10. The nasal dilator device of any preceding claim, wherein the first and second cantilever rib members comprise respective first and second nostril engaging elements for engaging with an inner wall of a respective nostril.

11. The nasal dilator device of any preceding claim, wherein the first and second nostril engaging elements are disposed at distal ends of the first and second cantilever rib members, respectively.

12. The nasal dilator device of claim 11, wherein enlarged pads are disposed on the first and second nostril engaging elements to engage with inner walls of the nostrils.

13. The nasal dilator device of any preceding claim, further comprising a first and second releasable attachment mechanism for releasably attaching the first and second cantilever rib members, respectively, to the U-shaped body.

14. The nasal dilator device of claim 13, wherein the releasable attachment mechanisms are arranged to releasably attach the first and second nostril engaging elements to the first and second leg members, respectively.

15. The nasal dilator device of claim 14, wherein the releasable attachment mechanisms are arranged to releasably attach the first and second nostril engaging elements to the first and second intermediate sections, respectively.

16. The nasal dilator device of any one of claims 11 to 15, wherein the releasable attachment mechanisms each comprise an arm and a socket arranged to receive and engage the arm.

17. The nasal dilator device of claim 16, wherein a stopper is disposed at an end of the arm to hinder the arm from withdrawing from the socket.

18. The nasal dilator device of claim 16 or 17, wherein the arms are disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the sockets are disposed on the first and second leg members.

19. The nasal dilator device of claim 16 or 17, wherein the arms are disposed on an inner surface of first and second nostril engaging elements of the first and second

cantilever rib members, respectively, and the sockets are disposed on the first and second intermediate sections.

20. The nasal dilator device of claim 16 or 17, wherein the sockets are disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the arms are disposed on the first and second leg members.

21. The nasal dilator device of claim 16 or 17, wherein the sockets are disposed on an inner surface of first and second nostril engaging elements of the first and second cantilever rib members, respectively, and the arms are disposed on the first and second intermediate sections.

22. The nasal dilator device of any one of claims 16 to 21, wherein a capsule is provided within the socket and is arranged to be activated by the arm when the arm is received by the socket.

23. The nasal dilator device of claim 22, wherein the capsule includes at least one of a medicament or compound.

24. The nasal dilator device of any one of claims 16 to 23, wherein the arm comprises a coating disposed thereon arranged to release a scent in response to abrasion of the coating.

25. The nasal dilator device of any one of claims 10 to 24, wherein an aperture is disposed in each of the first and second nostril engaging elements.

26. The nasal dilator device of claims 24, wherein the aperture is arranged to receive at least one of a compound, a medicament, and a capsule comprising a medicament or compound emanating a scent.

27. A nasal dilator device comprising:

a substantially U-shaped body including

a central portion arranged to span a septum of a nose when worn by a user; and

first and second leg members extending from the central portion in a first plane;

a first closed loop structure extending outward from a longitudinal axis of the U-shaped body in a second plane and defining a first aperture;

a second closed loop structure extending outward from the longitudinal axis of the U-shaped body in a third plane and defining a second aperture;

wherein the first and second closed loop structures extend away from each other;

a first intermediate section connecting an end of the first leg member to a proximal end of the first loop structure, wherein the first intermediate section extends between the first plane and second plane; and

a second intermediate section connecting an end of the second leg member to a proximal end of the second loop structure, wherein the second intermediate section extends between the first plane and the third plane.

28. The nasal dilator device of claim 26, wherein the first loop structure comprises a first flange portion and the second loop structure comprises a second flange portion, wherein the first and second flange portions are arranged to form a seal with the walls nasal passage in use.

29. The nasal dilator device of claim 27 or 28, wherein the first and second loop structures each comprise a filter spanning the first and second apertures defined by the first and second loop structures.

30. The nasal dilator device of claim 29, wherein the filters are arranged to snap fit into the first and second loop structures.

31. The nasal dilator device of claim 29, wherein the filters are welded to the first and second loop structures.

32. The nasal dilator device of any one of claims 28 to 31, wherein the first and second intermediate sections are arcuate intermediate sections, each having a curvature along its length.

33. The nasal dilator device of any one of claims 28 to 32, wherein the first and second intermediate portions extend obtusely from the ends of the first and second leg members.

34. The nasal dilator device of any one of claims 28 to 34, wherein the first and second intermediate sections are arranged, in use, to extend along a length of the septum and the first and second loop structures are each arranged, in use, to extend from a floor of a respective nasal orifice along an inner wall of the nostrils such that the first and second apertures are aligned with a nasal passage of the nose.

35. The nasal dilator device of any one of claims 28 to 34, wherein the second and third planes are converging planes.

36. The nasal dilator device of any one of claims 28 to 35, wherein the first and second leg members are inclined towards each other such that a relatively greater distance is provided between the first and second leg members towards the central portion to accommodate a columella of a nose when donned by the user.

37. The nasal dilator device of any preceding claim, wherein the first and second intermediate sections are inclined away from each other to assist in urging the respective first and second loop structures against inner walls of respective nostrils when worn by the user.

38. The nasal dilator device of any preceding claim further comprising a film disposed on a surface of the nasal dilator and a removable seal provided on the film to mitigate release of a compound from the film.

39. The nasal dilator device of any preceding claim further comprising an overmould disposed on at least one of the central portion, the leg members, the intermediate sections and the arcuate cantilever rib members.

40. The nasal dilator device of claim 39, wherein in the overmould is infused with a compound.

41. The nasal dilator device of claim 39 or 40, wherein in the overmould is infused with a medicament, a fragrance or an aroma.

42. The nasal dilator device of any preceding claim, wherein in the nasal dilator device is composed of a substrate material infused with a medicament, a fragrance or an aromatic agent.

43. The nasal dilator device of any preceding claim, wherein the central portion comprises a tab extending in a direction substantially opposite to the first and second leg members to assist with insertion, removal and/or placement of the nasal dilator device.

44. The nasal dilator device of claim 43, wherein the tab is removeable from the nasal dilator device.

45. A nasal dilator device comprising:

a substantially U-shaped body including

a central portion arranged to span a septum of a nose when worn by a user; and

first and second leg members extending from the central portion;

first and second cantilever rib members extending outward from the U-shaped body and away from one another;

a first intermediate section connecting an end of the first leg member to a proximal end of the first cantilever rib member; and

a second intermediate section connecting an end of the second leg member to a proximal end of the second cantilever rib member;

wherein the first and second leg members are arranged, in use, to extend inward of respective nasal orifices along the septum, the first and second intermediate sections are arranged, in use, to extend along a length of the septum behind the columella and alar fibrofatty tissue of the nose and the first and second cantilever rib members are each arranged, in use, to extend from a floor of the respective nasal orifices to an inner wall of the nostrils.

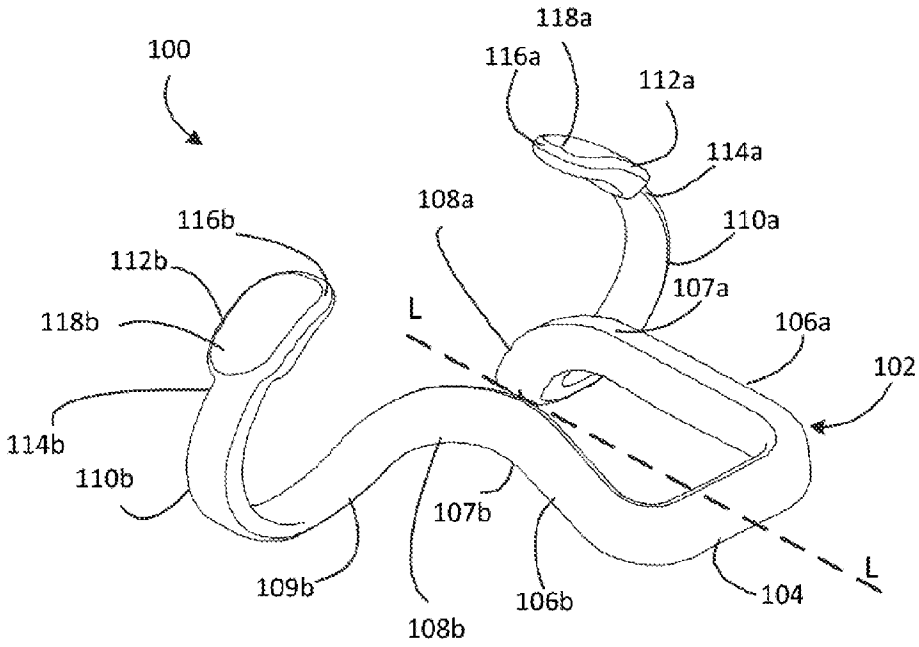

Figure 1A

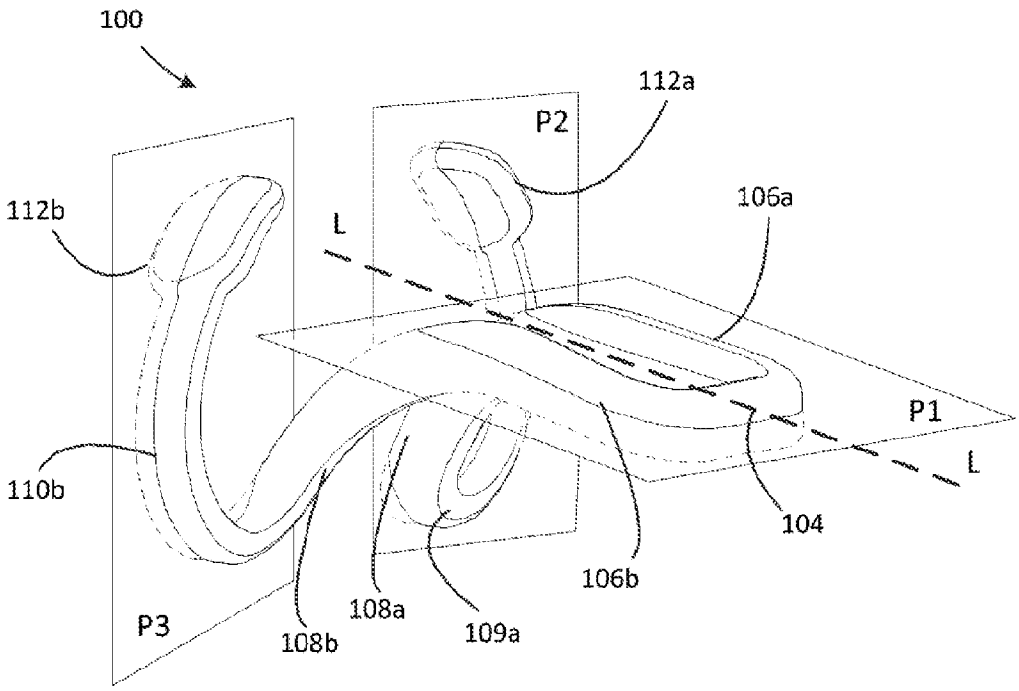

Figure 1B

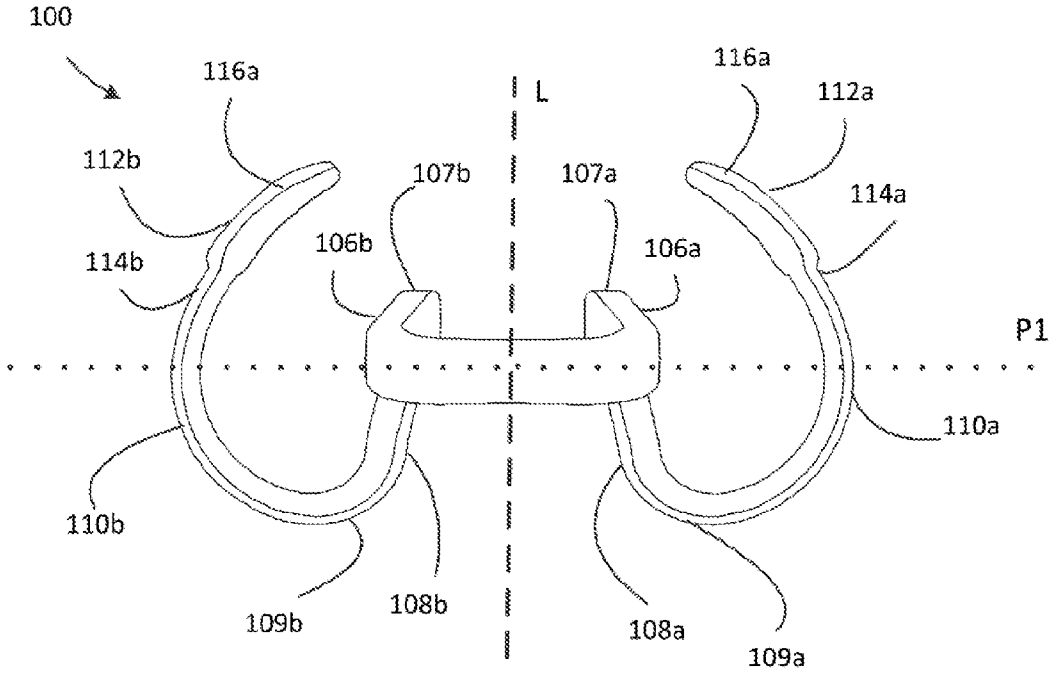

Figure 1C

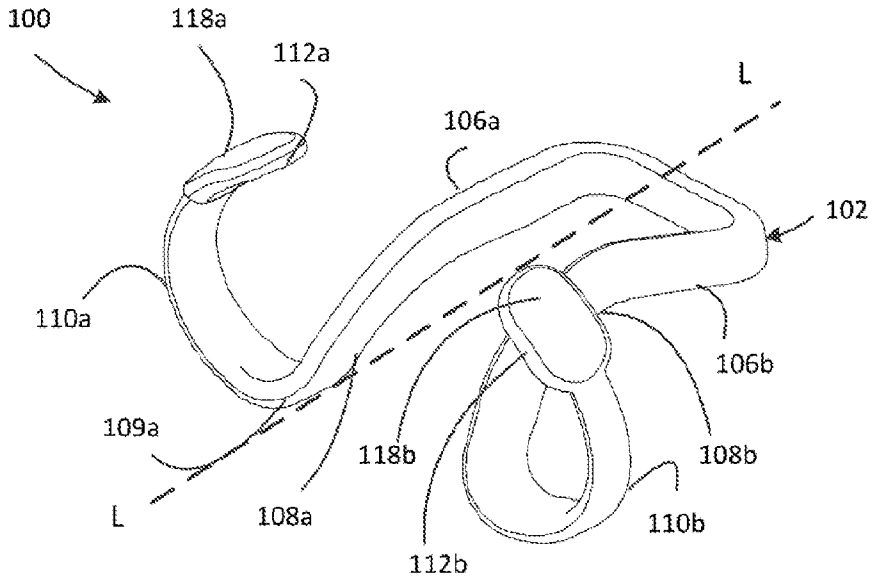

Figure 1D

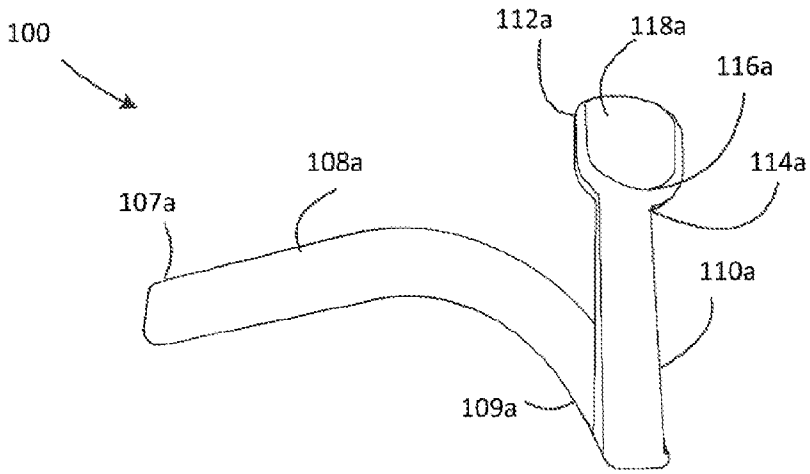

Figure 1E

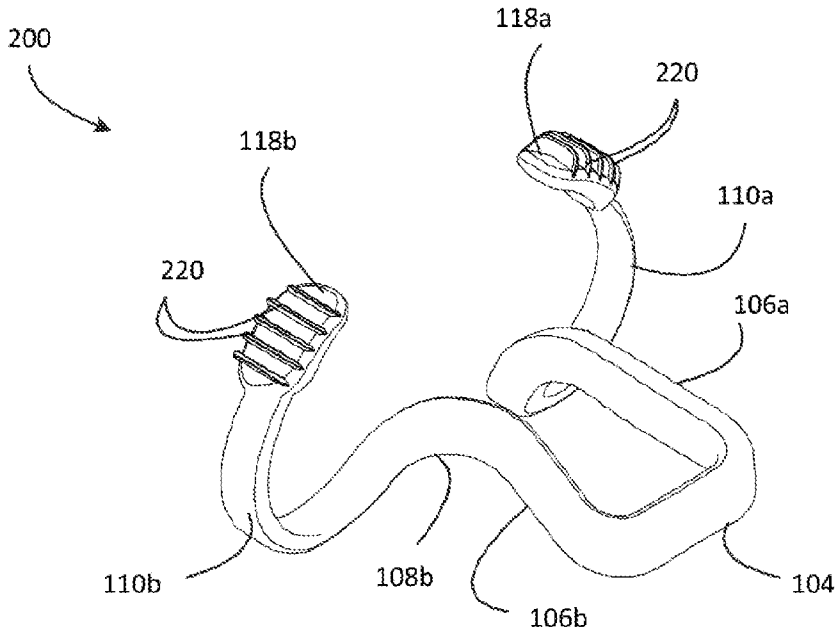

Figure 2

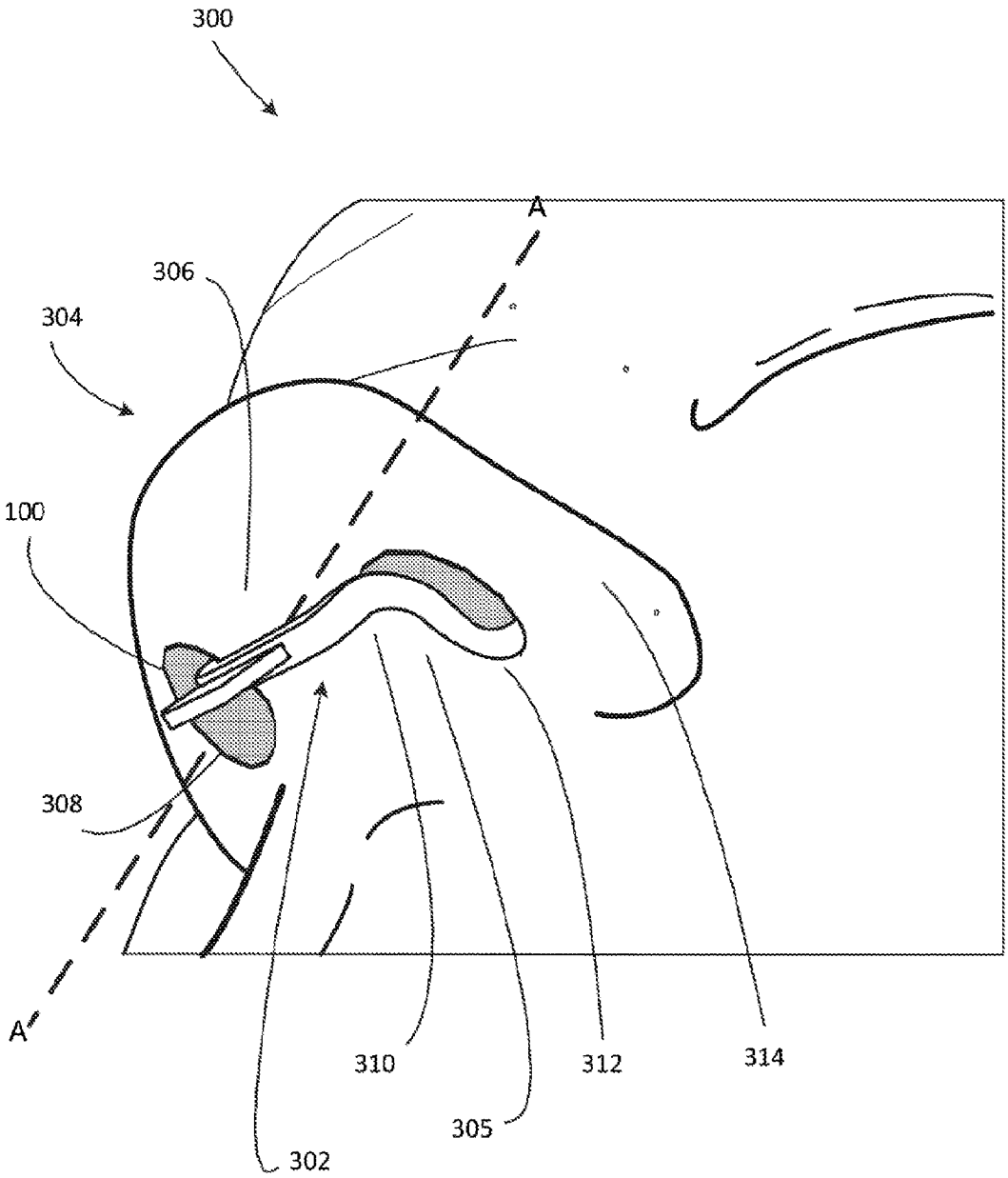

Figure 3A

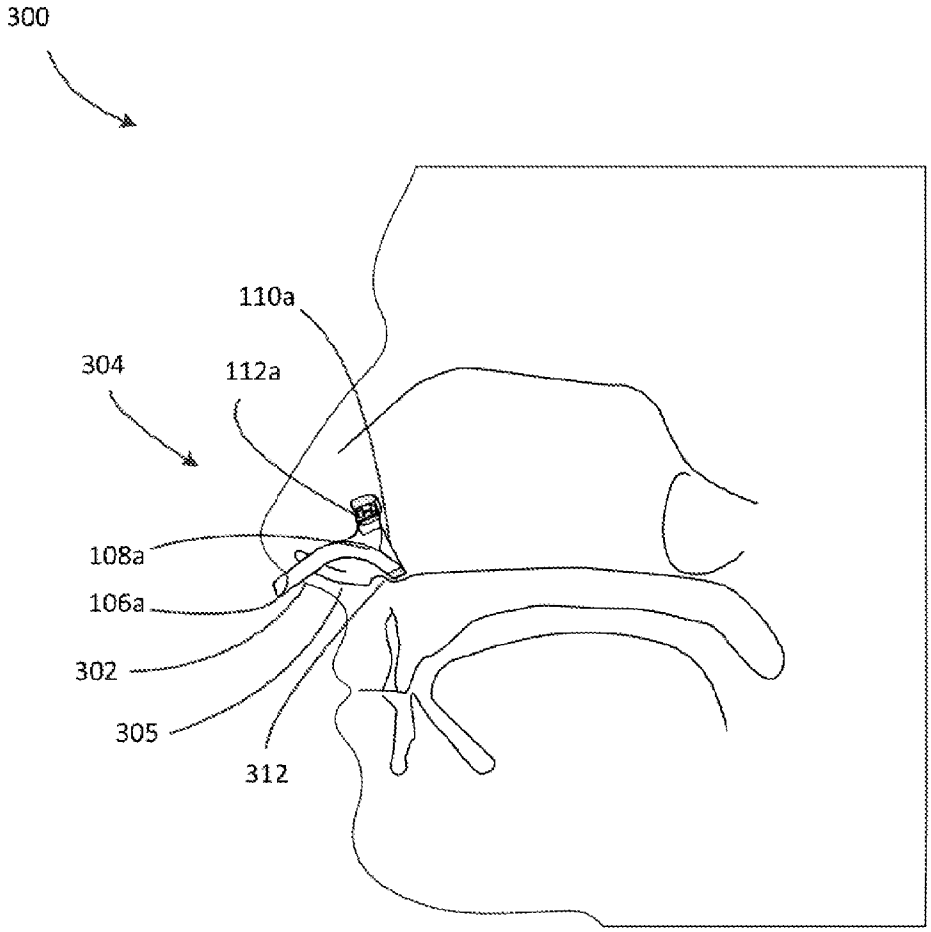

Figure 3B

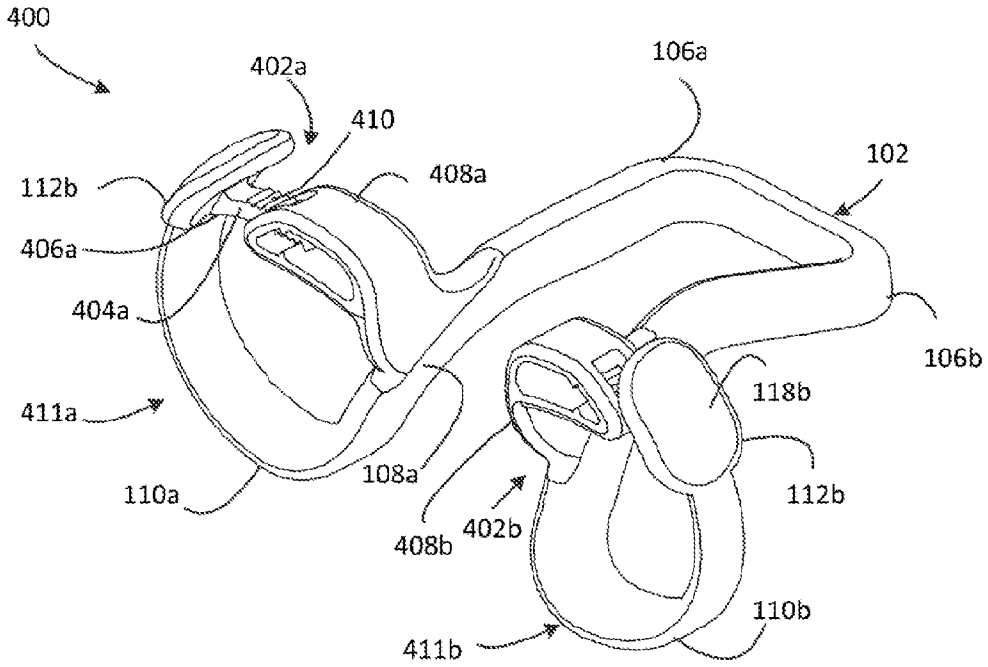

Figure 4A

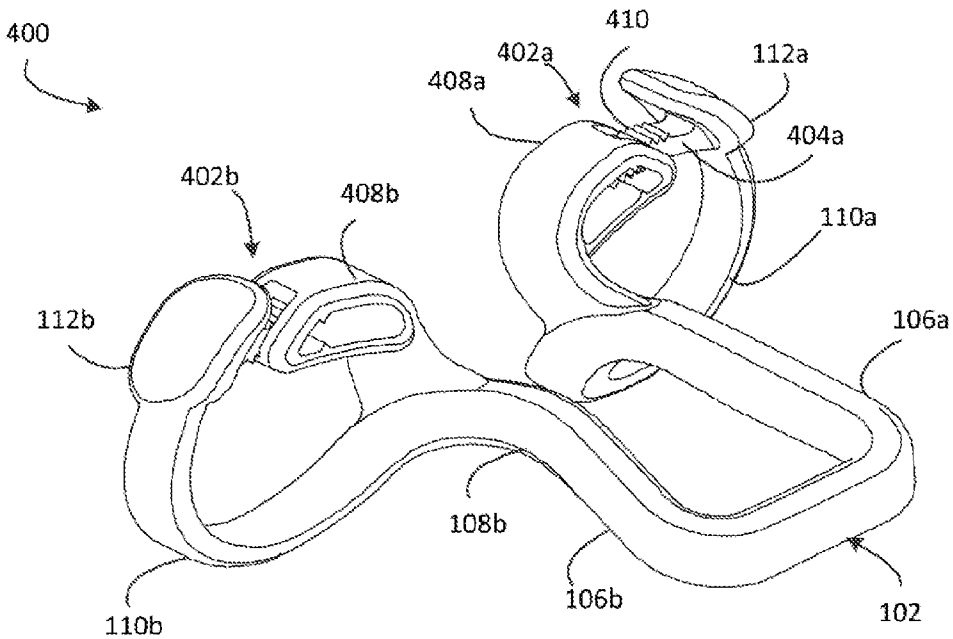

Figure 4B

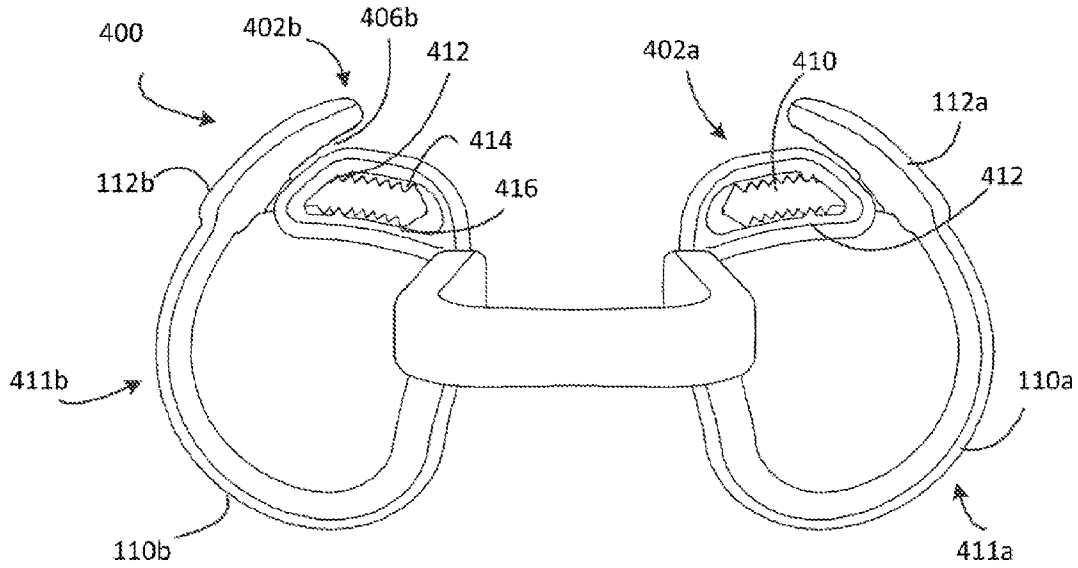

Figure 4C

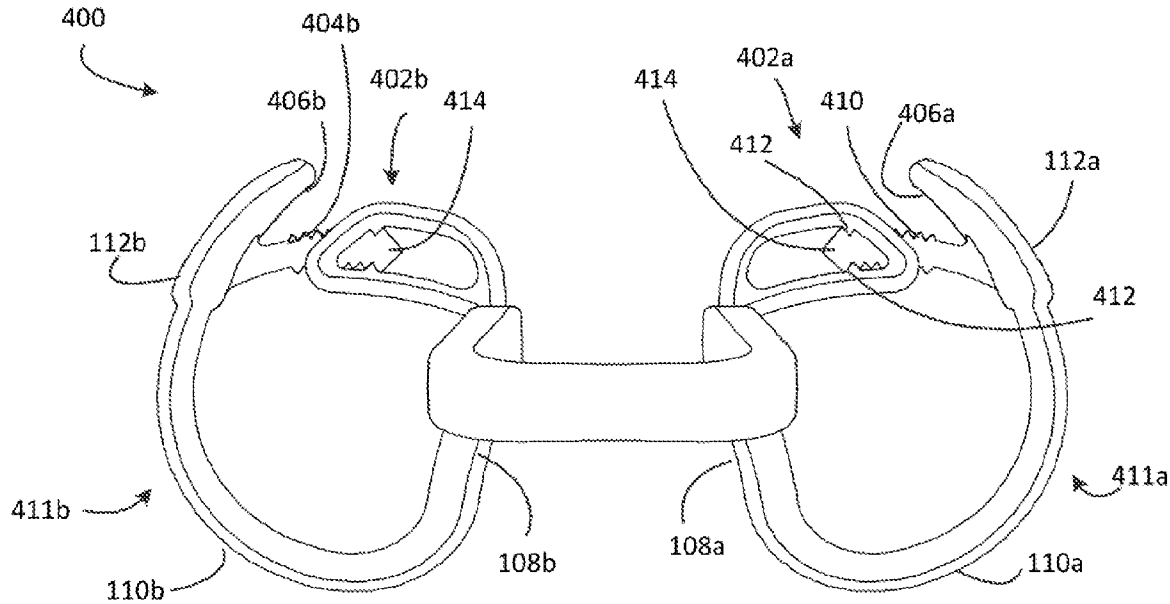

Figure 4D

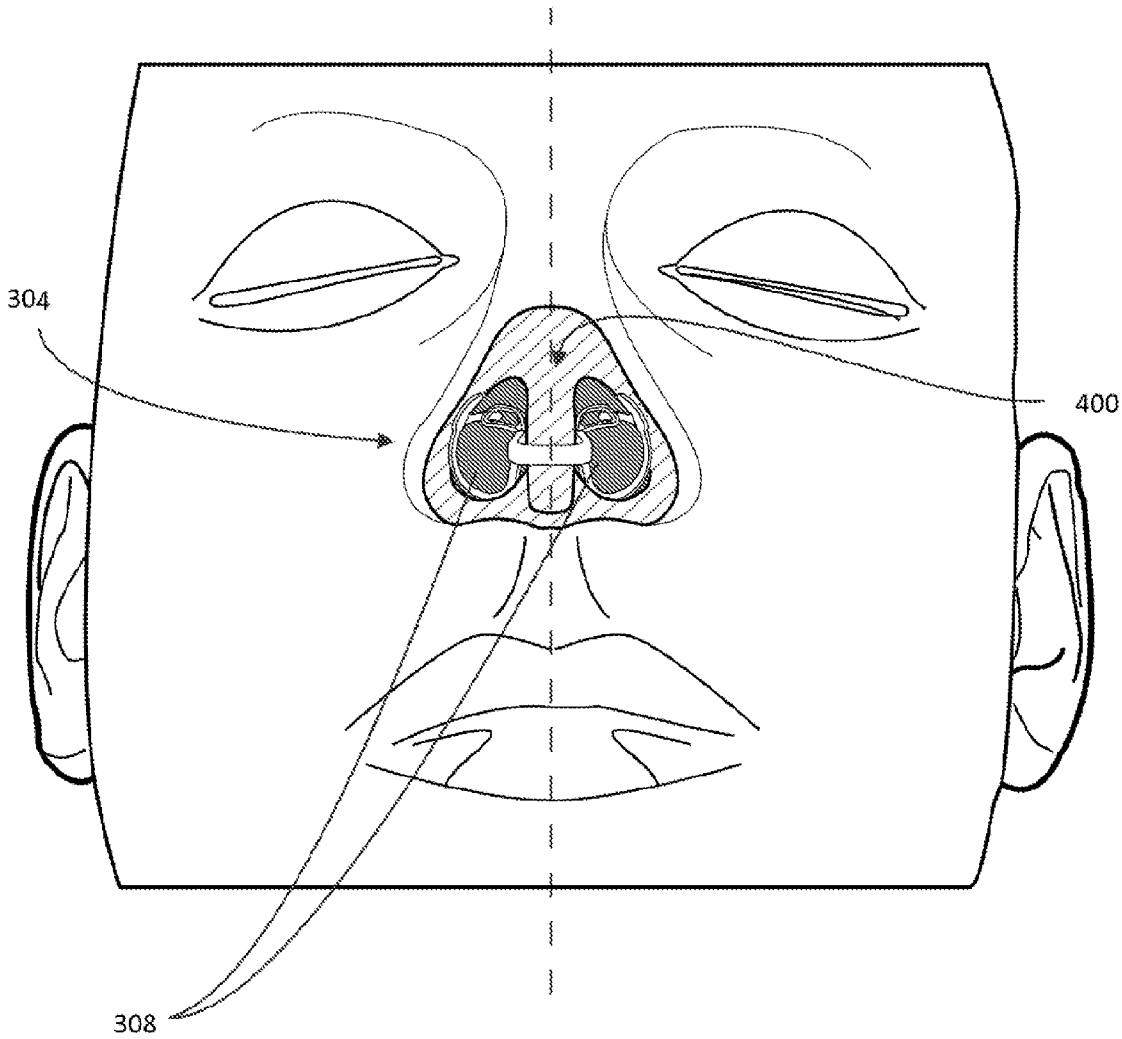

Figure 5

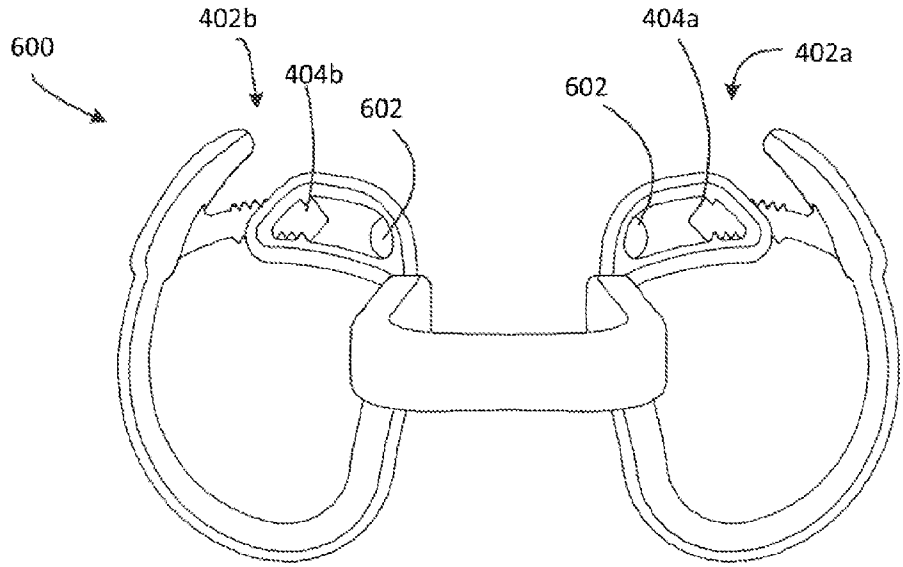

Figure 6A

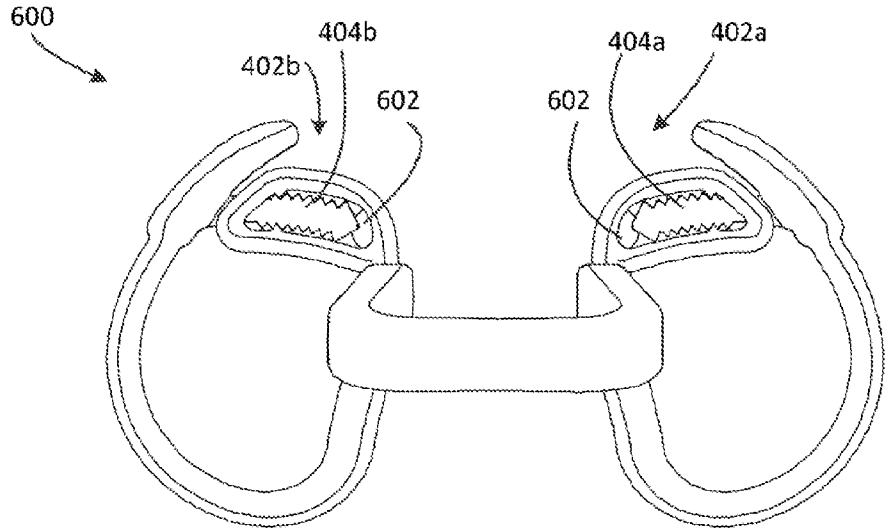

Figure 6B

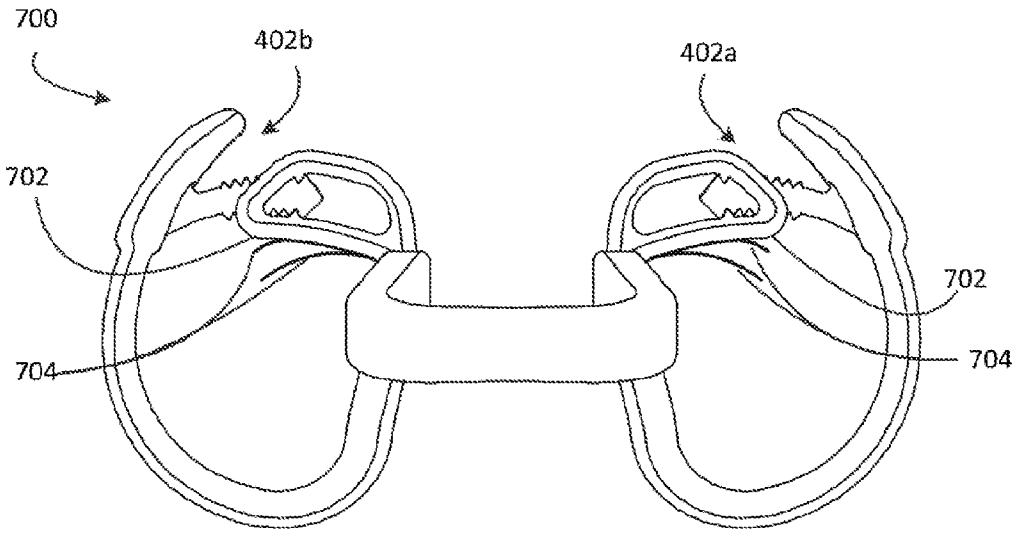

Figure 7A

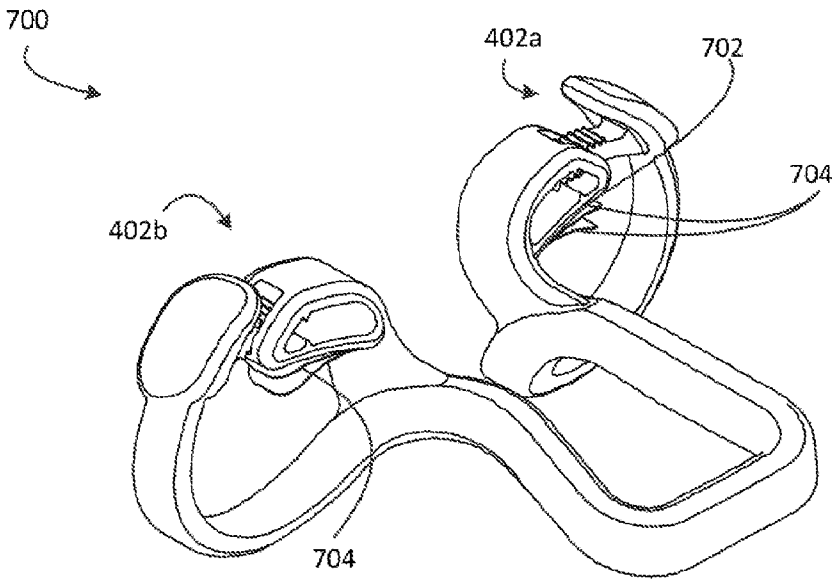

Figure 7B

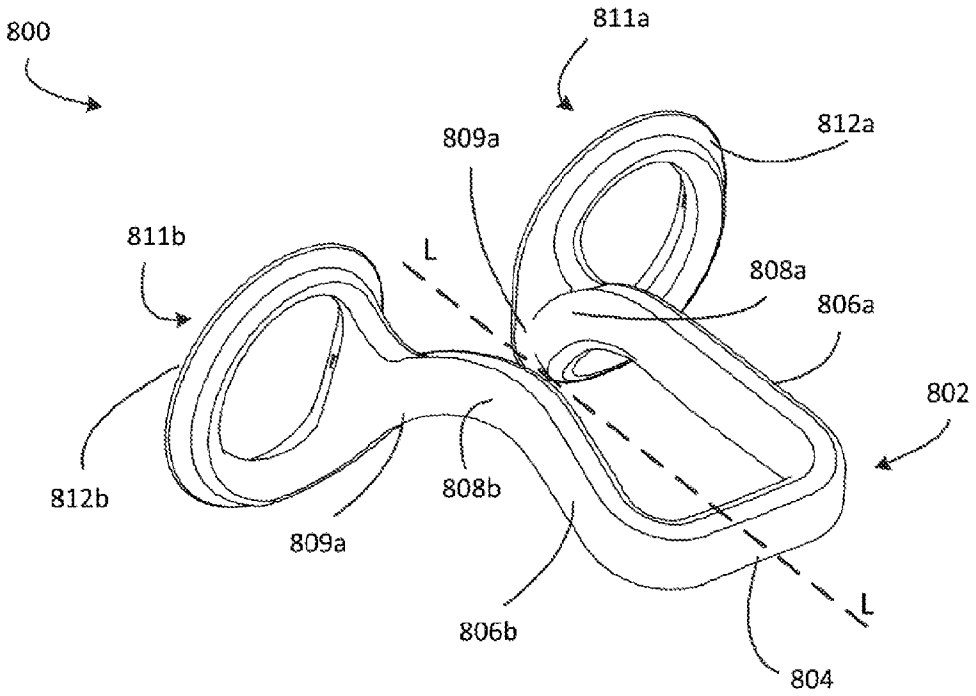

Figure 8A

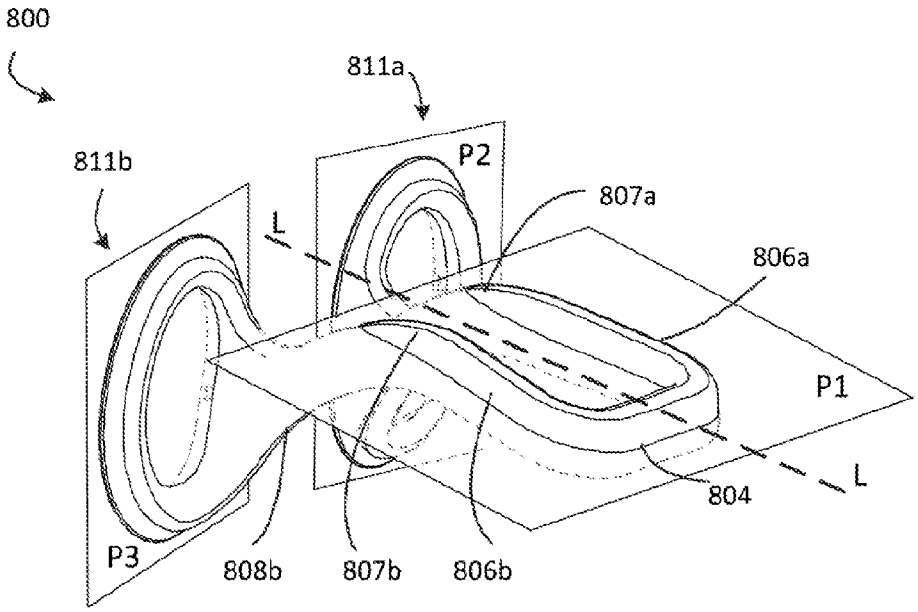

Figure 8B

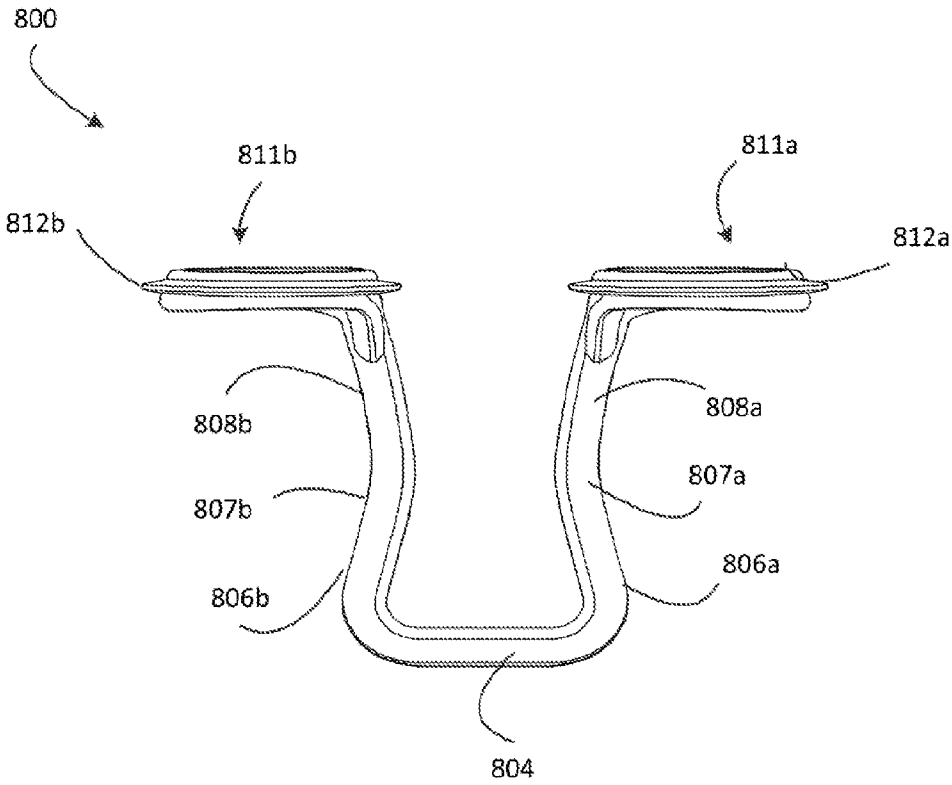

Figure 8C

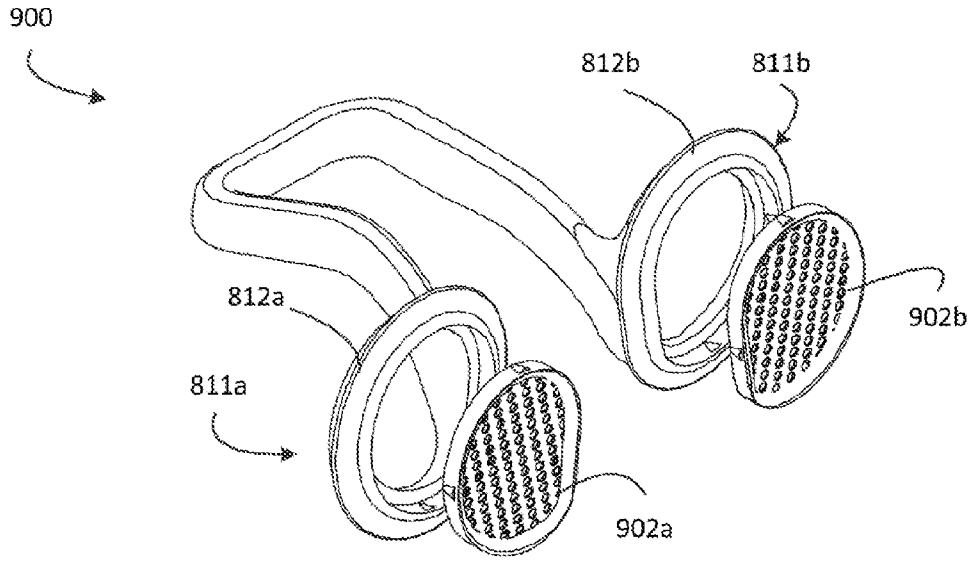

Figure 9

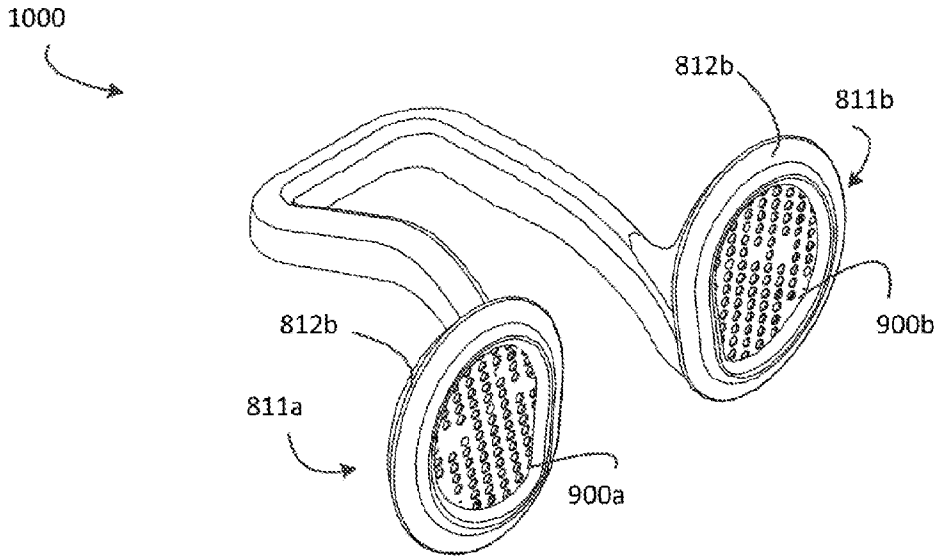

Figure 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2014/000649

A. CLASSIFICATION OF SUBJECT MATTER

A61F 5/08 (2006.01) A61F 5/56 (2006.01)

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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

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

WPI, EPODOC: A61F5/08 OR A61M29/00 OR A61F5/56 (Nose, Dilate, Bridge, Rib, Loop, Belt) and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

[X] Further documents are listed in the continuation of Box C [X] 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	Date of mailing of the international search report
18 September 2014	18 September 2014
Name and mailing address of the ISA/AU	**Authorised officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	Timothy Williams AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832067

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. **PCT/AU2014/000649**
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/026391 A1 (ASAP BREATHE ASSIST PTY LTD) 01 April 2004 Abstract, Figure 27, 28A, Page 3 Line 13-Page 12 Line 16	1-12, 45
X	AU 2013205674 A1 (CONSEGNA GROUP LIMITED) 13 February 2014 Abstract, Figure 1A-1D, Page 2 Line 19-Page 11 linbe 27	1-12, 27, 45
A	US 2010/0042134 A1 (WIEN) 18 February 2010 Whole Document	1-45
A	US 5931852 A (BRENNAN) 03 August 1999 Whole Document	1-45

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2014/000649

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:
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box 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:

See Supplemental Box for Details

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.

INTERNATIONAL SEARCH REPORT	International application No. PCT/AU2014/000649

Supplemental Box

Continuation of: **Box III**

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- Claims 1-26, 45 are directed to a nasal dilator device. The feature of 'first and second cantilever rib members extending outward from the U-shaped body in a second and third plane' is specific to this group of claims.

- Claims 27-44 are directed to a nasal dilator device. The feature of 'first and second closed loop structures extending outward from the U-shaped body in a second and third plane and each defining apertures' is specific to this group of claims.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions and which provides a technical relationship among them is *a U-shaped body including a central portion arranged to span a septum of a nose; first and second leg members extending from the central portion and first/second intermediate sections connecting an end of the leg members to the structures extending from the U-shaped body.*

However this feature does not make a contribution over the prior art because it is disclosed in:
D1: WO 2004/026391 A1 (ASAP BREATHE ASSIST PTY LTD) 01 April 2004

Therefore in the light of this document this common feature cannot be a special technical feature. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a posteriori*.

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2014/000649**

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

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
WO 2004/026391 A1	01 April 2004	AU 2003227108 A1	08 Apr 2004
		AU 2003227108 B2	04 Dec 2008
		AU 2007202425 A1	21 Jun 2007
		AU 2007202425 B2	15 Sep 2011
		AU 2011200652 A1	10 Mar 2011
		AU 2011200652 B2	15 Sep 2011
		CN 1729029 A	01 Feb 2006
		CN 1729029 B	05 May 2010
		EP 1549379 A1	06 Jul 2005
		EP 1549379 B1	23 Oct 2013
		JP 2006501889 A	19 Jan 2006
		JP 4582518 B2	17 Nov 2010
		MX PA05003044 A	27 Jan 2006
		NZ 539496 A	23 Feb 2007
		US 2004059368 A1	25 Mar 2004
		US 7105008 B2	12 Sep 2006
		US 2006259065 A1	16 Nov 2006
		US 7727252 B2	01 Jun 2010
		US 2006259064 A1	16 Nov 2006
		US 7740643 B2	22 Jun 2010
		US 2014246023 A1	04 Sep 2014
AU 2013205674 A1	13 February 2014	AU 2012386483 A1	17 Apr 2014
		AU 2012386483 B2	24 Jul 2014
		AU 2013204827 A1	13 Feb 2014
		AU 2013205665 A1	13 Feb 2014
		AU 2013205667 A1	13 Feb 2014
		AU 2013205673 A1	13 Feb 2014
		WO 2014015358 A1	30 Jan 2014
		WO 2014015359 A1	30 Jan 2014
US 2010/0042134 A1	18 February 2010	None	
US 5931852 A	03 August 1999	AU 4960299 A	09 Jan 2001
		EP 1105047 A1	13 Jun 2001
		WO 0078223 A1	28 Dec 2000

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2014/000649**

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

Patent Document/s Cited in Search Report		**Patent Family Member/s**	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.