



US010729575B2

(12) **United States Patent**
Castillo

(10) **Patent No.:** **US 10,729,575 B2**
(45) **Date of Patent:** **Aug. 4, 2020**

(54) **EYEWEAR SYSTEM FOR SECURING LENS ON A USER'S NOSE AND DILATING USER'S NOSE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 230 days.

(21) Appl. No.: **15/846,691**

(22) Filed: **Dec. 19, 2017**

(65) **Prior Publication Data**
US 2018/0104085 A1 Apr. 19, 2018

Related U.S. Application Data

(63) Continuation-in-part of application No. 15/071,459, filed on Mar. 16, 2016, now Pat. No. 10,137,028, (Continued)

(51) **Int. Cl.**
A61F 5/08 (2006.01)
A41D 13/11 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC *A61F 5/08* (2013.01); *A41D 13/1184* (2013.01); *A61F 9/026* (2013.01); *A61F 2/186* (2013.01); *A61M 2210/0618* (2013.01)

(58) **Field of Classification Search**
CPC .. *A61F 5/08*; *A61F 5/56*; *A61B 17/24*; *A61M 29/00*
See application file for complete search history.

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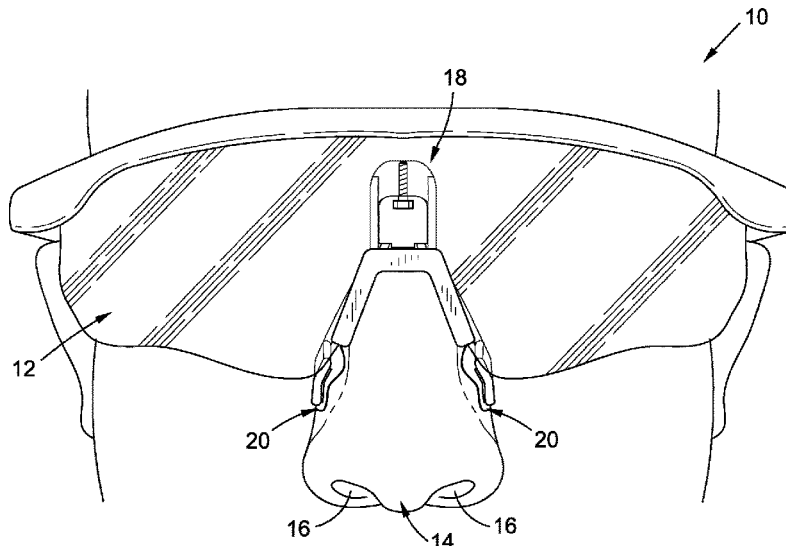
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(57) **ABSTRACT**

A device for securing an eyewear lens to a nasal applique which results in nasal dilation. The device includes a base engageable with the eyewear lens. First and second pivot units are is coupled to the base pivotal about respective pivot axes. The pivot units collectively define a nose adjustment angle therebetween, with the nose adjustment angle being generally conformable to the user's nose. The first pivot unit and the second pivot unit are configured to interact with at least one nasal applique to magnetically couple the first pivot unit and the second pivot unit to the at least one nasal applique. The magnetic coupling between the first pivot unit and the second pivot unit and the at least one nasal applique imparts a dilating force on the user's nose to dilate the nasal passageway when the at least one nasal applique is attached to the user's nose.

19 Claims, 19 Drawing Sheets



Related U.S. Application Data

which is a continuation-in-part of application No. 14/979,009, filed on Dec. 22, 2015, now Pat. No. 10,137,027, which is a continuation-in-part of application No. 14/799,192, filed on Jul. 14, 2015, now Pat. No. 10,556,095, which is a continuation-in-part of application No. 14/622,448, filed on Feb. 13, 2015, now Pat. No. 9,283,106, which is a continuation-in-part of application No. 14/502,348, filed on Sep. 30, 2014, now Pat. No. 9,675,493.

(60) Provisional application No. 61/918,826, filed on Dec. 20, 2013, provisional application No. 61/937,018, filed on Feb. 7, 2014.

(51) **Int. Cl.**
A61F 9/02 (2006.01)
A61F 2/18 (2006.01)

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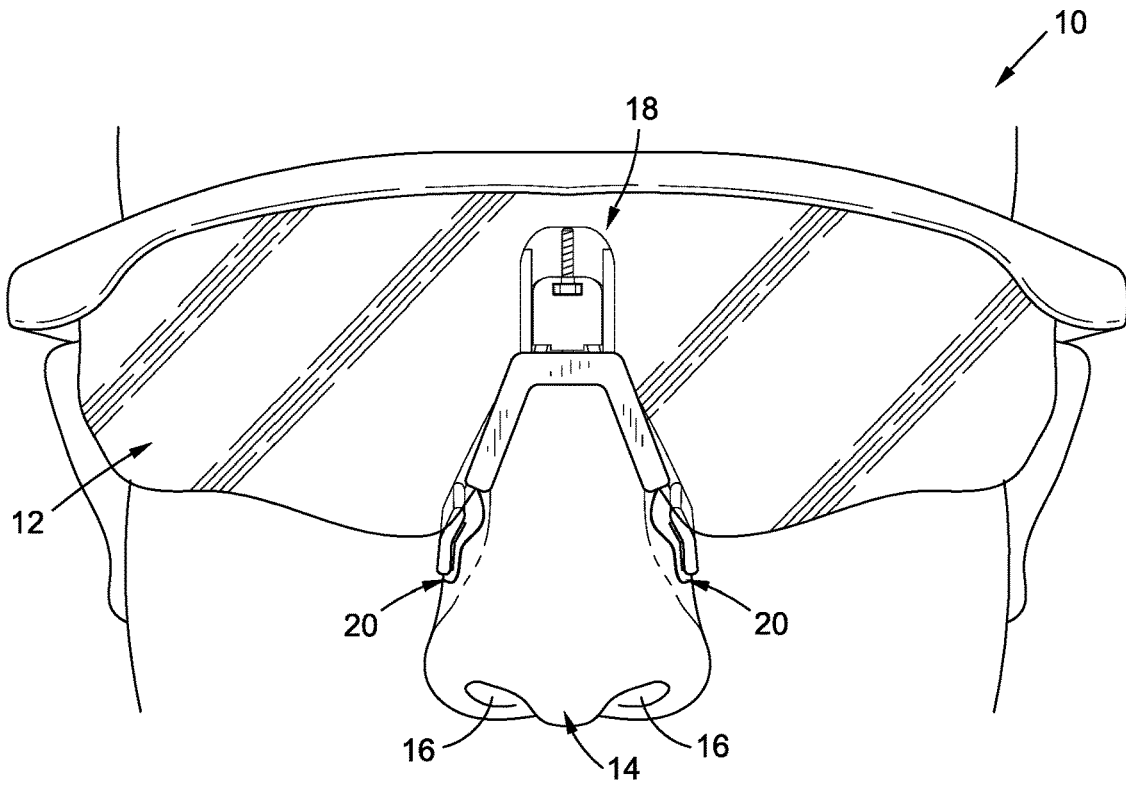


FIG. 1

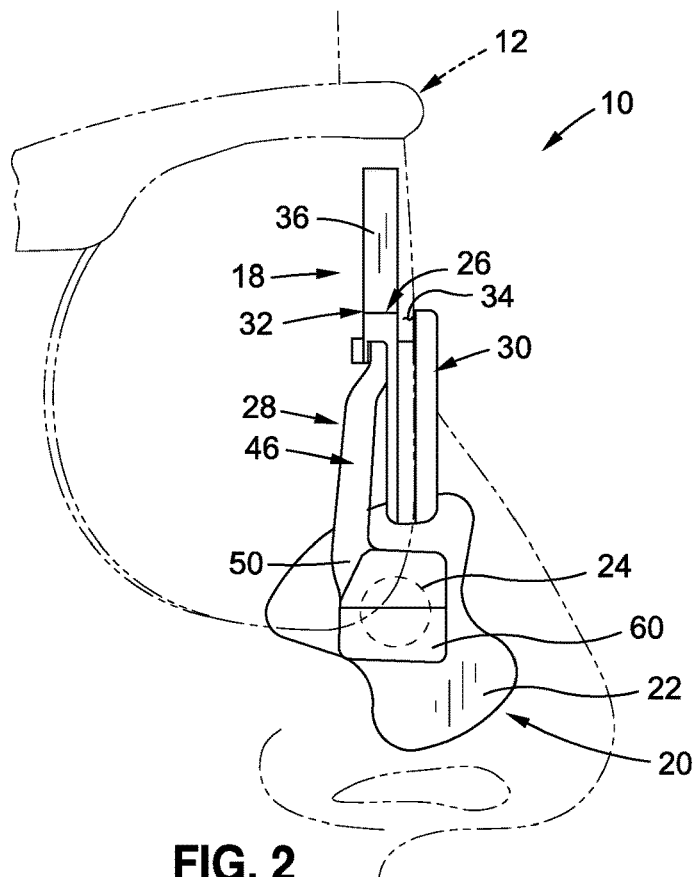


FIG. 2

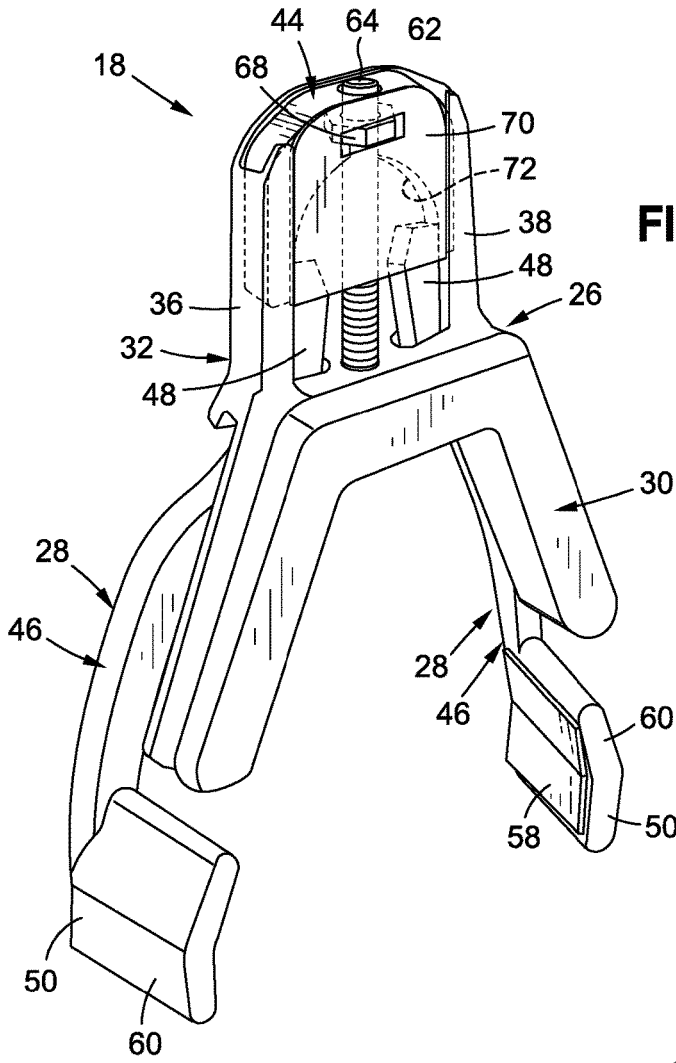


FIG. 3

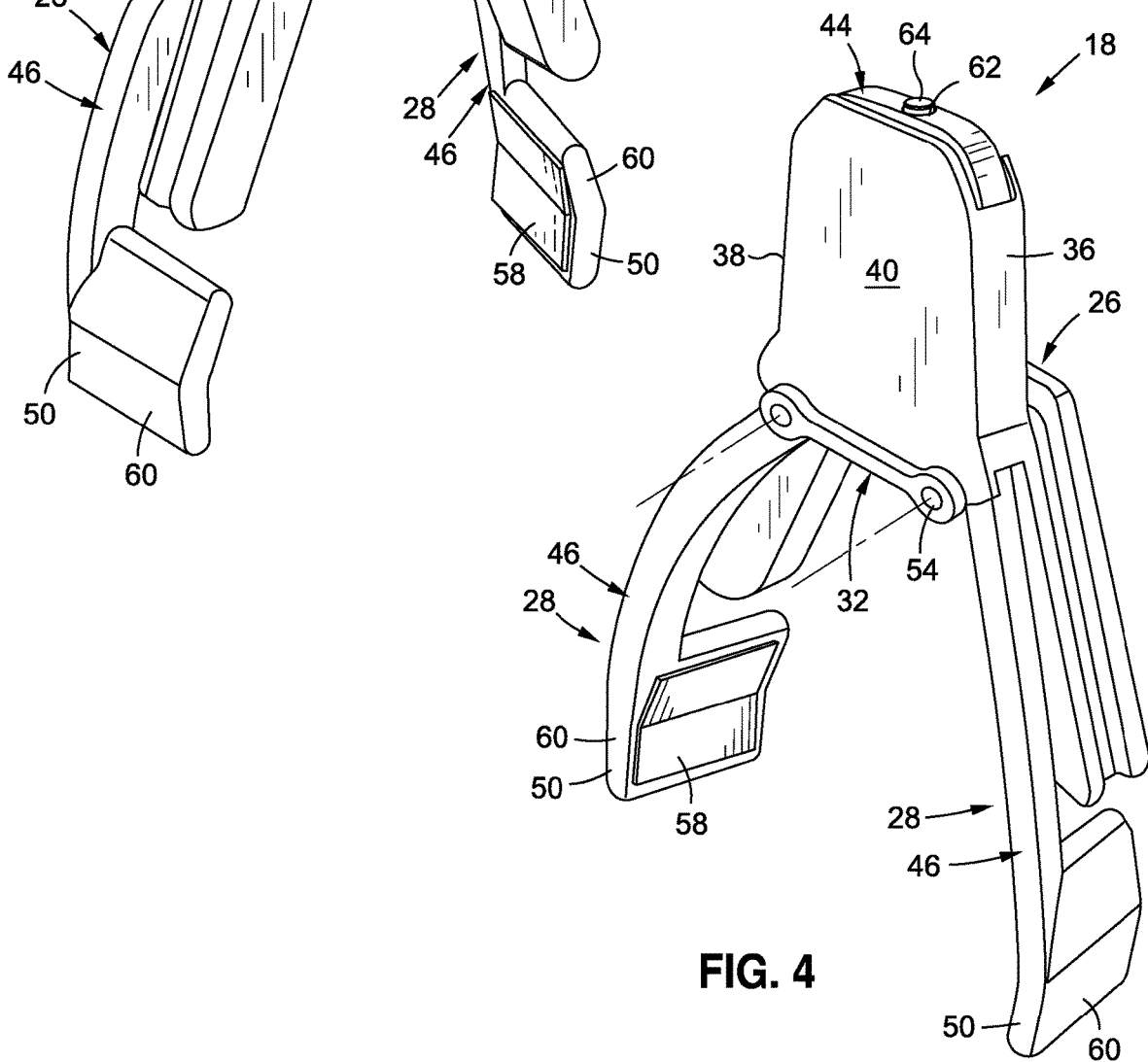


FIG. 4

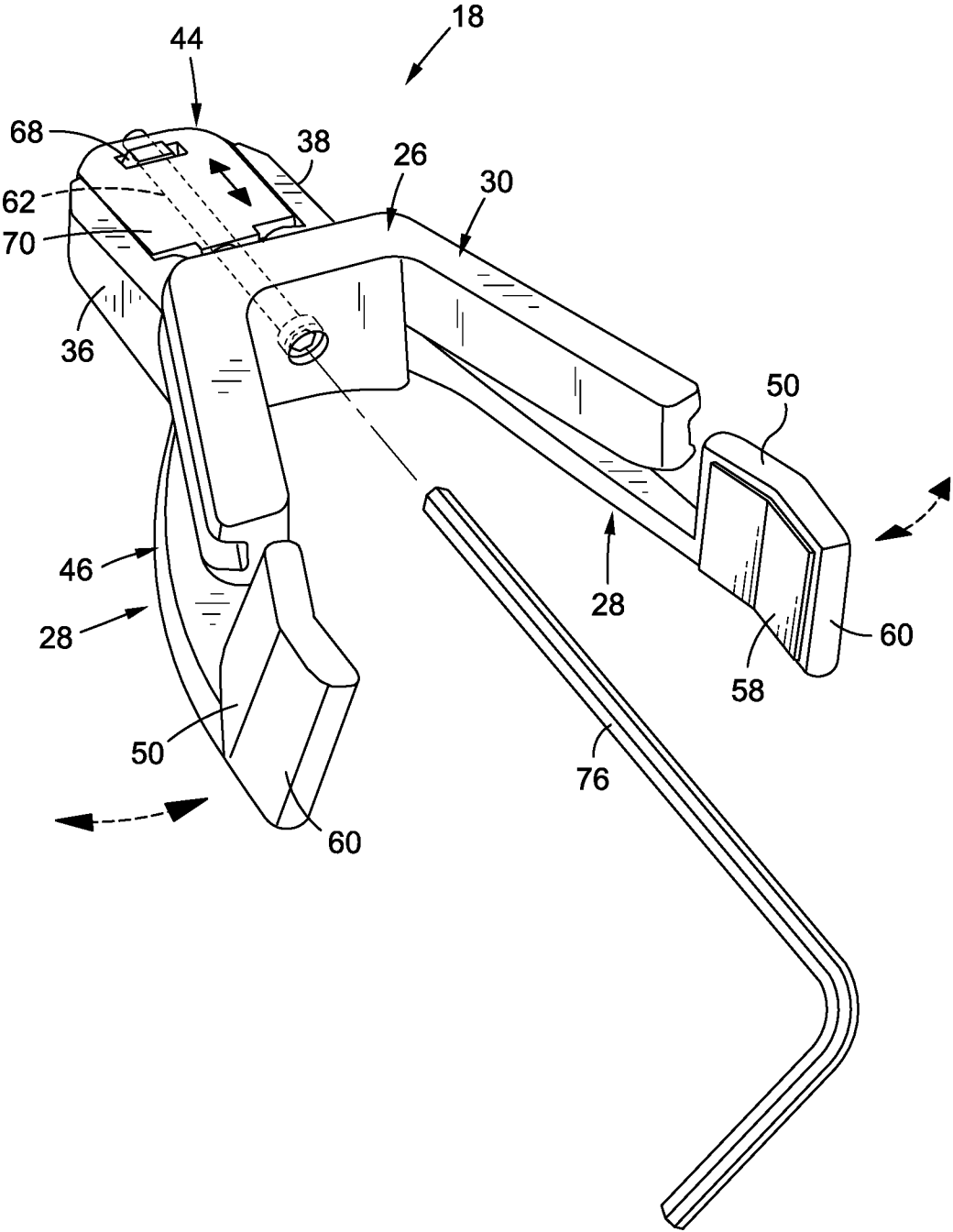


FIG. 5

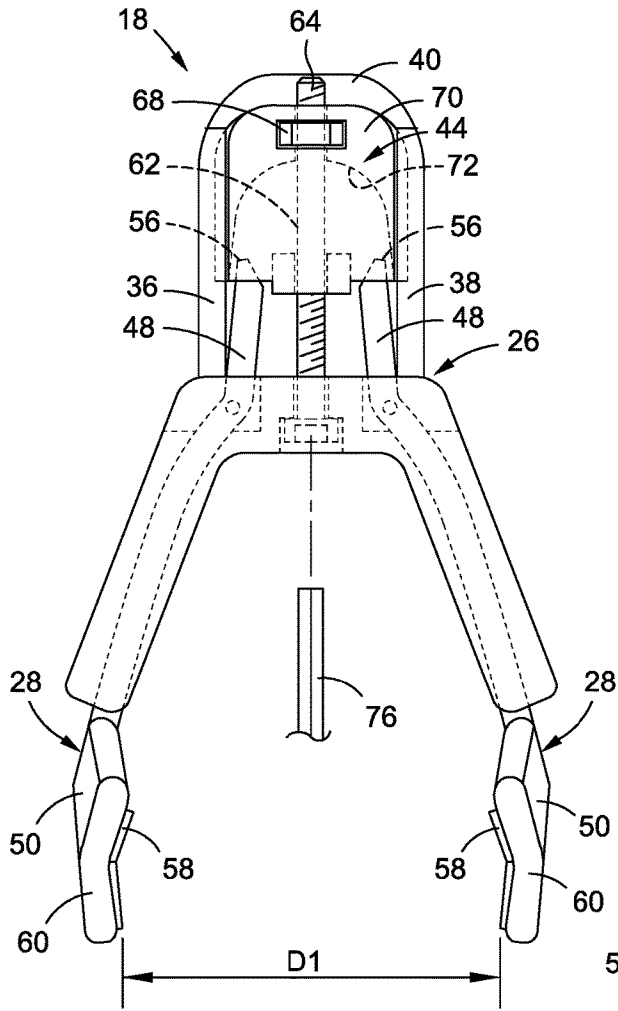


FIG. 6

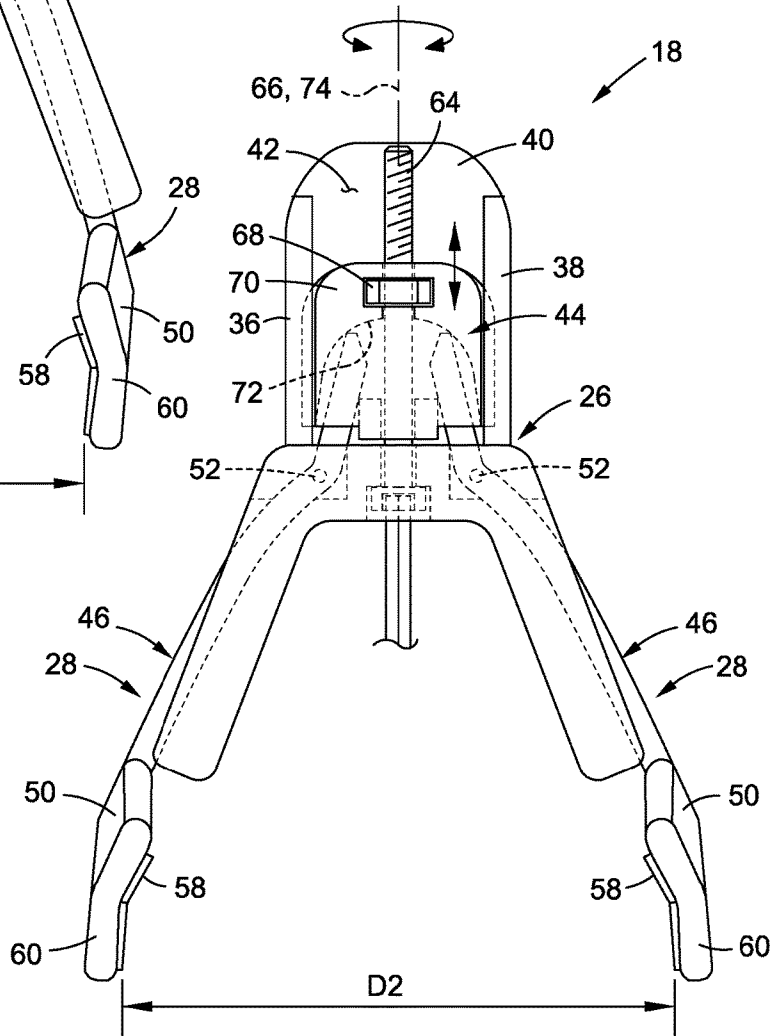


FIG. 7

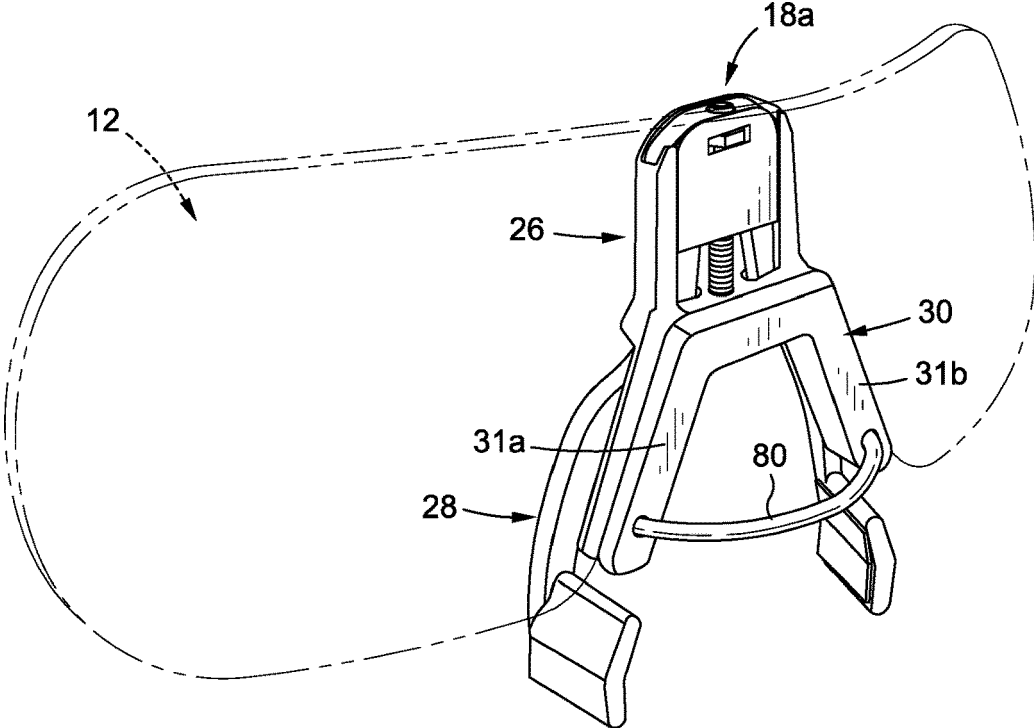


FIG. 8

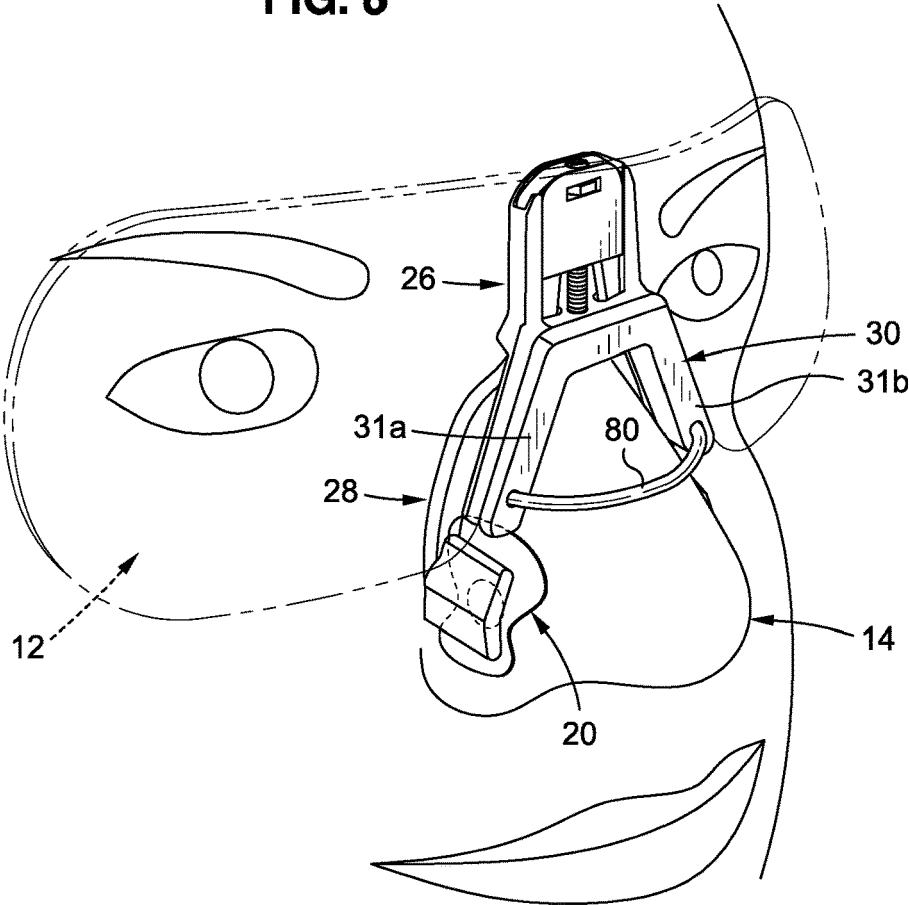


FIG. 9

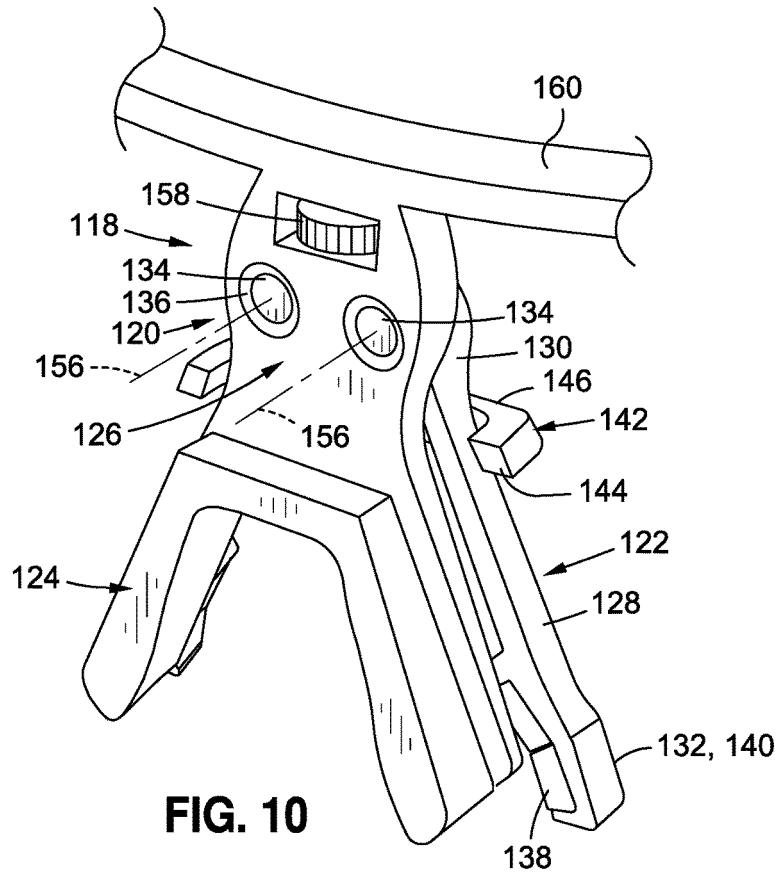


FIG. 10

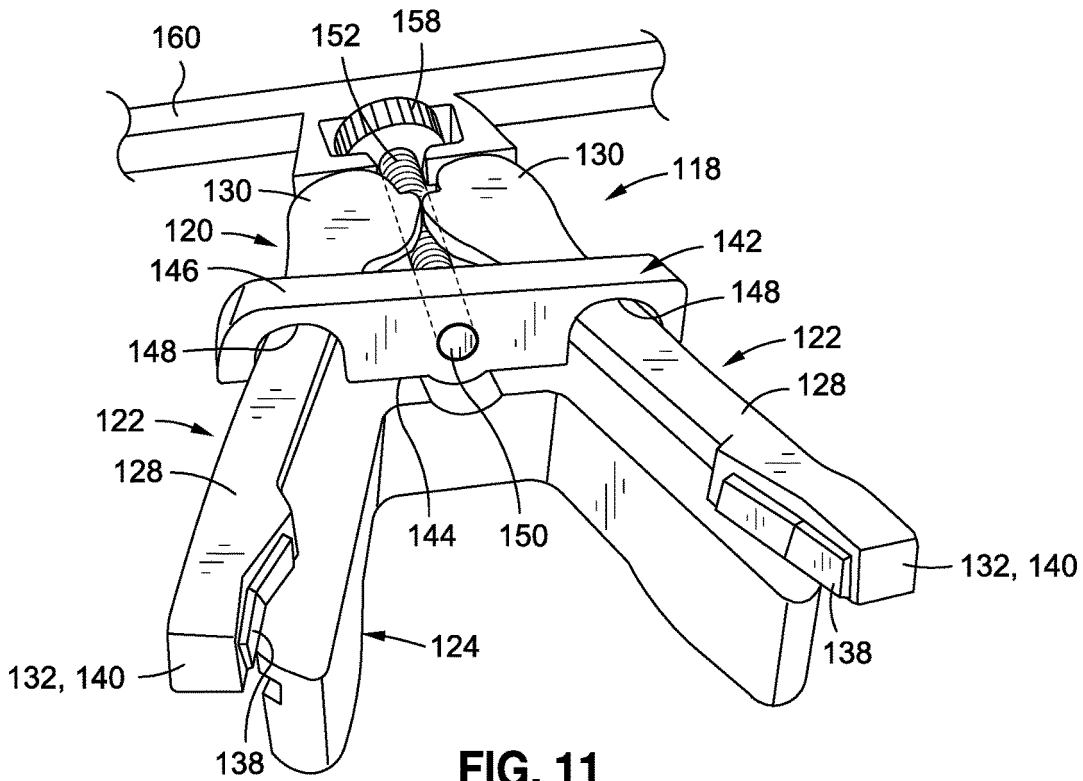


FIG. 11

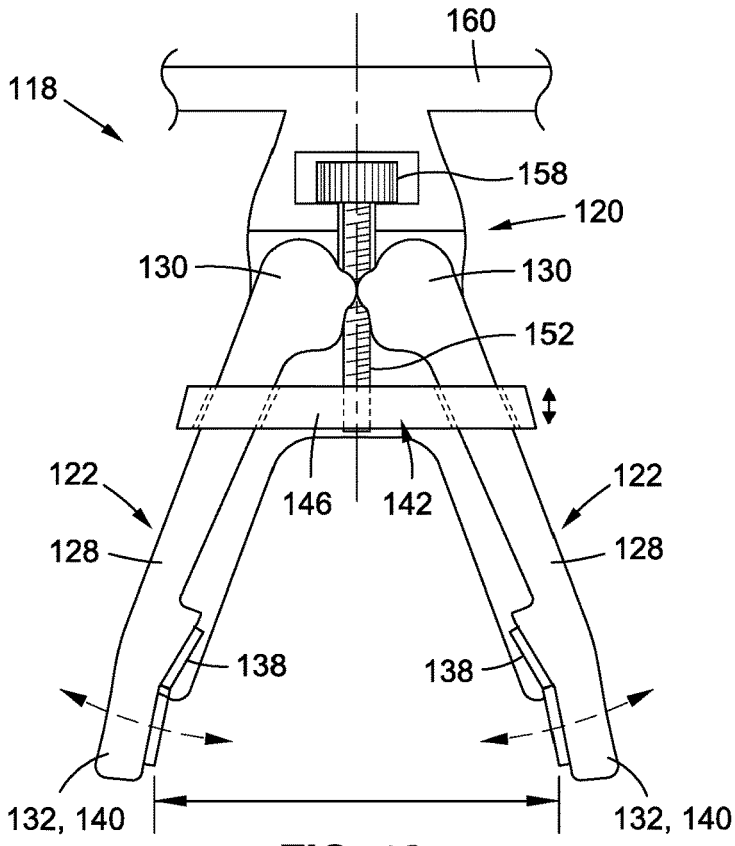


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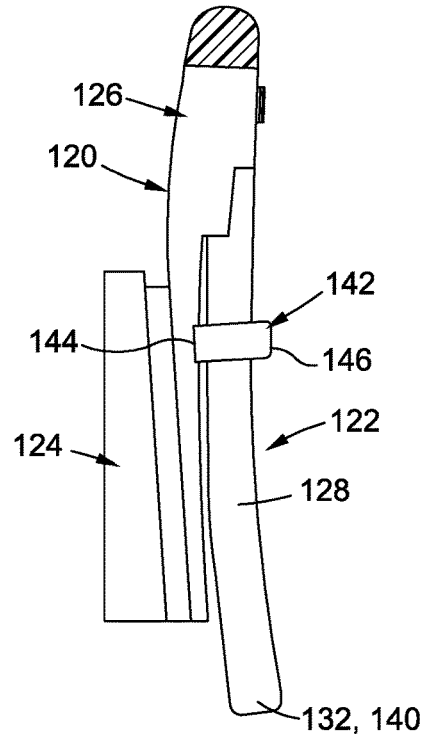


FIG. 12

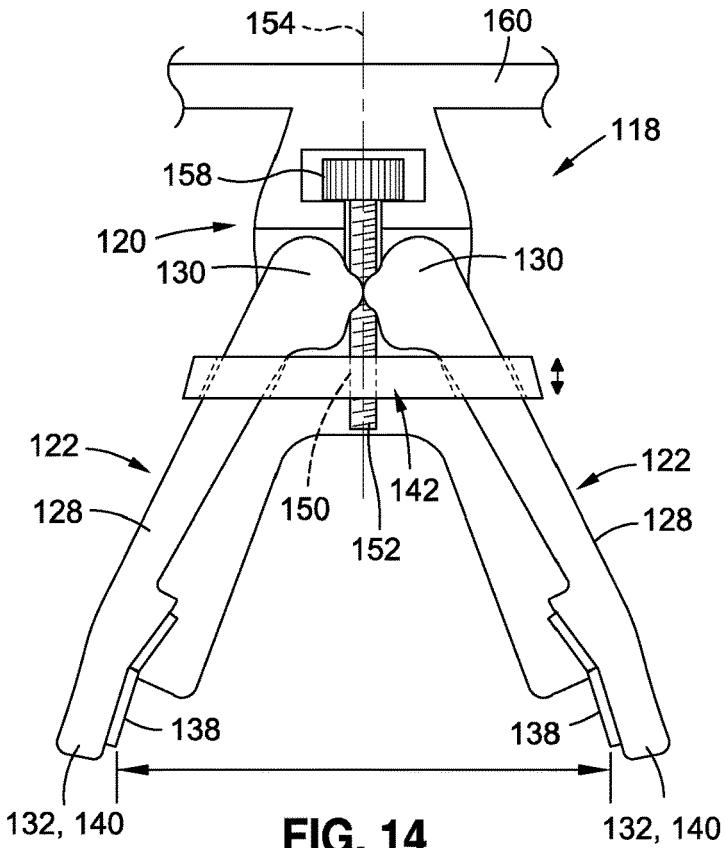


FIG. 14

FIG. 15

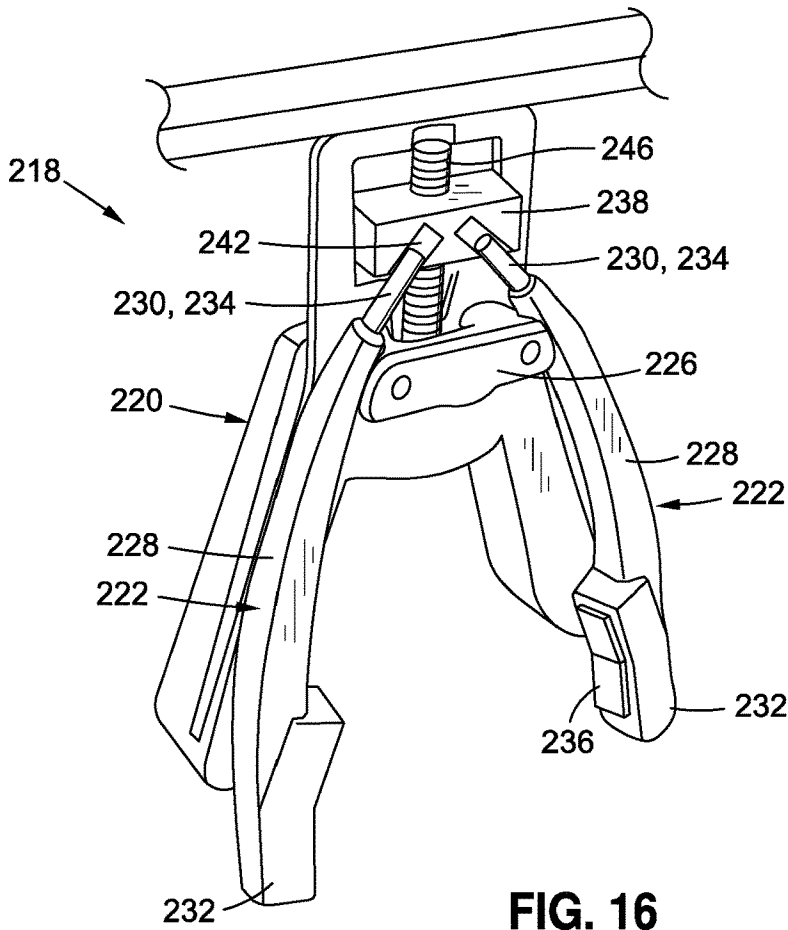
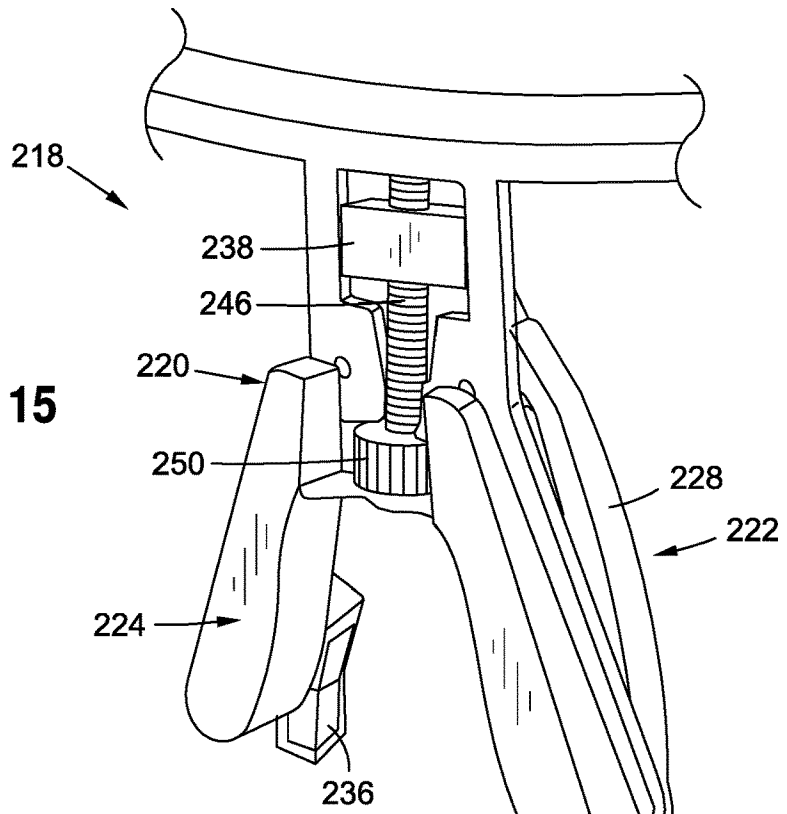


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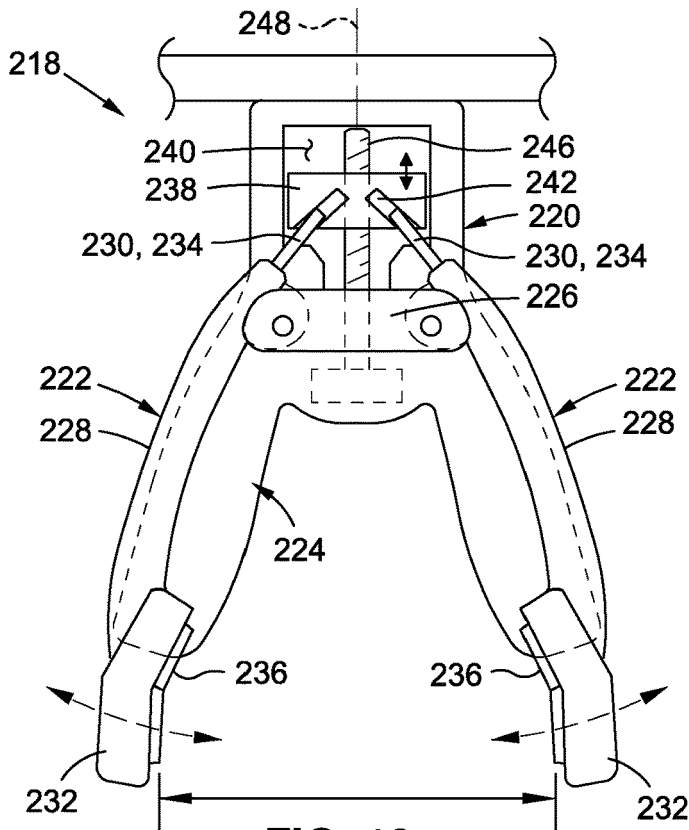


FIG. 18

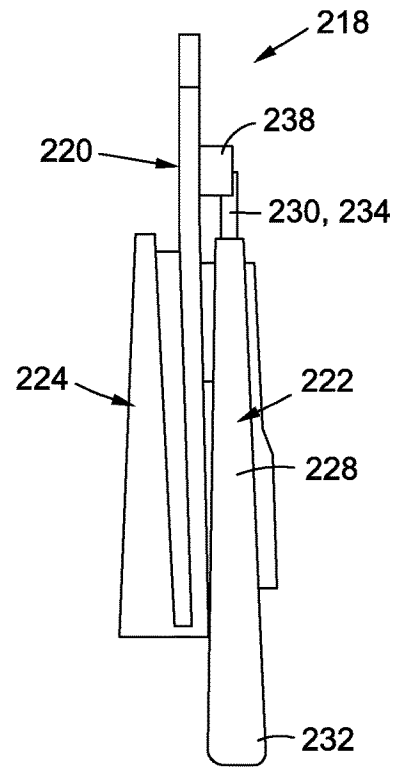


FIG. 17

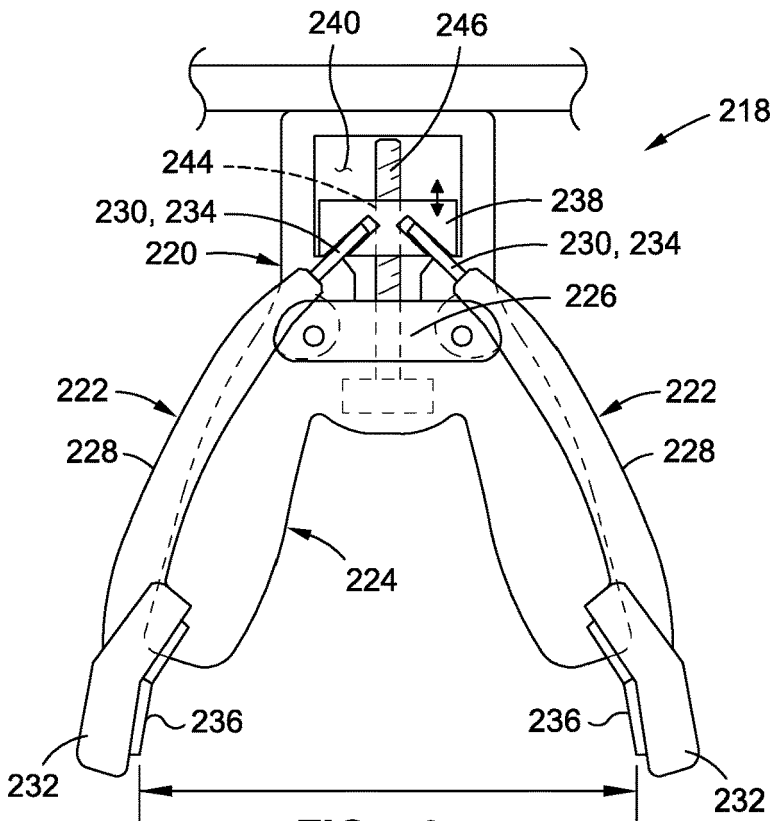


FIG. 19

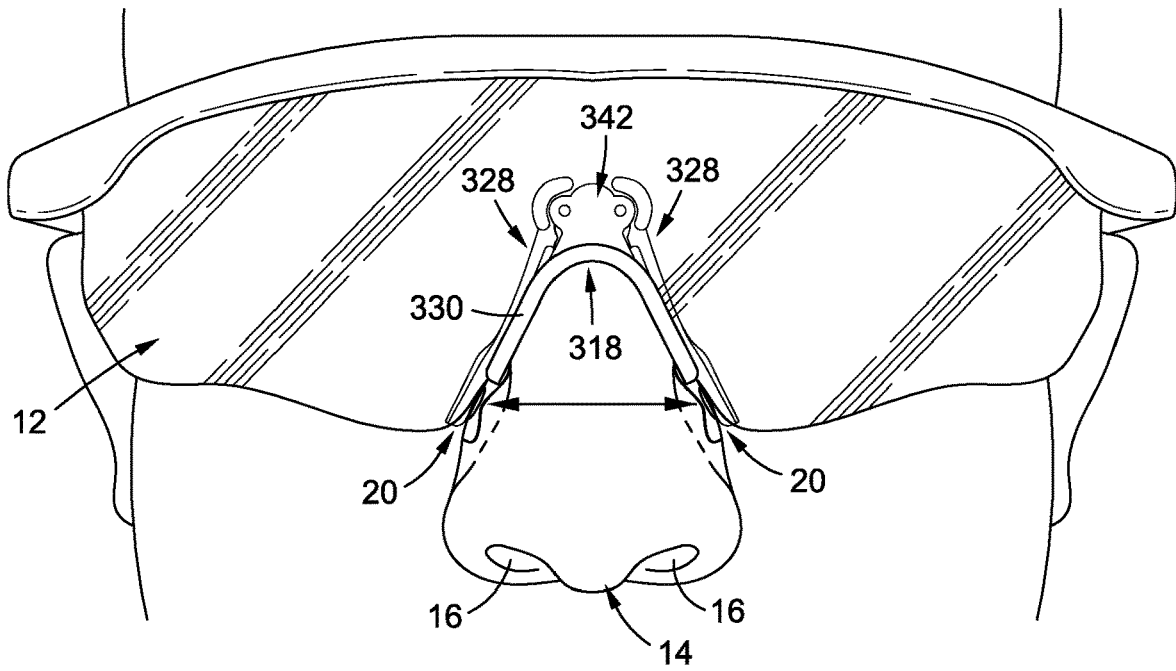


FIG. 20

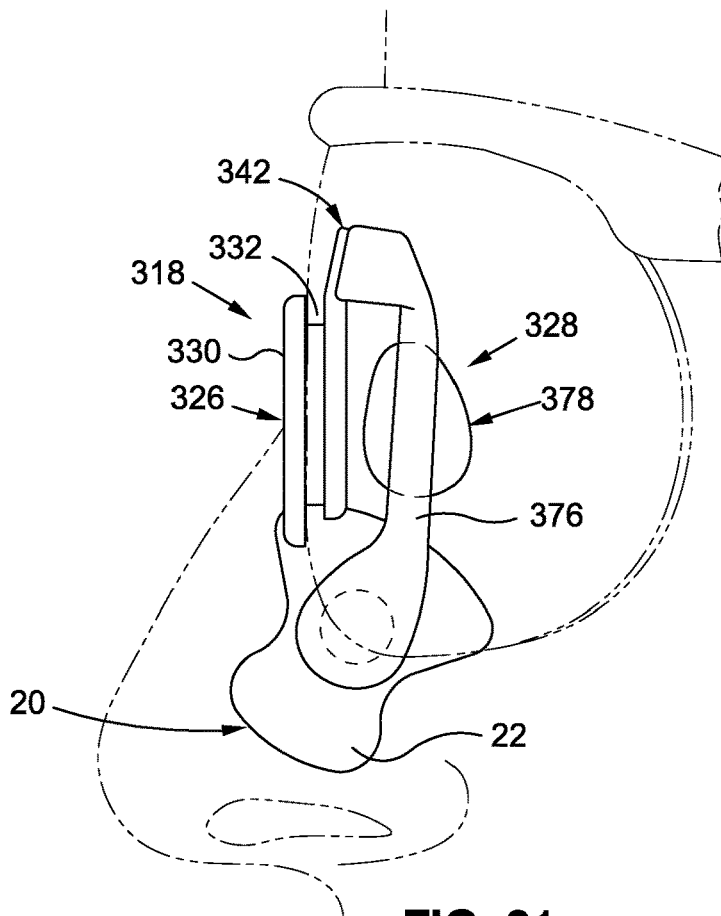


FIG. 21

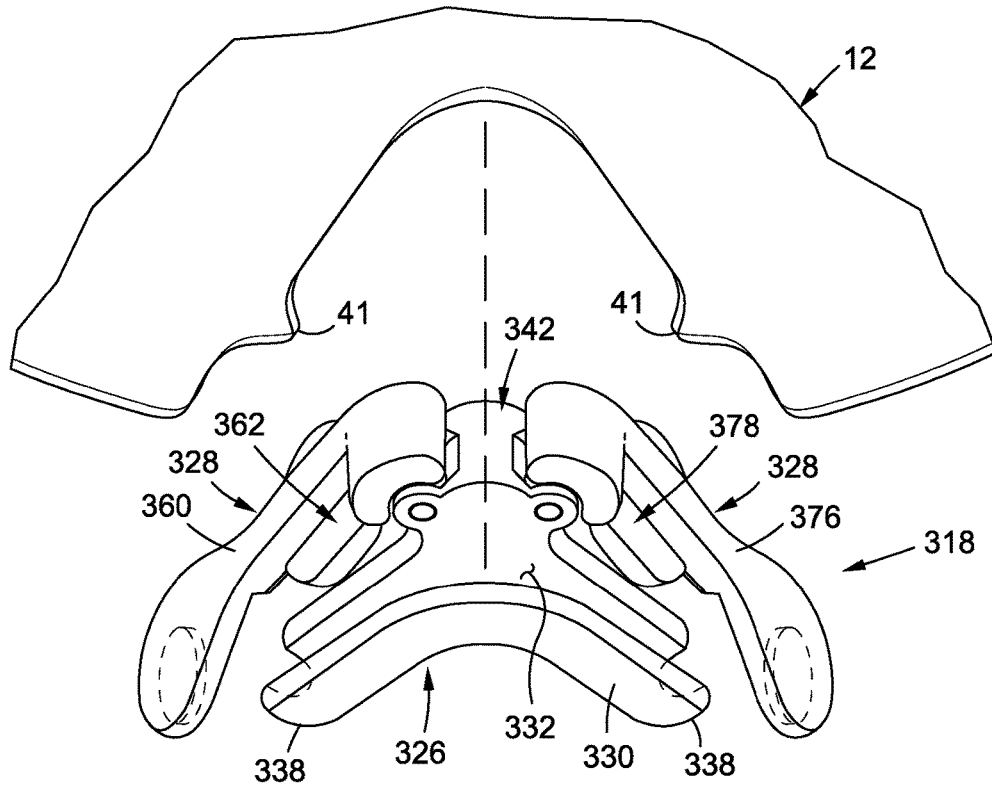


FIG. 22

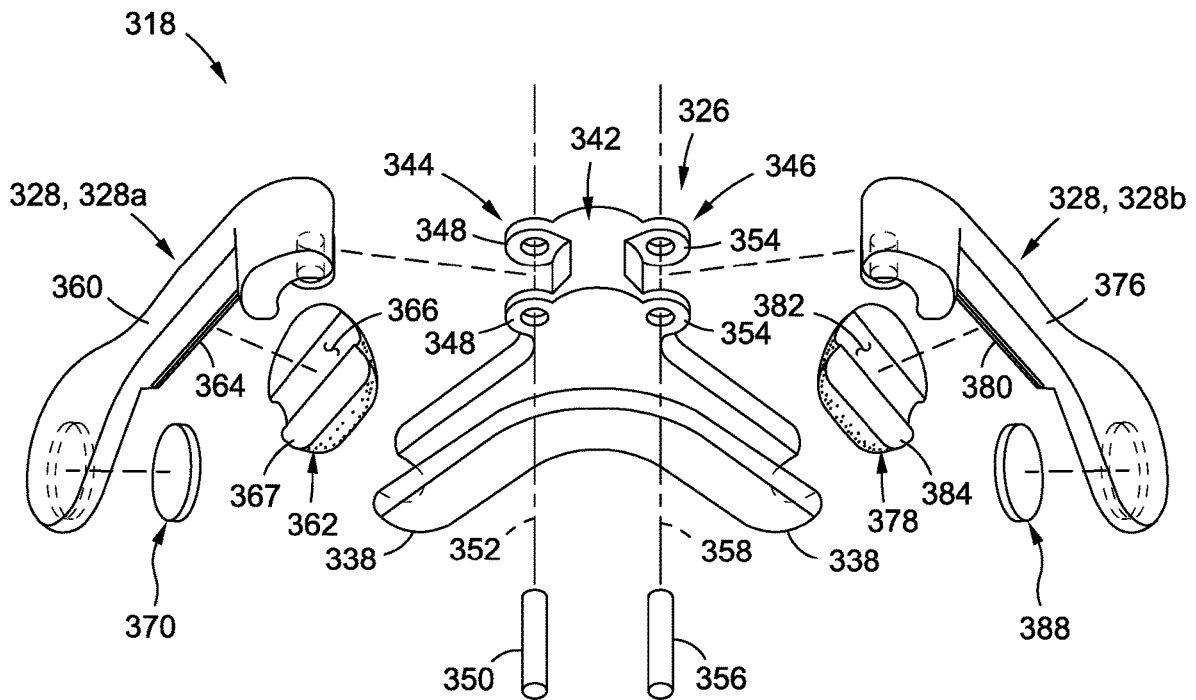


FIG. 23

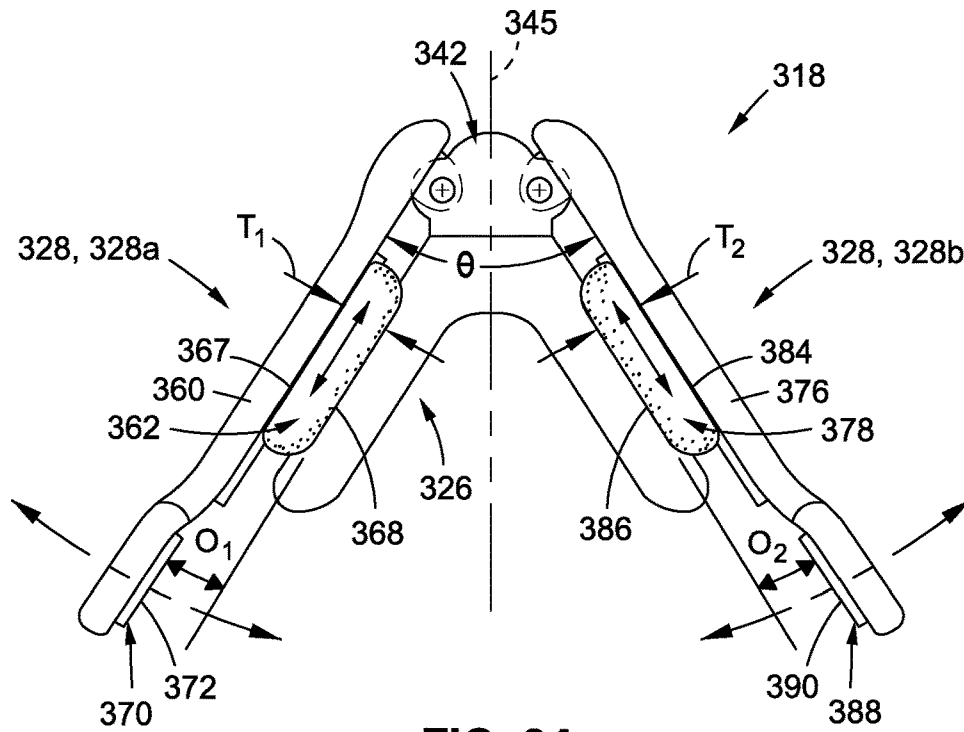


FIG. 24

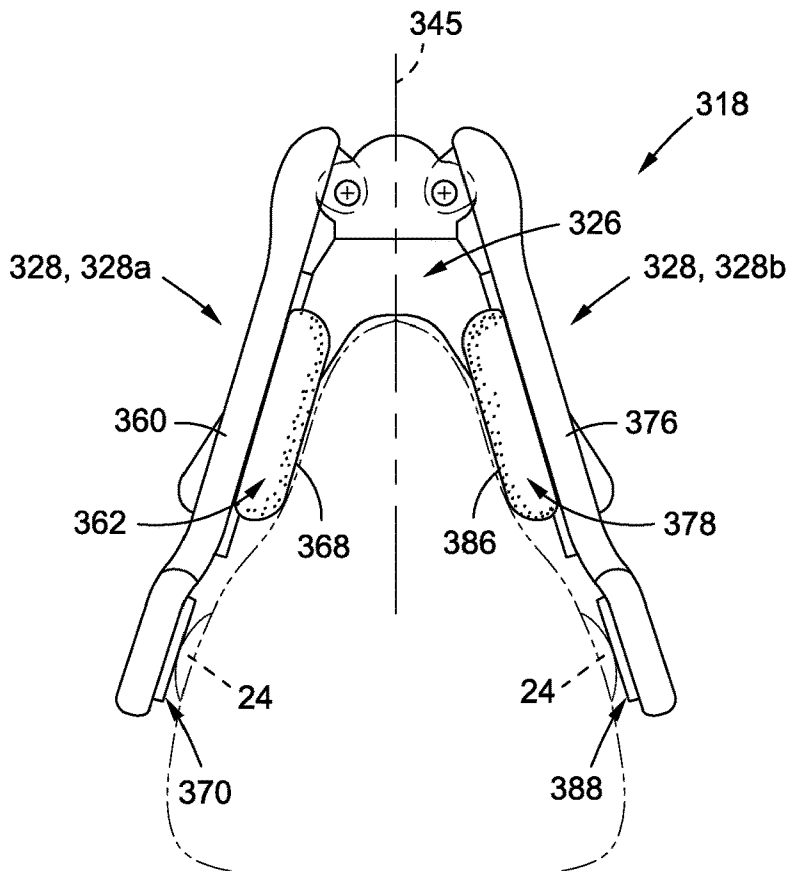


FIG. 25

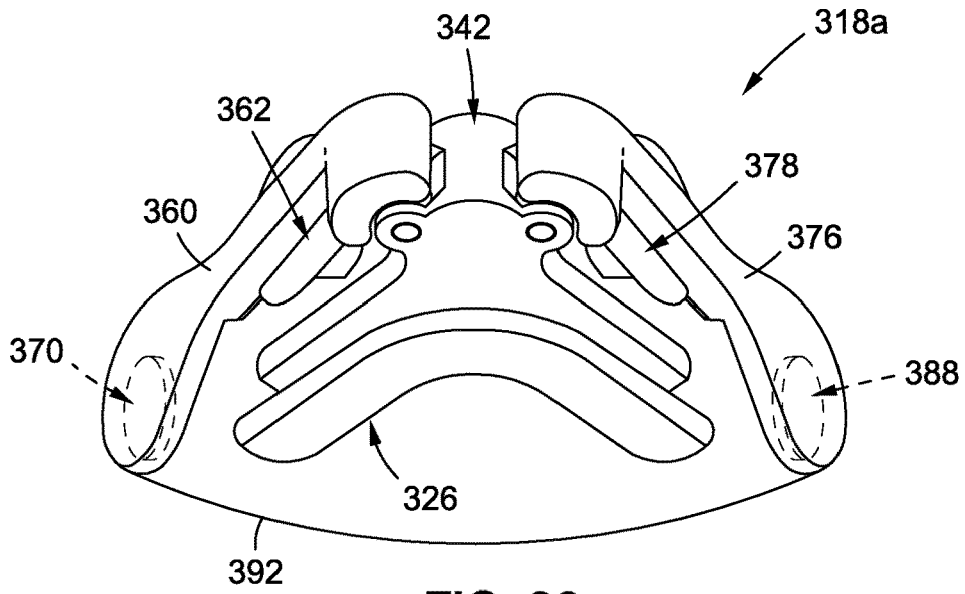


FIG. 26

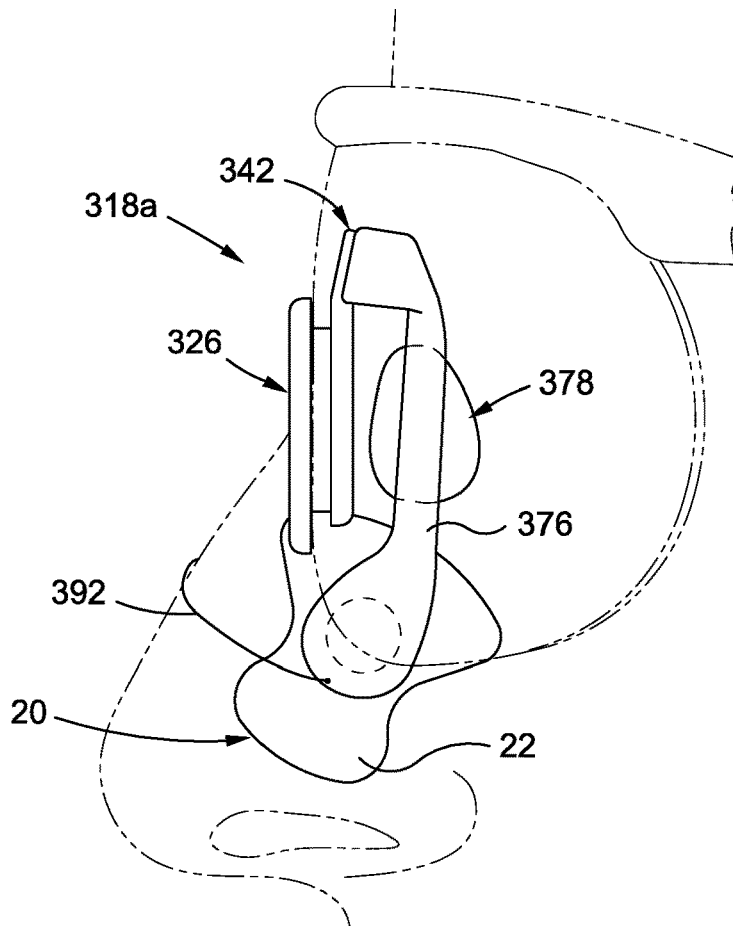


FIG. 27

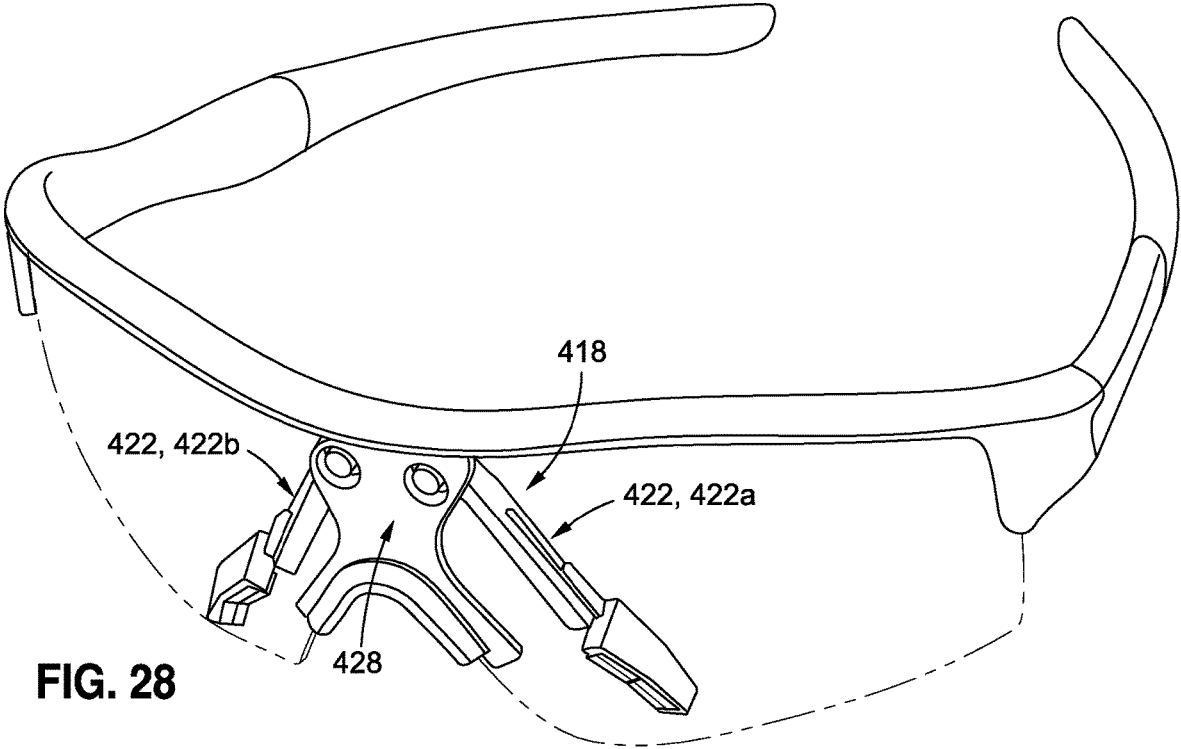


FIG. 28

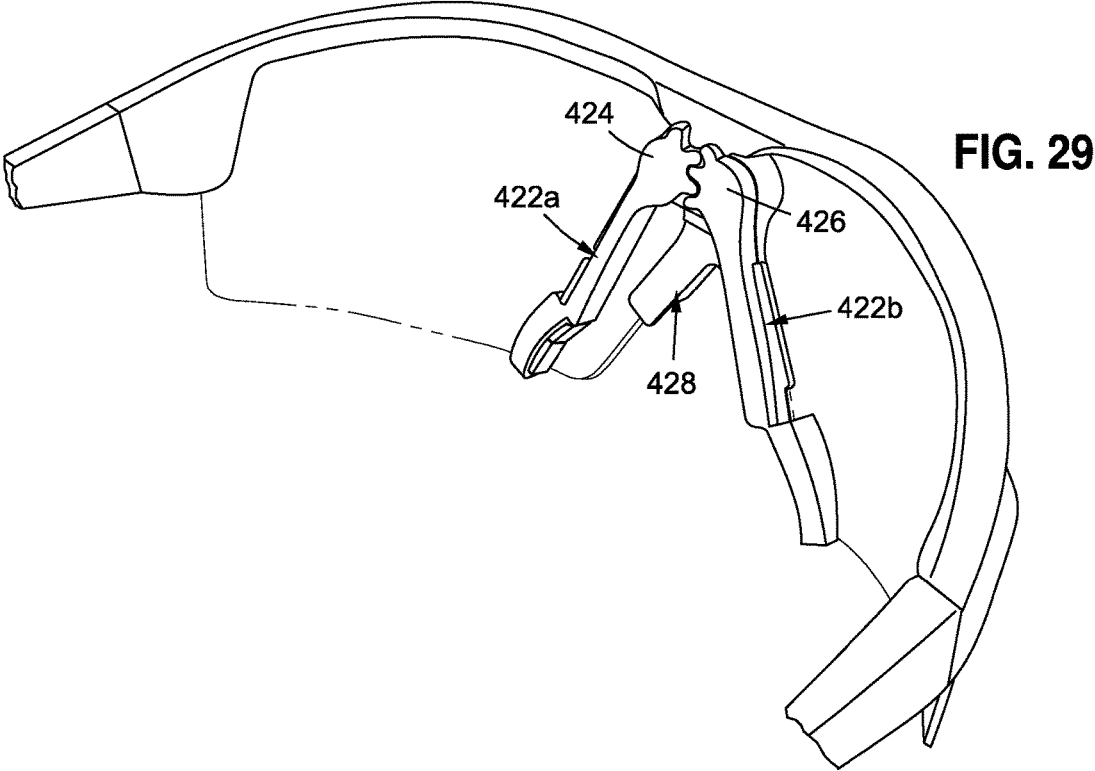


FIG. 29

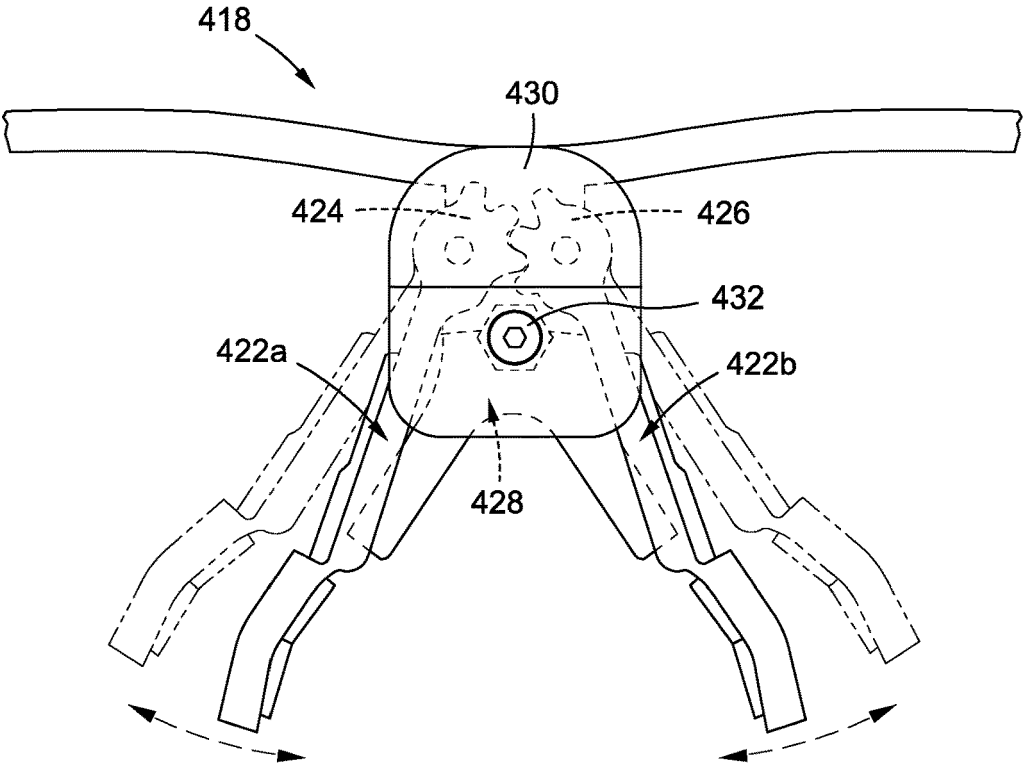


FIG. 30

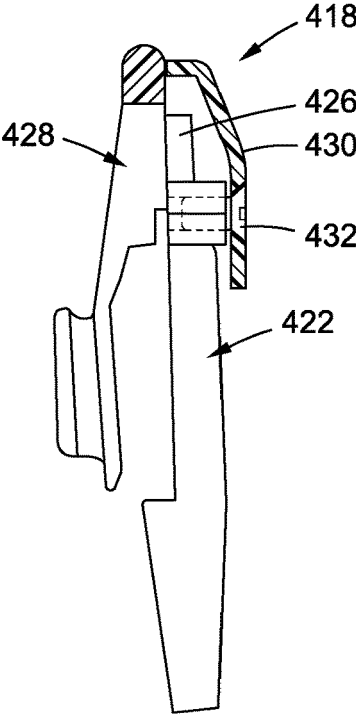


FIG. 31

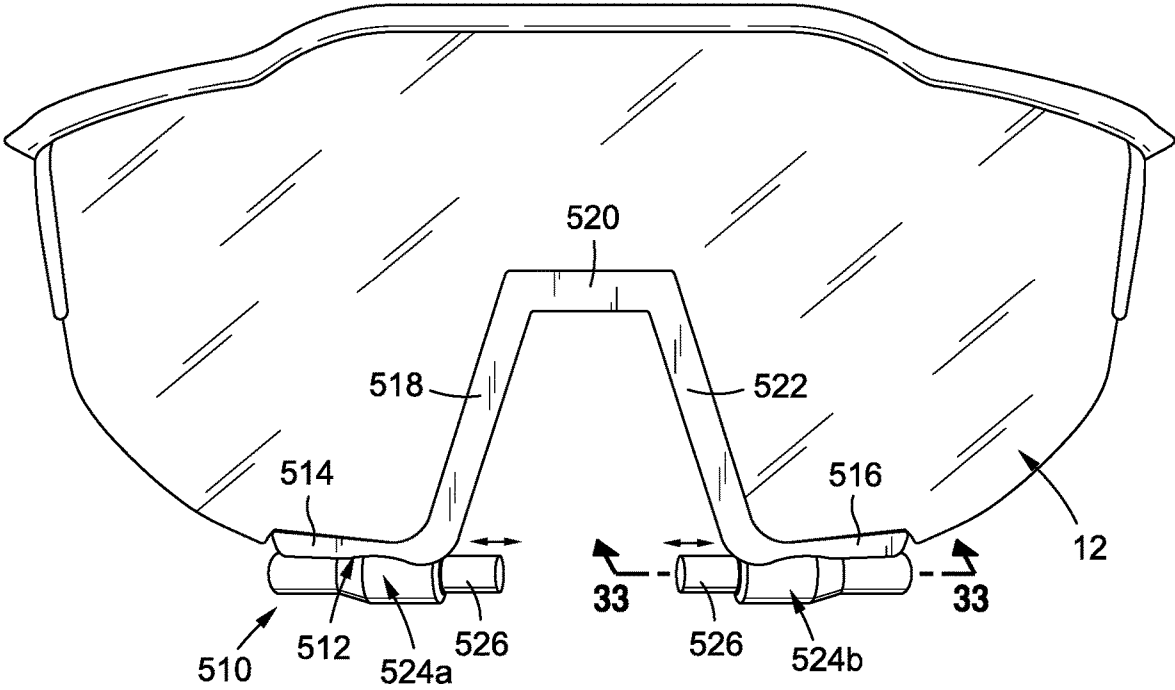


FIG. 32

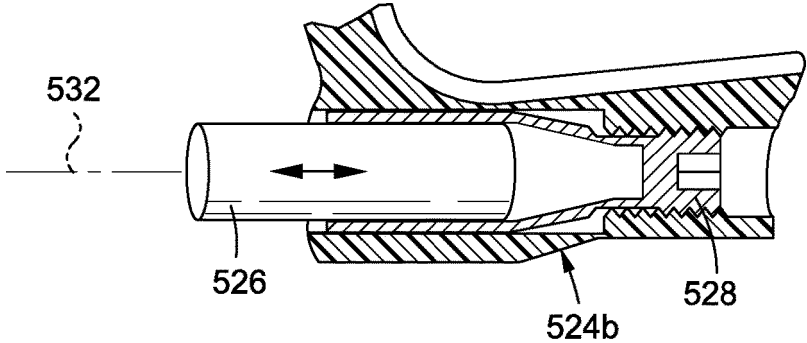


FIG. 33

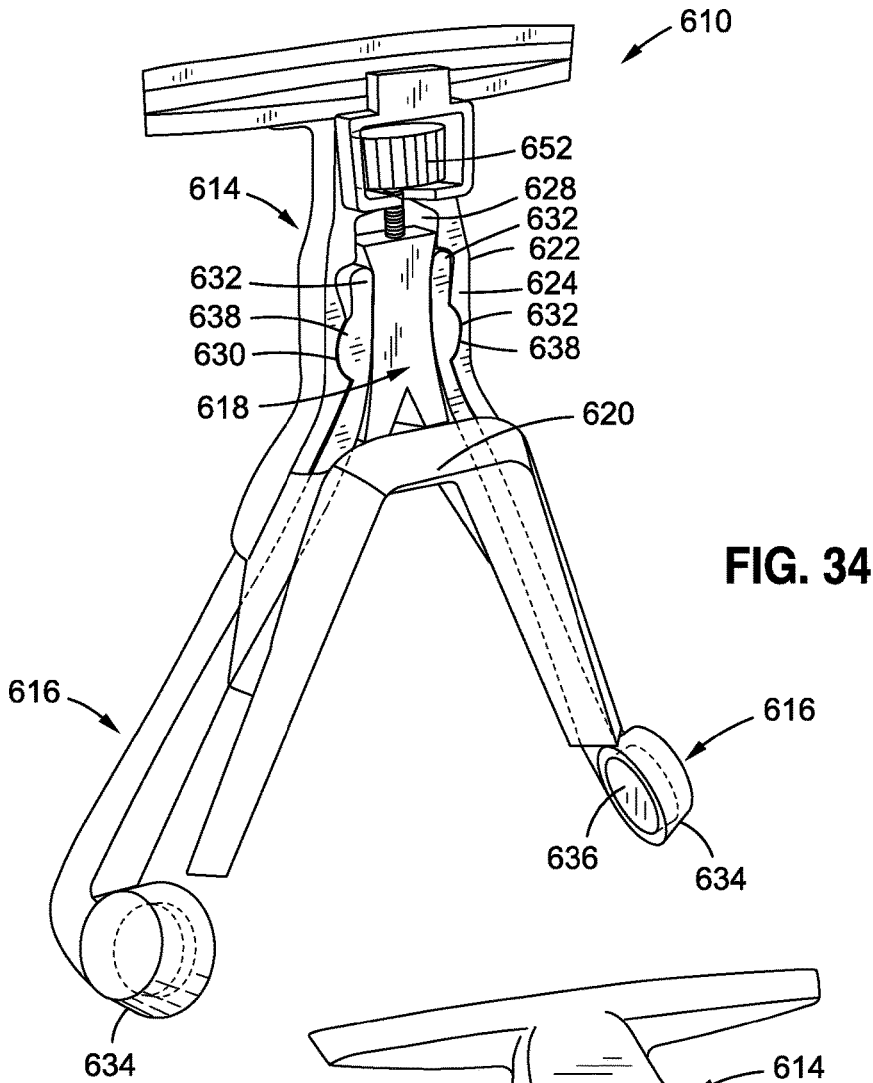


FIG. 34

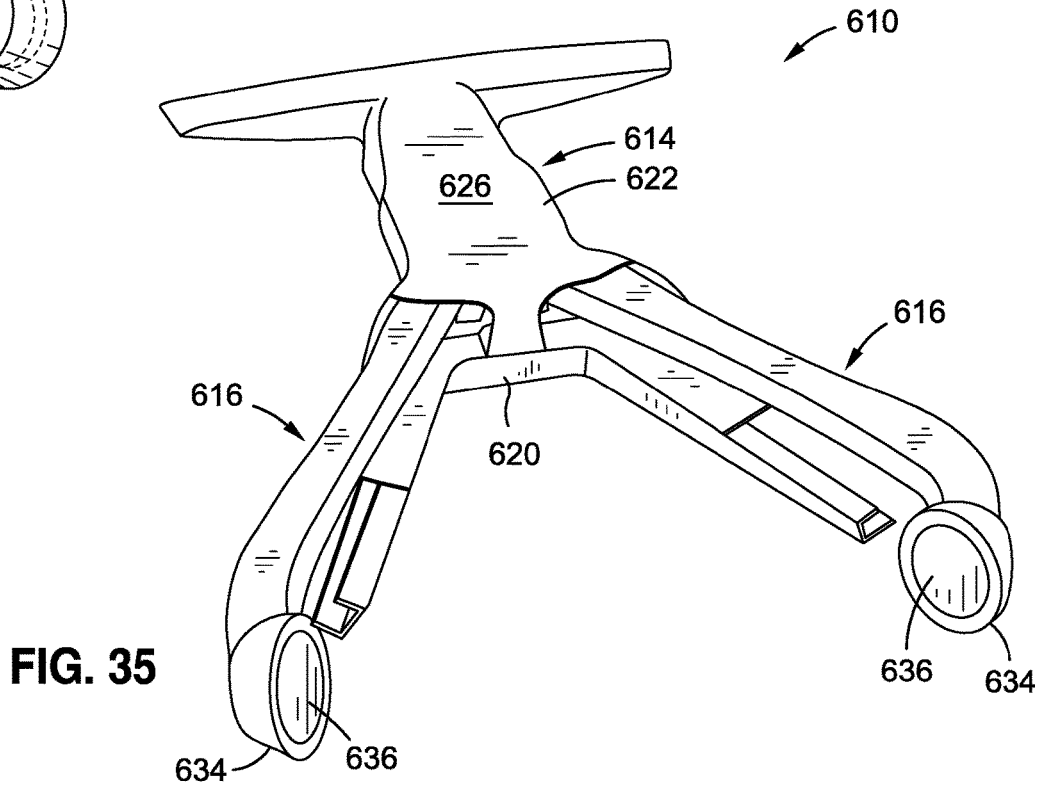
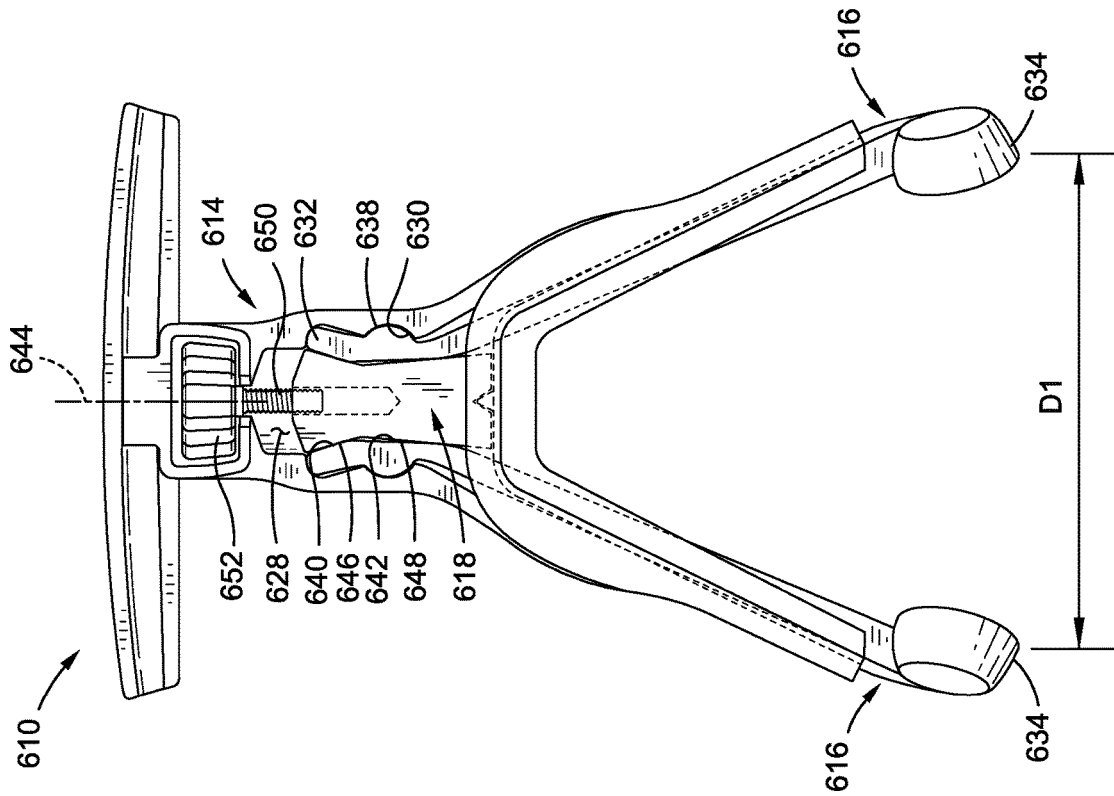
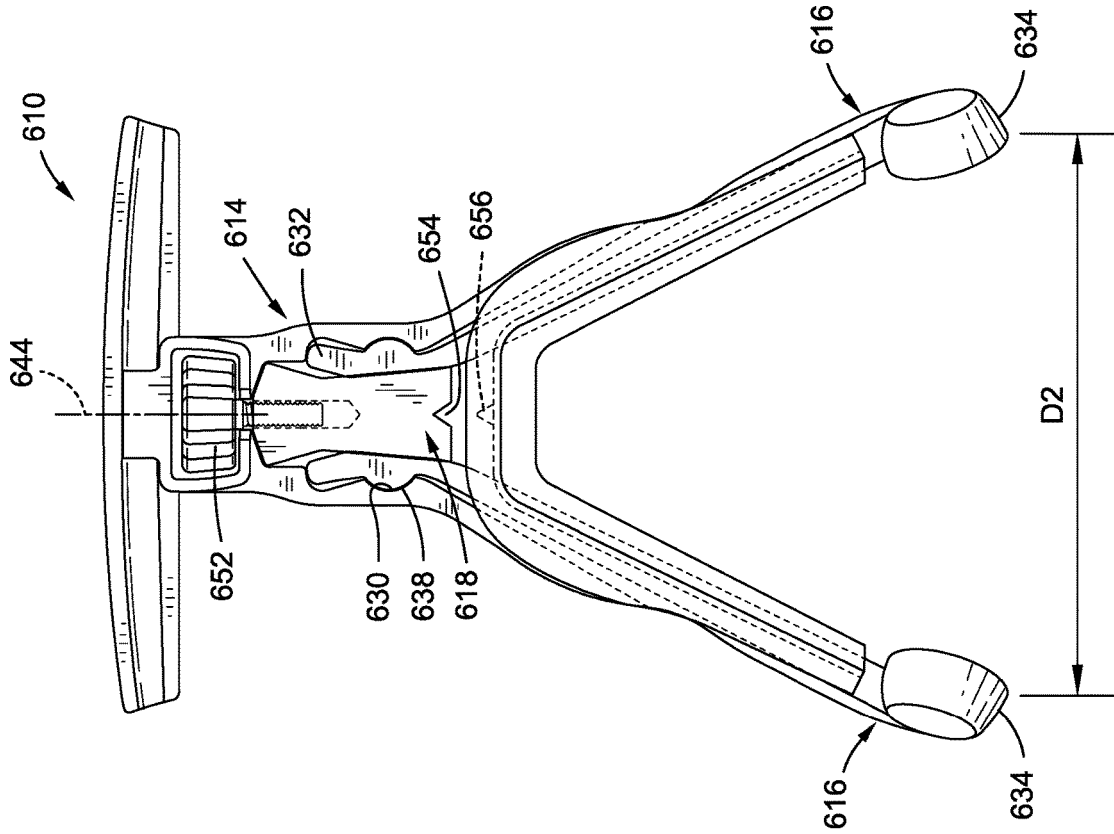


FIG. 35



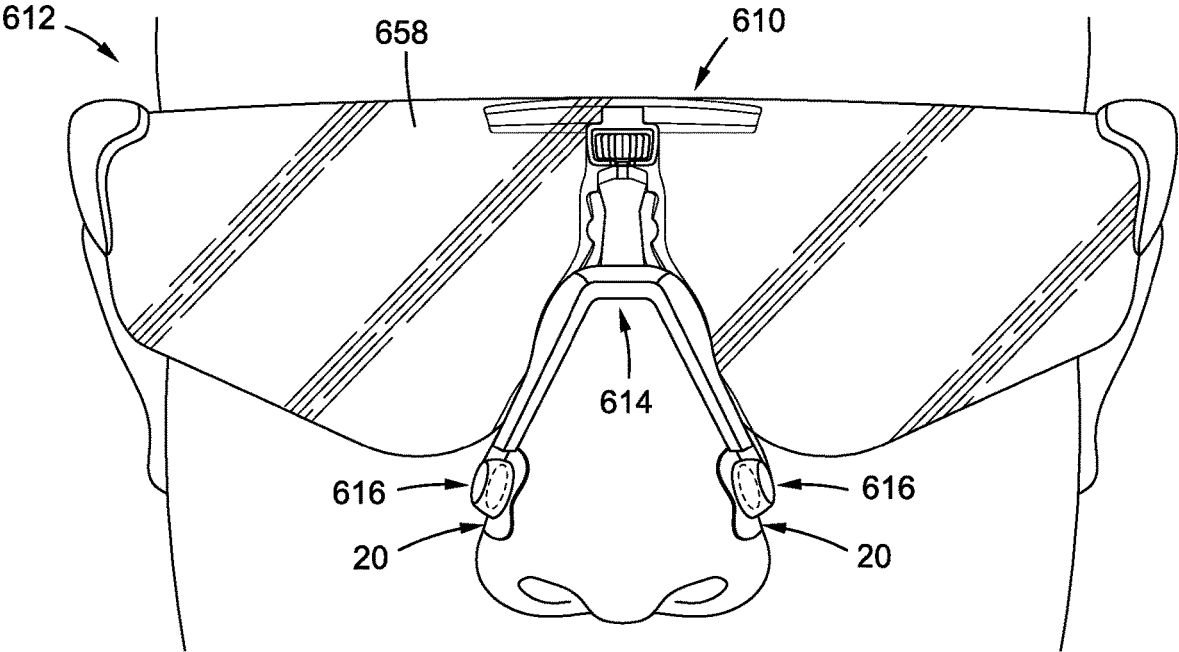


FIG. 38

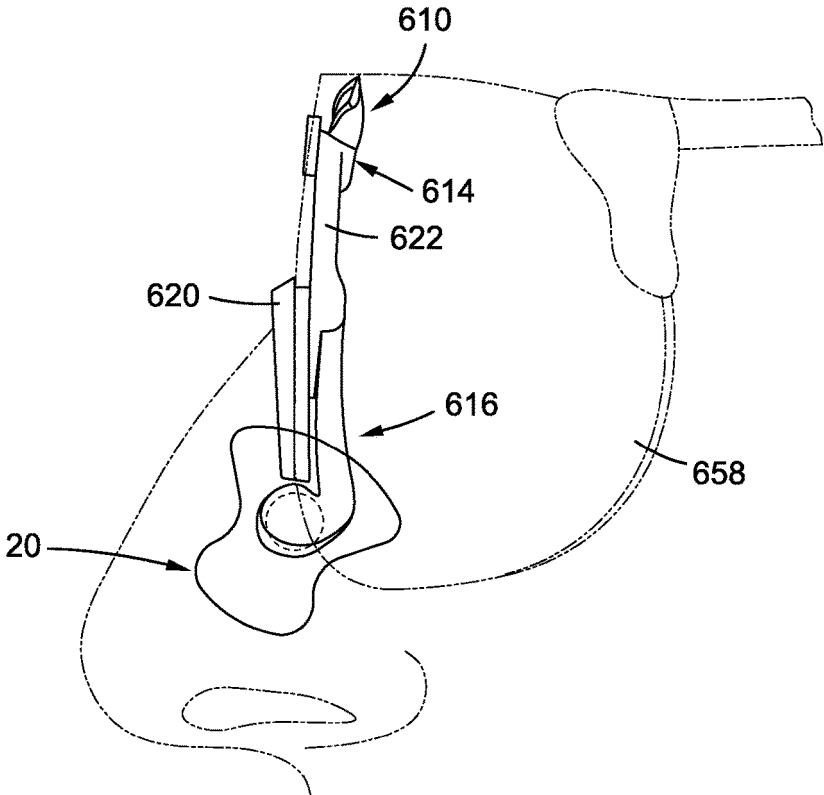


FIG. 39

**EYEWEAR SYSTEM FOR SECURING LENS
ON A USER'S NOSE AND DILATING USER'S
NOSE**

CROSS-REFERENCE TO RELATED
APPLICATIONS

This application is a continuation-in-part of U.S. patent application Ser. No. 15/071,459, filed Mar. 16, 2016 and published as United States Patent Application Publication No. 2016/0193070, which is a continuation-in-part of U.S. patent application Ser. No. 14/979,009, filed Dec. 22, 2015 and published as United States Patent Application Publication No. 2016/0106567, which is a continuation-in-part of U.S. patent application Ser. No. 14/799,192, filed Jul. 14, 2015 and published as United States Patent Application Publication No. 2015/0314113, which is a continuation-in-part of U.S. patent application Ser. No. 14/622,448, filed Feb. 13, 2015 and issued as U.S. Pat. No. 9,283,106, issued Mar. 15, 2016, which is a continuation-in-part of U.S. patent application Ser. No. 14/502,348, filed Sep. 30, 2014 and issued as U.S. Pat. No. 9,675,493, issued Jun. 13, 2017, which claims the benefit of U.S. Provisional Application No. 61/918,826, filed Dec. 20, 2013, and U.S. Provisional Application No. 61/937,018, filed Feb. 7, 2014, the contents of each of the foregoing applications being expressly incorporated herein by reference.

STATEMENT RE: FEDERALLY SPONSORED
RESEARCH/DEVELOPMENT

Not Applicable

BACKGROUND

1. Technical Field

The present disclosure relates generally to components for breathing enhancement, and more specifically to a system including a nasal applique wearable on a user's nose and a lens retaining device magnetically attractable to the nasal applique for securing the lens to the user's nose and dilating the user's nasal passageway.

2. Description of the Related Art

It is readily understood that breathing is important when playing sports or partaking in physical competition due to the increased demand for oxygen by the body. Breathing may be achieved by drawing air into the body through an individual's nostrils and/or through the individual's mouth. However, in some instances, it is preferable to breathe almost exclusively through the nostrils, as there may be a downside to breathing through one's mouth. Along these lines, breathing through the mouth may lead to rapid water loss and heat loss, both of which increase the likelihood of exercise-induced asthma.

It is also understood that eyewear is commonly used when participating in many sports and activities. Such eyewear may include sunglasses, protective eyewear, or vision-enhancing (e.g., prescription) eyewear. However, at the very least, most eyewear is not adapted to improve the ability of the wearer's breathing, and in some instance, may actually hinder the wearer's breathing by compressing the user's nose and constricting the nasal passageways.

Accordingly, there is a need in the art for a device which can be used with an eyewear lens or lenses for enhancing the

wearer's ability to breathe through the wearer's nasal passage while wearing the eyewear lens(es). Various aspects of the present invention address this particular need, as will be discussed in more detail below.

BRIEF SUMMARY

In accordance with one embodiment of the present disclosure, there is provided a device for securing an eyewear lens to at least one nasal applique attachable to a user's nose which results in dilation of a nasal passageway. The device includes a base configured to be engageable with the eyewear lens. A first pivot unit is coupled to the base and is pivotable relative to the base about a first pivot axis. A second pivot unit is coupled to the base and is pivotable relative to the base about a second pivot axis spaced from, and generally parallel to the first pivot axis. The first pivot unit and the second pivot unit are configured to interact with at least one nasal applique to magnetically couple the first pivot unit and the second pivot unit to the at least one nasal applique. The magnetic coupling between the first pivot unit and the second pivot unit and the at least one nasal applique imparts a dilating force on the user's nose to dilate the nasal passageway when the at least one nasal applique is attached to the user's nose.

The device may include a guide member coupled to the first pivot unit and the second pivot unit, with the guide member being moveable relative to the base and movement of the guide member relative to the base causing pivotal movement of the first pivot unit and the second pivot unit relative to the base.

The guide member may include a pair of grooves formed therein, with the first and second pivot units being received within respective ones of the pair of grooves. The guide member may include a camming surface which interfaces with the first pivot unit and the second pivot unit, with the camming surface being sized and configured to transform translational movement of the guide member into pivotal movement of the first pivot unit and the second pivot unit. The device may further include an adjustment shaft coupled to the base and the guide member, with the guide member being translatable along the adjustment shaft. The guide member and adjustment shaft may be configured such that the guide member is translatable along the adjustment shaft in response to rotation of the adjustment shaft about a rotation axis. The device may additionally include an adjustment knob coupled to the adjustment shaft and adapted to enable manually controlled rotation of the adjustment shaft about the rotation axis.

The first pivot unit may include a first gear portion and the second pivot unit may include a second gear portion cooperatively engaged with the first gear portion to facilitate geared pivotal motion of the first pivot unit relative to the second pivot unit. The device may further comprise an eyewear frame including a forward frame element and a pair of arms pivotally coupled to the forward frame element, with the base being integrally coupled to the forward frame element.

The base may include a bridge element having a lens receiving channel adapted to receive the eyewear lens. The base may include a hinge element coupled to the bridge element and have a first hinge portion and a second hinge portion, with the first pivot unit being coupled to the hinge element at the first hinge portion and the second pivot unit being coupled to the hinge element at the second hinge portion.

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The device may include a retaining member coupled to the base and adapted to engage with the user's nose to retain the device on the user's nose.

The first pivot unit may include a first pivot arm pivotally coupled to the base and the second pivot unit may include a second pivot arm pivotally coupled to the base. At least one magnet may be coupled to the first pivot arm, and at least one magnet may be coupled to the second pivot arm. A first pair of magnets may be coupled to the first pivot arm and angularly offset from each other and a second pair of magnets may be coupled to the second pivot arm and angularly offset from each other. A first pad may be coupled to the first pivot arm and a second pad may be coupled to the second pivot arm. The first pad may be translatable along the first pivot arm and the second pad may be translatable along the second pivot arm. The first pivot arm and the second pivot arm may be positioned on opposite sides of a central axis. A first magnet may be coupled to the first pivot arm and have a first magnet inward surface facing toward the central axis. A second magnet may be coupled to the second pivot arm and have a second magnet inward surface facing toward the central axis. The first pad may have a first pad inward surface facing toward the central axis and the second pad may have a second pad inward surface facing toward the central axis. The first magnet inward surface may be offset from the first pad inward surface and the second magnet inward surface may be offset from the second pad inward surface. The first magnet inward face may be generally parallel with the first pad inward face and the second magnet inward face may be generally parallel with the second pad inward face. The first pad may be detachably coupled to the first pivot arm and the second pad may be detachably coupled to the second pivot arm.

According to another embodiment, there is provided a system for attaching an eyewear lens to a user's nose and dilating the user's nose. The system comprises at least one nasal applique including a base layer and a metallic element coupled to the base layer, with the base layer configured to be attachable to the user's nose. The system further includes an eyewear securing device operatively connectable to the at least one nasal applique. The eyewear securing device includes a base configured to be engageable with the eyewear lens. A first pivot unit is coupled to the base and is pivotal relative to the base about a first pivot axis. A second pivot unit is coupled to the base and is pivotal relative to the base about a second pivot axis spaced from, and generally parallel to the first pivot axis. The first pivot unit and the second pivot unit collectively define a nose adjustment angle therebetween, with the nose adjustment angle being generally conformable to the user's nose. The first pivot unit and the second pivot unit are configured to interact with at least one nasal applique to magnetically couple the first pivot unit and the second pivot unit to the at least one nasal applique. The magnetic coupling between the first pivot unit and the second pivot unit and the at least one nasal applique imparts a dilating force on the user's nose to dilate the nasal passageway when the at least one nasal applique is attached to the user's nose.

According to yet another embodiment, there is provided a device for coupling at least one eyewear lens to a pair nasal appliques attachable to a user's nose. The device includes a base engageable with the at least one eyewear lens, with the base including a pair of base camming surfaces. A pair of arms is coupled to the base and magnetically connectable to respective ones of the pair of nasal appliques, with each of the pair of arms extending away from the base to define a distal end portion. Each of the pair of arms includes an arm

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camming surface sized and shaped to interface with a corresponding one of the pair of base camming surfaces. The interaction between the arm camming surfaces and the base camming surfaces at least partially facilitates transition of the pair of arms relative to the base between a narrow configuration and a wide configuration, wherein a distance between the distal end portions of the pair of arms increases as the pair of arms transition from the narrow configuration to the wide configuration.

The base may include a cavity, with a portion of the pair of arms being received within the cavity and retained within the cavity as the pair of arms transition between the narrow configuration and the wide configuration. The cavity may be at least partially defined by the pair of base camming surfaces. The device may further comprise a guide member moveable relative to the base and operatively engaged with the pair of arms. Movement of the guide member relative to the base at least partially causes the pair of arms to transition relative to the base between the narrow configuration and the wide configuration. The guide member may be received within the cavity and may be moveable within the cavity. The guide member and the pair of arms may be cooperatively sized and shaped such that movement of the guide member relative to the base in a first direction causes the pair of arms to transition from the narrow configuration toward the wide configuration, and movement of the guide member relative to the base in a second direction opposite to the first direction causes the pair of arms to transition from the wide configuration toward the narrow configuration. The device may additionally include a screw member engaged with the guide member. The screw member may be sized and shaped such that rotation of the screw member in a first rotational direction relative to the guide member causes the guide member to move in the first direction, and rotation of the screw member in a second rotational direction relative to the guide member causes the guide member to move in the second direction. The device may additionally include a wheel connected to the screw, with the wheel being sized and positioned to allow a user to manually rotate the screw in the first rotational direction and the second rotational direction.

Each base camming surface may include a concave portion, and each arm camming surface may include a convex portion complimentary to the concave portion of the corresponding base camming surface.

The device may additionally include a pair of magnets, with each magnet being coupled to a respective distal end portion of the pair of arms.

According to another embodiment, there is provided an eyewear system adapted for use with at least one nasal applique. The eyewear system includes a lens having an opening formed therein, and a base engageable with the lens. A pair of arms is coupled to the base and extends away from the base to define a pair of distal end portions. The pair of arms are transitional relative to the base between a narrow configuration and a wide configuration, with a distance between the pair of distal end portions increasing as the pair of arms transition from the narrow configuration toward the wide configuration. An adjuster is operatively connected to the pair of arms and extends at least partially through the opening in the lens, with the adjuster being sized and shaped to enable manual adjustment of the transition of the pair of arms.

The present disclosure will be best understood by reference to the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which:

FIG. 1 is a front view of a first embodiment of a system including an eyewear lens mounting device and a pair of nasal appliques;

FIG. 2 is a side view of the first embodiment of the eyewear lens mounting device;

FIG. 3 is a front upper perspective view of the first embodiment of the eyewear lens mounting device;

FIG. 4 is a rear upper perspective view of the first embodiment of the eyewear lens mounting device;

FIG. 5 is a bottom perspective view of the first embodiment of the eyewear lens mounting device along with an adjustment tool;

FIG. 6 is a front view of the first embodiment of the eyewear lens mounting device in a narrow configuration;

FIG. 7 is a front view of the first embodiment of the eyewear lens mounting device in a wide configuration;

FIG. 8 is an upper perspective view of a second embodiment of an eyewear lens mounting device;

FIG. 9 is an upper perspective view of the second embodiment of the eyewear lens mounting device shown in use on a wearer;

FIG. 10 is a front upper perspective view of a third embodiment of an eyewear lens mounting device integrated into an eyewear frame;

FIG. 11 is a rear lower perspective view of the third embodiment of the eyewear lens mounting device;

FIG. 12 is a side view of the third embodiment of the eyewear lens mounting device;

FIG. 13 is a rear view of the third embodiment of the eyewear lens mounting device in a narrow configuration;

FIG. 14 is a rear view of the third embodiment of the eyewear lens mounting device in a wide configuration;

FIG. 15 is a front upper perspective view of a fourth embodiment of an eyewear lens mounting device integrated into an eyewear frame;

FIG. 16 is a rear upper perspective view of the fourth embodiment of the eyewear lens mounting device;

FIG. 17 is a side view of the fourth embodiment of the eyewear lens mounting device;

FIG. 18 is a rear view of the fourth embodiment of the eyewear lens mounting device in a narrow configuration;

FIG. 19 is a rear view of the fourth embodiment of the eyewear lens mounting device in a wide configuration;

FIG. 20 is a front view of a fifth embodiment of a system including an eyewear lens mounting device and a pair of nasal appliques;

FIG. 21 is a side view of the system depicted in FIG. 20;

FIG. 22 is an upper perspective view of the eyewear lens mounting device of FIGS. 20-21 detached from an eyewear lens;

FIG. 23 is an upper perspective exploded view of the eyewear lens mounting device shown in FIGS. 20-22;

FIG. 24 is a front view of the eyewear lens mounting device of FIGS. 20-23 shown in a wide configuration;

FIG. 25 is a front view of the eyewear lens mounting device of FIGS. 20-23 shown in a narrow configuration relative to the wide configuration depicted in FIG. 24;

FIG. 26 is an upper perspective view of a sixth embodiment of an eyewear lens mounting device including a nasal retaining member;

FIG. 27 is a side view of a system including the eyewear lens mounting device depicted in FIG. 28;

FIG. 28 is a front upper perspective view of a seventh embodiment of an eyewear lens mounting device integrated into an eyewear frame;

FIG. 29 is a rear upper perspective view of the seventh embodiment of the eyewear lens mounting device;

FIG. 30 is a front view of the seventh embodiment of the eyewear lens mounting device;

FIG. 31 is a side view of the seventh embodiment of the eyewear lens mounting device;

FIG. 32 is a front view of an eighth embodiment of an eyewear lens mounting device;

FIG. 33 is a partial cross sectional view of the eighth embodiment of the eyewear lens mounting device;

FIG. 34 is a front, upper perspective view of a ninth embodiment of an eyewear lens mounting device;

FIG. 35 is a rear, lower perspective view of the eyewear lens mounting device depicted in FIG. 34;

FIG. 36 is a front view of the eyewear lens mounting device depicted in FIG. 34 in a narrow configuration;

FIG. 37 is a front view of the eyewear lens mounting device depicted in FIG. 35 in a wide configuration;

FIG. 38 is a front view of an eyewear system incorporating the eyewear lens mounting device depicted in FIG. 34; and

FIG. 39 is a side view of the eyewear system depicted in FIG. 38.

Common reference numerals are used throughout the drawings and the detailed description to indicate the same elements.

DETAILED DESCRIPTION

The detailed description set forth below in connection with the appended drawings is intended as a description of certain embodiments of a system for simultaneously positioning an eyewear lens on a user's nose and dilating the user's nose to enhance airflow therethrough and is not intended to represent the only forms that may be developed or utilized. The description sets forth the various structure and/or functions in connection with the illustrated embodiments, but it is to be understood, however, that the same or equivalent structure and/or functions may be accomplished by different embodiments that are also intended to be encompassed within the scope of the present disclosure. It is further understood that the use of relational terms such as first and second, and the like are used solely to distinguish one entity from another without necessarily requiring or implying any actual such relationship or order between such entities.

Referring now to FIG. 1 and according to one embodiment of the present disclosure, there is provided a system 10 for simultaneously securing an eyewear lens 12 to a user's nose 14 and dilating the user's nose 14 by imparting a dilating force on a region of the nose 14 defining the nasal passageway 16. As will be described in more detail below, the system 10 utilizes magnetic force to connect a lens mounting device 18 to one or more nasal appliques 20 which are adhered to the user's nose 14. The magnetic force at least partially maintains the lens mounting device 18 on the user's nose 14, with the lens mounting device 18 being adapted to engage with the eyewear lens 12 so as to position the eyewear lens 12 in a conventional position in front of the user's eyes. The magnetic force also "pulls" or biases the applique(s) 20 toward the lens mounting device 18 to dilate the nasal passageways 16.

The system 10 shown in FIGS. 1 and 2 includes a pair of nasal appliques 20, with each nasal applique 20 generally

including a flexible body **22** and the metallic element **24** coupled to the flexible body **22**. The flexible body **22** is configured to be attached to a lateral region of the user's nose **14**, with the flexible body **22** being capable of bending/flexing to conform to the unique anatomy of the user's nose **14**. According to one embodiment, the flexible body **22** includes an adhesive disposed on an outer surface thereof to enable selective attachment of the applique **20** to the nose **14**. A peel-away layer may be coupled to the flexible body **22** and cover the adhesive to preserve the adhesive until the applique **20** is to be used.

According to one embodiment, and when viewed in from the perspective depicted in FIG. 2, the flexible body **22** defines an outer periphery that is generally of the shape of an hour-glass or butterfly. In this respect, the outer periphery includes a pair of enlarged end portions separated by a narrow middle portion having a pair of opposed concave edges. The generally hour-glass configuration of the outer periphery may enable the flexible body **22** to more easily conform to the unique anatomy of the user's nose **14**. For instance, one end portion of the flexible body **22** may extend onto the "ala of the nose," e.g., the rounded eminence extending around the nostril, the middle portion of the flexible body **22** may extend over the alar crease, and the remaining end portion of the flexible body **22** may extend on an adjacent region of the nose **14**. The applique **20** shown in FIG. 2 is designed to be used on either side of the nose, although it is contemplated that the appliques **20** may be specifically configured for use on either the left-side or right-side of the nose **14**. In that instance, the cutout defined by the concave edge on the applique **20**, which would accommodate the crease on the nose **14**, would be on the side of the applique **20** closest to the user's cheek, and away from the ridge of the nose **14**.

According to one embodiment, the flexible body **22** is a composite structure including a pair of outer layers with the metallic element **24** being captured between the outer layers. The layers may be secured to each other via adhesive, lamination, or other means known in the art. The metallic element **24** is configured to interact with a magnet when the magnet is remotely positioned adjacent the nose **14** and the flexible body **22** is attached to the nose **14**. In the case of system **10**, the magnet which interacts with the metallic element **24** is part of the lens mounting device **18**, which will be described in more detail below. The metallic element **24** is positioned such that at least a portion of the flexible body **22** extends radially outward beyond the metallic element **24** to define a flexible peripheral portion.

According to one embodiment, the metallic element **24** includes a convex surface defining a "domed" or arcuate configuration to enhance magnetic engagement with the remotely located magnet. In this regard, flat-to-flat attachment between the magnet and the metallic element **24** may create uncomfortable torque on the user's nose **14**. Thus, by creating a domed engagement surface on the metallic element **24**, such uncomfortable torque may be avoided. Furthermore, the convex surface defines a suitable structure which does not inhibit motion of the magnet thereover, and instead, allows the magnet to move or float along during engagement between the applique **20** and the magnet. In particular, the magnet may move along at least one axis, and more preferably along at least two axes, relative to the metallic element **24** while the metallic element **24** remains magnetically engaged with the magnet.

The domed or arcuate surface may be positioned opposite a generally planar surface of the flexible body **22**, such as substantially parallel to a flexible body plane defined by the

flexible body **22**. It is understood that the outer periphery of the metallic element **24** may be any shape, including circular, oval, quadrangular, etc. The advantages of the convex engagement between the metallic element **24** and the corresponding magnet may also be effectuated through the use of an arcuate or dome shaped magnet. In this respect, the metallic element **24** and/or the magnet may have an arcuate or rounded surface.

According to one embodiment, the flexible body **22** includes at least one perforation (not shown) extending through the flexible body **22** to ventilate the user's skin residing under the applique **20** to prevent sweat from building up under the applique **20**. Along these lines, a buildup of sweat between the applique **20** and the user's skin could diminish the ability of the adhesive to effectively secure the applique **20** to the user's nose **14**. Thus, by incorporating the perforation(s), the sweat can evaporate or flow away from the user's skin to more effectively maintain adhesion between the applique **20** and the user's nose **14**.

For more information regarding nasal appliques **20**, please refer to U.S. patent application Ser. No. 14/799,192, U.S. patent application Ser. No. 14/622,448, (published as United States Patent Application Publication No. 2015/0173934), U.S. patent application Ser. No. 14/502,348 (published as United States Patent Application Publication No. 2015/0173933), the contents of each of which being expressly incorporated herein by reference. Furthermore, although the exemplary embodiment includes a pair of nasal appliques **20**, it is understood that other embodiments of the system **10** may include a single applique **20**, while in other embodiments, the system **10** may include more than a pair of nasal appliques **20**. In this respect, the scope of the present disclosure is not limited to a particular number of nasal appliques **20**.

Turning now to the lens mounting device **18**, such device **18** generally includes a base **26** and a pair of pivot units **28** pivotally coupled to the base **26**. The lens mounting device **18** is adjustable via the pivot units **28** to conform to the size and shape of the user's nose **14**, as well as to adjust the magnitude of the dilating force on the user's nose, as will be described in more detail below.

According to one embodiment, the base **26** is comprised of a bridge element **30** adapted to receive the eyewear lens **12** and a hinge element **32** adapted to pivotally engage with the pivot units **28**. The bridge element **30** and hinge element **32** shown in the exemplary embodiment are integral with each other, although it is understood that the bridge element **30** and hinge element **32** may be separate components which cooperate with each other.

The bridge element **30** includes a lens receiving channel **34** adapted to receive the eyewear lens **12**. The bridge element **30** includes a pair of bridge element arms which intersect at an apex and are adapted to extend along opposing lateral regions of the user's nose **14** when the base **26** is coupled to the user's nose **14**. The lens receiving channel **34** is formed by a forward wall and a rearward wall, with the lens receiving channel **34** being positioned therebetween, and extending along the pair of bridge element arms. The width of the lens receiving channel **34** (e.g., the distance between the forward wall and the rearward wall) generally corresponds to the thickness of the eyewear lens **12** so as to securely retain the eyewear lens **12** therein.

The hinge element **32** is pivotally coupled to the first and second pivot units **28** and includes a first sidewall **36**, a second sidewall **38**, and a main wall **40** extending between the first sidewall **36** and the second sidewall **38**. The first sidewall **36**, second sidewall **38**, and main wall **40** may

collectively define a cavity 42 (see FIG. 7), which receives a guide member 44, which will be described in more detail below.

Each pivot unit 28 includes a pivot arm 46 pivotally coupled to the hinge element 32 and including a first end portion 48 and an opposing second end portion 50. In the exemplary embodiment, each pivot arm 28 includes a pivot bore 52 which is aligned with a hinge bore 54 formed on the hinge element 32, with a pivot pin extending through the pivot bore 52 and hinge bore 54 to pivotally couple the pivot arm 46 to the hinge element 32. The pivot arms 28 are positioned such that the first end portion 48 of each pivot arm 46 extends into the cavity 42 adjacent a respective sidewall 36, 38 of the hinge element 32. The first end portion 48 of each pivot arm 28 defines an arm camming surface 56 which is specifically configured and adapted to interface with the guide member 44, as will be described in more detail below.

The second end portion 50 of each pivot arm 28 is coupled to at least one magnet 58, and preferably a pair of magnets 58. In the exemplary embodiment, each pivot arm 46 includes a magnet holder 60, which may result in an enlarged form factor at the second end portion 50 of the pivot arm 46. Each magnet holder 60 is sized and configured to engage with one, and more preferably, a pair of magnets 58. Each magnet 58 includes an exposed surface, which faces away from the corresponding magnet holder 60. According to one embodiment, a pair of magnets 58 is coupled to each magnet holder 60, wherein the exposed surfaces of the magnets 58 are angularly offset from each other to define a shallow "V" shape. The angularly offset configuration of the magnets 58 mitigates face-to-face magnetic engagement with the metallic element 24 of the nasal applique 20, and thus, reduces torque being applied to the user's nose as the nasal applique 20 moves relative to the magnets 58, or is urged to move relative to the magnets 58.

The pivot units 28 are configured to interact with the nasal appliques 20 to magnetically couple the pivot units 28 to the nasal appliques 20. The magnetic coupling between the pivot units 28 and the nasal appliques 20 imparts a dilating force on the user's nose 14 to dilate the nasal passageway 16. In this respect, the appliques 20 are specifically configured and adapted to selectively transition between an "ON" state and an "OFF" state, by selectively donning or removing the lens mounting device 18 from the user's nose 14. In particular, if the lens mounting device 18 is placed on the user's nose 14, thereby placing the magnets 58 in close proximity to the appliques 20 residing on the user's nose 14, the metallic elements 24 are drawn toward a respective magnet 58 (or a respective pair of magnets 58), thereby imparting the dilating force on the nose 14. In contrast, if the lens mounting device 18 is removed from the user's nose 14, and thus, the magnets 58 are no longer in close proximity to the user's nose 14, the metallic elements 24 are not drawn away from the user's nose 14, and thus, no dilating force is imparted on the nose 14 by the appliques 20. The ability to selectively transition between ON and OFF states without requiring removal of the appliques 20 from the user is a significant benefit, as it allows a user to place the appliques 20 on the nose 14 at the beginning of an athletic event, and keep the appliques 20 on the nose 14 throughout the duration of the athletic event, while allowing the user to selectively transition the appliques 20 between the ON and OFF states. Such ability to transition between ON and OFF states is a significant departure from existing nasal "strips" which use a spring-biased metal strip to open a user's nasal passageway. The conventional nasal strips continuously apply a

dilating force on the user's nose the entire time the nasal strip is coupled to the nose. In this regard, the conventional nasal strip does not include the ability to seamlessly transition between ON and OFF states based on the proximity of a magnet.

According to one embodiment, the nasal appliques 20 and the magnets 58 are configured to allow for relative movement between the appliques 20 and magnets 58 while the appliques 20 are magnetically coupled to the magnets 58. For instance, the domed or arcuate configuration of the metallic element 24 allow for movement of the magnet(s) 58 over the surface of the metallic element 24. In particular, the magnet(s) 58 may move along at least one axis, and preferably along at least two axes relative to the metallic element 24 when the magnet 58 is magnetically held adjacent to the metallic element 24. Such relative movement between the nasal appliques 20 and the magnets 58 may result from increased activity by the wearer. Such movement of the magnet(s) 58 over the surface of the metallic element 24 facilitates removal or disengagement of the magnets 58 (and the entire lens mounting device 18) from the appliques 20, so long as the user applies sufficient force to overcome the magnetic attraction. In this regard, since the coupling between the lens mounting device 18 and the appliques 20 may be exclusively achieved via magnetic coupling, and may not rely on any non-magnetic coupling, disengagement of the lens mounting device 18 from the appliques 20 is relatively simple.

Pivotal movement of the pivot units 28 is controlled via the guide member 44, which translates within the cavity 42 formed by the hinge element 32 and is coupled to the pivot units 28 in a manner which transforms the translational movement of the guide member 44 into pivotal movement of the pivot units 28. The outer configuration of the guide member 44 is complimentary in shape to the cavity 42, and includes a first side portion that is complimentary to the first sidewall 36, and a second side portion that is complimentary to the second sidewall 38. The guide member 44 further includes a central bore 62 formed therein which is sized and configured to receive an adjustment shaft 64, which rotates about a rotation axis 66. The guide member 44 and adjustment shaft 64 are cooperatively configured to transform rotational movement of the adjustment shaft 64 into axial movement of the guide member 44. In the exemplary embodiment, the guide member 44 includes a nut 68 coupled to a guide body 70, wherein the nut 68 is received within a slot formed within the guide body 70. The internal threads of the nut 68 engage with the external threads on the adjustment shaft 64 so that as the adjustment shaft 64 rotates in a first rotational direction, the nut 68 and guide body 70 move relative to the base 26 along the adjustment shaft 64 (and the rotation axis 66) in a first axial direction, and as the adjustment shaft 64 rotates in an opposing second rotational direction, the nut 68 and guide body 70 move along the adjustment shaft 64 in an opposing second axial direction. Thus, by rotating the adjustment shaft 64, the guide member 44 can move relative to the base 26. It is understood that in other implementations, the guide member 44 may be threaded to directly engage with the adjustment shaft 64, and in such implementations, the guide member 44 may not include a nut. It is contemplated that the guide member 44 may be fabricated out of plastic, metal, or other materials known in the art.

The guide member 44 includes a guide camming surface 72 which interfaces with the pivot units 28 and is the portion of the guide member 44 that is sized and configured to transform translational movement of the guide member 44

into pivotal movement of the pivot units **28**. As shown, the guide camming surface **44** is an arcuate surface that interfaces with both arm camming surfaces **56** of the pivot arms **46**. The arcuate nature of the guide camming surface **44** creates movement of the respective ends of the pivot arms **46** along an axis that is generally perpendicular to the guide member translation axis **74**. In the perspective shown in FIGS. **6** and **7**, the guide member **44** is arranged such that the guide camming surface **72** defines an inverted “U” shape, with the open end of the “U” facing downward and being below the closed end of the “U.” Each arm camming surface **56** is adapted to interface with a respective side of the “U.” When the arms **46** are located at the open end of the “U,” the pivot units **28** are in a narrow configuration, with the distance between opposed magnets **58** being D_1 , as shown in FIG. **6**. However, as the guide member **44** transitions from the location shown in FIG. **6** to the location shown in FIG. **7**, the arm camming surfaces **56** move along the guide camming surface **72** toward the closed end of the “U.” The arcuate configuration of the guide camming surface **72** causes the ends of the pivot units **28** to move toward the guide translation axis **74**, and thus, toward each other, which results in the pivot units **28** assuming a wide configuration, as shown in FIG. **7**, with the distance between opposed magnets **58** being D_2 , which is larger than D_1 . As the pivot units **28** transition from the narrow configuration toward the wide configuration, the distance between the second end portions **50** of the pivot arms **46** increases, as does the distance between the pairs of magnets **58**. Conversely, as the pivot units **28** transition from the wide configuration toward the narrow configuration, the distance between the second end portions **50** of the pivot arms **46** decreases, as does the distance between the pairs of magnets **46**.

The guide camming surface **72** is selectively transitioned between the narrow configuration and the wide configuration to adjust the dilating force applied to the user’s nose. In particular, the wider the second end portions **50** of the pivot arms **46** are (e.g., the more space between the first and second pairs of magnets **58**), the greater the magnitude of the dilating force applied to the user because the nasal appliques **20** are “pulled” or displaced toward the magnets **58** by a greater distance. Conversely, the magnitude of the dilating force may be reduced by transitioning the pivot units **28** to the narrow configuration, to lessen the distance by which the nasal appliques **20** are displaced.

As noted above, movement of the guide member **44** is associated with rotation of the adjustment shaft **64**. According to one embodiment, a tool **76** is used to rotate the adjustment shaft **64**. In this respect, the adjustment shaft **64** may have a socket or configuration complimentary in shape to the tool. For instance, the adjustment shaft **64** may be configured to engage with an allen wrench, screwdriver, or other mechanical tool known in the art. It is also contemplated that the adjustment shaft **64** may be configured to extend to a location which allows for manual adjustment thereof.

Referring now to FIGS. **8** and **9**, there is shown another embodiment of an eyewear lens mounting device **18a** similar to the embodiment shown in FIGS. **1-7**, with the primary distinction being the inclusion of a retaining strap **80**. Along these lines, the eyewear lens mounting device **18** shown in FIGS. **1-7** is particularly suited for use with eyewear having a securing mechanism, such as arms which extend around the wearer’s ears or a strap which extends around the wearer’s head. In this regard, without such a securing mechanism, the eyewear device **18** would pivot about the appliques **20** over the front of the user’s nose **14**.

The retaining strap **80** shown in FIGS. **8** and **9** is intended as a substitute for conventional securing mechanisms. In this regard, the retaining strap **80** is configured to retain the eyewear lens mounting device **18a** on the wearer’s nose **14** without arms or other similar conventional securing mechanisms. In the exemplary embodiment the retaining strap **80** extends from side segment **31a** of the bridge member **30** to the opposing side segment **31b** so that when the device **18a** is worn by the wearer, the retaining strap **80** extends over the wearer’s nose **14** so as to prevent the device **18a** from pivoting over the front of the user’s nose **14**. In this respect, the device **18a** is supported on the wearer’s nose **14** by at least three points of contact, i.e., supported on each side of the wearer’s nose **14** via the nasal appliques **20**, as well as being supported by the retaining strap **80**. Thus, the three points of support allows the device **18a** to function similar to a conventional tripod.

It is understood that the mounting of the retaining strap **80** is not limited to being mounted on the bridge member **30**. Rather, the retaining strap **80** may be mounted to the pivot units, directly to the lens(es), or on the eyewear frame.

Referring now to FIGS. **10-14**, there is depicted another embodiment of an eyewear lens mounting device **118**. The device **118** generally includes a base **120** and a pair of pivot units **122** pivotally coupled to the base **120**, with the pivot units **122** being configured to interact with the nasal appliques **20** to magnetically couple the pivot units **122** to the nasal appliques **20**. According to one embodiment, the base **120** is comprised of a bridge element **124** adapted to receive the eyewear lens **12** and a hinge element **126** adapted to pivotally engage with the pivot units **122**. The bridge element **124** is similar to the bridge element **30** discussed above. The bridge element **124** and hinge element **126** shown in the exemplary embodiment are integral with each other, although it is understood that the bridge element **124** and hinge element **126** may be separate components which cooperate with each other.

The hinge element **126** is pivotally coupled to the pivot units **122** to enable pivotable movement of each pivot unit **122** relative to the base **120**. Each pivot unit **122** includes a pivot arm **128** pivotally coupled to the hinge element **126** and including a first end portion **130** and an opposing second end portion **132**. In the exemplary embodiment, the first end portion **130** of each pivot arm **128** includes a pivot boss **134** which is received with a respective hinge bore **136** formed on the hinge element **126** to pivotally couple the pivot arm **128** to the hinge element **126**. The second end portion **132** of each pivot arm **128** is coupled to at least one magnet **138**, and preferably a pair of magnets **138**, as described above. Along these lines, the second end portion **132** of each pivot arm **128** forms a magnet holder **140** sized and configured to engage with one, and more preferably, a pair of magnets **138**. The magnet holders **140** shown in FIGS. **10-14** define a slimmer form factor than the magnet holders **60** depicted in FIG. **1-7**. The magnets **138** are preferably arranged in the offset, “V” shaped configuration described above.

Pivotal movement of the pivot units **122** is controlled via a guide member **142**, which is adapted to translate relative to the base **120**. The guide member **142** is also coupled to the pivot units **122** in a manner which transforms the translational movement of the guide member **142** into pivotal movement of the pivot units **122**. The guide member **142** includes a first face **144** facing toward the base **120** and an opposing second face **146** facing away from the base **120**. The guide member **142** also includes a pair of grooves **148** extending into the guide member **142** from the first face **144**

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toward the second face 146. Each groove 148 is adapted to have one of the pivot arms 128 extend therethrough.

An adjustment bore 150 is formed within the guide member 142 and is adapted to receive an adjustment shaft 152, which rotates about a rotation axis 154. The guide member 142 and adjustment shaft 152 are cooperatively configured to transform rotational movement of the adjustment shaft 152 into axial movement of the guide member 142. The adjustment bore 150 includes internal threads that engage with the external threads on the adjustment shaft 152 so that as the adjustment shaft 152 rotates in a first rotational direction, the guide member 142 moves relative to the base 120 along the adjustment shaft 152 (and the rotation axis 154) in a first axial direction, and as the adjustment shaft 152 rotates in an opposing second rotational direction, the guide member 142 moves along the adjustment shaft 152 in an opposing second axial direction. Thus, by rotating the adjustment shaft 152, the guide member 142 can move relative to the base 120.

A portion of each pivot arm 128 is fixed about a respective pivot axis 156 relative to the hinge element 126 and base 120 by virtue of the pivot bosses 134 being received within corresponding hinge bores 136. In this regard, the pivot bosses 134 may pivot about a respective pivot axis 156, but the distance between the pivot bosses 134 remains fixed. In contrast, the distance between the second end portions 132 of the pivot arms 128 may be varied as a result of the pivoting motion of the pivot arms 128.

The pivoting motion of the pivot arms 128 is controlled by the guide member 142. In particular, as the guide member 142 translates relative to the base 120, the guide member 142 slides along the pivot arms 128, which causes the pivot arms 128 to pivot relative to the hinge element 126, and to move relative to each other. When viewed from the perspective shown in FIGS. 13 and 14, as the guide member 142 moves down, the second end portions 132 of the pivot arms 128 are moved toward each other to assume a narrow configuration (see FIG. 13). In contrast, as the guide member 142 moves up, the second end portions 132 of the pivot arms 128 are moved away from each other such that the pivot arms 128 assume a wide configuration (see FIG. 14).

Movement of the guide member 142 is associated with rotation of the adjustment shaft 152. A manually-operated adjustment knob 158 is coupled to the adjustment shaft 152 to rotate the adjustment shaft 152. A user may rotate the adjustment knob 158 in a first rotational direction to effectuate rotation of the adjustment shaft 152 in the first rotational direction. Likewise, the user may rotate the adjustment knob 158 in a second rotational direction to effectuate rotation of the adjustment shaft 152 in the second rotational direction. The adjustment knob 158 is located near the top of the device 118, adjacent the frame 160 of the eyewear. In this respect, a slot may be cut through the lens to enable manual access to the adjustment knob 158 while the wearer is wearing the device 118. In this regard, the wearer may quickly and easily adjust the magnitude of the dilating force during use/on-the-fly by simply rotating the adjustment knob 158.

As shown in FIGS. 10-14, the device 118 is integrally formed with the eyewear frame 160. In this respect, the device 118 may be molded with the forward frame element which may extend along an upper edge of the eyewear lens 12.

Referring now to FIGS. 15-19, there is shown another variation of an eyewear lens mounting device 218. The device 218 generally includes a base 220 and a pair of pivot units 222 pivotally coupled to the base 220, with the pivot

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units 222 being configured to interact with the nasal appliques 20 to magnetically couple the pivot units 222 to the nasal appliques 20. According to one embodiment, the base 220 includes a bridge element 224 adapted to receive the eyewear lens 12. The bridge element 224 is similar to the bridge element discussed above.

The base 220 further includes a fulcrum element 226 (e.g., hinge element) coupled to the bridge element 224, with the fulcrum element 226 providing a structure upon which the pivot units 222 pivot. Each pivot unit 222 includes a pivot arm 228 having a first end portion 230 and an opposing second end portion 232. In the exemplary embodiment, the first end portion 230 of each pivot arm includes an attachment stem 234. The second end portion 232 of each pivot arm is similar to the second end portion 132 described above in relation to FIGS. 10-14, and is coupled to at least one magnet 236, and preferably a pair of magnets 236.

Pivotal movement of the pivot units 222 is controlled via a guide member 238, which translates relative to the base 220 in an opening 240. The guide member 238 and pivot units 222 are configured such that the translational movement of the guide member 238 is transferred into pivotal movement of the pivot units 222. The guide member 238 includes a pair of channels 242 extending into the guide member 238, with the channels 242 being specifically sized and configured to receive a respective attachment stem 234 to connect the pivot units 222 to the guide member 238. An adjustment bore 244 is formed within the guide member 238 and is adapted to receive an adjustment shaft 246, which rotates about a rotation axis 248. The guide member 238 and adjustment shaft 246 are cooperatively configured to transform rotational movement of the adjustment shaft 246 into axial movement of the guide member 238. The adjustment bore 244 includes internal threads that engage with the external threads on the adjustment shaft 246 so that as the adjustment shaft 246 rotates in a first rotational direction, the guide member 238 moves relative to the base 220 along the adjustment shaft 246 (and the rotation axis 248) in a first axial direction, and as the adjustment shaft 246 rotates in an opposing second rotational direction, the guide member 238 moves along the adjustment shaft 246 in an opposing second axial direction. Thus, by rotating the adjustment shaft 246, the guide member 238 can move relative to the base 220.

The pivoting motion of the pivot arms 222 is controlled by the guide member 238 and the fulcrum element 226. In particular, as the guide member 238 translates, the first end portions 230 of the pivot arms 228 are moved closer or farther away from the fulcrum element 226, which results in the pivotal movement of the pivot arms 222. When viewed from the perspective shown in FIGS. 18 and 19, as the guide member 238 moves up, the second end portions 232 of the pivot arms 228 are moved toward each other to assume a narrow configuration (see FIG. 18). In contrast, as the guide member 238 moves down, the second end portions 232 of the pivot arms 228 are moved away from each other such that the pivot arms 228 assume a wide configuration (see FIG. 19).

A manually-operated adjustment knob 250 is coupled to the adjustment shaft 246 to rotate the adjustment shaft 246. A user may rotate the adjustment knob 250 in a first rotational direction to effectuate rotation of the adjustment shaft 246 in the first rotational direction. Likewise, the user may rotate the adjustment knob 250 in a second rotational direction to effectuate rotation of the adjustment shaft 246 in the second rotational direction. The adjustment knob 250 is located near the bottom of the adjustment shaft 246, adjacent the bridge member 224. In this respect, the adjustment knob

250 may be located beneath the lens 12, or alternatively, a slot may be cut through the lens 12 to enable manual access to the adjustment knob 250 while the wearer is using the device 218. In this regard, the wearer may quickly and easily adjust the magnitude of the dilating force during use/on-the-fly by simply rotating the adjustment knob 250.

Referring now to FIGS. 20-25, there is depicted another embodiment of an eyewear lens mounting device 318 including a base 326 and a pair of pivot units 328 pivotally coupled to the base 320. In the exemplary embodiment the hinge element 342 is integrally formed with the bridge element 330, and the pivot units 328 are disposed on opposite sides of a central axis 345. Each pivot unit 328 is adapted to magnetically interact with one or more nasal appliques 20 to impart a dilating force on the user's nose 14.

The base 326 includes a bridge element 330 and a hinge element 342. The hinge element 42 is coupled to the bridge element 330 and includes a first hinge portion 344 pivotally coupled to the first pivot unit 328a and a second hinge portion 346 pivotally coupled to the second pivot unit 328b. Furthermore, the bridge element 330 may include a pair of terminal ends 338 respectively formed on the bridge element arms, wherein the terminal ends 338 are configured to abut respective protrusions 41 formed on a corresponding bridge region of the eyewear lens 12 for connecting the eyewear lens 12 to the bridge element 330. In particular, the protrusions 41 may extend around the terminal ends 338 of the bridge element 330 to prevent the eyewear lens 12 from being inadvertently disconnected from the bridge element 330. Of course, other mechanisms for attaching the eyewear lens 12 to the bridge element 330 may also be used without departing from the spirit and scope of the present disclosure, such as other snap-fit arrangements. It is also contemplated that in one particular embodiment, the bridge element 330 is overmolded onto the eyewear lens 12 to create a more permanent connection therebetween.

Referring now specifically to FIG. 22, the first hinge portion 344 includes a pair of tabs 348 spaced apart and defining a pair of co-axially aligned openings, with the spacing between the tabs 348 being adapted to receive a portion of the first pivot unit 328a. A first pivot pin 350 is advanced through the tabs 348 and the first pivot unit 328a to pivotally couple the first pivot unit 328a to the first hinge portion 344, such that the first pivot unit 328a is pivotal relative to the base 326 about a first pivot axis 352. The second hinge portion 346 is configured similar to the first hinge portion 344 and includes a pair of tabs 354 spaced apart and defining a pair of co-axially aligned openings, with the spacing between the tabs 354 being adapted to receive a portion of the second pivot unit 328b. A second pivot pin 356 is advanced through the tabs 354 and the second pivot unit 328b to pivotally couple the second pivot unit 328b to the second hinge portion 346, such that the second pivot unit 328b is pivotal relative to the base 326 about a second pivot axis 358.

According to one embodiment, the first pivot unit 328a includes a first pivot arm 360 and a first pad 362 coupled to the first pivot arm 360, with the first pivot arm 360 being pivotally coupled to the base 326. The first pad 362 is adapted to rest on the user's nose, and serve as a fulcrum about which the first pivot arm 360 acts on the applique 20. The first pad 362 is translatable along the first pivot arm 360. According to one embodiment, the first pivot arm 360 may include a ridge or spine 364, and the first pad 362 includes a corresponding groove 366 which receives the spine 364 to translatably couple the first pad 362 to the first pivot arm 360. The first pad 362 includes a first surface 367 facing

toward the first pivot arm 360 and a second surface 368 facing away from the first pivot arm 360 and defining an engagement face which engages with the user's nose 14 during use of the lens mounting device 18. The first pad 362 defines a first pad thickness, T_1 , as the distance between the first surface 367 and the second surface 368. The first pivot unit 328a further includes a first magnet 370 coupled to a distal end portion of the first pivot arm 360, with the first magnet 370 defining a first magnet inward surface 372 facing toward the central axis 345. The second surface 368 of the first pad 362 and the first magnet inward surface 372 are offset from each other by an offset distance, O_1 , the importance of which will be described in more detail below.

The second pivot unit 328b is configured similar to the first pivot unit 328a and includes a second pivot arm 376 and a second pad 378 coupled to the second pivot arm 376, with the second pivot arm 376 being pivotally coupled to the base 326. The second pad 378 is adapted to rest on the user's nose, and serve as a fulcrum about which the second pivot arm 376 acts on the applique 20. The second pad 378 is translatable along the first pivot arm 376. According to one embodiment, the second pivot arm 376 includes a ridge or spine 380, and the second pad 378 includes a corresponding groove 382 which receives the spine 380 to translatably couple the second pad 378 to the second pivot arm 376. The second pad 378 includes a first surface 384 facing toward the second pivot arm 376 and a second surface 386 facing away from the second pivot arm 376 and defining an engagement face which engages with the user's nose 14 during use of the lens mounting device 18. The second pad 378 defines a second pad thickness, T_2 , as the distance between the first surface 384 and the second surface 386. The second pivot unit 328b further includes a second magnet 388 coupled to a distal end portion of the second pivot arm 376, with the second magnet 388 defining a second magnet inward surface 390 facing toward the central axis 345. The second surface 386 of the second pad 378 and the second magnet inward surface 390 are offset from each other by an offset distance, O_2 .

In the embodiment depicted in FIGS. 20-25, the magnets 370, 388 are located within respective cavities formed in the pivot arms 360, 376. In particular, the cavities extend into the respective pivot arms 360, 376 from an inner surface thereof, e.g., a surface which faces the nose 14 when the device 18 is worn on the nose 14. In the exemplary embodiment, the magnets 370, 388 are circular disks, and thus, the distal end portions of the pivot arms 360, 376 include an enlarged, rounded end to accommodate the disk-shaped magnets 370, 388. It is also contemplated that multiple magnets may be coupled to each pivot arm 360, 376 and arranged in an angled configuration, as discussed above.

The first pivot arm 360 and the second pivot arm 376 are positioned on opposite sides of the central axis 345 and define a nose adjustment angle, Θ , therebetween, with the nose adjustment angle Θ being generally conformable to the user's nose 14. In this respect, the size of the nose adjustment angle Θ may be adjusted so as to correspond to the size of the user's nose 14.

According to one embodiment, the strength of the dilating force imparted on the user's nose is directly related to the magnitude of the offsets, O_1 and O_2 , which are defined by the thicknesses T_1 and T_2 of the pads 362, 378. In particular, as the magnitude of the offsets O_1 and O_2 increases, the magnitude of the respective dilating forces (e.g., the dilating forces imparted on the sides of the nose) also increases. Conversely, as the magnitude of the offsets O_1 and O_2 decreases, the magnitude of the respective dilating forces

also decreases. Therefore, according to one embodiment, the magnitude of the dilating forces may be selected by choosing pads **362, 378** having thicknesses T_1 and T_2 which correspond to the desired dilating force. In this respect, it is contemplated that the pads **362, 378** are removable from the corresponding pivot arms **360, 376** to allow the user to vary the magnitude of the dilating force by swapping out pads having an undesirable thickness for pads having a more desirable thickness.

Use of the system includes placing one or more of the nasal appliques **20** adjacent the lateral regions of the user's nose **14**, and preparing the lens **12** and lens mounting device **318** for use. In particular, if the lens mounting device **318** is not molded onto the lens **12**, the user may select which lens **12** is to be used and placed in the lens receiving channel **332**. The ability to select the lens **12** may allow for customization of the system **10** based on the environmental conditions. For instance, if the device **318** is going to be used in a bright, sunny environment, the user may select a tinted lens **12**, whereas if the device **318** is going to be used in a darker environment, the user may select a clear lens **12**. Preparation of the lens mounting device **318** also includes ensuring the pads **362, 378** having a desired thickness associated with the preferred dilating force are placed on the pivot arms **360, 376**.

Once the appliques **20** are placed on the nose **14** and the lens is coupled to the lens mounting device **318**, the lens mounting device **318** is placed on the user's nose, with the lens **12** being positioned in front of the user's eyes. As the lens mounting device **318** is moved closer to the nose **14**, the metallic elements **24** are drawn outwardly toward the magnets **370, 388**. Furthermore, the magnetic attraction between the metallic elements **24** and the magnets **370, 388** causes the pivot arms **360, 376** to pivot relative to the base **326** and conform to the size of the user's nose **14**. When the lens retaining device **318** is finally positioned on the user's nose **14**, the magnetic attraction between the metallic elements **24** and the magnets **370, 388** imparts a dilating force on the user's nose **14** to open the nasal passageway **16**. During use of the system, the user can self-adjust the location of the lens **12** by moving the lens **12** up or down the user's nose **14**, which may also vary the dilating force imparted on the user's nose **14**.

When the user wants to remove the lens **12** from the user's nose **14**, the user may simply slide the lens mounting device **18** forward over the tip of the user's nose **14**, which causes the magnets **370, 388** to slide over the surface of the metallic elements **24** and then move away from the metallic elements **24** to effectively eliminate the magnetic attraction therebetween and terminate the dilating force.

Referring now to FIGS. **26** and **27**, there is depicted another embodiment of the lens mounting device **318a**, with the primary difference being the inclusion of a retaining member **392** coupled to and extending between the first pivot arm **360** and the second pivot arm **376** and adapted to engage with the user's nose **14** to retain the lens mounting device **318a** on the user's nose **14**, particular when the lens mounting device **318a** is used with lenses formed without arms which extend behind the user's ears. The retaining member **392** may be an elastic band, strap, or piece of tubing which extends between the pivot arms **360, 376**. The retaining member **392** is pliable or stretchable to enable the pivot arms **360, 376** to pivot relative to the base **326**, as described in more detail above. Alternatively, a retaining member **392** that is not stretchable may be used, such as a band which could be lengthened or shortened at one or both ends to accommodate different noses.

Referring now to FIGS. **28-31**, there is depicted another embodiment of the lens mounting device **418** which includes a pair of pivot units **422** similar to the pivot units discussed above in relation to the previous embodiments. The primary distinction is that that pivot units **422** shown in FIGS. **28-31** are geared together, such that pivotal movement of one pivot unit **422** causes pivotal movement of the other pivot unit **422**, whereas the previous embodiments discussed above include pivot units that are capable of pivoting independent of each other.

Each pivot unit **422** is pivotally coupled to a base **428**, with a first pivot unit **422a** having a first gear portion **424** and a second pivot unit **422b** having a second gear portion **426**. The first gear portion **424** includes a series of gear teeth which cooperatively engage with a corresponding series of gear teeth on the second gear portion **426**. The first and second gear portions **424, 426** may be covered by a cap **430**, which may be secured to the base **428** by a screw **432** or other attachment mechanisms known in the art. The cap **430** provides at least partial coverage over the gear portions **424, 426** to protect against debris from interfering with the operability of the gear portions **424, 426**. The cap **430** may also further secure the pivot units **422a,b** to the base **428**.

Although the foregoing describes the pivot arms as being coupled to a base adapted to engage one or more eyewear lenses, it is contemplated that other embodiments of the device may include pivot arms that are directly connected to the lenses, and thus, do not require a base as shown. In particular, the lens(es) may include one or more apertures drilled therein, and the pivot arms may be mounted to the lenses using the apertures. In this regard, mounting hardware may be used to effectuate such mounting.

Referring now to FIGS. **32** and **33**, there is depicted another embodiment of a device **510** mountable on a wearer's lens **12** and adapted to magnetically interact with one or more appliques **20** worn by the wearer. The device **510** includes a main body **512** attachable to the lens **12**, wherein the main body **512** includes a channel adapted to receive a peripheral portion of the lens **12**. According to one embodiment, the main body **512** includes a first lower lens segment **514**, and a second lower lens segment **516**. In the exemplary embodiment, the first and second lower lens segments **514, 516** are coupled to each other via a first side segment **518**, an apex segment **520**, and a second side segment **522**. However, it is also contemplated that the first and second lower lens segments **514, 516** may be separate components which attach to separate lenses or separate regions of a common lens. A first magnet housing **524a** is coupled to the first lower lens segment **514** and a second magnet housing **524b** is coupled to the second lower lens segment **516**. Each magnet housing **524a,b** includes a recess or opening adapted to receive a magnet **526**, with each magnet **526** being operatively coupled to a magnet adjuster **528**. The magnets **526** are adapted to magnetically interact with the nasal appliques **20** when the lens is worn by the wearer. In the exemplary embodiment, the magnet adjuster **528** is capable of adjusting the corresponding magnet **526** along an adjustment axis **532**. The magnet adjuster **528** may be a set screw operatively coupled to the magnet **526**. The adjustment axes **532** are preferably co-axially aligned with each other, although the present disclosure is not limited thereto, i.e., the adjustment axes may be angularly offset from one another. The magnets **526** are independently movable along their respective adjustment axis to change the position of the magnet **526** relative to the respective magnet housings **524a,b** which in turn adjusts the dilating force on the wearer's nose. In particular, as the magnets **526** are moved

away from the wearer's nose, the dilating force increases because the appliques 20 are required to move a farther distance to physically interact with the magnets 526. Conversely, as the magnets 526 are moved towards the wearer's nose, the dilating force decreases, as the appliques 20 do not need to move as far to physically interact with the magnets.

It is contemplated that any of the foregoing embodiments of the device may be configured as a component which is separate from the eyewear frame, or alternatively, any one of the embodiments may be integrally formed with the eyewear frame, such that the device and the eyewear frame operate as a single unit. In this regard, some embodiments of the device may at least partially rely on the eyewear lens(es) for support, while other embodiments may be adapted such that they do not require structural support from the eyewear lens(es). Furthermore, any one of the foregoing embodiments may be adapted for use with a single lens, or a plurality of lenses, such as two lenses.

Referring now to FIGS. 34-39, there is depicted another embodiment of an eyewear lens mounting device 610 and a related eyewear system 612 incorporating the eyewear lens mounting device 610. The device 610 generally includes a base 614, a pair of pivot units in the form of pivot arms 616 pivotally coupled to the base 614, and a guide member 618 which interfaces with the pair of pivot arms 616 to cause the pivot arms 616 to transition between a narrow configuration and a wide configuration. As will be described in more detail below, the pivot arms 616 and the base 614 include complimentary camming surfaces which produces the pivoting motion between the pivot arms 616 and the base 614 in response to movement of the guide member 618 relative to the pivot arms 616.

The base 614 is comprised of a bridge portion 620 adapted to receive the eyewear lens and a hinge portion 622 adapted to pivotally engage with the pivot arms 616. The bridge portion 620 may include a lens receiving channel adapted to receive the eyewear lens. However, it is also contemplated that the lens receiving channel is optional, and that the device 610 may be secured to the rear of the eyewear lens so as not to be seen when viewed from the front. The hinge portion 622 includes a first surface 624 and an opposing second surface 626, with the first surface 624 facing the lens receiving channel, and the second surface 626 facing away from the lens receiving channel. A cavity 628 is formed in the hinge portion 622 and extends into the hinge portion 622 from the first surface 624 toward the second surface 626. The cavity 628 is at least partially defined by a pair of base camming surfaces 630, which also extend from the first surface 624 toward the second surface 626. The cavity 628 is sized to receive and retain a portion of the pair of arms 616 as the pair of arms 616 transition between the narrow configuration and the wide configuration.

Each of the arms 616 includes a proximal end portion 632 received within the cavity 628 and an opposing distal end portion 634 extending away from the base. A magnet 636 may be coupled to each distal end portion 634 to facilitate magnetic coupling with a nasal applique. Each of the arms 616 includes an arm camming surface 638 at the proximal end portion 632, with each arm camming surface 638 being sized and shaped to interface with a corresponding one of the pair of base camming surfaces 630. In the exemplary embodiment, each arm camming surface 638 defines a convex surface, while each base camming surface 630 defines a concave surface. However, it is understood that the configuration may be reversed without departing from the spirit and scope of the present disclosure. The interaction between the arm camming surfaces 638 and the base cam-

ming surfaces 630 at least partially facilitates transition of the pair of arms 616 relative to the base 614 between a narrow configuration and a wide configuration. A distance between the distal end portions 634 of the pair of pivot arms 616 increases as the pair of pivot arms 616 transition from the narrow configuration to the wide configuration. Along these lines, FIG. 36 shows the pivot arms 616 in the narrow configuration, with a distance D1 separating the distal end portions 634, while FIG. 37 shows the pivot arms 616 in the wide configuration, with a distance D2 separating the distal end portions 634. The distance D2 is larger than the distance D1.

Although one side of each pivot arm 616 is adapted to interface with the base camming surface 630, the opposing side of each pivot arm 616 is adapted to interface with the guide member 618. Along these lines, each pivot arm 616 includes a first surface 640 which extends away from a central axis 644 when the pivot arm 616 is coupled with the base 614 and a second surface 642, which is offset from the first surface 640. In particular, the first and second surfaces 640, 642 are configured such that a magnitude of an angle between the first surface 640 and the central axis 644 is larger than a magnitude of an angle between the second surface 642 and the central axis 644.

The guide member 618 is received within the cavity 628 and is located between the pair of pivot arms 616 so as to be operatively engaged with the pair of pivot arms 616. The guide member 618 is also moveable relative to the base 614, with such movement at least partially causing the pair of arms 616 to transition relative to the base 614 between the narrow configuration and the wide configuration. The guide member 618 and the pair of pivot arms 616 may be cooperatively sized and shaped such that movement of the guide member 618 relative to the base 614 in a first direction causes the pair of pivot arms 616 to transition from the narrow configuration toward the wide configuration, and movement of the guide member 618 relative to the base 614 in a second direction opposite to the first direction causes the pair of pivot arms 616 to transition from the wide configuration toward the narrow configuration.

According to one embodiment, the guide member 618 includes opposing sides which interface with respective ones of the pivot arms 616. Each side includes a first surface 646 and a second surface 648 which interface with respective first and second surfaces 640, 642 on a corresponding pivot arm 616. Along these lines, each first surface 646 extends away from the central axis 644, and the second surface 648 is offset from the first surface 646. In particular, the first and second surfaces 646, 648 are configured such that a magnitude of an angle between the first surface 646 and the central axis 644 is larger than a magnitude of an angle between the second surface 648 and the central axis 644.

In use, the guide member 618 translates along the central axis 644 between a first (lower) position and a second (upper) position. FIG. 36 shows the guide member 618 in the first position and FIG. 37 shows the guide member 618 in the second position. In the first position, the first surfaces 646 of the guide member 618 are engaged with the first surfaces 640 of the respective pivot arms 616, which causes the pivot arms 616 to assume the narrow configuration. In other words, due to the configuration of the first surfaces 646 of the guide member 618 and the first surfaces 640 of the pivot arms 616, the proximal end portions 632 of the pivot arms 616 are moved away from the central axis 644. Furthermore, due to the configuration of the pivot arms 616, and the pivotal connection with the base 614, when the proximal end portions 632 of the pivot arms 616 are moved away from the

central axis **644**, the distal end portions **634** of the pivot arms **616** are moved toward the central axis **644**, which results in the pivot arms **616** assuming the narrow configuration shown in FIG. **36**. According to one embodiment, when the guide member **618** is in the first position, the second surfaces **648** of the guide member **618** are slightly offset from the second surfaces **642** of the pivot arms **616**, which may result in the formation of a gap between the guide member **618** and the second surfaces **642** of the pivot arms **616**.

As the guide member **618** moves from the first position toward the second position, the first surfaces **646** of the guide member **618** are moved away from the first surfaces **640** of the pivot arms **616**, while the second surfaces **648** of the guide member **616** are moved into alignment with the second surfaces **642** of the pivot arms **616**. In this regard, the second surfaces **648** of the guide member **618** are parallel to the second surfaces **642** of the pivot arms **616**, which reduces or completely eliminates any gap therebetween. Due to the configuration of the guide member **618** and the pivot arms **616**, movement of the guide member **618** from the first position toward the second position causes the proximal end portions **632** of the pivot arms **616** to move toward the central axis **644** and the distal end portions **634** of the pivot arms **616** to move away from the central axis **644**, which results in the pivot arms **616** assuming the wide configuration depicted in FIG. **37**.

In order to facilitate transition of the guide member **618** between the first and second positions, the device **610** includes a screw member **650** engaged with the guide member **618**. The screw member **650** may be sized and shaped such that rotation of the screw member **650** in a first rotational direction relative to the guide member **618** causes the guide member **618** to move in the first direction, and rotation of the screw member **650** in a second rotational direction relative to the guide member **618** causes the guide member **618** to move in the second direction. According to one embodiment, the screw member **650** is an externally threaded shaft that interfaces with an internally threaded bore formed on the guide member **618**. The device **610** may additionally include a wheel **652** connected to the screw member **650**, with the wheel **652** being sized and positioned to allow a user to manually rotate the screw member **650** in the first rotational direction and the second rotational direction.

It is contemplated that the guide member **618** may include a notch **654** that interfaces with a corresponding protrusion **656** formed on the base **614** to locate or register the guide member **618** relative to the base **614** when the guide member **618** is in the first position.

FIGS. **38** and **39** show the eyewear system **612** including a lens **658** attached to the device **610**. It is contemplated that the wheel **652** may extend through a slot formed in the lens **658**, or alternatively, the wheel **652** may be located above the lens **658**.

The particulars shown herein are by way of example only for purposes of illustrative discussion, and are not presented in the cause of providing what is believed to be most useful and readily understood description of the principles and conceptual aspects of the various embodiments of the present disclosure. In this regard, no attempt is made to show any more detail than is necessary for a fundamental understanding of the different features of the various embodiments, the description taken with the drawings making apparent to those skilled in the art how these may be implemented in practice.

What is claimed is:

1. A device for coupling at least one eyewear lens to a pair nasal appliques attachable to a user's nose, the device comprising:

a base engageable with the at least one eyewear lens, the base including a pair of base camming surfaces;

a pair of arms coupled to the base and magnetically connectable to respective ones of the pair of nasal appliques, each of the pair of arms extending away from the base to define a distal end portion, each of the pair of arms including an arm camming surface sized and shaped to interface with a corresponding one of the pair of base camming surfaces, the interaction between the arm camming surfaces and the base camming surfaces at least partially facilitating transition of the pair of arms relative to the base between a narrow configuration and a wide configuration, a distance between the distal end portions of the pair of arms increasing as the pair of arms transition from the narrow configuration to the wide configuration; and
a pair of magnets, each magnet being coupled to a respective distal end portion of the pair of arms.

2. The device recited in claim 1, wherein the base includes a cavity, a portion of the pair of arms being received within the cavity and retained within the cavity as the pair of arms transition between the narrow configuration and the wide configuration.

3. The device recited in claim 2, further comprising a guide member moveable relative to the base and operatively engaged with the pair of arms, movement of the guide member relative to the base at least partially causing the pair of arms to transition relative to the base between the narrow configuration and the wide configuration.

4. The device recited in claim 3, wherein the guide member is received within the cavity and is moveable within the cavity.

5. The device recited in claim 3, wherein the guide member and the pair of arms are cooperatively sized and shaped such that movement of the guide member relative to the base in a first direction causes the pair of arms to transition from the narrow configuration toward the wide configuration, and movement of the guide member relative to the base in a second direction opposite to the first direction causes the pair of arms to transition from the wide configuration toward the narrow configuration.

6. The device recited in claim 5, further comprising a screw member engaged with the guide member, the screw member being sized and shaped such that rotation of the screw member in a first rotational direction relative to the guide member causes the guide member to move in the first direction, and rotation of the screw member in a second rotational direction relative to the guide member causes the guide member to move in the second direction.

7. The device recited in claim 6, further comprising a wheel connected to the screw, the wheel being sized and positioned to allow a user to manually rotate the screw in the first rotational direction and the second rotational direction.

8. The device recited in claim 2, wherein the cavity is at least partially defined by the pair of base camming surfaces.

9. The device recited in claim 1, wherein each base camming surface includes a concave portion, and each arm camming surface includes a convex portion complimentary to the concave portion of the corresponding base camming surface.

10. An eyewear system adapted for use with at least one nasal applique, the eyewear system comprising:

- a lens having an opening formed therein;
- a base engageable with the lens and including a pair of base camming surfaces;
- a pair of arms coupled to the base and extending away from the base to define a pair of distal end portions, the pair of arms being transitional relative to the base between a narrow configuration and a wide configuration, a distance between the pair of distal end portions increasing as the pair of arms transition from the narrow configuration toward the wide configuration, the pair of arms defining a pair of arm camming surfaces that interface with respective ones of the pair of base camming surfaces to at least partially facilitate transition of the pair of arm between the narrow configuration and the wide configuration; and
- an adjuster operatively connected to the pair of arms and extending at least partially through the opening in the lens, the adjuster being sized and shaped to enable manual adjustment of the transition of the pair of arms.

11. The eyewear system recited in claim 10, wherein the base includes a cavity, a portion of the pair of arms being received within the cavity and retained within the cavity as the pair of arms transition between the narrow configuration and the wide configuration.

12. The eyewear system recited in claim 11, further comprising a guide member moveable relative to the base and operatively engaged with the pair of arms and the adjuster, movement of the guide member relative to the base at least partially causing the pair of arms to transition relative to the base between the narrow configuration and the wide configuration.

13. The eyewear system recited in claim 12, wherein the guide member is received within the cavity and is moveable within the cavity.

14. The eyewear system recited in claim 12, wherein the guide member and the pair of arms are cooperatively sized and shaped such that movement of the guide member relative to the base in a first direction causes the pair of arms to transition from the narrow configuration toward the wide configuration, and movement of the guide member relative to the base in a second direction opposite to the first direction causes the pair of arms to transition from the wide configuration toward the narrow configuration.

15. The eyewear system recited in claim 12, further comprising a screw member engaged with the guide member and the adjuster, the screw member being sized and shaped such that rotation of the screw member in a first rotational

direction relative to the guide member causes the guide member to move in the first direction, and rotation of the screw member in a second rotational direction relative to the guide member causes the guide member to move in the second direction.

16. A device for coupling at least one eyewear lens to a pair nasal appliques attachable to a user's nose, the device comprising:

- a base configured to be engageable with the at least one eyewear lens;
- a pair of arms coupled to the base and magnetically connectable to respective ones of the pair of nasal appliques, each of the pair of arms extending away from the base to define a distal end portion, the pair of arms being transitional relative to the base between a narrow configuration and a wide configuration, a distance between the distal end portions of the pair of arms increasing as the pair of arms transition from the narrow configuration to the wide configuration;
- a guide member moveable relative to the base and operatively engaged with the pair of arms, movement of the guide member relative to the base at least partially causing the pair of arms to transition relative to the base between the narrow configuration and the wide configuration; and
- a pair of magnets, each magnet being coupled to a respective distal end portion of the pair of arms.

17. The device recited in claim 16, wherein the guide member and the pair of arms include a first set of cooperating camming surfaces, and the base and the pair of arms include a second set of cooperating camming surfaces, the interaction between the first set of cooperating camming surfaces and the second set of cooperating camming surfaces facilitating transition of the pair of arms between the narrow configuration and the wide configuration.

18. The device recited in claim 17, further comprising a screw member engaged with the guide member, the screw member being sized and shaped such that rotation of the screw member in a first rotational direction relative to the guide member causes the guide member to move in a first direction, and rotation of the screw member in a second rotational direction relative to the guide member causes the guide member to move in a second direction.

19. The device recited in claim 16, further comprising an adjuster operatively connected to the pair of arms, the adjuster being sized and shaped to enable manual adjustment of the transition of the pair of arms.

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