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(54) **PATIENT INTERFACES**

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Related U.S. Patent Documents

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(51) **Int. Cl.**
A62B 7/00 (2006.01)

(52) **U.S. Cl.** **128/204.18**; 128/202.27; 128/203.22; 128/204.12; 128/205.25; 128/206.21; 128/206.24; 128/207.13

(58) **Field of Classification Search** 128/202.27, 128/203.22, 204.12, 204.18, 205.25, 206.21, 128/206.24, 207.13
See application file for complete search history.

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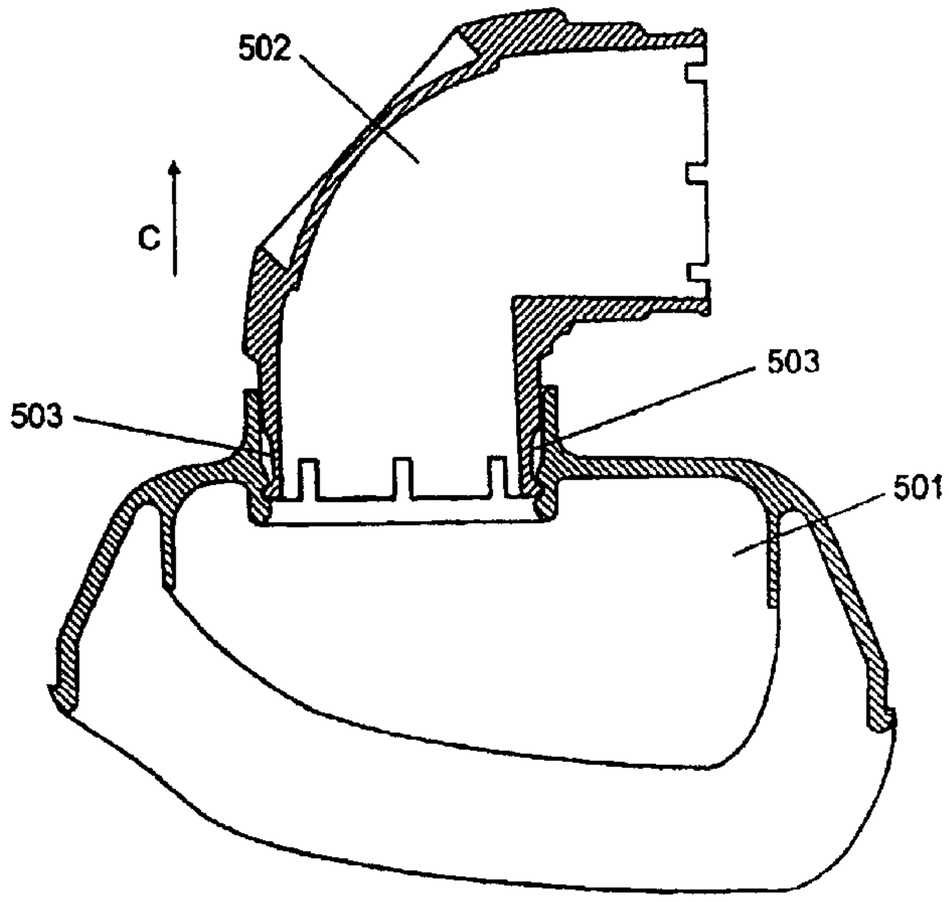
(57) **ABSTRACT**

The present invention relates to a device for delivering a supply of gases to a patient. The device includes a patient interface and connecting member. The connecting member is preferably a L-shaped swivelled connector that is capable of being fixed into one of two positions, a first position where the connector is freely rotatable within the patient interface, and a second position where an interference between the interface and connector prevents the free rotation of the connector within the patient interface. The present invention further relates to a connector that has outlet means, which includes at least one outlet vent and a funnel, which in use directs and passes a substantial portion gases expired from the patient through the outlet vent or vents.

12 Claims, 12 Drawing Sheets



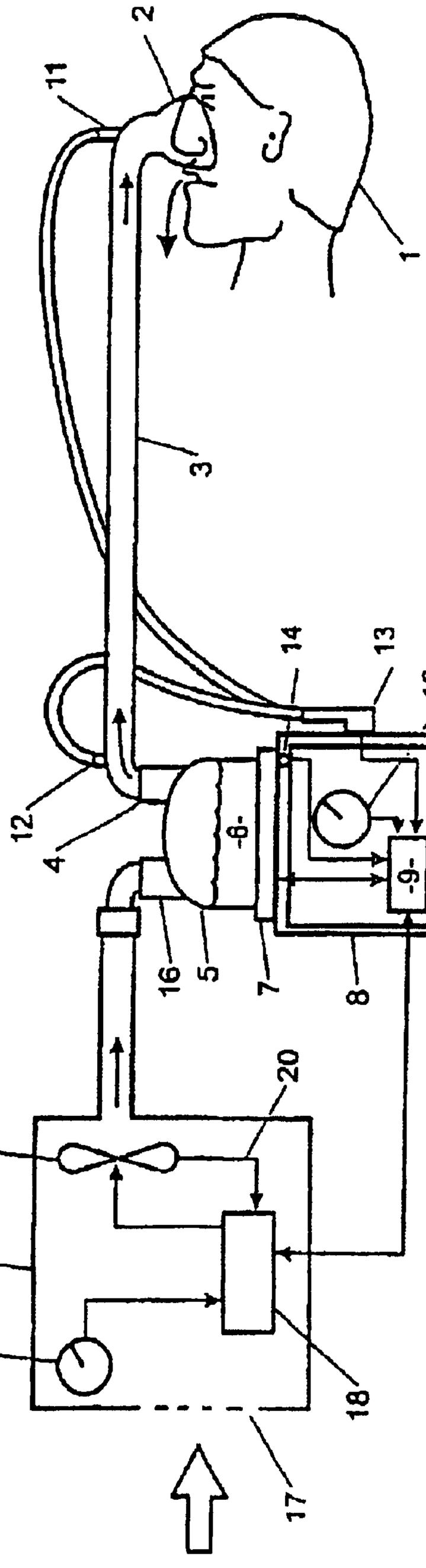


FIGURE 1

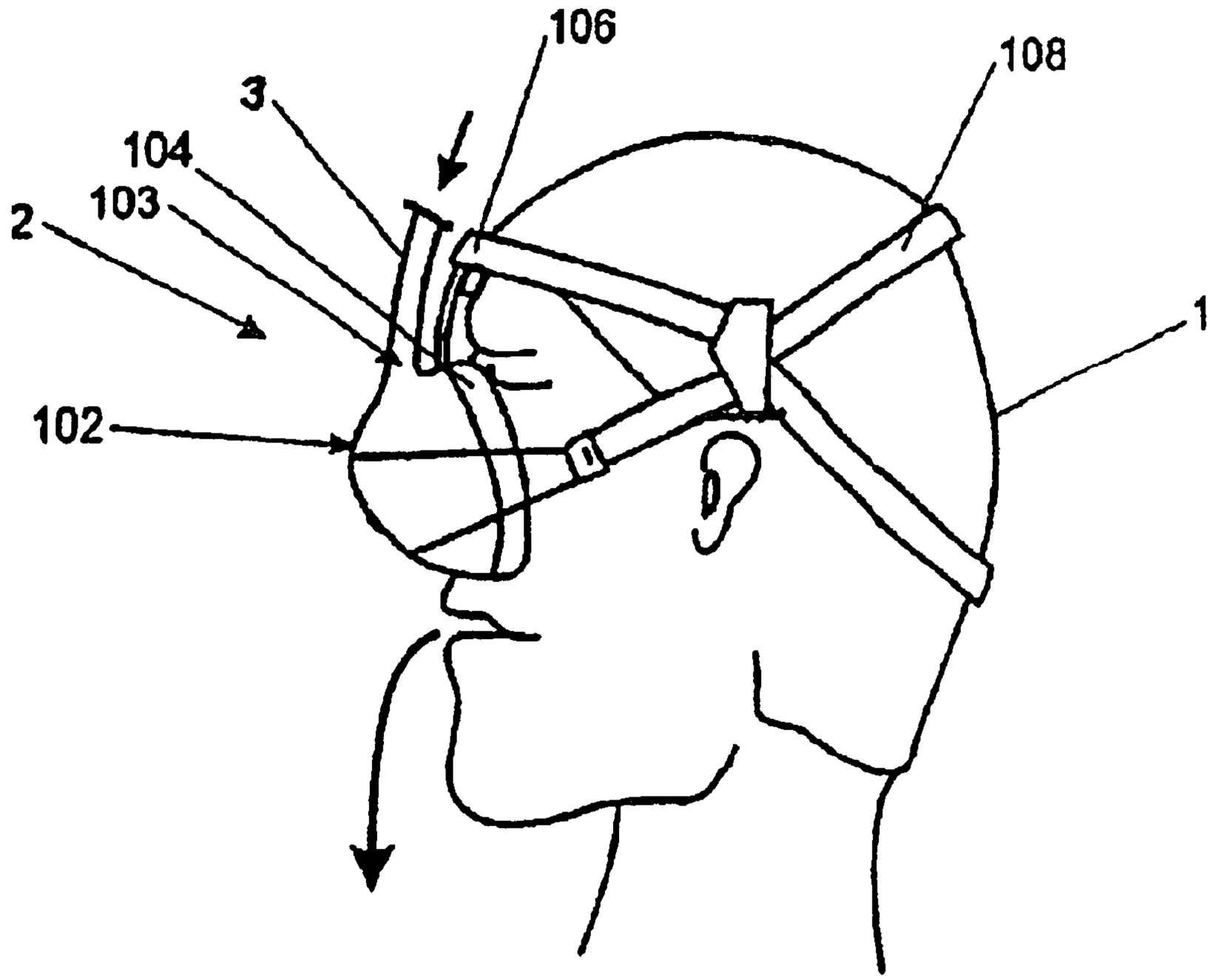


FIGURE 2

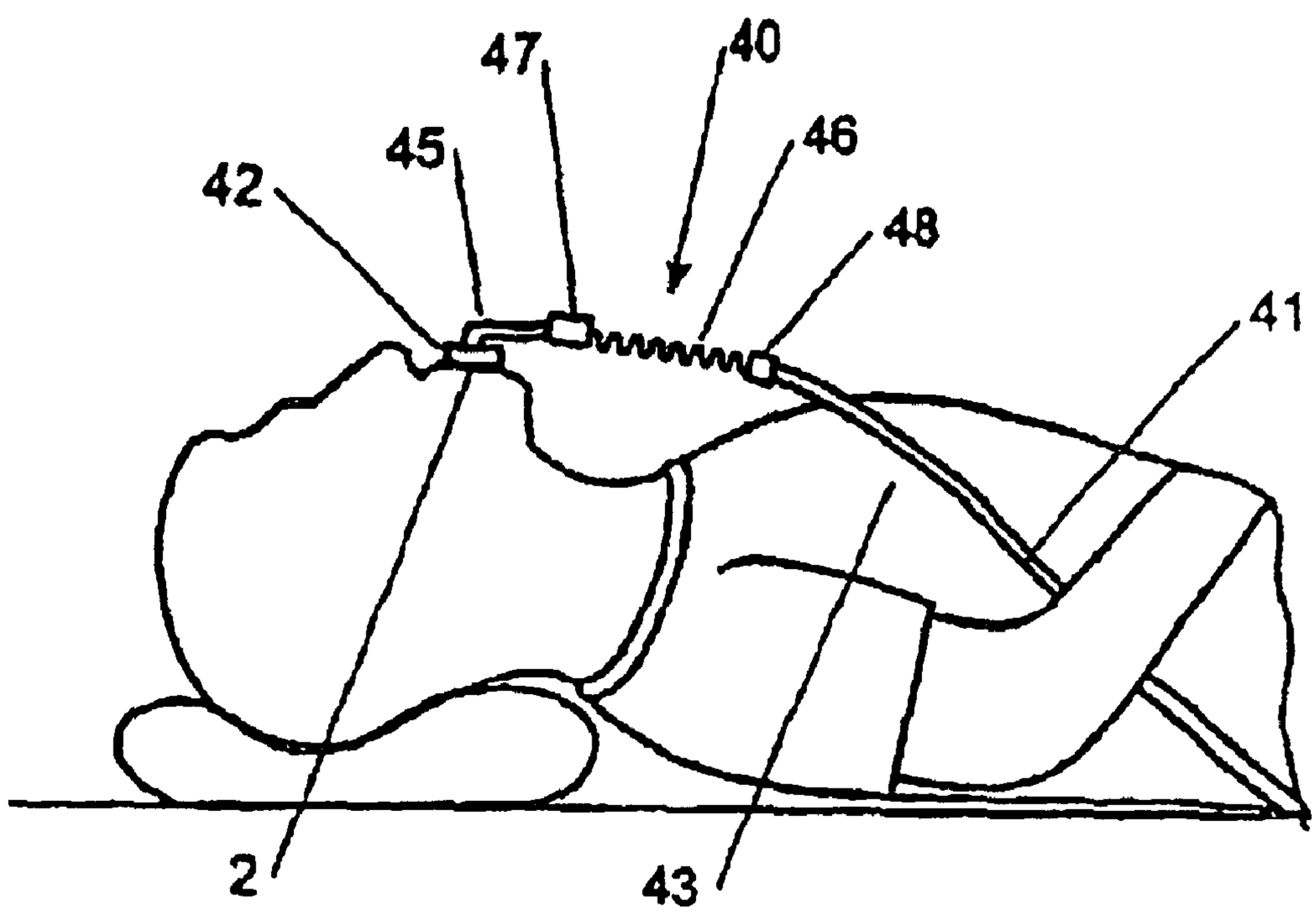


FIGURE 3

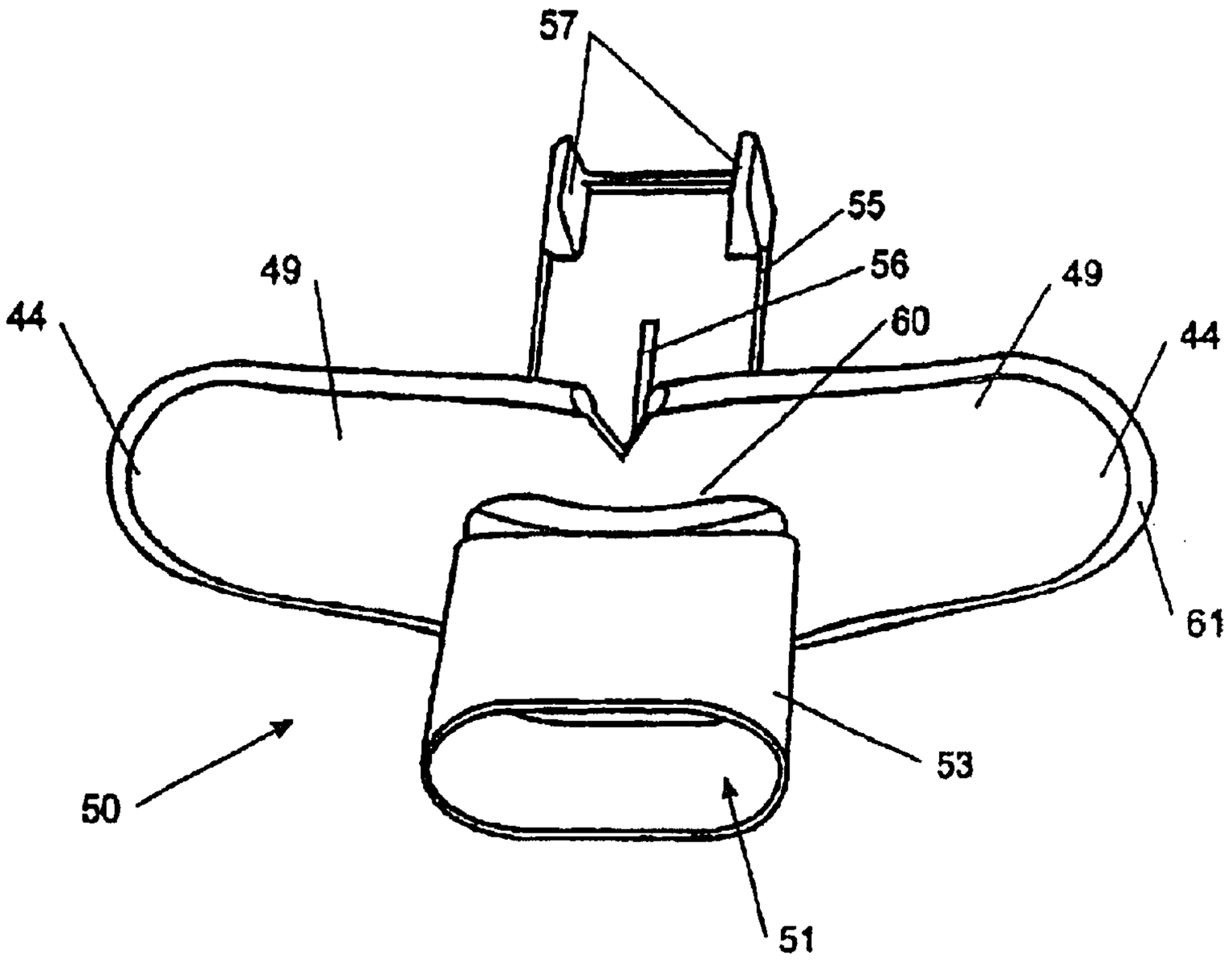


FIGURE 4

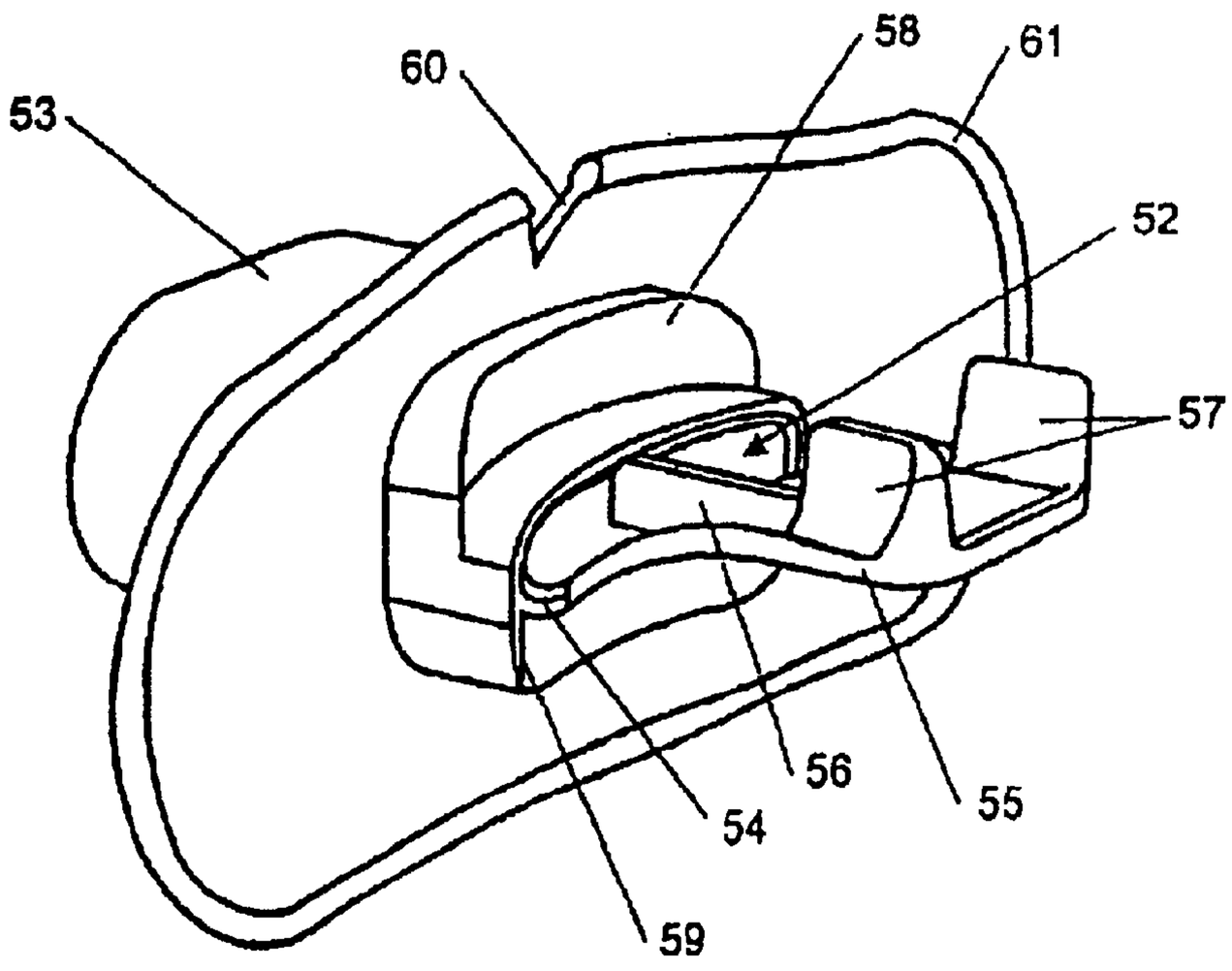


FIGURE 5

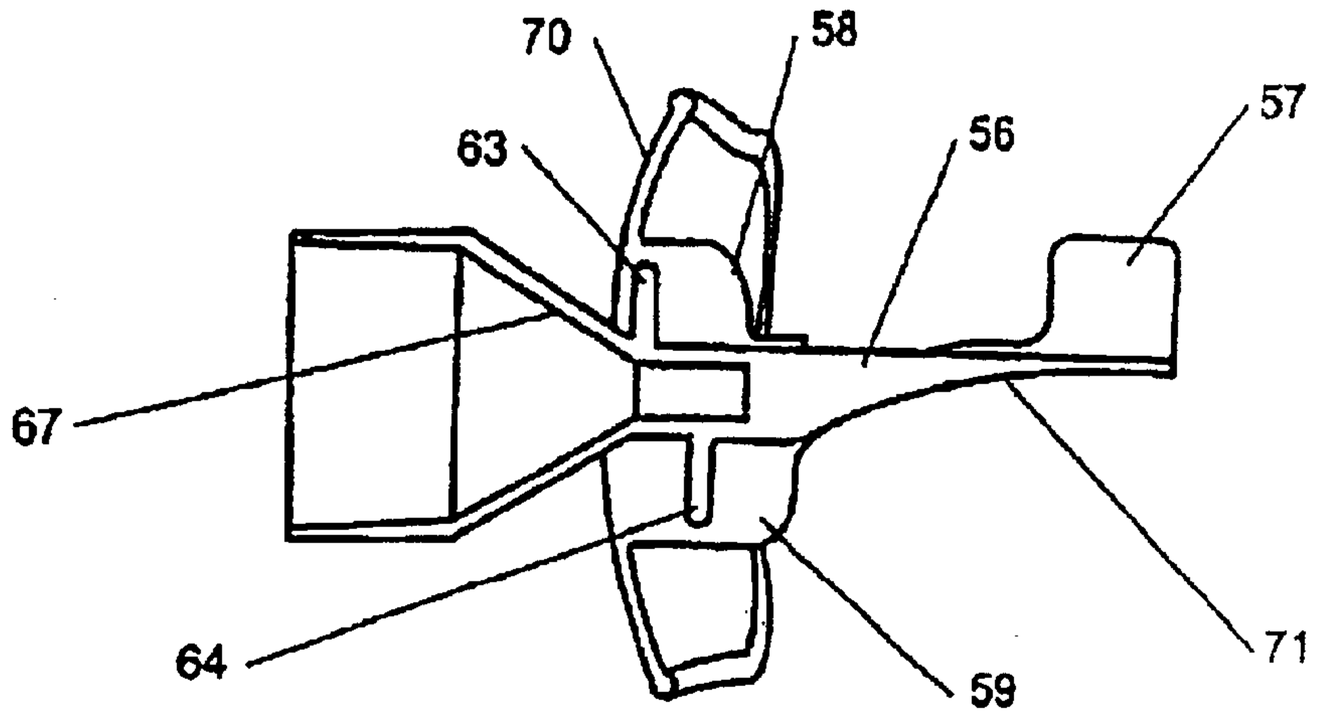


FIGURE 6

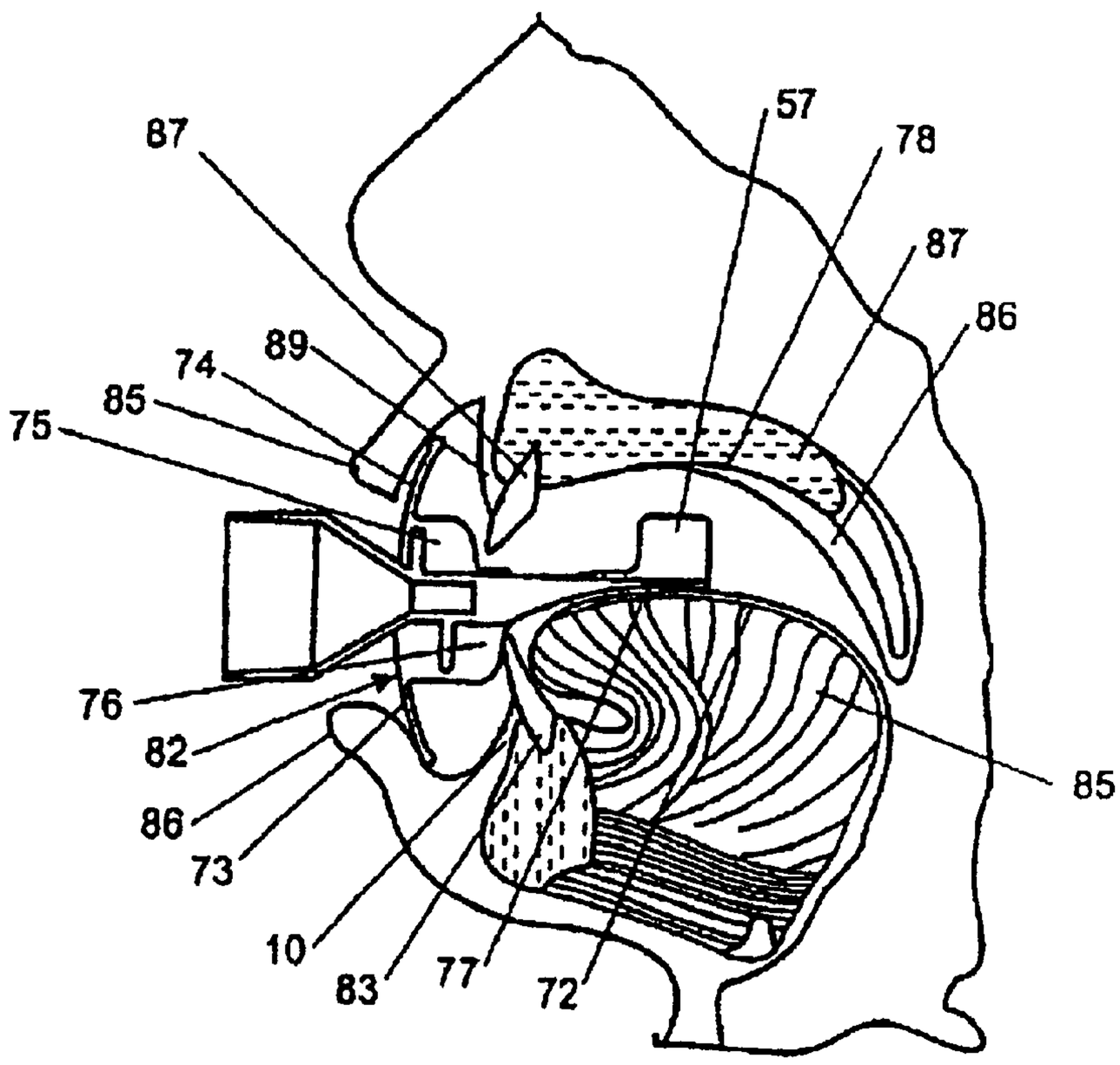


FIGURE 7

FIGURE 8

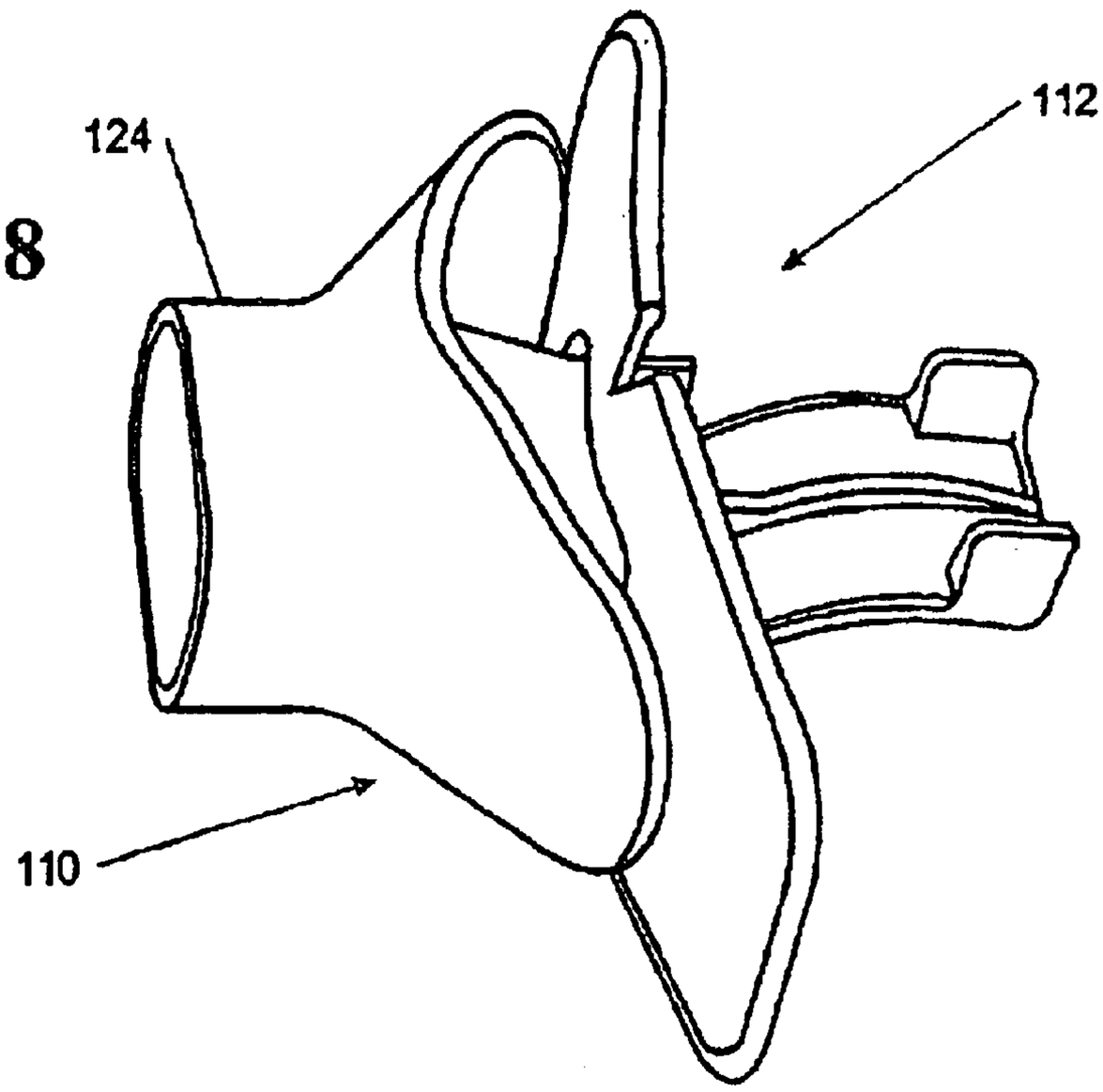
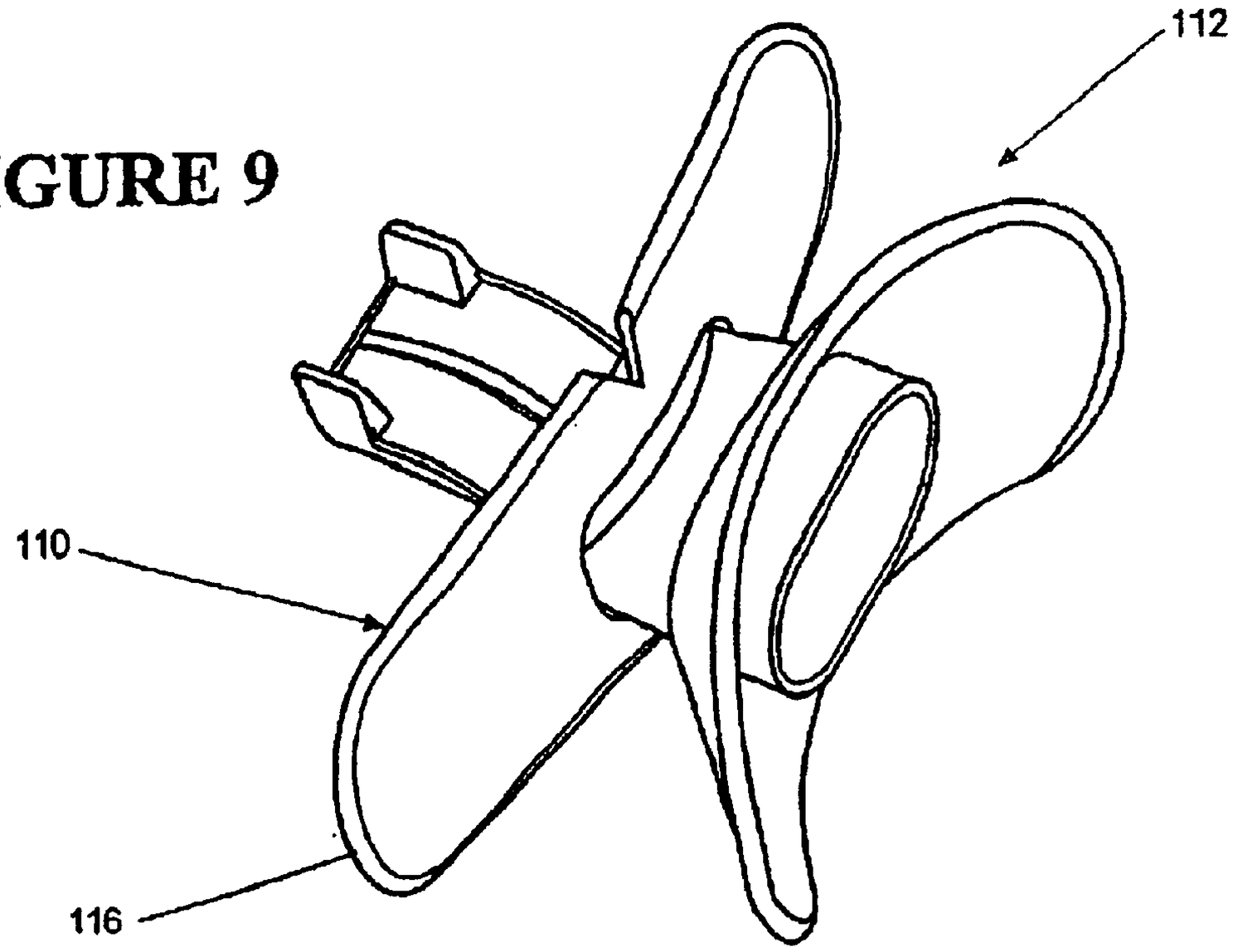
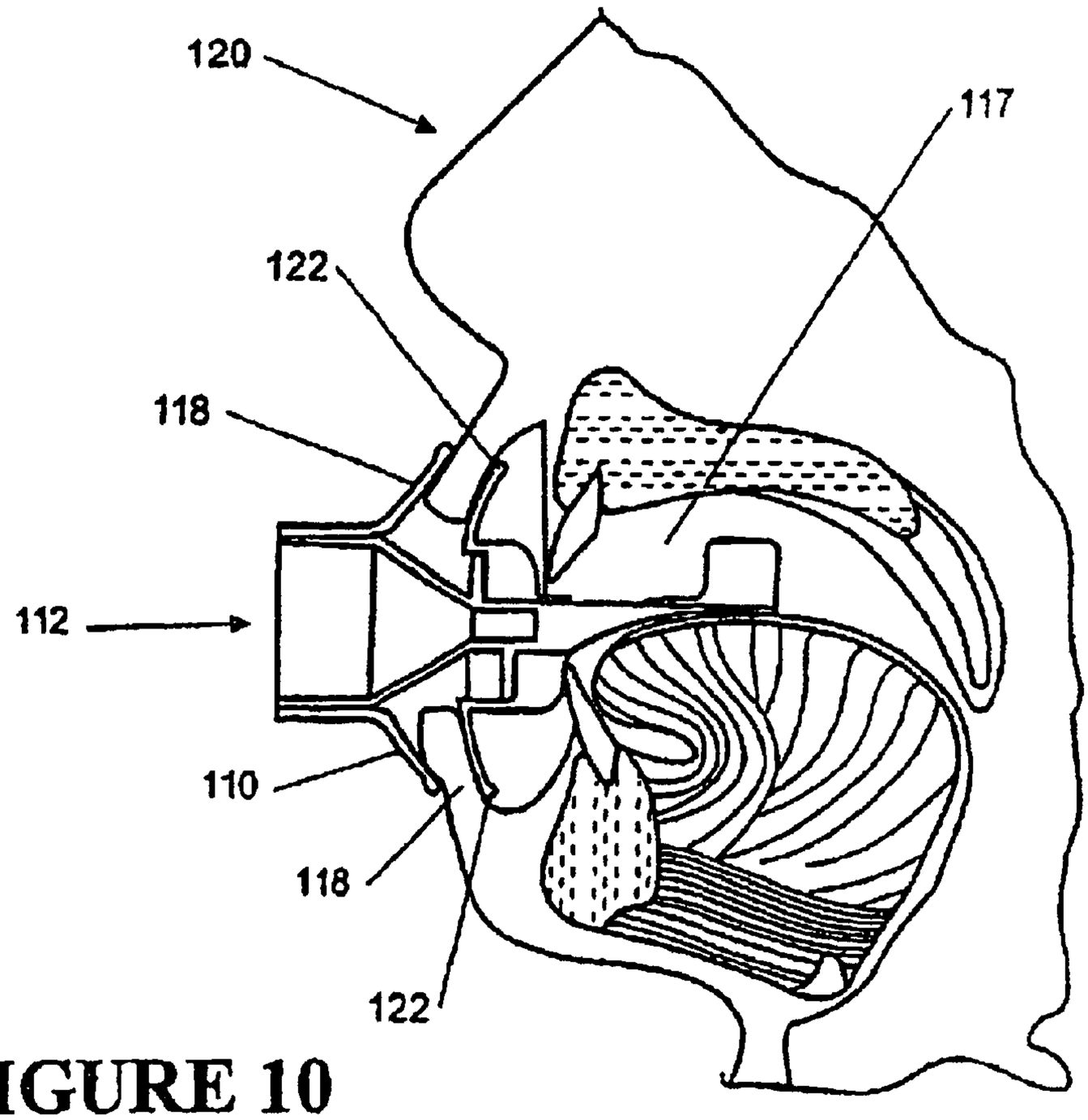


FIGURE 9





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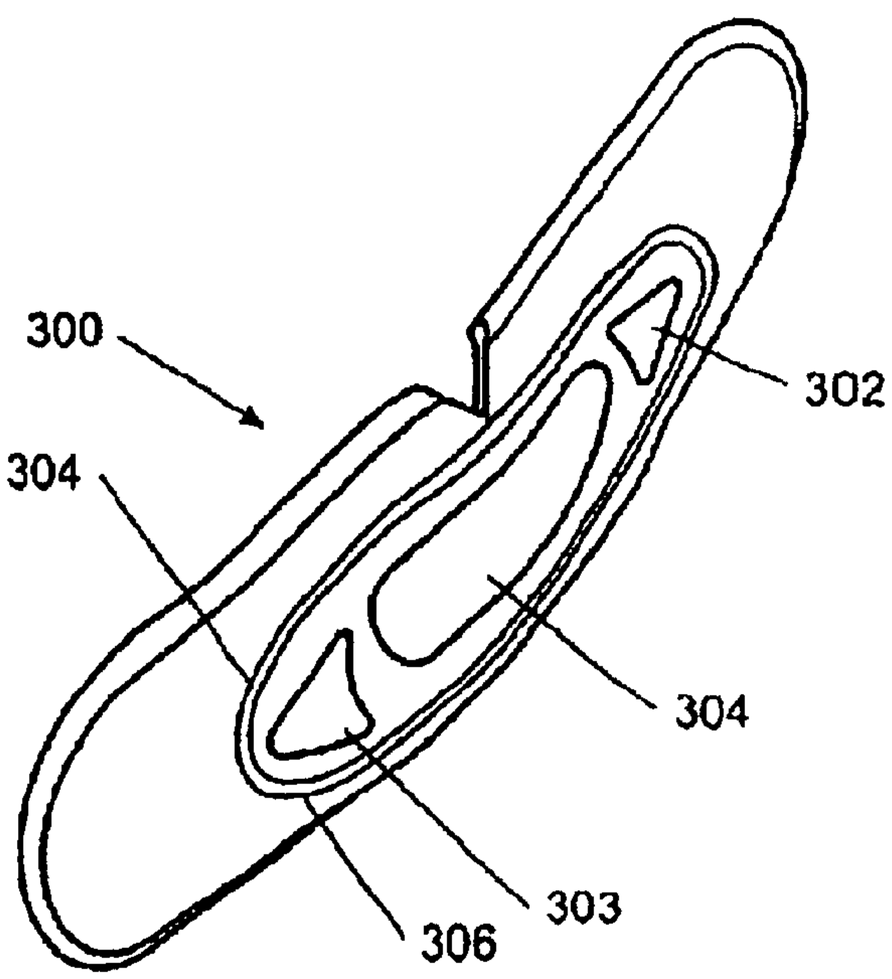

FIGURE 11

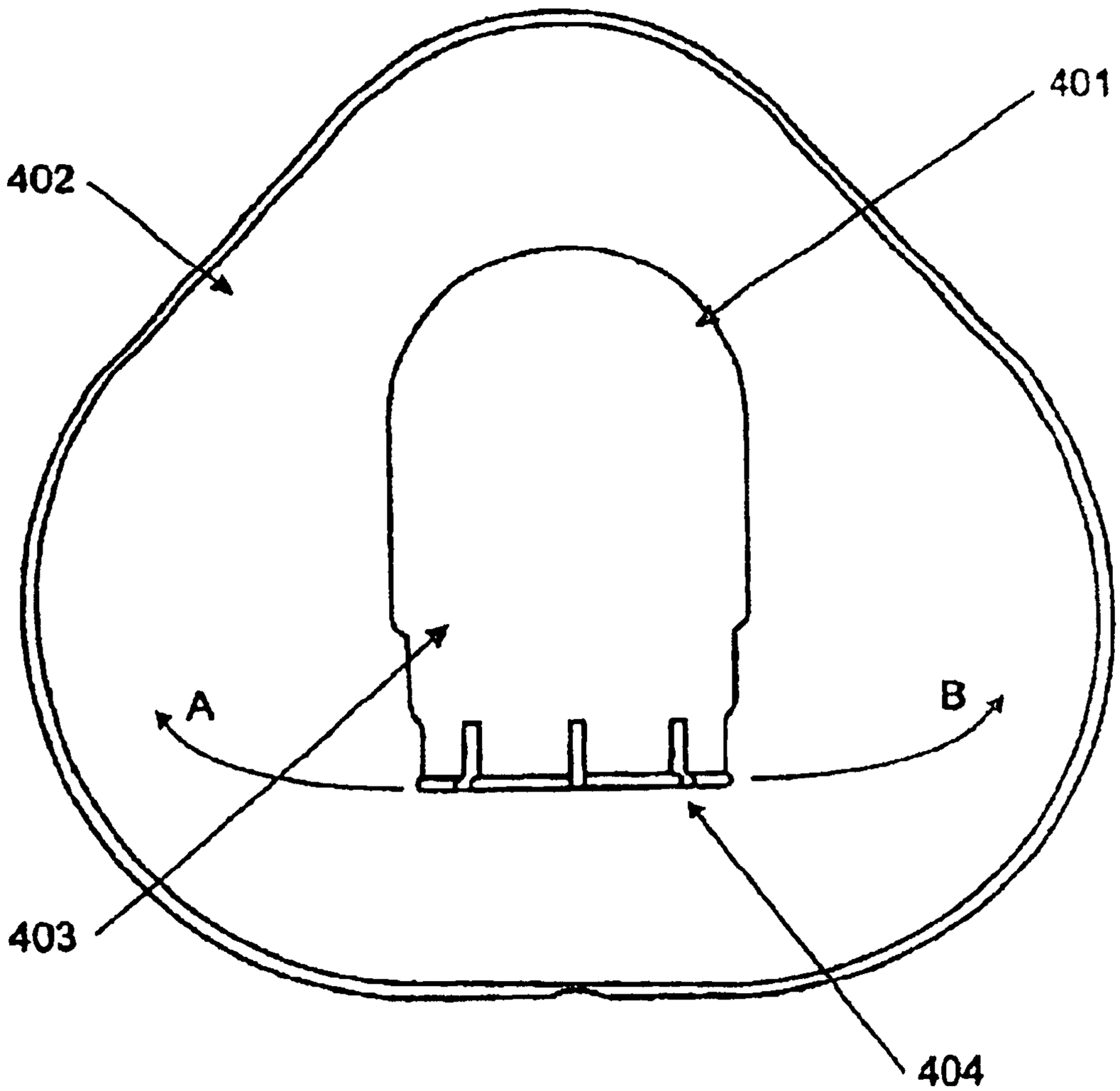

FIGURE 12

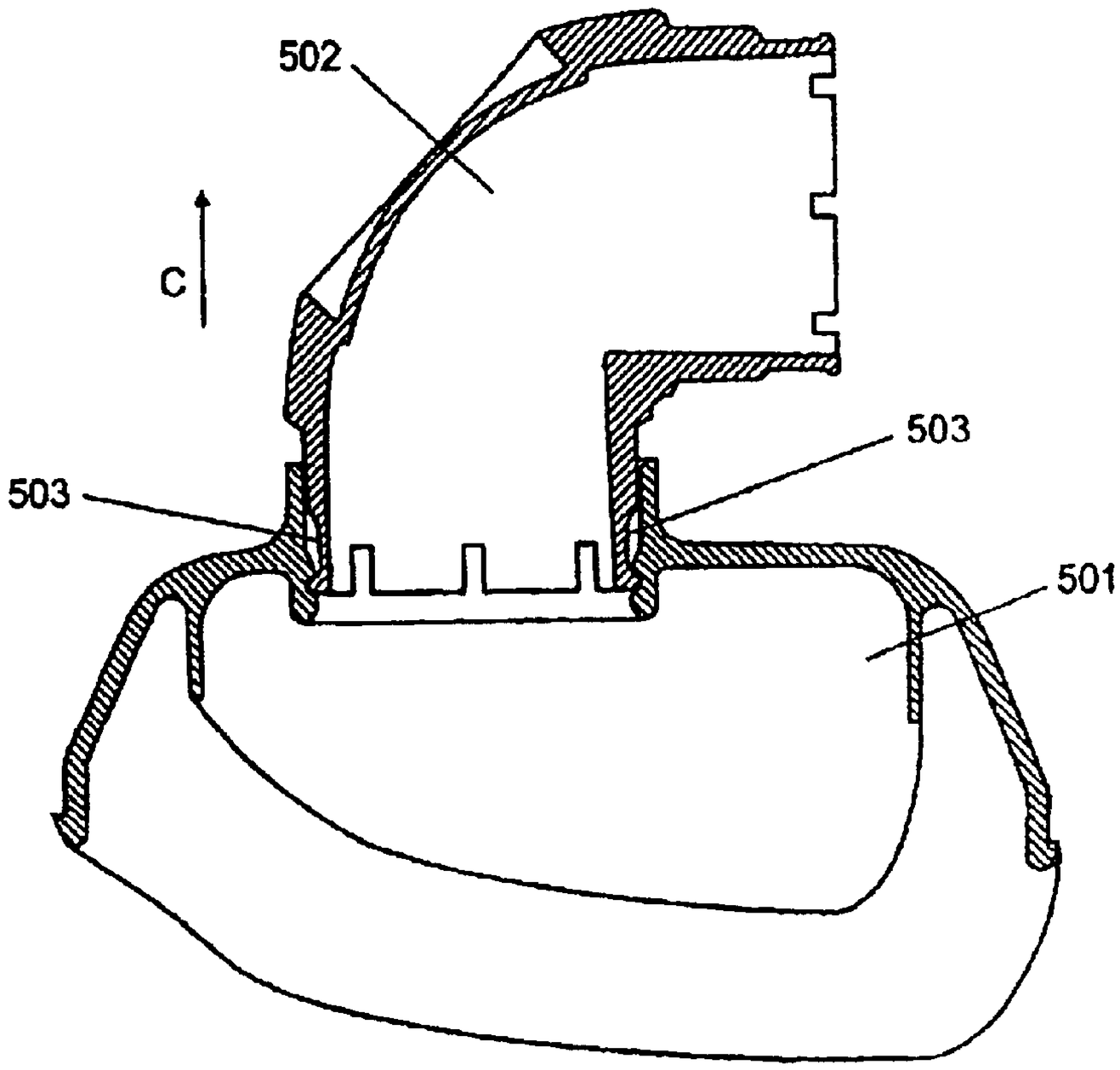

FIGURE 13

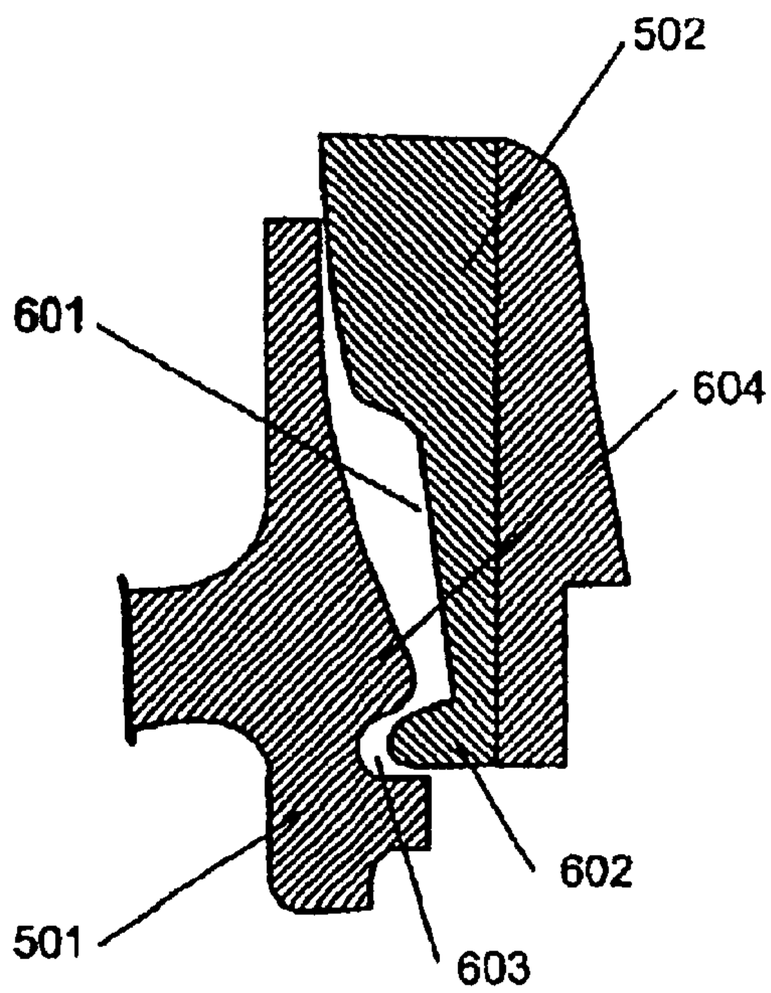

FIGURE 14

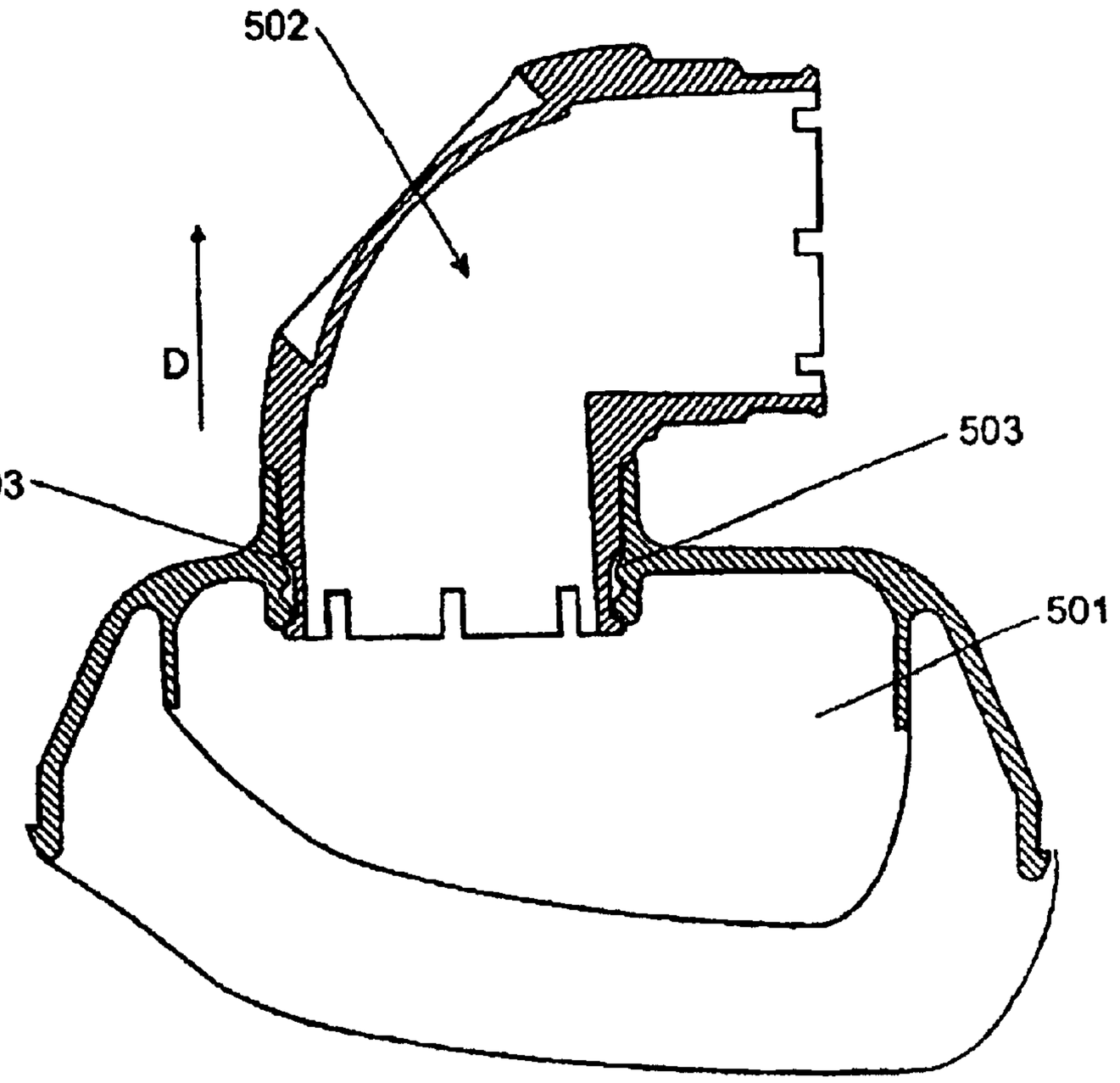

FIGURE 15

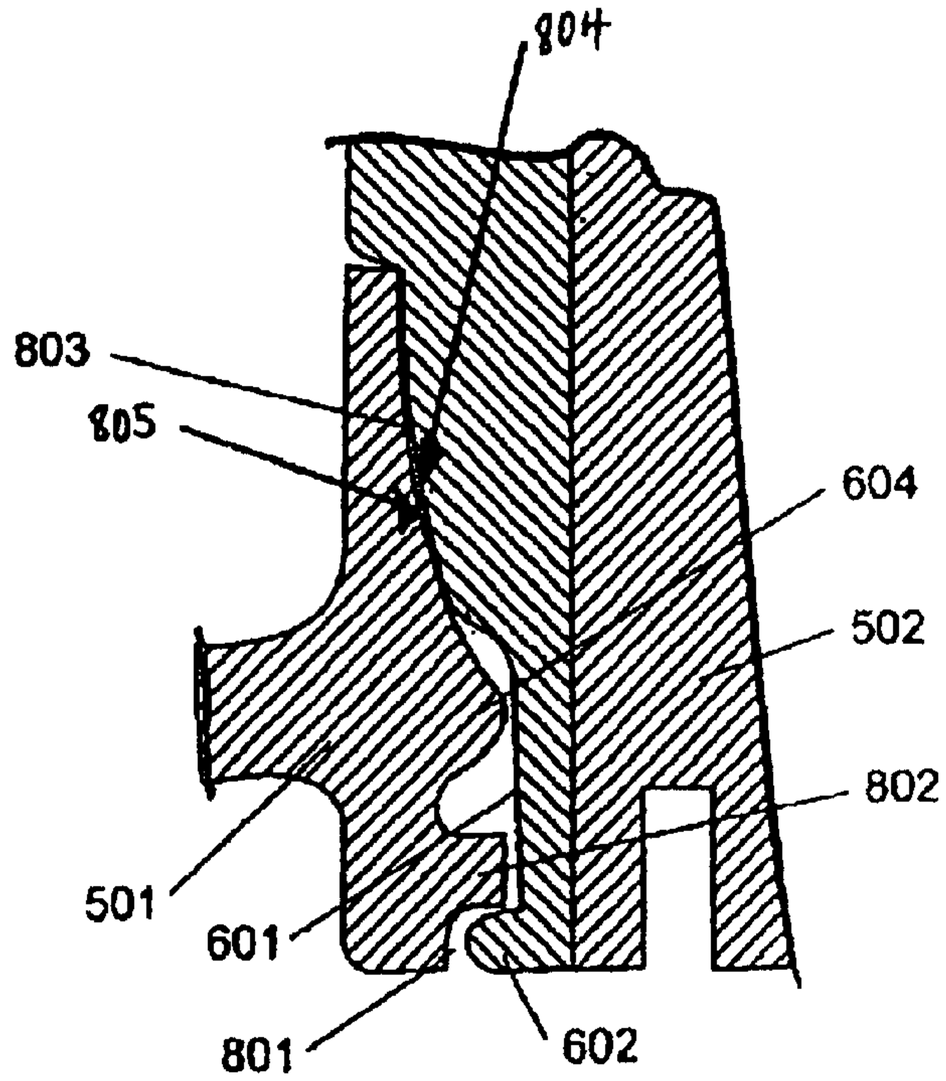

FIGURE 16

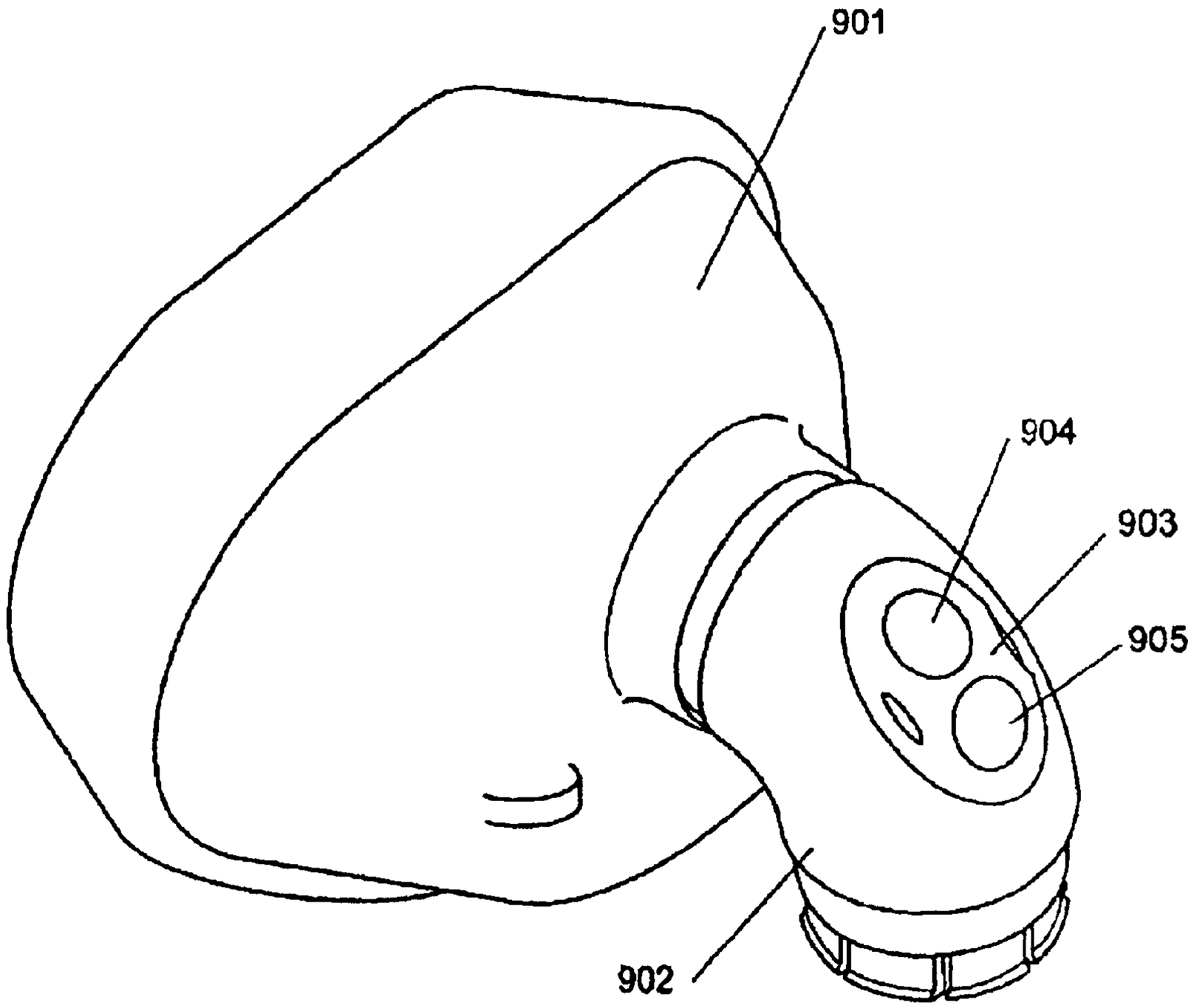

FIGURE 17

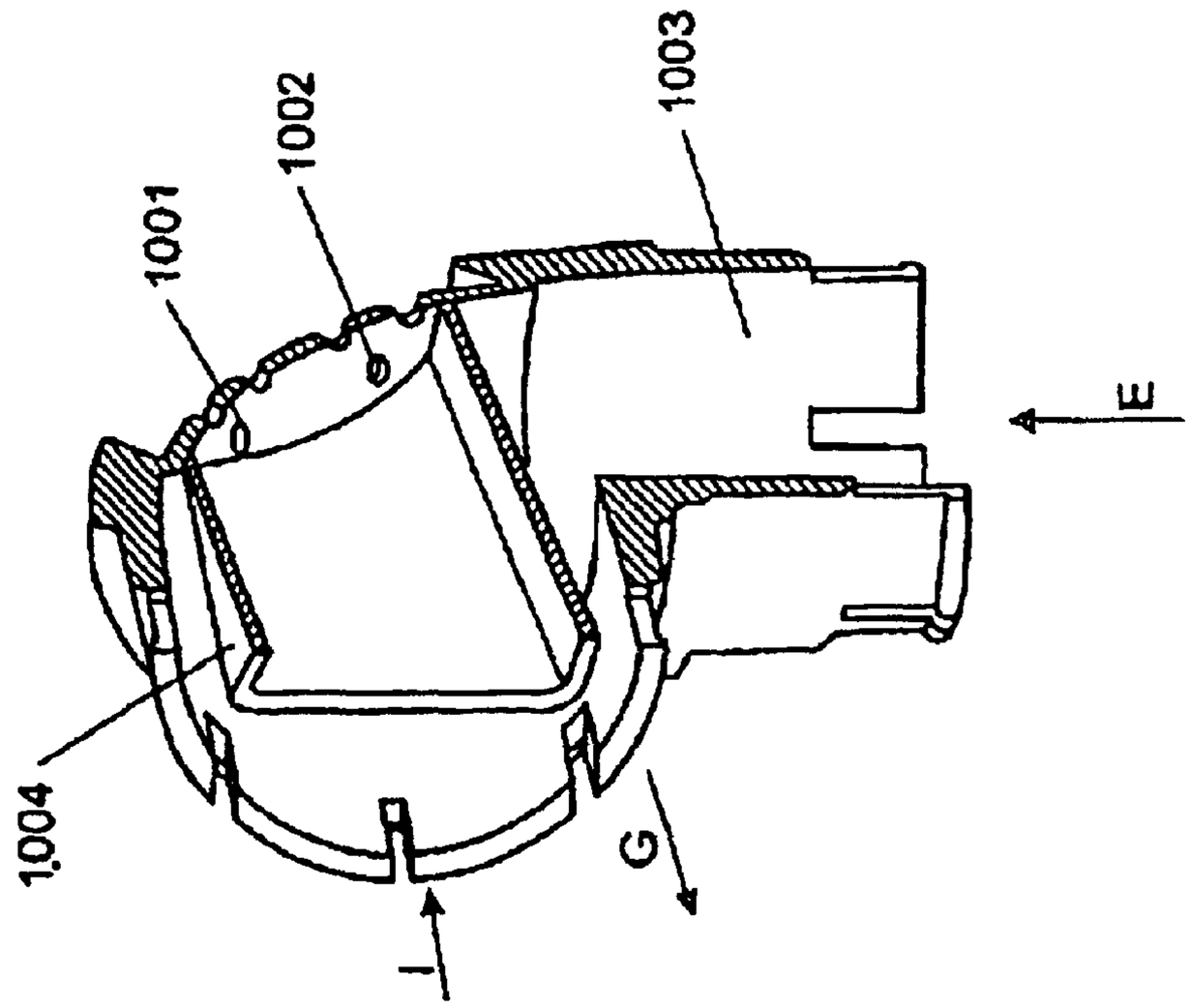

FIGURE 19

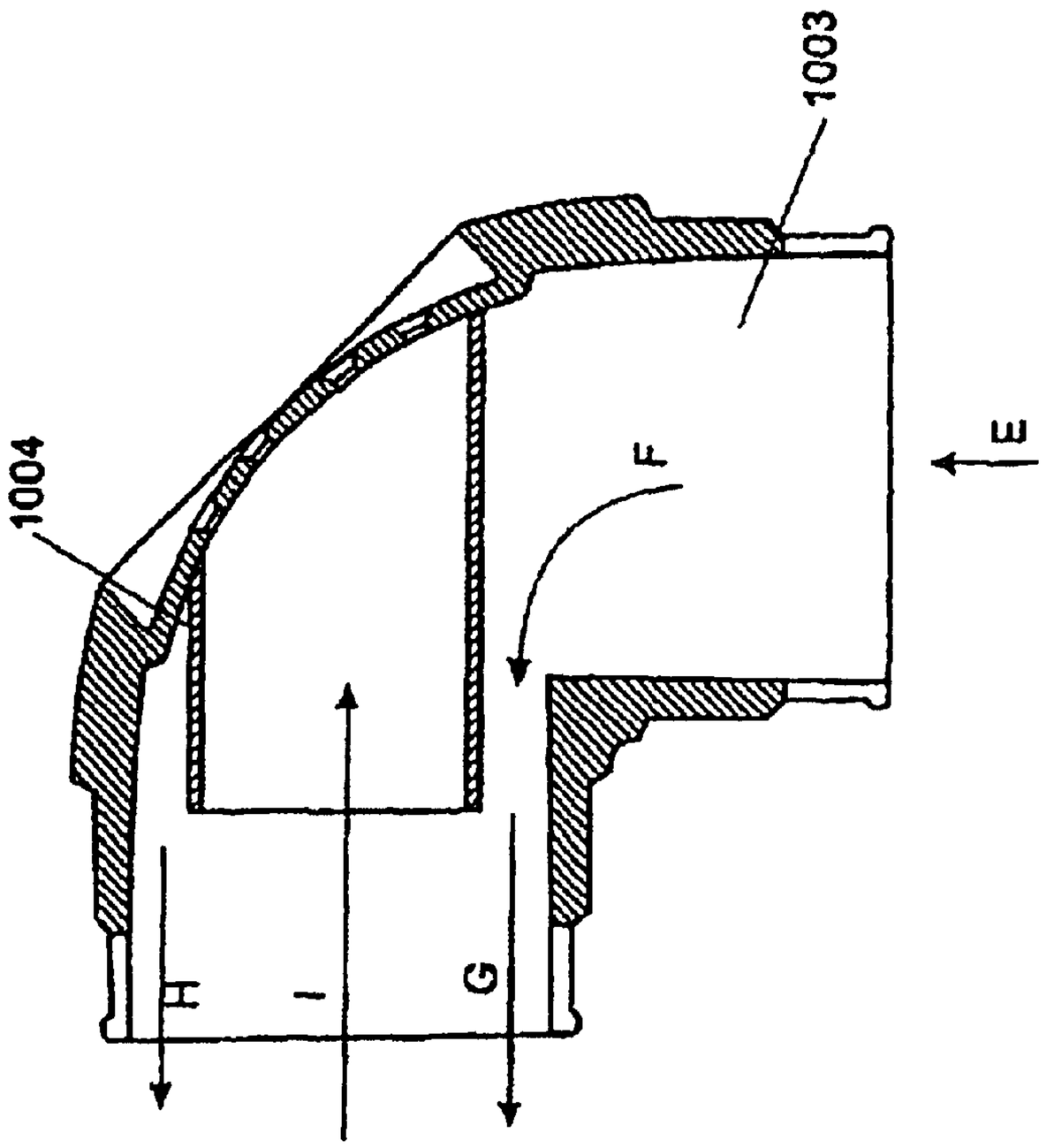

FIGURE 18

PATIENT INTERFACES

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to patient interfaces, particularly though not solely for use in providing Continuous Positive Airway Pressure (CPAP) therapy or positive pressure ventilation to patients suffering from obstructive sleep apnoea (OSA).

SUMMARY OF THE PRIOR ART

In the art of respiration devices, there are well known a variety of respiratory masks which cover the nose and/or mouth of a human user in order to provide a continuous seal around the nasal and/or oral areas of the face such that gas may be provided at positive pressure within the mask for consumption by the user. The uses for such masks range from high altitude breathing (ie. aviation applications) to mining and fire fighting applications, to various medical diagnostic and therapeutic applications.

One requisite of such respiratory masks has been that they provide an effective seal against the patient's face to prevent leakage of the gas being supplied. Commonly, in prior mask configurations, a good mask-to-face seal has been attained in many instances only with considerable discomfort for the user. This problem is most crucial in those applications, especially medical applications, which require the user to wear such a mask continuously for hours or perhaps even days. In such situations, the user will not tolerate the mask for long durations and optimum therapeutic or diagnostic objectives thus will not be achieved, or will be achieved with great difficulty and considerable user discomfort.

Where such masks are used in respiratory therapy, in particular treatment of obstructive sleep apnoea (OSA) using continuous positive airway pressure (CPAP) therapy, there is generally provided in the art a vent for washout of the bias flow or expired gases to the atmosphere. Such a vent may be provided for example, as part of the mask, or in the case of some respirators where a further conduit carries the expiratory gases, at the respirator. A further requisite of such masks is the washout of gas from the mask to ensure that carbon dioxide build up does not occur over the range of flow rates. In the typical flow rates in CPAP treatment, usually between 4 cm H2O and 20 cm H2O, prior art attempts at such vents have resulted in excessive noise causing irritation to the user and any bed partners.

Various approaches have been developed in the prior art to attempt to reduce the noise when CPAP therapy is provided. For example, in PCT Patent Application No. WO98/34665 it has been proposed that the vent include a resilient plug with rounded edge apertures to reproduce noise. However, this is not entirely effective in eliminating the extra noise created by a vent at the mask.

In common with all attempts to improve the fit, sealing and user comfort is the need to avoid a concentrated flow of air at any portion of the respiratory tracts. In particular with oral masks or mouthpieces it is a disadvantage of prior art devices that the oral cavity may become overly dehydrated by use of the device, causing irritation and possible later complications.

SUMMARY OF THE INVENTION

It is an object of the present invention to attempt to provide a patient interface which goes some way to overcoming the abovementioned disadvantages in the prior art or which will at least provide the industry with a useful choice.

Accordingly in a first aspect the present invention consists in a device for delivering a supply of gases to a patient comprising or including:

a patient interface fittable to said patients' nose or mouth, which in use is in fluid communication with said supply of gases,

connecting member having two ends and interface means, one end of said two ends being locatable within said patient interface and the other end of said two ends is connectable to said supply of gases, said member capable of being fixed into one of two positions, a first position where said member is freely rotatable within said patient interface, and a second position where said interference means prevents the free rotation of said member within said patient interface.

In a second aspect the present invention consists in a continuous positive airways pressure system for delivering gases to a patient comprising or including a pressurised source of gases, transport means, in fluid communication with said pressurised source, adapted to convey said gases, and a nasal mask in fluid communication with said transport means, in use, delivering said gases to said user, said nasal mask comprising or including:

a body portion having an inlet, connected to said transportation means by a connecting member,

sealing means engaged with said body portion, and adapted to seal against the facial contours of said patient, and

securement means attached to or around the head of said user,

wherein said connecting member has two ends and interference means, one end being locatable within said patient interface and the other end of said two ends connectable to said transportation means, said connecting member capable of being fixed into one of two positions, a first position where said member is rotatable within said patient interface, and a second position where said interference means prevents the free rotation of said member within said patient interface.

In a third aspect the present invention consists in a device for delivering a supply of gases to a patient comprising:

a patient interface, which in use is in fluid communication with said supply of gases,

connecting member that connects said patient interface with said supply of gases,

outlet means associated with said connecting member, said outlet means including at least one outlet vent and a funnel, which in use directs and passes a substantial portion gases expired from said patient through said at least one outlet vent.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

One preferred form of the present invention will now be described with reference to the accompanying drawings in which;

FIG. **1** is a block diagram of a humidified positive pressure ventilation system as might be used in conjunction with the present invention,

FIG. **2** is an illustration of the nasal mask in use according to the preferred embodiment of the present invention,

FIG. **3** is a side elevation view of an example of a connector used with a breathing circuit,

FIG. **4** is a perspective view from above of a mouthpiece that may be used with the elbow connector of the present invention,

FIG. **5** is a perspective view from one side and from an inward direction of the mouthpiece of FIG. **4**,

FIG. **6** is a cross-section of the mouthpiece of FIG. **4**,

FIG. **7** is a cross-sectional view of the mouthpiece of FIG. **4** and a user with the mouthpiece in place to demonstrate the location and positioning thereof in relation to the main features of the patient's anatomy,

FIG. **8** is a perspective view of the mouthpiece with an outer flap in place,

FIG. **9** is a perspective view of the outer flap bent back,

FIG. **10** is a cutaway view of the mouthpiece with the outer flap in use,

FIG. **11** is a perspective view of the outer flap including the ventilation apertures and moisture barrier,

FIG. **12** is a front view of a nasal mask, including a swivelled elbow connection of the present invention,

FIG. **13** is a side view of the swivelled elbow connection as attached to the mask body of the present invention in a first position,

FIG. **14** is an exploded side view of the locking mechanism part of the swivelled elbow connection in the first position,

FIG. **15** is a side view of the swivelled elbow connection as attached to the mask body of the present invention, in a second position,

FIG. **16** is an exploded side view of the locking mechanism part of the swivelled elbow connection in the second position,

FIG. **17** shows a nasal mask body and elbow connector with diffuser,

FIG. **18** shows a cutaway side view of the bias flow director of the present invention, and

FIG. **19** shows a cutaway perspective view of the bias flow director of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention provides improvements in the delivery of positive pressure ventilation therapy. In particular a patient interface is described which is quieter for the user to wear and reduces the side leakage as compared with the prior art. The patient interface of the present invention includes improvements to the swivel elbow connector, bias flow directional funnel and/or elbow diffuser. It will be appreciated that the patient interface as described in the preferred embodiment of the present invention can be used in respiratory care generally or with a ventillator but will now be described below with reference to use in a humidified positive pressure ventilation system. It will also be appreciated that the present invention can be applied to any form of patient interface including, but not limited to, nasal masks, oral masks and mouthpieces.

With reference to FIG. **1**, a humidified positive pressure ventilation system is shown in which a patient **1** is receiving

humidified and pressurised gases through a patient interface **2** connected to a humidified gases transportation pathway or inspiratory conduit **3**. It should be understood that delivery systems could also be YPAP (Variable Positive Airway Pressure) and BiPAP (Bi-level Positive Airway Pressure) or numerous other forms of respiratory therapy. Inspiratory conduit **3** is connected to the outlet **4** of a humidification chamber **5**, which contains a volume of water **6**. Inspiratory conduit **3** may contain heating means or heater wires (not shown), which heat the walls of the conduit to reduce condensation of humidified gases within the conduit. Humidification chamber **6** is preferably formed from a plastics material and may have a highly heat conductive base (for example an aluminium base) which is in direct contact with a heater plate **7** of humidifier **8**. Humidifier **8** is provided with control means or electronic controller **9** which may comprise a microprocessor based controller executing computer software commands stored in associated memory.

Controller **9** receives input from sources such as user input means or dial **10** through which a user of the device may, for example, set a predetermined required value (reset value) of humidity or temperature of the gases supplied to patient **1**. The controller may also receive input from other sources, for example temperature and/or flow velocity sensors **11** and **12** through connector **13** and heater plate temperature sensor **14**. In response to the user set humidity or temperature value input via dial **10** and the other inputs, controller **9** determines when (or to what level) to energise heater plate **7** to heat the water **6** within humidification chamber **5**. As the volume of water **6** within humidification chamber **5** is heated, water vapour begins to fill the volume of the chamber above the water's surface and is passed out of the humidification chamber **5** outlet **4** with the flow of gases (for example air) provided from a gases supply means or blower **15** which enters the chamber through inlet **16**. Exhaled gases from the patient's mouth are passed directly to ambient surroundings.

Blower **15** is provided with variable pressure regulating means or variable speed fan **21**, which draws air or other gases through blower inlet **17**. The speed of variable speed fan **21** is controlled by electronic controller **18** (or alternatively the function of controller **18** could be carried out by controller **9**) in response to inputs from controller **9** and a user set predetermined required value (preset value) of pressure or fan speed via dial **19**.

Nasal Mask

A nasal mask that may be used with the improvements to the swivel elbow connector, bias flow directional funnel and/or elbow diffuser of the present invention is shown in FIG. **2**. The mask includes a hollow body **102** with an inlet **103** connected to the inspiratory conduit **3**. The mask **2** is positioned around the nose of the user **1** with the headgear **108** secured around the back of the head of the patient **1**. The restraining force from the headgear **108** on the hollow body **102** and the forehead rest **106** ensures enough compressive force on the mask cushion **104**, to provide an effective seal against the patient's face.

The hollow body **102** is constructed of a relatively inflexible material for example, polycarbonate plastic. Such a material would provide the requisite rigidity as well as being transparent and a relatively good insulator.

The improved swivel elbow connector, bias flow directional funnel and/or elbow diffuser of the present invention may also be used with a mouthpiece as described below, or with a full facial mask.

Mouthpiece

Referring to FIGS. **3** to **10** a mouthpiece that may utilise the improvements to the swivel elbow connector, bias flow

directional funnel and/or elbow diffuser. In this embodiment, the mouthpiece **50** includes a vestibular shield **49** being a generally flat and generally rectangularly-shaped member in front elevation having a curved profile that reflects the curvature of a patient's jaw and in turn the curvature of the labial vestibule region A gases passageway extends through the vestibular shield from an inlet **51** to an outlet **52** in much the same way as with the earlier embodiments. The inlet **51** is provided by a flattened oval-shaped connector **53**. The outlet **52** has an even more laterally extended flattened oval shape **54**. Most prominently, the mouthpiece **50** includes a tongue depressor **55** extending from the inner face of the vestibular shield **49**. The operation of the tongue depressor will be described further on with reference to FIG. **5**. The tongue depressor includes a vertical stiffening flange **56** centrally located on its upper surface and extending from the gases outlet **52**. In use gases flow easily around the stiffening flange **56** effectively bifurcating the gases outlet **52**. The tongue depressor **55** further includes a pair of vertically extending spacers **57**, which in use may abut against the roof of the patient's mouth and ensure that the tongue cannot completely block the air passageway. In the mouthpiece **50** the sealing effect of the vestibular shield **49** against the lips of the user is enhanced by providing teeth abutments of significantly increased thickness than the raised area **20** of the earlier embodiments. In particular, an upper teeth abutment **58** and a lower teeth abutment **59** are provided, with the lower teeth abutment **59** protruding further from the inner face of the vestibular shield **49** than the upper teeth abutment **58**. This difference serves to match the typical over-bite of most users. The abutments **58** and **59** are not required to be wider than the gases outlet **52**.

A notch **60** is provided centrally in the upper edge of the vestibular shield **49** to accommodate the upper frenal attachment. A slight bead **61** is provided around the edge of the vestibular shield **49** for user comfort, with the vestibular shield **49** otherwise being very thin for additional suppleness.

Referring particularly to FIG. **6**, the mouthpiece **50** is preferably formed by over-moulding a soft and supple material part **70** over a stiffer material part **67**. These can generally be termed the shield part and the passageway-forming insert. The passageway-forming insert preferably includes a pair of upper and lower vertical flanges **63** and **64** to fully engage within the supple material. The passageway-forming insert **67** includes the vertically extending stiffening flange **56** of the tongue depressor **55**, together with a curved planar portion **71** forming the backbone of the tongue depressor **55**. The vertically extending spacers **57** are of the soft and supple material and are part of the over-moulding **70**, as are the upper and lower teeth abutments **58** and **59**.

Referring now to FIG. **7**, use of the mouthpiece according to FIGS. **4** to **6** is depicted. With the present mouthpiece **50**, the upper and lower lips **85**, **86** are further distended by the abutment action of the abutments **75**, **76** against the upper and lower teeth **87**, **88** respectively, thus forming a seal of greater pressure between the lips **85**, **86** and the upper and lower portions respectively of the vestibular shield **49**. A lower face **77** of the tongue depressor **55** impinges if necessary on the upper surface **72** of the tongue **85** and retains the tongue in the lower portion of the mouth. This ensures a clear gases outlet **52** from the gases passageway through the vestibular shield. The vertically extending spacers **57**, if forced by pressure from the tongue, will engage against the roof of the patient's mouth and maintain a clear air passageway. This stops the sleeping patient unconsciously blocking the oral passageway and reverting to nasal breathing.

Referring now to FIG. **8** of the present invention is illustrated including an extra-oral sealing flap **110**. The flap **110** in its natural bias is tapered, the wide-open end of which is shaped to conform to the facial contours around the outside of the mouth of a user. The narrow end joins to a cylindrical section, which is designed to slide over the inlet port **114** of the mouthpiece **112**. While this is one method of attachment the flap **100** might also be constructed as an integral part of the mouthpiece **112**. The flap **110** needs to be constructed of flexible material. Therefore, materials such as silicone rubber can be employed to fashion the flap.

The outer flap **110** is seen in FIG. **9**, in a bent back position. It will be appreciated that when the mouthpiece **112** is being inserted into the mouth of a users the user flap **110** is intended to be in this bent back position to aid insertion. Prior to insertion, the outer flap is bent back by simply pressing on its outer periphery **116**, until it snaps into the bent back position, in which it will stay unaided.

In FIG. **10** we see the outer flap **110** in use with the mouthpiece **112** in the mouth **117** of a user **120**. Once correctly positioned in the mouth **116**, the outer flap **110** may be adjusted into its operational position by pressing on its outer periphery **116** until it snaps back to press against the outside of the mouth **118**. Due to the relative position of the vestibular shield **122** and the outer flap **110**, the outer flap **110** is unable to fully reach its natural bias and thereby inflicts a compressive force on the outside of the mouth **118**.

It will be appreciated that as well as providing a substantially airtight seal the addition of the outer flap provides enough compressive force on the mouth to keep the mouthpiece and conduit in place without the need for straps. This allows the administering of positive airway pressure ventilation therapy to be considerably less obtrusive than traditional methods.

In a further additional improvement shown in FIG. **11**, the outer flap **300** is shown in perspective. Included are ventilation apertures **302**, **303** either side of the gases port **304**, which are surrounded by a ridge **306** acting as a moisture barrier. The apertures **302**, **303** are provided such that any excess moisture leaking from the mouth will migrate to the apertures where they may evaporate. Small vents in the conduit may be used to direct small amounts of pressurised gas at the apertures to aid evaporation. The ridge **306** is included to ensure that no moisture migrates further into the sealing region **308**, as this would be detrimental to the sealing properties of the flap.

Interface Connection

Attention is now directed to FIG. **3**. It has been found that an additional factor in the effectiveness of any patient interface **2**, is the manner in which the interface is connected to the breathing circuit. The weight of the breathing circuit, and any attempted movement of one other of the breathing circuit and the interface **2** relative to the other, is one of the largest influences tending to dislodge the interface **2**. It must be noted that the interface **2** must remain in position and maintain a seal during all sleep, when the user has no muscle tone.

The connection is usually provided between a breathing circuit and an interface **2**, which decouples the interface **2** from the breathing circuit. This type of configuration is shown in FIG. **3**, where the interface is a mouthpiece, although a nasal mask may be used in place of the mouthpiece. The connection **40** is effective in reducing the forces placed on the interface **2** by the breathing circuit **41** when the user moves around during sleep.

To connect between the bases outlet **42**, which is vertical when the user is lying on his or her back, and the breathing

circuit **41**, which is generally horizontal, a L-shaped elbow connector **45** is incorporated in the connection **40**. The elbow connector **45** may be incorporated in the interface **2**. The elbow connector **45** is formed at a right angle and provides a positive pressure on the interface **2**. The elbow connector **45** may include a swivel joint and may be disconnected from gaseous outlet **42**. The connection **40** further includes a connecting tube **46** provided between the elbow **45** and the breathing circuit **41**. The connecting tube **46** is preferably connected to the breathing circuit **41** by a swivel joint **48** for reasons described herein. The breathing circuit **41**, while flexible, will necessarily be stiff enough to maintain its inter over comparatively long tuns, while the flexible connecting tube **46**, being only a short length, for example 10 centimetres, merely has to span between the patient's mouth and chest, and can thereby be made in a manner that would not be suitable for long runs. Furthermore, as a result of the short length of the connecting tube **46**, the connecting tube **46** does not need to incorporate significant insulation or heating capability. The connecting tube **46** may be formed from a thin plastic membrane supported over helical or double helical or corrugated supporting ribs. In such a case, the support makes the connection tube **46** laterally flexible and resistant to torsion. The elbow swivel connector **45** allows for movement of the connection tube **46** relative to the interface **2**. The swivel connector **48** allows for movement of the connection tube **46** relative to the breathing circuit **41**. It is to be understood that one or both of the swivel joints **45**, **48** could be eliminated, but the preferred embodiment includes elbow swivel connector **48**.

Fixable Swivel Joint

The nasal mask or mouthpiece as described above can be provided with an improved L-shaped elbow connector similar to that described above. Referring to FIGS. **12** to **16** a L-shaped elbow **401** is fixed to the mask base **402** on the nasal mask although not shown in the Figures to inlet **51** of the mouthpiece **50**. Hereinafter when reference is made to "mask body" or "mask base **402**" it is intended to refer to either the mask body or inlet **51** of the mouthpiece. A portion **403** of the elbow connector can be rotated about a point X in the directions of arrows A and B. The elbow connector **401** is connectable at its end **404** to the breathing circuit or conduit **3** as described with reference to FIGS. **1** and **2**. The connector **401** is designed to be fixed into one of two positions and is able to be fully removed from the mask base **402**. If the connector **401** is assembled in a first position, it is able to freely swivel, as indicated by the arrows labelled A and B on FIG. **12**. If the elbow is pushed into a second position, an area of interference prevents the connector from freely swivelling.

Attention is now drawn to FIGS. **13** and **14** where the mask body **501** and elbow connector **502** are shown in a first position where the connector **502** is able to freely rotate 360 degrees about a vertical axis out of the mask body. The connector **502** is connected to an aperture in the centre of the mask body, so that in use, gases flow from the breathing circuit through the elbow connector and aperture in the mask body and into the patient's lungs. The elbow connector **502** is held within the aperture in the mask body **501** by way of tubular connector **503** located on the arm of the elbow connector **502**. The tubular connector **503** comprises various ridges and protrusions, moulded in the external surface of the elbow connector's arm, that meet with complimentary ridges and protrusions moulded in the interior surface of the aperture in the mask body (or the inlet **51** itself).

In particular, referring to FIG. **14**, when the connector **502** is in the position as shown in FIG. **13**, the ridge **601** and protrusion **602** in the connector **502** act with the small ridge **603** and protrusion **604** in the interior surface of the mask body, to lock the elbow connector **502** into a position that enables the elbow to swivel freely within the mask body. To remove the elbow **502** from the mask body **501** a force in the direction of arrow C (see FIG. **13**) must be placed on the elbow so that the protrusion **602** on the elbow is forced past the protrusion **604** on the mask body, thereby releasing the connector **502** from the mask body.

The elbow connector may be pushed downwards to into the mask body to a position as shown in FIGS. **15** and **16**. Here, the protrusion **602** of the elbow has been pushed past the lower protrusion **802** on the mask body **501** and sits within a complimentary ridge **801** in the mask. The protrusion **604** on the mask abuts the ridge **601** on the elbow connector and the exterior side surface **804** of the elbow connector above the ridge **601** abuts the interior surface **805** of the mask aperture. The area of interference **803** between these surfaces prevents the elbow from freely swivelling within the mask.

The improvements, as described above, to the elbow connector of the present invention provides an attachment that can either freely rotate, or be locked in a particular position according to the patient's desires. The improvement to the prior art swivel connectors is that the short flexible tubing (**46** as described with reference to FIG. **3**) is no longer required.

Flow Diffuser and Bias Flow Directional Funnel

In an alternative form of the present invention, and in order to reduce the noise caused by expiratory gases being expelled from the mask or mouthpiece, either may be provided with an elbow connector having a diffuser. In prior art systems the flow diffuser is usually provided within the elbow connector at the point of connection to the mask body or inlet to the mouthpiece, in the present invention it is envisaged to provide a diffuser on the elbow connector. The following description refers to nasal mask when describing the diffuser. The diffuser may also be provided with an elbow connector used with a mouthpiece as previously described.

FIG. **17** shows a nasal mask **901** and elbow connector **902** as that has a diffuser located along the length of the connector **902** previously. The elbow connector **902** includes a diffuser **903** on its exterior surface, the diffuser is a duct that provides for the broadening of the airflow and reduction in the airflow speed. In the preferred form the duct has outlet vent holes **904**, **905** and the duct is made out of flexible rubber material. Note must be made that any number of vent holes may be provided in the duct, the preferred form shown in FIG. **17**, merely shows two vents. The duct is preferably provided with a bias flow directional funnel, which will be described below.

Referring to FIGS. **18** and **19**, during positive pressure ventilation treatment a portion of the inlet air flow breathed by the patient is exhausted directly through the bias holes **1001**, **1002**. The only venting required is to clear the expired CO_2 gas from within the elbow connector **1003**. Therefore a funnel **1004** is provided within the elbow **1003** that directs the exhaled CO, gases to the bias holes **1001**, **1002** but does not direct the inlet airflow from the ventilation machine out the bias holes.

The purpose of the funnel is to vent exhaled air from the breathing system to remove CO_2 gases. With the prior art breathing systems it has been found that there is continuous leaking of gases through the vent holes during inspiration and expiration by the patient. Therefore, a loss of pressure occurs due to escaping air. Thus, on inspiration the patient receives less pressure and thus less breathing therapy, and

therefore this requires that vent holes are provided that are as small as possible to lessen this effect.

During expiration by the patient it is preferred that most of the exhaled gases are vented through the vent holes, in order to prevent pressure spikes and to ensure CO_2 gases are expelled from the breathing tubing. The funnel therefore provides for shielding of the vent holes during inspiration, but enhances the venting of CO_2 gases by providing directional flows during expiration, this also allows for vent holes to be increased in size, providing larger exhaust areas.

Inlet airflow E flows from the ventilating system through the elbow connector in the direction of arrows F, G and H and into the patient's lungs. The air that is exhaled, as indicated by arrow I, flows through the funnel **1004** that has been moulded within the interior of the elbow **1003**. The funnel **1004** is tubular in shape and provides for the funnelling of the exhausted CO_2 gases through the outlet bias holes **1001**, **1002**.

Providing such a diffuser on the elbow connector effectively minimises the noise generated by the outward flow of expiratory gases from the mask. The diffuser of the present invention requires little or no maintenance and improves user comfort.

The providing of a directional funnel within the elbow connector further minimises noise and reduces pressure spikes during exhalation.

What is claimed is:

1. A device for delivering a supply of gases to a patient comprising or including:

a patient interface fittable to a patients nose or mouth, which in use is in fluid communication with said supply of gases,

connecting member having two ends and means for interference with said patient interface, one end of said two ends being locatable within said patient interface and the other end of said two ends is connectable to said supply of gases, said member capable of being fixed into one of two positions, a first position where said member is freely rotatable within patient interface, and a second position where said means for interference with said patient interface prevents the free rotation of the member within said patient interface.

2. A device for delivering a supply of gases to a patient according to claim **1** wherein said other end is connected to a conduit that is connected to said supply gases.

3. A device for delivering a supply of gases to a patient according to claim **1** wherein said connecting member is a L-shaped connector.

4. A device for delivering a supply of gases to a patient according to claim **1**, wherein said means for interference with said patient interface is the meeting of an interference surface on the connecting member that is capable of abutting said patient interface.

5. A device for delivering a supply of gases to a patient according to claim **1** wherein said patient interface is a nasal mask.

6. A device for delivering a supply of gases to a patient according to claim **1** wherein said patient interface is a mouthpiece.

7. A device for delivering a supply of gases to a patient according to claim **5**, wherein said nasal mask comprises or includes:

a body portion, having an inlet receiving said supply of gases through a gases supply conduit, and

sealing means attached to or integrated with said body portion, said sealing means adapted to seal against the facial contours of a patient.

8. A device for delivering a supply of gases to a patient according to claim **7**, wherein said connecting member includes outlet means, said outlet means including, at least one outlet vent and a funnel, which in use directs and passes a substantial portion of gases expired from a patient through said at least one outlet vent.

9. A continuous positive airways pressure system for delivering gases to a patient comprising or including a pressurized source of gases, a conduit, in fluid communication with said pressurized source, adapted to convey said gases, and a nasal mask in fluid communication with said conduit, in use, delivering said gases to a patient, said nasal mask comprising or including:

a body portion having an inlet, connected to said conduit by a connecting member,

sealing means engaged with said body portion, and adapted to seal against the facial contours of a patient, and

securement means attached to or around the head of a patient,

wherein said connecting member has two ends and means for interference with said body portion, one end being locatable within said body portion and the other end of said two ends connectable to said conduit, said connecting member capable of being fixed into one of two positions, a first position where said member is rotatable within said body portion and a second position wherein said means for interference with said body portion prevents the free rotation of said member within said body portion.

10. A device for delivering a supply of gases to a patient according to claim **9** wherein said connecting member is an L-shaped connector.

11. A device for delivering a supply of gases to a patient according to claim **9** wherein said means for interference with said body portion is the meeting of an interference surface on said connecting member that is capable of abutting said body portion.

12. A continuous positive airways pressure system for delivering gases to a patient according to claim **9** wherein said connecting member includes outlet means, said outlet means including, at least one outlet vent and a funnel, which in use directs and passes a substantial portion of gases expired from a patient through said at least one outlet vent.

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