The invention provides a head gear apparatus for use in combination with a conventional nasal mask. The head gear apparatus includes a first frame member and a second frame member. Each frame member includes a substantially rigid shaft between 2 to 3 inches in length with a frictionally resistive surface. A flange with a receiving member eyelet is secured to the lower ends of the shafts to secure the frame members to the lower attachment members of the mask. An extension with a receiving member eyelet is secured to the upper ends of the shafts at an obtuse angle to secure the frame members to the upper attachment member on the mask. A strap is received by the shaft of each frame member for retaining the nasal mask on a person's face.
Fig. 1
PRIOR ART
HEAD GEAR APPARATUS FOR USE WITH A NASAL MASK

PRIORITY CLAIM

[0001] This application claims benefit of the filing date of U.S. Provisional Patent Application No. 60/292,120 filed May 18, 2001.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates generally to a novel head gear apparatus and more particularly to a head gear apparatus that will comfortably and successfully maintain a nasal mask; generally used for treatment of breathing disorders, such as sleep apnea, ventilation difficulties, anesthetic gas administration, and the like. The head gear apparatus is unobtrusive and will adequately and efficiently allow pressure adjustments to the particular mask for providing an air tight seal.

[0004] 2. Description of the Prior Art

[0005] Sleep apnea is a common disorder that is broken into three categories: obstructive, central and mixed, wherein obstructive sleep apnea is the most common. In obstructive sleep apnea there is a blockage in the airway. This blockage is generally caused by the soft tissue in the rear of the throat that collapses and closes during sleep. In central sleep apnea, there is no blockage, but rather the brain fails to signal to the muscles to breathe. Mixed apnea is a hybrid of obstructive and central apnea.

[0006] Regardless of which category, individuals with sleep apnea will frequently stop breathing while sleeping. An inadequate amount of oxygen will be supplied to their body, preventing a restful night of sleep. This will result in any one or any combination of the following symptoms of sleep apnea: restless sleep; very loud snoring, often interrupted by silence and then gasps; falling asleep while driving; falling asleep during the day; morning headaches; loss of energy; trouble concentrating; irritability or shortness of temper; forgetfulness; mood or behavior changes; anxiety or depression; and decreased interest in sex. Left untreated, sleep apnea can increase the risk of heat disease or stroke.

[0007] Several options are available for treating sleep apnea. One option is to surgically remove or shrink the tissue causing the obstruction in the throat. Non-surgical treatment includes the application of a continuous positive airway pressure (CPAP) device. This device is a mask, as shown in FIG. 1, which the patient wears during sleep. The mask 10 is snugly fitted on the patient and is designed to be placed centrally over the nose and mouth and is secured via conventional straps. The mask is coupled to a blower that sends a light stream of air pressure into the throat. This light stream of air pressure will prevent airway obstruction and thus enable the wearer to get a proper amount of sleep.

[0008] As seen in the figure, the mask comprises a mask frame 12 having a mask cushion 14 secured to the perimeter of the mask frame. Extending upwardly from the frame is the forehead support tab 16 having channels 18b therein for receiving the conventional head gear, also known as the strap. Secured to the front of the mask frame are head gear clips 20. These clips each include a channel 18b that are designed for receiving the conventional head gear. Located on the mask frame is a portal (illustrated, but not labeled) for receiving the valve assembly for coupling the mask to the blower.

[0009] The head gear 22 includes an upper portion 24a, that is adapted to removably extend into the channels of the forehead support tab, and a lower portion 24b, that is adapted to removably extend into the head gear clip. The upper and lower portions are coupled via middle section 24c to form a unitary structure. The head gear is flexible and is adapted to extend through the appropriate channel. This will provide for the rear of the head gear to contact the front of the strap when located therein. The rear and front are fabricated from cooperating hook and loop material to provide for the rear of the head gear to be removably secured to the front, and thus provide for the head gear to be in a fixed position when contact between the front and rear is accomplished, as shown.

[0010] Though somewhat effective, this strap design does have some shortcomings, in that adjustments must be made by removing an end of the strap and re-adjusting the particular end. Each end must be removed and re-attached in order to achieve the airtight seal. Using this type of strap can be cumbersome and tedious, resulting in a frustrating and unsuccessful attachment. During sleep, the straps can easily loosen and cause the seal to be broken, thus defeating the intent of the mask. In addition, removing the four strap mask requires the cumbersome step of loosening the lower strap, which requires the user to spend a greater time awake adjusting the mask. Finally, because the lower straps must be loosened for removal, the prior art four strap mask requires tedious readjustment each time the mask is removed.

[0011] What is needed is a strap that can be retrofitted onto the existing mask and one that is easy to attach and adjust. This strap should provide successful results yet be simple in design and comfortable to wear.

[0012] As will be seen, the present invention achieves its intended purposes, objectives and advantages by accomplishing the needs as identified above, through a new, useful and unobvious combination of component elements, which is simple to use, with the utilization of a minimum number of functioning parts, at a reasonable cost to manufacture, assemble, test and by employing only readily available material.

SUMMARY OF THE INVENTION

[0013] The present invention is a head gear apparatus designed and configured to be removably secured to a conventional mask. The conventional mask being a nasal mask generally used for the treatment of breathing disorders, such as sleep apnea, ventilation difficulties, anesthetic gas administration, and the like. When attached to the user, the head gear apparatus of the present invention will be comfortable, unobtrusive and will adequately and efficiently allow pressure adjustments to the particular mask for providing an air tight seal between the wearer and the mask.

[0014] In order to provide for an adequate attachment, the present invention comprises a mainframe having a flexible strap secured thereto. The mainframe comprises a first portion and a second portion. The first portion being secured to the left of the mask and the second portion being secured to the right of the mask. Each portion is substantially identical in structure.
Each portion includes a central shaft. This shaft is substantially rigid and is coated with or is fabricated from a material possessing a high resistance to friction. This shaft will receive the strap and the resistive material will prevent and aid the strap from moving when secured thereto.

Perpendicularly located on the lower end of each shaft is a flange. Secured to the outer end of the flange is a receiving member. This receiving member aligns with the existing channel of the head gear clips located on the conventional mask. Conventional attaching devices are removably inserted into the receiving member and channel in order to lock and secure the lower portion of the mainframe to the existing mask.

Angularly attached to the upper end of each shaft is an extension. Located at the opposite end of each extension is a second set of receiving members. Each receiving member aligns with the existing channel of the forehead support tabs located on the conventional mask. Conventional attaching devices are removably inserted into the receiving member and channel in order to lock and secure the upper portion of the mainframe to the existing mask.

Dependent upon the brand of mask utilized, the outer end of each flange and each extension can dip downwardly. This will provide for the receiving members to be located behind the shaft and render a more comfortable and adequate fit between the present invention, mask and user of the particular mask.

Once the mainframe is secured to the mask, a strap secures the mask to the wearer. Due to the solid and rigid structure of the mainframe, a singular and elongated strap is all that is needed for an adequate fit and one that will render an air tight seal between the wearer and the mask. The resilient strap includes two ends; each end will be secured to the shaft of the mainframe. Each end can be removably secured, or optionally, one end can be permanently attached thereto. This will reduce the steps for attaching the device for each use.

To utilize the present invention, the mainframe is secured to the upper and lower areas of the conventional mask. Once attached, removal and re-adjustment of the mainframe is not necessary. When secured, the user places the mask over their nose and mouth. An end of the strap is attached to one of the shafts and the second end is taken and wrapped around the user’s head to the second shaft. This second end is secured to the second shaft. Once secured, if adjustments are needed, the user merely lifts the first end and/or second end of the attached strap in the desired direction (upward or downward), until an airtight seal is met. Thereby providing adequate pressure around the perimeter of the mask. The mask may be easily removed without adjustment by lifting the strap off just as a baseball catcher would quickly remove a catcher’s mask while chasing a foul ball.

Accordingly, it is an object of the present invention to provide a head gear apparatus designed and configured to be adequately, successfully and comfortably secured to a conventional mask generally used for the treatment of breathing disorders, such as sleep apnea, ventilation difficulties, anesthetic gas administration, and the like.

It is another object of the present invention to provide for a head gear apparatus that will overcome the deficiencies, shortcomings, and drawbacks of prior head gears and attaching methods thereof.

Another object of the present invention is to provide a head gear apparatus that can be easily and efficiently adjusted as well as provide for a head gear apparatus that is non-obtrusive to use and wear.

Yet another object of the present invention, to be specifically enumerated herein, is to provide a head gear apparatus for use with a conventional nasal mask in accordance with proceeding objects and which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a head gear assembly that would be economically feasible, long lasting and relatively trouble free during utilization.

Although there have been many inventions related to nasal mask that are specifically gear to treat sleep apnea, none of the inventions provide a strap that will efficiency and successfully allow adjustment with a minimal amount of effort. The present invention meets the requirements of the simplified design, compact size, low initial cost, low operating cost, ease of installation and maintainability, and minimal amount of training to successfully employ the invention.

The foregoing has outlined some of the more pertinent objects of the invention. These objects should be construed to be merely illustrative of some of the more prominent features and application of the intended invention. Many other beneficial results can be obtained by applying the disclosed invention in a different manner or modifying the invention within the scope of the disclosure. Accordingly, a fuller understanding of the invention may be had by referring to the detailed description of the preferred embodiments in addition to the scope of the invention defined by the claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of a conventional mask and strap, typically used for individuals suffering from sleep apnea.

FIG. 2 is a front view of the headgear apparatus of the present invention attached to a conventional mask, used to treat individuals suffering from sleep apnea.

FIG. 3 is a side view of the headgear apparatus of the present invention attached to a conventional mask, used to treat individuals suffering from sleep apnea.

FIG. 4 is an alternative front view of the headgear apparatus of the present invention.

FIG. 5 is an alternative side view of the headgear apparatus of the present invention.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, in particular to FIGS. 2-5 thereof, the present invention, a head gear apparatus, denoted by reference numeral 30 will be described. Shown is a head gear apparatus 30 designed and configured...
to be secured to a conventional nasal mask. These masks are generally used for treatment of breathing disorders, such as sleep apnea, ventilation difficulties, anesthetic gas administration, and the like. When attached to the user, the head gear apparatus will be comfortable and will offer a means of adjusting the mask to the user so as to provide for an air tight seal between the wearer and the mask.

[0034] The present invention comprises a mainframe having a flexible strap removable secured thereto. The mainframe comprises a set of frame members comprising a first portion and a second portion. The use of two portions provides for the attachment to each side of the mask. Thus, the first portion will be secured to the left of the mask and the second portion will be secured to the right of the mask. Each portion is substantially identical in structure.

[0035] Located on each portion of the set of frame members is a shaft. This shaft includes a lower end and an upper end. The lower end will be located in proximity to the head gear clips of the conventional mask and the upper end will be located in proximity to the area of the forehead support tabs. The shaft is substantially rigid and is coated with or is fabricated from a material providing a high amount of friction for resistance to sliding. This shaft will receive the strap and the resistive material will prevent the strap from sliding when secured thereto. As seen in the drawings, when attached, the shaft will be located parallel to the mask and will be approximately the entire length of the mask. This will ultimately provide a device that is comfortable to wear and successful to maintain the mask on the wearer.

[0036] Perpendicularly located on the lower end of each shaft is a flange. Secured to the outer end of the flange is a receiving member for attaching the frame member to lower portion of the mask via an attachment member on the mask. As shown, this receiving member aligns with the existing channel of the head gear clips located on the conventional mask. The receiving member can be any conventional form and as shown in the drawings is a circular surface area, such as an eyelet, having an aperture extending therethrough. Conventional attaching devices are removable inserted into the receiving member and channel in order to lock and secure the lower portion of the mainframe to the existing mask. As seen in FIG. 3, the attaching device is illustrated as being a threaded rod device, such as a screw, that is inserted into the aperture and the existing channel. A nut is attached to the outer end and rotated until the attaching device is secured thereto.

[0037] Angularly attached to the upper end of each shaft is an extension. This attachment occurs at an obtuse angle and is dependent upon the length of the shaft. Located at the opposite end of each extension is a second set of receiving members, which may also consist of eyelets, and which attach the frame member to an upper portion of the mask via an attachment member on the mask, such as tab. Each receiving member may be aligned with the existing channel of the forehead support tabs located on the conventional mask. Conventional attaching devices are removable inserted into the receiving member and channel in order to lock and secure the upper portion of the mainframe to the existing mask. As seen in FIG. 3, the attaching device is illustrated as being a threaded rod device, such as a screw, that is inserted into the aperture and the existing channel. A nut is attached to the outer end and rotated until the attaching device is secured thereto.

[0038] It is noted that dependent upon the brand of mask utilized the outer end of each flange and each extension can dip downwardly, as shown in FIG. 5, providing for the receiving members to be located rearward from the shaft, ultimately providing an accurate and efficient fit.

[0039] Once the mainframe is secured to the mask, a strap secures the mask to the wearer. The strap, as seen in FIG. 2, is an elongated rectangular member having opposite ends. Each end will be attached to a shaft of the mainframe. The strap includes a first side and a second side. Each side is fabricated from a hook and loop material, such as VELCRO to provide for the first side to be removable attachable to the second side. Such a configuration will enable the strap to wrap around the shaft and provide for the rear side to be contacting the wearer. Once around, the rear side will be facing the front side of the strap. Contact between the front side and rear side will provide for the strap to be attached and secured to the wearer. It is noted that one end of the strap can be permanently secured to the mainframe. This will innately provide for securement to occur at one end of the strap and will inherently reduce if not eliminate the chance of misplacing and losing the mask and head gear of the present invention.

[0040] To utilize the present invention, the mainframe is secured to the upper and lower areas of the conventional mask. Once attached, the mainframe is semi-permanently attached thereto. This will provide that the removal and re-adjustment of the mainframe is not necessary once secured thereto. Consequently providing for the wearer to merely attach the strap to the device, adjust the strap appropriately, and wear.

[0041] When the mainframe is held in place via the appropriate attaching devices, the user can place the mask over their nose and mouth. An end of the strap is attached to one of the shafts and the second end is attached to the opposite shaft. The strap stretched around the user’s head and adjusted for comfort without having to further change the length of the strap. If adjustments are needed, the user merely lifts the first and second end of the attached strap in the desired direction vertical direction (upward or downward) along the height of the shaft, until an air tight seal is met. Thereby providing an adequate pressure around the perimeter of the mask.

EXAMPLE

[0042] By way of example, a mask as illustrated in FIGS. 2-4 has been fabricated and utilized. The present invention was utilized with a conventional CCAP mask and worn by a patient experiencing obstructive sleep apnea. The strap was a conventional elastic material and each end of the strap was permanently secured to a shaft.

<table>
<thead>
<tr>
<th>Portion</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of Shaft</td>
<td>approximately 2.75 inches (2 to 3 inches)</td>
</tr>
<tr>
<td>Length of Extension</td>
<td>approximately 2.75 inches (2 to 3 inches)</td>
</tr>
<tr>
<td>Outer Angular attachment</td>
<td>approximately 130 degrees (90 to 150 degrees)</td>
</tr>
<tr>
<td>Length of flange</td>
<td>approximately 0.5 inches (0.25 to 1 inch)</td>
</tr>
</tbody>
</table>

[0043] Once formed, the mainframe was attached to a conventional mask and worn each night for approximately
three months. The user observed that the mainframe was easy to install on a conventional mask and once attached efficient and effective to use. When attached, it was further observed that the mainframe, strap and mask performed exceptionally well and was comfortable to wear. The mainframe adequately and efficiently maintained an airtight seal and adjustment were easy and simple to make. Leaks were reduced substantially.

[0044] Hence, it is seen that the present invention provides a head gear apparatus that is adequate and efficient at maintaining a mask an air tight seal.

[0045] While the present invention has been particularly shown and described with reference to an embodiment thereof, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the present invention.

I claim:

1. A head gear apparatus for use in combination with a nasal mask comprising:

   a first frame member including a substantially rigid shaft having a lower end and an upper end, a flange secured to the lower end of the shaft, a first receiving member secured to the flange, an extension secured to the upper end of the shaft, a second receiving member secured to the extension, said first frame member attached to the mask by attachment of the receiving member on the flange to a lower attachment member on the mask and by attachment of the receiving member on the extension to an upper attachment member on the mask;

   a second frame member including a substantially rigid shaft having a lower end and an upper end, a flange secured to the lower end of the shaft, a first receiving member secured to the flange, an extension secured to the upper end of the shaft, a second receiving member secured to the extension, said second frame member attached to the mask by attachment of the receiving member on the flange to a lower attachment member on the mask and by attachment of the receiving member on the extension to an upper attachment member on the mask;

   a strap received by the shaft of first frame member and the shaft of the second frame member.

2. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said shaft of said first frame member and said shaft of said second frame member are each coated with a material providing a resistive surface for retaining said strap.

3. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said shaft of said first frame member and said shaft of said second frame member are each fabricated of a material providing a resistive surface for retaining said strap.

4. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said extension of said first frame member and said extension of said second frame member are each secured to the upper ends of each frame member’s said respective shaft at an obtuse angle.

5. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said shaft of said first frame member and said shaft of said second frame member is each between 2 and 3 inches in length.

6. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said extension of said first frame member and said extension of said second frame member is each between 2 and 3 inches in length.

7. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which said flange of said first frame member and said flange of said second frame member is each between 0.25 and 1 inch in length.

8. A head gear apparatus for use in combination with a nasal mask as in claim 1 in which each receiving member consists of an eyelet.

9. A head gear apparatus for use in combination with a nasal mask comprising:

   a first frame member including a substantially rigid shaft between 2 to 3 inches in length with a frictionally resistive surface and having a lower end and an upper end, a flange secured to the lower end of the shaft, a first receiving member secured to the flange, an extension secured to the upper end of the shaft at an obtuse angle, a second receiving member secured to the extension, said first frame member attached to the mask by attachment of the receiving member on the flange to a lower attachment member on the mask and by attachment of the receiving member on the extension to an upper attachment member on the mask;

   a second frame member including a substantially rigid shaft between 2 to 3 inches in length with a frictionally resistive surface and having a lower end and an upper end, a flange secured to the lower end of the shaft, a first receiving member secured to the flange, an extension secured to the upper end of the shaft at an obtuse angle, a second receiving member secured to the extension, said second frame member attached to the mask by attachment of the receiving member on the flange to a lower attachment member on the mask and by attachment of the receiving member on the extension to an upper attachment member on the mask;

   a strap received by the shaft of first frame member and the shaft of the second frame member.