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DEVICE AND METHOD FOR POSITIONING A DELIVERY TUBE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Ts application claims priority under 35 U.S.C. § 119(e) to United States Provisional Application Serial No. 60/708145, filed on August 15, 2005, which is hereby expressly incorporated by reference in its entirety.

Background of the Invention

Field of the Invention

[0002] The invention relates to devices for positioning delivery tubes.

Description of the Related Art

[0003] There are respiratory disorders affecting men, women and children in all age groups. Many devices used to treat people with respiratory or related afflictions use a length of plastic or other kind of tubing to deliver any variety of gases and/or medications to the patient. For example, people with respiratory failure, respiratory insufficiency, obstructive sleep apnea, or other similar airway diseases typically make use of respiratory therapy devices that include a face mask or nasal mask, connected to a therapy device, such as a gas delivery device, by some kind of tubing. The therapy machines may deliver pressurized air, oxygen, aerosols, or other gases to the patient. Some masks that are used in conjunction with therapy devices form a seal over the patient's nose or include fittings that go directly into the nostrils to provide a means of delivering air, oxygen, or other gases/aerosols. Typically, the tubing that connects the therapy device to the mask has no support and may rest on the bed, a chair, bedside, or on the patient. The position of the tubing may be problematic for the patient, causing the patient's bedding, clothing, neck, head, or arms to become entangled in the tubing. If the tubing becomes entangled, the supply of air, oxygen, or other deliverable gas may be reduced or cut off. Similarly, because a portion of the tubing typically rests on the patient, such as on the patient's neck or chest, the patient can roll on the tube, causing the tube to compress and reducing or blocking the flow of the deliverable gas.

[0004] Additionally, because the tubing is supported by the connection of the mask to the patient, the patient needs to tighten the mask or the fittings to the nostril to secure
the mask so that the weight of the tubing does not cause the mask seal to be broken, causing the deliverable gas to leak from the mask or fittings. However, tightening of the mask to that patient may cause discomfort and pain to the patient.

**SUMMARY OF THE INVENTION**

[0005] The invention described herein is a support arm for tubing and other components of devices commonly used for treating people with respiratory failure, respiratory insufficiency, obstructive sleep apnea, and other airway diseases.

[0006] In one embodiment, an apparatus for supporting an air delivery tube having a first end of the tube being coupled to a continuous positive airway pressure machine and a second end of the tube being coupled to a mask configured for placement on a user, comprises an attachment mechanism for coupling to a structure proximate the user. The apparatus further comprise a vertical telescoping member having lower and upper ends defining a length of the vertical telescoping member therebetween, the lower end being coupled to the attachment mechanism, wherein the vertical telescoping member length is adjustable by the user, and a horizontal telescoping member having first and second ends defining a length of the horizontal telescoping member therebetween, the first end being releasably coupled to the upper end of the vertical telescoping member, wherein the horizontal telescoping member length is adjustable by the user and the horizontal telescoping member is rotatable around the first end. The apparatus may further comprise one or more tube attachment mechanisms coupled to the horizontal telescoping member and configured to secure the air delivery tube along a length of the horizontal telescoping member so that the second end of the air delivery tube hangs downwardly over the second end of the horizontal telescoping members.

[0007] In another embodiment, an apparatus for securing a gas delivery tube so that an end of the delivery tube is positioned substantially above a user comprises a first member coupled to a support structure, a second member coupled to the first member so that the first and second members form a substantially L-shaped support, the second member comprising at least one tube securing mechanism for coupling the gas delivery tube along at
least a portion of a length of the second member, wherein a length of the first member is adjustable and the length of the second member is adjustable.

[0008] In another embodiment, a support apparatus comprises a first longitudinally extending member having an adjustable length, a second longitudinally extending member having an adjustable length, wherein the first and second members are releasably coupled to form a substantially L-shaped structure and means for supporting the L-shaped structure in a desired position, wherein the second member is configured to support a gas delivery tube such that an end of the gas delivery tube is positioned substantially over a user.

[0009] In another embodiment, a method of supporting a gas delivery tube so that the tube is distant from a patient's bed comprises coupling a first member to a second member in order to form a support apparatus, wherein the first member is length adjustable, coupling the support apparatus to a support structure, setting a length of the first member to a desired length, positioning the gas delivery tube along at least a portion of at least one of the first and second members, and securing the gas delivery tube to at least one of the first and second members.

[0010] In another embodiment, a method of manufacturing a support device configured for supporting a gas delivery tube comprises cutting a first material having a central aperture to a predetermined length, bending a first metal rod so that the first metal rod comprises a substantially L-shaped bend, wherein the first metal rod is sized so that an end of the first metal rod engages with a first end of the first material, and bending a second metal rod to form a support base, the support base having at least three sides, the at least three sides being substantially planar, and an attachment member extending substantially orthogonal to the plane of the support base, wherein the attachment member is sized for engagement with a second end of the first material.

[0011] In another embodiment, a support device kit comprises a longitudinal first member having a central aperture, a longitudinal second member having a substantially L-shaped bend, wherein an end of the second member is sized to engage the central aperture of a first end of the first member; and a longitudinal third member having at least three sides, the at least three sides being substantially planar, and comprising an attachment member
extending substantially orthogonal to the plane of the at least three sides, wherein the attachment member is sized for engagement with the central aperture of a second end of the first member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Figure 1A is a photograph illustrating an exemplary support apparatus attached to an endtable and supporting a gas delivery tube that is coupled to a CPAP machine.

[0013] Figure 1B illustrates an exemplary therapy device, such as a CPAP machine, and a mask coupled to the therapy device via a gas delivery tube.

[0014] Figure 1C is a side view of an exemplary support apparatus for supporting a gas delivery tube.

[0015] Figure 2A is a side view of vertical and horizontal telescoping members, wherein the telescoping members are each in retracted positions.

[0016] Figure 2B is a side view of the vertical and horizontal telescoping members illustrated in Figure 2B, wherein the telescoping members are each in extended positions.

[0017] Figure 3A is a side view of a first bracket for coupling the telescoping members to a support structure.

[0018] Figure 3B is a side view of a second bracket for coupling the telescoping members to a support structure.

[0019] Figure 3C is a photograph of the second bracket for coupling the telescoping members to a support structure.

[0020] Figure 4A is a side view of a third bracket for coupling the telescoping members to a support structure.

[0021] Figure 4B is a photograph of the third bracket for coupling the telescoping members to a support structure.

[0022] Figure 4C is a side view of a L-shaped mounting plate.

[0023] Figure 4D is a photograph of the third bracket coupled to a headboard.

[0024] Figure 5A is a side view of a fourth bracket for coupling the telescoping members to a support structure.
[0025] Figure 5B is a photograph of the fourth bracket for coupling the telescoping members to a support structure.

[0026] Figure 5C is a side view of a flat mounting plate.

[0027] Figure 5D is a photograph of the fourth bracket coupled to a bed frame.

[0028] Figure 6A is a side view of a rod of a telescoping member.

[0029] Figure 6B is a side view of a cylinder of a telescoping member.

[0030] Figure 7 is a side view of another support apparatus comprising a floor support, a therapy device support, and a mattress support plate.

[0031] Figure 8 is a side view of another support apparatus comprising a mattress support plate.

[0032] Figure 9 illustrates an exemplary floor support.

[0033] Figure 10 illustrates an exemplary therapy device support.

[0034] Figure 11 illustrates another exemplary support device.

[0035] Figure 12 illustrates a horizontal support member that may be used with the vertical member and support base of Figure 11.

[0036] Figure 13 illustrates one embodiment of a support base that may be used in conjunction with embodiment of Figure 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0037] Embodiments of the invention will now be described with reference to the accompanying Figures, wherein like numerals refer to like elements throughout. The terminology used in the description presented herein is not intended to be interpreted in any limited or restrictive manner, simply because it is being utilized in conjunction with a detailed description of certain specific embodiments of the invention. Furthermore, embodiments of the invention may include several novel features, no single one of which is solely responsible for its desirable attributes or which is essential to practicing the inventions herein described.

[0038] Figure 1A is a photograph illustrating an exemplary support apparatus 110 attached to an endtable 120 and supporting a gas delivery tube 130 that is coupled to a therapy device 140, such as a Continuous positive airway pressure (CPAP) machine. A CPAP machine is used mainly by patients for the treatment of sleep apnea, h1 sleep apnea, the
patient's airway becomes restricted as their muscles relax naturally during sleep, which can cause arousal from sleep. The CPAP machine stops this phenomenon by delivering a constant stream of compressed air via the face mask 135 and gas delivery tube 130, keeping the patient's airway open under air pressure so that unobstructed breathing becomes possible, and thereby reducing and/or preventing apneas and hypopneas.

[0039] As illustrated in Figure 1A, the support apparatus 110 positions the gas delivery tube 130 away from items that tend to entangle with the tube 130, such as the patient 150, and the bedding on which the patient is laying. In one embodiment, the support apparatus 110 elevates the tube 130 approximately 12-14 inches above the patient's head. In other embodiments, however, the support apparatus may be adjusted to elevate the tube 130 at any other distance above the patient's head, such as in the range of 2-24 inches above the patient's head.

[0040] In one embodiment, the support apparatus 110 rotates about the attachment to the endtable 120 such that the support apparatus 110 may be rotated as the patient 150 moves, in order to maintain the tube 130 substantially above the patient 150 so that the tube 130 descend vertically to the patient's breathing orifice(s) (e.g., mouth and/or nose). Because the support apparatus 110 secures the gas delivery tube 130 above the patient 150, a gas delivery mask 135 may be attached to the patient 150 using less pressure than necessary to maintain a seal between the mask 135 and the patient 150 if the tube 130 is only supported on the patient 150 and/or the patient's bed. The reduced pressure required to maintain a suitable seal between the mask 135 and the patient 150 may provide increased comfort to the patient 150.

[0041] Figure 1B illustrates an exemplary therapy device 140, such as a CPAP machine, and a mask 135 coupled to the therapy device 140 by a gas delivery tube 130. The therapy device 140 may comprises any other device that provides a deliverable gas, such as oxygen, to the patient 150.

[0042] Figure 1C is a side view of the exemplary support apparatus 110 of Figure 1A. As illustrated in Figure 1C, the support apparatus 110 comprises a vertical telescoping member 112, a horizontal telescoping member 114, and an attachment mechanism 116. In the embodiment of Figure 1C, the vertical and horizontal telescoping members 112, 114 are
removably coupled by a male coupling mechanism 115 of the horizontal telescoping member 114 and an aperture in an upper end 113 of the vertical telescoping member 112. The coupling of the male coupling mechanism 115 with the vertical telescoping member 112 secures the horizontal telescoping member 114 substantially orthogonal to the vertical telescoping member 112. hi this embodiment, the male coupling mechanism 115 is rotatable within the upper end 113 of the vertical telescoping member 112 mechanism 116 such that the horizontal telescoping member 114 may be pivoted around the vertical telescoping member 112, allowing a wide range of positions for the tube 130. Although referred to as "vertical" and "horizontal" telescoping members, the telescoping members 112, 114 are not limited to vertical and horizontal orientations. For example, hi one embodiment the vertical telescoping member may be tilted so that it is not vertical, thus causing the horizontal telescoping member to also tilt so that it is not horizontal. Furthermore, the angles of the telescoping members may be varied depending of the support structure to which the support apparatus 110 is coupled. Thus, references to "vertical" and "horizontal" herein are for illustrative puiposes and are not intended as limiting the support apparatus 110 to one particular configuration.

[0043] In the embodiment of Figure 1C, the vertical telescoping member 110 is coupled to the attachment mechanism 116 and is rotatable about the coupling. In this exemplary embodiment, a bolt 122 coupled to the vertical telescoping member 112 is threadedly engage with a threaded hole 124 in the attachment mechanism 116. Thus, the vertical telescoping member 112 may be rotated about this threaded coupling in order to increase the range of positions in which the tube 130 may be located.

[0044] The vertical telescoping member 112 comprises a cylinder 138 and a rod 137 sized to fit within the cylinder 138 so that at least a portion of the rod 137 is slideably moveable within the cylinder 138. A length of the vertical telescoping member 112 may be adjusted by moving the rode 137 within the cylinder 138 to either extend or shorten a length of the vertical telescoping member 112. hi the embodiment of Figure 1C, the vertical telescoping member 112 also comprises a coupling mechanism 134 for securing the rod 137 to the cylinder 138 when the vertical telescoping member 112 is set to a desired position. Accordingly, a length of the vertical telescoping member 112 may be maintained using the
coupling mechanism 134. In one embodiment, the coupling mechanism comprises a collet, which is generally a holding device that forms a collar around the object to be held and exerts a strong clamping force on the object when it is tightened. Therefore, a collet may be loosened in order to allow the length of the vertical telescoping member 112 to be adjusted, and then tightened when the desired length of the vertical telescoping member 112 is achieved.

[0045] Similar to the vertical telescoping member 112, the horizontal telescoping member 114 comprises a cylinder 118 and a rod 117 sized to fit within the cylinder, wherein the rod 117 is slideably moveable within the cylinder 118. The horizontal telescoping member 114 comprises a coupling mechanism 119, such as a collet, that operates in a similar manner to that of the coupling mechanism 139, and is configured to secure the rod 117 to the cylinder 118 at a desired position.

[0046] Other coupling mechanisms, other than a collet, known in the art may also be used in conjunction with the vertical and horizontal telescoping members 112, 114. Additionally, other structures that allow for an adjustable length member may replace the vertical and/or horizontal telescoping members 112, 114 described herein. For example, the members 112, 114 may be replaced by multiple modular rods, wherein a number of the rods that are coupled together maybe adjusted in other to adjust a length of the member.

[0047] In the embodiment of Figure 1C, the attachment mechanism 116 comprises a clamp; however, any other suitable attachment mechanism may be used. The exemplary attachment mechanism 116 comprises a substantially U-shaped base plate 109, and a tightening device 105. The tightening device 105 comprises a plate 106 and a knob 108 that are coupled by a threaded cylinder 107. The knob 108 is configured so that a user may manually rotate the knob 108, and, thus, the entire tightening device 105, so that the position of the plate 106 is adjusted with reference to a coupling face 104 of the base plate 109. In this embodiment, the plate 106 and the coupling face 104 tighten around a portion of a support structure in order to secure the support apparatus 110 to the support structure. More particularly, the knob 108 is initially turned, e.g., in a counterclockwise direction, so that a distance between the plate 106 and the coupling face 104 is greater than a thickness of the portion of the support structure to which the user desires to attached the support apparatus.
110. The portion of the support structure is then positioned between the plate 106 and the coupling face 104, after which the knob is turned, e.g., in a clockwise direction, until the attachment mechanism 116 is securely attached to the support structure.

[0048] hi the embodiment of Figures 1A and 1C, saddles 160 are positioned on either end of the horizontal telescoping member 114. The saddles 160 are configured to support the gas delivery tube 130 along a length of the horizontal telescoping member 114. hi one embodiment, the saddles comprise slats 162 (See Figure 2A, also) through which a securing structure 164 may be placed in order to further secure the tube 130 within the saddles 160. The securing structure 164 may comprise hook and loop material, such as Velcro®, for example, that may be tightened around the tube 130 in order to secure the tube 130 in a desired position along a length of the horizontal telescoping member 114. hi one embodiment, the saddles are rotatable about the horizontal telescoping member 114 so that the tube 130 may be more accurately moved to a desired position. Additionally, rotating saddles may also allow increased movement of the tube 130, such that if the patient turns on one side or the other, the tube 130 can rotate from 0 to 360 degrees or more without obstruction. hi other embodiments, fewer or more saddles 160 may be positioned on the horizontal telescoping member 114 and even on the vertical telescoping member 112. Additionally, other suitable mechanisms for securing the tube 130 to the horizontal telescoping member 114 are contemplated for use with the devices described herein.

[0049] Figure 2A is a side view of the vertical and horizontal telescoping members 112, 114 in compressed positions, and Figure 2B is a side view of the vertical and horizontal telescoping members 112, 114 in extended positions. More particularly, in the embodiment of Figure 2B, only minimal portions of the rods 117, 137 are within the respective cylinders 118,138 so that a length of the horizontal and vertical telescoping members 114, 112 is maximized. hi Figure 2A, larger portions of the rods 117, 137 are within the respective cylinders 118,138 so that a length of the horizontal and vertical telescoping members 114, 112 is minimized. Accordingly, a height of the support apparatus 110 may be adjusted by adjusting the vertical telescoping member 112 and a reach of the support apparatus 110 may be adjusted by adjusting the horizontal telescoping member 114.
[0050] Figure 3A is a side view of the attachment mechanism 116 of Figure 1C for coupling the telescoping members of a support apparatus, such as the support apparatus 110 to a support structure, such as a nightstand, table, desk, headboard, or chair, for example. As noted above, in one embodiment the attachment mechanism 116 comprises a substantially U-shaped base plate 109, and a tightening device 105, where the tightening device 105 comprises a plate 106 and a knob 108 that are coupled by a threaded cylinder 107.

[0051] Figure 3B is a side view of a second bracket 310 for coupling the telescoping members of a support apparatus to a support structure. Similar to the attachment mechanism 116, the bracket 310 comprises a substantially U-shaped base plate 319 and a tightening device 315. The tightening device 315 comprises a plate 316 that is coupled to a threaded cylinder 317 via a pivot mechanism 314. Thus, the plate 316 pivots around the pivot mechanism 314 in order to position the plate 316 so that a contact area between the plate 316 and the support structure is maximized. For example, if the support structure, such as a table, comprises a beveled edge such that the top and bottom surface of the table where the bracket 310 is to be attached are not parallel, the plate 316 may be pivoted so that substantially all of a top surface of the plate 316 contacts the beveled surface of the table. The bracket 310 may also provide a more secured connection to any other support structure having non-parallel top and bottom surfaces.

[0052] Figure 3C is a photograph of the second bracket 310 illustrated in Figure 3B. As shown in Figure 3C, the bracket 310 is coupled to the vertical telescoping member 112 via the threaded hole 124 in the base plate 319. In the illustration of Figure 3C, the plate 316 has pivoted around the pivot mechanism 314 (not visible in Figure 3C), such that the top surface of the plate 316 is not parallel to a coupling face 313 of the base plate 319.

[0053] Figures 3A, 3B, and 3C each illustrate attachment mechanisms that are advantageously used to attach the vertical and horizontal telescoping member 114, 112 to a horizontally extending portion of a support structure. For example, the attachment mechanisms 116, 310 may be coupled to a top surface of a table, such as a nightstand or an endtable, to a bed frame, or to other horizontally extending structures.

[0054] Figure 4A is a side view of a third bracket 400 and Figure 4B is a photograph of the third bracket 400. The bracket 400 may advantageously be used for
coupling the telescoping members 112, 114 to vertically extending portion of a support structure. For example, the attachment mechanism 400 may be coupled to a headboard or back of a chair. The bracket 400 also provides another rotational axis about which the members 112, 114 may be rotated in order to further increase a range of positions to which the tube 130 (Figure 1) may be moved.

[0055] Figure 4C is a side view of a L-shaped mounting plate 410 that is coupled to the mounting bracket 310 in order to form the bracket 400. Accordingly, by coupling the mounting plate 410 to the bracket 310 in the manner illustrate in Figures 4A and 4B, an attachment mechanism configured for attachment to a vertically extending portion of a support structure may be formed. The mounting plate 410 comprises a threaded hole 412 for threadedly engaging the bolt 122 (Figure 1, Figure 4A) of the vertical telescoping member 112. The mounting plate 410 further comprises a non-threaded hole 414 configured for supporting a threaded cylinder 418 attached to the knob 416 (Figure 4A).

[0056] As illustrated in Figures 4A and 4B, the mounting plate 410 is coupled to the bracket 310 via the knob 416 coupled to the threaded cylinder 418. The bracket 310 comprises a threaded hole 420 sized to threadedly engage the threaded cylinder 416. Thus, the mounting plate 410 may be tightened against the bracket 310 by tightening the knob 416 (e.g., turning in a clockwise direction) so that the knob 416 secures the mounting plate 410 against the bracket 310, as shown in Figure 4B, for example. Because the threaded cylinder passes through the unthreaded hole 414 in the mounting plate 410, the mounting plate 410 may be pivoted about the threaded cylinder 418 with respect to the bracket 310. This way, the position of the telescoping members 112, 114 may further be adjusted in order to secure the tube 130 in an optimal position with respect to the user.

[0057] Figure 4D is a photograph of the bracket 400 coupled to a headboard 430 such that the support apparatus 110 extends above the bed 440. Additionally, because the mounting plate 410 is pivotally moveable with respect to the bracket 310, the vertical telescoping member 112 may be pivoted so that it extends over the bed, rather than remaining in a substantially vertical alignment.

[0058] Figure 5A is a side view of a fourth bracket 500 and Figure 5B is a photograph of the fourth bracket 500. The bracket 500 may advantageously be used for
coupling the telescoping members 112, 114 to a vertically extending portion of a support structure. For example, the attachment mechanism 500 may be coupled to a headboard or back of a chair. The bracket 500 also provides another rotational axis about which the members 112, 114 may be rotated in order to further increase a range of positions to which the tube 130 (Figure 1) maybe moved.

[0059] Figure 5C is a side view of a flat mounting plate 510 that is coupled to the mounting bracket 310 in order to form the bracket 500. Thus, by coupling the flat mounting plate 510 to the bracket 310 in the manner illustrate in Figures 5A and 5B, an attachment mechanism configured for attachment to a vertically extending portion of a support structure may be formed. The mounting plate 510 comprises a threaded hole 512 for threadedly engaging the bolt 122 (Figure 1, Figure 5A) of the vertical telescoping member 112. The mounting plate 510 further comprises a non-threaded hole 514 configured for supporting a threaded cylinder 518 attached to a knob 516 (Figure 5A, 5B).

[0060] As illustrated in Figures 5A and 5B, the flat mounting plate 510 is coupled to the bracket 310 via the knob 516 coupled to the threaded cylinder 518. The bracket 310 comprises a threaded hole 520 sized to threadedly engage the threaded cylinder 516. Thus, the flat mounting plate 510 may be tightened against the bracket 310 by tightening the knob 516 (e.g., turning in a clockwise direction) so that the knob 516 secures the mounting plate 510 against the bracket 310, as shown in Figure 5B, for example. Because the threaded cylinder passes through the unthreaded hole 514 in the mounting plate 510, the mounting plate 510 may be pivoted about the threaded cylinder 518 with respect to the bracket 310. In this way, the position of the telescoping members 112, 115 may further be adjusted in order to secure the tube 130 in an optimal position with respect to the user.

[0061] Figure 5D is a photograph of the bracket 500 coupled to a bed frame 530 such that the support apparatus 110 extends above the bed 540. Additionally, because the mounting plate 510 is pivotally moveable with respect to the bracket 310, the vertical telescoping member 112 may be pivoted so that it does not abut the mattress, but instead is separated from the mattress through the use of the flat mounting plate 510. In this embodiment, the user may more easily make the bed and move the sheets and blankets on the bed as the vertical telescoping member 112 does not secure the sheets and blankets between
the vertical telescoping member 112 and the mattress, but instead, the vertical telescoping member 112 is positioned apart from the sheets and blankets through the use of the flat mounting plate 510.

[0062] Figure 6A is a side view of a rod 600 and Figure 6B is a side view of a cylinder 610 of a telescoping member, such as the telescoping member 112, 114. As noted above, the telescoping members may comprise a rod that is slideably engaged within a cylinder in order to allow a length of the telescoping member to be adjusted. The rod 600 comprises a guide 602 configured to support the rod 600 as it slides within the cylinder 610. The guide 602 may comprise a rubber or soft plastic material that tightly engages the cylinder 610 so that the rod 600 remains substantially centered within the cylinder 610.

[0063] The cylinder 610 is shown with a collet 620 configured to threadedly engage with a threaded portion 612 of the cylinder 610. The rod 600 is inserted through the collet 620 that is loosely attached to the cylinder 610 and when the rod 600 is in the desired position within the cylinder 610, the collet 620 is tightened (e.g., turned in a clockwise direction) so that the rod 600 is securely held in place within the cylinder 610. The collet 620 may be loosened (e.g., turned in a counterclockwise direction) so that the rod 600 may be moved to a different position within the cylinder 610 in order to adjust a length of the cylinder/rod assembly.

[0064] Figure 7 is a side view of another support apparatus 700 comprising a floor support 710, a therapy device support 720, and a mattress support plate 730. The exemplary support apparatus 700 comprises horizontal and vertical length adjustment mechanisms 712 that allow the height and the reach of the support apparatus 700 to be adjusted. In one embodiment, the adjustment mechanisms 712 comprise collets that may be loosened in order to allow a rod to move within a cylinder in order to adjust a length of the members 740, 750. In the embodiment of Figure 7, the support apparatus 700 is supported via a floor support 710 and a mattress support plate 730. The floor support 710 is configured to offset the weight of the members 740, 750. Figure 9, described below, illustrates one embodiment of a floor support 710. In the embodiment of Figure 7, a mattress support plate 730 is coupled to the member 740 and inserted between a box spring 732 and mattress 734 in order to provide further positional support to the support apparatus 700. The mattress
support plate 730 may be any suitable shape, such as rectangular or triangular, to provide support to the support apparatus 700.

[0065] The exemplary support apparatus 700 further comprise a therapy device support 720 configured for supporting a therapy device, such as CPAP or oxygen delivery machine, for example. Advantageously, the therapy device support 720 elevates the therapy device to a level that is easily accessible by the user. The support apparatus 700 may be used when no nightstand or table for supporting the therapy device is available.

[0066] In one embodiment, the floor support 710, the therapy device support 720, and the mattress support plate 730 are each moveable along a length of the member 740. Additionally, each of these structures may be removed from the support apparatus by sliding off of a bottom end of the member 740. Accordingly, the position of these structures on the member 740 may be adjusted. For example, in one embodiment the therapy device support 720 may be positioned above the mattress support plate 730 so that it is closer to level to a top surface of the mattress 734. Alternatively, the floor support 710 and/or the mattress support plate 730 may be removed from the member 740.

[0067] Figure 8 is a side view of another support apparatus 800 comprising a mattress support plate 830 coupled to a lower end of a support member 740. In this embodiment, the support member 740, which is attached to another support member (not shown) that secures a gas deliver tube above a patient, is the only support of the support apparatus 800. In one embodiment, the support apparatus 700 may be modified by removing the therapy device support 720 and floor support 710 in order to create a support structure that is support by only a mattress support plate.

[0068] Figure 9 illustrates the exemplary floor support 710 comprising a triangular tubing 902 and a ring 904 having an aperture sized to fit around a telescoping member, such as the telescoping member 740. The tubing 902 may comprise any suitable material, such as a rigid plastic or a metal. The ring 904 comprises a threaded hole 905 through which a tightening screw 906 may be threaded in order to secure the floor support 710 to a telescoping member. Other mechanisms for attaching the floor support 710 to the telescoping member are also contemplated. The size and shape of the tubing 902 may be adjusted depending on the particular requirements for the support structure, such as whether
there is a mattress suppoit also, and depending on the mass of the therapy device, for example.

[0069] Figure 10 illustrates an exemplary therapy device support 720. The support 720 may comprise plastic, metal, or any other material suitable for supporting a therapy device, such as a CPAP or oxygen delivery device. The exemplary therapy device support 720 comprises a ring 904 and tightening screw 906 that operate in the manner described above with reference to Figure 9. Other attachment mechanisms that suitably support the therapy device support 720 on a telescoping member, such as the member 710, are also contemplated for use in conjunction with the therapy device support 720.

[0070] Figure 11 illustrates another exemplary support device 1100 that is configured for quick assembly. The exemplary support device 1100 comprises a support base 1110, a vertical member 1120, and a horizontal member 1130. In Figure 11, these components are illustrated separately; however, the components may be assembled to form a support device as described below. In the embodiment of Figure 11, the vertical member 1120 comprises tubing, such as PVC or other tubing having a central aperture.

[0071] The support base 1110 comprises a steel rod, for example, shaped to form a substantially rectangular structure. In other embodiments, the support base may comprises various other materials, such as aluminum, plastic, or combinations of materials, and the structure may be shaped differently, such as triangular, circular, or otherwise polygonal. The exemplary support base 1110 comprises a substantially horizontally extending attachment member 1115 sized to fit within the central aperture of the vertical member 1120 so that the vertical member 1120 is supported by the support base 1110.

[0072] The horizontal member 1130 comprises a bend 1132 such that a first end 1134 of the member 1130 may engage the vertical member 1120 while a second end 1136 remains substantially parallel to the support base 1110. Thus, in this embodiment, the horizontal member 1130 comprises a material that is sized to engage with the central aperture of the vertical member 1120 so that the horizontal member is supported by the vertical member and the support base 1110. In one embodiment, the horizontal member comprises the same material as the support base 1110.
[0073] In operation, the support base 1110 is inserted between a mattress and box spring on a bed and the support device 1100 is assembled as noted above. Alternatively, the support base 1110 may be placed on the floor, possibly with an object on top of a portion of the base 1110 in order to stabilize the base 1110. In another embodiment, the support device 1100 may be assembled prior to insertion of the support base 1110 under the mattress of a bed. The gas delivery tube of a therapy device may be supported by the horizontal member 1130 by securing portions of the tube to the horizontal member 1130, such as by using tape or Velcro, for example. In this way, the gas delivery tube may be positioned over the patient so that an end of the tube that couples with a gas delivery mask hangs over the patient. In other embodiments, the tube maybe secured to the horizontal member 1130 using other attachment means such as string or zip ties, for example. Advantageously, the support device 1100 comprises only a few parts that are easily assembled and disassembled.

[0074] Figure 12 illustrates a horizontal member 1200 that may be used with the vertical member 1120 and support base 1110 of Figure 11. The horizontal member 1200 is configured for engagement with a vertical member, such as vertical member 1120 (Figure 11) and includes a hook 1210 that may be used for storage of a mask, such as a gas delivery mask. For example, if a user has a CPAP machine with a gas delivery tube supported by the horizontal member 1200, the user may place the CPAP mask on the hook 1210 for temporary storage of the mask when it is not in use. This may prevent the mask from becoming tangled in the blankets and pillows on the bed and may prevent breakage of the mask that may occur if a person lays on the mask that is resting on the bed. Additionally, by storing the mask off of the bed, the task of making the bed does not include the complication of moving the mask to another support prior to making the bed. In one embodiment, the horizontal member 1200 is a single piece of metal, such as a steel rod, that is bent to form the hook 1210.

[0075] In the embodiment of Figure 12, the horizontal member 1200 is show with attachment devices 1220, which may comprises any material suitable for securing a gas delivery tube to the horizontal member 1200. As discussed above, the attachment devices 1220 may comprise tape, such as two-sided tape, Velcro, string, zip ties, or any or suitable material.
[0076] Figure 13 illustrates one embodiment of a support base 1300 that may be used in conjunction with the vertical member 1120 and horizontal member 1130, 1200, for example. In the embodiment of Figure 13, the support base 1300 comprises a single length of an elongated material, such as steel rod, that is bent to form the base 1320 of the support base 1300, as well as the substantially horizontal attachment member 1310. In other embodiments, the support base 1300 may comprises other materials, such as aluminum or other metals, or PVC pipe or other plastics.

[0077] In one embodiment, the support device 1100 is manufactured by cutting a length of PVC pipe, or other material that is suitable for a vertical member, to a suitable height; bending a piece of metal rod to form a horizontal member; and bending another piece of metal rod to form a support base, where the metal rod is sized to engage with an aperture of the vertical member.

[0078] The foregoing description details certain embodiments of the invention. It will be appreciated, however, that no matter how detailed the foregoing appears in text, the invention can be practiced in many ways. As is also stated above, it should be noted that the use of particular terminology when describing certain features or aspects of the invention should not be taken to imply that the terminology is being re-defined herein to be restricted to including any specific characteristics of the features or aspects of the invention with which that terminology is associated. The scope of the invention should therefore be construed in accordance with the appended claims and any equivalents thereof.
WHAT IS CLAIMED IS:

1. An apparatus for supporting an air delivery tube, a first end of the tube being coupled to a positive airway pressure machine and a second end of the tube being coupled to a mask configured for placement on a user, the apparatus comprising:
   
   - an attachment mechanism for coupling to a structure proximate the user;
   
   - a vertical telescoping member having lower and upper ends defining a length of the vertical telescoping member therebetween, the lower end coupled to the attachment mechanism, wherein the vertical telescoping member length is adjustable by the user;
   
   - a horizontal telescoping member having first and second ends defining a length of the horizontal telescoping member therebetween, the first end releasably coupled to the upper end of the vertical telescoping member, wherein the horizontal telescoping member length is adjustable by the user and the horizontal telescoping member is rotatable around the first end; and
   
   - one or more tube attachment mechanisms coupled to the horizontal telescoping member and configured to secure the air delivery tube along a length of the horizontal telescoping member so that the second end of the air delivery tube hangs downwardly relative to the second end of the horizontal telescoping member.

2. The apparatus of Claim 1, wherein the vertical telescoping member comprises a cylinder and a rod, wherein the rod is sized to fit within the cylinder so that at least a portion of the rod is slideably moveable within the cylinder.

3. The apparatus of Claim 2, wherein the vertical telescoping member further comprises a securing mechanism for releasably coupling the rod to the cylinder at a user determined position.

4. The apparatus of Claim 3, wherein the securing mechanism comprises a collet.

5. The apparatus of Claim 1, wherein the structure is selected from the group comprising: a table, a nightstand, a desk, a headboard, a bedframe, and a chair.

6. The apparatus of Claim 1, wherein the attachment mechanism comprises a clamp configured for attachment on a vertically extending portion of the structure so that
when the clamp is attached to the structure the vertical extending member extends substantially vertical.

7. The apparatus of Claim 1, wherein the attachment mechanism comprises a clamp configured for attachment on a horizontally extending portion of the structure so that when the clamp is attached to the structure the vertical extending member extends substantially vertical.

8. The apparatus of Claim 1, wherein the delivery tube contains compressed air.

9. The apparatus of Claim 1, further comprising the air delivery tube.

10. An apparatus for securing a gas delivery tube so that an end of the delivery tube is positioned substantially above a user, the apparatus comprising:
   a first member coupled to a support structure;
   a second member coupled to the first member so that the first and second members form a substantially L-shaped support, the second member comprising at least one tube securing mechanism for coupling the gas delivery tube along at least a portion of a length of the second member;
   wherein a length of the first member is adjustable and the length of the second member is adjustable.

11. The apparatus of Claim 10, wherein the L-shaped support is rotatable about the support structure.

12. The apparatus of Claim 10, wherein the second member is rotatable about the coupling between the second member and the first member.

13. The apparatus of Claim 10, wherein the gas delivery tube comprises at least one of compressed air and oxygen.

14. A support apparatus comprising:
   a first longitudinally extending member having an adjustable length;
   a second longitudinally extending member having an adjustable length,
   wherein the first and second members are releasably coupled to form a substantially L-shaped structure; and
   means for supporting the L-shaped structure in a desired position;
wherein the second member is configured to support a gas delivery tube such that an end of the gas delivery tube is positioned substantially over a user.

15. The support apparatus of Claim 14, wherein the first longitudinally extending member extends substantially vertically and the second longitudinally extending member extends substantially horizontally.

16. The support apparatus of Claim 15, wherein the supporting means comprises a clamp.

17. The support apparatus of Claim 16, wherein the supporting means is configured for attachment to a substantially horizontally extending structure.

18. The support apparatus of Claim 16, wherein the supporting means further comprises an adjustment plate that couples to the clamp so that the attachment means is configured for attachment to a substantially vertically extending structure.

19. The support apparatus of Claim 17, wherein the horizontally extending structure comprises a portion of a table, nightstand, chair, desk or headboard.

20. The support apparatus of Claim 18, wherein the vertically extending structure comprise a portion of a chair or a headboard.

21. The support apparatus of Claim 16, wherein the supporting means comprises a floor support.

22. The support apparatus of Claim 16, further comprising a therapy device support coupled to one of the longitudinally extending members and configured to support a therapy device to which the gas delivery tube is coupled.

23. The support apparatus of Claim 16, further comprising a mattress support plate coupled to one of the longitudinally extending members and configured for insertion between a box spring and a mattress of a bed.

24. A method of supporting a gas delivery tube so that the tube is distant from a patient's bed, the method comprising:
   coupling a first member to a second member in order to form a support apparatus, wherein the first member is length adjustable;
   coupling the support apparatus to a support structure;
   setting a length of the first member to a desired length;

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positioning the gas delivery tube along at least a portion of at least one of the first and second members; and
securing the gas delivery tube to at least one of the first and second members.

25. The method of Claim 24, wherein the second member is length adjustable and the method further comprises: setting a length of the second member to a desired length.

26. The method of Claim 24, wherein the support structure is selected from the group comprising: a table, a nightstand, a desk, a headboard, a bedframe, a mattress, and a chair.

27. A method of manufacturing a support device configured for supporting a gas delivery tube, the method comprising:
cutting a first material having a central aperture to a predetermined length;
bending a first metal rod so that the first metal rod comprises a substantially L-shaped bend, wherein the first metal rod is sized so that an end of the first metal rod engages with a first end of the first material; and
bending a second metal rod to form a support base, the support base having at least three sides, the at least three sides being substantially planar, and an attachment member extending substantially orthogonal to the plane of the support base, wherein the attachment member is sized for engagement with a second end of the first material.

28. A support device kit comprising:
a longitudinal first member having a central aperture;
a longitudinal second member having a substantially L-shaped bend, wherein an end of the second member is sized to engage the central aperture of a first end of the first member; and
a longitudinal third member having at least three sides, the at least three sides being substantially planar, and comprising an attachment member extending substantially orthogonal to the plane of the at least three sides, wherein the attachment member is sized for engagement with the central aperture of a second end of the first member.
29. The support device kit of Claim 28, wherein the first member comprise PVC tubing, and the second and third members comprise a metal rod.

30. An apparatus for supporting a gas delivery tube coupled to a gas mask, the apparatus comprising:
   an attachment mechanism for coupling to a first structure;
   a substantially vertical telescoping member having a first end portion and a second end portion, the first end portion coupled to the attachment mechanism, wherein the vertical telescoping member length is adjustable by a user;
   a substantially horizontal telescoping member having a first end portion and a second end portion, the horizontal telescoping member coupled to the vertical telescoping member, wherein the horizontal telescoping member length is adjustable by the user; and
   one or more gas delivery tube attachment mechanisms coupled to the horizontal telescoping member and configured to secure a gas delivery tube so that an end of the air delivery tube hangs downwardly from the second end portion of the horizontal telescoping member, wherein the air delivery tube has a mask intended to be placed over a user breathing orifices attached there to.

31. The apparatus of Claim 30, wherein the vertical telescoping member comprises a cylinder and a rod, wherein the rod is sized to fit within the cylinder so that at least a portion of the rod is slideably moveable within the cylinder.

32. The apparatus of Claim 31, wherein the vertical telescoping member further comprises a securing mechanism for releasably coupling the rod to the cylinder at a user determined position.

33. The apparatus of Claim 32, wherein the securing mechanism comprises a collet.

34. The apparatus of Claim 30, wherein the structure is selected from the group comprising: a table, a nightstand, a desk, a headboard, a bedframe, and a chair.

35. The apparatus of Claim 30, wherein the attachment mechanism comprises a clamp configured for attachment on a vertically extending portion of the structure so that
when the clamp is attached to the structure the vertical extending member extends substantially vertical.

36. The apparatus of Claim 30, wherein the attachment mechanism comprises a clamp configured for attachment on a horizontally extending portion of the structure so that when the clamp is attached to the structure the vertical extending member extends substantially vertical.

37. The apparatus of Claim 30, wherein the gas delivery tube is an air delivery tube.