CLAIMS

1. Headgear configured to be secured to a patient interface of a respiratory therapy system, to mount the patient interface on a user's head, the headgear comprising;

at least one pair of side straps, each side strap having first and second opposed ends, a first end of each strap being secured to, or being configured to be secured to, the patient interface and to extend along the sides of the user's head;

a rear panel configured to engage the rear of the user's head, the second end of each side strap being joined to the rear panel such that the or each pair of side straps extend from the rear panel; wherein

the rear panel comprises a main body and a pair of laterally extending arms, the second end of each side strap being joined to a respective arm;

the main body comprising:

opposed top and base margins which are spaced apart by a distance,

opposed side margins extending between the top and base margins, and

a central longitudinal axis bisecting the top and base margins;

each laterally extending arm being inclined relative to the central longitudinal axis, extending away from a respective side margin of the main body and comprising a distal arm end,

each distal arm end having a width measured in a direction substantially parallel with the central longitudinal axis;

wherein the width of each distal arm end is between 30% to 60% of the distance between the opposed top and base margins of the main body.

2. The headgear of claim 1, wherein the side margins of the main body of the rear panel are substantially parallel and substantially equal length such that the main body is substantially rectangular.

3. The headgear of claim 1, wherein the side margins of the main body of the rear panel are substantially equal length and are inclined relative to the base margin such that the main body is substantially trapezoidal.

4. The headgear of any one of the preceding claims wherein two pairs of side straps are provided, one pair comprising upper side straps, the other pair comprising lower side straps.

5. The headgear of any one of the preceding claims wherein each lateral arm is of substantially uniform width along its length.

6. The headgear of any one of the preceding claims wherein the distal arm end comprises a substantially straight end margin.

7. The headgear of claim 6 wherein the end margin is parallel with the longitudinal axis.

8. The headgear or claim 6 wherein the end margin is inclined relative to the longitudinal axis.

9. The headgear of claim 8 wherein the end margin is inclined relative to the longitudinal axis at an angle between 0.1 and 20°.

10. The headgear of claim 3 wherein the side margins of the rear panel are inclined relative to the longitudinal axis at a different angle to the angle of inclination of the lateral arms relative to the longitudinal axis.

11. The headgear of claim 3 wherein the side margins of the rear panel are inclined at an angle between 0° and 40° relative to the longitudinal axis of the rear panel.

12. The headgear of any one of the preceding claims wherein the longitudinal axis of each arm is inclined at an angle between 40° and 90° relative to the longitudinal axis of the rear panel.

13. The headgear of any one of the preceding claims wherein the entire rear panel is constrained within a notional rectangle of 100-300mm wide by 50-120 tall, and in some embodiments within a notional rectangle of 180-200mm by 75-95mm.

14. The headgear of any one of the preceding claims when dependent on claim 2 wherein the rear panel can be defined by any one or more of the following ratios:

a. the ratio of the length of a lateral arm to the length of the main portion is between 0.65 and 0.8, length being measured in a direction perpendicular to the longitudinal axis;

b. the ratio of the height of a lateral arm to the height of the main portion, height being measured in a direction parallel to the longitudinal axis, is between 1.1 and 1.6;

c. the ratio of the length of the entire rear panel to the length of the main portion is between 2.0 and 3.0;

d. the ratio of the area of a lateral arm to the area of the main portion is between 0.3 and 0.5;

e. the ratio of the area of both lateral arms to the area of the entire rear panel is between 0.3 and 0.7.

f. the ratio of a cut out or recess formed adjacent the upper margin of the rear panel as defined by the area between the upper margin of the rear panel and a notional horizontal line extending between and connecting the two most upper points of the lateral arms, to the area of the entire rear panel is between 0.3 and 0.5.

g. the rear panel comprises between 30 and 70% of a notional rectangular area that surrounds and contacts all extreme points of the rear panel.

15. The headgear of any one of the preceding claims when dependent on claim 3 wherein the rear panel can be defined by any one or more of the following ratios:

a. the total area of the rear panel is between 8000 and 13000mm^2;

b. the ratio of the area of both lateral arms to the area of the main portion of the rear panel is between 0.1 and 0.3.

c. the ratio of the area of the main portion to the entire area of the main panel is between 0.75 and 1.0.

16. The headgear of any one of the preceding claims where the rear panel is defined by the following formula; w2=1/2 d1 − 1/2 *c*;

where w2 = the width of the lateral arm as measured in a direction substantially parallel with the longitudinal axis, d1 = the distance between opposed top and base margins of the main portion, and *c* = the clearance between adjacent rear panels required during manufacture of multiple rear panels on a sheet of material to ensure a satisfactory quality of cut.

~~17. The headgear of claim 3 wherein each inclined arm extends from a respective side margin and the top margin of the main body.~~

~~18. The headgear of claim 3 wherein the main body of the rear panel comprises opposing top and base margins, opposing side margins connecting the opposing top and base margins, a central vertical plane connecting the mid points of the opposing top and base margins, and a central horizontal plane connecting the mid points of the opposing side margins,~~

~~wherein the opposing side margins are inclined relative to the opposing top and base margin, and are of equal length, such that the main body is substantially trapezoidal;~~

~~wherein each inclined arm extends from one of the pair of side margins and the top margin of the trapezoidal shaped main body above the central horizontal plane and extend away from both the central horizontal and vertical planes, and at an angle between 0° and 90° from the horizontal plane.~~

~~19. The headgear of claim 3 wherein each angled arm extends away from one of the pair of side margins and the top margin of the trapezoidal shaped main body, and the area of each angled arm is less than 15% of the area of the main body.~~

~~20. The headgear of claim 3 wherein each angled arm extends from one of the pair of side margins and the top margin of the main body, and each upper side strap connects entirely to a respective one of the pair of angled arms and the at least one of the pair of lower straps connects entirely to the main body.~~

~~21. The headgear of any one of the preceding claims wherein each laterally extending arm tapers along its length.~~

~~22. The headgear of any one of claims 1 to 20 wherein each laterally extending arm flares along its length.~~

~~23. The headgear of any one claims 1 to 20 wherein each laterally extending arm is of substantially constant width along its length.~~

~~24. The headgear of any one of the preceding claims wherein the distal arm end of each laterally extending arm is stepped or tapered or waisted, so that the distal arm end is of narrower width than the remainder of the laterally extending arm.~~

~~25. The headgear of any one of the preceding claims wherein the ratio of the width of each laterally extending arm to the width of the main body portion is between 0.4 and 0.8:1.~~

~~26. Headgear configured to be secured to a patient interface of a respiratory therapy system, to mount the patient interface on a user's head, the headgear comprising;~~

~~a rear panel configured to engage the rear of a user's head,~~

~~a top strap extending from the rear panel and configured engage the crown of the user's head,~~

~~a pair of upper side straps extending from the top strap, and~~

~~a pair of lower side straps extending from the rear panel,~~

~~the upper and lower side straps being secured to, or being configured to be secured to, the patient interface;~~

~~the rear panel comprising a main body and a pair of inclined arms extending outwardly from the main body, wherein~~

~~the main body comprises opposing top and base margins which are spaced apart by a distance, and opposing side margins connecting the opposing top and base margins, wherein~~

~~the opposing side margins are inclined relative to the opposing top and base margin, and are of equal length, such that the main body is substantially trapezoidal;~~

~~each inclined arm extending from a respective side margin and the top margin of the main body;~~

~~the angled arms of the rear panel having a width which is between 30% to 60% the distance between the base and top margins of the main body.~~

~~27. Headgear configured to be secured to a patient interface of a respiratory therapy system, to mount the patient interface on a user's head, the headgear comprising;~~

~~a rear panel configured to engage the rear of a user's head;~~

~~a pair of upper side straps extending from the rear panel, and~~

~~a pair of lower side straps extending from the rear panel,~~

~~the upper and lower side straps being secured to, or being configured to be secured, to the patient interface;~~

~~the rear panel comprising a main body and a pair of opposed, laterally extending inclined arms, the main body comprising opposing top and base margins, opposing side margins connecting the opposing top and base margins, a central vertical plane connecting the mid points of the opposing top and base margins, and a central horizontal plane connecting the mid points of the opposing side margins,~~

~~wherein the opposing side margins are inclined relative to the opposing top and base margins, and are of substantially equal length, such that the main body is substantially trapezoidal;~~

~~wherein each inclined arm extends from a respective one of the pair of side margins and the top margin of the trapezoidal shaped main body, each inclined arm extending from a position above the central horizontal plane and away from both the central horizontal and vertical planes, and at an angle between 0° and 90° from the horizontal plane.~~

~~28. Headgear configured to be secured to a patient interface of a respiratory therapy system, to mount the patient interface on a user's head, the headgear comprising:~~

~~a rear panel configured to engage the rear of a user's head,~~

~~a pair of upper side straps extending from the rear panel, and~~

~~a pair of lower side straps extending from the rear panel,~~

~~the upper and lower side straps being secured to, or being configured to be secured to, the patient interface;~~

~~the rear panel comprising a main body and a pair of opposed, laterally extending inclined arms, the main body comprising opposing top and bottom margins and opposing side margins connecting the opposing top and bottom margins,~~

~~wherein the opposing side margins are inclined relative to the opposing top and base margin, and are of substantially equal length, such that the main body is substantially trapezoidal;~~

~~wherein each angled arm extends away from a respective one of the pair of side margins and the top margin of the trapezoidal shaped main body,~~

wherein the area of each angled arm is less than 15% of the area of the main body.

29. Headgear configured to be secured to a patient interface of a respiratory therapy system, to mount the patient interface on a user's head, the headgear comprising:

a rear panel configured to engage the rear of a user's head,

a pair of upper side straps extending from the rear panel, and

a pair of lower side straps extending from the rear panel,

the upper and lower side straps being secured to, or being configured to be secured to, the patient interface;

the rear panel comprising a main body and a pair of opposed, laterally extending inclined arms, the main body comprising opposing top and bottom margins and opposing side margins connecting the opposing top and bottom margins,

wherein the opposing side margins are inclined relative to the opposing top and base margin, and are of substantially equal length, such that the main body is substantially trapezoidal;

each angled arm extends from a respective one of the pair of side margins and the top margin of the main body,

wherein each upper side strap connects entirely to a respective one of the pair of angled arms, and each lower side strap connects entirely to the main body.

30. A patient interface assembly comprising;

a patient interface, and

the headgear of any one of the previous claims.

31. A respiratory therapy system comprising the headgear of any one of claims 1 to 29 and any one or more of:

a. a breathing gas flow generator;

b. a breathing gas humidifier;

c. a gas delivery conduit, which may or may not be heated; and/or

d. a patient interface.

32. A method of manufacturing headgear of any one of claims 1 to 29 comprising steps of:

~~a. controlling a die cutter to cut multiple rear panels from a single sheet of material, wherein the die cutter is controlled such that a first rear panel is cut in a first orientation on the sheet and such that an adjacent rear panel is cut in an inverted orientation on the sheet.~~

~~33. The method of claim 32 wherein the yield is above 80%.~~

~~34. A rear panel for a headgear, substantially as shown in Figure 6, Figure 20 or Figure 26.~~

~~35. A headgear, substantially as shown in Figures 4 and 5.~~

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1. An invention not claimed by any divisional application.