Claims

1. A humidification chamber for humidifying gases, comprising:

a water tub that is configured to receive a volume of water;

a gases inlet for receiving a flow of gases into an interior volume of the humidification chamber;

a gases outlet through which a humidified flow of gases may exit the interior volume of the humidification chamber;

one or more fill apertures in fluid communication with the water tub such that the water tub can be filled with water through the one or more fill apertures; and

a sealing closure configured to be releaseably mounted on the humidification chamber, the sealing closure being configured to sealingly close each fill aperture when the sealing closure is mounted on the humidification chamber to resist gas and/or vapour escaping from the one or more fill apertures,

wherein the sealing closure is further provided with at least one hinge or hinge region extending at least partially across the sealing closure and configured to enable one end region of the sealing closure to hinge relative to an opposed end region.

2. A humidification chamber according to claim 1 wherein the sealing closure comprises one or more sealing formations configured to sealingly engage a region of the humidification chamber that defines, or is adjacent, the one or more fill apertures, so as to close the one or more fill apertures.

3. A humidification chamber according to claim 2 comprising a plurality of fill apertures, the sealing closure comprising a corresponding plurality of sealing formations.

4. A humidification chamber according to claim 2 or claim 3 wherein each sealing formation comprises a plug depending from the sealing closure, each plug being received in a respective fill aperture when the sealing closure is mounted on the humidification chamber.

5. A humidification chamber according to claim 4 wherein the sealing closure comprises a mounting formation configured to engage the humidification chamber to mount the sealing closure to the humidification chamber such that the sealing formation is maintained in sealing engagement with the humidification chamber.

6. A humidification chamber according to claim 5 wherein the mounting formation ~~comprising~~ comprises at least one rib which projects outwardly from the sealing formation.

7. A humidification chamber according to any one of ~~the preceding~~ claims 2 to 6 wherein ~~at least part of the sealing closure is resiliently deformable.~~

~~8. A humidification chamber according to claim 7 wherein~~ each sealing formation of the sealing closure is resiliently deformable so as to at least partially deform into sealing engagement with the region of the humidification chamber that defines, or is adjacent, the one or more fill apertures when the sealing closure is mounted on the humidification chamber.

~~9~~8. A humidification chamber according to any one of the preceding claims further comprising a peripheral seal extending around the periphery of the sealing closure, the peripheral seal being configured to sealingly engage one or both of:

a margin of the humidification chamber; and/or

a respiratory apparatus in which the humidification chamber is used.

~~10~~9. A humidification chamber according to claim ~~9~~ 8 wherein the peripheral seal comprises a downwardly directed peripheral skirt depending generally downwardly from the periphery of the sealing closure.

~~11. A humidification chamber according to claim 9 where the peripheral skirt comprises a radially inwardly curved portion, when the sealing closure is viewed in transverse cross section, the radially inwardly curved portion defining a channel configured to receive a margin of the humidification chamber, and/or part of a respiratory apparatus in which the humidification chamber is used, when the sealing closure is mounted on the humidification chamber.~~

~~12~~10. A humidification chamber according to ~~any one of~~ claim~~s~~ ~~9~~ 8 ~~to~~ or ~~11~~ 9 wherein the peripheral seal comprises a bead projecting upwardly and/or radially outwardly from an upper surface of the sealing closure.

~~13~~11. A humidification chamber according to any one of the preceding claims wherein the sealing closure comprises a hand or finger grip formation configured to be gripped to remove the sealing closure from the humidification chamber.

~~14~~12. A humidification chamber according to claim ~~13~~ 11 wherein the hand or finger grip formation comprises a tab projecting from the sealing closure.

~~15~~13. A humidification chamber according to any one of the preceding claims wherein the sealing closure is substantially planar.

~~16~~14. A humidification chamber according to any one of claims ~~2~~ 3 to ~~15~~ 13 when dependent on claim 2 wherein the sealing closure comprises an upper surface and an undersurface, the undersurface being adjacent and/or in contact with the humidification chamber when the sealing closure is mounted on the humidification chamber, wherein the sealing formation projects from the undersurface.

~~17~~15. A humidification chamber according to claim ~~16~~ 14 wherein the shape and/or cross sectional profile and/or dimensions of the undersurface of the sealing closure is/are configured to correspond to and mate with the shape and/or cross sectional profile and/or dimensions of the part or parts of the humidification chamber that are adjacent the undersurface when the sealing closure is mounted on the humidification chamber~~.~~

~~18. A humidification chamber according to claim 17~~ , wherein the entire undersurface of the sealing closure is configured to mate with the entire upper surface of the humidification chamber adjacent the undersurface, such that the undersurface of the sealing closure seals against the entire upper surface of the humidification chamber.

~~19~~16. A humidification chamber according to any one of the preceding claims wherein the ~~sealing closure is further provided with at least one hinge or hinge region extending at least partially across the sealing closure and configured to enable one end region of the sealing closure to hinge relative to an opposed end region.~~

~~20. A humidification chamber according to claim 19 wherein the~~ hinge region comprises an elongate channel.

~~21~~17. A humidification chamber according to claim ~~20~~ 16 wherein the hinge region comprises a plurality of parallel channels extending across the sealing closure from one margin to another opposed margin.

~~22. A humidification chamber according to any one of the preceding claims wherein the water tub is formed of rigid plastic and comprises a base surface and a perimeter wall that extends upwardly from the base, and wherein the base surface comprises a heater plate.~~

~~23. A humidification chamber according to claim 22 wherein the heater plate is secured within an aperture of the base surface of the water tub by overmoulding.~~

~~24. A humidification chamber according to any one of claims 22 or 23 wherein the heater plate is metallic.~~

~~25. A humidification chamber according to any one of the preceding claims further comprising a step formation about an inner surface perimeter of a wall of the water tub, the step formation being configured at a height above a base surface of the water tub corresponding to a maximum fill line indicator.~~

~~26. A humidification chamber according to any one of the preceding claims wherein the base surface of the water tub is domed such that it curves outward toward a central apex defined by the heater plate.~~

~~27. A humidification chamber according to any one of claims 22 to 26 wherein the perimeter wall of the water tub comprises one or more reinforced regions.~~

~~28~~18. A humidification chamber according to any one of the preceding claims further comprising a lid hingedly coupled to the water tub for enclosing the water tub to define the interior volume of the humidification chamber and which is movable between a closed position in which the water tub is closed by the lid and an open position in which the water tub is open~~.~~

~~29. A humidification chamber according to claim 28 further comprising one~~, and one or more operable clips for securing the lid in the closed position; the sealing closure being configured to be releasably mounted on the lid.

19. A humidification chamber according to any one of the preceding claims, wherein the one end region and the opposed end region each are located on a respective opposite side of the at least one hinge, and each have a sealing formation configured to sealingly engage a corresponding one of the fill apertures, the sealing engagement sealingly closing each fill aperture.

20. A humidification chamber according to claim 19, wherein the sealing formations in the one end region and the opposed end region are in the form of plugs that at least partially fit inside the corresponding fill apertures of the humidification chamber.

21. A humidification chamber according to claim 19 or claim 20, wherein when the one end region is pivoted about the at least one hinge, the opposed end region remains attached to the humidification chamber.

~~30. A humidification chamber according to claim 28 or 29 wherein the lid and water tub are hingedly coupled by a living hinge and are integrally formed as a single item.~~

~~31. A humidification chamber according to any one of claims 28 to 30 wherein the gases inlet and gases outlet are provided on opposite sides of the lid.~~

~~32. A humidification chamber according to claim 31 wherein the lid comprises a vertical flow plane that extends downwardly from the underside of the lid in a central region of the lid.~~

~~33. A humidification chamber according to claim 32 wherein the vertical flow plane further comprises a pair of side baffles that each extend from a respective side edge of the vertical flow plane toward the side of the lid comprising the gases inlet.~~

~~34. A humidification chamber according to claim 32 or claim 33 wherein the gases inlet is coupled to an inlet conduit that extends between an inlet end at the gases inlet and an outlet end located at or toward an upper central region of the interior volume of the humidification chamber and adjacent a first side surface of the vertical flow plane such that the incoming gases flow enters the interior volume of the humidification chamber at that upper central region.~~

~~35. A humidification chamber according to claim 34 wherein a flow director formation in the form of an inverted curved ramp surface is located between the outlet end of the inlet conduit and the first side surface of the vertical flow plane.~~

~~36. A humidification chamber according to claim 34 or claim 35 wherein the gases outlet is coupled to an outlet conduit that extends between an inlet end located at or toward an upper central region of the interior volume of the humidification chamber and adjacent a second side of the vertical flow plane and an outlet end at the gases outlet.~~

~~37. A humidification chamber according to any one of the preceding claims wherein the gases outlet comprises an engagement surface about the perimeter of the gases outlet that is tilted outwardly such that an upper portion of the engagement surface is displaced further outward than a lower portion of the engagement surface.~~

~~38. A humidification chamber according to any one of the preceding claims wherein at least one water fill aperture comprises an associated maximum water level indicator comprising a tab member that is supported from the underside of the top of the water tub or lid such that it extends into the field of view of the interior volume of the humidification chamber visible directly through the water fill aperture.~~

~~39. A humidification chamber according to any one of the preceding claims wherein the humidification chamber has an overall shape defined by front and end walls between which side walls extend, and the walls extending between an upper surface of a lid and base surface of the water tub, and wherein the lid is hingedly coupled to the water tub at the rear end of the humidification chamber, and at least one operable clip is provided at the front end of the humidification chamber.~~

~~40. A humidification chamber according to any one of the preceding claims wherein at least one operable clip is provided in the form of a torsion clip that is mounted to either the lid or water tub and which is configured to engage with a catch provided on either the water tub or lid, respectively.~~

~~41. A humidification chamber according to any one of the preceding claims wherein at least one operable clip is provided that is hingedly coupled to the lid or water tub and which is configured to engage with a catch provided on either the water tub or lid, respectively.~~

~~42. A humidification chamber according to any one of the preceding claims further comprising a seal about the perimeter of the chamber between the lid and water tub to seal the chamber when it is in a closed position.~~

~~43~~22. ~~A~~ respiratory assistance device configured to provide a heated and humidified gases stream, comprising:

a device gases inlet configured to receive a supply of gases;

a blower configured to generate a pressurised gases stream from the supply of gases;

a humidifier configured to heat and humidify the pressurised gases stream;

a device gases outlet for the heated and humidified gases stream; and

a flow path for the gases stream through the respiratory device from the gases inlet though the blower unit and humidification unit to the gases outlet,

and wherein the humidifier comprises a sealable humidification compartment that is configured to receive and retain a removable humidification chamber according to any one of the preceding claims.

~~44. A respiratory assistance device according to claim 43 wherein the humidification compartment comprises a lid that is movable between an open position to enable removal of the humidification chamber and a closed position to retain the humidification chamber within the humidification compartment.~~

~~45. A respiratory assistance device according to claim 43 or claim 44 wherein the humidification compartment comprises a gases inlet connected to the flow path to receive the pressurised gases stream from the blower to create a pressurised humidification compartment and a gases outlet connected to the device gases outlet of the flow path.~~

~~46 A respiratory assistance device according to claim 45 wherein the gases inlet of the humidification chamber is open within the humidification compartment to receive an incoming flow of gases from within the pressurised humidification compartment.~~

~~47. A respiratory assistance device according to claim 45 or claim 46 wherein the gases outlet of the humidification compartment is sealingly connected to the gases outlet of the humidification chamber.~~

~~48. A respiratory assistance device according to any one of claims 45 to 47 wherein the humidification compartment comprises a heater pad upon which the humidification chamber sits.~~

~~49. A respiratory device according to any one of claims 43 to 48 wherein the device is contained within a single housing.~~

~~50 A respiratory device according to any one of claims 43 to 49 wherein the device is a CPAP respiratory device.~~

23. A respiratory device according to claim 22 wherein the device is a CPAP respiratory device.

24. A sealing closure for a humidification chamber for humidifying gases, the humidifying chamber comprising:

a water tub that is configured to receive a volume of water;

a gases inlet for receiving a flow of gases into an interior volume of the humidification chamber;

a gases outlet through which a humidified flow of gases may exit the interior volume of the humidification chamber;

one or more fill apertures in fluid communication with the water tub such that the water tub can be filled with water through the or each fill aperture;

the sealing closure being configured to be releaseably mounted on the humidification chamber, the sealing closure being further configured to sealingly close the or each fill aperture when the sealing closure is mounted on the humidification chamber to resist gas and/or vapour escaping from the one or more fill apertures.

wherein the sealing closure is further provided with at least one hinge or hinge region extending at least partially across the sealing closure and configured to enable one end region of the sealing closure to hinge relative to an opposed end region.

25. A sealing closure according to claim 24, wherein the one end region and the opposed end region each are located on a respective opposite side of the at least one hinge, and each have a sealing formation configured to sealingly engage a corresponding one of the fill apertures, the sealing engagement sealingly closing each fill aperture.

26. A sealing closure according to claim 25, wherein the sealing formations in the one end region and the opposed end region are in the form of plugs that at least partially fit inside the corresponding fill apertures of the humidification chamber.

27. A sealing closure according to claim 25 or claim 26, wherein when the one end region is pivoted about the at least one hinge, the opposed end region remains attached to the humidification chamber.

~~52. A sealing closure for sealingly closing at least one fill aperture of a humidification chamber for humidifying gases, the sealing closure:~~

~~being substantially oblong when viewed in plan;~~

~~substantially planar when viewed from the side and comprising an upper surface and an undersurface;~~

~~being formed from a resiliently deformable material;~~

~~being of one-piece construction;~~

~~being configured to be releasably mounted on the humidification chamber; and~~

~~comprising at least one sealing formation projecting from the undersurface and configured to sealing close the fill aperture to resist gas and/or vapour escaping from the one or more fill apertures.~~