BREATHING ASSISTANCE APPARATUS WITH LIQUID CONTAINMENT

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention generally relates to respiratory devices. More particularly, the present invention relates to respiratory devices receiving pressurized breathing gases for humidification and having liquid isolation constructions.

Description of the Related Art

[0002] Breathing treatment devices typically include an airflow generator to supply pressurized gases. In some breathing treatment devices the device may include an integrated water supply chamber. The water chamber can include a supply of water that is used to humidify the breathing gases that are being supplied by the breathing treatment device.

[0003] In some configurations the breathing treatment devices are designed to be portable and/or movable. When such devices are moved while containing a water supply reservoir, the reservoir may tip and allow water to spill from the water reservoir into other regions of the breathing treatment devices.

SUMMARY OF THE INVENTION

[0004] To protect various components, it would be desirable if the spilled water or other liquids could be contained and the infiltration of the water or liquid could be controlled. Accordingly, certain features, aspects and advantages of the present invention relate to providing a liquid containment construction. It also is an object of the present invention to at least provide the industry and users with a useful choice.

[0005] The invention broadly consists in a breathing assistance apparatus comprising a main body, the main body comprising an upper housing and a lower housing that are configured to be secured together, the main body having at least one outer wall and at least one generally vertical inner wall, a humidification compartment defined within the main body and adapted to receive a humidification chamber, a flow generator positioned within the main body, and a liquid containment compartment being interposed within the main body between the flow generator and the humidification compartment and positioned between the at least one outer wall and the at least one generally vertical inner wall ~~the~~

~~flow generator and the humidification compartment being fluidly connected and a liquid containment compartment being interposed within the main body between the flow generator and the humidification compartment,~~ the liquid containment compartment being fluidly connected to both the flow generator and the humidification compartment such that a gas flow path from the flow generator to the humidification compartment passes through the liquid containment compartment, and wherein the liquid containment compartment comprises a first opening that defines an outlet for gases flow out of the liquid containment compartment to the humidification compartment and a second opening that defines an inlet for gases flow into the liquid containment compartment from the flow generator.~~, the first opening and the second opening of the liquid containment compartment being offset from each other in at least two orthogonal spatial directions.~~

[0006] In some configurations, the first opening and the second opening of the liquid containment compartment are offset horizontally and vertically.

[0007] In some configurations, the first opening and the second opening of the liquid containment compartment are offset from each other in three orthogonal spatial directions. In one example, the first opening and the second opening of the liquid containment compartment may be offset horizontally in two orthogonal directions and vertically.

[0008] In some configurations, no portion of the first opening is vertically aligned with the second opening.

[0009] In some configurations, no portion of the first opening is horizontally aligned with the second opening.

[0010] In some configurations, the liquid containment compartment comprises a lower surface and the second opening being positioned generally vertically higher than the lower surface. In one example, the second opening spans a vertical distance and the lowermost portion of the second opening is vertically higher than the lower surface of the liquid containment compartment. In another example, the lower surface of the liquid containment compartment spans a vertical distance and the second opening is vertically higher than any portion of the lower surface that is directly adjacent to the second opening.

[0011] In some configurations, the second opening is canted toward the first opening.

[0012] In some configurations, a lowermost portion of the second opening is vertically higher than a lowermost portion of the lower surface of the liquid containment compartment.

CLAIMS:

1. A breathing assistance apparatus comprising a main body, ~~having~~ the main body comprising an upper housing and a lower housing that are configured to be secured together, the ~~upper housing~~main body having at least one outer wall and at least one generally vertical inner wall, a humidification compartment defined within the main body and adapted to receive a humidification chamber, a flow generator positioned within the main body, and a liquid containment compartment being interposed within the main body between the flow generator and the humidification compartment and positioned between the at least one outer wall and the at least one generally vertical inner wall the liquid containment compartment being fluidly connected to both the flow generator and the humidification compartment such that a gas flow path from the flow generator to the humidification compartment passes through the liquid containment compartment, and wherein the liquid containment compartment comprises a first opening that defines an outlet for gases flow out of the liquid containment compartment to the humidification compartment and a second opening that defines an inlet for gases flow into the liquid containment compartment from the flow generator.

2. ~~A~~ The breathing assistance apparatus according to claim 1 wherein the liquid containment compartment comprises a vertical wall defining the sides of the liquid containment compartment that is part of the upper housing of the main body.

3. ~~A~~ The breathing assistance apparatus according to claim 1 or claim 2 wherein the liquid containment compartment comprises a lower surface that is part of the lower housing of the main body.

4. ~~A~~ The breathing assistance apparatus according to claim 2 or claim 3 wherein a portion of the vertical wall of the liquid containment compartment corresponds to a portion of a vertical wall that defines the humidification compartment.

5. ~~A~~ The breathing assistance apparatus according to claim 4 wherein the first opening extends through the portion of the vertical wall of the liquid containment compartment that corresponds to the vertical wall of the humidification compartment.

6. ~~A~~ The breathing assistance apparatus according to any one of claims 2 to ~~-~~5 wherein a portion of the vertical wall of the liquid containment compartment corresponds to a portion of an outer wall of the main body provided by the upper housing.

7. ~~A~~ The breathing assistance apparatus according to any one of claims 2 to ~~-~~ ~~5~~ 6 wherein the liquid containment compartment comprises a ridge that defines the periphery of the lower surface of the liquid containment compartment and which extends from the lower housing of the main body, the ridge matching the configuration of the vertical wall of the liquid containment compartment provided in the upper housing such that the ridge of the lower housing and vertical wall of the upper housing abut each other to form the liquid containment compartment when the main body is assembled.

8. ~~A~~ The breathing assistance apparatus according to claim 7 wherein the ridge of the liquid containment compartment defines and encircles a reservoir of the liquid containment compartment.

9. ~~A~~ The breathing assistance apparatus according to claim 7 or claim 8 wherein the ridge of the liquid containment compartment surrounds the second opening.

10. ~~A~~ The breathing assistance apparatus according to any one of claims 7 to ~~-~~9 wherein a seal is provided between the ridge of the lower housing and the vertical wall of the upper housing that form the liquid containment compartment.

11. ~~A~~ The breathing assistance apparatus according to claim 10 wherein the ridge comprises a groove and the seal is provided within the groove.

12. ~~A~~ The breathing assistance apparatus according to any one of the preceding claims wherein the flow generator is mounted to or within the lower housing of the main body.

13. ~~A~~ The breathing assistance apparatus according to any one of the preceding claims wherein the first opening and the second opening of the liquid containment compartment are offset from each other in at least two orthogonal spatial directions.

14. ~~A~~ The breathing assistance apparatus according to claim 13 wherein the first opening and the second opening of the liquid containment compartment are offset horizontally and vertically.

15. ~~A~~ The breathing assistance apparatus according to claim 13 or claim 14 wherein the first opening and the second opening of the liquid containment compartment are offset from each other in three orthogonal spatial directions.

16. ~~A~~ The breathing assistance apparatus according to claim 15 wherein the first opening and the second opening of the liquid containment compartment are offset horizontally in two orthogonal directions and vertically.

17. ~~A~~ The breathing assistance apparatus according to any one of claims 13 to 16 wherein no portion of the first opening is vertically aligned with the second opening.

18. ~~A~~ The breathing assistance apparatus according to any one of claims 13 to 17 wherein no portion of the first opening is horizontally aligned with the second opening.

19. ~~A~~ The breathing assistance apparatus according to any one of the preceding claims wherein the second opening is fluidly connected to the flow generator by one or more passages within the main body that form part of the gas flow path.