

LEVITATIONARIUM FOR AIR FLOTATION OF HUMANS

BACKGROUND OF THE INVENTION

This invention relates to an installation to levitate human beings by an upward flow of air, and in particular, to a levitationarium in which air flotation of humans is produced, either for the sole fun and enjoyment of users and spectators or for training, such as to practice free fall by parachutists.

SUMMARY OF THE INVENTION

It is a general object of the present invention to provide a levitationarium of the above type.

It is another general object of the present invention to provide a levitationarium of the above type that is simple, safe and economic to operate.

It is a more specific object of the present invention to provide a levitationarium of the above type, wherein the air blowing requirement and associated power requirement are minimized by appropriate construction and arrangement of the air blowing propeller relative to the levitation chamber.

It is a still more specific object of the present invention to provide a levitationarium of the above type, wherein an air blowing propeller is shrouded and surrounded by an annular air passage to advantageously use the air flow by the propeller inside the shroud directly and also to produce an induced suction flow in that air passage around the shroud.

According to the present invention a levitationarium for air flotation of humans comprises a housing having an inner wall defining a levitation chamber, said levitation chamber having a central vertical axis and having an air inlet at the lower end thereof and an air outlet at the upper end thereof, a shroud supported in said housing proximate said lower end of said chamber and spaced from said inner wall, said shroud having a central vertical axis coaxial with the central vertical axis of the levitation chamber, the shroud having an air inlet at the lower end thereof and an air outlet at the upper end thereof communicating with the air inlet of the levitation chamber, and a blower within the shroud for propelling air upwardly through the shroud and the chamber and wherein the spacing of the shroud from the inner wall defines an annular space through which an upward air suction flow is induced by the blower.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and advantages of the present invention will be better understood with reference to the following detailed description of preferred embodiments thereof which is illustrated, by way of example, in the accompanying drawings, in which:

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Figure 1 is a cross-sectional view in elevation of a levitationarium for air flotation of humans according to the present invention;

Figures 2, 3, 4 and 5 are cross-sectional views as seen along lines, 2-2, 3-3, 4-4, and 5-5, respectively;

Figure 6 is an enlarged scale view of the center of Figure 2;

Figure 7 is a cross-sectional view as seen along line 7-7 in Figure 2 and particularly illustrating an air blower system according to the present invention;

Figure 8 is a fragmentary cross-sectional view of an alternative embodiment of the lower portion of the levitation chamber proximate the walkway thereof; and

Figure 9 is a cross-sectional view taken along line 9-9 of Figure 8.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The illustrated levitationarium comprises a housing 1, in this case in the form of a building having a generally cylindrical outline. The housing 1 includes a cylindrical outer lateral wall 2 coaxial with a cylindrical inner wall 3. It is noted that the outer lateral wall 2 and inner lateral wall 3 may have other geometrical shapes, such as being octagonal. The present invention should not be construed as limited to cylindrical configurations, wherever mentioned. The outer wall 2 is integrally formed with a base 4 and a roof 5, all of concrete. The building 1 is formed with a toroidal chamber in which is mounted a core 6 of toroidal shape.

The toroidal core 6 includes an inner cylindrical wall 6a and an outer cylindrical wall 9, although, as aforementioned, other shapes can be utilized. The inner wall 6a of the toroidal core 6 is internally coated with a shock-absorbing lining to form with it the inner wall 3. The toroidal core 6 is supported on a plurality of posts 7 that are radially streamlined for uniform streamline air flow between them. The inner wall 3 of housing 1 encloses a levitation chamber 8 and is open at its bottom and top to form a lower inlet end 3a and a top outlet end 3b. The internal space in the housing 1 forms a toroidal air passage extending between the top outlet end 3b and the bottom inlet end 3a of the levitation chamber 8 and passing between the outer wall 9 of the core 6 and the outer wall 2 of the building 1. That toroidal air passage thus allows closed circuit air flow serially with upright air flow in the levitation chamber.

To produce an appropriate smooth or streamlined air flow, the base 4 and the roof 5 are formed with an inward axial projection 10 and 11, respectively. Advantage is taken of the top inward axial projection to secure light projectors 12 and possibly other utility items such as air flow meters, not shown. On the bottom inward axial projection 10, there is mounted an air blower in the form of an air blowing propeller 13. Propeller 13 is mounted coaxially with the levitation chamber 8 below the bottom thereof and is driven by a motor 14 through a gearbox 15. The propeller 13 is surrounded by a cylindrical shroud 16, although not limited to this shape, supported by a plurality of radially extending struts 30 which extend

between inner wall 6a of core 6 and shroud 16. Shroud 16 is diametrically smaller than the inner wall 3 to define an annular air passage 32 between them. The air blowing propeller 13 produces suction on the air in the aforementioned air passage 32 and, thus, an additional upward air flow, or suction air flow, in addition to its own upwardly directed air flow through shroud 16. Thus, the relatively smaller propeller 13 requires a substantially smaller engine 14 than if the same flow was all produced only by direct flow through a large propeller. Shroud 16 also acts to reduce noise caused by propeller 13 and the air flow created thereby.

A grid or grille 17 is secured in shroud 16 below the levitation chamber above the propeller 13. Grille 17 is substantially V-shaped in cross-section. Since grille 17 is sloped towards the center of propeller 13, it inwardly deflects the air flow produced directly by propeller 13. A cone shaped member 34 is provided on grille 17 directly above propeller 13 on the axis of rotation thereof. Member 34 allows for uniform air flow and prevents turbulence due to the dead air space directly above the center of propeller 13.

A take-off and landing base 25 overlies the shrouded propeller and includes a grating 18, of any suitable material such as a net, to support standing users while allowing upward air flow therethrough. The take-off and landing base 25 also includes an air-impervious peripheral walkway 19 on which people can stand substantially clear of the upward air flow and from which they can dive toward the center of the chamber to be lifted by the air flow and float, as shown in Figure 1.

In order to prevent turbulence and interfering air currents from forming proximate the edge 19a of walkway 19, in an alternative embodiment depicted in Figures 8 and 9, a deflector 40 is provided. Deflector 40 is preferably a deformable material such as canvas. A circular rod 42 is secured against wall 6a of toroidal core 6 above struts 30. Canvas deflector 40 is annular in shape and includes an outer edge 40a and an inner edge 40b. Outer edge 40a is secured to ring 42 preferably by wrapping it around ring 42 and stitching to canvas deflector 40. Inner edge 40b is free.

When air is flowing up through air passage 32 due to the air current created by propeller 13, deflector 40 will be forced up in the direction of arrow A and will assume the position depicted in phantom in Figure 8. The inner edge 40b of deflector 40 will extend slightly inwardly of walkway 19. The sloped wall defined by deflector 40 prevents turbulence at walkway 19 and allows for the smooth flow of air therepast. When propeller 13 is at rest, deflector 40 will relax and assume the full line position substantially as depicted in Figure 8.

The core 6 forms superposed annular galleries 20 in which spectators may be allowed to watch the users through windows 21 in the wall 3. Appropriate stairways 22 and passages 23 are provided to give access to the inner levitation chamber through the toroidal surrounding portion of the building 1. The top and bottom of each internally-extending portion of the building, such as of the core 6 and passages 23, are curved and streamlined at their top and bottom for maximum air flow efficiency according to the known concepts of aerodynamics.

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It is of critical significance that the air flowing in chanber 8 have minimum turbulence and that friction be maintained at a minimum. These factors contribute to noise level and heat generation, both of which are undesirable. The features heretofore described are directed to providing an operating system where noise is reduced to a minimum and heat build-up is reduced.



CLAIMS.

1. A levitationarium for air flotation of humans comprising a housing having an inner wall defining a levitation chamber having a central vertical axis and having an air inlet at the lower end thereof and an air outlet at the upper end thereof, a shroud supported in said housing proximate said lower end of said chamber and spaced from said inner wall, said shroud having a central vertical axis coaxial with the central vertical axis of the levitation chamber, the shroud having an air inlet at the lower end thereof and an air outlet at the upper end thereof communicating with the air inlet of the levitation chamber, and a blower within the shroud for propelling air upwardly through the shroud and the chamber and wherein the spacing of the shroud from the inner wall defines an annular space through which an upward air suction ^{flow} is induced by the blower.
2. The levitationarium as claimed in claim 1 wherein the housing includes an outer wall spaced from the inner wall and an air passage portion formed between the outer wall and inner wall and communicates with the air outlet at the upper end of the levitation chamber and with the air inlet at the lower end of the levitation chamber, so

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that the air passage portion provides a closed circuit flow therethrough serially with the levitation chamber and the blower.

3. A levitationarium as claimed in claim 2, further including a grating extending transversely across the lower end of the levitation chamber above the shroud, said grating allowing the upward air flow created by the blower to pass there-through.

4. The levitationarium as claimed in claim 3, wherein the grating includes an annular platform extending peripherally around the inner wall of the levitation chamber.

5. The levitationarium as claimed in claim 4, further including a deflector in said annular space for deflecting air flow through said annular space away from said platform.

6. The levitationarium as claimed in claim 5, wherein the deflector is deformable, is annular in shape and has inner and outer edges, the outer edge being secured adjacent to the inner wall.

7. The levitationarium as claimed in claim 5 or 6, wherein the shroud and the inner wall include a plurality of struts extending therebetween, the outer edge of the deflector being secured adjacent the inner wall proximate the struts.



8. The levitationarium as claimed in claim 5, 6 or 7 wherein the inner edge of the deflector in its deflecting position is located inwardly of the platform when air is flowing through the annular space.

9. The levitationarium as claimed in any one of the preceeding claims wherein the shroud includes a grille spaced above the blower for directing the air flow from the blower.

10. A levitationarium as claimed in claim 9, wherein the grille directs the air flow from the blower towards the centre of the chamber.

11. The levitationarium as claimed in claim 10 wherein the grille is essentially V-shaped in cross-section.

12. The levitationarium as claimed in any one of claims 10, 11 or 12 wherein the grille includes a deflector in the center thereof positioned over the central portion of the blower for eliminating dead air spaces at the center.

13. The levitationarium as claimed in any one of claims 2 to 12 wherein the housing includes a toroidal core portion positioned around the inner wall inwardly of the air passage and forming a spectator-gallery externally of the inner wall and an access for the passage of users in and out of the levitation chamber through the inner wall,

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the inner wall including windows registering with the spectator-gallery for spectator viewing of the levitation chamber.

14. The levitationarium as claimed in any one of the preceeding claims wherein the housing includes a roof at the upper end thereof, the roof including an axial projection extending downward towards said chamber.

15. The levitationarium as claimed in claim 14 wherein said housing includes a base at the lower end thereof, said base including an axial projection extending upward towards said blower means.

16. The levitationarium as claimed in claim 15, wherein said axial projections of said roof and base provide for smooth, streamlined air flow through said levitationarium.

17. A levitationarium for air flotation of humans substantially as described herein with reference to or as illustrated in the accompanying drawings.
