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GAS CELLS FOR AIRSHIPS

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My invention relates to dirigible airships and it has particular relation to gas cells designed to be incorporated within the hulls of rigid airships. 15 One object of the invention is to provide an airship having gas cells so arranged therewith as to insure minimum shifting of the lifting or other gases under various conditions of aerial navigation.

Another object of the invention is to provide an improved relatively light-weight gas cell construction in which each gas cell has at least a portion of its wall constituting a common portion of an adjacent gas container.

Rigid airships comprise transverse frames or so-called main rings which sub-divide the hull construction into compartments that ordinarily define the shape and size of the lifting gas cells employed therein. Since the number of main rings must be limited and since modern airships may be relatively large, the gas cells, in order to form to the space between the main rings, in some cases, would assume sizes too large for practical purposes.

Under these conditions, when the airship assumes an inclined position, the gas pressure becomes effective against the bulkheads which are usually secured to the main rings in substantially the median planes thereof, and the bulkheads are bulged outwardly axially of the main ring. This action of the gas, wherein it shifts toward one end or the other of the airship, according to the direction of inclination thereof, dislocates the center of buoyancy with respect to the center of gravity of the airship. Such shifting of the gas materially interferes with the proper navigation of the airship.

The improved arrangement of gas cells according to this invention, includes a series of cells disposed between the several main rings. The end walls of each gas cell are so shaped as to bulge inwardly toward each other with respect to the cell, and away from the median planes of the main rings, thereby providing gas spaces or chambers within the inner circumferential portions of the main rings. The circumferential portions of the gas cells adjacent the main rings are connected together in gas tight relation by means of annular strips or other suitable devices and are fastened circumferentially to the main rings. Thus gas containing chambers are provided between the adjacent opposed end walls of adjacent gas cells, as well as within the respective gas cells. According to this arrangement, a continuous gas cell construction, having single wall partitions, can be installed from one end of the airship to the other; or, if desirable, several separate sections of substantially the same construction may be employed.

For a better understanding of the invention, reference may now be had to the accompanying drawings, forming a part of this specification, of which:

Fig. 1 is a diagrammatical elevational view of an airship, parts thereof being omitted for the purpose of illustrating the arrangement of gas cells within the airship hull according to the invention; 70 Fig. 3 is a cross-sectional view, on a larger scale, taken substantially along the lines ΙΙ—ΙΙ of Fig. 1; and Fig. 3 is a fragmentary cross-sectional view, on a larger scale, showing in detail the connecting members between adjacent gas cells.

In practicing the invention, an airship embodying a rigid hull 10 having spaced transversely disposed main rings 11 built therein is provided with gas cells 12 and 13. These gas cells contain gas spaces or chambers 14 and 15, and are located within compartments between adjacent main rings, while their end walls 16 and 17 normally bulge inwardly to form ellipsoidal gas chambers 17 therebetween. The axial inwardly bulging end portions of the walls 16 and 17 of the respective gas cells may be connected together, or they may bulge sufficiently to engage each other tangentially.

The end walls 15 and 16 of the gas cells 12 enclosing the chambers 17 are connected substantially tangentially to the inner circumferential portions of the main rings 11 by means of annular strips 18 of gas cell or other suitable material, as indicated at 19. Also, strips 20 of suitable material, which form gas-tight joints between the end walls of the cells 12, are installed sufficiently slack to prevent them from being adversely affected by the gas forces acting against the walls 15 and 16.

According to this arrangement, the gas chambers 14 and 17 are disposed in series and are respectively separated by single walls. After all of the gas cells have been connected together by the strips 18 and 20, a unitary gas-tight construction is thereby provided.
2. having partitions therein formed by the end walls 15 and 16. In order to compensate for the contraction of a gas cell when it has been deflated, a fold 21 supported by a cord or wire 22, that is secured to the upper portion of the airship, is provided at the lower portion of the cell wall or a portion of the lower walls may be doubled, as indicated at 23.

The gas chambers 17 are inflated to a considerably higher pressure than the chambers 14, and hence the walls of the gas cells tend to maintain their proper position, even when the airship is inclined in either direction. Since the end walls 15 and 16 of the gas cells must serve as bulkheads, they are composed of stronger material than that forming the circumferential walls.

In order to maintain the end walls taut and to insure proper proportional gas pressure within the chambers 14 and 17, valves 24, which are automatically operable, are so set that an excessive pressure within the chambers 14 causes the gas to escape into the chambers 17. Conventional safety valves 25 are also employed, which provide for the escape of gas to the atmosphere in the event the gas pressure becomes too great within the chambers 17.

From the foregoing description, it will be apparent that the gas cell construction designed according to this invention will insure proper functioning of an airship and at the same time the likelihood of gas being wasted by the escape thereof through the end walls is reduced to a minimum. Also, the weight of the gas cell material required in this type of construction is greatly reduced as compared with gas cells of the type previously constructed.

Although only the preferred forms of the invention have been illustrated and described in detail, it will be apparent to those skilled in the art that it is not so limited but that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What I claim is:

1. A rigid airship comprising spaced transversely disposed main rings, gas cells disposed between the main rings and normally having cavities formed by the end walls thereof and means connecting the end walls of the gas cells in gas-tight relation to form gas chambers within the inner circumference of the main rings.

2. A rigid airship comprising spaced transversely disposed main rings, gas cells disposed between the main rings and normally having cavities formed by the end walls thereof, the outer circumferential portions of the cavities being disposed substantially tangentially to the inner circumferential portions of the main rings, and means for connecting together the tangential portions of the cells adjacent the main rings in gas tight relation to form gas containers within the inner circumference of the main ring.

3. A rigid airship comprising spaced transversely disposed main rings, gas cells disposed between the main rings and normally having opposed cavities formed by the end walls thereof, means connecting the end walls of the gas cells to the inner circumferential portion of the main rings and means secured to the end walls of the gas cells to form additional gas chambers within the inner circumferences of the main rings.

4. A rigid airship comprising spaced transversely disposed main rings, gas cells disposed between the main rings and normally having opposed cavities formed by the end walls thereof and means for connecting the circumferential portions of the end walls adjacent the inner circumference of the main ring to form additional gas chambers, the lower portions of the gas cells having folds therein to facilitate the deflation thereof.

5. A rigid airship comprising spaced transversely disposed main rings, gas cells disposed between the main rings and normally having opposed cavities formed by the end walls thereof, means for connecting the circumferential portions of the gas cells adjacent the inner circumference of the main rings to form additional gas chambers, the lower portion of the gas cells having double walls to facilitate the deflation thereof.

In witness whereof, I have hereunto signed my name at Akron, in the county of Summit, and State of Ohio, this 23rd day of November 1927.

EUGEN SCHOETTEL