J. SCHÜTTE.

BALLOON STRUCTURE.

APPLICATION FILED DEC. 29, 1910.

992,909. Patented May 23, 1911.

Fig.1.

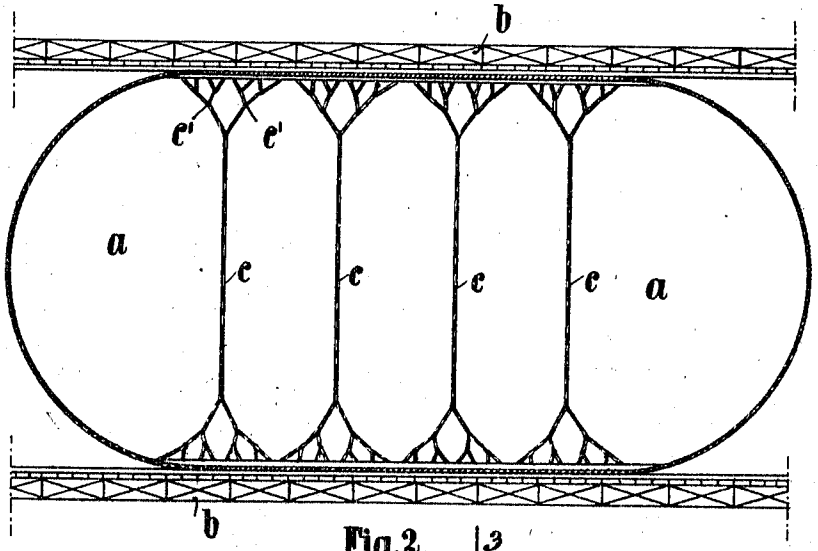


Fig.2.

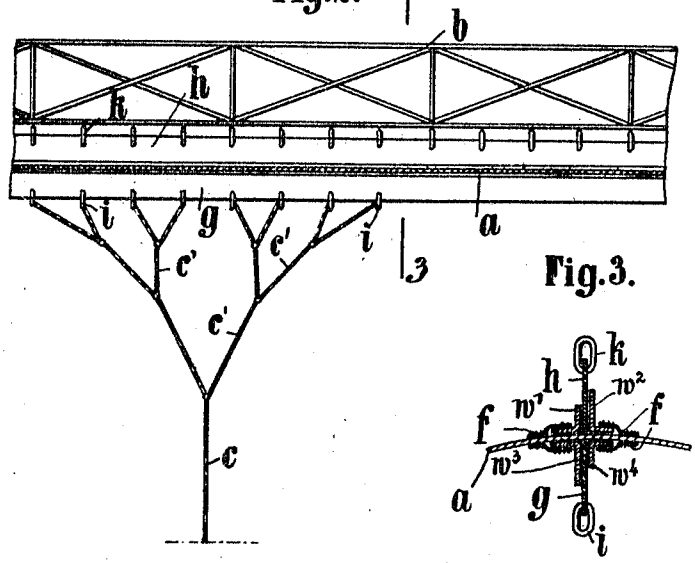


Fig.3.




Witnesses.

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# UNITED STATES PATENT OFFICE.

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## BALLOON STRUCTURE.

992,909. Specification of Letters Patent. Patented May 23, 1911.

Application filed December 29, 1910. Serial No. 599,918.

*To all whom it may concern:*

Be it known that I, JOHANN SCHÜTTE, a subject of the King of Prussia, residing at Langfuhr, near Danzig, Germany, have invented certain new and useful Improvements in Balloon Structures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to air-ships and particularly to that class of air-ships, which are provided with a frame containing the gas bag or bags or similar inflatable elements, and has for its object the provision of means for stiffening the frame of the air-ships, as the gas bags after being filled tend to deform the frame due to the buoyancy of the gas contained therein and also the forces being produced normal to the inflated body by the tangential pull exerted by the dead and alive loads supported by it tend to deform the said frame.

Referring to the drawings in which like parts are similarly designated: Figure 1 is a vertical, longitudinal, central section of a balloon and so much of its attached frame as is necessary for an understanding of my invention. Fig. 2 is an enlarged detail view showing the manner of applying the internal flexible stiffening members and Fig. 3 is a transverse section on line 3—3 of Fig. 2.

By my invention I prevent any deformation by stiffening the frame by internal stiffening members, preferably flexible, and I do this by attaching said members to and stretching them inside the balloon, without making openings therethrough or tearing the balloon fabric. These members are attached either directly or indirectly to the interior of the gas bag and connect preferably diametrically opposite points of the supporting frame.

In the balloon shown in Fig. 1, as an example, $b$ is the frame work surrounding the gas bag $a$ of an airship. Inside the gas bag $a$ are a number of stiffening ropes $c$ whose branched ends $c'$ are connected to the top and bottom thereof in a vertical central plane. The ends of the branches $c'$ of the ropes $c$ are secured to a strip or girt of fabric $g$, as shown in the drawings, extending longitudinally of the balloon, on the inside thereof. In the same plane as the strip of fabric or other girt $g$ is a similar strip $h$ on the outside thereof. The strips or webs of fabric $h$ and $g$ are sewed or otherwise fastened between or to angles $w^1$, $w^2$ and $w^3$, $w^4$, which angles are sewed or otherwise fastened to the gas bag $a$. The joints between the angles and the gas bag $a$ are covered with rubber balloon fabric or equivalent, or otherwise to effect a gas tight joint. Eyes or rings $i$ and $k$ are secured to the fabric strips or webs $g$ and $h$ respectively. The branched ends $c'$ of the tension ropes $c$ are secured in the eyes $i$ while the eyes $k$ serve to lash or otherwise secure the gas bag to its frame $b$, thereby all forces produced by inner and outer influences and tending to deform the frame are uniformly distributed over the same without injuring the density of the gas bag which remains passive.

I do not limit myself to placing these stiffening ropes in any particular plane as they may be stretched across the interior of the balloon in any plane. I have found however that the placing of these members in a vertical plane is very effective in preventing the deformation above referred to. By arranging such inner tensile members in air-ships with a rigid frame the across stiffening means hitherto used, which require always a subdivision of the gas bags and double walls may be dispensed with so that larger gas bags with single inner walls may be used.

I claim:

1. In an airship the combination of a frame with a gas bag contained therein, of webs secured to the inside of the gas bag and webs secured to the outside of the gas bag and lying in the plane of the inner webs, of stiffening members, by which the inner webs are connected to each other the outer webs being secured to the said frame.

2. In an airship the combination of a frame with a gas bag therein, of webs secured to the inside of the gas bag and webs secured to the outside of the gas bag and lying in the plane of the inner webs, of stiffening members having branched ends, which are secured to the inner webs, the outer webs being secured to the frame.

3. In an airship the combination of a frame with a gas bag therein, of webs secured to the inside of the gas bag and webs

secured to the outside of the gas bag and lying in the plane of the inner webs, both the inner and outer webs being provided with eyes, of stiffening members attached to the eyes of the inner webs and connecting the inner webs to each other the eyes of the outer webs being secured to the frame.

4. In an airship the combination of a frame with a gas bag therein, of webs secured to the inside of the gas bag and webs secured to the outside of the gas bag and lying in the plane of the inner webs angles of fabric secured on both sides of the webs and to which the webs are secured, of stiffening members connecting the inner webs to each other, the outer webs being secured to the frame.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

JOHANN SCHÜTTE.

Witnesses:

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RICHARD GOETZ.