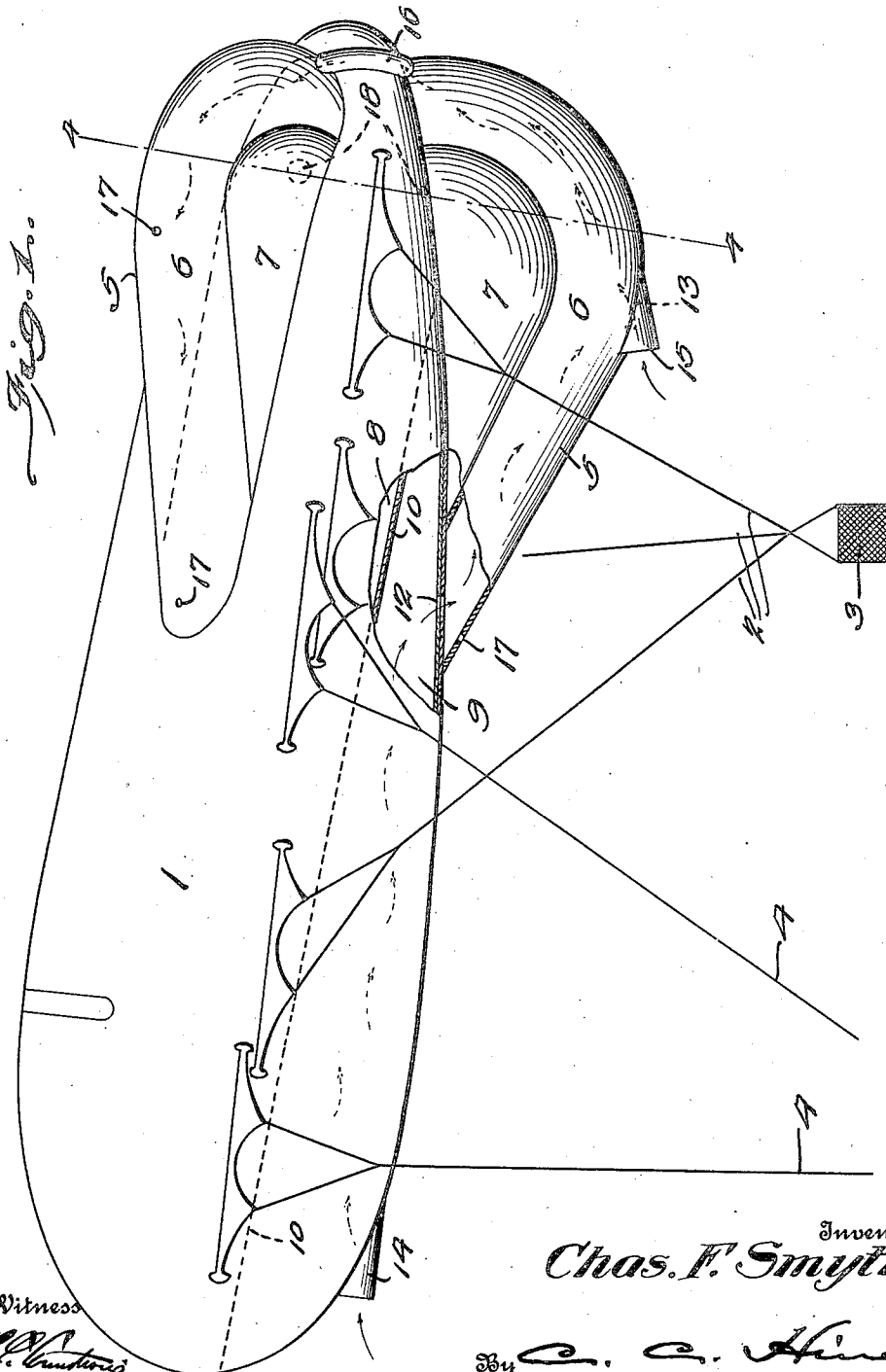


C. F. SMYTH.
KITE, CAPTIVE, OR OBSERVATION BALLOON.
APPLICATION FILED OCT. 4, 1919.

1,376,121.

Patented Apr. 26, 1921.

2 SHEETS—SHEET 1.



Witness
R. C. [Signature]

Inventor:
Chas. F. Smyth,
By *A. C. Hines,*
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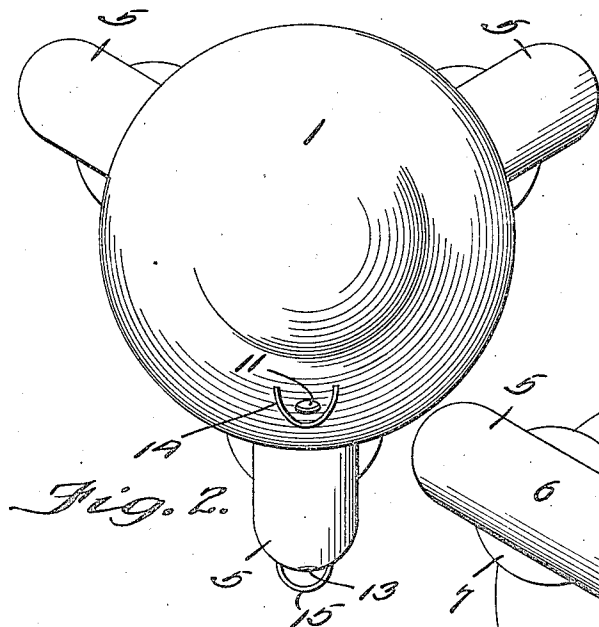


Fig. 3.

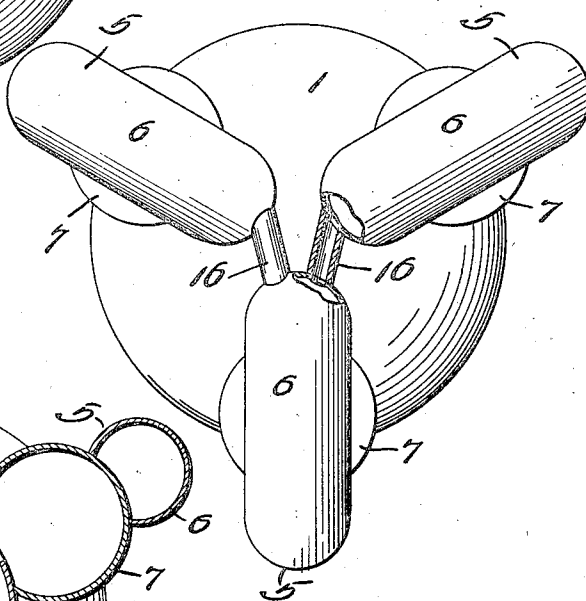
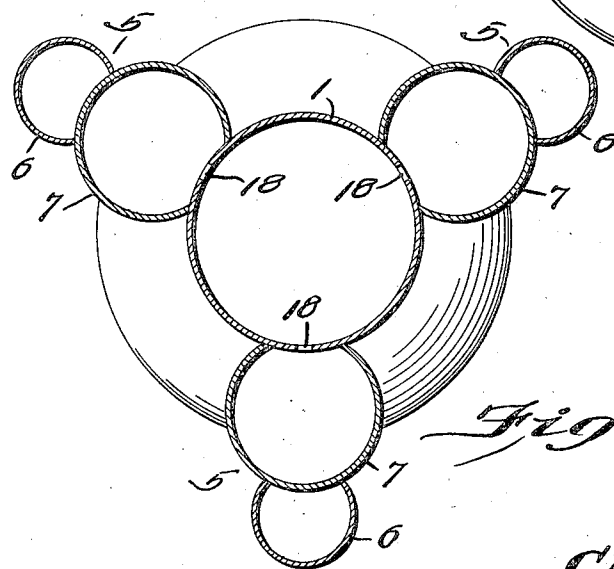


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES F. SMYTH, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO CONNECTICUT AIRCRAFT COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

KITE, CAPTIVE, OR OBSERVATION BALLOON.

1,376,121.

Specification of Letters Patent. Patented Apr. 26, 1921.

Application filed October 4, 1919. Serial No. 328,419.

To all whom it may concern:

Be it known that I, CHARLES F. SMYTH, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Kite, Captive, or Observation Balloons, of which the following is a specification.

This invention relates to improvements in kite, captive or observation balloons of that type shown in my prior patent No. 1,288,451, dated December 17, 1918, wherein a gas-bag of streamline form is provided upon its tail portion with hollow inflatable lobes or stabilizing protuberances, generally three in number, arranged equidistantly around the tail portion of the bag. In practice these protuberances are inflated, when the balloon is in use, by means of air supplied under existing wind pressures, and are employed in place of tail-cups to keep the balloon steady in the air. The air thus supplied is taken into the bottom lobe and distributed through conductors to the upper or side lobes, whereby the lobes are kept distended whenever there is adequate wind pressure, i. e., as long as the wind is blowing with sufficient force. Each lobe is provided with one or more air vents to allow any excess air pressure to escape. When not distended, the lobes, which are ordinarily made, like the gas-bag, of balloon-fabric, lie slack or in a flabby state and have little or no stabilizing effect.

A serious objection to balloons of the type mentioned, and having protuberances of the character described, is that the stability of the balloon is dependent upon wind pressure and varies under varying wind pressures, and is materially impaired in case of a calm. In hauling down a balloon, with the lobes filled with air only, these become flabby and more or less deflated and in many instances entirely deflated when the balloon is lowered to a hundred feet or less above the ground. When this occurs the balloon is subject to pitching and diving and, in the event of a storm or high wind pressure, where the ground air currents are uncertain, there is great difficulty in landing the balloon with liability of damage to the gas-bag or injury to the occupants of the basket.

The object of my present invention is to provide means for overcoming the aforesaid

objections, and for keeping the stabilizing protuberances inflated to a stabilizing degree at all times, so that the balloon will maintain an even keel and balance at all altitudes clear down to the ground.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation, partially in section, of a captive balloon constructed in accordance with my invention.

Fig. 2 is a front elevation of the same.

Fig. 3 is a rear elevation, partially in section.

Fig. 4 is a transverse section on line 4—4 of Fig. 1.

The balloon comprises a gas-bag or envelope 1, which is preferably of streamline form, that is, cigar-shaped or tapering from front to rear, the bag being constructed of any of the materials commonly employed. Attached to the bag are the suspension cables 2 supporting the car or basket 3, and also suitably attached to the bag are branch ropes or cables 4 for attachment to a mooring or towing rope or cable, (not shown). It will, of course, be understood that in practice the balloon may be made of any suitable dimensions and will be provided with the usual rip panel and necessary valves and instruments for maneuvering.

In accordance with my invention, the tail portion of the balloon is provided with a stabilizing construction to take the place of and obviate the use of tail-cups or other similar tail appendages. This novel tail construction consists of a suitable number of rudders, lobes or protuberances 5, projecting from the tapered rear end or tail portion of the bag 1. In practice any suitable number of these protuberances may be employed. In the present instance I have shown the use of three of such lobes or protuberances, which are arranged at an angle of 120° to each other, and extend in a group or series equidistantly around the tapered tail portion of the bag. One of these protuberances is vertically disposed in the vertical plane of the center of the bag, upon the underside of the tail portion thereof, while the other two protuberances project upwardly and outwardly at reverse oblique

angles to a horizontal line extending transversely through the center of the bag, and are disposed above the horizontal center of the bag and in similar positions on opposite sides thereof.

Each of the said lobes or protuberances consists of a substantially scroll-shaped or involute hollow or tubular outer or rim portion 6 and an inner hollow or tubular web portion 7. The outer or rim portion 6 is connected at its forward end with the side of the bag at a point about in line with the forward part of the tapered tail portion, and thence extends inwardly and rearwardly on a spiral line and has its rear end curved inwardly and forwardly and connected with the extremity of the tail portion, thus spacing said rim portion from the tail portion between its ends. The web portion 7 occupies this space between the tubular rim portion 6 and the tail portion of the bag, and coöperates with the portion 6 to form an aerofoil, giving sufficient wind surface to establish a desired amount of resistance for a stabilizing action and a proper amount of lifting effect to assist sustentation. It will be obvious that by the construction described and arrangement of the stabilizers or protuberances the tendency of the bag to plunge vertically, move laterally, or to roll will be resisted in a reliable and effective manner, thus insuring a maximum degree of stability, the general advantages gained being more fully set forth in detail in my aforesaid patent.

In accordance with my present invention, the portions 6 and 7 of each lobe or protuberance are constructed to provide separate and non-communicating fluid containing compartments, the rim portion 6 being designed in practice to receive and to be inflated by air under wind pressure, while the web portion 7 is designed to receive and to be inflated by hydrogen or other gas lighter than air. Any suitable means for supplying the respective fluids to the compartments of the protuberances may be employed, but in the construction shown it will be seen that the gas bag 1 is provided with a main or gas compartment 8, to receive hydrogen or other gas lighter than air, and a relatively smaller compartment or ballonnet 9 to receive atmospheric air, said compartments being separated by a diaphragm or partition 10.

When the balloon is in use, air under wind pressure enters the compartment 9 through an inlet opening 11 at the forward end of the gas bag, and passes from said compartment 9 into the bottom lobe or protuberance 5 through a communicating opening 12. Preferably the bottom lobe or protuberance 5 is also provided with an intake opening 13 for the direct admission of air thereto, and

the openings 11 and 13 are associated with air scoops 14 and 15, respectively.

The air thus supplied to the compartment 6 of the bottom lobe or protuberance 5 keeps the same inflated and distended, and the supplied current of air flows therefrom through conducting tubes 16 into the similar compartments 6 of the two upper lobes 5, whereby such compartments of said upper lobes are inflated and distended. The compartment 6 of each lobe 5 is provided with one or more air vents 17 to permit of the escape of air and thereby relieve the lobe of excess pressure.

The webs or inner compartments 7 of the lobes or protuberances are preferably supplied with gas lighter than air from the main gas compartment 8 of the gas bag, for the purpose of keeping said compartments 7 constantly inflated and distended while the balloon is in service. To this end, each compartment 7 is in communication through an opening 18 with the compartment 8, whereby at all times in the operation of the balloon the compartment 7 will be kept filled with a character of gas lighter than air employed for sustaining the balloon in the atmosphere.

It will thus be understood that the compartment 6 of the lobes will be inflated with air pressure, supplied through the force of the wind currents, which vary or fluctuate at different times, while the compartments 7 will remain constantly inflated, since they are connected with the gas compartment of the envelope. By this means the lobes will be kept partly distended, even though the balloon is floating in calm air, with the air compartments of the lobes more or less uninflated and flabby. Hence even under the lightest of wind pressures the lobes will be kept sufficiently distended to maintain stability. An important advantage accruing from the present invention is the high degree of stability and safety secured in launching and landing a balloon. In hauling down a balloon, with the lobes filled with air only, these lobes become more or less deflated and flabby and in many cases entirely deflated when the balloon is pulled down to a hundred feet or less above the ground, due to the wind pressure becoming very uncertain and falling off entirely at times. When this occurs, the balloon is subject to pitching and diving, and in the event of a storm or high wind pressure, where the ground air currents are uncertain, there is great difficulty in safely landing the balloon and damage often results to the envelope and injury to the occupants of the car. With my invention, on the contrary, by having a gas compartment in each lobe, the balloon maintains an even keel and balance at all altitudes clear down to the ground, as the gas pres-

sure is always maintained in the gas compartments of the lobes, holding these out partially but enough at all times to secure stability and permit safe and easy landing of the balloon as well as the launching of the balloon into the air.

Having thus fully described my invention, I claim:—

1. A kite, captive or observation balloon comprising a gas-bag having stabilizing means upon the tail portion thereof, said stabilizing means including a protuberance having separate and independent fluid containing compartments, one of said compartments being in communication with the atmosphere for inflation by wind pressure and the other of said compartments being in communication with the gas containing space of the gas-bag for inflation by gas therefrom.

2. A kite, captive or observation balloon comprising a gas-bag having stabilizing means upon the tail portion thereof, said stabilizing means including a protuberance having relatively inner and outer separate and independent fluid containing compartments one bounding the other, one of said compartments being in communication with the atmosphere for inflation by wind pressure and the other of said compartments being in communication with the gas containing space of the gas-bag for inflation by gas therefrom.

3. A kite, captive or observation balloon comprising a gas-bag having stabilizing means upon the tail portion thereof, said stabilizing means including a protuberance having relatively inner and outer separate and independent fluid containing compartments, the said outer compartment being in communication with the atmosphere for inflation by wind pressure and the said inner compartment being in communication with the gas containing space of the gas-bag for inflation by gas therefrom.

4. A kite, captive or observation balloon having an inflatable stabilizing fin or rudder provided with relatively inner and outer compartments, one bounding the other, said compartments being separated from each other, one of said compartments being in communication with the atmosphere for atmospheric inflation and the other with the gas containing space of the bag for inflation by gas therefrom.

5. A kite, captive or observation balloon comprising a gas-bag having a substantially scroll-shaped inflatable stabilizing protuberance embodying an outer or rim portion forming an air compartment communicating with the atmosphere and an inner or web portion forming a gas compartment separate from said air compartment and communicating with the gas containing space of the bag.

6. A kite, captive or observation balloon comprising a gas-bag provided with hollow inflatable stabilizing protuberances, each having an air compartment and a gas compartment, said gas compartments being in communication with the gas containing compartment of the bag, and means for supplying air under wind pressure to the air compartments of the protuberances.

7. A kite, captive or observation balloon comprising a gas-bag provided with a plurality of stabilizing protuberances upon the tail portion thereof, each protuberance comprising a scroll-shaped outer or rim portion forming an air compartment and an inner or web portion forming a gas compartment closed against communication with said air compartment, the said gas compartments of the protuberances being in communication with the gas compartment of the bag, means for admitting air to the air compartment of one of said protuberances, and means for conducting air therefrom to the air compartments of the other protuberances.

In testimony whereof I affix my signature.

CHARLES F. SMYTH.