C. F. SMYTH.

KITE, CAPTIVE, OR OBSERVATION BALLOON.

APPLICATION FILED FEB. 23, 1917.

1,288,451. Patented Dec. 17, 1918.

Fig. 1.

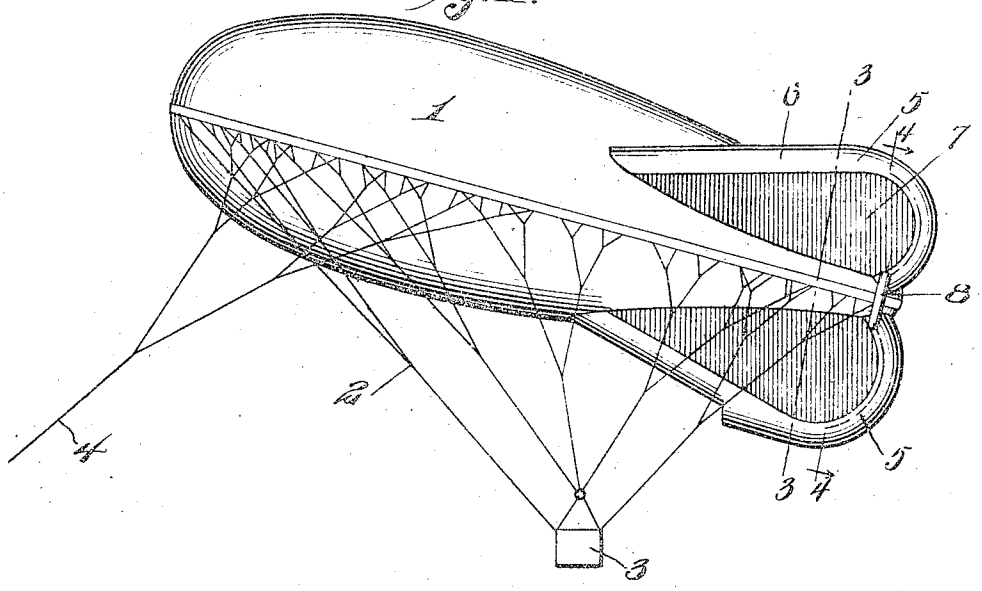


Fig. 3.

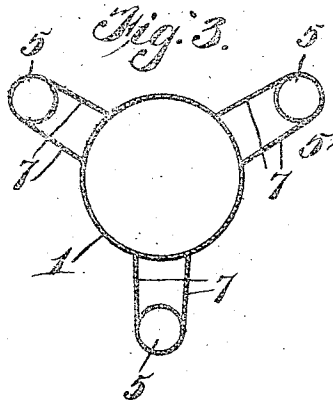


Fig. 2.

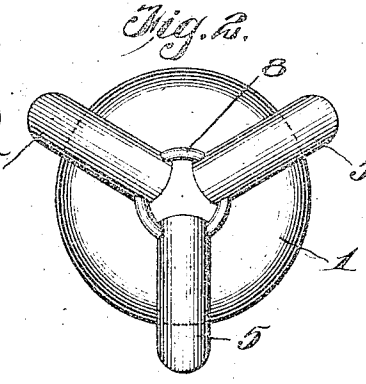
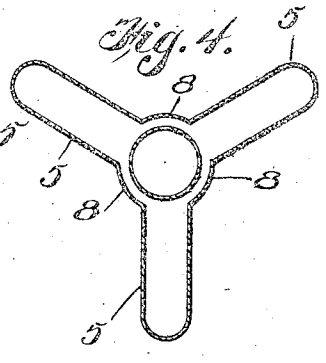


Fig. 4.



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KITE, CAPTIVE, OR OBSERVATION BALLOON.

1,286,451. Specification of Letters Patent. Patented Dec. 17, 1918.

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To all whom it may concern:

Be it known that I, CHARLES F. SEYMER, 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 a new and improved construction of kite, captive or observation balloon designed to obviate the necessity of using tail cups or similar devices for holding the balloon steady.

The primary object of the invention is to provide a balancing construction which dispenses with the employment of a trailing tail appendage, and reduces the weight of the balloon to a material degree, rendering it possible to make the entire gas bag smaller, and at the same time lowering the total wind resistance.

A further object of the invention is to provide a construction which permits packing of the balloon into a smaller space for transportation, thus making it possible to carry a larger number of balloons within a given amount of space.

A further object of the invention is to provide a construction which facilitates rising of the balloon from the ground, such construction embodying protuberances which project from the side of the gas bag and serve the purpose of stabilizers to keep the balloon from rolling and to render the balloon steady at high or low altitudes.

A still further object of the invention is to provide stabilizing protuberances which afford additional lift, and which when filled with air form surfaces to catch the wind and utilize the force of the wind as a lifting agent, and which when filled with a gas lighter than air will cause an additional lifting force equal to the sum of the wind plus the lifting force of the gas.

A still further object of the invention is to provide a stabilizing construction which obviates the use of ropes or objects of any kind dragging behind the balloon and which are liable to catch on the ground or other obstructions, causing the tail cups to be torn off and endangering the life of the observer, and furthermore to provide a construction which makes possible the use of a smaller and lighter mooring or towing cable due to the lowering of the wind resistance and a more uniform pull on the cable thereby secured.

A still further object of the invention is to provide a stabilizing construction which adapts the balloon to be used in very high winds owing to the lowering of the wind resistance as set forth, and the greater ease with which the balloon may be handled when launching and drawn down after flight is completed.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

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

Fig. 2 is a rear end elevation of the same.

Figs. 3 and 4 are sectional views taken, respectively, on the lines 3—3 and 4—4 of Fig. 1.

The balloon comprises a gas bag or aerostat 1, which may be of any of the ordinary forms in common use, but which as herein shown 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 is a mooring or towing rope or cable 4. It will, of course, be understood that in practice the balloon may be made of any suitable dimensions, according to its particular type and the use to which it is to be put.

In accordance with my invention, the tail portion of the balloon is provided with a stabilizing construction designed to take the place of and to obviate the use of tail cups and other similar tail appendages. This novel tail construction consists of two or more fins or protuberances 5, projecting from the sides of the tapered rear end or tail portion of the bag 1. In the present instance I have shown the use of three of such fins or protuberances, which are arranged at an angle of 90° 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 under side of the tail portion thereof, while the other two protuber-

ances project upwardly and outwardly at reverse oblique angles to a horizontal line extending transversely through the center of the bag, and are disposed wholly above the horizontal center of the bag and in similar positions on opposite sides thereof.

Each of the said fins or protuberances consists of a substantially scroll-shaped or involute tubular body or protuberance 6 which 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 the tubular body from the tail portion between its extremities. Occupying this space between each tubular body and the tail portion of the bag is a vane or web 7, which coöperates with the tubular portion 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 sustension. It will be obvious that by the described construction 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.

In practice, a greater or lesser number of the protuberances than the number shown may be employed, it being essential, however, to employ at least two of such protuberances, suitably arranged to prevent side drift, rolling or plunging of the gas bag. By the use of the vertical protuberance 5, which serves the function of a vertical fin or rudder vane, lateral deflection or side drift is prevented, while the upper inclined fins 5 serve to prevent rolling, plunging or other deflections of the gas bag from a stable position even under the pressures of high winds, thus insuring steadiness of the balloon in all kinds of weather and at different altitudes. It will be observed that the upper inclined protuberances serve, with their webs or fins, to provide lifting surfaces, thus increasing the lifting and sustaining capacity of the balloon, as will be readily understood. Owing to the great stability of the balloon due to the described stabilizing construction, the use of dangerous and objectionable tail appendages is avoided, and smaller and lighter mooring and towing cables may be employed, and the balloon launched and landed with much greater ease and facility.

In practice, the tubular protuberances 5 may communicate with the gas containing space of the bag 1, or with a ballonet or air containing space, so that they may be kept distended for an obvious purpose. When filled with air the protuberances will provide aerofoil surfaces of adequate area to catch and utilize the force of the wind as a lifting agent, and when filled with hydrogen or other gas lighter than air the protuberances will produce an additional lifting force equal to the sum of the wind plus the lifting force of the gas. Bracing elements 8 connect the curved ends of the protuberances 5, and these bracing elements may be in the form of connecting tubes, to allow air or gas to flow from one protuberance to the other, and thus keep the pressures therein equalized. If desired, the webs 7 may also be hollow and form receptacles communicating with the bag or protuberances, or both, for the supply of air or gas thereto to increase the area of the stabilizing surfaces as a whole.

A material and important advantage of my improved stabilizing construction, in addition to dispensing with trailing tail appendages, is that the stabilizing elements, while performing the desirable functions set forth, lie within a space not greater than the major diameter of the gas bag, thus securing great compactness and allowing the balloon to be stored and transported with great convenience and facility.

Having thus described my invention, I claim:

1. A balloon comprising a gas bag provided with one or more hollow inflatable involute stabilizing protuberances upon the tail portion thereof.

2. A balloon comprising a cigar-shaped gas bag provided with one or more hollow inflatable, scroll-shaped stabilizing protuberances upon the tapered tail portion thereof.

3. A balloon comprising a gas bag provided with one or more hollow inflatable, spirally disposed involute protuberances upon the tail portion thereof.

4. A balloon comprising a gas bag provided with a plurality of hollow inflatable involute protuberances upon the tail portion thereof, said protuberances being grouped about said tail portion.

5. A balloon comprising a gas bag provided with a tapered tail portion and a plurality of equidistantly spaced hollow inflatable involute stabilizing protuberances grouped about the said tapered tail portion thereof.

6. A balloon comprising a gas bag provided with a plurality of scroll-shaped protuberances upon the tail portion thereof, and webs bounded by said protuberances and disposed between the bag and portions of the protuberances.

7. A balloon comprising a gas bag having a tapered tail portion, a tubular inflatable scroll-shaped protuberance upon said tail portion and a relatively flat web bound-

ed by said protuberance and disposed between the same and the bag.

8. A balloon comprising a gas bag having an annular series of protuberances upon the tail portion thereof, each of said protuberances comprising a scroll-shaped tubular body and webs bounded by said protuberances and disposed between the same and the body.

9. A balloon comprising a tapered body having scroll-shaped protuberances upon the tail portion thereof, each protuberance comprising a tubular body in communication with the bag and a web bounded by said tubular body and disposed between the same and the bag, said protuberances being in communication with each other.

10. A balloon comprising a gas bag having a tapered tail portion, and an annular series of protuberances grouped about said tail portion, each protuberance comprising a scroll-shaped tube communicating with the bag, and a web bounded by said tube and disposed between the same and the bag, and conductors connecting the rear ends of said tubes.

11. A balloon comprising a tapered body having scroll-shaped protuberances upon the tail portion thereof, each protuberance comprising a tubular body in communication with the bag and a web bounded by said tubular body and disposed between the same and the bag.

12. A balloon comprising a gas bag having a tapered tail portion and an annular series of protuberances grouped about said tail portion, each protuberance comprising a scroll-shaped tube communicating with the bag, and a web bounded by said tube and disposed between the same and the bag, and comprising elements connecting the rear ends of said tubes.

13. A balloon comprising a cigar-shaped gas bag provided upon the tail portion thereof with scroll-shaped protuberances, each protuberance comprising a spirally arranged involute tubular body in communication with the bag, and a web bounded by said tubular body and disposed between the same and the bag.

14. A balloon comprising a cigar-shaped gas bag provided upon the tail portion thereof with a series of protuberances grouped about said tail portion, each protuberance comprising a spirally arranged involute scroll-shaped tube communicating with the bag, and a web bounded by said tube and disposed between the same and bag, one of said protuberances being arranged vertically in line with the center of the bag and the other protuberances being arranged at an angle to the vertical on opposite sides of the bag.

15. A balloon comprising a cigar-shaped gas bag provided upon the tapered tail portion thereof with an annular series of three protuberances grouped about said tail portion, each protuberance comprising a spirally arranged scroll-shaped involute tubular body communicating with the bag, and a web bounded by said tubular body and disposed between the same and the bag, one of said protuberances being arranged centrally upon the underside of the tail portion, and the other of said protuberances arranged so as to project upwardly and outwardly at reverse oblique angles to a horizontal line extending transversely through the center of the bag.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. SMYTH.

Witnesses:
NELLIE B. MILLS,
O. G. CLEMENTS.