

Sept. 23, 1969

P. SNIBBE

3,468,503

KITE CONSTRUCTION

Filed June 5, 1967

2 Sheets-Sheet 1

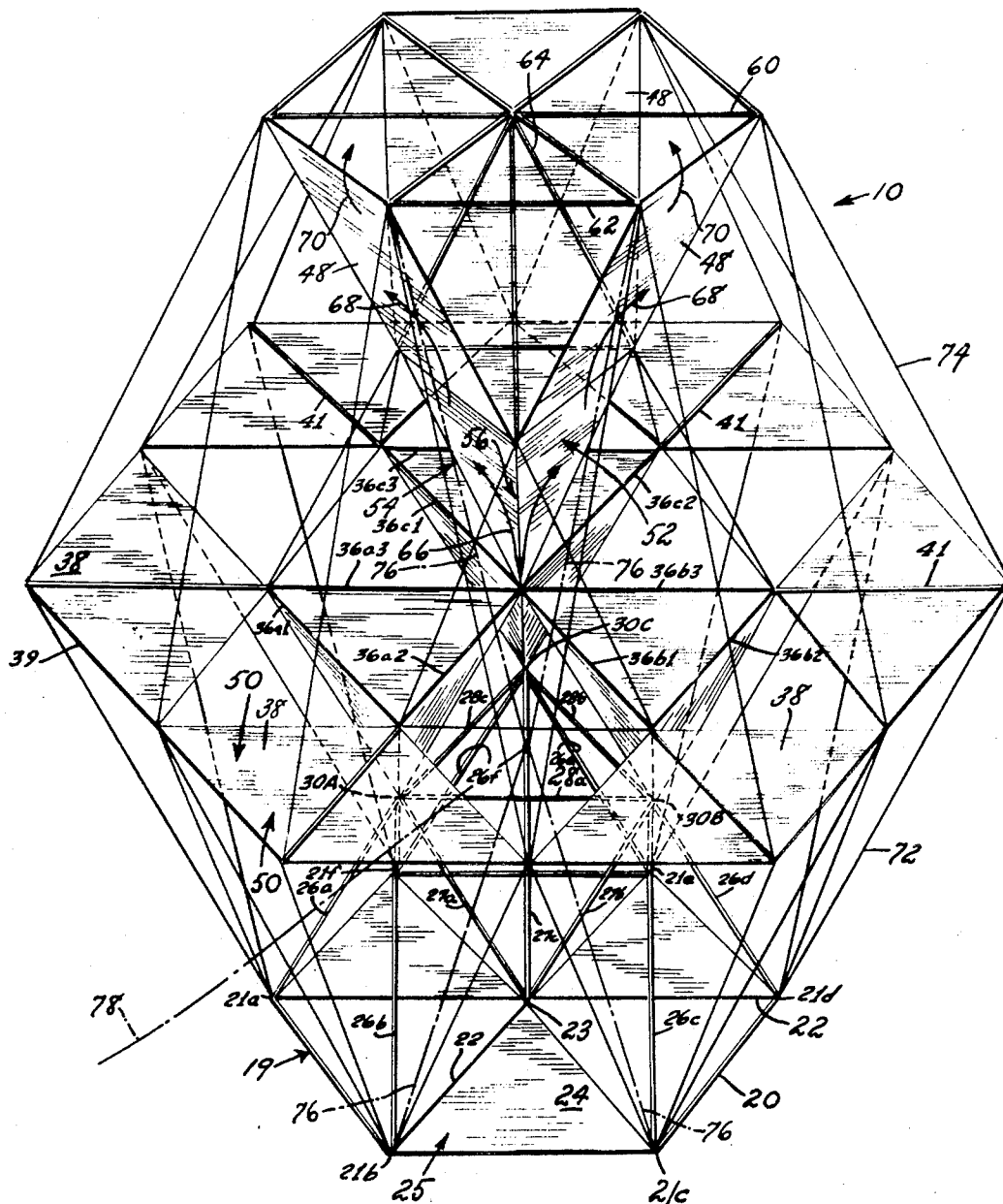


Fig. 1

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Fig. 2

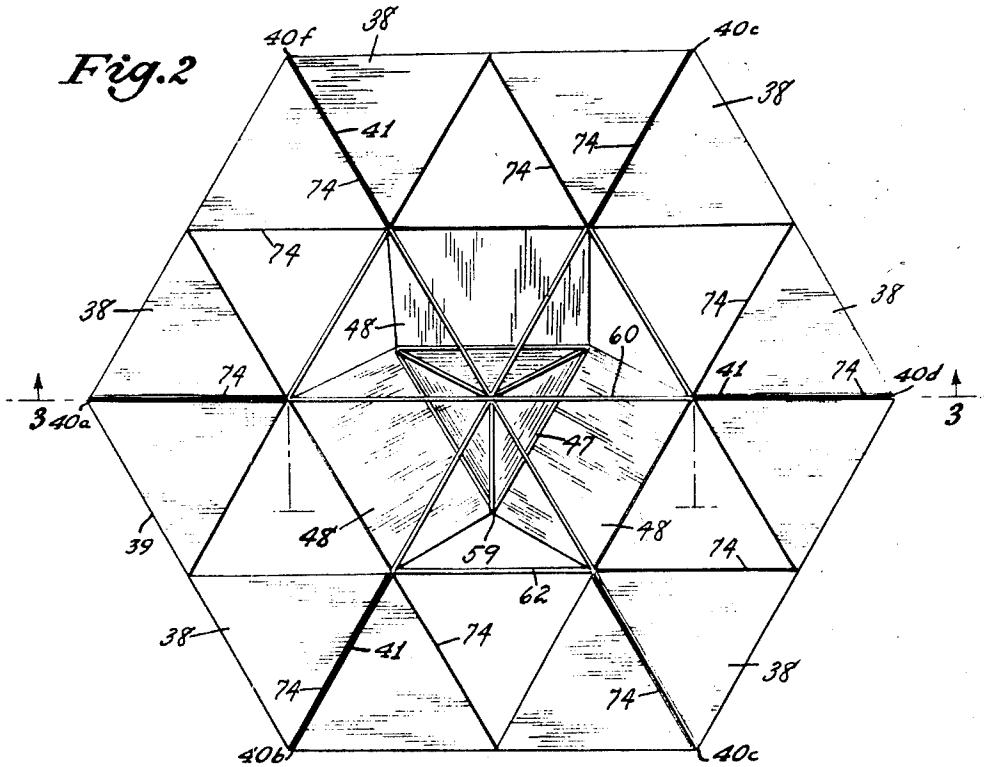
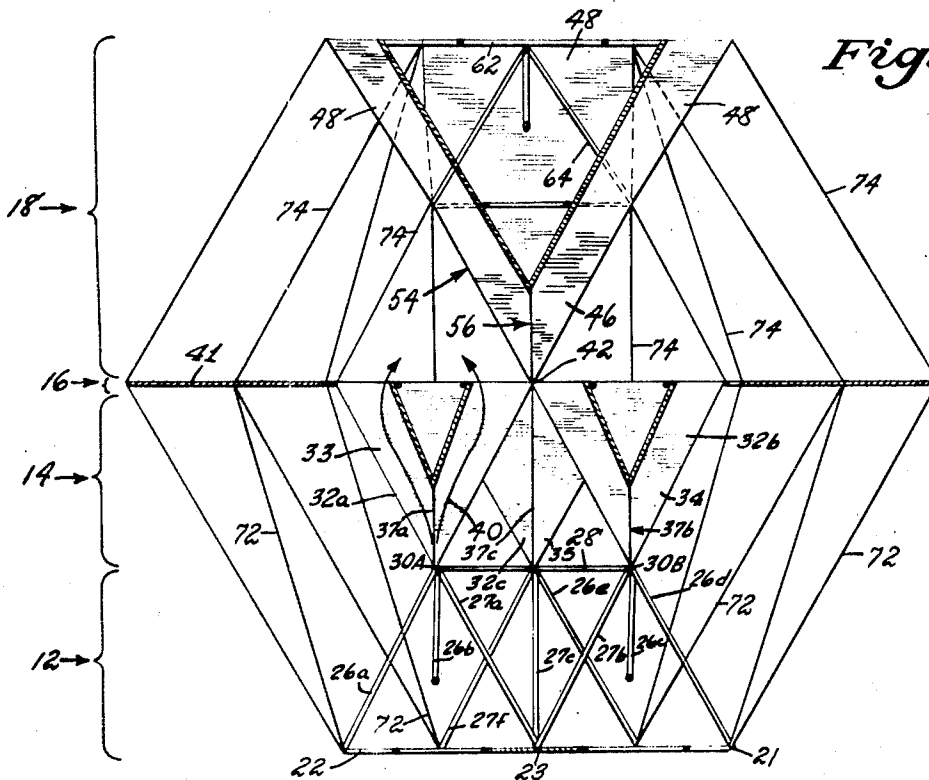


Fig. 3



1

2

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KITE CONSTRUCTION

Paul Snibbe, 312 W. 90th St., New York, N.Y. 10024

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4 Claims

ABSTRACT OF THE DISCLOSURE

A kite construction with high efficiency lift characteristics. The main element comprises a tetrahedron shaped element having an apex at its lowest point, the three sides extending upwardly from the apex being covered, and the top side being uncovered. Extending upwardly and outwardly from the covered sides are generally rectangular flaps. Air currents are accelerated first passing up the leading sides (facing into the current) and then again passing up and over the vanes creating unusually high efficiency lift characteristics.

BACKGROUND OF THE INVENTION

Kite constructions involving tetrahedron skeletons are well-known in the art, and are shown, for example, in Patents Nos. 770,626 and 856,838. These patents are directed towards the structural benefits of the particular tetrahedron geometric design. Other inventors have also utilized the tetrahedron skeleton. Patent No. 2,744,701 shows a tetrahedron structure with only two of the four sides covered.

The above mentioned kites, as well as all other kites of varying designs presently known, require large amounts of open space. It is necessary for the user to trail the kite behind him and run into a wind or breeze until the kite is caught by the air currents and carried up into the air.

Thus, it is not only necessary to have a large area in which to "launch" the kite, but it is also necessary to have a sufficiently strong air current to allow the kite to become air-borne.

SUMMARY OF THE INVENTION

The present invention contemplates a completely unique application of the basic tetrahedron structural element, combining excellent structural characteristics and esthetic beauty with high efficiency lift characteristics.

Among the principal objects of the present invention is to provide an improved kite construction with unusually high performance lift characteristics.

Another object of the present invention is to provide a kite construction of the character described utilizing a tetrahedron element with three covered sides to accelerate air-flow and increase lift characteristics.

Yet, another object of the present invention is to provide a kite construction with a main three-covered sided tetrahedron element having vanes extending upwardly and outwardly from the upper edges of the covered side to provide additional acceleration of air-flow, increasing lift efficiency.

Yet, another object of the present invention is to provide a kite construction with high efficiency lift characteristics which can be flown from a confined area, such as the roof of a building.

Yet, a further object of the present invention is to provide a kite construction whose high performance lift characteristics allow the kite to become air-borne in relatively small air currents.

A feature of the present invention is the provision of a hexagonal shaped center portion which adds to the esthetic appearance of the kite and provides additional lift during flight.

A further feature of the present invention is the provision of a stabilizer portion at the bottom of the kite, eliminating the need for a tail trailing after the kite structure during flight.

The kite construction comprises a main tetrahedron shaped element, having an apex at its lowest point. The three sides extending upwardly from the apex are covered, and the top side is uncovered. Extending upwardly and outwardly from the top edges of the covered sides are three flaps. During flight, the kite so positions itself so that two of the three sides are facing into the wind with the leading common edge of the two sides cutting the wind and forcing it against the sides and upwardly along them. This accelerates the air flow. The air flow then encounters the flaps and it is further accelerated, finally passing over the tops of the flaps towards the rear of the kite. This double acceleration provides high lift performance characteristics by creating a partial vacuum over the top of the tetrahedron element and the flaps in the well-known manner. Positioned symmetrically below the main tetrahedron element are three secondary elements which provide additional lift in the manner just described. Extending outwardly from the apex of the main tetrahedron element and incorporating the top edges of the three secondary tetrahedron elements is a center portion having covered vanes providing additional lift characteristics and esthetic beauty. Extending downwardly from the apexes of the secondary tetrahedrons is a stabilizer portion which includes struts holding lower vanes. This stabilizer portion acts as a tail for the kite with the struts providing the necessary weight for stabilization, and the lower vanes also add to the lift characteristics.

Additional objects and advantages of the present invention will become apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a kite construction made in accordance with the present invention;

FIG. 2 is a top plan view of the device shown in FIG. 1, and

FIG. 3 is a cross-sectional view taken approximately along line 3—3 of FIG. 2.

Turning to FIGS. 1 and 3, there is shown a kite 10 including a stabilizer portion 12, a lower flight portion 14, a center portion 16, and an upper flight portion 18.

More particularly, the stabilizer portion 12 comprises a lower hexagonal structure 19 bounded by tail edge struts 20. (For purposes of convenience in reading the drawing and where possible, when a plurality of the same element is present, only one representative element of the group will be denoted by a reference numeral.) The struts meet at tail corners 21a—21f. Extending diagonally across the hexagonal structure and joining the tail corners are tail support struts 22. The struts cross in the center forming an apex 23. Three of the six triangular elements thus formed are covered and form vanes 24. The other three triangular elements remain exposed allowing passage of the air current flow 25 therethrough. The exposed elements are bounded by points 21a, 21b, and 23; 21c, 21d, and 23; and 21e, 21f, and 23. The air current flow 25 over the vanes causes a slight amount of lift, and thus the vanes serve not only to enhance the aesthetic appearance of the kite, but they also provide a slight contribution to the lift characteristics thereof.

Extending upwardly from the corners 21a—21f are angular support struts 26a—26f; and from the apex 23, 27a—27c. The struts meet in a common plane and are maintained in place by positioning struts 28a—28c. The plane may be further defined by points 30A, 30B and 30C. The struts 26, 27, and 28, and the structure 19 all form the stabilizer portion, which serves to maintain the kite in a continuing stable configuration during flight.

The struts 28a-28c also lie within the lower flight portion 14. The points 30A, 30B, and 30C form the apexes of three lower tetrahedron units 32a, 32b, and 32c, having covered sidewalls 33, 34, and 35, bounded by upper edges 36a1, 36a2, 36a3; 36b1, 36b2, 36b3; and 36c1, 36c2, 36c3, respectively.

Viewing the kite construction as heading into the wind, and as shown in FIGS. 1-3, the sidewalls 33, 34, and 35 facing into the wind are joined by leading edges 37a, 37b, and 37c; the windflow as the air current hits the leading edges 37a-37c, is shown by the double arrows 40 wherein the air current is divided and passes upwardly along the sidewalls, rapidly accelerating in passing over the upper side edges 36a1, 36a2; 36b1, 36b2; and 36c1, 36c2. This flow and acceleration significantly adds to the lift characteristics of the invention.

The upper edges 36a1-36c3 of the tetrahedron units 32a-c, lie within the center portion 16 of the kite, the tetrahedron units meeting at a center apex 42. The center portion 16 forms a plane which is parallel to the planes formed by the points 30A-C, and the lower hexagonal structure 19. The center portion also is hexagonal in shape and is much larger than the structure 19. If the element formed by the points 30A-C is given an area equivalent of 1, then the lower hexagonal structure 19 would have an area of 6, and the center portion 16 would have an area of 24. It is understood that these area relationships were established primarily to enhance the aesthetic appearance of the kite construction, and while it does provide a construction which is proven to have very efficient lift characteristics, it is possible to maintain substantially similar characteristics while varying the area relationships.

The center portion is bounded by center edge struts 39 whose length is twice the length of struts 20 or 28, since it forms the edges of two triangular elements (FIG. 2). The struts meet at points 40a-40f. The points are joined by center support struts 41, all of which pass through the center apex 42. The edge struts 39 and support struts 41 form six symmetrical triangles having a common apex 42, and each encompassing four triangular elements substantially equal in area to the elements described in the structure 19 and formed by the struts 28a-c. Several of the triangular elements in the center portion 16 may be covered, forming vanes 38 over which the air current may pass, as shown by the arrow 50. Again, these vanes, add a slight amount of lift to the overall performance characteristics of the kite.

The main element of the invention is to be found in the upper flight portion 18 and comprises an upper tetrahedron unit 52, having struts 54 extending upwardly from the apex 42 defining the covered sidewalls 46 having upper edges 47. Extending upwardly and outwardly from the upper edges 47 are flaps 48, which are generally rectangular in shape and are maintained in proper position by supporting struts 60 and upper edge struts 62, and upper interior supports struts 64.

For purposes of this preferred embodiment, it has been found that the desired lift efficiency characteristics are obtained when the upper flight portion 18 is equal in height to the stabilizer portion 12 plus the lower flight portion 14. It is further then found that good results are obtained when the stabilizer portion 12 is equal in height to the lower flight portion 14. It has further been found that when the straps 48 are equal in height to the tetrahedron unit 52 the desired characteristics are obtained. Thus, for purposes of the illustrated embodiment the desired height dimensions occur when the relationships of the various portions described are either one-half or one-quarter heights as set forth above.

As best seen in FIG. 1, the air current meets the leading edge of the sidewall 56 facing into the wind and

divides the air current in the manner previously described and illustrated by the numeral 66. The air-current passes along the sidewalls until it meets the flaps 68 where it is further accelerated as shown by the arrows 68. The air current then passes up along the flaps and over the top as shown by the arrow 70. The double acceleration greatly increases the velocity of the air-current, so that when it passes over the top of the flaps, a very significant amount of lift is created. As a result, the overall kite construction, including the lift contributions from the hexagonal structure 19 of the stabilizer portion 12, the lower flight portion 14, and the center portion 16, are unusually high and allow the kite to be flown in very slight breezes and in very limited areas.

For purposes of maintaining the structure, there may be added strings 72 on the lower part of the kite and strings 74 on the upper part of the kite. The kite may also have attached two strings 76, to which is attached the guide-line 78 for flight purposes. The guide-line is usually attached somewhere below the center portion of the kite. It should be noted that when in flight the kite is tipped slightly away from the direction of the flow of the air-current, so that the leading edges assume an almost perpendicular position with respect to the ground.

It will be understood by those skilled in the art, that the now preferred embodiments of the invention have been illustrated and described primarily for the purpose of illustrating the principles of the invention, and that modifications and changes may be made in the structural details without departing from the spirit and scope of the invention.

What is claimed is:

1. An improved kite construction having high efficiency lift characteristics comprising:

- a frame;
- a tetrahedron shaped element secured to the frame, the element being positioned with an apex at the lowest point;
- the three sides of the element extending upwardly from the apex being surfaced, and the top side being unsurfaced;
- vanes secured to the three sides and extending upwardly and outwardly therefrom;
- the edge between two of the three sides facing into an air current, dividing the current and accelerating the flow thereof as it passes upwardly along the sides, the current being further accelerated as it passes upwardly along the vanes, the twice accelerated current then passing over the top of the vanes and past the kite construction, developing high efficiency lift characteristics.

2. The invention according to claim 1, three secondary tetrahedron elements secured to the frame and positioned symmetrically below the apex of the tetrahedron shaped element.

3. The invention according to claim 2, a center portion secured to the frame and extending outwardly from the apex of the tetrahedron shaped element, the center portion including vanes.

4. The invention according to claim 3, a stabilizer portion secured to the frame and positioned below the secondary tetrahedron elements.

References Cited

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MILTON BUCHLER, Primary Examiner
P. E. SAUBERER, Assistant Examiner