1,080,322

PATENT SPECIFICATION 1,080,322

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Tailless Kite.

I, CHARLES HYDE CLEVELAND, of Bend, Oregon, United States of America, a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to kites and particularly to a tailless kite. Tailless kites, per se, are not new. The box kite is a tailless kite and is relatively stable in flight, but it is complex and expensive. The ordinary diamond shaped kite can be flown without a tail although it is quite unstable unless certain critical conditions are met.

It is a main object of the present invention to provide a kite of simple and inexpensive construction and which requires no tail or even a bridle and yet is quite stable and does not require critical adjustments.

A more specific object of the invention is to provide a tailless kite having a simple frame and a simple covering wherein the frame so holds the covering in a predetermined contour and the covering is of such shape as to attain predetermined stable aerodynamic characteristics of the kite.

A further object of the invention is to provide a kite as just described in which the covering can be of square form so as to result in a minimum of expense in forming kite coverings from rolls of paper.

Various other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

Fig. 1 is a face-on view of my kite;

Fig. 1A shows my kite in its flying position;

[*Pr*]

Fig. 2 is a view of my kite taken in the direction of the arrows 2—2 of Fig. 1;

Fig. 3 is a rear view of my kite;

Fig. 4 is a front end view of my kite taken in the direction of the arrows 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary view of the nose portion of the frame of my kite taken from the rear thereof;

Fig. 6 is a side view of the nose portion shown in Fig. 5 taken in the direction of the arrows 6—6 of Fig. 5, and showing the kite sticks in phantom lines; and

Fig. 7 is a section taken along line 7—7 of Fig. 5.

Referring to the drawings, my kite K comprises a frame F (Fig. 3) of generally elongated arrowhead form when viewed from the face of the kite. The frame includes a straight main body or fuselage stick 11 and a pair of straight auxiliary or lateral wing sticks (or spars) 13, which sticks are held by a nosepiece connector 15 so that they converge symmetrically towards the connector.

The connector shown is of hollow one piece tubular form, which is preferably molded of plastic, and it has a pair of leg portions 15*a* and 15*b* and a central shank portion 15*c*. The sticks are shown as being of square cross section with rounded corners and fit snugly with a compressed frictional fit (Fig. 7) within the leg and shank portion of the connector, which are of circular cross section.

While it is evident from Fig. 5 that the connector itself is of generally arrowhead shape when the kite is viewed face-on, it is evident from Figs. 2, 4 and 6 that the axes of the legs of the connector are not in the same plane as the axes of the shank of the

connector. In fact, the axes of the legs of the connector lie in a common plane which obliquely intersects the axes of the shank portion 15*c* of the connector.

It is evident from Figs. 4 and 6 that the inclination of the axes of the legs of the connector to a symmetrically located plane containing the axis of the shank portion of the connector, when considered from the front end of the kite, provides a positive dihedral angle *a*.

Secured to the frame F is a square flexible covering C with a diagonal line of the square coinciding with the fuselage stick 11 and with two marginal portions 21 folded over the wing sticks 13 and secured to the body of the covering C. In order to provide clearance for the connector 15, the upper corner of the covering C, as the parts are shown in Fig. 3, is removed.

The body portion of the covering C is secured to the lower portion of the body stick 11, as the parts are shown in Fig. 3, by an adhesive material 25. The edges of the kite at 27 may be left plain or may be folded over and adhesively secured to the body portion of the covering C. In any event the final shape of the covering will be square. There is no necessity for connecting string between the free ends of the wing sticks 13 and the lower end of the body stick 11.

A plurality of pairs of holes 31 are provided in the body portion of the covering C in straddling relation to the body stick 11, such holes being located forwardly or above the line through the ends of the wing sticks, as the parts are shown in Fig. 3. A string 33 is shown passing through the central pair of holes 31 and secured around the body stick 11. As evident from Figs. 1—3, no bridle is required for the kite. Instead of providing holes, a manufacturer could print hole locations on the covering to indicate where the string 33 is to be fastened.

The extra pairs of holes are for different flying purposes. If the wind is of moderate velocity, the string 33 is fastened as shown in Figs. 1—3. If the wind is of greater than moderate velocity, the upper pair of holes as the parts are shown in Figs. 1—3 are utilized, whereas if the wind velocity is less than moderate, the lower pair of holes are utilized.

An important advantage of my kite is that the covering C may be of square form. If it is, the angular relation of the wing sticks 13 (considered from the face-on view) is slightly less than 90° depending on the magnitude of the dihedral angles. I have found, however, that this angle can be varied (with a consequent change in the shape of the covering) from somewhere around 90° as a minimum, to 120° as a maximum. This of course depends somewhat on the weight of the sticks in relation to the weight of the paper and the size of the kite, but for a normal size kite (say around 30—36 inches as its major dimension) the above limitations will apply. These limitations are certainly realistic when using sticks of pine of reasonable size, and wherein the paper is ordinary kite paper in the nature of 25 pound bleached kraft paper.

Referring to Fig. 4, I have found that a dihedral angle of around 20°, plus or minus 10°, is satisfactory in achieving stable flight characteristics.

While my kite may be considered generally of diamond shape, my kite has far superior characteristics from that inherent in the ordinary diamond kite. For instance, in the ordinary diamond kite, the forward flight edges of the kite are not rigidly held in a predetermined angular relation to the remainder of the kite but may flex or flop depending on the differential pressure of the air on the opposite side thereof. In fact, the ordinary diamond (or bow) kite is very unstable unless certain critical adjustments are made. An important advantage of my kite is that it is stable without requiring any critical adjustments.

While I have used the term "stick" to refer to the elongate frame members 11 and 13, I do not mean to imply that such members must necessarily be made of wood, although at the present time, members of wood will probably be the cheapest form of frame member.

Also, while I have shown a kite covering of square form, the covering may be of rectangular and indeed of varying quadrangular shapes. However, it has been a general object of the kite industry for years to produce a simple, stable kite having a square covering. Thus, the fact that the covering of my kite may be square results in a substantial saving in costs in making the kite since a roll of covering paper can be very readily cut up into square sections, but cannot but cut into other quadrangular shapes except at greater cost.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited other than by the provisions of the following claims.

WHAT I CLAIM IS:—

1. A tailless kite comprising a rigid frame of generally elongate arrowhead form having a converging substantially pointed front end, the frame including a shank portion and a pair of symmetrically disposed laterally diverging portions extending from the frame's front end and lying in a common plane obliquely intersecting the axis of the shank portion, the rear end of the shank

portion extending substantially beyond a plane which is normal to the shank portion and which passes through the rear ends of the diverging portions, such length beyond the last mentioned plane being at least greater than one half the length between the last mentioned plane of the frame's front end, and further comprising a flexible covering of quadrilateral form secured to the frame including the length of the shank portion beyond the plane normal to the shank portion, a lengthwise diagonal of the covering coinciding with the shank portion and the frame of the kite maintaining the flexible covering in the quadrilateral shape.

2. A tailless kite as claimed in claim 1 in which a plane passes through one laterally diverging portion and the shank portion to form an included angle of substantially between 120° and 160° with a plane which passes through the other laterally diverging portion and the shank portion to provide positive dihedral angles, the covering in the areas between the laterally diverging portions and the shank portions substantially coinciding with these last two planes.

3. A tailless kite as claimed in claim 1 comprising means providing for the securement of a string to the shank portion at a place between the front end of the frame and the plane which is normal to the shank portion and passes through the rear ends of the diverging portions.

4. A tailless kite as claimed in claim 1 in which the flexible covering is substantially square, the frame positively holding the flexible covering to maintain a substantially square shape therefor, and the portions of the covering between the laterally diverging portions and the shank coinciding with the planes containing such laterally diverging portions and the shank.

5. A tailless kite as claimed in claim 2 in which the planes which pass through the laterally extending portions and the shank portion each forming an acute angle of less than 45° with a plane passing through the shank and symmetrically disposed relative to the laterally diverging portions forming an angle therebetween of substantially less than 90° considered in the common plane which contains the laterally diverging portions.

6. A tailless kite substantially as described with reference to the accompanying drawings.

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1 SHEET This drawing is a reproduction of the Original on a reduced scale

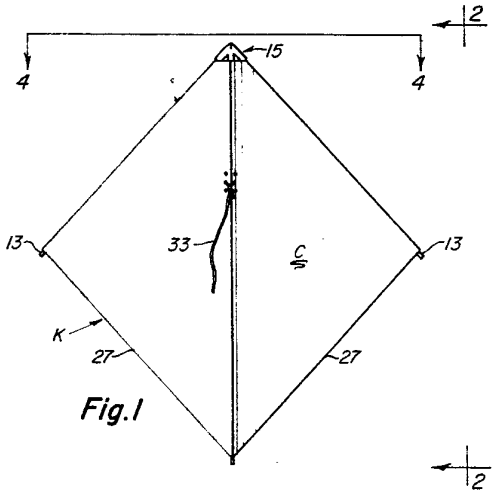

Fig.1

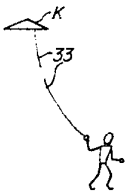

Fig.1A

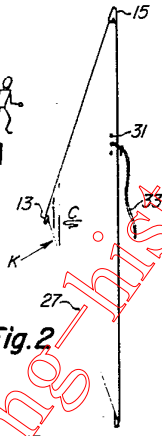

Fig.2

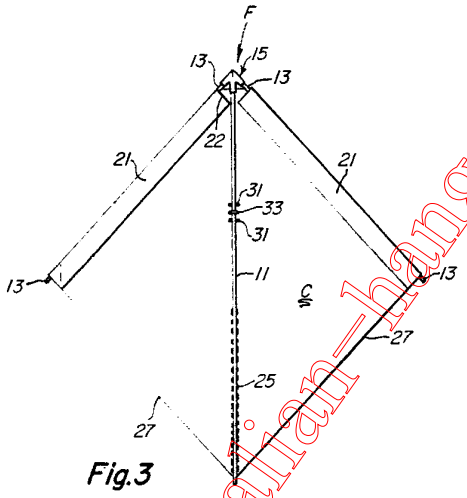

Fig.3

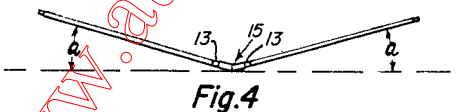

Fig.4

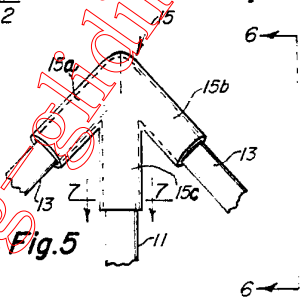

Fig.5

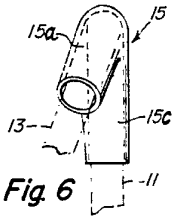

Fig.6

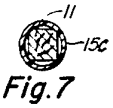

Fig.7