June 21, 1927. 1,632,822

C. DAHL

SELF BALANCING KITE

Filed July 17, 1926

Fig 1.

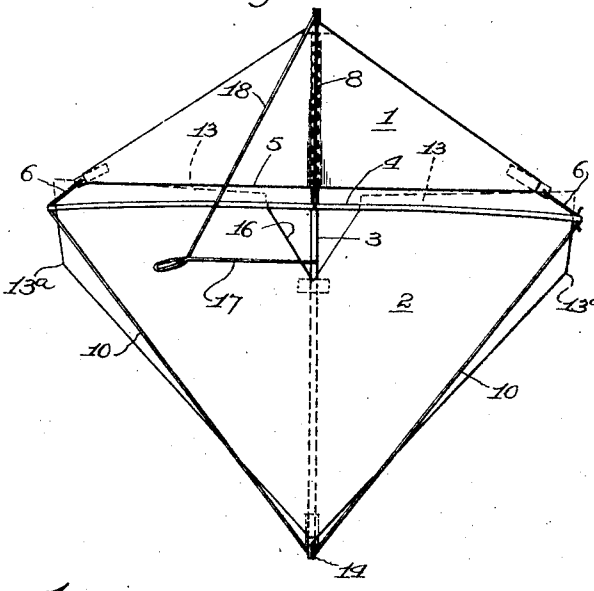


Fig 4.

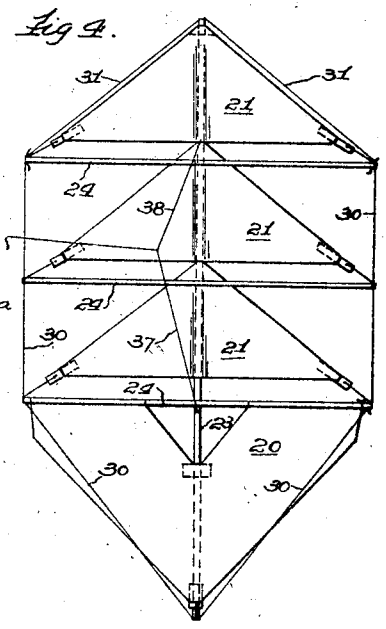


Fig 2.

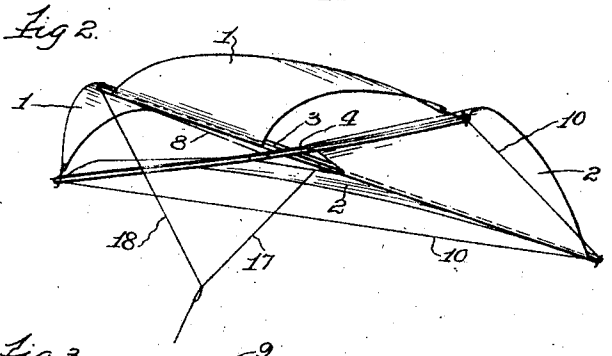
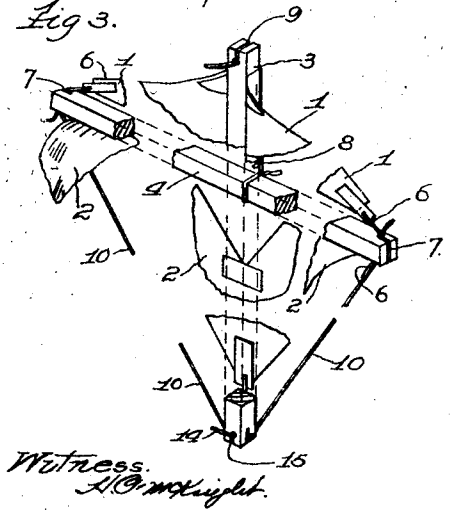
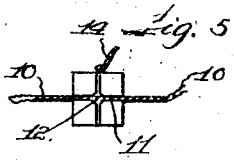


Fig 3.



Witness.
A. O. McKnight.

Fig. 5.



Inventor.
Conrad Dahl.
by Brown & Brown
his Attorneys.

Patented June 21, 1927. 1,632,822

UNITED STATES PATENT OFFICE.

CONRAD DAHL, OF SPRINGFIELD, OHIO, ASSIGNOR TO ROBERT N. BURTON, OF CHICAGO, ILLINOIS.

SELF-BALANCING KITE.

Application filed July 17, 1926. Serial No. 123,118.

The purpose of this invention is to provide a kite of relatively, simple and economical construction in which the parts are connected together with sufficient flexibilty to permit an automatic adjustment to the wind pressure upon them for maintaining a proper balance so that the kite will fly steadily and without the use of a tail or other ballast. The invention consists of certain features and elements of construction in combination, and herein shown and described, and as indicated by the claims.

In the drawing:

Figure 1 is a bottom plan view of a kite embodying this invention.

Figure 2 is a perspective view of the kite in the position which it assumes in flight.

Figure 3 is a perspective view with portions of the sails and other parts broken away for the purpose of revealing certain details of the frame construction.

Figure 4 is a plan view similar to Figure 1 showing a modified form of the invention.

Figure 5 is a detail view looking directly at the lower end of the midrib.

As shown in the drawings this kite comprises a head sail 1 and a main sail 2 which are supported upon two frame members, a midrib 3 and a cross arm 4. The head sail 1 is in the form of an isosceles triangle having the opposite ends of its base line 5 anchored to the ends of the cross arm 4 by strings 6 which are knotted and slipped through slots 7 in the ends of the cross arm as shown in Figure 3. Along its median line the head sail 1 is glued to the midrib 3 so that the apex of the triangle 1 extends adjacent one end of the midrib.

From the middle of the cross arm 4 a guy string 8 is stretched to the end of the midrib where it is engaged in a slot 9, a knot in the end portion of the string serving to hold it in tension. From opposite ends of the cross arm 4 guy strings 10 extend to the other end of the midrib 3 and preferably, these strings 10 are integral, with a knot tied at the middle of the length of the string where it will normally engage in the slot 11 in the end of the midrib 3. A hole 12 is bored into the stick in the end to form an enlarged recess or pocket in the slot 11 to receive the knot and ordinarily this positioning of the knot will hold the parts in proper balance; but if this should prove not to be the case the knot in the string 10 may be shifted to one side or the other of the midrib 3 so as to alter the tension in the two halves of the string to compensate for any inequality of the other parts. It will thus be seen that the cross arm 4 is held by the tension of the guy string 8 and the guy strings 10, but is not itself actually attached to the midrib 3, and within a limited range may shift across the midrib in response to wind pressure on the main sail. The main sail 2 is approximately of the form of an isosceles triangle, but to give the sail the desired fullness so that it may pocket the wind to a certain extent the base line of the triangle is not perfectly straight but is cut as indicated by the dotted line 13 in Figure 1. The sail 2 is then secured to the cross arm 4 by gluing this base edge to the cross arm and is held in position on the kite frame by a short string 14 extending from the apex of the sail through a cross slot 15 in the same end of the midrib 3 in which the guy strings 10 are fastened. The sides of the main sail 2 also deviate from the outline of a true triangle at the points 13^a whereby they are given some added length which allows of the curving of the sail away from a true plane. The triangular gore 16 is cut out of the sail 2 at the middle of its base line leaving a portion of the midrib exposed so that one branch 17 of the divided leading string may pass through this gore of the sail for attachment to the midrib 3. The other branch 18 of the leading string is anchored in the slot 9 at the head end of the midrib.

Viewed from the underside of the kite the main sail 2 is pressed upwardly against the midrib at the median line of the sail and swells upwardly at its outer edges so as to form pockets which are warped surfaces in which the wind is caught and deflected so that it slides laterally away from the midrib. The head sail 1 is also designed to permit of some fullness so that it curves upwardly away from the midrib as seen in Figure 2. The main sail, however, may slide laterally over the midrib in adjusting itself to the wind pressure so that the two halves of the main sail are in balance,—carrying the cross arm 2 with them in this lateral adjustment.

The construction described permits the kite to be quickly knocked down for shipment

or storage as each of the strings engaging the slotted ends of the two sticks is simply held in place by the tension of the assembly, —the strings being knotted near their ends to prevent them slipping through the slots under this tension. It is thus a simple matter to remove the strings from the slots for disconnecting the parts from each other. The head sail 1 which is permanently attached to the upper end portion of the midrib may be rolled up around it and the main sail 2 may also be rolled loosely about the cross arm 4. The cross arm is wholly disconnected from the midrib by removing the string 8 from the slot 9 and disengaging the string 18 from said slot so that it may be drawn through the gore 16 clear of the sail 2 and its cross arm 4. The various guy strings are easily wrapped about the sticks so that the whole kite may be contained in a package whose length is that of the midrib 3 and whose diameter is only one or two inches.

When the kite has been re-assembled and tested in flight it may be necessary to make a slight adjustment in the knot of the string 10. If the kite tends to fly or tilt toward the right (as viewed from head sail end) the center knot in the guy string 10 is lifted out of the hole 12 and shifted to the right side of the slot 11. If the kite tilts toward the left the string is adjusted in the opposite direction. The slight change will compensate for practically any inequality in the parts although it is obvious if any greater alteration were required the knot itself could be loosened and shifted slightly along the string 10.

In Figure 4 I have shown a slightly modified form of the invention in which there are three head sails 21 each similar in shape to the head sail 1 of Figure 1 and arranged in tandem upon an elongated midrib 23. Corresponding to each head sail I provide a cross arm 24 and steady these cross arms in position by extending the oblique kite strings 30 from the other end of the midrib 23 to engage the ends of all three cross arms 24. I then connect the upper-most cross arm 24 with the head end of the midrib 23 by oblique guy strings 31 so that the cross arms are free to slip laterally upon the midrib 23 as in the structure first described. The single main sail 20 is shown at the lower or rear end of the midrib and is attached to the nearest cross arm 24. The branches 37 and 38 of the leading string are attached to the midrib respectively adjacent to the main sail 20 and the base of the topmost head sail 21; and it will be understood that the position of attachment may be varied according to the number of sails employed. Obviously a kite of this construction will have greater pulling power than that shown in Figure 1 but the principle by which it maintains its proper balance in the air is the same.

I claim:—

1. A kite comprising a mid-rib and a cross arm unconnected at their adjacent portions, a head sail attached to the mid-rib, a main sail attached to the cross arm, ties connecting the opposite sides of the head sail to the opposite ends of the cross arm, guys extending from the ends of the cross arm to one end of the mid-rib and means connecting the main sail to said end of the mid-rib.

2. In a kite as defined in claim 1, said main sail extending under the mid-rib, but being unconnected thereto except at the end mentioned to permit said main sail to shift laterally under influence of the wind.

3. In a kite as defined in claim 1, the head sail being designed with fullness at both sides, so that it presents two concave surfaces to the wind at opposite sides of the mid-rib.

4. In a kite as defined in claim 1, said main sail being designed with fullness longitudinally of the mid-rib so that in the wind it bulges away from the plane formed by said mid-rib and cross arm.

5. In a kite as defined in claim 1, said main sail being cut with fullness longitudinally of the mid-rib, but lapping under the latter so that the wind forces said sail against the mid-rib at its medial portion while causing its edges to bulge away from the plane formed by the mid-rib and cross arm.

6. In a kite as defined in claim 1, the cross arm extending under the mid-rib and a branched leader string attached to the mid-rib at its forward end and at a point adjacent the cross arm.

7. A kite comprising a head sail and a main sail, each in the form of an isosceles triangle, a mid-rib and a cross arm unconnected at their adjacent portions with the base of the main sail attached to the cross arm, and the head sail adherently attached to the mid-rib along the axis of symmetry of said sail, the head sail having its lateral points anchored to the ends of the cross arm, and the main sail having its vertex anchored to one end of the mid-rib.

8. In a kite comprising two sails and two frame sticks, said sticks being arranged transversely of each other, but unconnected at their adjacent portions, one sail being attached to one stick along a line of substantial length and having its corners opposite said line anchored to the ends of the other stick, and the other sail being attached to said other stick along a line of substantial length with an opposite portion of the sail connected to the first mentioned stick.

9. In the combination defined in claim 7, said main sail having a triangular opening at its middle portion adjacent the base, said

opening having a vertex adjacent the mid-rib.

10. In the combination defined in claim 7, said main sail having a triangular opening at its middle portion adjacent the base, said opening having a vertex adjacent the mid-rib, together with a branched leading string having one end attached to the end of the mid-rib adjacent the vertex of the head sail and its other branch attached to the mid-rib extending through the opening in the main sail.

11. A kite comprising a mid-rib and a cross arm, a head sail presenting triangular areas to the wind, each attached to the mid-rib along one side of the triangle, and having their opposite points attached to the cross arm with fullness between the points of attachment, and a triangular main sail secured to the cross arm along one side with its opposite corner attached to the mid-rib.

12. In the combination defined in claim 1, a hanger string connecting the middle of the cross arm to the other end of the mid-rib opposing the stress of said guys.

13. A kite comprising a frame which consists of a mid-rib and a cross arm transversely disposed with respect to each other and unconnected at their adjacent portions, a hanger string extending from one end of the mid-rib to the middle of the cross arm, and guy strings extending from the ends of the cross arm to the other end of the mid-rib, together with sails attached to the frame with fullness between their points of attachment, whereby the frame members and the sails can shift with respect to each other for balancing themselves under pressure of the wind.

14. In a kite, a frame comprising a mid-rib and a cross arm attached thereto by means of a hanger string extending from one end of the mid-rib to the middle of the cross arm, and guy strings from the ends of the cross arm to the other end of the mid-rib, whereby the cross arm is adapted to shift laterally over the mid-rib, and a sail attached at one end to the cross arm, and at the other end to the mid-rib, with fullness in its lateral margins, the middle portion of the sail overlying the mid-rib, but adapted to shift thereon.

CONRAD DAHL.