April 6, 1926. 1,579,473

C. DAHL

KITE STRUCTURE

Filed June 13, 1924

Fig. 1.

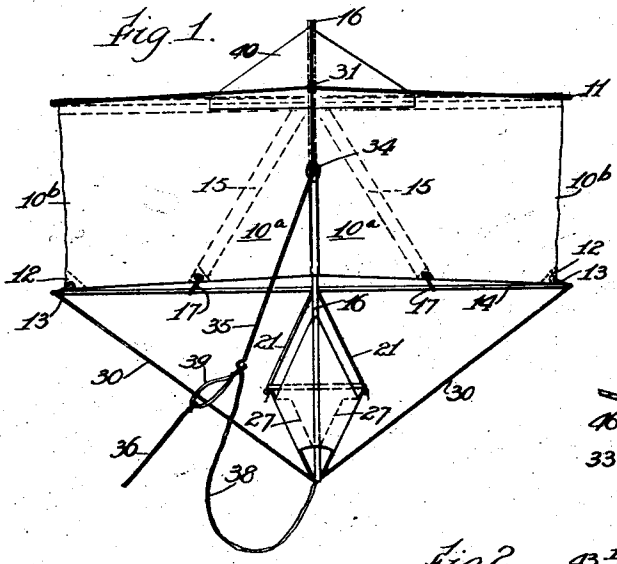
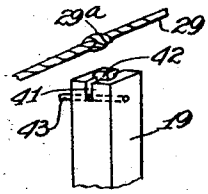


Fig 6



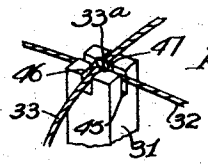


Fig 7.

Fig 2.

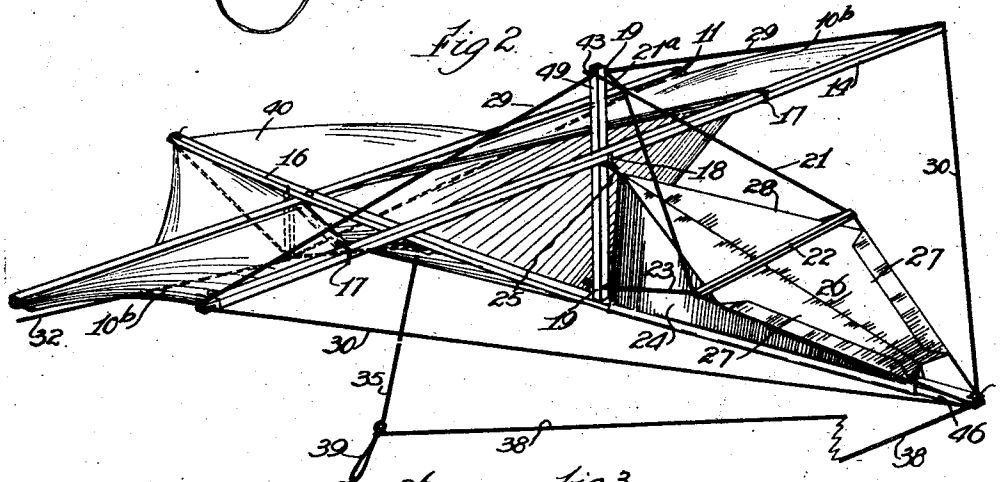


Fig 4.

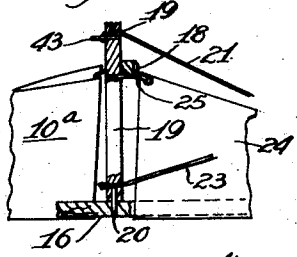


Fig 3

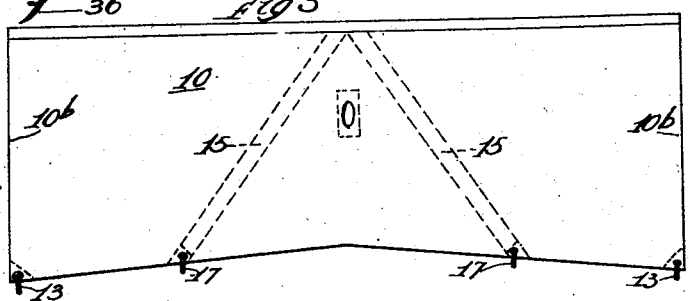
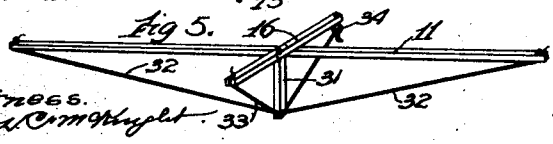


Fig 5.



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UNITED STATES PATENT OFFICE.

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KITE STRUCTURE.

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To all whom it may concern:

Be it known that I, CONRAD DAHL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Kite Structures, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved kite of sturdy construction and designed for maximum stability in the air; by virtue of certain features of construction this kite is adapted to be shipped in knock-down form and can be readily assembled by anyone with the aid of simple instructions. The invention consists in various features and elements of construction hereinafter described and shown in the drawings as particularly indicated by the claims.

In the drawings:—

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

Figure 2 is a perspective view in the nature of a ¾ rear elevation viewing the kite from above with respect to its approximate position during flight in the air.

Figure 3 is a plan view of the main sail showing its pattern or outline before attachment to the kite frame.

Figure 4 is a detail view partly in section showing the construction of the upright post which supports one of the cross arms and to which the rudder plane is attached.

Figure 5 is a detail perspective view showing the trussed construction for the forward cross arm.

Figure 6 is a detail perspective view of the upper end of the post shown in Figure 4.

Figure 7 is a detail perspective view of the outer end of the strut for the truss shown in Figure 5.

Referring first to Figure 1 it may be noted that the main sail, 10, is a unitary piece attached at its forward edge to the cross-arm, 11, and having its rear corners, 12, secured by loops of string, 13, to the opposite ends of a second cross arm, 14. Reenforcing strips, 15, of cloth or paper are gummed to the sail, 10, extending divergently thereon from a point adjacent the intersection of the mid-rib, 16, and the cross-arm, 11, thus forming tension members whose rear ends are connected by string loops, 17, to laterally separated points on the second cross-arm, 14. Figure 1, being a bottom plan view, indicates that the material of the sail, 10, is stretched against the under side of the mid-rib, 16, so that the triangular areas, 10^a, formed between the mid-rib and the tension strips, 15, lie in planes extending divergently upward from the mid-rib,—because the second cross-arm, 14, is spaced above said mid-rib, 16, by lodgment on an upwardly open hook, 18, carried by the post, 19, upstanding from the mid-rib and positioned thereon by a dowel pin, 20, as indicated in Figure 4. From the re-enforcing strips, 15, the material of the main sail, 10, extends laterally outward substantially to the ends of the cross-arms, 11 and 14, and preferably I make the lateral edges, 10^b, of the sail slightly longer than the normal distance between the ends of said cross-arms so as to give some fullness to these outwardly extending areas of the sail allowing it to pocket the wind to a certain extent by bulging upwardly as indicated in Figure 2. The pattern of the mainsail, 10, is clearly indicated in Figure 3.

The post, 19, is held in its upright position by the tension of the main sail pulling forwardly upon the cross-arm, 14, which laps against the rear face of the post,—and by the rearward tension of a double cord consisting of the strands, 21, 21, leading from the top of the post, 19, to the extreme rear end of the mid-rib, 16. About midway of their length the strands, 21, are held apart by a spreader stick, 22, and may be somewhat deflected downwardly at this point by the tension of cords, 23, extending forwardly and downwardly to an anchorage in the foot of the post, 19. A rudder plane, 24, is composed of a double thickness of material folded around the mid-rib, 16, and extending vertically upward for attachment of its forward upper corner to the hook, 18, by a string loop, 25. From this point the upper edge of the rudder plane slopes downward toward the rear end of the mid-rib, 16, being defined by creases, 26, at which the material of the plane, 24, is folded outwardly to form two wings, 27, of approximately triangular form whose outer edges are folded over the cords, 21, rearwardly of the spreader stick, 22. The forwardly converging edges, 28, of said planes meet in a

vertex closely adjacent the attaching loop, 25.

The post, 19, is additionally steadied by tension cords, 29, extending from the outer ends of the cross-arm, 14, over the top of the post and also by tension cords, 30, which extend rearwardly from the ends of the cross-arm, 14, around the rear end of the mid-rib, 16. The downward trend of the cord, 30, and the corresponding downward trend of the main sail, 10, in a forward direction oppose the upward tension of the cord, 29; but it will be seen that in a heavy wind the upward bulging of the sail, 10, may carry the cross arm, 14, upwardly a short distance along the post, 19. This allows the kite to accommodate itself to sudden or irregular wind pressure and to hold its position without any noticeable tendency to dive or pitch about in the air.

For use in a heavy wind I find it desirable to re-enforce the foward cross arm, 11, by means of a truss consisting of a strut, 31, extending downward from a point adjacent the intersection of the cross-arm with the mid-rib, 16, and notched at its lower end to receive a tension member, 32, extending to the outer ends of the cross arm, 11, and a second tension member, 33, extending from the forward end of the mid-rib, 16, and over the strut to a point on the mid-rib about the same distance rearwardly of the cross-arm, 11.

A convenient point for attachment of the string, 33, is the hook, 34, which forms a pivotal connection for a stiff wire leader, 35, by which the leading string, 36, is connected to the kite. The leader is somewhat less than half the length of the mid-rib, 16, and from an eye, 37, formed in its lower end a flexible tie string, 38, extends upwardly and rearwardly to a point on the mid-rib, preferably to the extreme rear end thereof. For convenience a part of this string, 38, is made into a loop, 39, adjacent the eye, 37, so that the leading string, 36, may be readily attached or detached from the kite.

The front end of the kite is properly balanced by providing a small triangular sail, 40, with its vertex attached to the forward end of the mid-rib, 16, and with its opposite edge secured permanently to the forward edge of the main sail, 10.

Figures 6 and 7 illustrate features of construction which permit me to make the kite so that it may be shipped in knock-down form and easily put together. As an example of this construction Figure 6 shows the upper end of the post, 19, having a saw slit, 41, cut down a short distance and a hole, 42, bored into the end of the post for the same depth. This allows the tension cord 29, to be dropped into the slot, 41, while a knot, 29^a, tied at the midpoint of the cord becomes engaged in the hole, 42, and thus prevents the cord slipping back and forth through the saw slit, 41. By driving a pin, 43, into the front face of the post and just below the depth of the slit, 41, I am able to use a loop, 21^a, at the forward end of the double cord, 21, and simply drop this loop around the upper end of the post, 19, for engagement therewith.

Figure 7 illustrates the lower end of the strut, 31, in which two saw slits, 45 and 46, respectively, are formed at right angles with a central hole, 47, at their intersection. This allows the tension members, 32 and 33, to cross in the hole, 47, and a knot such as that shown at 33^a, will definitely lock the tension member by engagement with said hole, 47.

As shown in other figures of the drawing the tension members which terminate at one of the slotted ends of a cross-arm or mid-rib are simply made with terminal knots which lodge against a face of the slotted member for locking the cords in the slots under tension.

I claim:

1. In a kite, the combination of a longitudinal mid-rib, a cross-arm secured thereto near the forward end, a second cross-arm positioned rearwardly of the first and spaced above the common plane of said first cross-arm and the mid-rib, tension members extending divergently from the first cross arm adjacent its intersection with the mid-rib to laterally spaced points on the second cross arm and a sail stretched in the triangular areas from the mid-rib divergently upward to said tension members and extending thence outwardly in the common plane of the cross arms.

2. In the combination defined in claim 1, the outer or lateral edges of the sail being longer than the normal distance between the ends of the respective cross arms to give fullness to the outwardly extending areas of the sail.

3. In the combination defined in claim 1, the mid-rib extending forwardly beyond its intersection with the first cross-arm and a triangular sail secured at its vertex to the forward end of the mid-rib and extending rearwardly for attachment to the forward edge of the other sail.

4. In a kite comprising a mid-rib and a pair of cross-arms supporting the sail, a relatively stiffer leader pivoted loosely to the mid-rib and extending downwardly therefrom, a leading string attached to the lower end of the leader and a flexible tie connecting said lower end of the leader to a point on the mid-rib rearward of the pivotal connection of the leader thereto.

5. In combination with a kite frame, a leader of relatively stiff material pivoted loosely to one of the frame sticks, a flexible tie extending from a point on the leader at a distance from its pivotal connection to a

point on the frame at a distance from said pivotal connection and a leader string extending from the lower end of said leader.

6. In a kite structure in combination with a mid-rib and an intersecting cross-arm supporting the sail, a truss for the cross-arm comprising a strut extending downwardly adjacent the intersection between the mid-rib and the cross-arm, a tension member passing over the strut upwardly and connected to points on the cross-arm at opposite sides of the mid-rib, and a second tension member passing over the strut upwardly, and connecting points on the mid-rib at opposite sides of the cross-arm.

7. In a kite the combination of a longitudinal mid-rib, a cross-arm secured thereto near the forward end, a second cross-arm positioned rearwardly of the first and spaced above the common plane of said first cross-arm and the mid-rib, a main sail supported by said cross-arm, a post up-standing from the mid-rib to support the second cross-arm, a double cord extending rearwardly from the upper part of the post to the rearward end portion of the mid-rib with a spreader stick interposed between its two strands at a point intermediate its ends, a rudder plane up-standing from the mid-rib with laterally extending wings folded outwardly in opposite directions from its upper edge lying in the inclined plane determined by said double cord and its spreader stick.

8. In the combination defined in claim 1, tension members extending rearwardly from the outer ends of the second cross-arm to the rear portion of the mid-rib.

9. In the combination defined in claim 1, tension means extending rearwardly from the second cross-arm to the rear portion of the mid-rib, a post up-standing from the mid-rib adjacent said cross-arm but unattached thereto and tie members extending from the outer ends of said cross-arm to a point on the post above said arm.

10. In the combination defined in claim 1, tension means extending rearwardly from the second cross arm to the rear portion of the mid-rib, a post upstanding from the mid-rib adjacent said cross arm but unattached thereto, an upwardly open hook on the face of the post adjacent the cross-arm extending under the latter, and a rudder plane up-standing from the mid-rib with its forward end connected to said hook.

11. In the combination defined in claim 1, said divergent tension members comprising re-enforcing strips secured to a face of the sail and the forward edge of the sail being attached throughout its length to the first cross-arm.

CONRAD DAHL.