

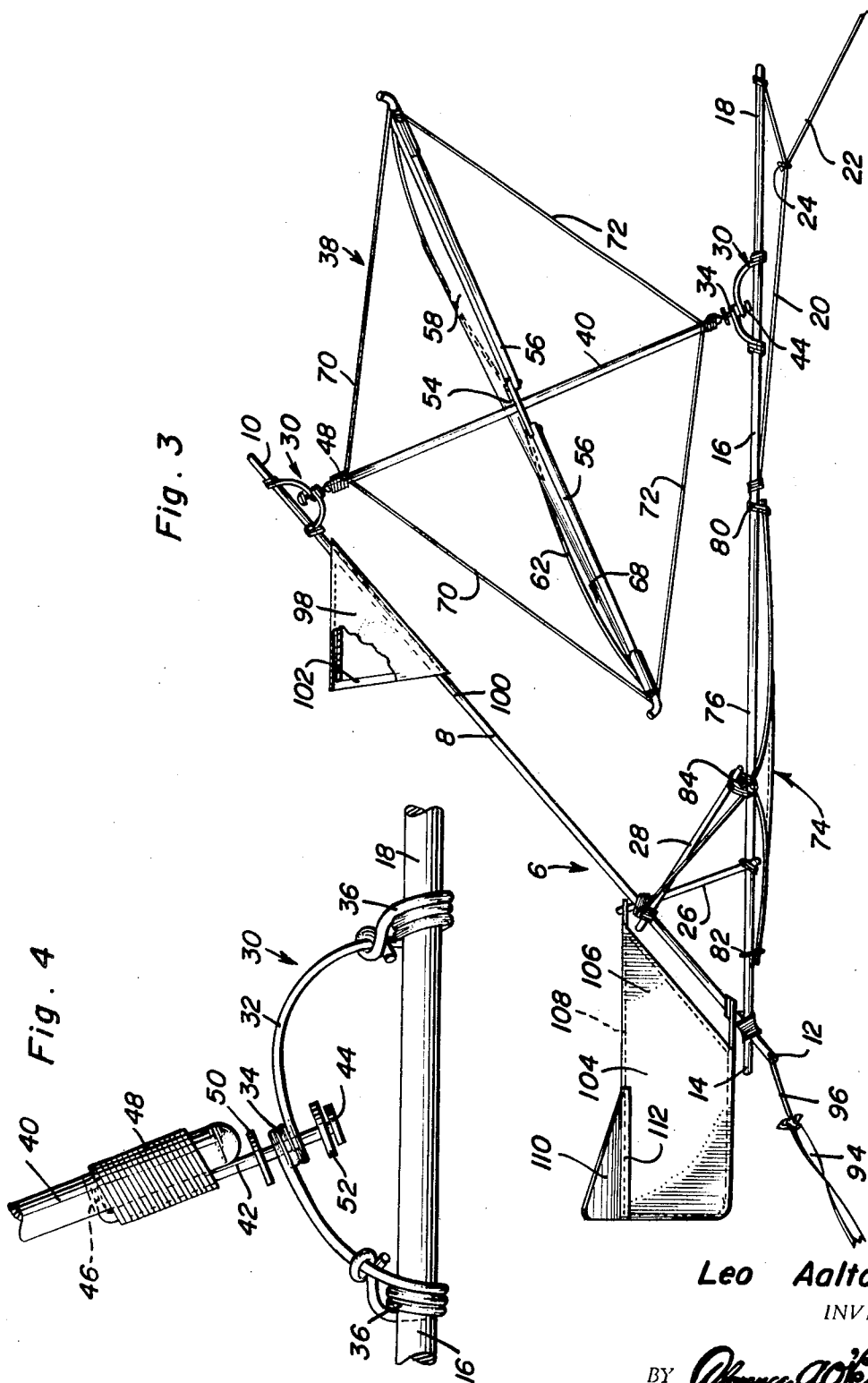
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TURBOCOPTER KITE

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TURBOCOPTER KITE

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10 Claims

ABSTRACT OF THE DISCLOSURE

A V-shaped yoke or frame is made of upper and lower bamboo or equally strong wooden rearwardly converging members. A first strut provides a rear brace. A second strut rigidifies a cross-stick or bow forming a part of a diamond-shape kite-like stabilizer which underlies and is carried by a median portion of the lower frame member. This wing-like stabilizer is situated forwardly of a tail-end fin-equipped steering rudder and rearwardly of a unique lifting rotor. This rotor functions as a helicopter, provides the chief support means and its shaft is oblique angled and is freely turnable in bearing brackets which are fastened to the free leading end portions of the respectively oriented frame members. In addition to a front fin and an optional tail the lower frame member is provided with a bridle to which the kite line is connected.

This invention relates to a line controlled captive kite which is an innovation in that it can be played out to a distant point of flight and can be flown at a height and is unique in that it embodies a helicopter-type lifting rotor, a frame therefor, and an underslung wing-type stabilizer which is braced and suspended from a median portion of the lower member of the frame.

Briefly, the frame is V-shaped and made up of a pair of bamboo or equivalent stout wooden sticks or frame members. The bottom frame stick, in FIG. 3 for example, is longer than the upper frame stick. A stabilizer is equally balanced and suspended beneath a rearward median portion of the lower frame member. This stabilizer resembles a diamond-shaped wing in plan, is marginally bound with a strengthening cord, wire or equivalent frame, has a cross-stick or bow secured between its ends to the lower frame member and resembles a deltoid kite. A lifting and supporting rotor is bracketed and mounted for free rotation between the space divergent leading ends of the frame members embodying an oblique angled shaft having spindles journaled for rotation in bearings carried by the mounting brackets. The chief component of the rotor is the pinwheel fixed to the median portion of the shaft and having triangular vanes with air circulating slots between adjacent coacting radial edges. Upper and lower guy wires are joined to the shaft and outer ends of the radial spokes, whereby to provide an air actuated helicopter. Steering rudders are mounted on forward and rearward end portions of the upper frame member for advantageously maneuvering the kite.

With further and more specific reference to the frame the chief component parts are the rearwardly diverging overlapping and connected sticks or frame members. Just forwardly of the vertex of the frame there is a first strut which is suitably joined to the frame members and which provides a reinforcing brace. There is a second strut adjacent the first strut which is arranged and inclines outwardly and downwardly and is anchored on the stabilizer, that is the cross-stick of the stabilizer in a manner to strengthen and keep the stabilizer as nearly undistorted as possible. The lower frame member provides not only a support for the wing-type stabilizer but also as an attaching member for the bridle to which the captive line is connected.

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The leading or forward end portions of the frame members are provided with substantially U-shaped brackets which are bent upon themselves to define bearings for headed spindles at the respective end portions of the rotor shaft. The rotor itself is made up of reliable and properly reinforced component parts and embodies suitably triangular vanes which are amply flexible to achieve the support result and driven air stream action needed.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a top plan view with portions broken away and appearing in section of a helicopter-type kite constructed in accordance with the principles of the present invention and readied for flight.

FIG. 2 is a front end view of the kite.

FIG. 3 is a view in side elevation of the kite as it would appear when aloft and in use.

FIG. 4 is an enlarged fragmentary detail view showing one of the aforementioned brackets and the manner in which the cooperating end of the shaft is provided with a spindle with the spindle journaled for rotation on the bracket.

All of the essential parts can be seen advantageously, it is believed, in FIGS. 3 and 4. The aforementioned V-shaped frame or yoke is denoted, as an entity, by the numeral 6. It comprises a straight suitably elongated upper stick or frame member 8 whose free leading end is denoted at 10 and whose rearward or trailing end is denoted at 12. The rearward end overlaps the corresponding rearward end 14 of the correspondingly straight but slightly longer lower frame member or stick 16. The forward end of the latter stick is denoted at 18. It is to this end portion that the suitably proportioned bridle 20 is connected. The captive and controlling line, usually referred to as the kite line, is denoted by the numeral 22 and is connected with the bridle at 24. The first relatively short strut is denoted by the numeral 26 and spans the crotch portion of the frame and has its ends suitably wrapped and connected with the upper and lower frame members 8 and 16. The second outwardly and downwardly angled strut or brace is denoted at 28 and functions in a manner to be described. The diverging free end portions 10 and 18 are provided inwardly of their respective ends with adapter brackets 30 and each bracket is of the construction detailed in FIG. 4 wherein it will be seen that it is formed from a length of wire which is curved and bent upon itself as at 32 and provided intermediate its ends with coils 34 defining a bearing. The end portions of the wire are coiled around the frame member and anchored in place as denoted generally at 36. Both brackets are the same in construction and one is attached to the upper frame member and the other one to the lower frame member as brought out in FIG. 3.

These brackets serve to properly locate and operatively mount the freely turnable lifting rotor which is denoted, generally speaking, by the numeral 38 in FIG. 3. This rotor embodies a wooden or an equivalent shaft 40 which spans the space between the ends 10 and 18 and is disposed at the desired oblique angle and is rotatively connected with the aforementioned brackets 30. As brought out in FIG. 4 a spindle is provided and, specifically speaking, comprises a simple nail 42 having a head 44 at the lower end and having its upper shank laterally directed at 46 and anchored in the wooden or equivalent shaft 40. The end portion can be held securely in place by an appropriately wrapped wire or cord 48. The journal portion is turnable in the bearing 34 and limit stop washers

may be provided at 50 and 52 if desired. The shaft 40 provides the main supporting member of the overall rotor and, generally stated, the propeller portion of the rotor resembles a pinwheel and comprises a hub 54 joined to the intermediate portion of the shaft and four circumferentially spaced spokes 56 having inner ends joined to the hub at circumferentially spaced places in any suitable manner. The complementary paper or sheet material vanes 58 (see FIG. 1) are substantially triangular and have outer marginal edges provided with hems which are attached to reinforcing cord means 60. Inward marginal edge portions are wrapped around or otherwise attached to the radial spokes. The remaining free marginal edge portions are denoted at 62 and the intermediate part is gathered at 64 and a patch or tab of paper or the like is secured thereto as at 66 on the top surface (FIG. 1) to provide the desired slight longitudinal curvature. By securing two edges of each vane and leaving the other edge free it will be seen that the respective free edges of the four vanes provide vertical air circulating and venting slots or openings 68. These four vertical vents, depending on the size thereof, establish the speed at which the rotor spins. For added strength and reliability upper guy wires are provided at 70 and are anchored in place as shown in FIG. 3. Similar lower guy wires are provided at 72.

Taking up now the aforementioned "horizontal" stabilizer this component is denoted by the numeral 74 in FIG. 3. As already mentioned it comprises a diamond-shaped wing which is sometimes referred to as resembling a deltoid-shape kite. This wing is made of paper, plastic or imperforate sheet material and is mounted on the median portion 76 of the lower frame member. The marginal edge portions are formed with suitable hems (not detailed) connected with bordering or marginally encompassing cord means 78 as brought out in FIG. 1. The forward and rearward ends are tied or suitably secured in place as at 80 and 82. The wing or sheet is centrally balanced beneath the lower frame member and is held in spread position by a cross-stick or bow 84 (FIG. 1) which has its intermediate portion secured to the lower frame member at 86. The end portions 88 are connected to corner portions of the sheet. This cross-stick can be straight or slightly bowed if desired and to achieve the end result desired a tensioning cord 90 (FIG. 1) is connected intermediate its ends to the aforementioned struts 26 and 28 and is connected at the outer ends as at 92 to end portions of the cross-stick 84. With reference again to the strut 28 it will be evident that the lower outer end thereof is attached to one end portion 88 as brought out in FIG. 1.

The optionally usable balancing cloth or nylon tail is denoted at 94 (FIGS. 1 and 3) and is suitably tied in place by a length of string as at 96.

The uppermost front rudder comprises a stiff outer piece of paper 98 having a smaller companion piece of paper 100 folded and fitted therein as shown in FIG. 3. This rudder 98 is also referred to herein as a fin. The rearward tail fin, also referred to as a steering rudder, is denoted at 104 and is of elongated form and made of paper or equivalent stock as at 106 and is mounted on a suitably shaped retaining frame 108. The frame members are mounted on the aforementioned frame 6 as shown at the right in FIG. 3. The left hand or rearward end portion of the rudder is provided with triangular outwardly and upwardly flaring fins 110 secured in place along the upper rearward edge portion as at 112.

It is also desirable in most instances to provide triangular corner flaps on the underneath side of the rotor and these flaps are best shown in FIG. 2. Each flap 112 is marginally secured in place along two edges and has a free edge 114 which provides a sort of a V-shaped pocket. This is an air pocket and experience has shown that the presence of these corner pockets on the rotor greatly facilitates the speed of rotation of said rotor.

It will be evident that the lifting rotor constructed as

herein shown and described constitutes a helicopter such as is used on certain aircraft and whose support in the air is derived chiefly from the reaction of a stream of air driven downward by one or more lifting rotors turning about upstanding axes.

It is a matter of common knowledge that maneuvering and getting a kite into the air and then keeping it aloft often depends on the skill of the person handling the line 22. Experience with the kite shown has revealed that the lift may be increased by pulling the string and tautening it in a manner to cause the kite to rise. Slackening the string will cause it to come down. However and as experience with kit flying has shown, and whether to use a tail or not and for other purposes, it is believed that it is not necessary here to dwell on the matter of using and controlling the kite but rather, to stress the construction and arrangement of the component parts and the manner in which they contribute their proportionate share to the over-all kite construction.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A high-flying kite comprising a frame embodying upper and lower frame members having forward ends spaced apart and rearward ends joined together, a stabilizer carried by a median portion of the lower frame member, an air actuated lifting rotor mounted for free whirling rotation between the forward ends of said frame members and situated forwardly of a forward marginal portion of said stabilizer, and a tail fin operatively mounted on the rearward end of the upper frame member and situated rearwardly of an associatively cooperable marginal portion of said stabilizer.

2. The kite defined in and according to claim 1, and wherein said frame is V-shaped in side elevation, said frame members having their rearward ends converging and secured together to provide a rigid vertex and having their forward ends diverging in a manner to support the rotor between free terminal end portions.

3. The kite defined in and according to claim 2, and wherein said stabilizer comprises a self-contained gliding kite which is small compared to said rotor and characterized by an imperforate sheet of flexible material attached to a tautened marginal encompassing string and having a complementary cross-stick at right angles to said lower frame member and having a median portion fastened to said lower frame member and outer ends connected to coacting corner portions of said flexible sheet.

4. The kite defined in and according to claim 3 and wherein said sheet of flexible material is diamond-shaped in plan and constitutes a wing, and, in combination, a first strut bridging and connected at its ends to coordinating converging ends of said frame members and providing a rigidifying brace.

5. The kite defined in and according to claim 3 and wherein said sheet of flexible material is diamond-shaped in plan and constitutes a wing, and, in combination, a first strut bridging and connected at its ends to coordinating converging ends of said frame members and providing a rigidifying brace, and a second strut having an upper end secured to a rearward end of said upper frame member and a lower end angled outwardly and downwardly from said upper frame member and anchored to one end of the aforementioned cross-stick.

6. The kite defined in and according to claim 2, and wherein said rotor comprises a shaft spanning the space between said forward ends and having its end portions journaled for idling rotation in bearings carried by the respective end portions, a hub mounted on a median por-

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tion of said shaft, circumferentially spaced spokes joined at inner ends to said hub and radiating outwardly and having string means interconnecting said outer ends, and air propelled rotor turning vanes having certain marginal edges connected to said spokes and string means, respectively, and other adjacent edges spaced to provide air venting slots.

7. A helicopter-type kite comprising a frame, said frame being V-shaped in side elevation and embodying upper and lower frame members having rearward ends converging and secured together and free forward ends spaced a predetermined distance apart, each forward end provided with a U-shaped adapter bracket having a bearing, a pinwheel-type lifting rotor comprising a free idling shaft spanning the space between said frame members and having spindles at its ends journaled and rotatable in their respective bearings, a hub mounted on the median portion of said shaft, a plurality of coplanar spokes having inward adjacent ends secured to said hub at equidistant circumferentially spaced points and radiating outwardly and having free ends oriented and tied together by a tautened encompassing cord, a plurality of companion triangular sheet material flexible turning vanes having certain marginal edges joined to coacting spokes and cord portions, respectively, and certain other edges unconnected and spaced apart to provide circumferentially spaced vertical air venting and circulating openings, a bridle carried by the forward end of the lower frame member, a captive kite flying and controlling line having an end connected to said bridle, a stabilizer generally parallel with and operatively mounted on said lower frame member in a plane below and rearwardly of the axis of said shaft, a tail rudder rearwardly of said stabilizer and having an upper portion provided with upwardly diverging fins, the leading end of said rudder being mounted atop a rearward end of said upper frame member, said rudder being in a plane at right angles to the plane of said stabilizer.

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8. The kite defined in and according to claim 7 and, in combination, a rudder-like fin mounted atop a forward end portion of said upper frame member and lined up, generally speaking, with the relatively rotatable vanes of said lifting rotor.

9. The kite defined in and according to claim 7, and wherein said stabilizer comprises a self-contained gliding kite which is small compared to said rotor and characterized by an imperforate sheet of flexible material attached to a tautened marginal encompassing string and having a complemental cross-stick at right angles to said lower frame member and having a median portion fastened to said lower frame member and outer ends connected to coacting corner portions of said flexible sheet.

10. The kite defined in and according to claim 8 and wherein said sheet of flexible material is diamond-shaped in plan and constitutes a wing, and, in combination, a first strut bridging and connected at its ends to coordinating converging ends of said frame members and providing a rigidifying brace, and a second strut having an upper end secured to a rearward end of said upper frame member and a lower end angled outwardly and downwardly from said upper frame member and anchored to one end of the aforementioned cross-stick

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