March 23, 1937. H. J. DE COURCY 2,074,327

KITE

Filed July 11, 1933 2 Sheets-Sheet 1

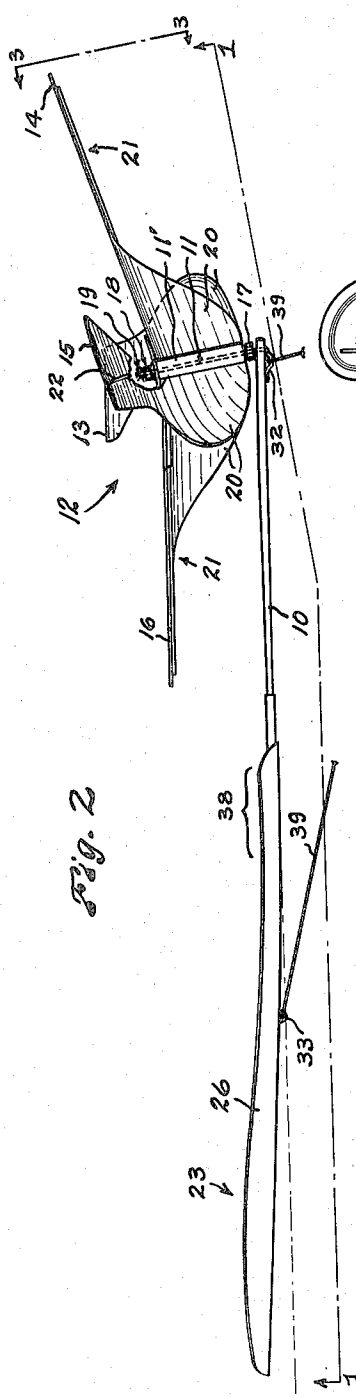

Fig. 2

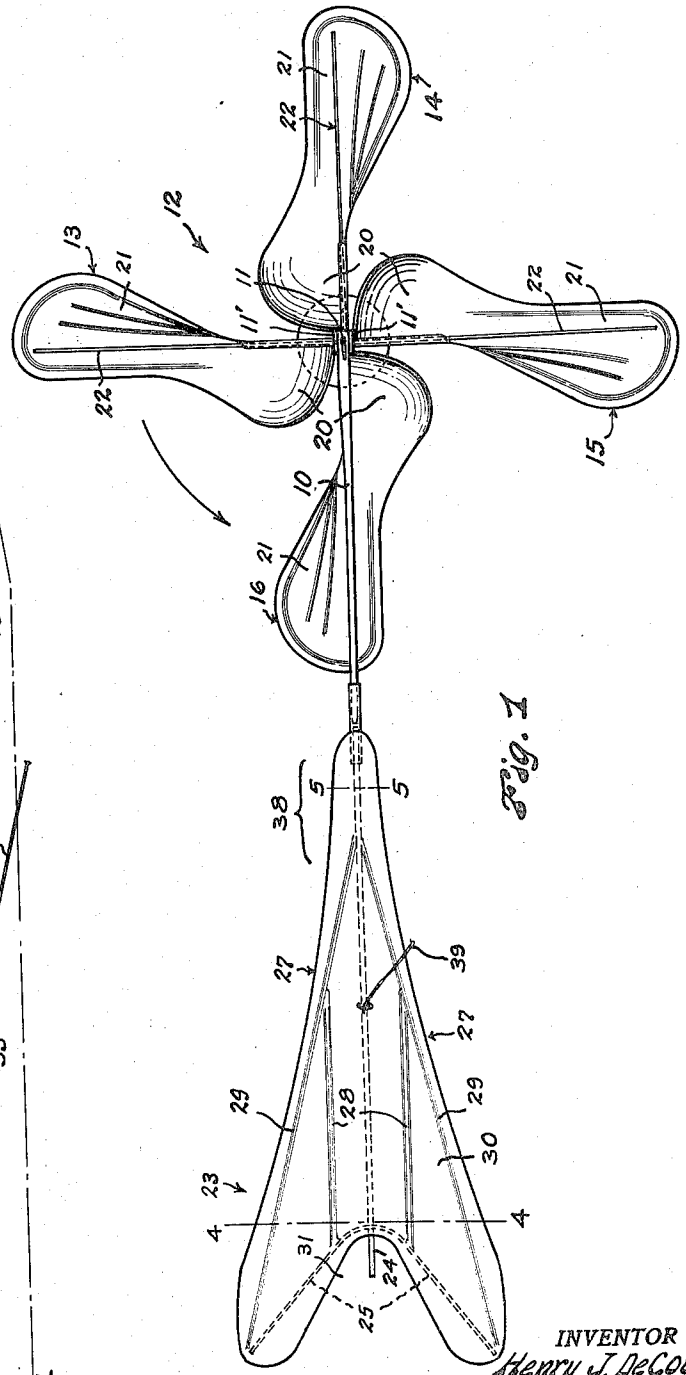

Fig. 1

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Filed July 11, 1933 2 Sheets-Sheet 2

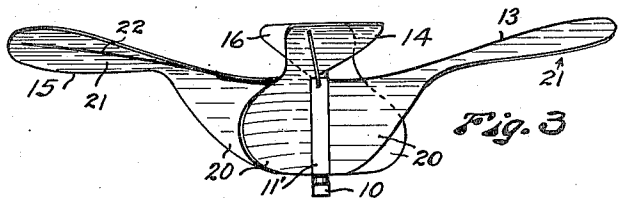

Fig. 3

Fig. 5

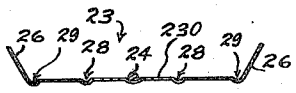

Fig. 4

Fig. 6

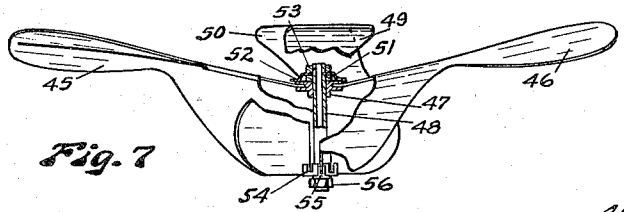

Fig. 7

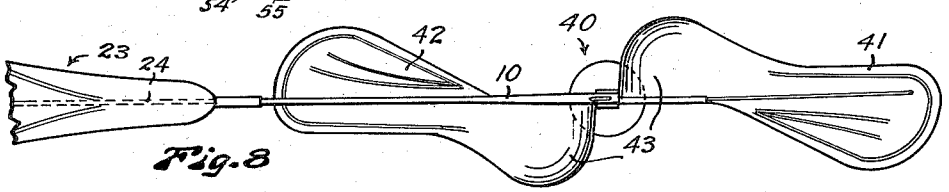

Fig. 8

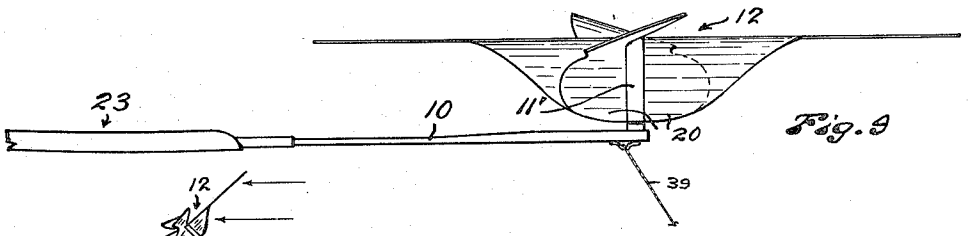

Fig. 9

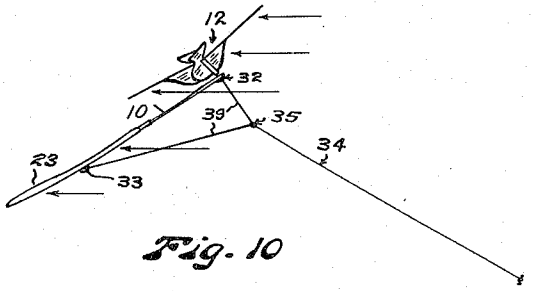

Fig. 10

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UNITED STATES PATENT OFFICE

2,074,327

KITE

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Application July 11, 1933, Serial No. 679,913

10 Claims. (Cl. 244—153)

My invention relates to the art of kites. More particularly, my invention relates to a kite characterized by having a rotating member mounted adjacent on one end of a stem, and an elevating stabilizing element secured to the other end of said stem.

Certain objections obtained to the usual kite as heretofore commonly constructed and used as a toy. When the wind pressure or air current increases beyond the point for which the bridle strings are adjusted, the kite is given to excessive darting, swaying or diving, which may lead to its being caught in wires and the kite string being broken, or to the kite being wrecked or damaged in other ways. In other words, to obtain a successful operation of the kite, it has been necessary to adjust the bridle strings according to the velocity of the wind in which the kite is flying. With this kite no such adjustment of the bridle strings for winds of different velocity is necessary. Moreover, the ordinary kite used as a toy has no movable means whose velocity varies with the velocity of the wind or air stream. Also, such kites heretofore commonly used as toys embody fixed surfaces, and when descending are out of control and fall with such force as to often cause them to be wrecked or damaged, in whole or in part.

A primary purpose of my invention is to provide a kite which will overcome these various disadvantages, and to provide a kite which will have a rotating member which functions as the sail means, or as a part of the sail means, and which also functions as a part of the elevating means.

Another primary purpose of my invention is to provide a kite having an elevating stabilizing element which cooperates with said rotating member. Furthermore, my kite will descend gracefully and gently to earth because of rotation of the rotating member and will not be damaged or wrecked as an ordinary kite may be.

Another primary object of my invention is to provide a kite capable of flying steadily and uniformly in winds of varying velocity without the usual kite tail appendage.

Another primary object of my invention is to provide a rotating member which adds to the amusement and enjoyment of the flyer of the kite, and which rotating member offers greater resistance to the wind due to its rotation, and such rotation affords greater lifting power to the kite.

Another primary object of my invention is to provide a kite with a rotating member, which rotating member is a useful and necessary member in the elevation and stabilization of the kite.

The above mentioned general objects of my invention, together with others inherent in the same, are attained by the devices illustrated in the following drawings, the same being preferred exemplary forms of embodiment of my invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a plan view of the underside of a kite embodying my invention;

Fig. 2 is a view in side elevation of the same;

Fig. 3 is a view in elevation substantially on broken line 3—3 of Fig. 2 showing the end of the mounting stem and the rotating member mounted thereon, and showing two of the blades provided with a pitch;

Fig. 4 is a cross sectional view of the elevating stabilizing element substantially on broken line 4—4 of Fig. 1;

Fig. 5 is a cross sectional view of the elevating stabilizing element substantially on broken line 5—5 of Fig. 1;

Fig. 6 is a plan view of the underside of the kite showing the elevating stabilizing element turned end for end and side for side, which may be its position when a flexible kite tail is used;

Fig. 7 is a view of a modified form of a rotating member embodying my invention, which rotating member is capable of having the blade elements superimposed in pairs for shipment;

Fig. 8 is a view of another modified form of a rotating member constructed with two blades;

Fig. 9 is a fragmentary view of a modified form of a rotating member and mounting means therefor; and

Fig. 10 is a somewhat diagrammatic view illustrating one position of the kite as it may appear in flight and the wind is shown by arrows.

On one end portion of a mounting stem 10, formed preferably of light weight, strong, material (I find seasoned pine very satisfactory), an axle 11 is fixedly secured substantially at an angle of 90°. In Fig. 2 the angle X between the mounting stem and axle is shown as slightly less than 90°, while in Fig. 9 it is indicated as at 90°. Upon this axle 11 a rotating member 12, which may have four blade elements 13, 14, 15, and 16 is revolvably mounted. The number of blade elements may be two or more. In Fig. 8, I have indicated two blades, while in the other views four blades are shown. However, four blade elements I have found to utilize very satisfactorily the ordinary wind pressure and provide the necessary said area. The material of these blade elements may be of various light weight materials having the proper strength. I have found this material may

be paper which may be treated to stiffen it and render it water resistant. Sleeves 17 and 18, or other friction reducing means may be provided, and a cotter pin like means 19 keeps the rotating member 12 upon the axle.

Blade elements 13 and 15 are paired, i. e., are similar in construction and function, while blade elements 14 and 16 are paired, i. e., are similar in construction and function. Each of the four blade elements are similar in having a turbine-vane form portion 20 and a sail portion 21. The turbine-vane form portions 20 are centrally disposed in the rotating member and constitute the part of said member which primarily develops the rotating force.

Each of the blade elements may have a rib member 22 which is mounted in hub 11' and acts as a supporting means for the blade. This rib member 22 may be mounted at such an angle, with respect to the axle, that it is parallel to stem 10 when turned to a position thereabove, (see Fig. 2). Such rib member may be also mounted at right angles as respects the hub 11' as shown in Fig. 9. The sail portions 21 of blade elements 14 and 16 are disposed in a plane at a right angle to the plane passing through the stem 10 and the axle 11. To simplify the description, the plane passing through the stem 10 at a right angle to the plane passing through the axle 11 and the stem 10 will be a horizontal plane in Fig. 2 and will be called the horizontal plane. Then, the sail portions 21 of blade elements 14 and 16 may be described as lying in a plane parallel to the horizontal plane when the said blades 14 and 16 are turned to a position above the stem 10, as shown in Fig. 2. On the other hand, the sail portions 21 of blade elements 13 and 15 preferably are provided with a pitch (see Figs. 2 and 3). The direction of the pitch is one that will cooperate with the turbine portion of the blade in turning the same. In other words, the forward edge relative to the direction of turning is lower. In actual operation, I find that satisfactory results are obtained with a pitch of 15 to 35°.

On the end portion of the mounting stem 10, removed from the rotating member, is fixedly mounted an elevating stabilizing element 23, preferably of the general form of a swallow tail. This may be formed with a central midrib 24 of light weight, flexible material and a V formed rear rib 25 which may be of similar material to the midrib, but preferably much smaller in diameter. Mounted on these ribs 24 and 25 is a stiffened paper, which may be of the same character of the material employed in making the blade elements. This elevating stabilizing element preferably has turned up marginal portions 26 and 27 (turned up with reference to the horizontal plane above defined when the stabilizing element is in the position shown in Figs. 1 to 5.) Also this elevating stabilizing element is preferably provided with stiffening corrugations 28 and creases 29. The V shaped opening 31 in the stabilizing element seems to aid the kite in overcoming swaying and darting which is common in the operation of kites of ordinary construction commonly used as toys. The edges 26 and 27 are preferably curved to permit of the adjustment of the convexed curve of the midrib 24 and stabilizing element 23. The midrib 24 is convexed or curved upwardly with respect to the said horizontal plane, see Fig. 2. Since the face of the elevating stabilizing element 23 has this angle, with respect to the axis of the mounting stem 10, the said element operates as an elevating means in conjunction with the air stream, after the manner similar to kites in general.

The bridle string 39 is secured to the mounting stem 10 at 32, and to the elevating stabilizing element 23 at 33, see Fig. 10. The string 34 of the kite is secured by a knot at the point 35 to the bridle string, and this is a knot that may be initially adjusted lengthwise of the bridle string.

My experience, so far, has shown that when the wind exceeds a moderate velocity, it is advantageous to utilize a flexible kite tail, and when this is employed, the elevating stabilizing element may be reversed in position, see Fig. 6, with the V shaped end portion forwardly positioned, and the flexible kite tail 36 may be secured to the end 37 of the elevating stabilizing element, as shown in Fig. 6.

The reversing of the position of the elevating stabilizing element as just described, when the tail is attached, seems to provide for a better distribution of the weight of the kite.

In Fig. 8, I have shown a kite having a rotating member 40 which has two blades 41 and 42, instead of four blades as described in connection with the preceding figures. These blades 41 and 42 have turbine like central portions 43, and the outer portions of said blades preferably have a pitch corresponding in direction to the pitch of the turbine like portions 43. In other words, they correspond to the blades 13 and 15 of Figs. 1, 2, and 3.

The mode of operation of the kite embodying my invention is as follows: The side of the rotating member on which the turbine-vane like portions 20 of the blade elements are disposed may be called the front or under side, that is, the side against which the air stream or wind impinges. As the air stream presses against the turbine-vane like portions of the blade elements, the rotating member is caused to revolve. The sail end portions of revolving blades 14 and 16 form a sail like or supporting element for the kite. The sail end portions 21, of pitched blades 13 and 15 also provide a sail like or supporting element, and further seem to provide a stabilizing means for the kite.

In practice with two blades pitched and two flat, as shown in Figs. 1 to 3, the kite leaves the ground easier, with winds of varying velocities, than with all blades flat, and flies with a better balance in a wind of light velocity than with all blades flat. Various theories may be set forth explaining why the pitching of two blades and the positioning of two flat improves the practical operation of my kite, but whatever the theory may be the above sets forth actual results.

By pinching the portion 38 (see Figs. 1 and 2) of the elevating stabilizing element 23, the convexity of the curve of the midrib 24 is increased. The stiffness of the paper, combined with the curved form of the marginal edge of the elevating stabilizing element 23 makes possible this adjustment of the degree of convexity to provide the necessary elevating effect of the element for initially adjusting the same.

Referring to Fig. 10, it will be noted that the wind pressure is on the under side of all the blades. The wind thereby causes a lifting action on the top of the blades and maintains the kite in the air. Also the rotation of the member 12 seems to augment the lifting action of the air stream on the kite.

In the operation of the kite using the two bladed rotating member shown in Fig. 8, the blades are preferably pitched as shown. This

kite is slightly less stable in the air and requires somewhat more wind to fly successfully.

The effect of the rotating member of the kite when in flight provides a most pleasing and interesting spectacle, so that the toy has the appearance of a power-driven device, which greatly enhances its interest as a toy. Also the effect of this rotating member will stimulate the interest of the younger generation in aeronautics. Furthermore, the vibration of the rotating member is carried down the string and can be readily felt by the person flying the kite. Also certain noise or roar results from the rotation of this member. This vibration and roar results in a feeling of life and greatly increases the amusement obtained in flying the kite.

In practice, I have found that satisfactory results obtain if the total effective lifting areas of the rotating member and the stabilizing elevating member are substantially equal. This ratio was substantially obtained in practice in a kite embodying my invention, which had a total surface area in the rotating member equal to about 44 square inches, with the total surface area of the elevating stabilizing element equal to about 28 square inches. The diameter of the propeller of this device was about 12 inches, and the total weight of the device was about ½ ounce.

Fig. 7 is a fragmentary view partly in elevation and partly in section showing a rotating member in which the blades are arranged in pairs and may be folded in superimposed relation to occupy less space in shipment. In Fig. 7 one pair of blades **45** and **46** have their ribs secured to a clip **47** which is preferably fixedly secured to a tubular post **48**. The other pair of blades **49** and **50** have their ribs secured to another clip **51** which is rotatably mounted on tubular post **48** and rests on top of the clip **47**. A clamping member **52** held by a nut **53** may be used to hold the clip **51** at right angles to the clip **47** when the blades are in operative position for flying. The bottom extremities of the turbine-vane portions of the pair of blades **45** and **46** may be secured to a fixed clip **54** on the lower end of the post **48** and the turbine-vane portions of the pair of blades **49** and **50** is secured to a clip **55** which is rotatably mounted on post **48** in engagement with the clip **54**. A nut **56** on the bottom end of the post **48** may be used to secure the two clips **54** and **55** at right angles to each other when the blades are in position for flying.

The two pairs of blades may be folded so that they lie parallel one on top of the other for packing when the nuts **53** and **56** are loosened and may be held at right angles to each other for flying by the clamping action of the nuts.

Obviously, changes may be made in the forms, dimensions, and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. A kite embodying a mounting stem; a rotating member having four blades, two of said blades functioning as a sail means, and two of said blades functioning as a stabilizing means; and mounting means for said rotating member secured to said stem.

2. A kite embodying a mounting stem; a rotating member having blade elements, a part of which function as a sail means, and a part of which function as a stabilizing means; mounting means for said rotating member secured adjacent one end portion of said stem; and an elevating stabilizing element disposed on the other end portion of said stem.

3. A kite embodying a mounting stem; a rotating member having blade elements, a part of which function as a sail means, and a part of which function as a stabilizing means; mounting means for said rotating member secured adjacent one end portion of said stem; and an elevating stabilizing element disposed on the other end portion of said stem, said elevating stabilizing element having means whereby the same may be adjusted to the axis of said mounting stem.

4. A kite embodying a mounting stem; and a rotating member having blade elements, the centrally disposed portions of said blade elements being of a turbine-vane form, and the outer extremity of said blade elements, as respects some of the blades, being flat and, as respects other blades, being pitched and mounting means for said rotating member secured to said stem.

5. A kite embodying a mounting stem; a rotating member having blade elements, the centrally disposed portions of said blade elements being of a turbine-vane form, and the outer extremity of said blade elements, as respects some of the blades, being flat and, as respects other blades, being pitched and mounting means for said rotating member secured to said stem; and an elevating stabilizing element disposed on the other end portion of said stem.

6. A kite embodying a mounting stem; a rotating member having blade elements, the centrally disposed portions of said blade elements being of a turbine-vane form, and the outer extremity of said blade elements, as respects some of the blades, being flat and, as respects other blades, being pitched and mounting means for said rotating member secured to said stem; and an elevating stabilizing element disposed on the other end portion of said stem, the effective lifting area of which elevating stabilizing element is substantially equal to the combined effective lifting area of the rotating member.

7. A kite embodying a longitudinally curved flexible elevating stabilizing element having longitudinally disposed diverging marginal edges lying in a plane substantially at right angles to the abutting plane of the face of the stabilizing element; a crease extending substantially along the line of juncture of said marginal edges with the face of the stabilizing element and kite string engaging means secured intermediate the length of the elevating stabilizing element, whereby wind pressure will flex said flexible elevating stabilizing element and vary the longitudinal curve thereof.

8. A kite embodying a mounting stem; rotating member mounting means secured adjacent one end portion of said stem and directed upwardly from said stem; kite string means connected with the same end portion of said mounting stem; a rotating member on said mounting means positioned above said mounting stem, said rotating member having means cooperating with passing air for rotating said rotating member and having blade elements functioning as the sail means for the kite; and an elevating stabilizing element disposed on the other end portion of said stem.

9. A kite embodying a mounting stem; rotating member mounting means secured adjacent one end portion of said stem and directed upwardly from said stem; kite string means connected with the same end portion of said mounting stem; a rotating member on said mounting means po-

sitioned above and in a plane intersecting at a slight angle the plane of said mounting stem, said rotating member having means cooperating with passing air for rotating said rotating member and having blade elements functioning as the said means for the kite; and an elevating stabilizing element disposed on the other end portion of said stem.

10. A kite embodying a mounting stem; rotating member mounting means secured adjacent one end portion of said stem and positioned at an angle of substantially 90° to said stem; kite string means connected with the same end portion of said mounting stem; a rotating member on said mounting means positioned in a plane substantially parallel to the mounting stem, said rotating member having means cooperating with passing air for rotating said rotating member and having blade elements functioning as the sail means for the kite; and an elevating stabilizing element disposed on the other end portion of said stem.

HENRY J. DE COURCY.