March 21, 1939. S. FROMME 2,151,349

KITE

Filed Oct. 22, 1937 2 Sheets-Sheet 1

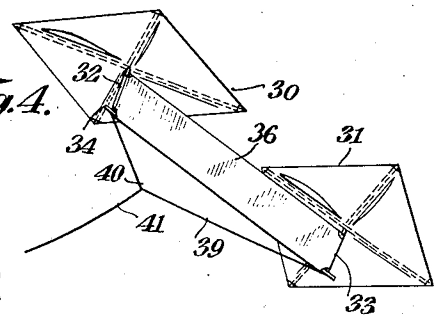

Fig. 4.

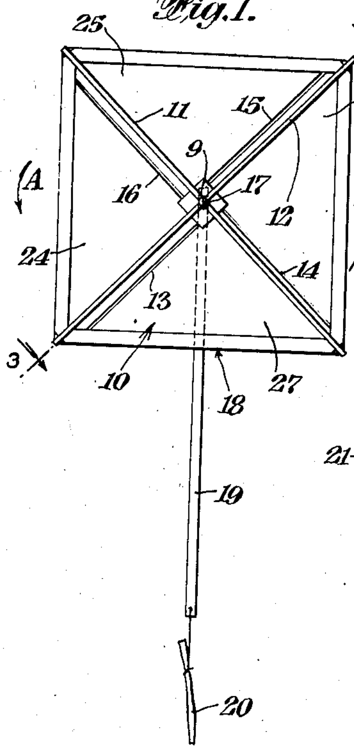

Fig. 1.

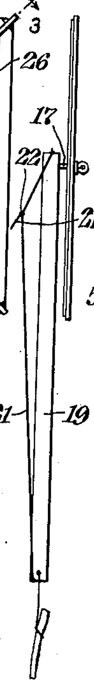

Fig. 2.

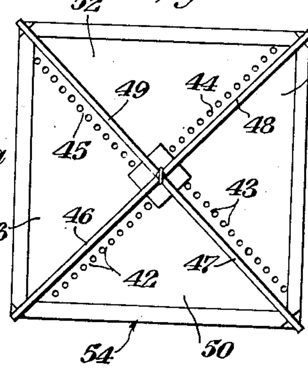

Fig. 6.

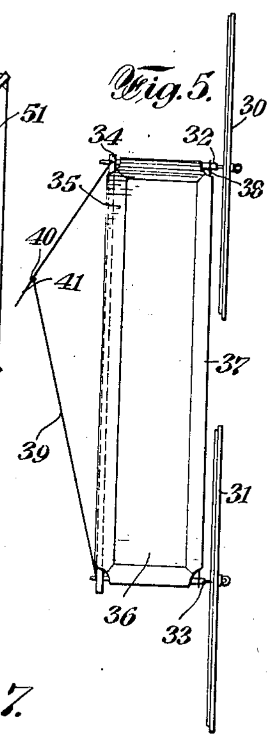

Fig. 5.

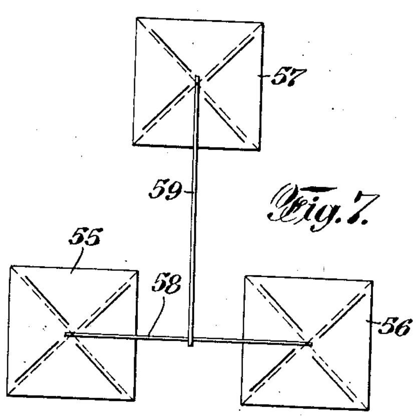

Fig. 7.

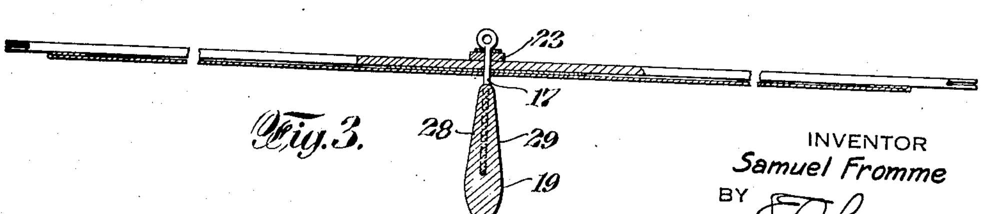

Fig. 3.

INVENTOR
Samuel Fromme
BY
[signature]
ATTORNEY

March 21, 1939. S. FROMME 2,151,349

KITE

Filed Oct. 22, 1937 2 Sheets-Sheet 2

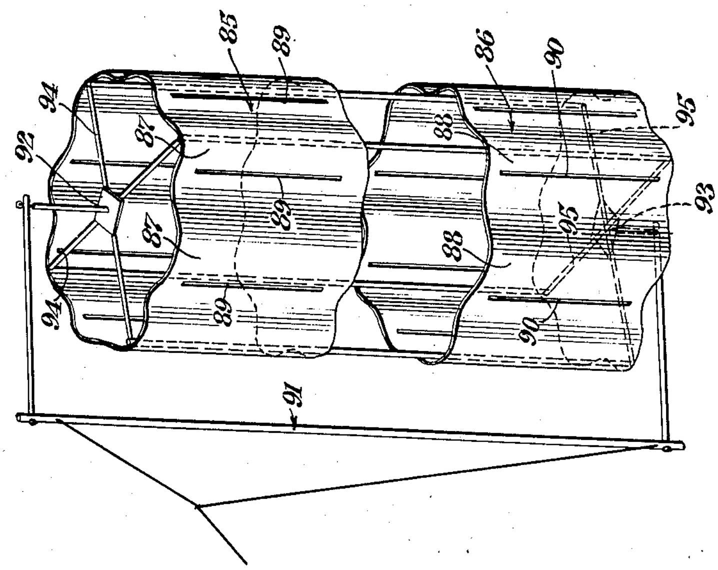

Fig. 9.

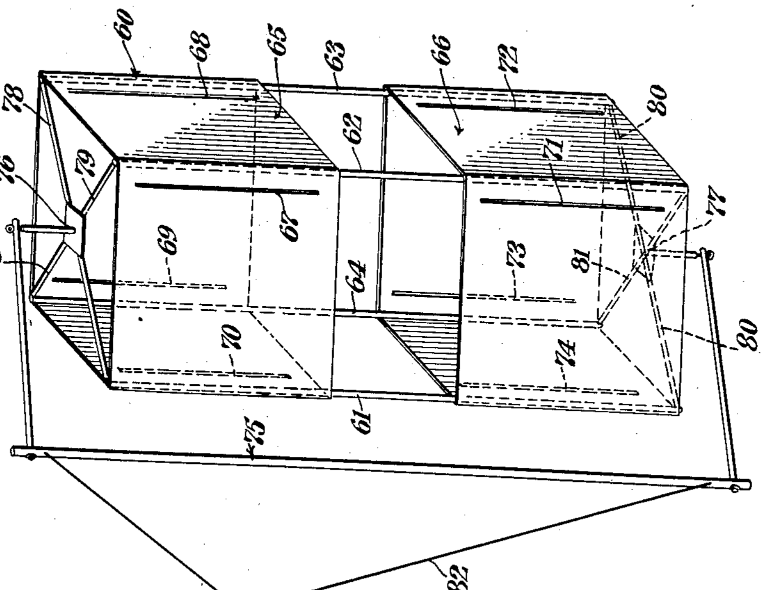

Fig. 8.

INVENTOR
Samuel Fromme
BY [signature]
ATTORNEY

Patented Mar. 21, 1939

2,151,349

UNITED STATES PATENT OFFICE

2,151,349

KITE

Samuel Fromme, Brooklyn, N. Y.

Application October 22, 1937, Serial No. 170,323

9 Claims. (Cl. 244—153)

This invention relates to kites, particularly of the type containing a rotatable element therein.

The common variety of kite generally contains one or more stationary or non-rotatable wind receiving surfaces, although cognizance is taken of certain kite structures containing a stationary body portion to which is attached an independent pin-wheel or fan-like element that is caused to rotate by the wind action while the kite is in flight. It is within the contemplation of this invention to provide a kite structure wherein one or more of the main wind receiving surfaces are rotatable, thereby producing an animated effect. With a structure of this kind it is obviously possible, by employing rotor elements of various configurations, or having the rotor elements contain various predetermined designs thereon, to produce attractive effects while the kite is in motion.

It is another object of this invention to enable the rotor of a kite of the aforesaid type to be rotatable at different speeds, thereby enabling various animated effects to be obtained for each different speed.

Another object of this invention is to provide a kite with stabilizing means whereby a balanced and steady flight thereof can at all times be effected.

It is also within the contemplation of this invention to enable certain of the elements thereof to be so combined as to present the appearance of an aeroplane, helicopter, autogyro, or other flying machine,—another object of this aspect of my invention being to enable various combinations of rotatable and stationary elements to be readily made.

And still another object of this invention is to enable the rotatable elements thereof to be readily applied either to the conventional flat type of kite or various forms of box kites.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a rear view of one form of my invention containing a single rotor element.

Figure 2 is a side view of Figure 1.

Figure 3 is a diagonal section of Figure 1 taken along line 3—3.

Figure 4 is a perspective showing a modified form of this invention in flight, two rotors and a special type of stabilizing element being illustrated.

Figure 5 is an enlarged side view of the structure of Figure 4.

Figure 6 is a rear view of a modified form of rotor substantially similar in general construction to that shown in Figure 1.

Figure 7 is a plan view of my invention embodied in a structure containing three rotors.

Figure 8 is a perspective of a box type of kite containing certain features of my invention, and

Figure 9 is a perspective of another form of box kite, of cylindrical construction, also containing certain features of my invention.

In the drawings and particularly in Figure 1 thereof, the wind receiving surface 10 consists of a square sheet of paper or fabric suitably supported by diagonal braces 11 and 12. The sheet 10 contains, in the form illustrated, slits 13, 14, 15 and 16, preferably adjacent the said braces. Suitably mounted at the intersection 9 of the braces 11 and 12 is the support or pin 17 extending transversely therethrough, the entire rotor 18 being rotatable upon the shank of said pin. Attached to the shank of the said pin, and in spaced relation to the rotor 18, is the stabilizer 19 which may, if desired, have attached to the lowermost extremity thereof, the tail 20. The "belly" band 21, extending longitudinally of the stabilizer 19, is attached to the extremities thereof; and at a selected point 22 thereon, the string 21a held by the person flying the kite is suitably attached.

It will be noted that in the preferred form, particularly as illustrated in Figure 3, the stabilizer 19 is of streamlined effect, tapering inwardly towards the rotor to a reduced thickness. The said pin or support 17 may be an eye bolt extending through a block 23 suitably attached at the intersection of the braces 11 and 12, and extending into and being in threaded engagement with the stabilizer 19.

In the operation of this invention, the kite is given an initial elevation by exposing it to the wind or running a short distance to cause the air to strike the surface 10,—the string being let out in the usual manner. As the air currents strike the said surface 10, portions of the air impinging thereagainst will pass through the slits 13, 14, 15 and 16, thereby causing a slight rearward deflection of the sections 24, 25, 26 and 27 of the surface 10, the greatset deflection obviously taking place at the region of each slit. This produces a vane-like or propeller effect, creating a sufficient pitch to each one of the said sections 24, 25, 26 and 27 to cause a rotation of rotor 18 as indicated by the arrow A. This is obviously caused by the fact that certain portions of the air currents directed substantially normal to the rotor strike the rearwardly deflected sections 24, 25, 26 and 27 at a slight angle, thereby producing components of force which will cause a rotation. The rotating effect is also produced by the reaction caused by those portions of the air passing through said slits 13, 14, 15 and 16, in a manner similar to the operation of a reaction turbine.

The stabilizing element 19, which preferably extends considerably below the lowermost extremity of the rotor, is engaged by currents of air at both of the sides 28 and 29 thereof, so that it will remain substantially in one vertical plane at all times, there being an equal distribution of pressure on both sides thereof. Should the pressure on one side be momentarily greater than on the other, the direction of the kite will adjust itself by the rudder action of the stabilizer, thereby maintaining an equilibrium and a balancing effect. It is of course understood that the streamlined configuration of the stabilizer 19 reduces wind resistance and is a preferred, though not necessary, design. The tail 20 may be employed if it is desired to give greater stability to the kite, although it may be dispensed with, if desired, without materially affecting the operation of the kite.

It is obvious that by changing the dimension or shape of the rotor, or the position and size of the slits 13, 14, 15 and 16, different rates of speed can be obtained, inasmuch as the pitch and surface of the sections 24, 25, 26 and 27 of surface 10 will be correspondingly changed. The variations in speed will obviously produce different animated effects depending upon the shape of the rotor and the designs thereon. It is also understood that by varying the position of point 22, to which the string held by the kite flyer is attached, the angular disposition of the kite can be varied accordingly.

Instead of employing a single rotor, several rotors similar in structure to that shown in Figure 1 can be embodied in the structure. For example, by referring to Figure 4, two of such rotors 30 and 31 are employed in a kite, the general construction being substantially similar, though not identical, with the structure of Figure 1. As is clearly illustrated in Figure 5, instead of employing a single support or pin such as 17 of Figure 1, two such supports 32 and 33 respectively are used, the rotors 30 and 31 being rotatably mounted thereon. The stabilizer is of slightly modified form, although similar in principle to the form hereinabove described. A longitudinal member 34 is suitably attached to the extremities of pins 32 and 33 remote from the rotors, the said member 34 preferably extending through a pocket 35 in the flexible stabilizer 36 made of paper or other suitable material. The stabilizer 36 may be of any predetermined width, being preferably wider than the form 19 illustrated in Figures 1, 2 and 3. The said stabilizing sheet 36 contains preferably another pocket 37 through which extends a string 38 tied to the pins 32 and 33 respectively. In this manner, a very light stabilizing element of considerable area is provided, being particularly adaptable for a multi-rotor structure. It is, of course, understood that instead of having a flat stabilizing sheet 36, consisting of a single sheet of material, a double thickness can be employed to give the effect of a fuselage, particularly when the kite is in motion at the inclination illustrated in Figure 4. The "belly" band 39, in this structure, is suitably attached to the stabilizer 36 as indicated, and at some selected point 40 a string 41 can be attached in conventional manner.

In the modification of this invention shown in Figure 6, instead of having slits similar to those identified by the reference numerals 13, 14, 15 and 16 of Figure 1, a plurality of preferably longitudinally disposed perforations 42, 43, 44 and 45 are employed, these being shown disposed in rows positioned adjacent the braces 46, 47, 48 and 49 respectively. The effect of flying a kite of the construction of Figure 6 is substantially similar to that obtained in the device of Figure 1, a portion of the air engaging the sections 50, 51, 52 and 53 of the surface of rotor 54 passing through the apertured portions thereof. It is obvious that each of said sections contains on the side remote from said apertured portions a greater wind receiving surface than on the side including the apertured portions, so that said sections receive at corresponding sides a greater proportion of the wind pressure, thereby causing the rotor to rotate.

The forms of rotor above described can be arranged according to various predetermined designs, such as that illustrated in Figure 7 which shows three rotors 55, 56 and 57 suitably mounted on members 58 and 59, the specific mounting constructions being similar to that hereinabove described. It is apparent that the kite thus formed will present an attractive and novel appearance. It is, of course, understood that other combinations of rotors of the above described type can be employed within the contemplation of this invention.

The box type of kite shown in Figure 8 also employs the principal and essential features of my invention, the box portion 60 containing four parallel braces 61, 62, 63 and 64. Suitably secured and embracing said braces are the flexible sheets 65 and 66, these being in spaced relation to each other, each sheet containing four apertured portions illustrated as being formed by the slits 67, 68, 69, 70, 71, 72, 73 and 74, these slits being positioned adjacent the said braces. A connecting member of substantially C-shaped structure 75 is suitably secured to the intersections 76 and 77 of the upper and lower sets of diagonally disposed braces 78 79 and 80 and 81, respectively, whereby the entire box structure is rotatably mounted. The band 82 is suitably secured to the vertical portion of the member 75; and attached at point 83 of the band is the string 84 held by the person flying the kite.

The operation of the structure of Figure 8 is based upon the principles hereinabove set forth, portions of the air passing through the aforesaid slits to cause a retraction of rearward deflection of the adjacent portions of the sheets 65 and 66, to cause a rotation of the kite.

The structure of Figure 9 is similar in general principle to that of Figure 8, but instead of being of square or rectangular configuration, a cylindrical form is employed containing two spaced sheets 85 and 86 of sinuous or corrugated configuration. Near the crests 87 and 88 of the convolutions of said sheets are positioned slits 89 and 90 permitting air to pass therethrough to cause a rotation of the structure when, during the flying of the kite, currents of air are caused to impinge against the lateral surface of the sheets 85 and 86. The entire structure is pivotally and rotatably supported by a C-shaped member 91 connected at the intersections 92 and 93 of the upper and lower sets of diametrical braces 94 and 95 respectively.

It is of course understood that the various embodiments above described and shown in the drawings are illustrative of my invention and not employed by way of limitation, inasmuch as numerous changes and modifications may be made within the scope of the appended claims without departing from the spirit of this invention.

What I claim is:

1. In a kite, a rotor comprising a substantially flat flexible wind-receiving sheet and a mounting therefor, said sheet comprising a plurality of sections containing apertured portions correspondingly positioned remote from the middle regions of the sections; a pin to which said mounting is rotatably secured, and a stabilizer consisting of a relatively long and thin stabilizing element one end of which is attached to said pin, said element being spaced from said sheet and extending substantially parallel thereto, said element being adapted to operatively receive a tail and the string held by the flier of the kite.

2. In a kite, a rotor comprising a substantially flat flexible wind-receiving sheet and a plurality of braces supporting the sheet and dividing it into a plurality of adjacent sections, said sections containing apertured portions adjacent said braces and at corresponding sides thereof; supporting means to which said rotor is rotatably secured, and a long and relatively thin stabilizing element suspended at the region of one terminal thereof from said supporting means and in spaced and substantially parallel relation to said sheet.

3. In a kite, a rotor comprising a flexible wind-receiving sheet and a plurality of intersecting braces supporting the sheet and dividing it into a plurality of adjacent sections, each of said sections containing a slit adjacent a correspondingly positioned brace; a pin extending transversely through the intersection of said braces and rotatably supporting the rotor, and a long and relatively thin stabilizing element suspended from said pin and in spaced and substantially parallel relation to said sheet.

4. In a kite, a rotor comprising a flexible wind-receiving sheet and a plurality of intersecting braces supporting the sheet and dividing it into a plurality of adjacent sections, each of said sections having at a region adjacent a correspondingly positioned brace a plurality of perforations; a pin extending transversely through the intersection of said braces and rotatably supporting the rotor, and a long and relatively thin stabilizing element suspended from said pin and in spaced and substantially parallel relation to said sheet.

5. In a kite, a plurality of rotors with substantially flat parallel flexible wind-receiving sheets, each sheet being mounted upon a plurality of braces dividing it into a plurality of adjacent sections, said sections containing apertured portions adjacent said braces at corresponding sides thereof; independent mountings upon which said rotors are rotatably secured, and a long and relatively thin stabilizing element attached to and connecting said mountings and in spaced and substantially parallel relation to said sheets.

6. In a kite, a rotor comprising a flexible wind-receiving sheet and a plurality of intersecting braces supporting the sheet and dividing it into a plurality of adjacent sections, said sections containing apertured portions adjacent said braces and at corresponding sides thereof; a pin extending transversely through the intersection of said braces and rotatably supporting the rotor, and a relatively long and flat stabilizing element suspended from said pin and disposed in a plane substantially normal to that of the said sheet, the said element being spaced from the sheet and extending substantially parallel thereto.

7. In a kite, a plurality of rotors with parallel flexible wind-receiving sheets, each sheet being mounted upon a plurality of braces dividing it into a plurality of adjacent sections, said sections containing apertured portions adjacent said braces at corresponding sides thereof; supporting means to which said rotors are rotatably secured, and a stabilizing element comprising a flexible stabilizing sheet disposed in a plane substantially normal to that of said wind-receiving sheets and spaced therefrom and extending in a direction substantially parallel thereto; and two parallel members secured to said supporting means and upon which the stabilizer sheet is mounted.

8. A box kite comprising a mounting containing a plurality of parallel braces, two flexible sheets mounted upon said braces in spaced relation to each other, supporting means to which said mounting is rotatably secured, and means associated with said supporting means for operatively receiving the string held by the flier of the kite; said sheets each containing a plurality of sections formed by adjacent braces, said sections having apertured portions adjacent corresponding braces.

9. A box kite comprising a substantially cylindrical mounting containing a plurality of parallel braces, two spaced sheets mounted upon said braces and presenting surfaces of corrugated configuration, supporting means to which said mounting is rotatably secured, and means associated with said supporting means for operatively receiving the string held by the flier of the kite; said sheets each containing a plurality of sections formed by adjacent braces, said sections having apertured portions adjacent corresponding braces near the crests of the convolution of the sheets.

SAMUEL FROMME.