May 28, 1957 E. B. BRUMFIELD 2,793,829

ROTARY KITE

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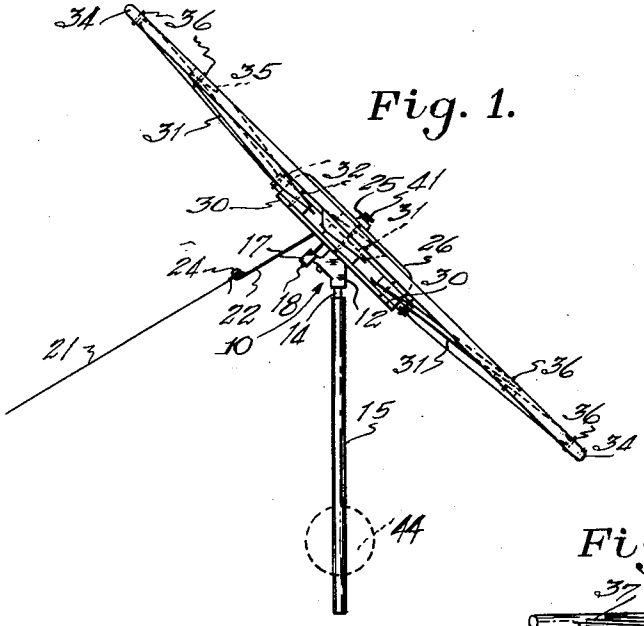


Fig. 1.

Fig. 3.

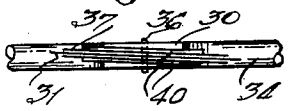
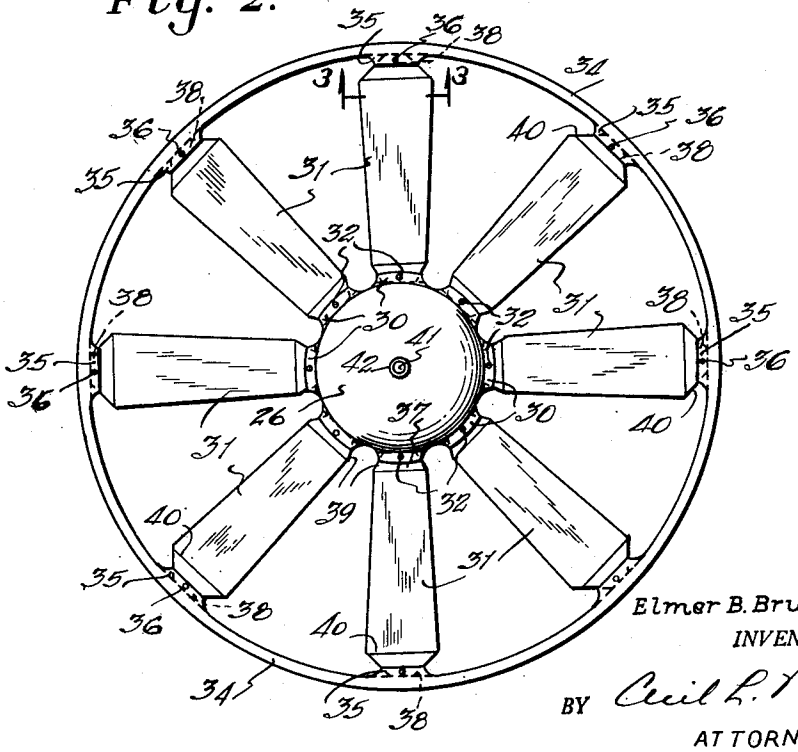


Fig. 2.



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Fig. 4.

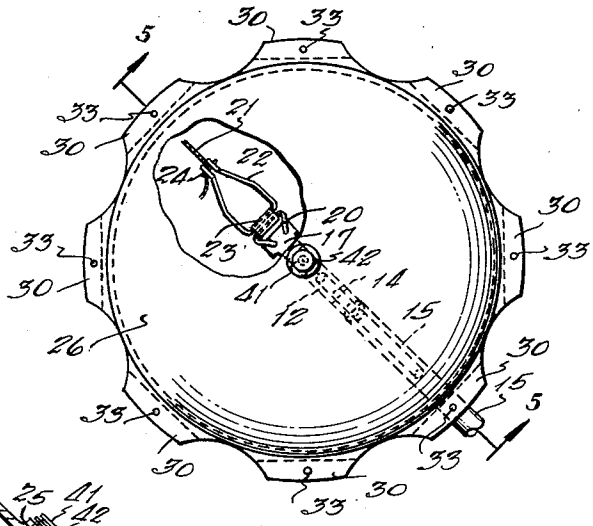
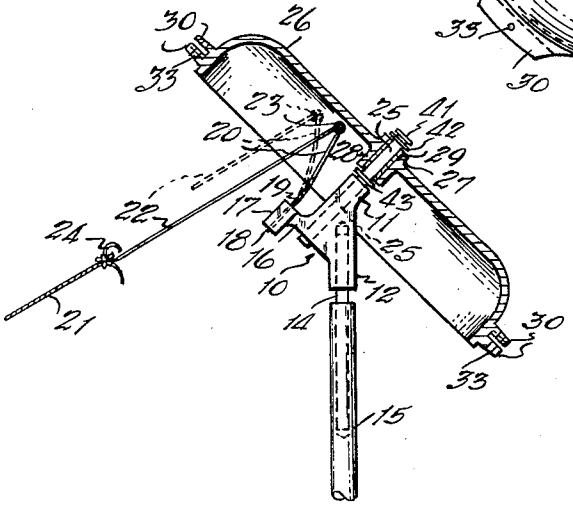


Fig. 5.



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ROTARY KITE

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3 Claims. (Cl. 244—153)

This invention relates to toy or novelty flying devices, and it has particular reference to a rotary kite capable of being controlled or retained in tow by a cord or kite-string, and its principal object resides in the provision of a light and compact structure which embodies a body member on which is pivotally supported a rotor having a plurality of blades capable of functioning in the manner of a helicopter and to raise the device and keep it airborne, a counter-balance being provided, if desirable, to properly stabilize the structure in flight.

Another object of the invention is that of providing a simple arrangement of parts by which the rotor element is flexible and capable of resisting substantial abuse, rendering the device relatively crash-proof not readily damaged when allowed to fall to the ground in attempts to fly the device.

It is an object of the invention to provide a structure comprising few parts, which may be formed from light wood or plastics, and a minimum of metal parts, to eliminate such hazards as contacts with overhead electric wires, or the like, where metal materials may provide electrical conductors, or draw lightning when airborne.

Broadly, the invention contemplates the provision of a helicopter-type of kite structure which can be dismantled and packed in a kit for hobbyists, and obtainable in toy or hobby shops, and assembled without the aid of tools or securing devices.

While the foregoing objects are paramount other and lesser objects will become manifest as the description proceeds, taken in connection with the appended drawings wherein:

Figure 1 is a side elevational view of the invention in its operative or flight position.

Figure 2 is a top plan view of the device, showing the propeller construction and assembly.

Figure 3 is a fragmentary sectional view through one of the propeller blades, on lines 3—3 of Figure 2, illustrating the manner of attachment and pitch of the blades.

Figure 4 is a plan view of the hub for the propeller assembly, showing a portion cut away to illustrate the yoke member for connecting the string, and

Figure 5 is a transverse sectional view through the hub illustrating the spindle structure and its association with the hub.

The invention accordingly comprises a body **10** which is formed with a spindle column **11** constituting its forward portion and which is in an oblique arrangement when the device is in operative position, as illustrated in Figure 1. The tail portion **12** of the body **10** extends at an angle with respect to the spindle column **11** and has an axial bore therein to receive a dowel **14**, on the opposite end of which is arranged a stabilizing rod and handle **15** which depends vertically while the invention is in flight, as in Figures 1 and 5. Forwardly of the body **10** is a bracket **16** on which is formed an integral head **17** having a pair of parallel spaced bores therein adapted to receive the ends **18** of the legs **19** of a tensioned wire loop **20**. The bores in the member **17** are parallel with

the axis of the spindle column **11**, as apparent in Figure 5, and spaced apart.

The tensioned loop **20** has a specific function also of insuring stabilization of the kite in flight even when wind velocities vary. It will be noted, by reference to Figure 1, that the outer ends of the blades **31**, with the ring **34**, are in a plane above the plane of their attachment to the hub **26**, and when this condition occurs, the loop **20** will flex to the dotted line position shown in Figure 5. The flexibility of the member **20**, therefore, will allow for certain movements of the kite at different wind velocities. Since the blades **31** are relatively long in proportion to their thickness, a limited amount of movement of ring **34** relative to hub **26** may occur in flight. However when this occurs and also when wind gusts tend to change the attitude of the rotary kite from its normal flight attitude (as shown in Fig. 1 to be approximately 45°), then the tension placed on loop **20** will return the kite to its normal attitude when the wind gusts have subsided.

The loop **20**, which is substantially U-shaped, is somewhat flexible and affords a medium by which the control line or string **21** is attached to the assembly through a yoke **22**, also of wire, and a clip **23** which joins the yoke **22** to the loop **20** in the manner shown in Figures 4 and 5. The outer end of the yoke **22** has a hook **24** formed thereon to which the string **21** is secured.

A spindle **25** is journalled in the spindle column **11** providing a rotative mounting for the rotor assembly which consists of a hub **26** which is circular and substantially bowl-shaped, as illustrated in Figure 5, but whose plane surfaces are at right angles to the peripheral depending flange. Concentrically of the member **26** are opposing bosses **27** and **28** having a central bore in which a bearing **29** is arranged to receive the spindle **25**. The hub **26** is therefore freely rotative on the spindle **25**.

Formed about the periphery of the hub **26**, and integral with the flange thereof, are a plurality of equidistantly spaced sets of ears **30** whose opposing plane surfaces are spaced to receive the inner ends of a series of radial blades **31** which are secured by pins or rivets **32** arranged through apertures **33** in the members **30**. The blades **31** are slightly tapered inwardly, as indicated in Figure 2, and have a slight angle with respect to the plane surfaces of the hub **26**, and the plane of the outer ring **34** securing the outer ends of the blades **31**, as shown in the fragmentary illustration in Figure 3. The form of the blades **31**, however, can be varied according to the particular requirements. Obviously, these members may be tapered outwardly if desired.

It is apparent that the opposing faces of the ears **30** about the hub **26** should be slightly oblique, as indicated in dotted lines in Figure 5, to provide the proper angle for the blades **31**, as shown in Figure 3. The ring **34** also has a series of spaced sets of ears **35** whose opposing surfaces are in a slightly angular plane to conform to the members **30** of the hub **26**, and the outer ends of the blades **31** are attached to the members **35** by rivets **36** arranged through apertures therein and in the ears **35**. Both ends of the blades **31** are tapered sharply to materially reduce the inner and outer tips **37** and **38** and these are reenforced at **39** and **40**, respectively, since it is desirable to form the blades **31** from a very light material.

The hub **26** is rotatively secured on the spindle **25** by a stud **41**, or other suitable device, threaded into the outer end of the spindle **25**, and it is desirable to provide washers **42** and **43** on each side of the hub **26** to afford a suitable bearing assembly, as shown in Figure 5. Obviously, the body **10**, the hub **26**, the blades **31** and outer ring **34** can be formed of plastic, if desired, and in a variety of different colors. The stabilizing member or handle **15** can be of any desired length or weight, for proper balance, and may have an adjustable weight **44**

thereon, shown in dotted lines in Figure 1, if such device is deemed necessary.

Manifestly, the structure herein shown and described is capable of certain changes and modifications, by persons skilled in the art, without departing from the spirit and intent of the invention or the scope of the appended claims.

What is claimed is:

1. In a rotary kite adapted to be controlled by a line attached thereto, in combination, a body member formed with a spindle column and an integral head formed on said body member, a tail portion formed on said body member opposite said head, a flexible wire loop secured in said head and having a yoke member connected thereto providing a bridle for attaching a line to said body member, and a rotor mounted for rotation on said spindle column, the said rotor comprising a hub having radial blades thereon connected at their outer ends by a ring, and said rotor having a tip path plane disposed at an acute angle relative to the longitudinal axis of said tail portion.

2. In a rotary kite adapted for control by a line attached thereto, in combination, an elongated body member comprising a spindle column having a tail portion formed therewith and extending at an angle therefrom, a head integrally connected to said body member opposite said tail portion, a yoke member flexibly connected to said head for attaching a line to said body member, a rotor comprising a hub, having a series of radial blades thereon, rotatively supported on said body member, and a circular member connecting the outer ends of said blades, said tail portion depending from said body member in a vertical plane when said rotary kite is in flight, and said rotor blades during rotation describing a tip path plane disposed angularly with respect to the longitudinal axis of said tail portion.

3. In a rotary kite of the character described having means thereon for securing a control line, in combination, a body having a portion supporting a spindle, a tail portion on said body, said spindle forming an acute angle with respect to said tail portion, a head portion formed with said body opposite said tail portion, a flexible loop secured to said body in said head portion, and a yoke member attached to said loop whereby to secure a line to said body, a rotor on said spindle having a hub and a radial arrangement of blades on said hub, and a ring circumscribing said rotor and connecting the outer ends of said blades.

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