

[54] **FLYABLE TOY ROTOR APPARATUS**

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[51] Int. Cl. **B64c 31/06**

[58] Field of Search **244/155 R, 153 R, 154**

[56] **References Cited**

UNITED STATES PATENTS

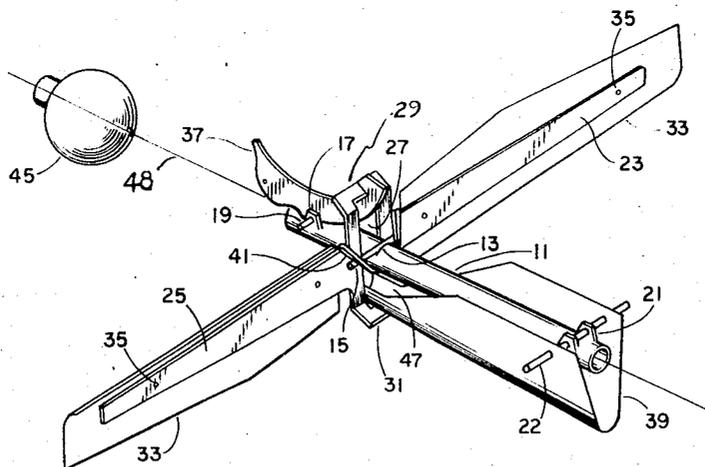
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[57] **ABSTRACT**

A flyable toy rotor apparatus with rotatable blades spring mounted to a shaft that receives a kite or balloon string. Mounted to the shaft is a trigger mechanism which when cocked retains the rotor in a rotating climb position, but which when tripped against a pre-set stop pivots the rotor blades to a low drag position in which rotor rotation stops. Hence, the apparatus returns down the string. In one embodiment the actuation of the trigger releases cargo from a holder also attached to the shaft.

6 Claims, 3 Drawing Figures



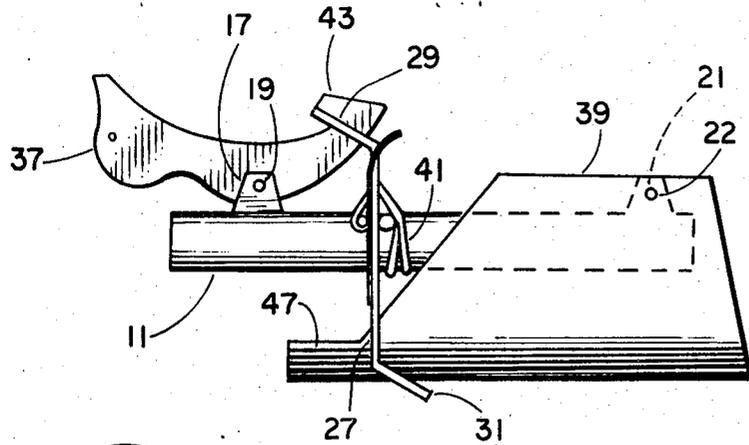


FIG. 2

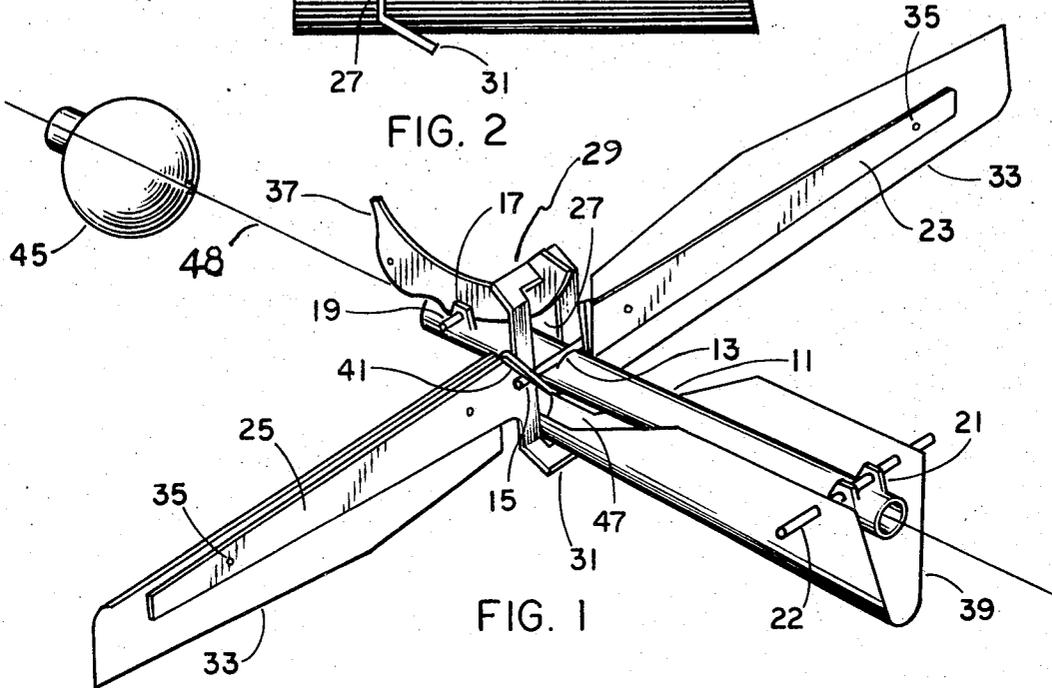


FIG. 1

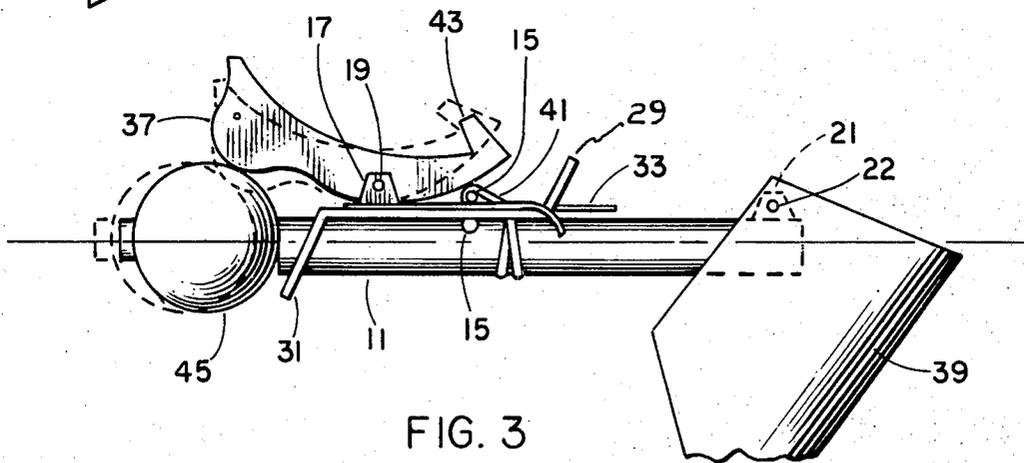


FIG. 3

FLYABLE TOY ROTOR APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to amusement devices of the type generally referred to as kite accessories, and in particular to a toy rotor apparatus with automatic rotor blade conversion and parachute release means.

2. Description of the Prior Art

Previously, kite accessories in the form of propellers, spinners, and rotors have ascended a kite string responsive to the pressure of wind. It is advantageous that such apparatus be returned on the string to the user, but thus necessitates changing geometric configuration from one having a high drag during ascent to one having a low drag, during descent. However, previous apparatus, so far as is known to me, has not accomplished this desired result with a rotor type apparatus.

SUMMARY OF THE INVENTION

It is, accordingly, the general object of my invention to provide attachment apparatus for use with air-borne, string controlled amusement devices, such apparatus utilizing the above described drag conversion principle for moving a rotary apparatus up and down a string in an advantageous and reliable manner.

A specific object of my invention is to provide a toy rotor apparatus for use with a kite, balloon or other air-borne, line controlled amusement device, which will move with the wind until contact is made with a pre-set stop, causing the rotor apparatus to automatically convert to a low drag condition and enabling it to return into the wind to the operator of the air-borne device.

The above and other objects are accomplished by my invention in a manner that is apparent from the following description taken in accordance with the accompanying drawing that forms a part of the application.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a toy rotor apparatus embodying the principles of my invention, including means for carrying a parachute,

FIG. 2 is a side elevation view of the apparatus shown in Fig. 1, with the rotor and chute holder positioned for launch.

FIG. 3 is the side elevation view shown in Fig. 2, except that the trigger has been tripped, the rotor converted and the chute holder opened.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to Fig. 1, the numeral 11 designates a shaft or body of a rotor apparatus having a transverse slot 13 that houses a rotor axle 15. Further, the shaft supports a clevis 17 on one end (designated the front end of the apparatus) that supports a trigger axle 19. In addition, the rear end of the shaft 11 supports a clevis 21 that houses a chute holder axle 22.

A rotor hub 23 contains oppositely extending ears 25 that protrude from a hub 23, which has a rectangular and thus elongated opening 27 that receives the shaft or body 11. The hub 23 terminates respectively in upper and lower protrusions 29, 31, that may be seen in Fig. 2. Extending across the mid-region of the opening 27 of the hub 23 is an axle 15, previously described.

The rotor hub 23, ears 25 and axle 15 may be molded of plastic as one part. In the embodiment shown the blades 33 are secured to the ears 25 by means of fasteners 35. Each of the blades 33 has a transverse, or chordwise, axis and a longitudinal, or span, axis, the span axis being at a predetermined angle with respect to the axis of the shaft 11. Each blade, including its chordwise axis, is rotated as the rotor hub 23 is rotated, or pivoted. Thus, the rotor hub 23, ears 25, and the axle 15 to which the blades are secured serve as a means for supporting the blades for rotational movement to effect the respective high and low drag configurations.

As may be seen from the above description, the hub 23 is shaped to serve as a latch for a trigger 37 pivotally carried by the trigger axle 19 and clevis 17. In addition, the hub 23 serves as a latch for a chute holder 39 during launch, and as a rotor stop during descent.

The rotor axle 15 of rotor hub 23, is retained in the transverse slot 13 of the body or shaft 11 by means of an elastic band 41 (one form of biasing means) that is placed around the hub 23, against the ears 25, adjacent the hub axle 15, and underneath body 11. The elastic band 41 encircles protruding tabs, which may be extensions of the rotor axle 15, as illustrated in Fig. 3. The elastic band 41 also acts as a spring for trigger 37.

To arrange the rotor apparatus for launch, the hub 23 is rotated against the spring load of elastic band 41 until the opening 27 of the hub 23 can be latched to the protrusion 43 of the trigger, as shown in Fig. 2. The opposite end 31 of the hub 23 engages the chute holder 39 to return it in the position shown in Figs. 1 and 2 to contain a parachute or other cargo.

A stop 45 or release means preferably in the form of a sphere, may be attached to the kite string 48 some point below the kite in order to trip the trigger 37 such that protrusion 43 is released from hub 27. This converts the rotor hub 23 to the position shown in Fig. 3, which is a non-rotating, low drag configuration permitting the rotor apparatus to return down the kite string to the operator. The low drag configuration is commonly referred to in this art as the "feathered" condition for the blades.

In addition, rotation of the hub 27 in a clockwise position to the position shown in Fig. 3, releases one end 47 of the chute holder 39 such that it pivots downward as shown in Fig. 3 to release a chute or other cargo.

Another object of my invention is to provide in the above apparatus a parachute or other cargo adapted to release at the moment of rotor conversion from high to low drag.

In operation the guide string 48 is inserted inside the axial opening of the shaft or body 11. In preparation for ascent the hub 23 and blades 33 are rotated to the high drag configuration shown in Figs. 1 and 2, being retained in that position by the elastic band 41 and trigger 37. Expressed otherwise, the hub 23 is rotated to rotate the chordwise axis of the blades with respect to the axis of the shaft while maintaining the span axis at the same predetermined angle to effect the high drag configuration. In addition, the forward end 47 of the chute or cargo holder 39 is retained in an upward position by insertion into the lower portion of the elongated opening 27 of the hub 23. Similarly, the protrusion 43 of the trigger 37 is inserted in the upper end of the opening 27 in the hub 23 as seen in Figs. 1 and 2.

With the hub 23 and blades 33 that comprise the rotor in the high drag configuration shown in Figs. 1 and 2, the wind pressure holding the kite or balloon aloft rotates the rotor and raises the apparatus upward on the string toward the trigger release mechanism or pre-set stop 45, that may be a portion of a kite, or a balloon or the juncture of two pieces of string. When the upper end of the trigger 37 engages the trigger release mechanism 45, it is rotated in the clockwise direction as seen in FIG. 2 such that the protrusion 43 is urged downward relative to the hub 23, thus enabling the elastic band 41 to rotate the hub 23 in the clockwise direction as viewed in FIG. 2. This clockwise rotation also separates the hub 23 from the forward end 47 of the cargo holder 39. Hence, the parachute or other cargo in the chute holder 39 is released and the rotor assumes a low drag configuration, enabling the apparatus to glide downward for return to the user.

While I have shown my invention in only one of its forms, it should be apparent to those skilled in the art that it is not so limited but is susceptible to various changes and modifications without departing from the spirit thereof.

I claim:

1. Toy rotor apparatus for climbing a kite string or the like and subsequently descending the string, said apparatus comprising:
 a shaft to receive said string;
 a rotor hub having an opening to receive said shaft;
 at least one blade connected with and extending outwardly from said hub; said blade having a chordwise axis and a span axis, said span axis being at a predetermined angle with respect to the axis of said shaft;
 means for supporting said at least one blade for rotational movement of its chordwise axis with respect to the axis of said shaft while maintaining said span axis at said predetermined angle such that said at least one blade can be moved into a first drag configuration in which said chordwise axis effects lift on said toy rotor apparatus as it rotates about said string such that said toy rotor apparatus will climb said string; and such that said blade can be moved

into a second drag configuration in which said chordwise axis is feathered such that said toy rotor apparatus will descend said string;

biasing means connecting the hub and the shaft to urge said at least one blade toward said second drag configuration; and a trigger mounted on said shaft to hold the blade in said first configuration.

2. Apparatus as defined by claim 1 which further includes a cargo holder having one end pivotally secured to the shaft, the opposite end of said holder engaging the rotor hub when the blades are in a high drag position for release by the trigger when the blades assume a low drag position.

3. Toy rotor apparatus for climbing a kite string or the like and subsequently descending the string, said apparatus comprising:

a shaft to receive said string;
 a rotor hub having an elongated opening that receives said shaft;

a rotor axle secured to the hub to extend across said opening and disposed in a transverse slot in the shaft;

at least one blade extending oppositely from said hub;

an elastic band threaded around the hub and the shaft to urge the blades toward a low drag configuration; and

a trigger having a protrusion received in the elongated opening of the hub to hold the blade in another drag configuration.

4. Apparatus as defined by claim 3 including trigger release means for mounting on the string to actuate the trigger.

5. Apparatus as defined by claim 3 which further includes a cargo holder having one end pivotally secured to the shaft, the opposite end of said holder being engaging the rotor hub when the blades are in a high drag position for release by the trigger when the blades assume a low drag position.

6. Apparatus as defined in claim 3 in which the elastic band urges the blades toward a low drag configuration, and the trigger holds the blades in a high drag configuration.

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