KITE FLIGHT CONTROL DEVICE
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Filed Feb. 6, 1968, Ser. No. 793,425
Int. Cl. B64c 31/00; A63b 27/08
U.S. Cl. 244—155
20 Claims

ABSTRACT OF THE DISCLOSURE
A device for controlling the flight actions of a kite having a stick frame provided with control strings. The device includes a holder having a handle adapted to be held in a hand of the operator and having a group of arms by means of which the control strings are guided to and from a common groove of a reel rotationally supported upon the holder. The reel is releasably retained upon the holder by means of a group of resilient snap elements. The reel is so arranged upon the holder that the operator may while gripping the handle extend a finger forwardly to engage and brake rotation of the reel when the occasion demands.

BACKGROUND OF THE INVENTION
The invention relates to the art of hand held devices for controlling by means of control strings the flight actions of kites, and has means for reeling in and paying out the control strings.

Control devices of this general nature are known in the art as having a separate reel associated with each control string; or having reels that are bolted in place; or which include cumbersome braking mechanism; or which have cumbersome or no handle structures.

A feature of the present invention is a single reel for the control device providing a common groove into which and from which all of the control strings may be simultaneously wound or payed out.

Another feature is a reel and holder combination so arranged that the reel is releasably retained upon the holder by means of a group of resilient snap elements.

Another feature is the compact association of the reel with the holder and the handle, whereby the operator may brake rotation of the reel when desired by simply extending a finger of the hand gripping the handle into pressed relation with the reel.

A further feature is the arrangement of guide arms for the control strings, the linear dimension between the extremities of any two of which is substantially less than the length of the cross stick of the kite. This advantageous arrangement enables a smooth and desirable degree of control over the actions of the kite.

Further, the particular configuration and organization of the several components of the device permit the entire device to be made of plastic material. This material has many desirable advantages. It provides the requisite strength needed for the device; its colors are inherent; and its surfaces have desirable qualities for bearing purposes where needed.

BRIEF DESCRIPTION OF THE DRAWING
FIG. 1 is a rear end elevational view of a kite flight control device embodying the invention;
FIG. 2 is a section taken on line 2—2 of FIG. 1;
FIG. 3 is a section taken on line 3—3 of FIG. 1;
FIG. 4 is a conventional two stick bow kite with control strings attached with which the control device shown in FIG. 1 is intended for association; and
FIG. 5 is a detail of a control string cap fitted to an end of one of the kite sticks.

DETAILED DESCRIPTION
The kite flight control device 1 illustrated in the drawing comprises a reel 2 releasably supported for rotation upon a holder 3 which is adapted to be gripped in a hand 4 of the operator. The reel and holder are separable components of the device. Each is an integral unit formed of plastic material, the advantages of which have been earlier mentioned.

The control device 1 (FIG. 1) is adapted to be associated with a conventional two stick bow kite 4 (FIG. 4) by means of a group of control strings 5, 6, and 7. The kite includes the usual frame having a vertical stick 8 and a cross stick 9 covered over by conventional lightweight material such as paper 10. The kite may be selectively controlled in its flight so as to veer to the right or to the left, dip downwardly or rise upwardly, roll clockwise or counter-clockwise, or hold a steady balanced position. This control is effected by selective manipulation of one or more of the control strings in various directions. Toward obtaining this control, each string is anchored fast at one end to a particular end of one of the kite sticks. Each string may be tied directly to the kite stick; or it may be tied to a cap 11 snugly fitted on the end of the stick, as indicated in FIG. 5. Here, the kite is shown as provided with three control strings, of which string 5 is fixed to the bottom end of the vertical stick 8 and strings 6 and 7 are fixed to opposite ends of the cross stick 9. The other end of each string is tied to the bottom wall 12 of a common annular groove 13 provided about the reel 2. The groove is common to and adapted to receive all three strings; and the reel is operable to wind in or pay out all three strings simultaneously.

The reel is defined by means of a pair of radially extending annular end walls 14 and 15 having parallel front and rear end faces 16 and 17. The walls 14 and 15 are joined by the axially extending bottom wall 12 so as to provide the groove 13 between them. The inner diameter wall surface 18 defining the central open area of the reel is slidable received and bears for rotation upon an axially extending hub 19 formed at the forward end of an opened ended body 20 of the holder. The rear face 17 of the reel bears against a radial annular shoulder 21 provided by a thickened body portion 22 of the holder. The reel, hub and body of the holder have coincident axes.

A handle adapted to be gripped in a hand of the operator is provided for the holder by means of a rib 23. The latter extends diametrically across the body of the holder. The rib serves not only as a handle, but also serves to strengthen the holder. A forward portion of the rib is fixed at its ends 25 to the inner diameter wall 26 of the body of the holder. A portion of the rib protruding rearwardly of the body of the holder is fixed at opposite end areas 27 in abutment with the rear face of the body. The axial extent of the combined reel and holder body is relatively short, so that when the handle is gripped by the operator a portion of his clenched hand projects into the open area of the reel. The axial extent of the reel and body of the holder in assembled relation is about one inch. The rear wall 15 of the reel extends radially beyond the periphery of the thickened body portion 22 of the holder. This is of advantage in that it enables the operator, when the occasion demands during use of the device, to extend a finger of the hand that grips the handle into pressed relation with the rear wall 15 to brake rotation of the reel. The periphery 28 of the wall 15 is rounded so as to present a non-bitting surface to the operator's brake finger.

A group of three arms 29 is provided on the holder for guiding movement of the control strings to and from the groove of the reel. Each arm is associated with a separate one of the control strings. The arms extend integrally and
radially from the periphery of the thickened portion 22 of the body of the holder. They are centered circumferentially apart, and all lie in the same plane. The arms are of triangular configuration having an open central area 30 defined between a pair of opposed legs 31 that are made integral at their base ends with the body of the holder. Each arm is provided in its vertex portion with an axially extending guide hole 39 for passage of one of the control strings.

Fixed between the legs of each arm is a snap ear 32 which extends axially forward over the periphery of the reel. A slight clearance is provided between the ears and the periphery of the reel to allow free rotation of the latter. Each ear has a radially extending hole 33 in its body opposite to the groove of the reel as a means for further guiding a related control string from the arm to the groove. The bottom wall 12 of the groove is provided with means for anchoring the control strings to the reel. For this purpose three small radial holes 34 are provided in the reel wall 12, spaced circumferentially equally apart, two of the holes being shown, one in Fig. 2 and the other in Fig. 3. Across each hole 34 extends a rib 35 about which an end of a control string may be tied. The axial extent of the hub 19 of the holder is relatively shorter than that of the reel 2, so that it does not cover over the holes 34 and ribs 35 when the reel is seated upon the hub. This advantageous construction enables the control strings to be tied to the reel while the latter is seated upon the holder.

The snap ears 32 also serve to releasably retain the reel upon the hub of the holder. Each ear terminates at its free end in an intumescent lip 36 which fronts a marginal area of the front face 16 of the reel, whereby the reel is retained upon the holder against endwise escape. The reel has slight end play between the several lips 36 and the hub shoulder 21 permitting it to rotate freely about the hub. The several ears 32 are resilient and adapted under manually applied pressure to be flexed away from the periphery of the reel so as to allow the reel to be retracted over the several lips 36 free of the holder when the occasion demands.

To facilitate assembly of the reel onto the hub 19 of the holder, the outer diameter of the rear wall 15 of the reel is less than the inner diameter defined by the several lips 36 of the ears 32; and the outer diameter of the front wall 14 of the reel is a little greater than the inner diameter defined by the lips. To assemble the reel upon the holder, its rear wall 15 is passed over the lips and the reel is slipped axially upon the hub 19 of the holder with the rounded peripheral edge 37 of the front wall 14 of the reel abuts correspondingly rounded edges 38 of the several lips. Then, as manual pressure is applied to the reel, the several ears 32 are resiliently forced outwardly as the reel rides over the lips. The ears then snap back to return the lips in retaining relation to the front wall of the reel.

To prepare the device for use, the reel is first snapped in position upon the holder. The control strings are drawn from three balls of string. An end of each string is threaded, as in Fig. 2, from front to rear through the guide hole 39 of a separate one of the arms 29, then passed forwardly through the open area 30 of the arm and through the hole 33 of the related ear into the groove of the reel where it is tied to one of the ribs 35. A crank pin 41 at the front of the reel is then manipulated to rotate the reel and wind the several strings simultaneously into the groove of the reel. The remaining end of the control string 5 is tied to the bottom end of the vertical kite stick and is serviced by the lower arm 29, as appears in Fig. 1. The control string 6 served by the upper right arm is tied to the right end of the kite cross stick; the remaining string 7 served by the upper left arm is tied to the left end of the cross stick.

In use, the control device is held as in Fig. 1 with the handle 23 in vertical position and the arm servicing the control string 5 depending downward. By manipulating the control device in selected directions the control strings will act upon the kite to maneuver it accordingly. As the kite is bared endwise by wind it the several control strings will be drawn simultaneously from the reel. The paying out of string and rotation of the reel may be stopped at any time by the operator applying a braking pressure to it with his thumb or other finger. The kite may be brought back to earth by manipulating the crank pin 41 to rotate the reel so as to wind the several strings simultaneously back into the reel.

The actual linear distance between the extremities of the arms 29 servicing the control strings 6 and 7 attached to the ends of the kite cross stick is substantially less than the length of the cross stick. The cross stick, arm and string maneuvering of the control device and provides a good degree of control over the flight actions of the kite. However, excellent results are achieved when the linear distance between the arms servicing the cross stick control strings is about one-half the length of the cross stick.

Since all three arms 29 are of equal radial extent, either one may serve any selected one of the control strings. However, it is preferable to use that arm depending below the handle as the arm to be associated with the control string to be attached to the bottom end of the kite. The several control strings may be readily distinguished by different colors.

I claim:

1. A kite flight control device comprising a holder having an open-ended annular body provided with a handle transversely of its open area and formed with a hub at its forward end, a separable open-ended annular reel rotatably supported upon the hub, a plurality of resilient elements carried by the holder releasably retaining the reel upon the hub against endwise escape, a plurality of kite control string guide arms extending in a radial plane from the body, each arm adapted for guiding a separate control string to and from the reel, the reel having a single groove about it adapted for receiving a plurality of control strings one from each arm, and a plurality of control string anchoring means in the groove spaced circumferentially equally apart, the number of anchoring means corresponding to the number of arms.

2. A kite flight control device as in claim 1, wherein the hub has a radial shoulder at its rear, the reel has front and rear parallel end walls defining the groove between them, the rear wall of which bears upon the shoulder, and each resilient element has a lip radially overlying a marginal portion of the front wall of the reel.

3. A kite flight control device as in claim 2, wherein each resilient element has a resilient body extending axially over the lip anchored at its rear in a separate one of the arms, the resilient body extending axially over the periphery of the reel and adapted under pressure to be flexed away from the periphery of the reel sufficiently to carry its lip clear of the reel.

4. A kite flight control device as in claim 3, wherein the rear end wall of the reel has an outer diameter less than the inner diameter defined by the several lips, the front end wall of the reel is of slightly greater outer dimension than said inner diameter, and cam means is formed about the periphery of the front end wall of the reel which is cooperable with cam means formed upon the several lips to cause the front wall of the reel to ride over the several lips when pressed axially in the direction of the hub.

5. A kite flight control device as in claim 1, wherein an axially extending annular wall defines a bottom wall for the groove of the reel, and each control string anchoring means is defined by a radial aperture in the bottom wall and a rib extending across the aperture.

6. A kite flight control device as in claim 5, wherein the hub has an axial dimension less than the axial dimension of the reel, and the apertures and ribs defining the
anchoring means are located in the bottom wall axially beyond the hub.

7. A kite flight control device as in claim 2, wherein the rear wall of the reel projects radially beyond the shoulder of the hub, the reel is adapted upon application of manual pressure of the operator to the periphery of the rear wall to be braked against rotation, and the rear wall is located in such close relation to the handle as to enable a finger of the operator's handle gripping hand to engage the periphery of the rear wall for braking purposes.

8. A kite flight control device as in claim 1, wherein the handle is defined by a rib extending diametrically across the inner diameter of the body of the holder, and the open area of the body of the holder adjacent opposite sides of the rib is adequate to accommodate the clenched hand of the operator as he grips the rib.

9. A kite flight control device as in claim 1 for controlling the flight actions of a kite having a frame including a vertical stick and a cross stick in which a control string is tied to the bottom end of the vertical stick and a separate control string is attached to each end of the cross stick, wherein the guide arms are three in number spaced circumferentially equally apart about the body of the holder and lying in the same radial plane, each arm having a control string guide hole proximate its extremity for receiving a separate one of the control strings, and the linear distance between the two extremities of the arms servicing the control strings attached to the cross stick is substantially less than the length of the cross stick.

10. A kite flight control device as in claim 9, wherein the arms are of equal radial extent, and the linear distance between the extremities of any two of the arms is about one-half the length of the cross stick.

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