July 3, 1951 F. O. PINKHAM 2,558,980

KITE RUDDER

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Fig. 1

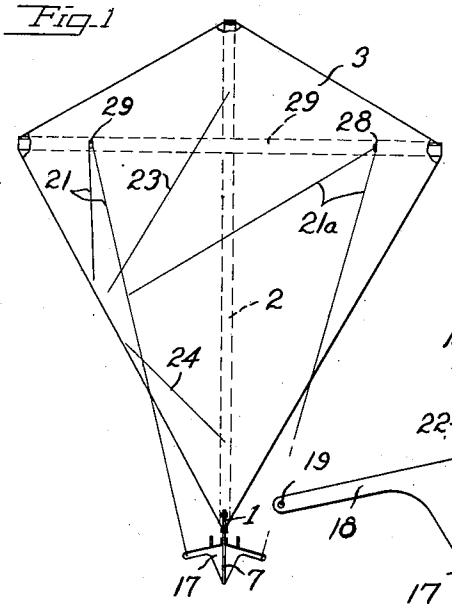


Fig. 2

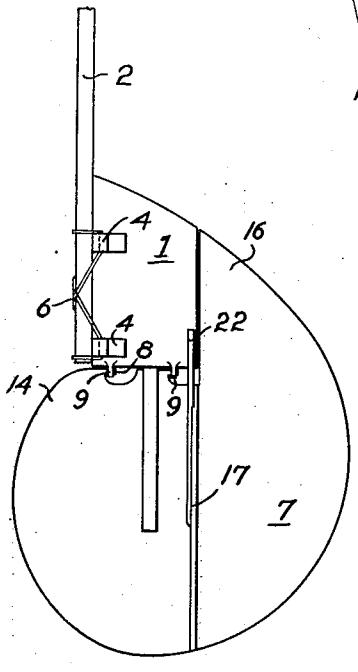


Fig. 4

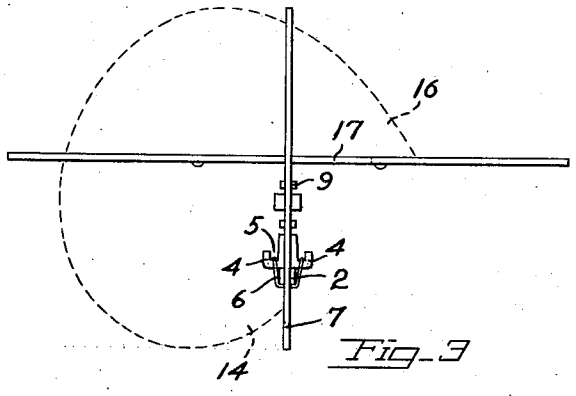


Fig. 3

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KITE RUDDER

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3 Claims. (Cl. 244—153)

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My invention relates to kite controlling mechanism, and particularly to a kite rudder unit, attachable to an ordinary kite, and by which the kite may be maneuvered.

It is among the objects of my invention to provide a kite rudder which will permit the flight of a kite to be effectively controlled from the ground by an operator.

Another object is to provide a kite rudder unit which may be independently fabricated as a unit suitable for attachment to any desired kite.

A further object is to provide a kite rudder so designed and positioned as to effectively utilize the air flow from the lower tip of a kite to control the flight of a kite, with a high degree of sensitivity and accuracy.

Another object is to provide a rudder construction for kites embodying improved features tending to facilitate manufacture and operation of the device.

My invention has many other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claims.

In the drawings:

Figure 1 is an elevational view of the face of a kite equipped with the kite rudder of my invention, the kite being assumed to be in flight;

Figure 2 is a front elevational view of a kite rudder unit embodying my invention, the figure being drawn upon a larger scale;

Figure 3 is an end elevational view of the unit shown in Figure 2; and

Figure 4 is a side elevational view of the unit shown in Figures 2 and 3.

In terms of broad inclusion, the kite rudder of my invention comprises a fixed fin attachable to the main mast of an ordinary kite adjacent its lower end, in a plane normal to the face of the kite, and passing through the longitudinal axis of the kite mast. A movable fin is pivoted to the fixed fin for movement to inclined relationship on either side thereof. A stabilizing fin, having portions extending laterally from opposite sides of the movable fin, is positioned in a plane substantially normal to the plane of said movable fin and to its pivot axis, at a point spaced axially and transversely from the lower end of the kite to intercept and deflect the air stream passing from the lower tip of the kite. Stops are provided for limiting movement of the movable fin to either side of the fixed fin. Control cord engaging

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means are preferably positioned upon the ends of the stabilizing fin.

In terms of greater detail, the kite rudder of my invention comprises a fixed fin 1 formed of wood, plastic, metal or other suitable material, attachable to the main mast 2 of a kite 3. In the embodiment illustrated in the drawings, the fin 1 is provided with spaced pairs of oppositely disposed lugs 4, recessed as at 5 to receive loops of an elastic band 6 or other fastening strand, by which the fin may be firmly secured to the mast, in a plane normal to the face of the kite, and passing through the axis of the mast 2. The fin 1 is positioned at the lower end of the mast 2, preferably with its lower end in substantial alinement with the extreme lower end of the mast.

A movable fin designated in general by the numeral 7 is pivoted to the fin 1 by any suitable pivot connection such as the interengaging pintle pins 8 and bearings 9 upon proximate edges of the fins 1 and 7. The fin 7 normally hangs from the fixed fin 1 in the plane thereof, and is movable upon the pivot connection to inclined positions on either side of the fixed fin, as indicated in dotted lines in Figures 2 and 3.

The fin 7 is supported in a position such that the major portion of its area hangs below the lowermost end of the kite, and within the path of air currents flowing off from the face of the kite in a stream. The air stream divided by the fixed fin 1 exerts substantially a jet action against the movable fin 7 when it is moved out of the plane of the fixed fin. Preferably the fin 7 is shaped as shown in Figure 4, with a leading edge portion 14 extending past the plane of the kite, and into the stream of air that spills over the tapering edges of the kite near its lowermost tip.

The fin 7 is also provided with an extension 16 projecting upwardly above the pivot axis adjacent the outer edge of the fixed fin 1. The extension provides an area on which the air stream passing on one side of the fixed fin 1 exerts a pressure tending to partially counterbalance the pressure effective upon the major area of the movable fin upon the opposite side of the fixed fin. The area of the extension 16 combines with the major area of the fin 7 below the pivot, both for stabilizing the kite in steady flight and in steering the kite along a given course. At the same time, the partial counterbalancing of air pressures above and below the pivot axis tends to lessen the pull which must be applied to turn the movable fin in either direction out of the plane of the fixed fin, and permits the use of relatively light control connections.

A stabilizing fin 17 is secured to the movable fin 7, in a position normal to the surface of the fin 7, and also normal to the pivot axis on which the fin 7 is mounted. Preferably the fin 17 is positioned in substantial alinement with the trailing edge of the fixed fin 1, and in correspondingly spaced relation to the plane of the kite. Also, the fin 17 is preferably positioned substantially wholly below the pivot axis on which the fin 7 moves. The fin 17 extends laterally in tapering form from opposite sides of the movable fin 7 and terminates in relatively narrow arms 18. Holes 19 or other cord engaging means are provided near the ends of the arms 18 for engaging control cords 21 and 21*a* which in turn are operable for manipulating the rudder.

Movement of the movable fin 7 relative to the fixed fin 1 is limited by suitable stops 22, as for example rods secured to the fin 17 in spaced relation and on opposite sides of the fin 7. As the fin 7 reaches the limit of its movement on either side of the fixed fin 1, after preferably about 45° to 60° of movement, the corresponding rod strikes the fixed fin 1 and prevents further movement in that direction. The stops 22 may of course be secured to the fixed fin 1; and other forms of stop means may be substituted, if desired.

The rudder unit of my invention is preferably fabricated as an independent unit which may be applied to any kite; and which may be transferred from one kite to another, as desired.

In operation, the kite is flown in conventional manner by a string or strings, not shown, attached to bridle cords 23 and 24 in any desired manner. Control cords 21 and 21*a* are connected to the rudder by the securing means 19 at the ends of the arms 18. The cords 21 and 21*a* pass through guides 28 secured to the cross spar 29 of the kite and thence to a tiller bar or other connection, not illustrated, by which the rudder may be manipulated from the ground by an operator. By shortening one of the cords 21 or 21*a* and correspondingly lengthening the other, the movable fin 7 may be shifted to incline relative to either side of the fixed fin 1. Air currents spilling off from the lower tip of the kite are divided by the fixed fin 1. When the fin 7 is moved to either side, the air currents exert a pressure thereon, and cause the flight of the kite to be shifted accordingly. The air currents, as they leave the tip of the kite, are intercepted and deflected by the stabilizer fin 17 into paths along the sides of movable fin 7, whereby the air stream, at its greatest velocity, is directed onto the fin 7. As a result, the rudder provides a highly sensitive control of the flight, whereby it may be maneuvered through long or short turns or loops, or along a relatively straight controlled course, as desired.

I claim:

1. A control rudder for kites having a main mast comprising a fin, spaced pairs of lugs upon the fin positioned to extend laterally upon opposite sides of the mast, an elastic band engageable with the lugs and crossing the mast upon the side opposite the fin for securing the fin in fixed position upon the mast in a plane normal to the face of the kite through the longitudinal axis of the mast, a movable fin pivoted to the fixed fin, and means for manipulating the movable fin.

2. A control rudder for kites having a main mast comprising a fin, spaced pairs of lugs upon the fin positioned to extend laterally upon opposite sides of the mast, an elastic band engageable with the lugs and crossing the mast upon the side opposite the fin for securing the fin in fixed position upon the mast in a plane normal to the face of the kite through the longitudinal axis of the mast, a movable fin pivoted to the fixed fin, stabilizing fins extending laterally from opposite sides of the movable fin in a plane normal to the surface of said movable fin and to the pivot axis thereof, and means for manipulating the movable fin.

3. A control rudder for kites having a main mast comprising a fin, spaced pairs of lugs upon the fin positioned to extend laterally upon opposite sides of the mast, an elastic band engageable with the lugs and crossing the mast upon the side opposite the fin for securing the fin in fixed position upon the mast in a plane normal to the face of the kite through the longitudinal axis of the mast, a movable fin pivoted to the fixed fin, stabilizing fins extending laterally from opposite sides of the movable fin in a plane normal to the surface of said movable fin and to the pivot axis thereof in spaced relation to the lower end of the main mast, and means for manipulating the movable fin.

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