Jan. 21, 1930. H. DE HAVEN 1,744,529

KITE

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Fig. 1.

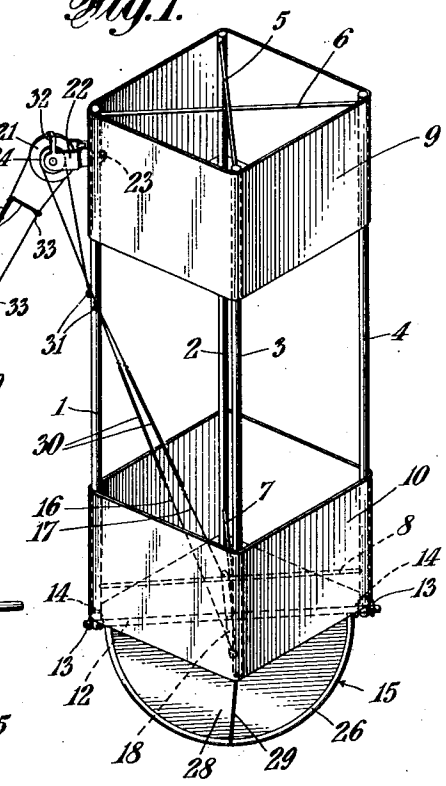


Fig. 2.

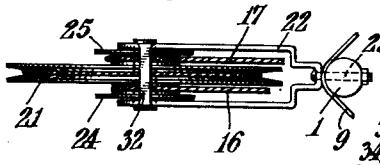


Fig. 6.

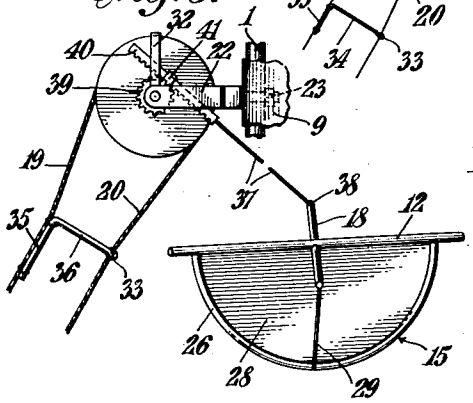


Fig. 3.

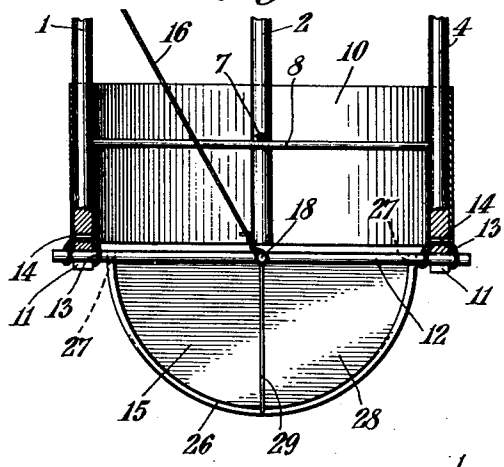


Fig. 4.

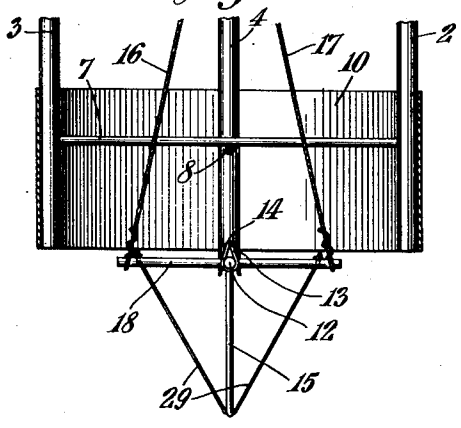
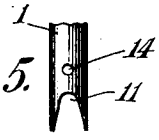


Fig. 5.



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Fig. 7.

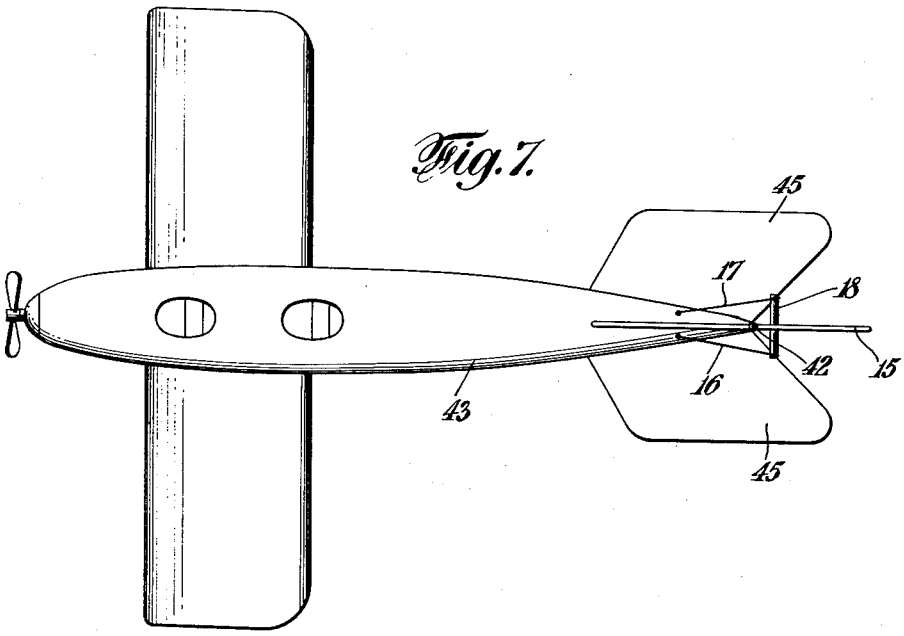


Fig. 8.

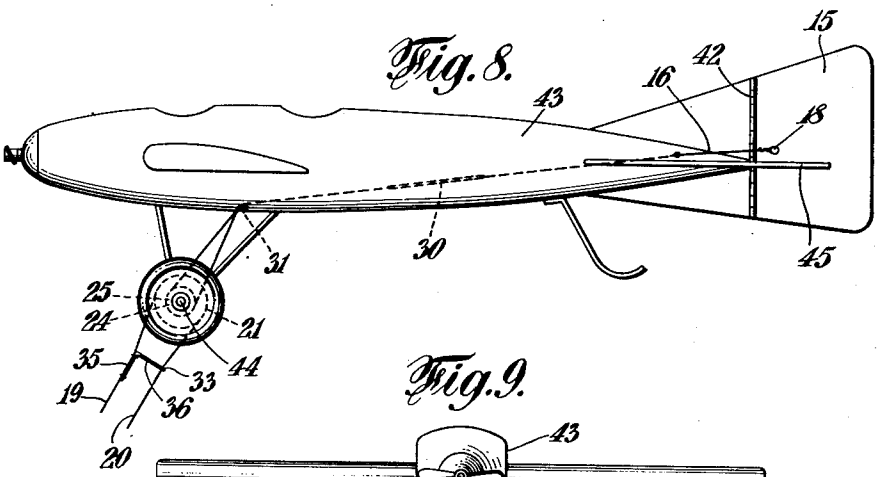
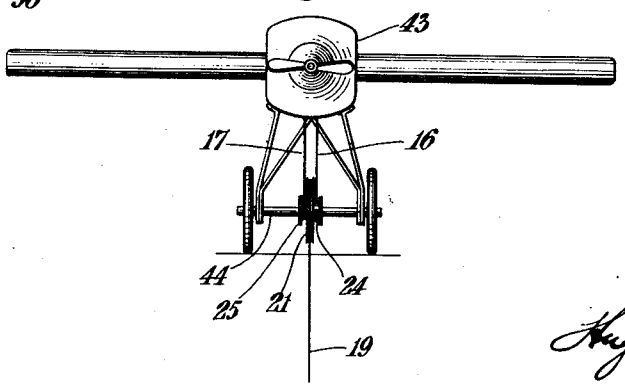


Fig. 9.



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UNITED STATES PATENT OFFICE

HUGH DE HAVEN, OF NEW CANAAN, CONNECTICUT

KITE

Application filed December 5, 1928. Serial No. 323,970.

Kites heretofore have merely been tied to the end of a string and sailed in the air and they have had no means for guiding them so that they could be moved across the current of air in which they were flying.

The kite of the present invention is provided with a movable rudder which can be moved by the kite string held in the hands of the person flying the kite so that the kite may be guided from the ground. The kite string is connected to the kite by means of a device, such as a pulley, which can be moved by the string and that device is connected to the rudder so that when the device moves the rudder is moved to guide the kite.

These and other objects and features of the invention will more fully appear from following specification and the accompanying drawings which, however, are to be considered in no sense limiting, but merely as illustrating, the invention.

In the drawings:

Figure 1 is an elevation of a box kite with the rudder and means to move it from the kite string.

Figure 2 is an enlarged view of the pulley for moving the rudder and for connecting the kite string to the kite.

Figures 3 and 4 are enlarged views of the end of the kite to which the rudder is attached.

Figure 5 is a detail of the end of one of the uprights of the kite in which the rudder bar is seated.

Figure 6 is a diagrammatic view of another form of mechanism for moving the rudder.

Figure 7 is a plan view of a kite in the shape of an airplane.

Figure 8 is a side view of the kite of Figure 7 showing the controls for the rudder.

Figure 9 is a front view of the kite showing a way of mounting the rudder control pulleys and connecting the kite string to the kite.

As illustrated in Figure 1 the means for guiding the kite is applied to the usual box kite consisting of the uprights 1, 2, 3, and 4 which are braced by the braces 5, 6, 7 and 8, and the usual cloth or paper flying surfaces 9 and 10.

In the form of kite shown in Figure 1 the bottoms of the two opposite uprights are notched at 11, as is shown in Figure 5, to receive the rudder bar 12. The notches 11 are preferably rounded at their inner ends to fit the seating portions of the rudder bar so that the rudder bar rotates easily, and the contacting portions of the notches and rudder bar are preferably greased. The rudder bar may be held in the notches by any suitable means such as rubber bands 13, which conveniently pass through holes 14 in the uprights, with the ends of the bands around the rudder bar.

The rudder, which is designated at 15 on the kite illustrated in Figure 1, is moved by the rudder lines 16 and 17 which are preferably connected to the rudder by being fastened near the ends of the tiller bar 18. The tiller bar is preferably rather long to enable the rudder to be moved easily and also transmit the movement of the rudder moving means, to the rudder, in reduced degree. The ends of the rudder lines are connected to means for moving them from the ground. To enable the rudder lines, and consequently the rudder, to be moved from the ground, the kite string, which has the two strands 19 and 20, is connected to means adapted to be moved thereby and which is also connected to the rudder lines. This movable means may be the pulley wheel 21 which is rotatably mounted in the bracket 22. The bracket is fastened to the kite by being fastened to the proper upright 1 by the bolt 23, or other suitable means, and by this the kite string is connected to the kite for flying it. In order to transmit the movement of the kite string and the pulley wheel 21 to the rudder lines in reduced degree, the rudder line 16 is connected to the small pulley wheel 24 and the rudder line 17 is connected to the small pulley 25 and both of the small pulley wheels 24 and 25 are connected to the large pulley wheel 21 so that as the pulley wheel 21 is revolved the small pulley wheels are also revolved. The large pulley 21 may thus have a rela-

tively large peripheral movement but the small pulleys 24 and 25 have only a relatively small peripheral movement so that only a relatively small movement is transmitted along the rudder lines to the tiller bar 18 where, due to the fact that the rudder lines are connected near the ends of the tiller bar, the movement is transmitted in still less degree to the rudder. This gives a delicacy of control which is so highly desirable in order to easily and absolutely control the kite.

The rudder may be made of any suitable material and mounted on the rudder bar in any suitable way and may be of any suitable shape. As illustrated in Figures 1, 3, and 4, the rudder is formed of a peripherial piece 26 connected to the rudder bar 12 in any suitable way as by having the ends of piece 26, seated in or passing through holes 27 in the rudder bar 12. The space between the peripheral piece 26 and the rudder bar 12 is filled in by the web 28 which catches the wind and moves the kite. The rudder is strengthened by the stay lines 29 which preferably extend from the ends of the tiller bar 18 to the outermost point of the rudder so that the force to move the rudder is not entirely transmitted by the joints between the peripheral piece 26 and the rudder bar 12 at the holes 27, but the force is partially transmitted along the stay lines 29.

In order to prevent any looseness in the connections between the kite strings and the rudder, elastic sections 30 preferably form part of the rudder lines and always keep the rudder lines and the associated parts tight. To keep the parts of the rudder lines which go around the small pulleys 24 and 25 always in line with the pulleys so that the lines run true onto and from the pulleys, they pass through guides 31. These guides may conveniently be suitably placed screw eyes which are screwed into the upright 1 a sufficient distance so that the eyes are in line with the small pulleys.

As heretofore stated the kite is flown by a double string. To keep the string in the groove of the large pulley 21, when the kite is made to perform evolutions in the air and when it is brought to earth, the pulley bracket is provided with a band 32 or similar device which fits closely adjacent to the periphery of the large pulley so that the kite string can not ride over the rims of the pulley wheel.

In order to space the strands of the kite string so that they do not become intertwined by the wind and thus prevent the delicate control of the rudder, spacer wires preferably are used. While these spacer wires may be of any suitable design they may conveniently have a loop or eye 33 through which one of the strands of the kite string runs freely and a shank 34 extending from the eye 33 to a clamping bar 35 to which the shank 34 is fastened in angular relation. The clamping bar may be lightly clamped along the other strand of the kite string to prevent the spacer wires from slipping down the string toward the ground when the kite is in the air and the tension on the strand 19 always holds the clamping bar 35 in line with the strand and holds the shank 34 at the angle to space the strands. The uppermost spacer wire 36 is preferably placed relatively close to the pulley wheel 21 and the shank is relatively short so that the eyes 33 and 35 are closer together than the diameter of the groove in the large pulley wheel 21, in order that the loop of the kite string which surrounds that pulley will be held down in the pulley so that the kite string will not come off of the pulley and control of the kite will not be lost.

In Figure 6 a slightly different mechanism for transmitting the movement of the pulley 21 to the rudder is shown. The single rudder line is preferably a stiff light rod, for instance a stiff light wire 37, so that it will transmit force along its length in both directions. The wire rudder line need be fastened to only one end of the tiller bar 18 as the tiller bar is both pulled and pushed by the rudder line to control the rudder. The wire 37 is connected at 38 to the tiller bar by any suitable connection which will permit the angle between the wire and the tiller bar to change as the tiller bar moves, so that there is free and easy motion. The other end of the wire 37 is connected to the large pulley 21 by means which will transmit the bidirectional movement of the pulley to the wire. Such means is illustrated in Figure 6 as a gear 39 fastened to the large pulley 21 so that the gear 39 and pulley 21 revolve together. The gear 39 meshes with a rack 40 which is fastened to the wire 37 so that as the gear 39 moves, the wire 37 moves to move the rudder. The rack 40 is held in contact with the gear 39 by any suitable means such as an offset in the band 32 or in the bracket 22 or by an angle bar 41 which extends over the rack.

The invention as applied to the airplane form of kite is illustrated in Figures 7 and 9. The rudder 15 is hinged at 42 so that it may be moved by the tiller bar 18 and the rudder lines 16 and 17. The rudder lines extend to the small pulleys 24 and 25 which are moved by the large pulley wheel 21, as heretofore described. The rudder lines may conveniently pass through the fusilage 43 of the airplane, passing around or through pulleys or eyes 31 which permit the change of direction of the rudder lines and also guide the rudder lines directly to the small pulleys 24 and 25. The pulleys 21, 24 and 25 are conventionally mounted on the axle 44 of the airplane. It will be understood that the elevators 45 may, if desired, be hinged and controlled by means similar to that heretofore described and by the term "rudder" and similar terms

is meant any surface which guides the kite.

Although both a box kite and an airplane form of kite have been described, the box kite is at present preferred because it has lateral flying surfaces and will fly much better in the various evolutions into which it can be thrown by the operation of the rudder, without losing altitude even though flying on its side.

The kites will probably find their greatest usefulness in interesting children in flying devices but, because of the fact that the flight of the kite can be controlled and it can be made to move across the current of air in which it is flying, its field of usefulness is wide. For instance it may be used to carry a line between two vessels at sea when rescues are to be effected. The sea is frequently too rough to launch a boat from the rescuing vessel to the foundering vessel and often the deck of the foundering vessel is awash so that a line which could be floated from the rescuing vessel to the foundering vessel, can not be gotten hold of by any one on the foundering vessel. However, with a kite, and particularly a box kite having lateral flying surfaces, such as has been described, the kite may be flown directly to or over the bridge of the foundering vessel as the kite can be made to fly across the wind. The kite string may be grasped by those aboard the foundering vessel and used to haul a heavier line aboard. The kite will probably be destroyed, but several kites may be carried aboard every vessel, as they are rather inexpensive, and used for rescue work.

It will readily be understood that many modifications of invention may be made, both in construction and application, and it is therefore to be understood that the invention is to be construed as broadly as the claims, taken in conjunction with the prior art, may allow.

I claim:

1. The combination of a box kite and means to guide the kite across the wind from the ground while the kite is flying.

2. The combination of a kite having a rudder and a plurality of flying surfaces at angles to each other and means for moving the rudder from the ground while the kite is flying.

3. The combination of a box kite having a movable rudder, a rudder line connected to the rudder, and means to move the rudder line from the ground.

4. The combination of a kite having a movable rudder, a tiller connected to the rudder to move the rudder, and means to move the tiller from the ground.

5. The combination of a kite having a movable rudder, and a string connected to the kite for flying the kite and also connected to the rudder for moving the rudder.

6. The combination of a kite having a movable rudder, a pulley fastened to the kite, a double strand kite string having a loop around the pulley to move the pulley and means to transmit the motion of the pulley to the rudder.

7. The combination of a kite having a movable rudder, a double strand string, movable means to connect the string to the kite and adapted to be moved in one direction by increasing the tension on one of the strands of the string and to be moved in the other direction by increasing the tension on the other strand, and connecting means to connect the movable means to the rudder whereby movement of the movable means is transmitted to the rudder.

8. A kite having a movable rudder, and rudder moving means for moving the rudder, said means being connected at a point remote from the operator to the string for flying the kite.

9. A kite having a movable rudder, a rudder line connected to the rudder and to means to move said line, said means being connected to the string for flying the kite to be moved thereby.

10. A kite having flying surfaces and a movable rudder separate from the flying surfaces and a pair of elastic rudder lines connected to the rudder and adapted to be moved from the ground.

11. A kite having a movable rudder, a pulley fastened to the kite in position to be connected to the string for flying the kite and to be moved thereby, and a rudder line connected to the rudder and to the pulley whereby when the pulley is moved by the kite string the rudder is moved.

12. A kite having a movable rudder, a large pulley fastened to the kite in position to be connected to the string for flying the kite to be moved thereby, a smaller pulley connected to the first mentioned pulley, and a rudder line connected to the rudder and to the small pulley whereby when the large pulley is moved by the kite string the movement is transmitted in less degree to the rudder lines.

13. A kite having a movable rudder, movable means fastened to the kite and adapted to be moved by the string for flying the kite, a rudder line connected to the rudder and to said movable means, said movable means being arranged to transmit the movement of kite strings to the rudder line in reduced degree.

14. A kite having a movable rudder, movable means fastened to the kite and adapted to be moved by the string for flying the kite, and means connected to said rudder and to said movable means and adapted to transmit the motion of said movable means to said rudder in reduced degree.

15. A kite having surfaces including a plurality of flying surfaces at angles to each other for supporting it in the air and a rud-

der for directing its flight and means for altering the position of the rudder in the wind to direct the flight of the kite.

16. A box kite having surfaces for supporting it in the air and a rudder for directing its flight and means for controlling the angle of the rudder to the wind while the kite is in the air, to direct the flight of the kite.

In testimony that I claim the foregoing, I have hereunto set my hand this 4th day of Dec., 1928.

HUGH DE HAVEN.