

W. KRIEDTER & W. BOURDON.
 UNIVERSAL RUDDER FOR FLYING MACHINES.
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996,863.

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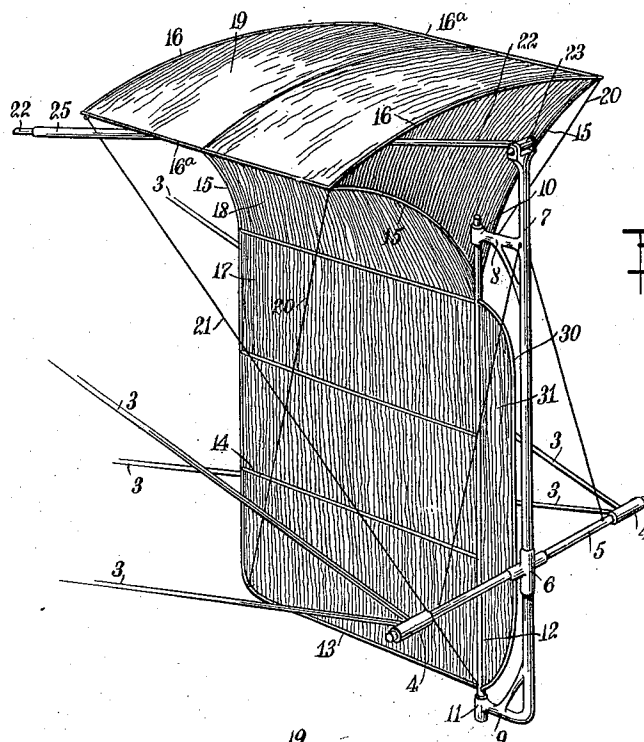


Fig. 1.

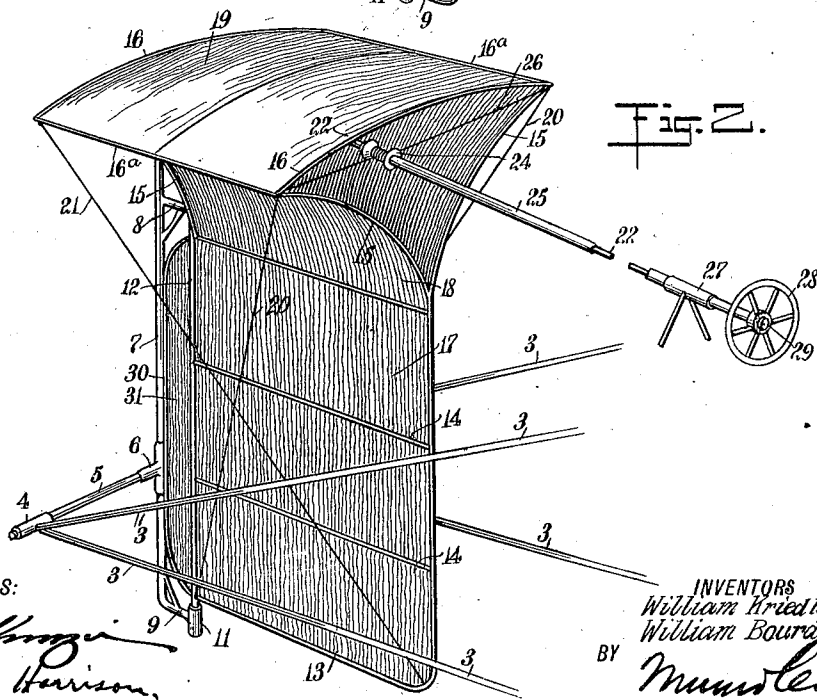


Fig. 2.

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WILLIAM KRIEDTER AND WILLIAM BOURDON, OF NEW YORK, N. Y.

UNIVERSAL RUDDER FOR FLYING-MACHINES.

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Specification of Letters Patent.

Patented July 4, 1911.

Application filed May 27, 1910. Serial No. 563,732.

To all whom it may concern:

Be it known that we, WILLIAM KRIEDTER and WILLIAM BOURDON, both citizens of the United States, and residents of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Universal Rudder for Flying-Machines, of which the following is a full, clear, and exact description.

Our invention relates to flying machines, our more particular purpose being to provide a universal rudder for service upon said machines; that is to say, a rudder having a vertical movement for controlling altitude and a horizontal movement for controlling directions relative to the points of the compass—the rudder having surfaces disposed at different angles for enabling movements of the rudder to be effected.

Our invention further relates to the provision in a rudder of both a plane and a box, in order to give to the rudder a maximum of usefulness as regards its ability to confer movements of different kinds upon the flying machine, and also to increase the stability of the flying machine as controlled by the rudder.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the views.

Figure 1 is a fragmentary perspective showing our combinational rudder complete and ready for use; and Fig. 2 is a perspective showing the rudder as it appears when seen from a different angle from that associated with Fig. 1; Fig. 2 further showing the means whereby the operator is enabled to shift the rudder into different positions.

Frame members 3 converge forwardly of the machine to cylindrical bearings 4. These bearings support a horizontal rocking shaft 5 and connected with the latter is a cross bracket 6. A tiller post 7 extends upward through this cross bracket and is provided with arms 8, 9 extending a short distance toward the rear. The arms 8, 9 are rigid relatively to the tiller post 7 and are provided with cylindrical bearings 10, 11. A rudder post 12 is journaled in the bearings 10, 11 and supports a rib 13 which extends backwardly a distance, and is then bent upwardly, thus forming the bottom and rear edge of the rudder. Extending from the

vertical portion of this rib to the tiller post 12 are various horizontal ribs 14. Mounted upon the upper end of the rib 13 are two ribs 15 bent outwardly from each other at the top, and extending from the upper and outer portion of each rib 15 over to the opposite rib 15, is a bow 16. Two other ribs 15 extend upwardly and outwardly from the rudder post 12 and are similarly connected by a bow 16. Extending from one bow 16 to the other are rods 16^a. At 17 is a web which is mounted in part by the rib 13, and at 18 are also webs which are bent outwardly at their uppermost portions, their outer edges thus being secured to the rods 16^a. Webs 19 extend from one of the bows 16 to the opposite bow 16, and also from one to the other of the rods 16^a. Guy cords 20, 21 extend from the outer ends of the ribs 15 down to the bottom of the rudder and cross each other.

A steering rod 22 is by aid of a pivot joint 23 connected with the top end of the tiller post. At 24 (Fig. 2) is a spool which is mounted upon a sleeve 25. A cord 26 is given several wraps around the spool 24 and is connected securely to the same, the ends of the cord being connected to opposite ribs 16^a. At 27 are bearings, one of which is shown in Fig. 2, and which support both the rod 22 and the sleeve 25. At 28 is a steering wheel connected rigidly with the sleeve 25, and at 29 is a head against which bears the end of the sleeve. At 30 is a rib mounted directly upon the rudder post 12, and this rib carries a web 31, which lies in the same plane as the web 17 and for some purposes may be considered as practically a continuation of the latter.

The various webs and the ribs supporting the same together make up a rudder, the upper portion of which, because of its analogy to a box kite, we designate as a box. The air can flow freely through this box—that is, beneath the web 19 and above the webs 18. The box greatly increases the stability of the rudder and correspondingly increases the stability of the flying machine as a whole. The operator, by moving the steering wheel in the general direction of the length of the rod 22, pushes and pulls this rod endwise, and thereby causes the entire rudder and parts immediately associated with it to tilt upon the axis of the bearings 4 as a center. By turning the steering wheel so as to rotate or partially rotate the

sleeve 25, the operator turns the spool 24 and in so doing he turns the rudder upon the axis of the bearings 10, 11 as a center. The rudder as a whole thus has two distinct motions both controllable at will by the operator. First, a forward motion in adjusting the flight of the machine to different altitudes; second, a horizontal or lateral motion which steers the flying machine to different points of the compass. While the universal rudder is thus susceptible of two distinct movements for two separate purposes, the stability of the box at the top of the rudder is considerable under all conditions.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A combinational rudder for flying machines, comprising a frame provided with bearings, a rocking shaft journaled within said bearings, a tiller post connected with said rocking shaft and adapted to tilt, said tiller post being provided with arms carrying bearings, a rudder post journaled in said last-mentioned bearings, a rudder journaled within said last-mentioned bearings,

said rudder being provided with surfaces extending at different angles, and means controllable at will for tilting said rudder at various angles in planes perpendicular to each other, so as to render effective the different angles of its surfaces.

2. A combinational rudder for flying machines, comprising a rocking shaft, means for supporting the same, a tiller post connected with said rocking shaft and adapted to tilt in a direction crossing the general direction of said rocking shaft, a rudder post journaled relatively to said tiller post and substantially parallel with the same, and a rudder mounted upon said tiller post and provided with surfaces extending in different planes, and means for controlling horizontal and vertical movements of said rudder.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM KRIEDTER.
WILLIAM BOURDON.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."