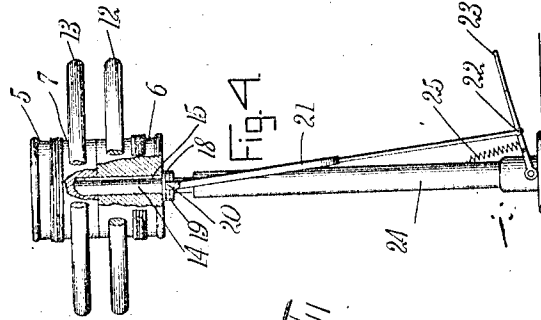
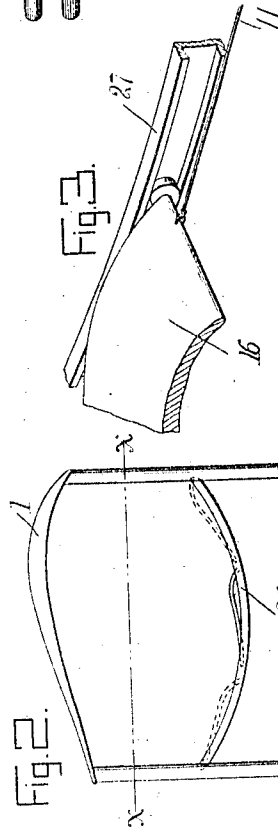
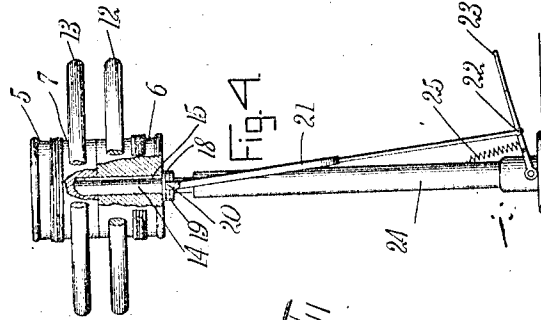
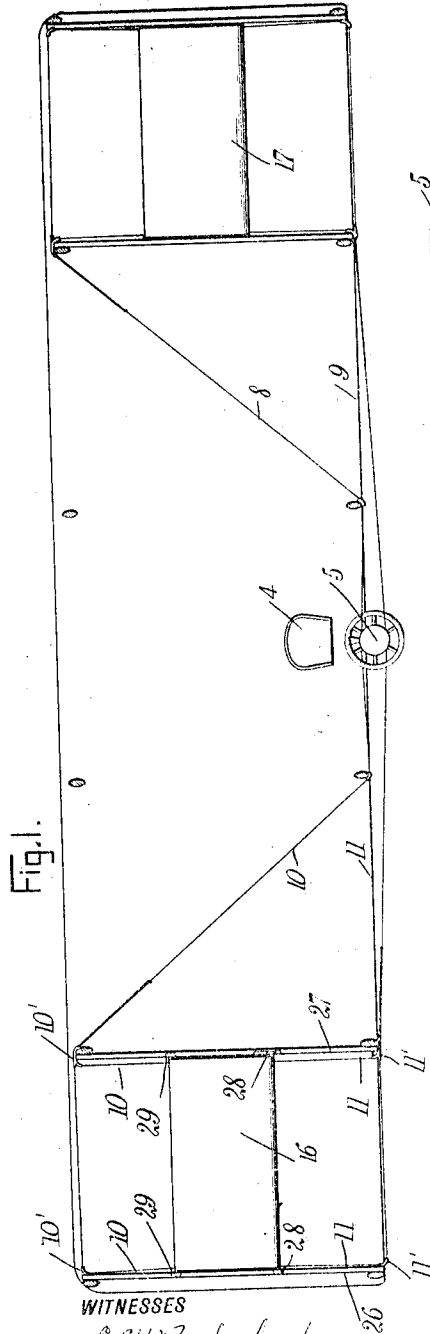


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CONTROL FOR AEROPLANES.  
APPLICATION FILED APR. 9, 1912.

Patented Dec. 24, 1912.

1,048,386.



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# UNITED STATES PATENT OFFICE.

WINSOR A. BARTHOLOMEW, OF RAVENNA, MICHIGAN.

CONTROL FOR AEROPLANES.

1,048,386.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed April 9, 1912. Serial No. 689,608.

*To all whom it may concern:*

Be it known that I, WINSOR A. BARTHOLOMEW, a citizen of the United States, and a resident of Ravenna, in the county of Muskegon and State of Michigan, have invented a new and Improved Control for Aeroplanes, of which the following is a full, clear, and exact description.

This invention relates to improvements in 10 aeroplanes, and particularly to a device for the transverse controlling of the planes, and has for an object the provision of an improved structure which will act at or near the extremities of the planes, or other convenient points for causing the aeroplane to 15 maintain its proper equilibrium or return to its proper position quickly when moved therefrom.

Another object of the invention is to provide a reciprocating plane arranged at or 20 near the ends of the lifting planes designed to be moved back and forth substantially longitudinally of the direction of flight, and be guided in an arc-shaped groove formed with its axis in a plane extending longitudinally of the longitudinal direction of the 25 lifting planes.

In forming a device embodying the invention and in carrying out the objects of the 30 invention, an aeroplane of any desired structure may be used, to which are secured tracks at or near the ends of the lifting planes. These tracks are arc-shaped and accommodate rollers connected with controlling 35 planes whereby the controlling planes may be shifted forward or rearward and the angle of incidence of the controlling planes increased or decreased, or made positive or negative, and thus secure a large range of 40 influence for the controlling planes. These controlling planes when used as such are arranged at or near the outer ends of the lifting planes, but when the same are used as elevating planes either at the front or 45 rear of the machine, the movement and operation is the same.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in 50 which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a section through Fig. 2 on the line  $x-x$ ; Fig. 2 is an end view of the 55 lifting planes of an aeroplane; Fig. 3 is a detail fragmentary perspective view showing part of a guiding track and part of a controlling plane associated therewith; and

Fig. 4 is an enlarged front elevation of the steering mechanism, certain parts being broken away to disclose a clutch device. 60

Referring to the accompanying drawings by numerals, 1 and 2 indicate lifting planes connected by any desired or suitable posts 3. Arranged centrally of the plane 2 is an operator's seat 4, in front of which is positioned a controlling mechanism 5. The controlling mechanism 5 (Fig. 4) is formed 65 with drums 6 and 7, on which are wound wires or cables 8 and 9, and also 10 and 11, respectively. Hand wheels 12 and 13 are 70 connected with the drums 6 and 7 so that the operator may freely rotate the respective drums. Both of these drums are mounted on a shaft 14 so as to freely rotate thereon. A key 15 is slidingly mounted in 75 the shaft 14 and when in the position shown in Fig. 4, the drums 6 and 7 are rigidly connected together, whereby when the wheels 12 and 13 are rotated in either direction the controlling planes 16 and 17 will be 80 moved in opposite directions, namely, one toward the front and one toward the rear. The key 15 is rigidly secured to a spool 18 having a slip ring 19 mounted thereon. The ring 19 is formed with ears 20 to which 85 is secured an operating member 21 pivotally mounted at 22 to a foot lever 23. The foot lever 23 is pivotally mounted in a standard 24 and normally held in an elevated position by a spring 25. The spring 25 90 also normally holds the spool 18 in its upper position so that the key 15 will be normally engaging the drum 7. When it is desired to move both of the controlling planes 16 and 17 in the same direction, as for instance, 95 when the aeroplane makes a sudden dip, the operator places his foot on the lever 23 and rotates the wheels in opposite directions so that both of the controlling planes 16, 100 and 17 will move to the front and cause a lifting action. Of course the planes 16 and 17 could be moved to the rear, if desired, as hereinafter clearly described.

Arranged at each end of the lifting planes 1 and 2 are tracks 26 and 27 which are 105 adapted to accommodate rollers 28, 28, and 29, 29. The rollers are arranged near the front and rear edges respectively of the planes 16 and 17 so as to prevent any swinging movement of these planes, except as the 110 wheels and rollers move longitudinally of the tracks 26 and 27. Each of the planes 16 and 17 is formed substantially arc-shaped so that when moved to the front of the

tracks 26 and 27, as shown in dotted lines in Fig. 2, they will act as elevators or lifting planes, while in the position shown in full lines in Fig. 2, they will be neutral. If moved to the rear position shown in dotted lines in Fig. 2, the controlling planes will act in a negative sense and will have a depressing tendency. This is of advantage where one end of the lifting planes 1 and 2, is elevated and the other depressed. In a case of this kind the end of the planes 1 and 2 which is elevated will have its controlling plane move to the rear and the end that is depressed will have its controlling plane moved to the front, whereby the controlling planes will depress at one end and lift at the opposite end. Connected to the front of the planes 16 are wires 11 which pass over guiding members 11' and from thence around one of the steering drums. Connected to the rear of the plane 16 are wires 10 which pass around suitable guiding members 10' and from thence around preferably the same steering drum which receives wires 11. The guiding members 11' and 10' may be pulleys, tubes or any other guiding means preferred. The wires 8 and 9 are similarly connected with the plane 17, and the plane 17 is otherwise constructed and arranged exactly like plane 16 and associated parts so that no additional description thereof will be necessary.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a device of the character described, an aeroplane structure, a pair of arc-shaped ways arranged on each side of said aeroplane structure, said arc-shaped ways being bowed down centrally, a balancing plane arranged between each pair of said arc-shaped ways, a pair of guiding rollers at the front and at the rear of each of said balancing planes fitting into side arc-shaped ways whereby the movement of the arc-shaped ways are controlled, a propelling cable arranged at the front and rear of each of said balancing planes, and means for shifting the position of said cable for varying the angle of the balancing planes.

2. In a device of the character described, an aeroplane structure, a pair of downwardly bowed ways arranged on each side of said aeroplane structure, each of said ways being formed of substantially U-shaped material, the ways of each pair having the open part facing each other, a balancing plane arranged adjacent each pair of said ways, an antifriction roller arranged on each side of the front and the back of each of said balancing planes fitting into said substantially U-shaped material for guiding and controlling the movement of

the balancing planes, and means for shifting the balancing planes longitudinally of the ways.

3. In a device of the character described, an aeroplane structure, a plurality of balancing planes, one of said balancing planes being arranged on each side of the aeroplane structure, a plurality of cables connected to each of said balancing planes for giving the same a fore and aft movement, an independently actuated drum connected to the cables of each balancing plane whereby the balancing planes may be independently adjusted or moved, one of said drums being formed with a socket therein, a reciprocating pin arranged in the other of said drums adapted to be moved so that one end will project into said socket whereby said drums are locked together for causing the simultaneous action of the balancing planes when either of the drums are moved, and foot operated mechanism for moving said pin out of said socket.

4. In a device of the character described, an aeroplane structure, a pair of slidable balancing planes arranged on opposite ends of the lifting planes of said aeroplane structure, a plurality of cables connected with the forward end of each of said balancing planes, a plurality of cables connected with the rear of said balancing planes, a plurality of guiding means for each of said cables, a pair of independently mounted drums arranged to have said cables wound thereon, and means for locking said drums together, and means for releasing said drums whereby said drums may simultaneously shift the position of said balancing planes and shift the position of said balancing planes independently at will.

5. In a device of the character described, a pair of side balancing planes, a plurality of cables connected at each of said planes for shifting the position thereof, and a steering device connected with the ends of said cables, said steering device comprising a pair of independent drums on which said cables are adapted to be wound, a reciprocating locking member for locking said drums together, and pivotally mounted means for moving said reciprocating member for unlocking said drums, said drums when locked together being adapted to simultaneously adjust said balancing planes and when unlocked being adapted to independently adjust said balancing planes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WINSOR A. BARTHOLOMEW.

Witnesses:

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I. R. BARTHOLOMEW.