J. P. NISSEN.

AEROPLANE CONTROLLING DEVICE.

APPLICATION FILED SEPT. 23, 1909.

1,085,932.

Patented Feb. 3, 1914.

2 SHEETS—SHEET 1.

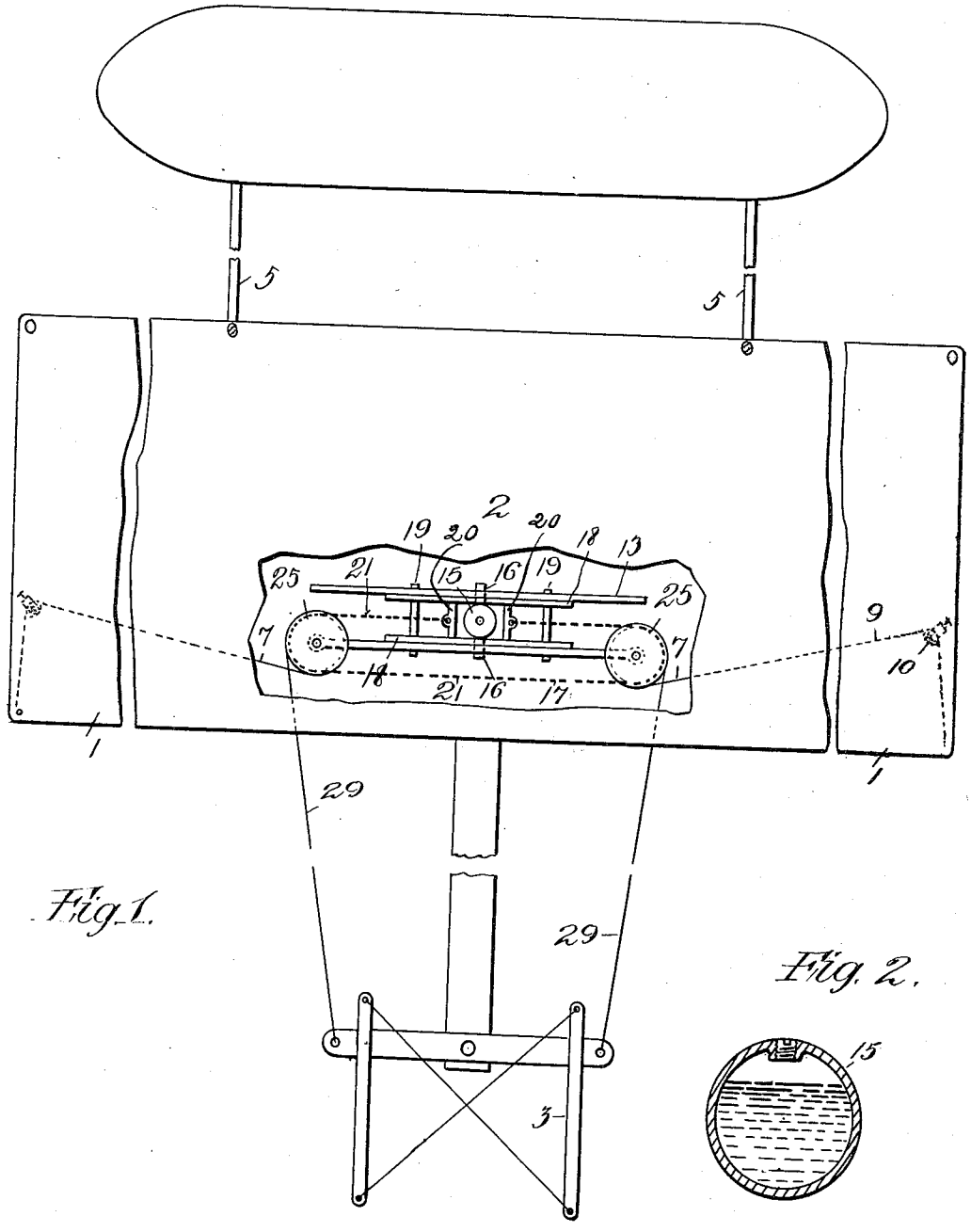


Fig. 1.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig 3

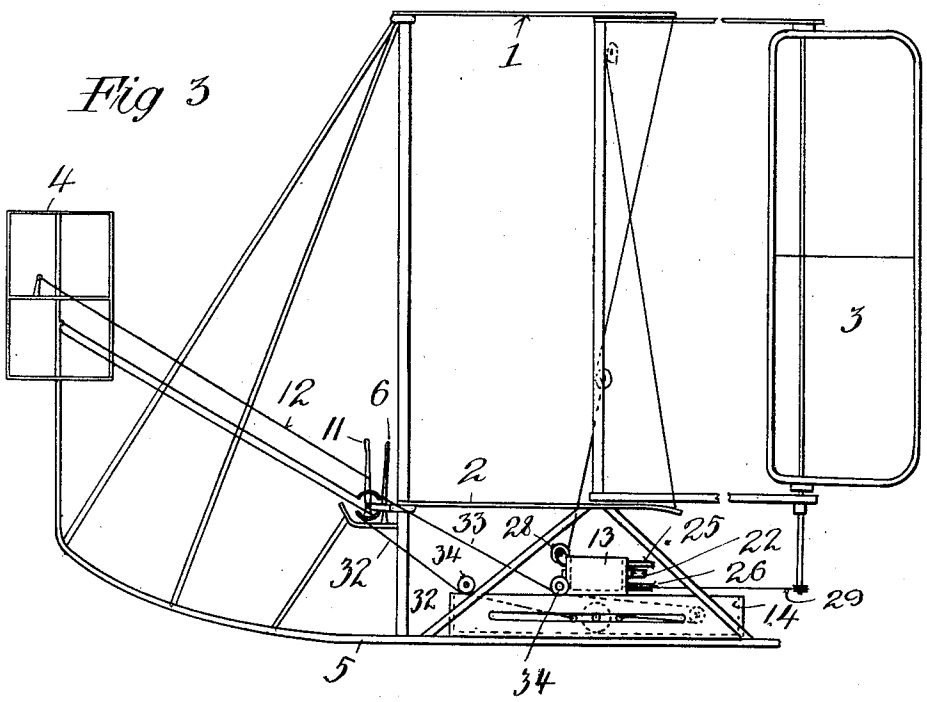


Fig. 4.

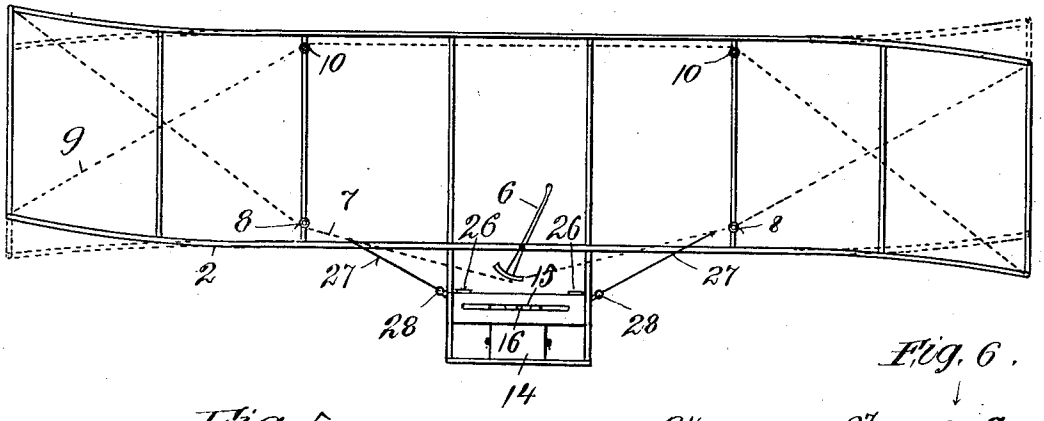


Fig. 5

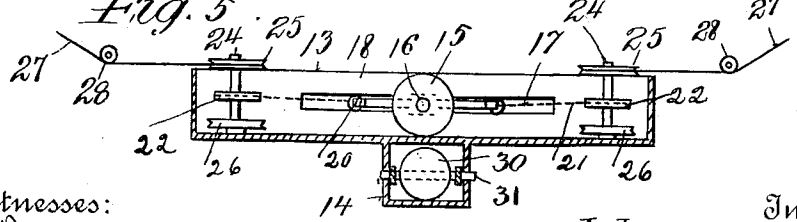
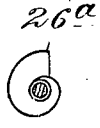


Fig. 6.



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UNITED STATES PATENT OFFICE

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AEROPLANE-CONTROLLING DEVICE.

1,085,932. Specification of Letters Patent. Patented Feb. 3, 1914.

Application filed September 23, 1909. Serial No. 519,180.

To all whom it may concern:

Be it known that I, JOHN P. NISSEN, a citizen of the United States, and a resident of 35 Bertha Place, Stapleton, Staten Island, city of New York, county of Richmond, and State of New York, have made a new and useful Improvement in Aeroplane-Controlling Devices, of which the following is a specification.

The object of my invention is to provide a controlling device which will control the mechanism of an aeroplane so that it will maintain itself automatically with a proper poise in the air when in use. This object is accomplished by my invention one embodiment of which is hereinafter set forth.

For a more particular description of my invention reference is to be had to the accompanying drawings forming a part hereof, in which;

Figure 1 is a plan view partially in section, of an aeroplane provided with my improvements. Fig. 2 is a sectional view of a controlling weight. Fig. 3 is an end elevation of an aeroplane provided with my improvement, irrelevant parts being omitted. Fig. 4 is a front elevation of an aeroplane provided with my improvement. Fig. 5 is a sectional view showing the controlling means. Fig. 6 shows a spiral sheave.

Throughout the various views of the drawings, similar characters designate similar parts.

While my improved controlling device is applicable to any structure of the class specified, it is particularly applicable to that shown in the patent granted to Wright Brothers, No. 821,393, which is the form of aeroplane herein shown and described. As is well known, this form of aeroplane is provided with upper and lower planes 1 and 2 respectively, the rear edges of which are warped by wires to conform to the requirements of flight and this aeroplane is steered in a horizontal plane by the rear rudder 3 and in a vertical plane by the front rudder 4 and when at rest the entire structure is carried by suitable runners 5. The aeroplane is steered by means of three levers only two of which are shown. The lever 6 connects with a wire 7 which runs over suitable pulleys 8 to the upper and rear corners of the plane 1, and a second wire 9 runs from the rear lower corners of the plane 2 and over pulleys 10 placed substantially as shown. The lever for steering the aeroplane in a horizontal plane by turning the rudder 3 is purposely omitted to avoid confusion and the front rudder 4 is controlled by a lever 11. The operation is such that by shifting the lever 6 and the lever not shown or the lever 11, as may be appropriate, the aeroplane may be kept in its proper position in the air and steered under the control of the aviator. All the foregoing is old and well known and form no part of my invention.

In the structure just described the aviator must be alert to keep his machine properly poised in the air because of the varying density of the air due to the constantly changing winds. This requires him to be exceedingly alert and careful so as to operate his three levers promptly and effectively and the strain upon him is very great because of alertness just referred to. My invention does automatically what an aviator has to do instinctively or consciously. In the embodiment herein described, connections are made with the controlling wires or links above referred to so that when the aeroplane gets out of true, a weight will be shifted and thereby shift either or both rudders and warp the planes 1 and 2 to correspond and thereby cause the machine to right itself. The automatic device just referred to is so arranged and disposed as to not interfere with the aviator's control of the machine when he shifts the levers for steering purposes.

The frame of the machine carries two troughs 13 and 14 which run one above the other, in horizontal planes, and one perpendicular to the other. In the structure shown the trough 13 runs above the trough 14 and transversely of the machine and the trough 14 runs longitudinally. The mechanism of the trough 13 acts on the planes 1 and 2 so as to warp them and also shifts the rudder 3 to correspond and the mechanism in the trough 14 shifts the front rudder 4.

In the trough 13 runs a ball 15 which is preferably made hollow and provided with a liquid which partially fills the same or a liquid like substance which will act with less speed than liquid, such as shot, and will possess greater inertia when acting, so that the material placed in the ball 15 will depend upon the conditions of use. Both kinds come within the purview of my invention. The ball 15 has suitable lugs 16 extending from each side and diametrically opposed

and these lugs 16 enter corresponding slots 17 in the vertical and longitudinal walls of the trough 13. These trunnions also extend through the bars 18 which rest snug against the interior, vertical walls of the trough 13 and these bars are united by suitable cross-bars 19 and 20. The bars 19 are extended sufficiently to run through the slots 17 and the bars aid the trunnion 16 in guiding what might be termed the frame, that is the longitudinal bars 18 and the cross bars 19 and 20. The bars 20 are connected by a sprocket chain 21 that runs over sprocket wheels 22 journaled at each end of the trough 13 by being fixed on vertical shafts 24.

Each shaft 24 has an upper pulley or drum 25 and a lower pulley drum 26, fixed thereto. The pulleys 25 are connected to wires 27 which run over suitable guiding pulleys 28 and are connected to the wire 7 near the pulleys 8 so that the rotation of the pulleys 25 will warp the planes 1 and 2 to correspond.

The drums or pulleys 26 are similarly connected by wires 29 to the rear rudder 3 and shift this rudder to correspond with the warping of the aeroplane.

From the foregoing it is obvious that as long as the trough 13 remains level, the ball 15 will remain in the center, but should the machine get out of its true position, one end or the other of the trough will be lowered and thereby cause the ball 15 to roll under the influence of gravity toward the lower end. This shifting of the ball 15 causes the frame to move with it and thereby shifts the sprocket chain 21 to correspond so that the planes 1 and 2 are warped and the rudder 3 is shifted to right the machine. The shot in the ball 15 will prevent it from moving too rapidly and yet will give it sufficient weight to control the apparatus. The ball 15 is not sufficiently heavy to interfere with the shifting of the levers by the aviator. When the machine starts to right itself it will not assume a true position immediately but will rise a little too much so that the ball 15 will roll beyond its normal position to a slight extent, but will shift less than before so that the machine will gradually be righted with a gentle rocking motion which is scarcely perceptible.

The mechanism in the trough 14 consists of the ball 30, in all respects the same as ball 15, and mounted in a similar frame 31, the ends of which are connected to wires 32 and 33 respectively and run from suitable idle pulley 34 so as to get the right direction of movement. The wire 33 is connected to the lever 11 above its fulcrum and the wire 32 below and these wires shift this lever so that if the ball 30 rolls forward of its normal position, the rudder 4 is set to elevate the apparatus, and if in rear of its normal position, the rudder 4 is set to depress the apparatus.

When the spiral sheave 26ª as shown in Fig. 6 is used instead of a pulley or drum 25 or 26 the wire on said sheave is first pulled very slightly with an increasing tension as the wire winds on the increasing diameter of the spiral of the sheave 26ª. When unwinding the greater tension is removed in the first part of the movement.

From the foregoing, the operation of my aeroplane will be readily understood.

The apparatus is always controlled by the levers which the aviator grasps and by which the aviator manages the machine except that when he wishes to fly on a level without turning either to the right or left, he starts the machine true or nearly true and releases the levers and then the weights 15 and 30 and will shift sufficiently to make the apparatus take a true course and hold it if already in a true course. These balls or movable weights 15 and 30, shifting together or separately, act in the manner described.

While I have shown one embodiment of my invention, it is obvious that it is broad enough to cover all structures that come within the scope of the annexed claims and is not restricted to the precise construction shown.

What I claim is.

1. In a device of the class described, aeroplane mechanism, a trough and means for supporting the same, a hollow weight in said trough partially filled with a liquid or a liquid-like substance and means for connecting said weight with the mechanism of the aeroplane.

2. In a device of the class described comprising warpable aeroplanes, a trough and means for supporting the same, a weight in said trough, a frame shifted by the moving of said weight, shafts and means for causing said frame to drive said shafts, and spiral sheaves on said shafts for the support of wires warping the planes of the aeroplane.

3. In a device of the class described, the combination with the mechanism connecting the upper and lower planes of an aeroplane, of an automatically movable hollow rolling weight, a relatively movable substance within said weight, and means connecting the weight with said mechanism.

4. In a device of the class described, the combination with the mechanism connecting the upper and lower planes of an aeroplane, of an automatically movable hollow rolling weight, a relatively movable substance within said weight, means connecting said weight with said mechanism, and means for guiding said weight in its movement.

5. In a device of the class described, the combination with the mechanism and upper

and lower planes of an aeroplane, of movable hollow weights mounted for independent movement in planes at an angle to each other, and means for connecting said weights with said mechanism, said weights being partially filled with a movable substance.

6. In a device of the class described, the combination with the mechanism and upper and lower planes of an aeroplane, of a movably mounted weight, a sliding frame carrying the same, a guide for said frame, and means connected with said frame and with said mechanism for shifting the latter.

7. In a device of the class described, the combination with the mechanism and upper and lower planes of an aeroplane, of a movably mounted weight, a sliding frame carrying the same, a guide for said frame, means connected with said frame and with a portion of said mechanism for shifting the latter, and a second weight movable at an angle to the first-named weight and independently connected with a portion of said mechanism.

8. In a device of the class described, the combination with the mechanism and upper and lower planes of an aeroplane, of a movably mounted hollow weight, a sliding frame carrying the same, a guide for said frame, means connected with said frame and with said mechanism for shifting the latter, and a second hollow weight movable at an angle to the first-named weight and independently connected with said mechanism, said weights being partially filled with a movable substance.

Signed at the city of New York, county of New York, State of New York, this 2nd day of September, 1909.

JOHN P. NISSEN.

Witnesses:
GUSTAVE I. ARONOW,
HARRY RADZINSKY.

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