Feb. 6, 1923. 1,443,982

J. W. ENDEAN.

AEROPLANE.

FILED JULY 27, 1920. 3 SHEETS-SHEET 1

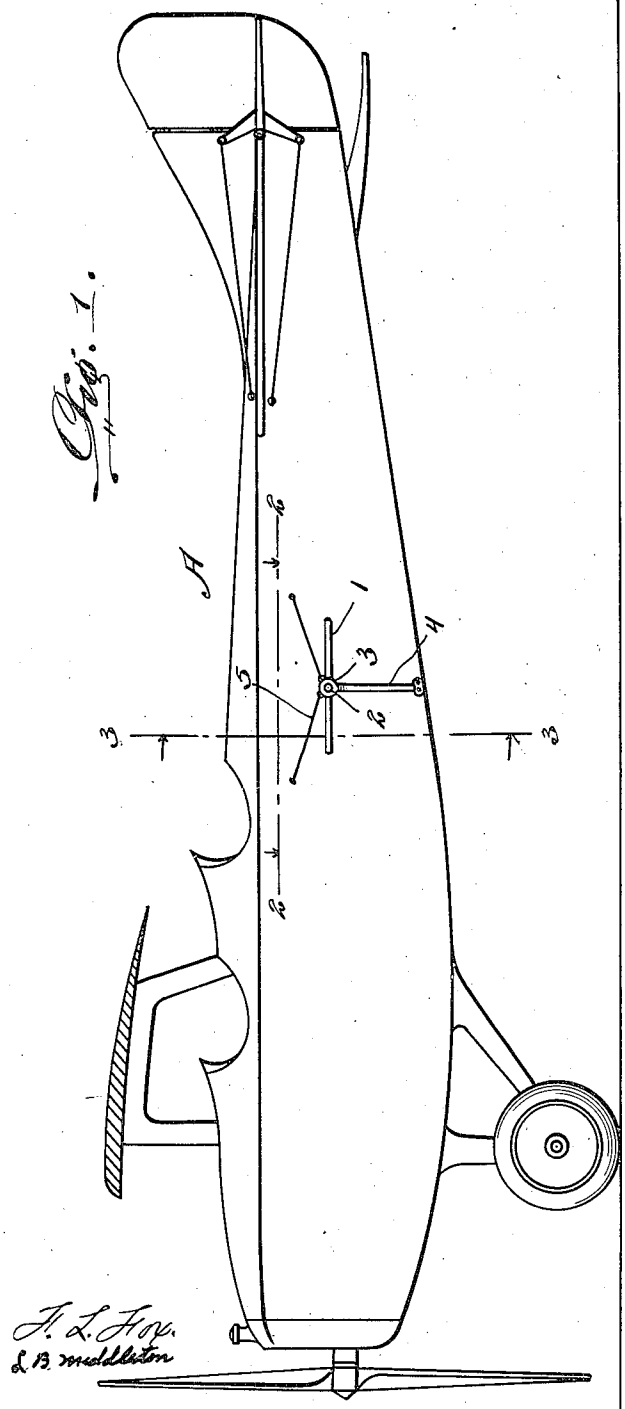


Fig. 1.

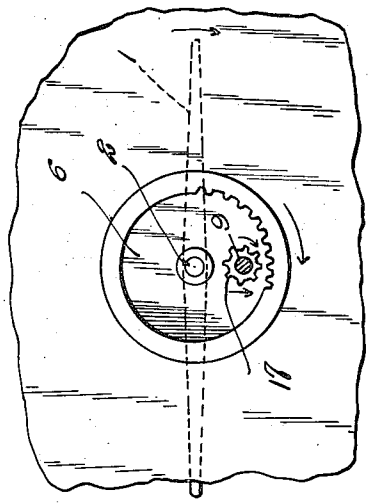


Fig. 4.

WITNESSES:

F. L. Fox.

L. B. Middleton

John W. Endean.

INVENTOR

BY Victor J. Evans.

ATTORNEY

Feb. 6, 1923. 1,443,982

J. W. ENDEAN.

AEROPLANE.

FILED JULY 27, 1920. 3 SHEETS-SHEET 2

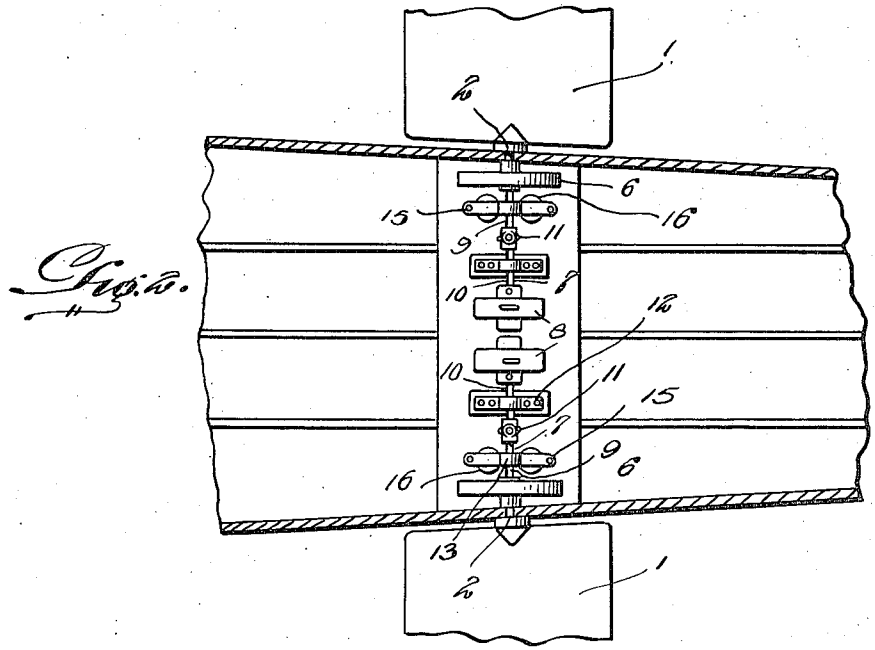


Fig. 2.

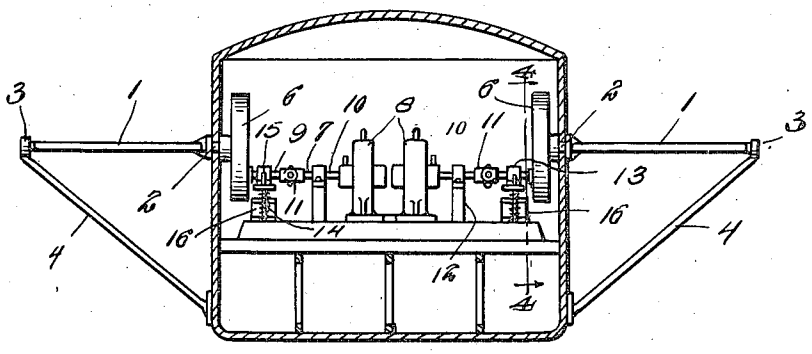


Fig. 3.

F. L. Fox,

L. B. Middleton

WITNESSES:

John W. Endean.

INVENTOR

BY Victor J. Evans.

ATTORNEY

Feb. 6, 1923. 1,443,982

J. W. ENDEAN.
AEROPLANE.
FILED JULY 27, 1920. 3 SHEETS-SHEET 3

Fig. 5.

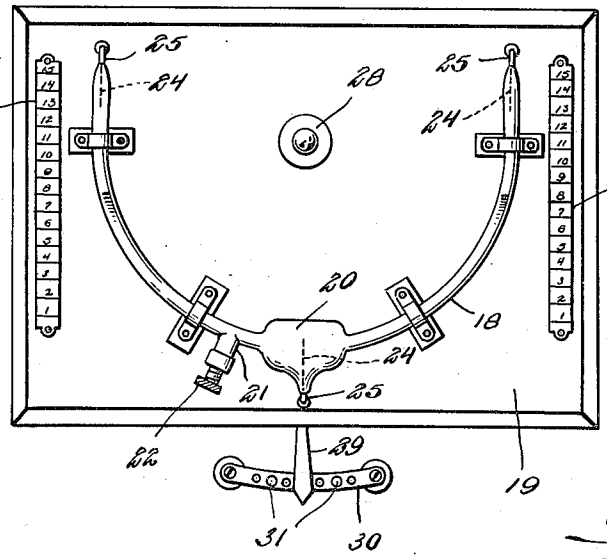
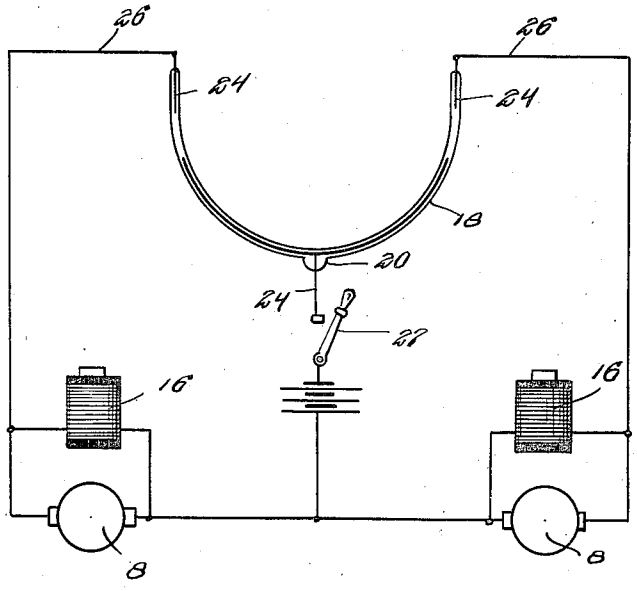


Fig. 6.



F. L. Fox.
L. B. Middleton
WITNESS:

John W. Endean.
INVENTOR
BY Victor J. Evans.
ATTORNEY

Patented Feb. 6, 1923. 1,443,982

UNITED STATES PATENT OFFICE.

JOHN WILLIAM ENDEAN, OF FRANKFORT, NEW YORK.

AEROPLANE.

Application filed July 27, 1920. Serial No. 399,330.

To all whom it may concern:

Be it known that I, JOHN W. ENDEAN, a citizen of the United States, residing at Frankfort, in the county of Herkimer and State of New York, have invented new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention relates to improvements in aeroplanes and the principal object of the invention is to provide an automatically operated stabilizing plane on each side of the aeroplane for keeping the same on an even keel. Thus the equilibrium of the aeroplane is automatically maintained and the possibility of its capsizing sideways and making a nose dive is eliminated.

Another object of the invention is to provide means for adjusting the automatic controlling means for the planes by the pilot so that the aeroplane may list within certain limits without actuating the planes.

Still another object of the invention is to provide electrical means for actuating the planes, the circuit of said electrical means being controlled by the automatic means which preferably consist of a hollow member containing mercury for closing the electrical circuits when the aeroplane lists.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a diagrammatic side elevation showing my invention applied to an aeroplane.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a section on line 4—4 of Figure 3.

Figure 5 is a front view of the controlling device for the circuits.

Figure 6 is a diagrammatic view of the circuits.

In Figure 1 the aeroplane is shown generally at A and as the same may be of any type it will not be described in detail. In carrying out my invention I place a stabilizing plane 1 on each side of the fuselage, said planes being balanced on the shafts 2 which have their inner ends suitably journaled in the sides of the fuselage and extend into the same. The outer ends of the shafts are journaled in the bearings 3 which are supported by the stay rods 4 extending upwardly and outwardly from the sides of the fuselage. These rods may be provided with suitable guy wires 5. The inner end of each shaft 2 carries an internal toothed gear, the teeth of which extend over a quarter of the circumference of the gear. Within the fuselage is arranged a pair of cross shafts 7. These shafts are in alignment with each other and have their inner ends suitably connected with the electric motors 8 so that when either one of the motors is operating the shaft connected therewith will be rotated. Each shaft is composed of two parts 9 and 10 which are connected together by the universal joint 11. The part 10 of each shaft is suitably journaled in the bearing 12 while the part 9 is carried by the movable bearing 13, this bearing 13 being supported by the springs 14 carried by the uprights 15. These springs support the bearing spaced above the electro-magnets 16 and these parts are so arranged that when the magnets are energized they will attract the bearing and cause it to move downwardly against the springs. This downward movement will place the pinion 17 carried by the part 9 of the shaft in mesh with the teeth of the gear 6 so that the rotation of the shaft will be communicated to the gear and thus the plane will be tilted so as to bring the aircraft back to an even keel.

The means for automatically closing the circuit of the motors and electric magnets comprises a semi-circular glass tube 18 secured to a base 19 and adapted to contain mercury. The central part of this tube is provided with an enlarged part 20 and adjacent said enlarged part the tube is formed with a nipple to form a reservoir 21, the nipple being provided with a screw threaded opening to receive the thumb screw 22. By turning this screw in one direction or the other the level of the mercury in the tube can be adjusted. I may place scale plates 23 on the base on each side of the glass tube. In each end of the tube and in the rear side

of the enlargement are embedded the wires 24 which are preferably formed of platinum. These wires project well into the tube and act as contacts for the mercury. These wires project from the tube and are passed through insulated tubes 25 carried by the base and are secured to the conductors 26, which are connected with the motors and electro-magnets, as shown in Figure 6. I may place a switch 27 on the instrument board for manually controlling the circuit. The base 19 is pivotally secured to the instrument board, or any other desired part of the aeroplane. by the bolt 28 in such a manner that the base will swing on the board. A pointer 29 is secured to the lower edge of the base and said pointer extends over a perforated plate 30 secured to the instrument board, the perforations in which are adapted to receive pins 31 for limiting the swinging movement of the base by engaging said pointer. By this means the pilot may control the actuation of the device so that it will not operate until the aircraft tilts beyond a safe limit.

It will thus be seen that if the aircraft should tilt to a certain degree the mercury will flow to one end of the tube and thus complete the circuit to the electric motor and electro-magnets for the plane on the low side of the aircraft. The closing of this circuit will start to bring the pinion into mesh with the gear and cause the motor to rotate the shaft so as to tilt the plane and thus the aircraft will be brought back to an even keel. If the aircraft should list to the other side then the mercury will flow to the other end of the tube and the same action will be repeated in connection with the other plane. By this invention the aircraft is held on an even keel automatically and without any effort on the part of the pilot. This invention will effectually prevent the aircraft from listing beyond a predetermined degree so as to prevent nose dives. Whenever the pilot desires he may operate the ship in the usual manner by opening the switch 27 and thus rendering the automatic device inactive. By means of the pins 31 the pilot may control the operation of the device so that it will not act until the ship lists beyond a degree set by the pilot.

It is thought from the foregoing description that the advantages and novel features of my invention will be readily apparent.

I desire it to be understood that I may make changes in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. A safety device for aeroplanes comprising a stabilizing plane on each side of the fuselage, electric means for tilting each plane and automatic means for closing the circuit to such means by the listing of the aeroplane, said automatic means comprising a base swingingly attached to the instrument board of the aeroplane, a semi-circular tube carried by the base and containing mercury, contacts carried by the tube and connected with the circuit and means for controlling the swinging movement of the base, such means consisting of a pointer carried by the base, a perforated stationary part and pins engaging the perforations and acting as stops for the pointer.

2. A safety device for aeroplanes comprising a stabilizing plane on each side of the fuselage, electric means for tilting each plane and automatic means for completing the circuit to said electric means, said automatic means comprising a base swingingly attached to the instrument board of the aeroplane, a semi-circular tube carried by the base and containing mercury, means for adjusting the level of the mercury in the tube, contact wires projecting into the tube and connected with the circuit and means for adjusting the swinging movement of the base.

3. A safety device for aeroplanes comprising a stabilizing plane located on each side of the fuselage, a shaft carrying each plane, a gear carried by each shaft, a pair of shafts journaled in the fuselage, a pinion on each shaft adapted to engage with each gear, motors for driving the pair of shafts, spring means for holding the pinions out of engagement with the gear and electro-magnetic means for placing the pinions in mesh with the gears.

4. A safety device for aeroplanes comprising a stabilizing plane located on each side of the fuselage, a shaft for each plane, a gear carried by each shaft and having teeth on a part of its circumference while the other part is smooth, a pair of shafts mounted in the fuselage, a pinion on each shaft adapted to engage each gear, an electric motor for driving each shaft, spring means for holding the pinions out of mesh with the gears, electromagnetic means for placing the pinions in engagement with the teeth of the gears and means controlled by the listing of the aeroplane for closing the circuit to said electromagnetic means and to the motors.

In testimony whereof I affix my signature.

JOHN WILLIAM ENDEAN.