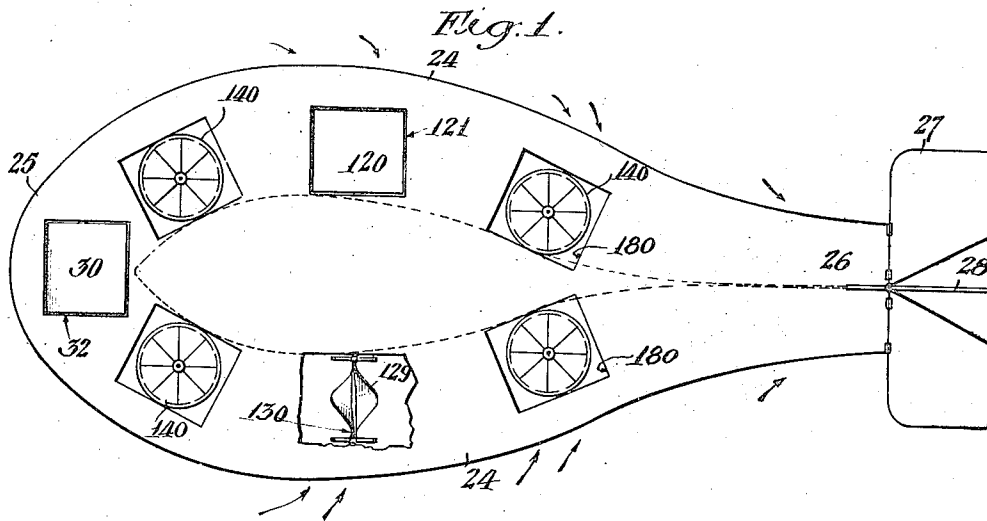
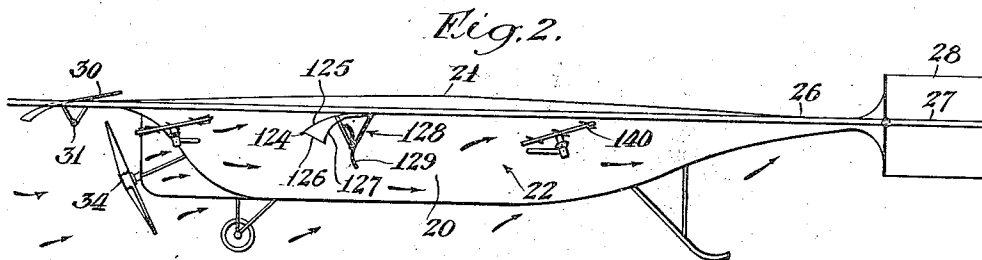
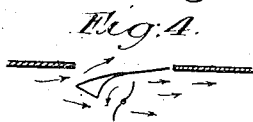
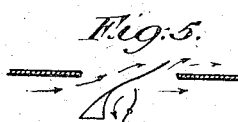
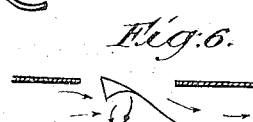
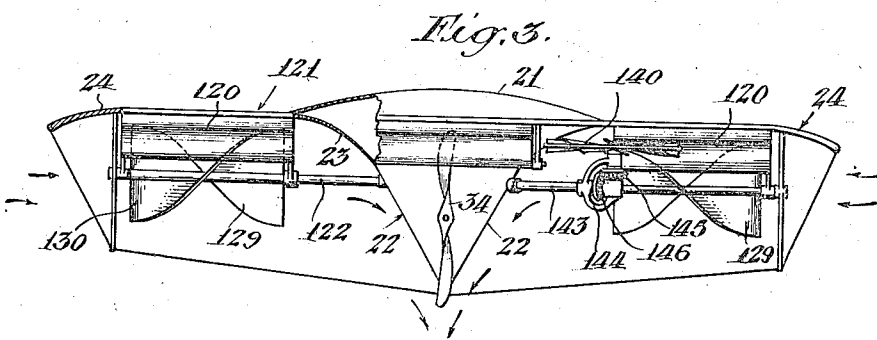


Mar. 6, 1923.

O. F. ZAHN.
AIRSHIP.
FILED NOV. 25, 1918.

1,447,584.

3 SHEETS—SHEET 1.



Inventor.
Oswald F. Zahn
by Graham & Harris
Attorneys.

Mar. 6, 1923.

O. F. ZAHN.
AIRSHIP.
FILED NOV. 25, 1918.

1,447,584.

3 SHEETS—SHEET 2.

Fig. 7.

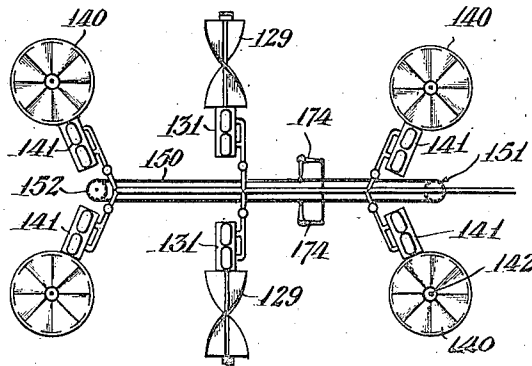


Fig. 8.

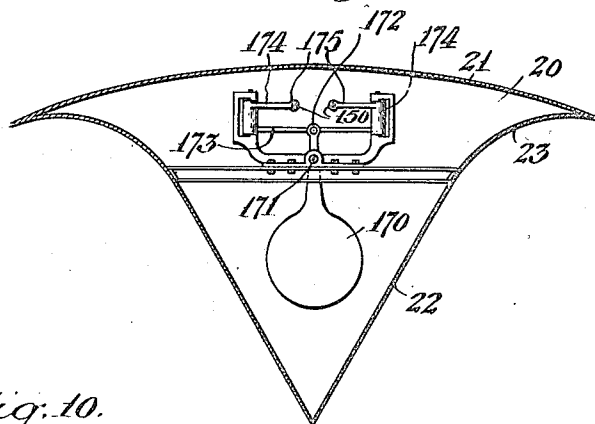


Fig. 10.

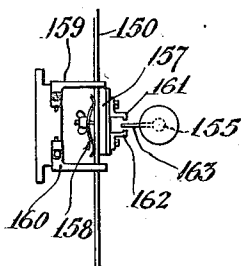
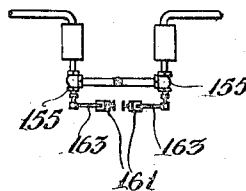


Fig. 9.



Inventor
Oswald F. Zahn.
by Graham & Harris
Attorneys

Mar. 6, 1923.

O. F. ZAHN.
AIRSHIP.
FILED NOV. 25, 1918.

1,447,584.

3 SHEETS—SHEET 3.

Fig. 11.

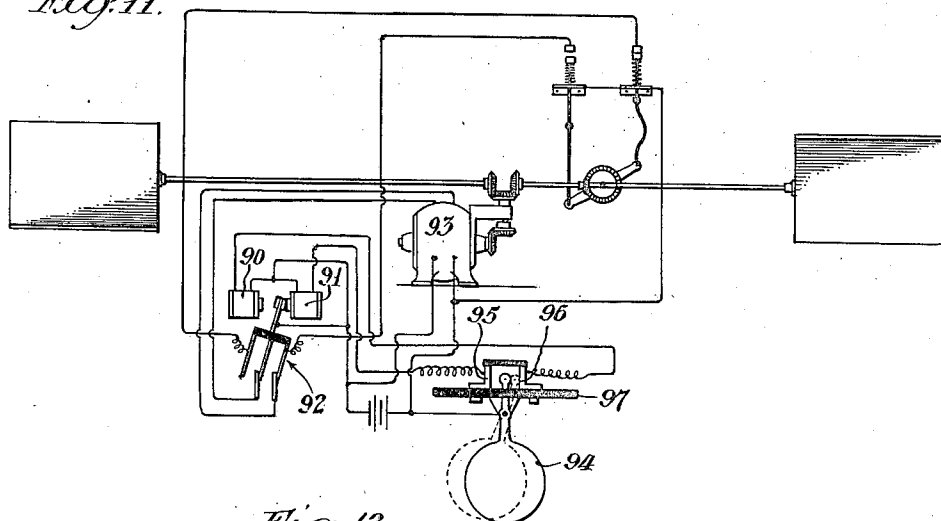


Fig. 12.

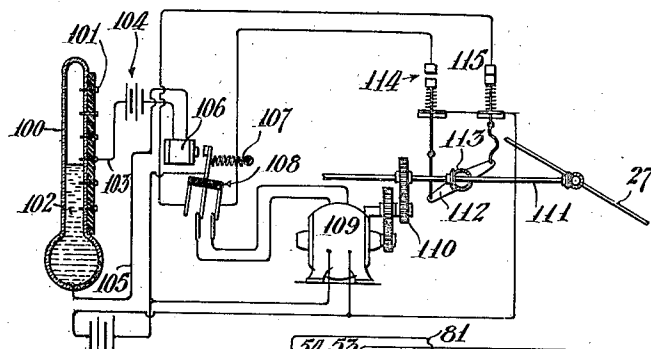
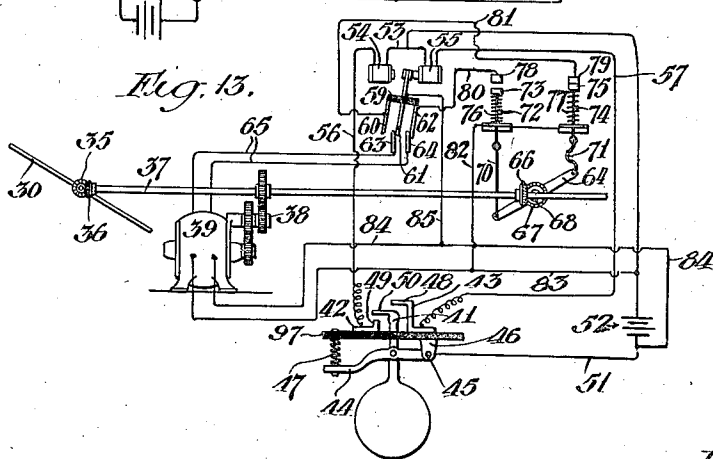


Fig. 13.



Inventor
Oswald F. Zahn
by Graham & Kamin
Attorneys

UNITED STATES PATENT OFFICE.

OSWALD F. ZAHN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO EDITH L. ZAHN, OF LOS ANGELES, CALIFORNIA.

AIRSHIP.

Application filed November 25, 1918. Serial No. 264,115.

To all whom it may concern:

Be it known that I, OSWALD F. ZAHN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Airship, of which the following is a specification.

My invention relates to air ships designed for the purpose of transporting passengers or freight from place to place, and is of the type commonly known as "heavier than air machine."

One of the objects of my invention is to provide means whereby the altitude of the air ship in its course of travel is predetermined and subsequently regulated during the flight so that the air ship will travel in a proper lane or course, other air ships being similarly regulated to fly at higher or lower altitudes so that collision is to a great extent avoided.

Another object of the invention is to provide means whereby the air ship is automatically stabilized during its flight.

Another object of the invention is to provide means whereby air is forced against and downwardly over the sides of the air ship so as to give a greater buoyancy to the air ship.

Another object of the invention is to provide means whereby the air ship may be lifted or held in its proper elevation aside from the deflection of the ailerons and lifting planes.

Other objects and advantages will appear hereinafter from the following specification.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is a plan view of an air ship embodying a form of my invention.

Fig. 2 is a side elevation of the air ship shown in Fig. 1.

Fig. 3 is an enlarged front view partly in section of the air ship shown in Fig. 1.

Figs. 4, 5 and 6 are diagrammatic views showing the operation of an aileron.

Fig. 7 is a diagrammatic plan view of the lifting propellers or fans, the spiral propellers, and other operating means.

Fig. 8 is an enlarged cross-sectional view of the air ship showing a stabilizing controlling device.

Fig. 9 is a cross-sectional view showing the controlling device for the carbureters.

Fig. 10 is a plan view showing the connection between the controlling device for the gas engines and the throttles for the same.

Fig. 11 is a diagrammatic view showing a control for the ailerons for automatic lateral balancing.

Fig. 12 is a diagrammatic view showing the tail control for automatically retaining a predetermined altitude.

Fig. 13 is a diagrammatic view showing the elevator control for fore and aft stabilizing.

The air ship consists of a car or body 20 longitudinally disposed in the center part of the ship, provided with a curved roof 21 and downwardly converging sides 22 which terminate at their upper ends in a curved portion 23 which joins the roof, as clearly shown in Figs. 3 and 8. It is understood that the air ship is of sufficient size to accommodate a great number of people, the body 20 being suitably fitted to accommodate the passengers and operators of the aeroplane.

Extending outwardly from each side of the body 20 are planes 24 which terminate at their forward end in a curved nose 25 and which extend rearwardly, joining each other behind the body and terminating in a tail 26. 27 designates a tail piece suitably mounted or hinged to the tail 26, and 28 designates a rudder which is also suitably hinged to the tail 26, the tail piece 27 and rudder 28 being operated in a manner hereinafter described.

30 designates an elevator which is hinged in a suitable support 31 on the nose of the air ship, an opening 32 being provided in which the elevator is free to be operated. 34 designates a propeller mounted on the forward portion of the body 20, which propeller is driven from an engine (not shown) as is ordinarily done with aeroplanes now in use. The elevator 30 is provided with a beveled gear 35 which is driven or operated by a beveled gear 36 on a shaft 37, the shaft 37 being driven through a chain of gears 38 from a motor 39. The operation of the motor is controlled by a pendulum 40, the upper end 41 of which makes a contact with ter-

minals 42 or 43 which are connected together but insulated from each other slidably mounted on a common base 97. The pendulum 40 is pivotally mounted on an arm 44 which in turn is pivotally mounted at 45 on a bracket 46. The outer end of the arm 44 is suspended on a spring 47 so that the proper contacts will be made even though a sudden downward or upward sweep might create a centrifugal force in which case the pendulum would not swing. The terminals 42 and 43 are provided with extensions 48 and 49 respectively and the end 44 of the pendulum is provided with an extension 50 so that in the event the pendulum does not swing due to centrifugal force then the pendulum may rise or fall and by such movement the extension 50 on the pendulum will contact with the extensions 48 or 49.

The pendulum 40 is connected by means of a wire 51 through a battery 52 to a wire 53 common to two solenoids 54 and 55, the other end of the solenoid 54 being connected by a wire 56 to the terminal 42 and the other end of the solenoid 55 being connected by a wire 57 to the terminal 43. The solenoids 54 and 55 are arranged to operate a reversing switch 59, the reversing switch having blades 60, 61 and 62 arranged to contact with terminals 63 and 64 of a motor starting circuit 65.

When the motor starts the shaft 37 drives the beveled gear 66 thereon which in turn drives the beveled gear 67 on a shaft 68. The turning of this shaft operates an arm 69 secured thereto which arm is provided at each end with flexible connections 70 and 71, the connection 70 being fastened to a rod 72 having thereon a contact 73 and the connection 71 being secured to the lower end of a rod 74 which has a contact 75 thereon, the rods 72 and 74 being elastically held or braced upwardly by means of suitably coiled springs 76 and 77. The contact 73 is arranged to close a circuit with a contact 78 when in upward position and the contact 75 is arranged to close a circuit through a contact 79 when in upward position, the contact 78 being connected to the blade 62 of the switch 59 by a wire 80. The contact 79 is connected by means of a wire 81 with the blade 60 of the switch 59. The contacts 73 and 75 are connected in a line 82 which line is connected to a wire 83, which, together with wire 84, form a motor circuit. The middle blade 61 of the switch 59 is connected by a wire 85 with the wire 84 of the motor circuit.

The elevator control just described operates in the following manner:

As the motor is started by the swinging of the pendulum 40 to make contact with either contact 42 or 43 as heretofore described, the solenoids 54 or 55 is energized according to the direction of the movement of the pendulum as heretofore referred to. The energiz-

ing of the solenoid 55, as shown in full lines in the drawing, starts the motor as the blades 61 and 62 of the switch contact with contacts 63 and 64 of the motor starting circuit and the starting of the motor changes the angular position of the elevator 30 due to the operation of the shaft 37. The operation of the shaft 37 also operates the arm 69 through the mechanism heretofore described, which as shown in Fig. 13, breaks contact between points 73 and 78 thereby opening the motor circuit so that the motor is stopped and the elevator remains in the position to which it has been moved until the angle of flight of the air ship causes the pendulum to begin to swing into the opposite position from which it first was operated, at this moment, and prematurely before the ship has come to a level position, the pendulum comes into contact with either 42 or 43 according to the position into which the contacts have been moved on base 97 by the pendulum force, thus the elevator is brought to a level position before the ship is on a level, in order to offset or counteract the momentum of the plane as it is being righted.

A similar form of controlling device is used for the aileron or sidewise balancing control and is best illustrated in Fig. 11, that is, solenoids 90 and 91 are used for operating a reversing switch 92 of a motor 93, a pendulum 94 being used to operate the solenoids. The contacts 95 and 96 of the pendulum are arranged to slide on a block of insulation 97 so that a slight movement of the pendulum causes the upper end of the same to contact with one of the contacts 95 or 96 and a further tilting of the machine would permit the contact to slide but remaining during such sliding movement in electrical engagement with the contact which it touches.

The arrangement for controlling the altitude at which the air ship is to fly is best illustrated in Fig. 12 in which 100 designates a barometer provided with a series of pins 101 which may be engaged by a column of mercury 102. A wire connection illustrated at 103 is connected to one of the pins 101 according to the height or lane in which the air ship is to travel. Assuming that the air ship is to travel at an elevation of 2,000 feet, the wire connection 103 is made to the third pin from the bottom on the barometer, in which case should the air ship get above the 2,000 foot level the contact between the mercury and the wire 103 would be broken and the circuit formed by the wire 103 through the battery 104 and the wire 105 to the solenoid 106 would be broken, in which case the spring 107 would pull the reversing switch 108 into the position shown. In this position the motor 109 would be operated in one position and through the gears 110 would operate the

shaft 111 to change the angular position of the tail piece 27, until the shaft had operated the arm 112 through gears 113 to break the contact 114 of switch 115, as shown in full lines.

In the event the altitude of the air ship changed and the air ship was flying below its proper course, the mercury would rise and make contact with the wire 103 thereby energizing the solenoid 106 to swing the reversing switch to start the motor in the opposite direction and reverse the angle of the tail piece through the mechanism heretofore described.

The air ship shown in the drawings is provided with two ailerons 120 which operate in two openings 121 formed in the wings 24, these ailerons being mounted to swing on a shaft 122. The ailerons are built of light material and have a forward edge 124 from which a curved upper face 125 extends rearwardly and a short end face 126 which terminates in a curved face 127 forming a pocket 128 under the aileron. In this pocket 128, mounted on the shaft 122, is a spiral propeller 129, the outer edge 130 of which is bent over to catch the air or cut into the air after which the air is thrown against the angular sides 22 of the air ship and being under the planes 24, such air thrown against the sides gives the ship a greater buoyancy.

Each propeller 129 is operated by an internal combustion engine 131, the running of which is operated as hereinafter described. The propellers 129 being in the pocket 128 behind the ailerons, the portion of the propeller below the shaft 122 extends below the aileron and as the propeller is moving in the direction of the arrows shown in Figs. 4, 5 and 6, the air is caught by the under part of the propeller and thrown downwardly and backwardly as heretofore described. The propellers or fans 140 are each driven from internal combustion engines 141. The fans 140 are mounted on shafts 142 which are driven from the engine shafts 143 through a universal joint 144, the shaft 142 being provided with a gear 145 which meshes with a gear 146 on the shaft 143. Any suitable mechanism may be employed for varying the position of the fans, the speed of the fans being regulated by the engines which operate the same.

Means are provided by which the engines operating the fans and spiral propeller on one side of the air ship may be caused to operate at a greater speed than those on the other, for stabilizing purposes, this controlling means consisting of a cable 150 which runs over pulleys 151 and 152, the cable being connected to the throttle of the respective gas engines so that a movement of the cable operates to open the throttles of the engines on one side of the air ship and par-

tially closes the throttles on the other side of the air ship. The connection used between the cable 150 and the throttles 155 consists of a suitable clamp 157 which engages the cable through an elastic connection 158, the movement of the clamp 157 on the cable 150 being controlled by adjustable stops 159 and 160. This arrangement will insure the operation of the engines so as to lift the low side and will, as in the case of electric control, above described, cease action a moment before the plane is balanced which in time offsets the momentum of the plane. Any suitable connection may be made between the clamp 157 and the throttle, in the present instance stops 161 and 162 engage the arm 163 of the throttle 155. The movement of the cable is controlled by a pendulum 170 which is pivotally mounted at 171 to swing transversely of the air ship. The upper end 172 of the pendulum is connected by rods 173 with the bell crank lever 174 which in turn is connected in any suitable manner at 175 to the cable 150.

The planes 24 are cut to form openings 180 directly over each propeller 140 as clearly shown in Fig. 1.

Air currents are first directed upwardly from underneath the air ship by the propeller 34 in Fig. 2. This action creates currents of air which continue to travel upwardly the entire length of the air ship. Propellers 140, being adjustable, aid in starting or stopping the air ship by changing their angular position. During flight the angular position of these propellers may be adjusted for maximum efficiency.

I claim as my invention:—

1. An airship comprising a body V shaped in cross section, planes extending outwardly from each side of said body and a spiral propeller under each plane, said propellers being arranged to direct currents of air laterally against the sides of said body.

2. An air ship comprising a body V shaped in cross-section, planes extending outwardly from each side of said body, an aileron for each plane, and a spiral propeller on each side of said body under said aileron, said propeller being arranged to direct a current of air laterally against the sides of said body.

3. An air ship comprising a body V shaped in cross-section, planes extending outwardly from each side of said body, a spiral propeller on each side of said body under said planes, said propeller being arranged to direct a current of air against the sides of said body, extensions on said planes extending forward of said body, and a propeller in front of said body under the extension formed by said planes.

4. An airship comprising a body, a plane on each side of said body, an aileron for each

plane, a motor for operating said ailerons, a pendulum, and contacts arranged to be engaged by said pendulum to start said motor, said contacts being connected to each other
5 by insulating material and slidably mounted so as to be moved together by said pendulum.

5. An air ship comprising a body, planes on each side of said body, ailerons for said planes, a tail piece, means for operating said
10 ailerons, means for operating said tail piece, an elevator at the forward part of said body, a motor for operating said elevator, a pendulum, contacts arranged to be engaged by said pendulum to start the motor, said con-
15 tacts being spaced apart in fixed relation but slidable by engagement with said pendulum.

6. An airship comprising a body, planes extending outwardly from each side of the body, a driven shaft under each plane, a propeller on each shaft, and an aileron rotatably
20 mounted on each shaft movable with respect to its associated propeller.

7. An airship comprising a body, planes extending outwardly from each side of the
25 body, a driven shaft under each plane, a spiral propeller on each shaft, and an aileron mounted on said shaft in movable relation with its associated propeller.

8. An airship comprising a body, planes
30 on said body, propellers mounted under said planes, and means for automatically increasing the speed of the propellers on one side of the body and decreasing the speed on the other side of the body, said means compris-
35 ing an engine for each propeller, a fuel supply for each propeller, a cable connected to the fuel supply of all the engines, a clamp elastically mounted on said cable, means for limiting the movement of the clamp on the
40 cable, means on said clamp for engaging the throttle of the engine and a pendulum connected to said cable.

9. An airship comprising a body, planes
45 on said body, propellers mounted on said body, an elevator, and means for automatically operating said elevator consisting of a motor, connections between said motor

and the elevator, an electric controlling circuit for said motor, a pendulum contact in said circuit arranged at the side and extending above and below the upper end of
50 said pendulum, and elastic means for supporting said pendulum whereby said pendulum may move up and down to engage said contacts. 55

10. In an equalizer for aeroplanes, an elevator, a pendulum, operating means for said elevator, and means for elastically mounting the pivotal axis of said pendulum whereby the rise or fall of said pendulum operates
60 said operating means.

11. In an equalizer for aeroplanes, operating means therefor and a pendulum having an elastically mounted pivotal axis arranged to put said operating means into operation
65 by the rise and fall of said pendulum.

12. A stabilizer for aeroplanes comprising a suspended weighted body, a slidably arranged member, contacts on said member and an arm on said weighted means ar-
70 ranged to engage the contacts on said member whereby the position of said contacts are changed relative to said arm.

13. An airship comprising a body, a plane on each side of said body, an aileron for
75 each plane, a motor for operating said ailerons, a pendulum, and contacts arranged to be engaged by said pendulum to start said motor, said contacts being connected to each other by insulating material and adjustably
80 mounted so as to be moved together by said pendulum.

14. A stabilizer for aeroplanes comprising a suspended weighted body, an adjustably arranged member, contacts on said member
85 and an arm on said weighted means arranged to engage the contacts on said member whereby the position of said contacts are changed relative to said arm.

In testimony whereof, I have hereunto set
90 my hand at Los Angeles, California, this 13th day of November, 1918.

OSWALD F. ZAHN.