J. STUPAR.

STABILIZER.

APPLICATION FILED NOV. 10, 1916. RENEWED MAR. 27, 1919.

1,306,318.

Patented June 10, 1919.

2 SHEETS—SHEET 1.

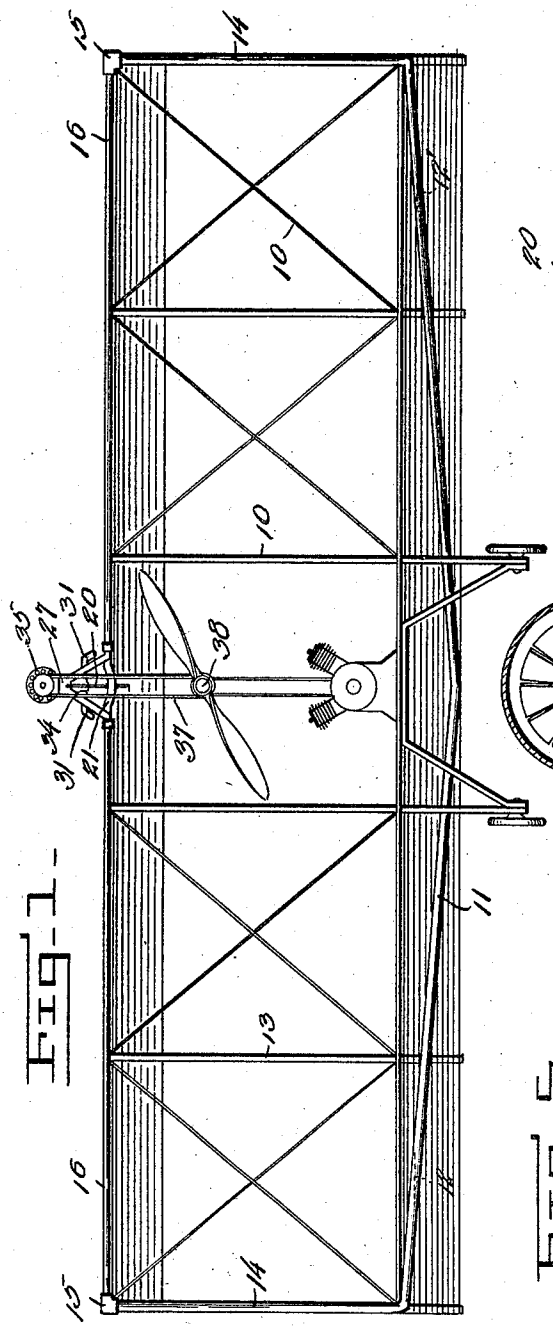


Fig. 1.

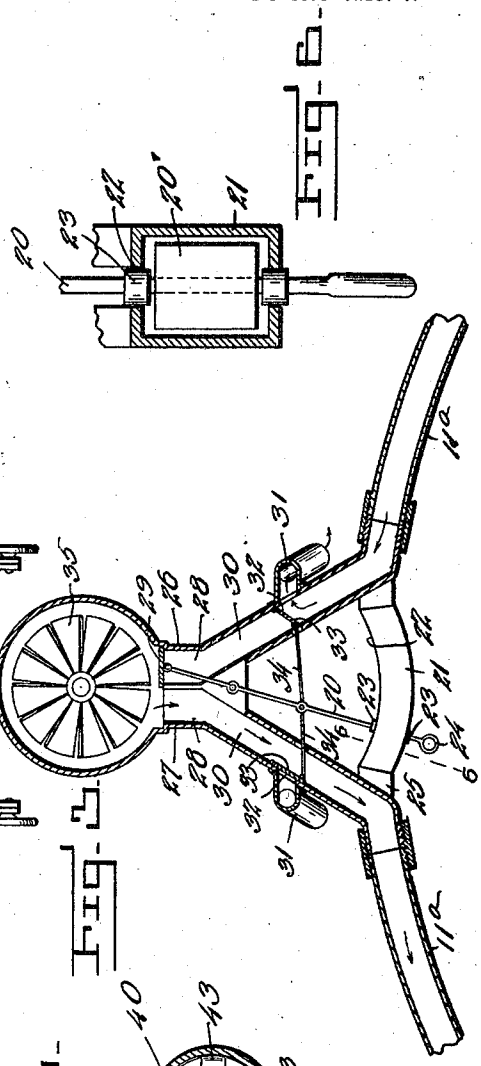


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses

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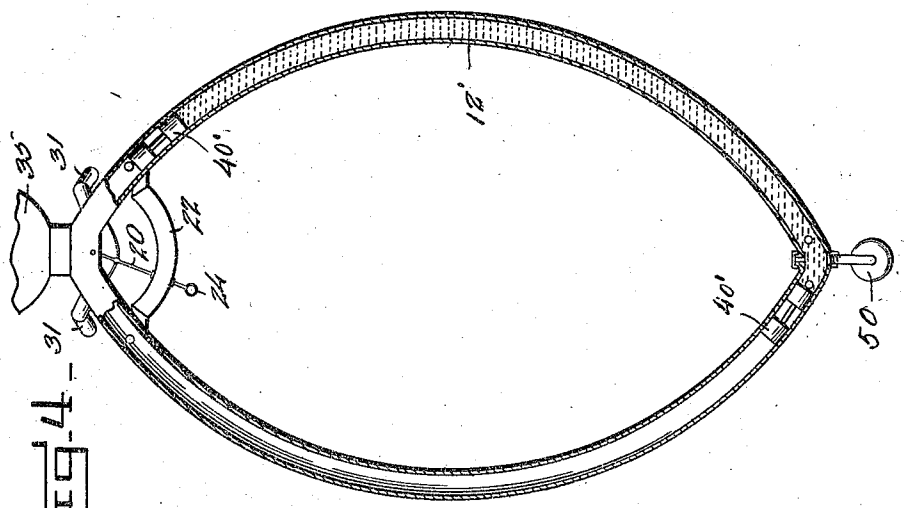


Fig. 1.

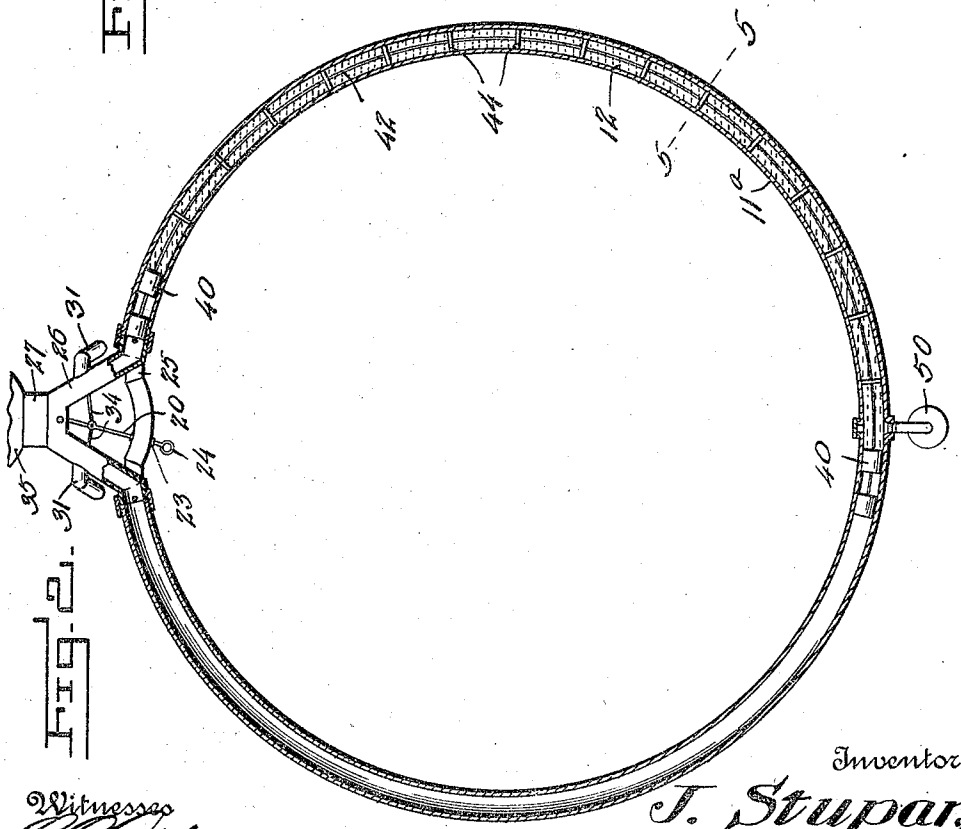


Fig. 2.

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UNITED STATES PATENT OFFICE.

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STABILIZER.

1,306,318. Specification of Letters Patent. Patented June 10, 1919.

Application filed November 10, 1916, Serial No. 130,601. Renewed March 27, 1919. Serial No. 285,709.

To all whom it may concern:

Be it known that I, JOSEPH STUPAR, a citizen of the United States, residing at Honolulu, in the county of Oahu and Territory of Hawaii, have invented certain new and useful Improvements in Stabilizers, of which the following is a specification.

This invention has for an object to provide a balancing device for nautical and aerial craft and for similar uses where such a device is needed. It is an important aim to provide a device of this character which will operate automatically, and in which there is provided means normally tending to act, and in which the forces are balanced and adapted to be unbalanced easily for opposite effects, as desired. An important object is to provide a novel device for controlling movement of a balancing weight through the application of moderate air pressure, and for effecting application of the power to the weight. A further important object is to perfect a desirable mechanism whereby the application of force to the movement of the weight may be readily controlled by a pendulum.

Additional objects, advantages and features of invention lie in the specific construction of parts hereinafter set forth, the arrangement and combination of parts.

In the drawings forming a part of this application,

Figure 1 is an elevational view of the device applied to an aeroplane,

Fig. 2 is a similar view of the device applied to a cylindrical device, such as a submarine boat or a dirigible balloon,

Fig. 3 is a detail sectional view of air connections and controlling parts,

Fig. 4 illustrates a modification of the device.

Fig. 5 is a cross section on the line 5—5 of Fig. 2,

Fig. 6 is a similar view on the line 6—6 of Fig. 3.

There is illustrated in Fig. 1 an aeroplane 10 of an familiar construction, in the present case a biplane being shown, and mounted upon the lower wing there is a tube 11, of suitable diameter for containing a liquid weight 12, sufficient to fill the device from one end to the middle and normally extending half way of each end portion of the pipe 11 as shown, at 12′, the pipe being inclined upwardly from the center of the plane toward one side and then vertically as at 14, one of the structural struts 13 between the wings of the craft being extended vertically behind to a suitable height. At the upper ends of the pipe 11 there are fitted reducers 15, from which smaller pipes 16 extend to a central point on the aeroplane where means is provided to alternatively supply air under pressure to one, and opening the other of the pipes 16, for relief of pressure therethrough. As shown in greater detail in Fig. 3, a pendulum 20 is mounted at a suitable point, the weight 20′ of which is carried in a curved casing 21, whereby it is protected from the effects of air pressure, air currents, or other disturbing causes excepting gravity, and if desired may be held in the proper path by a small track 22, and rollers 23 mounted on the pendulum to engage the track. The pendulum is extended above the weight and is provided with a handle 24 by which it may be manually operated when desired. By reason of the nature of the controlling device subsequently to be described, it is unnecessary that the pendulum have a considerable length, and as shown, it may be located in a very small space within the machine. The casing 21 may be mounted upon a suitable bracket 25 mounted in any suitable way, and the casing may include a valve device 26 including a casing 27 having parallel passages 28 extending therethrough across which a small valve plate 29 is adapted to move, being suitably connected to the upper end of the pendulum 20, which is pivoted therebelow, immediately at the under side of the casing 27. From the passages 28 ducts 30 lead in opposite directions, these being branched at their outer parts, one arm 31 of each opening directly to the atmosphere, while the other is connected suitably to one of the pipes 16, at respective sides of the aeroplane. At the point where the ducts branch small valves 32 of a suitable type for closing each branch 31 are located so that a clear passage will be provided through the duct 30 to the adjacent pipe 16, and constructed in a manner so that limited movement of the valve will close the duct 30, and form communications between the branch 31 and pipe 16. In the present instance, these valves comprise simply pivoted plates 33 shaped and mounted so that at one limit of their movement they will lie across the duct 30, and at another limit of movement will extend across the opening of the branch 31 into the duct. These valves are connected in

a suitable manner to links 34, leading to the lower part of the pendulum a short distance below the pivot, so that as the pendulum swings toward one side, the valve 32 at the side will be operated to open the branch 31 and close the duct, while at the opposite side the valve 32 is operated to close the branch 31 and open the duct for communication with the pipe 16, whereby air pressure may be directed to this end of the pipe and the opposite pipe relieved of pressure, and displacement of the water will balance the device as will be understood.

A blower casing 35 is mounted over the valve 26, in which a fan 36 is mounted, to be driven by a belt 37 from the engine, and here shown formally as connected to the shaft of the propeller 38 of any usual construction.

With the blower operating toward the ducts 30, it will be seen that with the craft normally balanced air under equal pressure will be applied through each of the ducts 30, which will be vented through the branches 31. These branches are preferably directed toward the rear of the machine, so that no back pressure will be encountered. Should the aeroplane incline downwardly to one side, the swinging of the pendulum toward that side will operate to close the valve 29 over the duct 30 at the opposite side and open the valve 32 to the adjacent branch 31, consequently directing pressure with force through the duct 30 and pipe 16 against the body of liquid in the lower end portion of the pipe 11, whereby the liquid is displaced toward the high side of the machine. This will quickly restore the machine to its proper balance, and its return will cause the operation of the pendulum to equalize the pressure at opposite ends of the pipe 11, whereby the liquid therein is permitted to return to normal level.

In Fig. 2 the device is shown adapted to use in a craft having such form as customary in submarines or dirigible balloons, and is there shown to include an annular pipe 11^a, corresponding to the pipe 11 before described, and having a suitable fluid therein. In this instance, piston devices 40 are engaged in the pipe 16 in which the liquid is confined, the pistons being connected by a suitable curved rod 42 supported clear of the pipe by anti-friction devices 43 of a suitable character. Those shown comprise annular members 44 of suitable metal adapted to fit loosely within the pipe, and suitably apertured to permit free flow of liquid therethrough. These are engaged snugly upon the rod at regular intervals. In this case, the sheathing of the balloon may be extended around the pipe 11, which may be utilized for a stiffening element, and in a submarine the pipe may be extended closely around the inner side of the shell of the vessel interfering in a minimum degree with the utilization of the space within the vessel for other purposes.

Fig. 4 illustrates a modifiation of the device in which the device is adapted to use in an oval form instead of circular form, and pistons 40′ are employed on each side of the body of fluid 12′, the pistons not being connected in any way, serving simply to prevent passage of air past the fluid at any time. The operation of the device otherwise, and the construction of the governing device is the same as before described.

In connection with any of the forms of the device described, a supplementary tank 50 may be connected to the tube, containing a quantity of liquid under pressure or otherwise, by which the supply in the tube may be replenished to compensate for losses by evaporation or otherwise.

What is claimed is:

1. A stabilizing device comprising a balance tube, a longitudinally movable balance element therein of a character to be moved by air pressure at one end of the tube, a device for supplying air or the like under pressure, ducts leading therefrom to respective ends of the pipe, branches opening from the ducts to the atmosphere, a pendulum, and means actuated by the pendulum for alternatively closing said ducts, and opening the adjacent branches upon oscillation of the pendulum in respective directions.

2. In a device of the class described, a balance tube, an element longitudinally movable therein adapted for movement by action of air pressure in either end of the tube, a blower, ducts from the blower to opposite ends of said tube, a valve device for closing the ducts alternatively, vent branches from the ducts, valve means for closing the branches, a pendulum including a stem portion pivoted intermediately of its length, connections between the upper end of the stem and the first named valve, and connections between the last named valve and the lower portion of the stem for opening the branch of a duct closed by the first named valve.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH STUPAR.

Witnesses:
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EDWARD B. MULLANEY.

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