S. S. BENSON.

AEROPLANE STABILIZER.

APPLICATION FILED JULY 12, 1917.

1,293,312.

Patented Feb. 4, 1919.

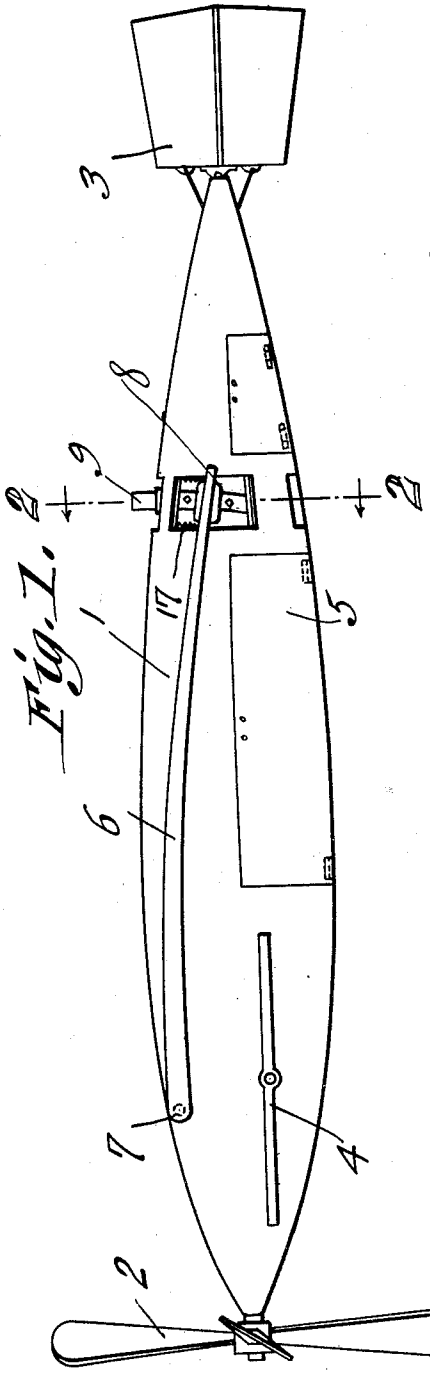


Fig. 1.

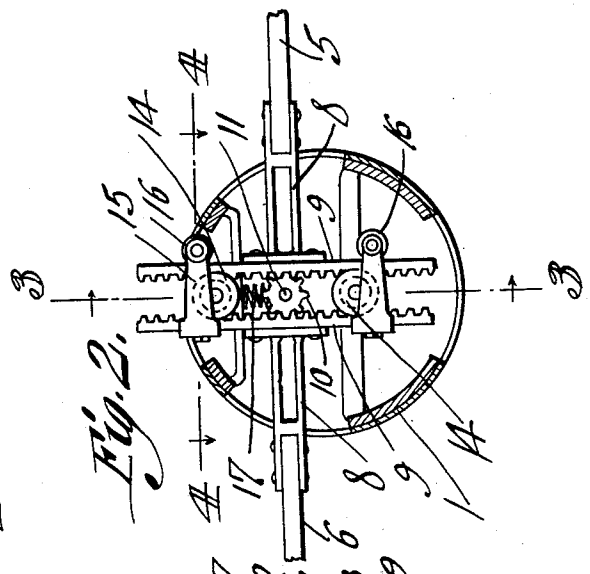


Fig. 2.

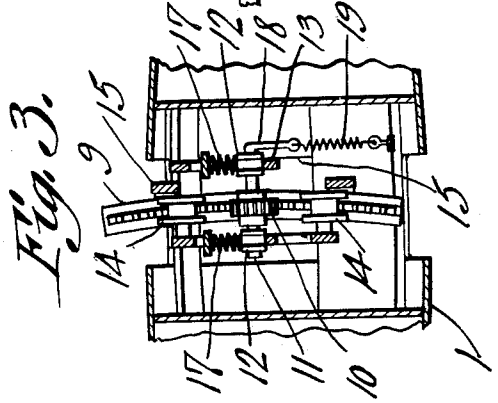


Fig. 3.

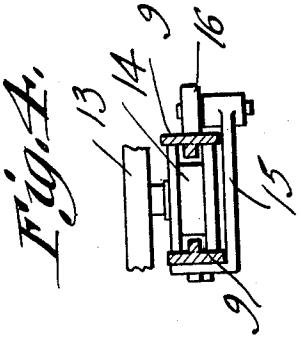


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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AEROPLANE-STABILIZER.

1,293,312. Specification of Letters Patent. Patented Feb. 4, 1919.

Application filed July 12, 1917. Serial No. 180,184.

To all whom it may concern:

Be it known that I, SHERMAN S. BENSON, a citizen of the United States, residing at York, in the county of York and State of Nebraska, have invented a new and useful Aeroplane-Stabilizer, of which the following is a specification.

The present invention relates to an aeroplane stabilizer, and aims to provide novel and improved means for automatically maintaining the equilibrium of the aircraft in place, the device being designed especially for use with the aerial bomb dropper disclosed in my co-pending application, Serial No. 178,991, filed July 6, 1917, although the device can be used in aeroplanes generally.

The invention has for its object provision of a novel mechanism connecting the planes or wings of the aeroplane, whereby when one plane or wing is subjected to abnormal air pressure, either from below or above, the planes or wings will be tilted to compensate for such difference in pressure thereagainst whereby to maintain the equilibrium of the aircraft.

The device is also so constructed that the planes or wings can yield and move toward a plane parallel with the axis of the aeroplane as the speed thereof is increased, whereby the inclination of the planes will be inversely proportional to the speed of the machine, in order to sustain the machine in a practically horizontal line of flight, even though the speed may vary.

It is also the object of the invention to provide a mechanism of the nature indicated which is comparatively simple in construction and practical and efficaceous in use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a side elevation of an aeroplane, embodying the improved mechanism.

Fig. 2 is an enlarged cross section on the line 2—2 of Fig. 1.

Figs. 3 and 4 are sections on the respective lines 3—3 and 4—4 of Fig. 2.

The mechanism is shown applied to an aerial bomb dropper, such as disclosed in said application, but it is to be understood that it can be used upon various airships for automatically maintaining the equilibrium. The aeroplane illustrated embodies the shell or body 1 having the propeller 2, compound steering rudder 3, elevating planes 4, bomb dropping means 5, and the sustaining planes or wings 6 at the opposite sides of the monoplane type. The invention relates to the mechanism for automatically tilting the planes or wings 6.

In carrying out the invention, the planes 6 are suitably pivoted, as at 7, adjacent tc their forward edges to the body 1, so that the planes can be swung upwardly and downwardly or warped. Shanks 8 are attached to the planes 6 at their adjacent ends and rear edges and project toward one another through openings in the body 1, said shanks being attached to arcuate racks 9 movable vertically within the body and meshing with a pinion 10 mounted on a shaft 11 journaled in floating bearings 12 normally supported by the frame 13 within the body. Guide wheels 14 are carried by the frame between the racks and serve to guide the racks for reciprocatory movement, one rack also having arms 15 extending across the other rack and having rollers 16 bearing against the back of the last mentioned rack, whereby to hold the racks in engagement with the rollers 14 and pinion 10. The racks thus are guided for reciprocatory movement vertically, and the pinion 10 causes the racks to reciprocate in opposite directions, whereby when the rear edge of one plane 6 is raised or depressed, the rear edge of the other plane will be moved in the opposite direction.

Coiled wire expansion springs 17 or other suitable springs are disposed between the floating bearings 12 and the frame 13, to normally depress said bearings and shaft 11, but enabling said bearings and shaft to yield upwardly. This permits the pinion 10 and both racks 9 to yield upwardly with the rear edges of the sustaining planes 6 due to increased pressure against the under surfaces of the planes.

In order to maintain the planes 6 in normal relative position, the shaft 11 has an

arm 18 extending at an angle and connected by a spring 19 with the frame 13, thereby tending to hold the pinion 10 in normal position with the racks 9 and planes 6 in corresponding position.

In operation, when the aeroplane is in flight, should a gust of wind strike one sustaining plane 6 and tend to raise it and, therefore, tilt the machine, said plane will be swung upwardly and thereby raise the corresponding rack 9, and through the pinion 10 lower the other rack 9. This will depress the opposite sustaining plane or wing, which in presenting a greater angle of incidence, will resist the sidewise tilting of the machine and maintain its lateral balance. Should the gust of wind tend to lower one plane, said plane will be swung downwardly, thereby, through the operative connection between the planes, swinging the other plane upwardly to resist the lateral tilting of the machine. The sustaining planes or wings will, therefore, tilt or adjust themselves to any differences in pressure thereagainst, to maintain the lateral balance, the spring 19 tending to hold the planes in normal position, and returning said planes to said position when the pressure thereagainst is equalized. As the speed of the aeroplane increases, to increase the pressure against the under surfaces of the planes 6, said planes can yield upwardly, due to the fact that the racks 9, pinion 10, shaft 11, and bearings 12 can all yield vertically as a unit. The springs 17 and 19 permit such upward movement of the planes, and serve to lower said planes as the speed is decreased. This serves to sustain the aeroplane in a practically horizontal line of flight, and even when the planes yield upwardly, the operative connection therebetween is operable for maintaining the equilibrium. The operation of the mechanism is entirely automatic, requiring no manual attention, so that the device can be employed in an aerial bomb dropper or other automatic aerial machine, as well as manually controlled ones.

Having thus described the invention, what is claimed as new is:

An aeroplane having opposite pivoted planes swingable upwardly and downwardly, racks connected to said planes, a pinion meshing with said racks so that the planes swing in opposite directions, a floating bearing for said pinion, spring means for said bearing to yieldably lower the rear portions of the planes, and spring means connected to the pinion tending to hold it in normal position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

SHERMAN S. BENSON.

Witnesses:
IVY E. SIMPSON,
PHILOMENA A. ROCKELLI.

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