April 12, 1932. A. SCHWARZ 1,853,233

STABILIZING DEVICE FOR AIRSHIPS

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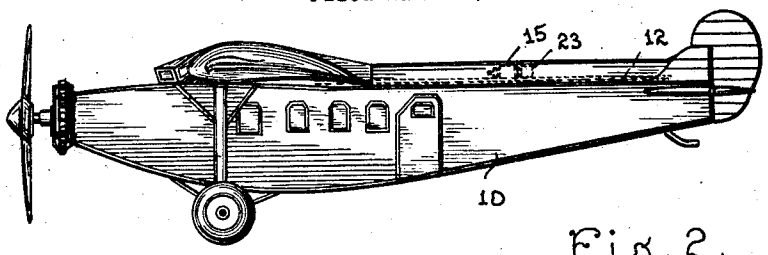


Fig. 2.

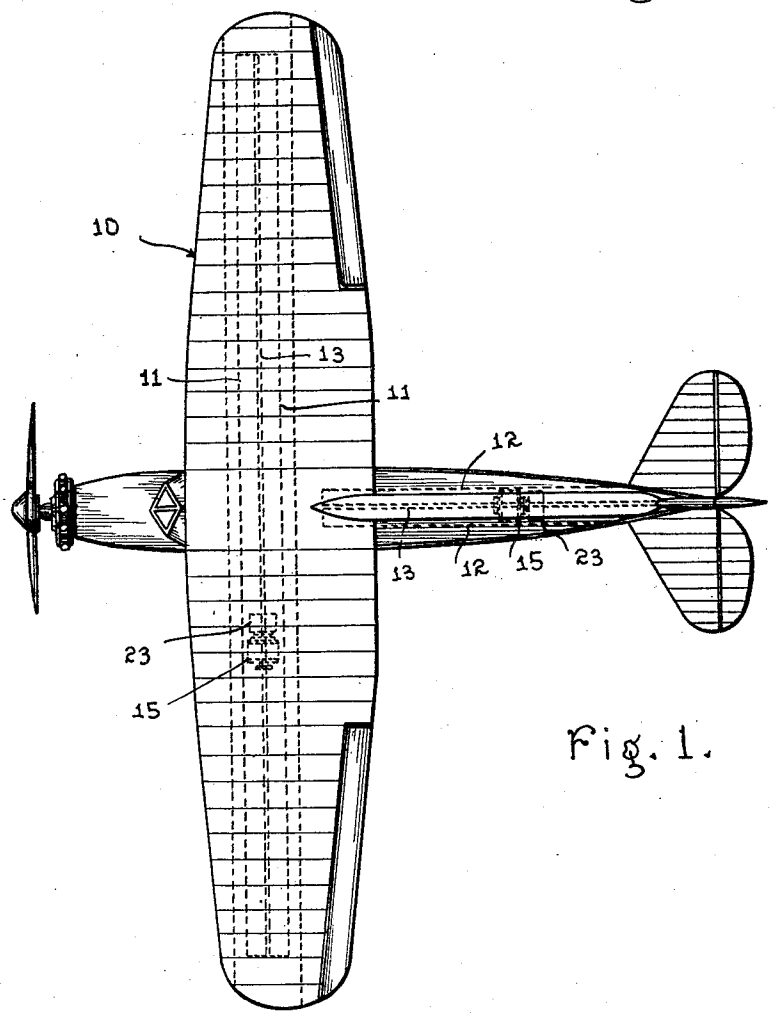


Fig. 1.

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Fig. 3.

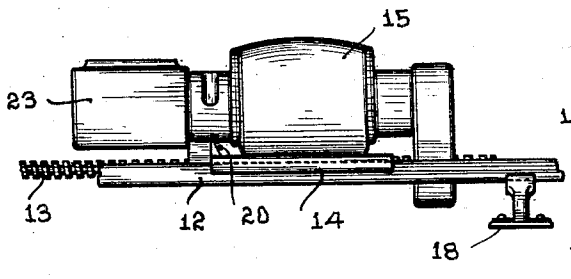
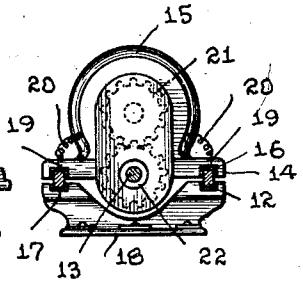


Fig. 4.



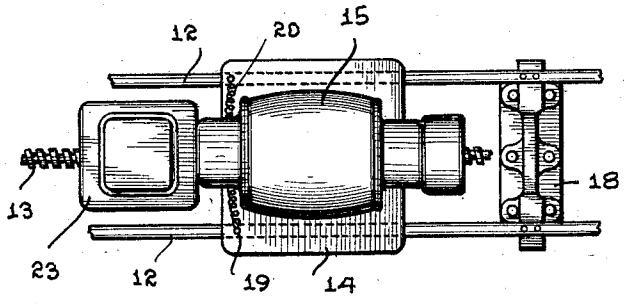


Fig. 5.

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UNITED STATES PATENT OFFICE

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STABILIZING DEVICE FOR AIRSHIPS

Application filed March 4, 1930. Serial No. 433,088.

This invention relates to airships and more particularly to a stabilizing device especially adapted for aeroplanes.

In the operation of aeroplanes, it often becomes essential that the airship shall be stabilized by means other than the wings, the ailerons, elevators, and other like parts acted on by the surrounding air. For example, in the event of damage to a wing of an aeroplane while in flight, the damage lessening the supporting power of the wing, it is, of course, the tendency of the ship to dip or tilt downwardly on the damaged side and it then becomes desirable to throw more of the weight supported by the wings to the undamaged side so that the tilting tendency above mentioned may be neutralized by a corresponding tilting tendency in the opposite direction caused by excess of weight on the undamaged side. Such cases have occurred and been recorded in which a member of the crew has taken position on the undamaged wing, and thus enabled a safe landing to be made.

It is accordingly a major purpose of the present invention to provide a novel and improved arrangement of weight elements which may be shifted to one side or the other of a neutral position to overcome such lateral tilting tendency as has been above described.

In like manner it is sometimes necessary to shift weight fore and aft of the ship to overcome pitching in one direction or the other, and it is accordingly a further object of the invention to provide a novel and improved arrangement of weight elements which may be shifted longitudinally of the ship.

A still further object of the present invention is to provide a novel and improved form of device for longitudinally stabilizing an aeroplane or other airship, the device embodying a novel weight shifting arrangement.

It is a still further object of the invention to provide novel and improved means for stabilizing an airship comprising novel weight shifting elements operable automatically by the pilot of the ship from his seat in the cockpit. Further objects of the invention will be hereinafter more fully set forth.

The accompanying drawings illustrate one practical aeroplane embodying the present invention which will be described in detail to enable others to understand and use the same, but the invention is not considered restricted to the specific construction which has been shown in the drawings, and reference is therefore had to the claims for summaries of the essentials of the invention and for the novel features of construction and novel combinations of parts for all of which protection is desired.

In the accompanying drawings like characters of reference indicate like parts in the several views, and:—

Figure 1 is a plan view of an aeroplane equipped with the present invention.

Figure 2 is a view in side elevation thereof.

Figure 3 is an enlarged detail view in side elevation of one of the stabilizing weights, a portion of its supporting means and feed screw being also shown.

Figure 4 is a detail view illustrating in end elevation the parts shown in Figure 3.

Figure 5 is a detail plan view thereof.

In the embodiment of the invention as herein disclosed there is illustrated somewhat diagrammatically an aeroplane 10 of conventional construction. Extending transversely of the aeroplane, as for instance through the wings thereof, is provided a pair of rails 11, and extending longitudinally of the fuselage is a similar pair of rails 12. These rails may be of any desired form and may be maintained in secure position in any desired manner.

Between each pair of rails is mounted a shiftable weight element of any desired character. One preferable form of such weight element has been illustrated as comprising a motor base 14 supporting a motor 15 of any desired reversible type. Preferably insulation 16 is provided to insulate the motor from the rails and the latter are in turn insulated, as by the insulation 17 from their supports 18 so that these rails may be used as conductors.

Suitable controlling devices (not shown)

are used to control the flow of electrical current from any desired and suitable source as a battery or the like, through these rails in such direction as may be desired. Brushes 19 preferably engage the rails and are connected to the motor through suitable conductors 20.

The motor 15 preferably further carries a weight box 23 which may be filled with any desired weight giving substance. For instance part of the fuel used in the aeroplane engine may be carried in this box or casing. At one end of the motor there is provided gearing 21 adapted to drive a nut or the like 22 engaging the feed screw 13.

Under normal conditions these motors and their associated weight boxes are positioned in neutral positions on the transverse and longitudinal centers of gravity or balance of the ship. Should anything affect the stability of the plane in either longitudinal or lateral direction or in both, the control elements are operated to energize the respective motor and cause it to move in such direction as to neutralize the disturbed stability by the shifting of the weight of the motor and the parts associated and moving therewith.

There has thus been provided a simple and highly efficient device of the kind described and for the purpose specified whereby entire stability of an aeroplane or other airship either in a lateral or in a longitudinal direction may be had at all times.

It will be obvious that changes may be made in the form and construction of the invention without in any way departing from the principles involved. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such forms as properly come within the scope claimed.

The invention having thus been described, what is claimed is:—

1. In an airship having longitudinal and transverse axes, a pair of electric conductive guide rails parallel to an axis, a motor of reversible type supported on said rails and electrically connected thereto and adapted to move therealong, and driving means operated by the motor to move the motor along the rails.

2. In an airship having longitudinal and transverse axes, a pair of guide rails parallel to an axis, a motor of reversible type supported on said rails and adapted to move therealong, and driving means operated by the motor to move the said motor along the rails, said driving means including a fixed feed screw supported parallel to said rails, a nut on said screw movable with the motor, and gearing connecting the motor and nut.

3. In an airship having longitudinal and transverse axes, a pair of electric conductive rails parallel to an axis, a motor of reversible type supported on said rails and electrically connected thereto and adapted to move therealong, a weight box carried by the motor, and driving means operated by the motor to move the said motor and weight box along the rails.

4. In an airship having longitudinal and transverse axes, a pair of guide rails parallel to an axis, a motor of reversible type supported on said rails and adapted to travel therealong, a weight box carried by the motor, and driving means operated by the motor to move said weight box and motor along the rails, said driving means including a fixed feed screw supported parallel to the guide rails, a nut on said screw movable with the motor, and gearing connecting the motor and the nut.

5. In an airship having longitudinal and transverse axes, a pair of guide rails parallel to one axis, a motor of reversible type supported on said rails and adapted to travel therealong, and driving means operated by the motor to move the said motor along the rails, the said driving means including a fixed feed screw supported parallel to the rails, a nut on said screw movable with the motor, and gearing connecting the motor and nut; in combination with a second pair of rails supported parallel to the other axis of the ship, and a second motor and associated parts supported on the second pair of rails and adapted to travel thereon.

6. In an airship having longitudinal and transverse axes, a pair of guide rails parallel to an axis, a motor of reversible type supported on said rails and adapted to travel therealong, a weight box carried by the motor, and driving means operated by the motor to move the said weight box and motor along the rails, said driving means comprising a fixed feed screw supported parallel to the guide rails, a nut on the said feed screw movable with the motor, and gearing connecting the motor and the nut; in combination with a second pair of rails supported parallel to the other axis of the ship, and a second motor and associated parts supported on the second pair of guide rails and adapted to travel thereon.

7. In an airship, a pair of rails mounted upon the airship and parallel to an axis thereof, a reversible motor movably supported on said rails, a gear, a fixed feed screw between said rails and passing centrally through said gear, a nut fixed to said gear and mounted on and movable along said screw, and a second gear fixed to and rotatable by said motor and in mesh with the first mentioned gear.

8. In an airship, a pair of electrically conductive rails mounted upon the airship and parallel to an axis thereof, a supporting plate movable along said rails and electrically insulated therefrom, a reversible motor supported on said plate and electrically connected to said rails, a gear, a fixed feed screw between said rails and passing centrally through said

gear, a nut fixed to said gear and mounted on and movable along said screw, and a second gear fixed to and rotatable by said motor and in mesh with the first mentioned gear.

9. In an airship, a pair of electrically conductive rails mounted upon the airship and parallel to an axis thereof, a supporting plate movable along said rails and electrically insulated therefrom, brushes in said plate and contacting said rails, a reversible motor supported on said plate and electrically connected to said brushes, a fixed feed screw parallel to said rails, a nut on said screw movable with said motor and plate, and gearing connecting the motor and nut.

In testimony whereof he affixes his signature.

ALFRED SCHWARZ.