H. C. LOBNITZ.

AERIAL MACHINE.

APPLICATION FILED OCT. 8, 1909.

1,000,273.

Patented Aug. 8, 1911

3 SHEETS—SHEET 1.

Fig. 1.

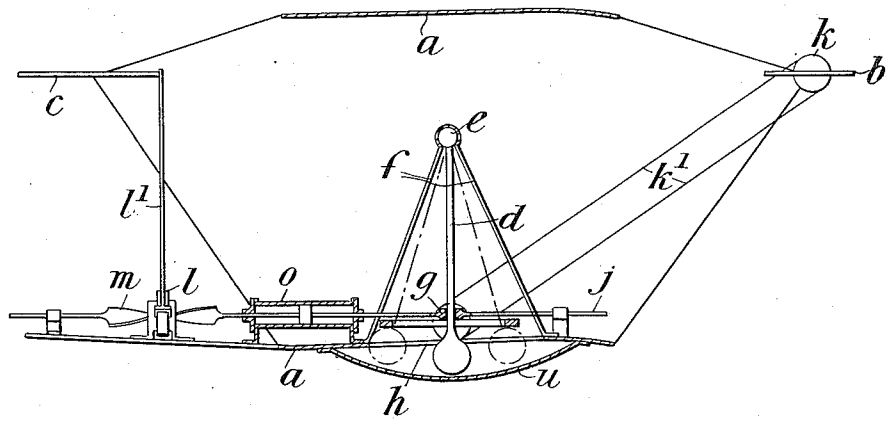
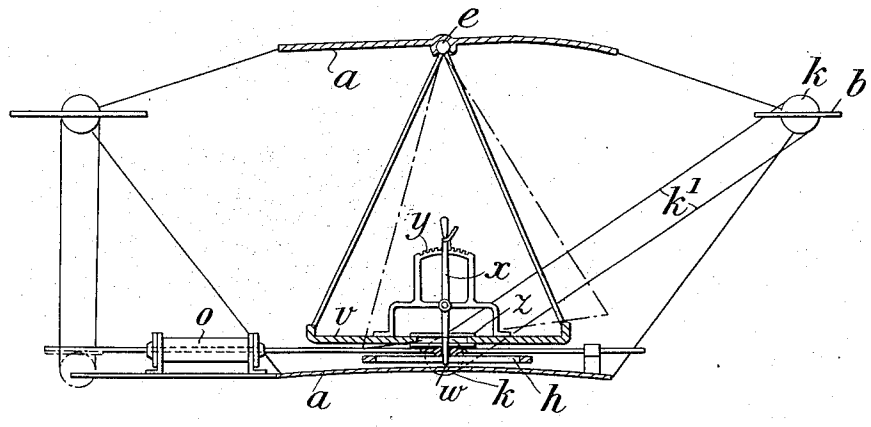


Fig. 7.



Witnesses.

J. K. Moore

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Inventor.

Henry Calder Lobnitz

by Whittemore Prevost & Coffin.

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3 SHEETS—SHEET 2.

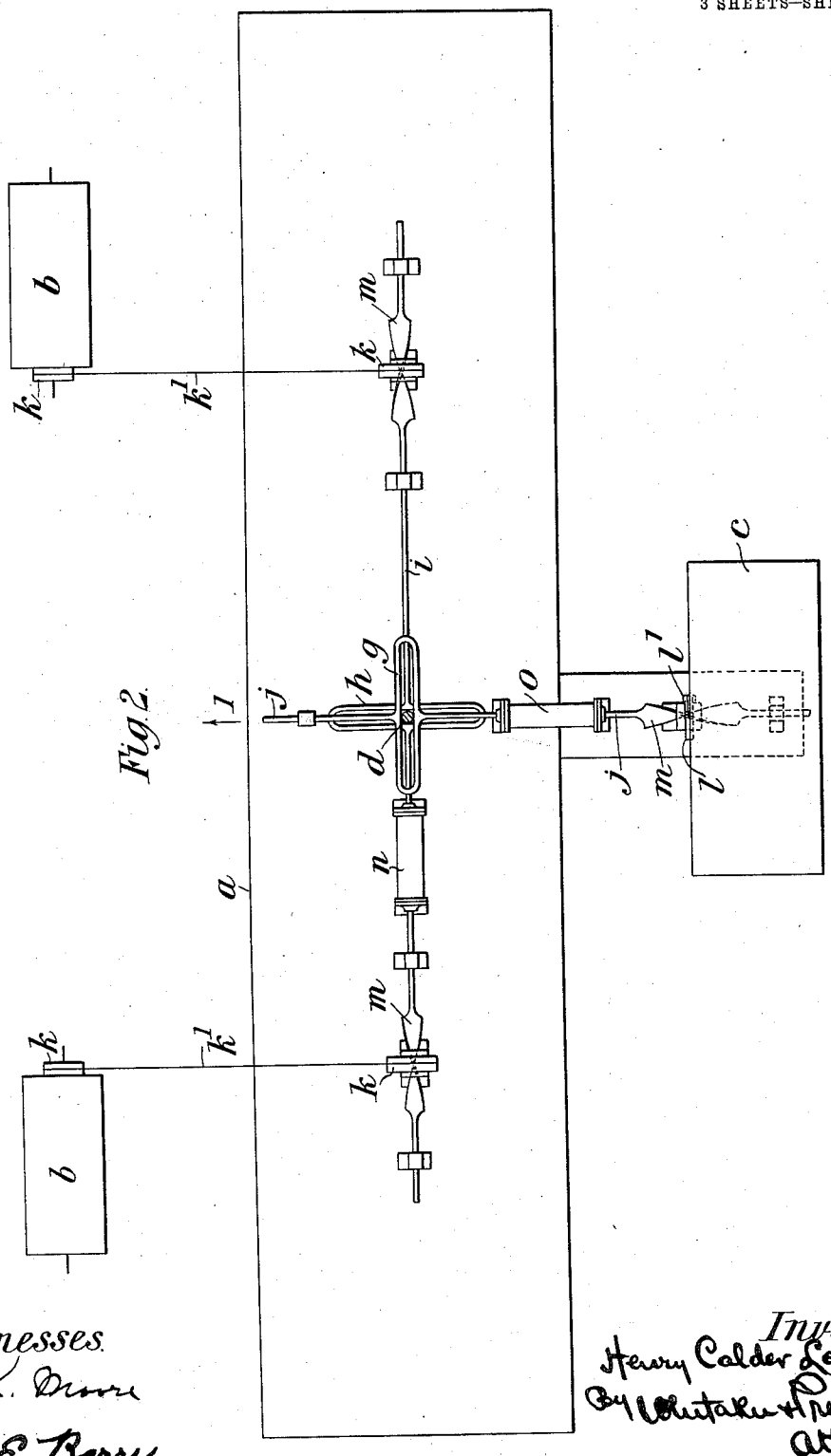

Fig. 2.

Witnesses.

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3 SHEETS—SHEET 3.

Fig. 3.

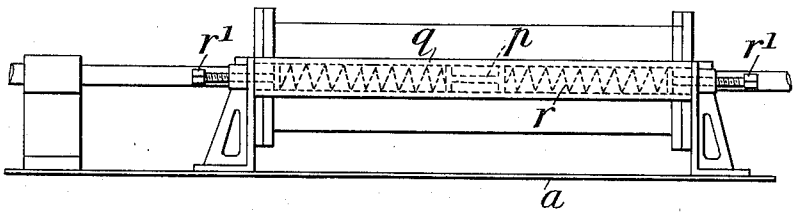


Fig. 4.

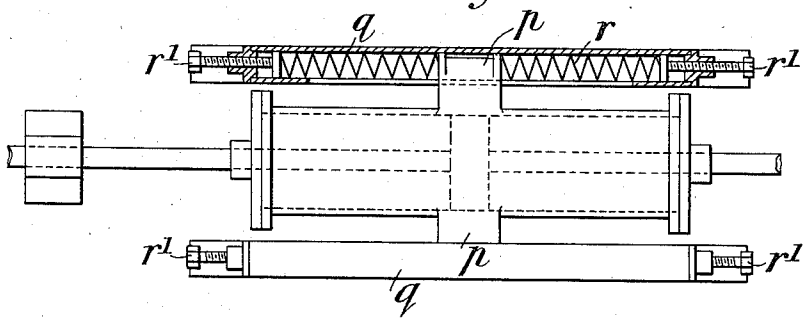


Fig. 5.

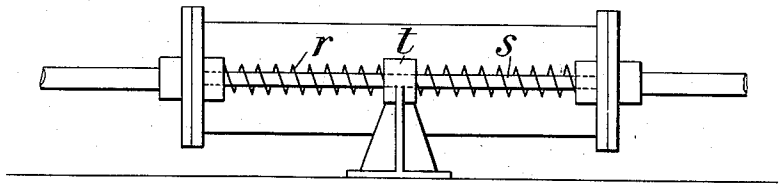
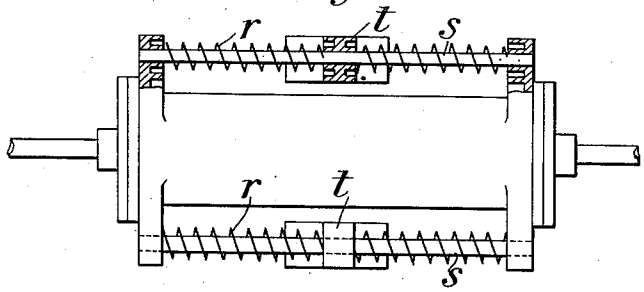


Fig. 6.



Witnesses.

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HENRY CALDER LOBNITZ, OF COWES, ISLE OF WIGHT, ENGLAND.

AERIAL MACHINE.

1,000,273. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed October 8, 1909. Serial No. 521,671.

To all whom it may concern:

Be it known that I, HENRY CALDER LOBNITZ, a subject of the King of Great Britain, residing at Devonia, Baring Road, Cowes, Isle of Wight, England, have invented new and useful Improvements in and Relating to Aerial Machines, of which the following is a specification.

This invention relates to improvements in aerial machines of the kind in which a pivoted weighted pendulum or weight has been employed in combination with planes actuated by the same for balancing or equilibrating purposes.

According to my invention I employ a weighted pendulum hung from a universal joint to allow it to swing fore and aft or laterally and depending through slotted straps or bars arranged at right angles to each other, and which are connected to rods attached by wires or the like to the equilibrating planes. Each rod passes through a cylinder or dash-pot provided with a piston having a small opening therein, the said cylinder being filled with oil or other liquid or air for the purpose of preventing a too quick movement of the rod and consequent jerking. The lower part of the aeroplane has an opening to allow the weighted pendulum which is suspended above the bottom of the aeroplane to swing freely and the said opening is provided with a cap or cover inclosing the pendulum weight and protecting it from air currents.

Instead of a weighted pendulum a platform hung from the upper plane by a universal joint or front uprights and having a rod projecting from the underside and being suspended just above the bottom plane of the aeroplane may be used. The rod projecting from the underside of the platform depends through slotted straps or bars as previously mentioned. On this platform the aviator, passengers or cargo can be carried.

To enable my invention to be fully understood I will describe it by reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic view in sectional side elevation, and Fig. 2 is a sectional plan, also diagrammatic, of an aerial machine provided with my improvement. Figs. 3 and 4 are respectively a side view and a sectional plan illustrating a modifications of my invention, and Figs. 5 and 6 are views similar to Figs. 4 and 5 respectively illustrating another modification. Fig. 7 is a view similar to Fig. 1 illustrating an arrangement of a pendulous platform.

a, *a* indicate the aeroplanes which are connected to a framing of any suitable construction, and *b*, *b* and *c* are the adjustable planes arranged at the front and rear of the machine respectively, which are designed to be operated for maintaining the equilibrium of the machine.

d Figs. 1 and 2 is the pendulum, the motions of which, relatively with the frame when the machine tilts, is to be utilized for controlling the equilibrating planes *b*, *b* and *c*. This pendulum, as shown is at its upper end carried by the universal joint *e* in a stand or frame *f*, and near its lower end passes through the slots *g*, *h* in bars *i*, *j* respectively, which bars are in connection with the equilibrating planes *b*, *b* and *c* in such a manner that, if, for instance, the front of the machine tilts downward, the pendulum, by maintaining its vertical position will draw the rod *j* forward in the direction of the arrow 1 Fig. 2, and operate the equilibrating plane *c* through suitable connections to the required extent to restore the equilibrium, no movement being imparted to the rod *i* as the pendulum swings freely in the slot thereof. If, on the other hand, the machine tilts so that one end or wing is lower than the other end, then the motion is transmitted through the slotted bar *h* to the rod *i* so that the equilibrating planes *b*, *b* are moved in the required manner to effect re-adjustment, for instance, by turning one plane with the leading edge up and the other plane with the leading edge down.

As shown in Figs. 1 and 2 the motion of the slotted bars *i*, *j* is transmitted to the respective planes through the medium of pulleys *k*, *k* and disk *l* and wire ropes k^1, k^1 and connecting rod l^1, the said ropes being attached to the pulleys to prevent slip. Through each of the pulleys *k* and disk *l* a quick-threaded screw *m* passes in such a manner that the longitudinal movement of the said rods *i*, *j* causes the rotation of the said pulleys and disk. The motion may, however, be transmitted by any other suitable means, for instance, by a rack and pin-

ion as shown in Fig. 7. The rod *i* is represented as being arranged in conjunction with two pulleys actuated by right and left-hand screws respectively, so that the movement which turns one plane *b* down, will turn the other plane up.

To prevent a too sudden movement of the rods *i*, *j* the latter pass through buffer or cushion cylinders *n*, *o* respectively, the said cylinders being suitably fixed and having upon them pistons which slide in the said cylinders, each piston being provided with a small hole through which the oil or other liquid or air, with which the cylinder is filled, will pass slowly when the pistons move, in a well-known manner.

In order to provide for a more rapid movement of the rods *i*, *j* than would be possible if the fluid had to pass through a hole in the piston, as, for instance, in case the machine is struck by a gust of wind, I advantageously arrange that the cylinders *n*, *o* shall be capable of moving bodily; an arrangement for this purpose is shown in Figs. 3 and 4, wherein the cylinder is represented as being provided with projecting side pieces *p*, *p* which slide in guides *q*, *q*, springs *r*, *r* (the pressure of which is adjustable by means of screws r^1, r^1) being arranged in the said guides on either side of the projecting pieces *p*, *p* which springs are of sufficient strength to retain the cylinder in a rigid position under normal pressures, but to yield in one direction or the other in case of a very sudden movement. A similar arrangement is shown in Figs. 5 and 6, in this case, however, each cylinder carries two guide rods *s*, *s* which are adapted to slide in brackets *t*, *t* on the framing, springs being arranged around the said rods and between the brackets and the lugs which carry the rods. Or a spring valve may be fixed to the piston to serve the same purpose the said valve opening under abnormal pressure and thus allowing the piston more freedom of movement within the cylinder.

u is the shield for protecting the bob of the pendulum from air currents.

In the form of my invention shown in Fig. 7 the pendulum is in the form of a platform *v* upon which the aviator and passengers or a dead weight, may be carried, the platform being suitably connected to the mechanism which controls the equilibrating planes. In the specific device shown in this figure the platform is provided with a longitudinally movable slide *z* which has rigidly secured to its lower side a pin *w* which extends into the slots *g* and *h* of the bars *j* and *i* which control the equilibrating planes and I also provide means for changing the relation of the slide *z* and pin *w* with respect to the platform, which consists of a hand lever *x* working in conjunction with a locking quadrant *y*, the lower end of said hand lever entering a recess in the upper face of slide *z* as shown.

Supposing the lever to be locked in its median position, as shown in Fig. 7, the change of balance of the aeroplane would cause the platform to swing longitudinally or laterally and the pin *w* would cause the operation of the proper equilibrating plane or planes to restore the equilibrium. By adjusting the hand lever backward or forward the slide *z* can be shifted with respect to the platform, thereby actuating the forward equilibrating plane, and causing the machine to ascend or descend, by moving forward or backward the operating bar *j*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, devices having slotted portions disposed perpendicularly with each other, and engaging a part connected with said pendulous body, connections from one of said slotted devices to said lateral equilibrating planes and connections from the other of said slotted devices to the central equilibrating plane.

2. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally arranged vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, devices having slotted portions disposed perpendicularly with each other, and engaging a part connected with said pendulous body, connections from one of said slotted devices to said lateral equilibrating planes, and connections from the other of said slotted devices to the central equilibrating plane, and cushioning devices for retarding the movements of said slotted devices.

3. In an aerial machine, the combination with the main frame and main supporting plane, of laterally disposed vertically movable equilibrating planes, a centrally arranged vertically movable equilibrating plane, a pendulous body supported by the main frame, connections from said pendulous body to said laterally disposed equilibrating planes, and operable by the lateral

movement of said body, connections between said pendulous body and said centrally arranged equilibrating plane, operable by the movement of said body longitudinally of the machine, a cushioning device connected with said pendulous body for retarding its lateral movements, and a cushioning device connected with said body for retarding its longitudinal movements.

4. In an aerial machine, the combination with the main frame and main supporting plane, of laterally disposed vertically movable equilibrating planes, a centrally arranged vertically movable equilibrating plane, a pendulous body supported by the main frame, connections from said pendulous body to said laterally disposed equilibrating planes, and operable by the lateral movement of said body, connections between said pendulous body and said centrally arranged equilibrating plane, operable by the movement of said body longitudinally of the machine, a dash pot connected with said pendulous body for retarding its lateral movements, a dash pot connected with said body for retarding its longitudinal movements, each of said dash pots being provided with cushioning springs interposed between the dash pot and the main frame.

5. In an aerial machine, the combination with the main frame and main-supporting plane, of laterally disposed vertically movable equilibrating planes, a centrally arranged vertically movable equilibrating plane, a pendulous body supported by the main frame, connections from said pendulous body to said laterally disposed equilibrating planes, and operable by the lateral movement of said body, connections between said pendulous body and said centrally arranged equilibrating plane, operable by the movement of said body longitudinally of the machine, a double acting dash pot connected with said pendulous body for retarding its lateral movements in both directions, a double acting dash pot connected with said body for retarding its longitudinal movements in both directions, connections between said dash pots and the main frame permitting the longitudinal bodily movement of the dash pots in both directions, and a cushioning spring interposed between each end of each dash pot and a part connected with the main frame.

6. In an aerial machine, the combination with a main frame, a main plane, and a movable equilibrating plane, of a pendulous body supported from the main frame, a connection between said pendulous body and the equilibrating plane, a dash pot connected to said main body for retarding its movement in a direction to operate the equilibrating plane, connections between said dash pot and the main frame permitting the dash pot to move bodily with respect to the main frame and yielding cushioning devices interposed between the dash pot and parts connected with the main frame, whereby the dash pot may yield bodily against sudden shock from the pendulous body.

7. In an aerial machine, the combination with a main frame, a main plane and a movable equilibrating plane, of a pendulous body supported from the main frame, a connection between said body and the equilibrating plane, a dash pot movably mounted on the main frame connected to said pendulous body, and cushioning springs interposed between said dash pot and the main frame.

8. In an aerial machine, the combination with a main frame, a main plane and a movable equilibrating plane, of a pendulous body supported from the main frame, a longitudinally sliding bar connected to said pendulous body, a rotary device, the said sliding bar having a spirally disposed portion engaging and movable through said rotary device for rotating the same in opposite directions simultaneously, and a connection between said rotary device and said equilibrating plane.

9. In an aerial machine, the combination with a main frame, a main plane and a movable equilibrating plane, of a pendulous body supported from the main frame, a longitudinally sliding bar connected to said pendulous body, a rotary device, the said sliding bar having a spirally disposed portion engaging and movable through said rotary device for rotating the same in opposite directions simultaneously, and a connection between said rotary device and said equilibrating plane, and a cushioning device operatively connected with said pendulous body.

10. In an aerial machine, the combination with a main frame, a main plane and a movable equilibrating plane, of a pendulous body supported from the main frame, a longitudinally sliding bar connected to said pendulous body, a rotary device, the said sliding bar having a spirally disposed portion engaging and movable through said rotary device for rotating the same, and a connection between said rotary device and said equilibrating plane, and cushioning devices connected with said longitudinally movable bar for retarding the movements thereof in both directions.

11. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable de-

vice mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and provided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars.

12. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable device mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and provided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars, and a cushioning device operatively connected with each of said bars.

13. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable device mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and provided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars, and a dash pot operatively connected to each of said bars.

14. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable device mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and provided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars, a dash pot operatively connected to each of said bars, and cushioning devices interposed between each of said dash pots and the main frame.

15. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable device mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and provided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars, a piston operatively connected to each of said bars, a cylinder closed at each end and engaging each of said pistons, said cylinders being connected to the main frame.

16. In an aerial machine, the combination with the main frame, and a main supporting plane, of laterally disposed vertically movable equilibrating auxiliary planes arranged in a line extending transversely of the machine, a centrally disposed vertically movable equilibrating plane arranged out of transverse alinement with said lateral planes, a pendulous body supported by the main frame, a longitudinally movable device mounted on the main frame and provided with a slotted portion disposed transversely thereof, connections between said bar and the lateral equilibrating planes, a second longitudinally movable device disposed perpendicularly to the first, and pro-

vided with a transversely slotted portion extending transversely of the slotted portion of the other bar, connections between said second bar and the central equilibrating plane, and a part connected with the pendulous body engaging the slotted portions of both bars, a piston operatively connected to each of said bars, a cylinder closed at each end engaging each of said pistons, a sliding connection between each of said pistons and the main frame, and cushioning springs for retarding the movement of each of said cylinders in both directions.

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Witnesses:
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