E. B. HARRIS & A. ZAMRSKY.

FLYING MACHINE.

APPLICATION FILED MAR. 1, 1912.

1,044,382.

Patented Nov. 12, 1912.

2 SHEETS—SHEET 1.

Fig. 1

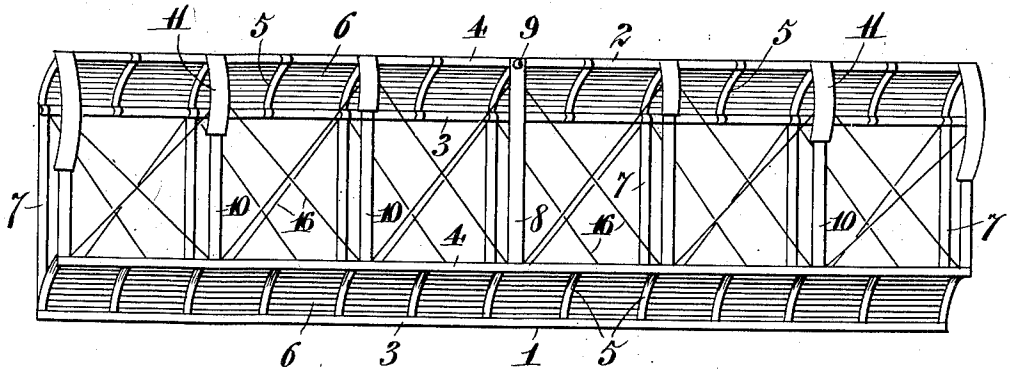
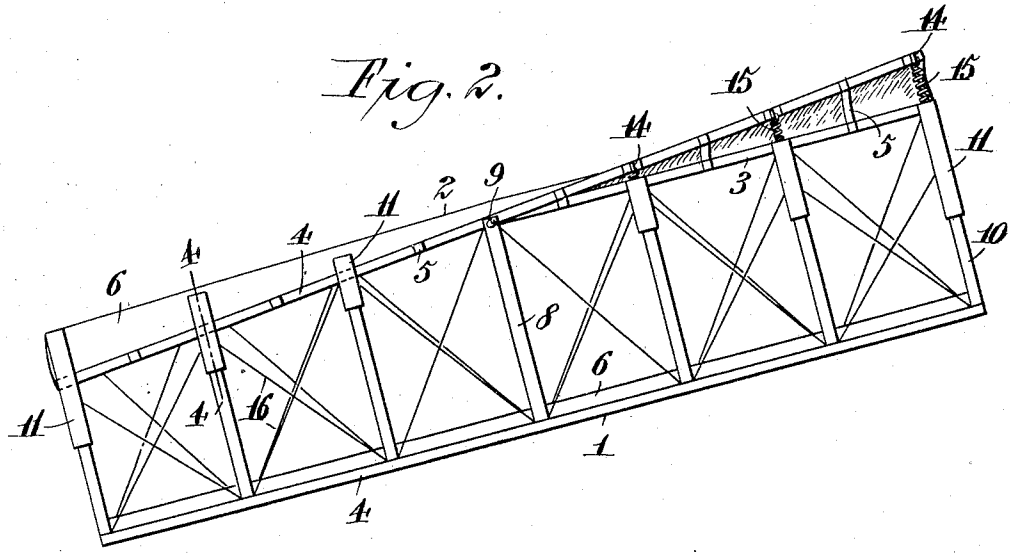


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

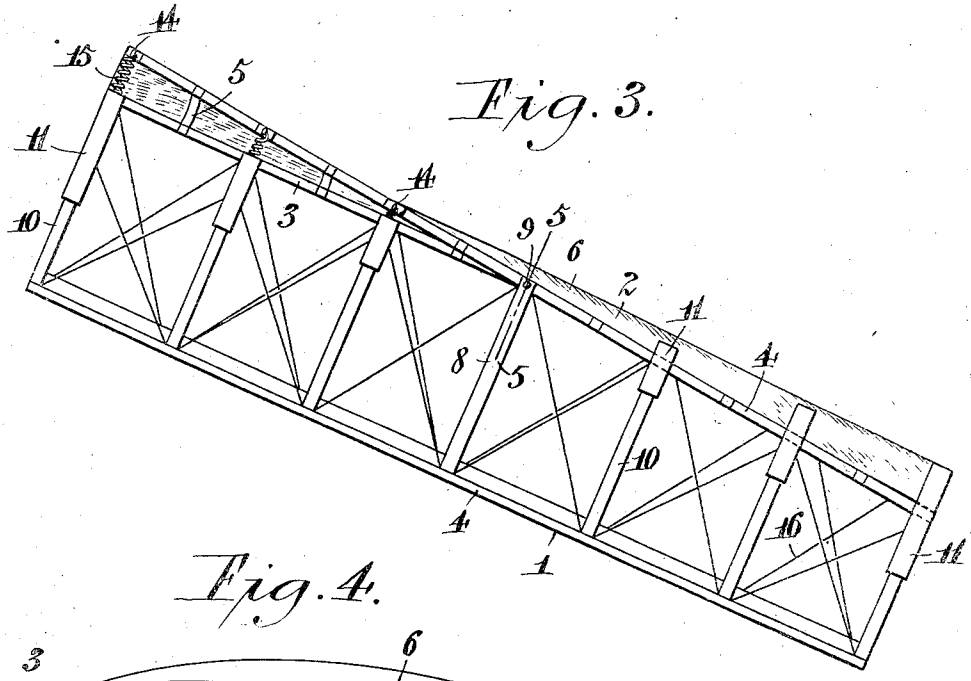


Fig. 4.

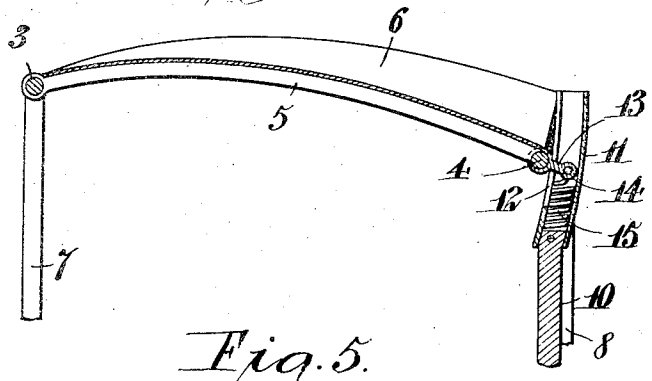


Fig. 6.

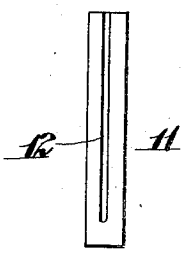
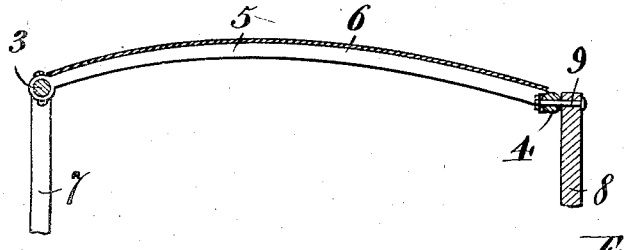


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

1,044,382. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed March 1, 1912. Serial No. 680,820.

To all whom it may concern:

Be it known that we, ERNEST B. HARRIS, a citizen of the United States, and ADOLPH ZAMRSKY, a subject of the Emperor of Austria-Hungary, residing at Fort Stevens, in the county of Clatsop and State of Oregon, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines, and particularly to means for automatically restoring and maintaining the lateral balance or equilibrium thereof.

One object of the invention is to provide a supporting plane or surface which is adapted to adjust itself automatically when the machine tilts laterally in either direction to warp or flex downward a portion of the wing at the depressed side for an elevating action and correspondingly warp or flex upward a portion of the wing at the elevated side for a depressing action.

A further object of the invention is to provide a supporting surface of the character described which is automatically movable in part to increase the angle of incidence of the depressed wing in a positive direction and increase the angle of incidence of the elevated wing in a negative direction when the lateral balance of the machine is disturbed, to secure a positive lifting action at the depressed side of the machine and a positive depressing action at the elevated side of the machine, whereby a quick restoration of the machine to a normal balanced position is insured and secured.

A further object of the invention is to provide a supporting surface of the character set forth which will automatically return to normal position when the machine is restored to a state of equilibrium after said surface has been adjusted to counteract the tilting motion of the machine.

A still further object of the invention is to provide a biplane structure whose upper plane or surface is constructed and mounted to perform the functions above set forth, and which is adapted for use upon any conventional type of machine.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a perspective view of the supporting surfaces of a biplane machine having its upper supporting surface constructed in accordance with our invention, the view being taken at a point looking upwardly toward the rear of the supporting surfaces. Fig. 2 is a rear elevation showing in dotted lines the adjustment of the upper supporting surface when the machine tilts laterally in one direction. Fig. 3 is a similar view showing the adjustment of the supporting surface when the machine tilts laterally in the opposite direction. Figs. 4 and 5 are vertical fore and aft sections on the lines 4—4 and 5—5 of Figs 2 and 3. Fig. 6 is a face view of one of the telescoping tubular stanchion sections.

In the illustrated exemplification of our invention as embodied in a biplane structure, 1 and 2 designate the upper and lower supporting planes or surfaces, each comprising front and rear wing bars or spars 3 and 4, a series of ribs 5 and a covering of fabric or other suitable flexible material 6.

The front wing bars 3 of the supporting surfaces are rigidly connected by a row of struts or stanchions 7, which extend continuously between them, while the rear wing bars 4 of the supporting surfaces are connected by a central continuous strut 8, to which the rear wing bar of the upper surface 2 is pivoted, as at 9, and a series of telescopic struts or stanchions composed of rods or posts 10 fixed to the lower wing bar 4 and tubular upper sections 11 slidably engaging the rods or posts 10 and fixed to the wing bar 4 of the upper supporting surface. The rear wing bar of the upper plane is thus mounted to tilt vertically upon an axis 9 arranged parallel with the line of flight, so that either wing of the upper supporting surface is adapted under excess air pressure to be flexed or warped helicoidally upward in rear of the diagonal center thereof, while the other wing is adapted to be simultaneously flexed or warped downwardly in a similar manner, to negatively increase the angle of incidence at the elevated side for a depressing action of the air thereon, and to positively increase the angle of incidence at the depressed side for a lifting action of the air thereon, whereby the machine will be automatically restored, on tilting in one direction or the other, to a normally balanced position and its equilibrium thereby maintained. For the purpose of permitting such adjustment of the portions of the wings of the upper plane, the ribs 5 are

pivotally or otherwise flexibly connected with the wings bars 3 and 4, except at the center where the rib extending between the central continuous front and rear struts is fixed to the struts in any suitable manner. The telescopic sections 11 of the rear set of struts or stanchions progressively increase in length outward from the center toward the lateral margins of the supporting surface, to accord with their required extent of adjustment on the strut sections 10 to accord with the arc of movement of the wings of the upper plane or supporting surface. These tubes are provided in their front faces with longitudinal slots 12 which receive connecting members 13 on the forward ends of the adjacent ribs, which members are fitted to slide vertically in the slots and provided with eyes 14 movable within the tubes. Inclosed within each tube is a coiled contractile spring 15 secured at its lower end to the fixed strut section 10 and at its upper end to the eye 14 of the connecting member 13 of the adjacent rib, such springs serving to hold the wings of the plane or surface 2 in normal position and to resist to a certain extent upward movement of either wing under air pressure. The tubes have a slight longitudinal curvature to adapt them to have free and easy movement on the fixed strut sections, and are pivotally coupled by the connecting members 13 to the ribs to allow them to assume the required angular positions relative to the supporting surface 2 in the up and down adjustments of the wings of the latter.

It will be understood from the foregoing description that the wings of the surface 2 are maintained in normal horizontal position against the pressure of the air by the weight of the plane and action of the springs 15, but that when excess air pressure falls upon either wing the rear diagonal half of the wing will be forced upward, while under the ensuing movement of the bar 4 the rear diagonal half of the opposite wing will be forced downward, thus warping the surfaces of the wings for an automatic balancing action. This action will occur when the machine tilts laterally in either direction to a greater or less extent, whereby the equilibrium of the machine will be restored and automatically maintained at all times.

In the adaptation of the invention to a biplane structure, the usual truss wires 16 may be employed. Where the invention is embodied in a monoplane structure, the supporting surface 2 will be mounted in the manner described upon equivalent supports constituting a part of the main frame of the machine.

Having thus described the invention, what we claim as new is:—

1. In a flying machine, a supporting surface comprising a flexible body, a fixed front wing bar, a centrally pivoted rear wing bar, flexible ribs connecting said bars, slidable supports for the rear wing bar, and sustaining springs associated with said supports.

2. In a flying machine a supporting surface comprising a flexible body having a fixed front wing bar and a centrally pivoted rear wing bar, and means including springs for yieldingly supporting the rear wing bar.

3. In a flying machine, a supporting surface comprising a flexible body, a fixed front wing bar, a centrally pivoted rear wing bar, and telescopic supports for said rear wing bar.

4. In a flying machine, a supporting surface comprising a flexible body, a rigid front wing bar, a centrally pivoted rear wing bar, telescopic supports for said rear wing bar, and springs associated with said supports for normally maintaining the rear wing bar in a horizontal position.

5. In a flying machine, a frame structure composed of front and rear sets of stanchions, upper and lower supporting surfaces connected thereby, the upper supporting surface comprising a flexible body, a fixed front wing bar secured to the front stanchion, a rear wing bar centrally pivoted to the intermediate front stanchion, flexible ribs connecting said bars, supporting members carried by the rear wing bar and telescopically engaging the remaining rear stanchions, and springs inclosed in said telescopic supporting members and connecting the coacting stanchions with said rear wing bar.

6. In a flying machine, a supporting surface comprising a flexible body, a rigid front wing bar, an intermediately pivoted rear wing bar, and sliding spring controlled means yieldingly supporting the ends of the rear wing bar beyond its pivotal connection.

In testimony whereof we affix our signatures in presence of two witnesses.

ERNEST B. HARRIS.
ADOLPH ZAMRSKY.

Witnesses:
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WM. B. YOUNG.