

W. E. SOMERVILLE.
 FLYING MACHINE.
 APPLICATION FILED NOV. 4, 1910.

1,154,214.

Patented Sept. 21, 1915.
 2 SHEETS—SHEET 1.

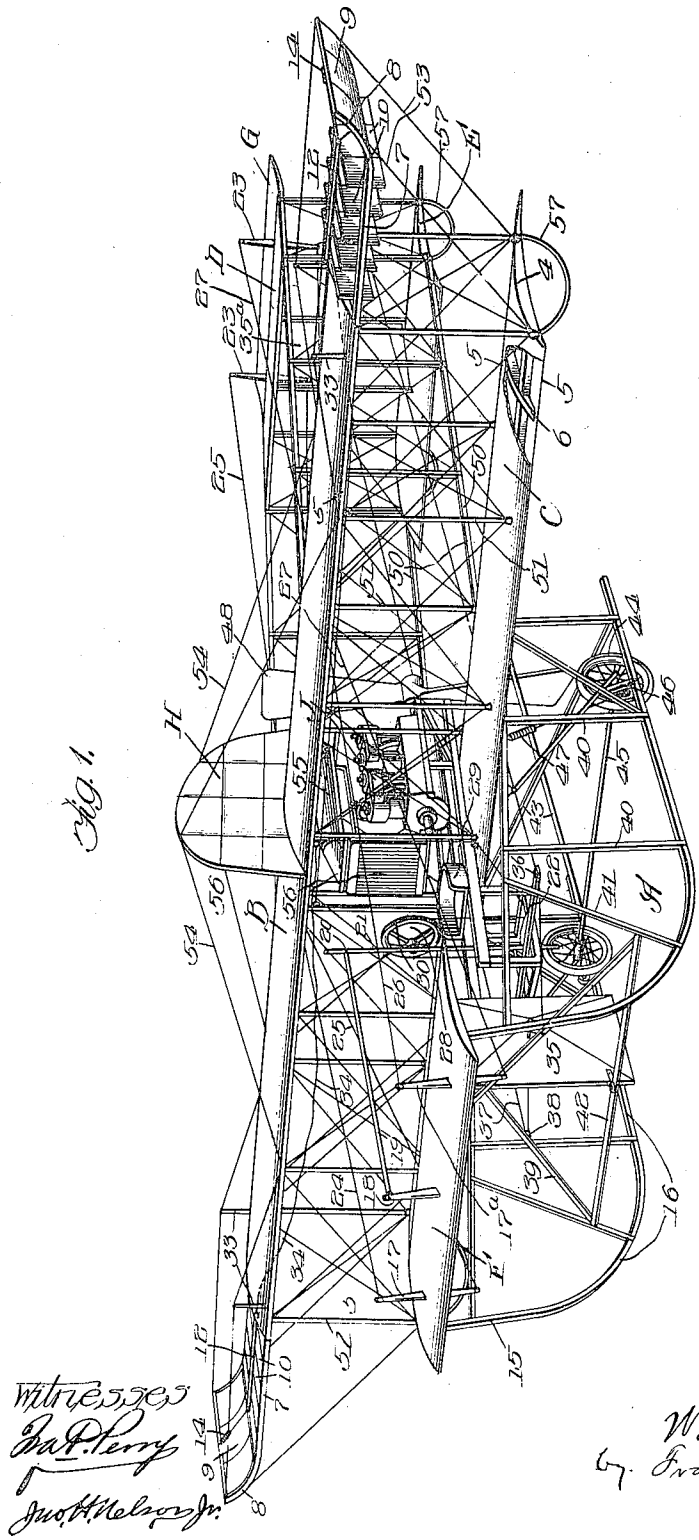


Fig. 1.

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Fig. 2.

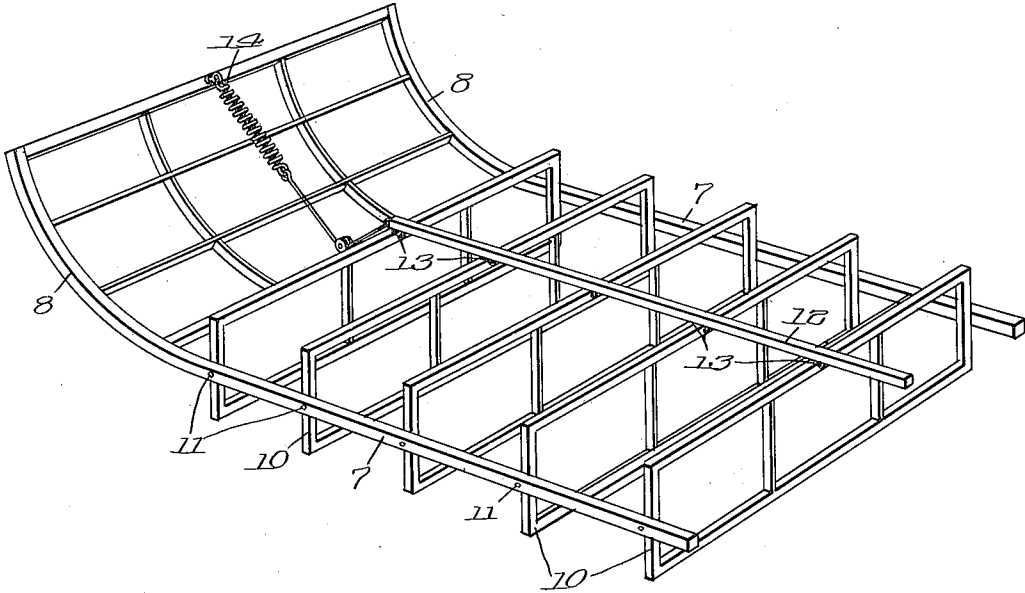
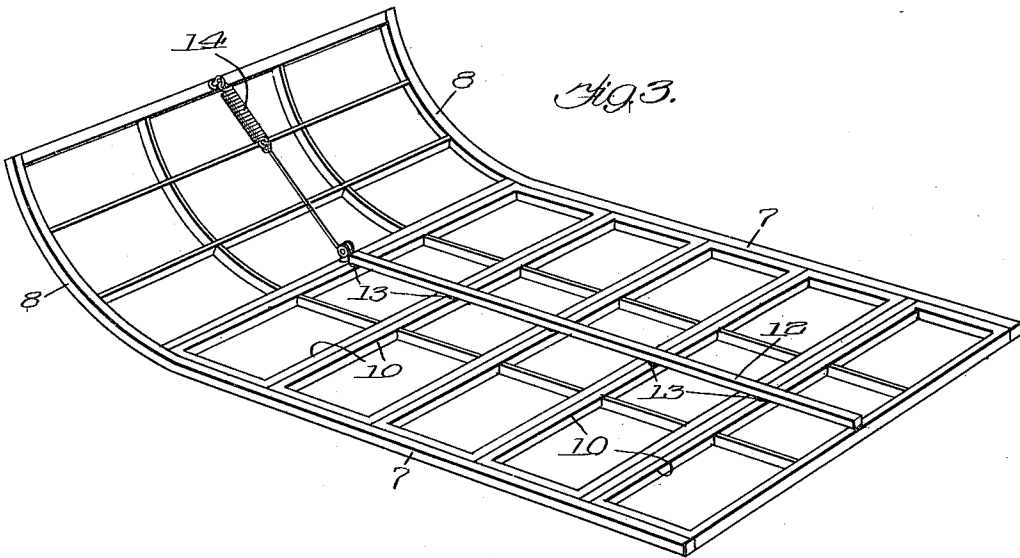


Fig. 3.



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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

1,154,214.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM E. SOMERVILLE, a citizen of the United States, residing at Coal City, in the county of Grundy and State of Illinois, have invented new and useful Improvements in Flying-Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in aeroplanes and has for its object the production of a machine possessing means for maintaining or restoring equilibrium of the machine when in the air.

The further object is the production of a machine possessing positive means for varying the effective working area of the planes.

Further objects are the production of a machine, the structure of which combines lightness and strength and a machine that can be easily operated.

These and such further objects as may hereinafter appear are obtained by my device, an embodiment of which is illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of my machine; Fig. 2 represents a perspective view of one end of the upper plane-frame and extension with the shutter opened; Fig. 3 represents a view similar to Fig. 2 with the shutter closed.

Like numerals of reference indicate like parts in the several figures of the drawings.

My invention relates to that class of flying machines in which the weight is sustained by reactions occasioned by the movements of one or more planes through the air, mechanical power and the force of gravity both being utilized.

I have illustrated my improvement in connection with a biplane, but all of the essential elements of my invention are as well applicable for use with a monoplane.

Referring now to the drawings, A represents a supporting frame, B an upper main plane, C a lower main plane, D an upper rear plane, E a lower rear plane, F a front plane or elevator, G a rear elevator hingedly secured to the rear of the plane D, H a central fin rigidly mounted on the top of the plane B and centrally located thereof and J an engine of any suitable type properly positioned within the frame of the machine.

All of the planes with the exception of the plane D are slightly curved, with the concave side downward, as shown at 4, and are preferably formed with tough wooden frames having side pieces 5—5 and curved cross bars 6 over which canvas is tightly stretched, forming light and strong planes.

The ends of the upper plane B are extended beyond the end of the lower plane C, as shown, and the extreme end curved upward at 8, the upwardly curved portion being also covered as shown at 9. A plurality of movably covered slats 10 are pivotally mounted between the bars 7, being pivoted at 11 and a bar 12 is hingedly secured to the top of the slats 13, forming, in effect, a Venetian blind, the opening and closing of which is under the control of the operator, as will be set forth later. A spring 14 mounted on the upper end of the curved portion of the plane is connected with the end of the bar 12, thus holding the slats normally in closed position. The elevator F is constructed the same as the other planes, but is much shorter and occupies a position slightly above the level of the lower plane C. This elevator is pivotally mounted on top of the upwardly curved ends of the runner 16 of the skid and is also provided with a pair of bars 17^a and 17 extending above and below the surface of the plane. A central post 18 is mounted on the top of the elevator from the end of which extends rearwardly a connecting rod 19, the rear end of which is pivotally secured at 20 to the controlling lever 21. This controlling lever is pivoted at its lower end to the main frame at 22.

The rear elevator G which is hingedly mounted on the rear end of the level plane D is also provided with a pair of bars 23 extending above and below the plane.

The front and rear elevators F and G are connected together by means of connecting wires 24 passing from the top of the post 17 to the bottom of the post 23, a wire 25 from the bottom of the post 17 to the top of the post 23, a wire 26 from the top of the post 17^a to the bottom of the post 23 and a wire 27 from the bottom of the post 17^a to the top of the post 23. An operating wheel 28 is mounted on the rear of the lever 21 directly in front of the seat 29 reserved for the operator. By pushing this lever forward and back the operator can incline the

elevators to any desired degree, the two being connected to work in opposite directions, that is, when the elevator F is tilted upwardly the elevator G is pulled downwardly and vice versa.

5 The operation of the shutters at the ends of the top plane are also operated through the medium of this wheel 28, the wheel being provided with a peripheral groove 30 which is connected with the inner end of the bars 12 at 33, the wire or connection 31 passing downwardly from the wheel and thence upwardly and along the underside of the upper plane. It will be noted that the wire is slightly longer than the distance traveled thereby, leaving a slack as indicated at 34, thus making it possible to have one of the shutters open while the other is closed or held in its normally closed position by means of the spring 14. The rudder 35 is pivotally mounted in front of the operator and is operated through the medium of the foot bar 36 from the ends of which connecting wires 37 extend around the pulleys 38 on one of the upright diagonal braces 39 to the rudder. A rear rudder 35^a is movably mounted between the rear planes D and E and connected to move with the front rudder.

30 While it is intended to operate the shutter by means of the wheel and in so doing the slack allows one shutter to be closed while the other is held manually opened, it is evident that in the event that a strong wind is encountered, the closed shutter will be forced open, the strength of the spring being so arranged as to permit the opening of the shutter under predetermined conditions.

40 The skid comprises the runner 16 curved upwardly as shown in Fig. 1, the upright braces 40, diagonal braces 41, cross braces 42 and diagonal rear braces 43. A pair of wheels 44 are mounted on an axle 45 secured in rocking bearings 46 on the skid frame. Springs 47 are connected with the bearings 46 by means of which any jar incident to sudden alighting is taken care of, thereby preventing injury to the machine.

50 The engine J may be of any desired type on the rear shaft of which is mounted the propeller wheel 48.

The rear planes are connected to the front by means of longitudinal bars 50 which extend forwardly, forming the upper bars of the main frame or skid and are set sufficiently far apart to permit the free revolution of the propeller. The planes B, C and D, E are secured together by means of uprights 51 suitably placed and suitably tied together by means of connecting wires. Guy wires 53 also extend from the end of the curved upward extension of the upper front plane to the end of the lower plane.

65 The central fin H is rigidly mounted midway of the machine and is further held in

place by means of the guy wires 54 extending from the top of the fin to the side bars 5 of the upper plane.

The gasoline tank 55 and the cooler 56 are located in any desired position adjacent the engine. Suitable spring supports 57 are extended downwardly from the ends of the lower planes C and E forming supports for that portion of the machine and also serving as buffers if the machine should when alighting happen to strike the rear portion first.

Referring now to the operation of my device, it is not the intention of the applicant to go into any extensive discussion or explanation of the art of aeronautics as this invention has to deal with actual details of construction and the operation of the parts so constructed.

The first feature to be considered is that of the upturned end of the upper plane. This is made rigid and of as great a strength as the planes of the machine. When the machine is in the air, and if, for any reason, one end tips more than desired, the curved end acts as a skid in falling to force the machine to right itself. This operation is assisted by means of the central fin H against which the air rushes as the machine is in the act of falling. The air from below the plane rushing out under the plane tends to force the plane upwardly into a horizontal position while at the same time the air rushing up the upper side of the plane strikes against the face of the fin H and also the upturned ends of the highest end of the plane. The lower upturned end will also in a measure compress the air to such an extent that the three forces will form a righting couple that will immediately force the plane to a level keel.

In the machines as now constructed in which the stability is maintained by the warping of the plane or by the use of ailerons whenever either are used they tend to cause the aeroplane to turn from its course, adding resistance to the lower side, and in order to counteract the tendency to turn the machine the vertical rudder must be used, whereas in my improved machine the vertical rudder is not required in righting the machine as there is no resistance to overcome.

The machine in question is not merely a creature of imagination or a theoretical device, but one that has stood the test of actual flight over long periods of time and on many occasions.

While I have illustrated particular forms of construction and wiring with respect to the aeroplane illustrated, I in no way limit myself to such specific construction as these details form no part of my invention.

I claim:—

1. A flying machine comprising a motor, an upper main plane, a lower main plane,

a pair of rear planes, a movable front plane, the outer ends of the upper plane being curved upwardly, a fin extending upwardly from the center of said upper main plane, a

5 movable rear plane, and means whereby said movable planes may be moved in unison in opposite directions.

2. A flying machine comprising a motor, an upper main plane, a lower main plane, a

10 pair of rear planes, a movable front plane, the outer ends of the upper plane being curved upwardly, a central fin extending longitudinally of said machine and project-

15 ing upwardly from the central portion of said upper main plane, a movable rear plane, and means whereby said movable planes may be moved in unison in opposite direc-

3. A flying machine comprising a motor, an upper main plane, a lower main plane, a

20 pair of rear planes, a movable front plane, the outer ends of the upper plane being curved upwardly, a fin extending upwardly from the center of said upper main plane, a

25 movable rear plane, means whereby said

movable planes may be moved in unison in opposite directions, and hand operated means whereby the effective wind area of said upper plane may be varied.

4. A flying machine comprising a motor, 30 an upper main plane, a lower main plane, a pair of rear planes, a movable front plane, the outer ends of the upper plane being curved upwardly, a central fin extending 35 longitudinally of said machine and projecting upwardly from the central portion of said upper main plane, a movable rear plane, means whereby said movable planes may be 40 moved in unison in opposite directions, and hand operated means whereby the effective wind area of said upper plane may be varied.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM E. SOMERVILLE.

Witnesses:

GORDAN CAMPBELL,
WILLIAM CAMPBELL.