

O. T. BELCHER.

AEROPLANE.

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1,005,127.

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Fig. 1.

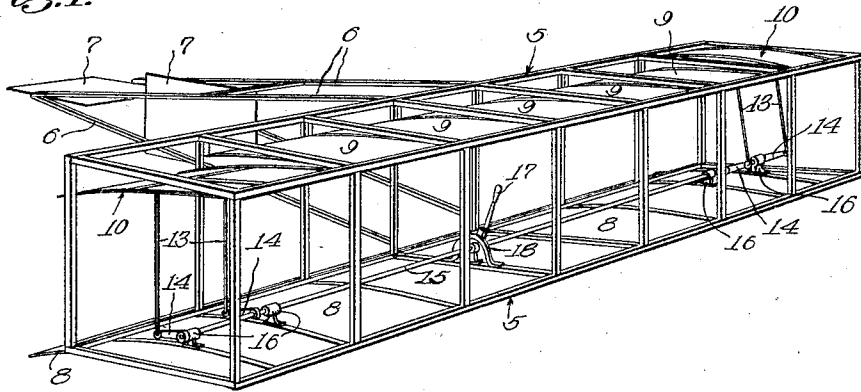
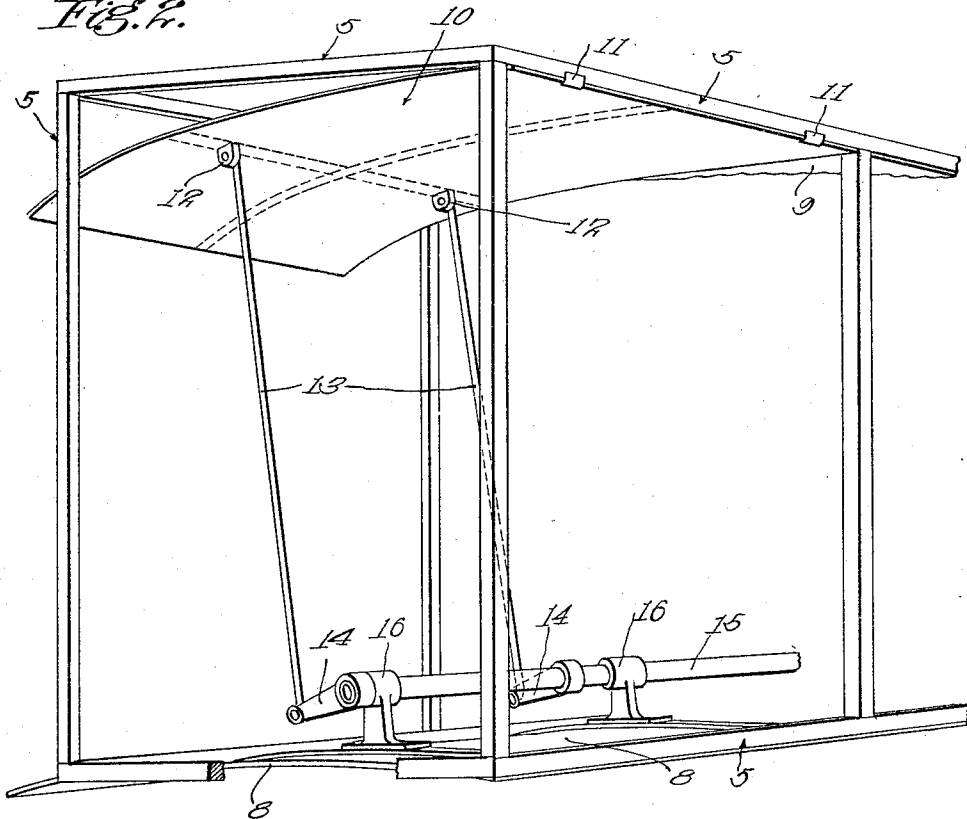


Fig. 2.



Witnesses
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AEROPLANE.

1,005,127.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OSMOND T. BELCHER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention relates more particularly to aeroplanes of the biplane type, although it is capable of adaptation to the monoplane; and consists in a novel arrangement of lateral equilibrium mechanism, including novel lateral equilibrium planes and mechanism for their manipulation.

Heretofore, so far as I am aware, there have been different mechanisms and methods for maintaining lateral equilibrium. Among these have been the methods of warping the outer corners of the main planes, of providing separate equilibrium planes between the main supporting planes, and of providing the small planes to extend rearwardly from the main supporting planes. But none of these mechanisms or methods give the direct results which are made possible by providing a wide surface directly movable by a suitable mechanism, without warping the surface or otherwise changing its configuration. In its specific aspect, my invention consists of making the end portions of the upper supporting plane of a biplane free and disconnected from the remainder of the upper supporting planes and movable around a pivot so that its rear edge may be raised and lowered to maintain lateral equilibrium. The movable portions of the upper supporting plane are easily moved when pivotally mounted at their forward edges, and yet they are of sufficient extent to provide means for quick control of lateral stability.

I prefer to provide equilibrium planes only in connection with one of the main planes, preferably the upper plane; but it is possible to duplicate my mechanism to apply the movable equilibrium planes to both planes, or to apply it only to the lower plane. For general purposes, I have thought it best to allow the lower plane to remain totally as a supporting plane, the upper plane constituting a supporting plane in its central portion and lateral equilibrium planes in its end portions. These features, and the mechanism for operating the lateral equilibrium planes, will become better apparent from the following specification and the accompanying drawings, in which:

Figure 1 is a perspective view of a typical biplane equipped with my improved device. Fig. 2 is an enlarged perspective view of one end of the same, showing the arrangement of one of the equilibrium planes and its operating mechanism.

In the drawings 5 designates a main rectangular or box-like frame, forming the main frame of the aeroplane, frames 6 extending rearwardly from the main frame for supporting the horizontal and vertical rudders 7. It will be understood that I only aim to illustrate a typical construction, my improved device being capable of combination with any of the biplane structures now in common use. Along the lower side of main frame 5, and from end to end thereon, is mounted the lower supporting plane 8. This plane is rigidly mounted on the frame, it being intended to act strictly as a supporting plane and not be used at all for equilibrium purposes. In the upper part of the main frame is mounted the upper supporting plane 9. I have shown main frame 5 divided into a number of panels in its upper part, and I have shown the upper supporting plane extending along under all of the panels except the two outermost ones. In these two outermost ones the equilibrium planes are mounted, the equilibrium planes forming, when in their normal or mean positions, extensions of the upper supporting plane. It will be understood that the extent of the equilibrium planes may be varied, that is, in the construction shown, the number and relative size of the different panels of the main frame may be varied so as to accommodate equilibrium planes of different sizes.

Equilibrium planes 10 are pivoted in any preferred manner at their front edges, as at 11, to the front upper edge of main frame 5. They extend rearwardly and are curved in a manner similar to the curvature of the upper supporting plane 9, the curvature being best shown in Fig. 2. The framing for the equilibrium planes may be varied in any desired manner; I have shown a method of framing which stiffens the frame to compensate for its lack of support at the rear part of main frame 5 (the lack of such support as the upper and lower main supporting planes receive at the rear edges of the frame.) Attached to the equilibrium planes at points near their rear edges are sets of pivot members 12, these pivot members affording means of connection with control-

ling rods 13. Controlling rods 13 are secured at one end to pivot members 12 and at their other ends to arms 14 mounted on a longitudinal shaft 15. Shaft 15 is preferably mounted in bearings 16, the shaft extending from one end of the frame to the other. The shaft may be made of hollow tubing so as to insure lightness and strength. It will be seen that arms 14 at one end of the machine are mounted on the opposite side of shaft 15 from the arms 14 at the other end of the frame; this provides that a rotation of shaft 15 will simultaneously throw one equilibrium plane downwardly and the other upwardly. Shaft 15 is manipulated in any preferred manner, a lever 17 with a mechanism 18 for holding it in any desired position being shown.

My arrangement of forming the entire ends of one of the supporting planes into lateral equilibrium planes affords ample surface for quick control of lateral equilibrium. The lateral equilibrium planes may be made of any desired extent, being limited only by the possibilities of forming a stiff structure, so that they may be moved from one position to another, and held to that position, with reasonable accuracy. Although the equilibrium planes may be applied to the lower sustaining plane alone or to both of the sustaining planes, I now prefer to apply it to the upper plane alone, deeming the best combination to be the one shown with the lower plane extending intact directly below the movable equilibrium plane.

Having described my invention, I claim:

1. A device of the class described, comprising a frame, a pair of supporting planes mounted thereon one above the other, the lower plane projecting beyond the upper plane at both its ends, rigid lateral equilibrium planes pivoted along their forward edges to the frame in the line of extension of the forward edge of the upper

supporting plane and over the end portions of the lower supporting plane, the equilibrium planes adapted to normally form continuations of the upper supporting plane, and means to move the equilibrium planes about their pivoted edges.

2. A device of the class described, comprising a frame, a pair of supporting planes mounted thereon one above the other, the lower plane projecting beyond the upper plane at both its ends, rigid lateral equilibrium planes pivoted along their forward edges to the frame in the line of extension of the forward edge of the upper supporting plane and over the end portions of the lower supporting plane, the equilibrium planes adapted to normally form continuations of the upper supporting plane, and means to simultaneously move the equilibrium planes about their pivoted edges in opposite directions downwardly when the other is moved upwardly.

3. A device of the class described, comprising a frame, a pair of elongated supporting planes mounted thereon one above the other, the lower plane extending beyond the upper plane at each end, lateral equilibrium planes pivoted at their forward edges on the frame, their forward edges continuing along the line of forward edge of the upper supporting plane, a longitudinal shaft mounted in bearings on the frame, arms mounted on the shaft, and connections between the arms and the equilibrium planes, the arrangement being such that a rotation of the shaft in one direction will cause the movement of one equilibrium plane upwardly and the other downwardly.

In witness that I claim the foregoing I have hereunto subscribed my name this 17th day of February, 1911.

OSMOND T. BELCHER.

Witnesses:

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ELWOOD H. BARKELEW.