W. S. EATON.

AEROPLANE STABILIZER.

APPLICATION FILED JULY 20, 1917.

1,280,195.

Patented Oct. 1, 1918.

2 SHEETS—SHEET 1.

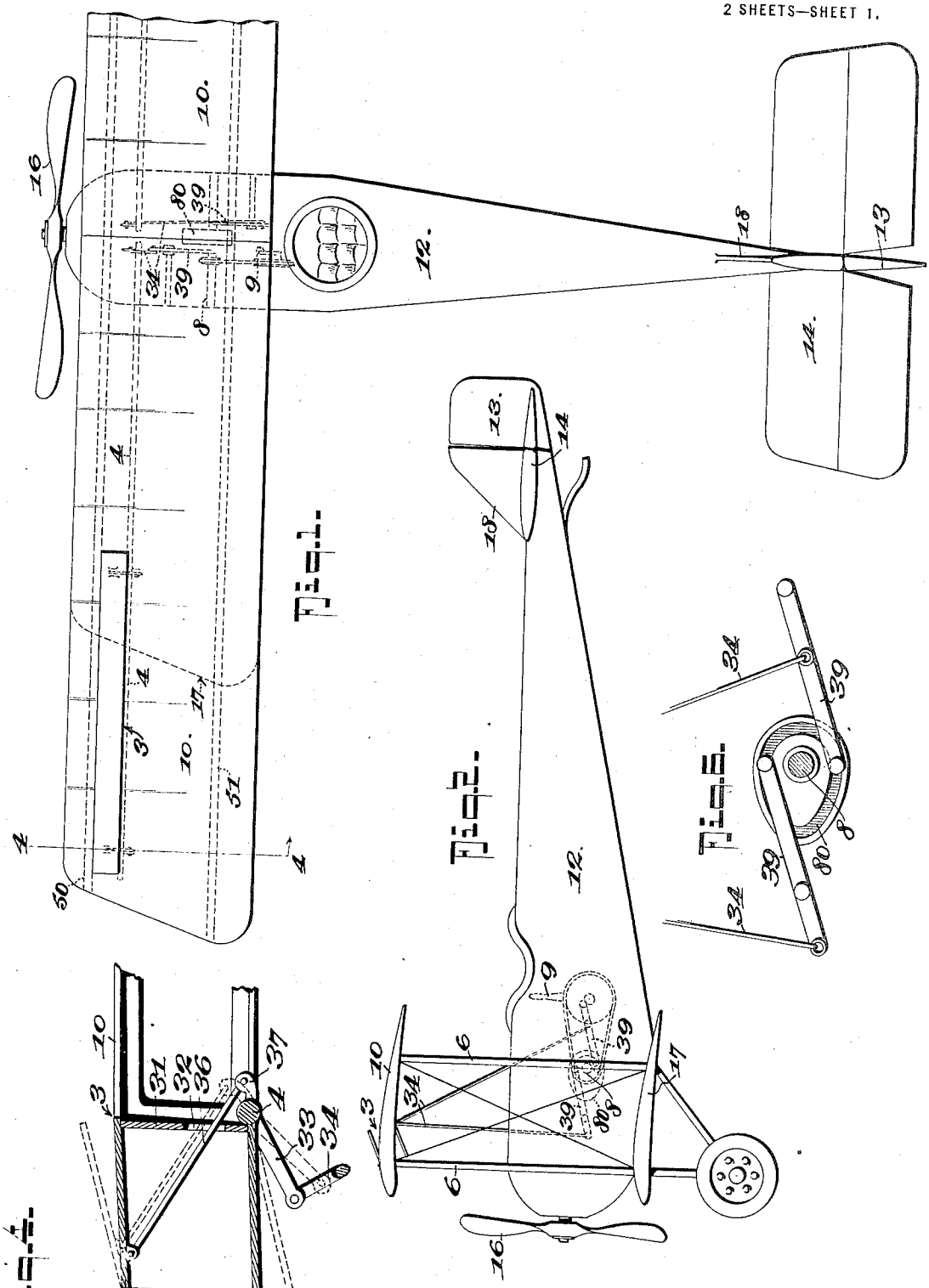


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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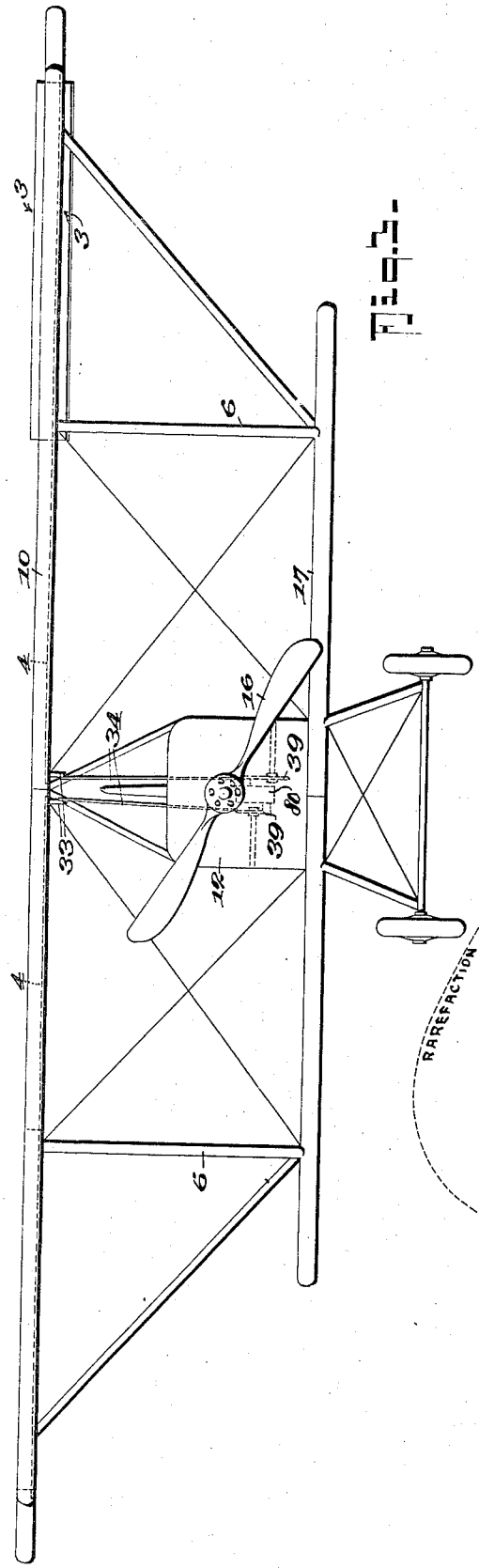


Fig. 4.

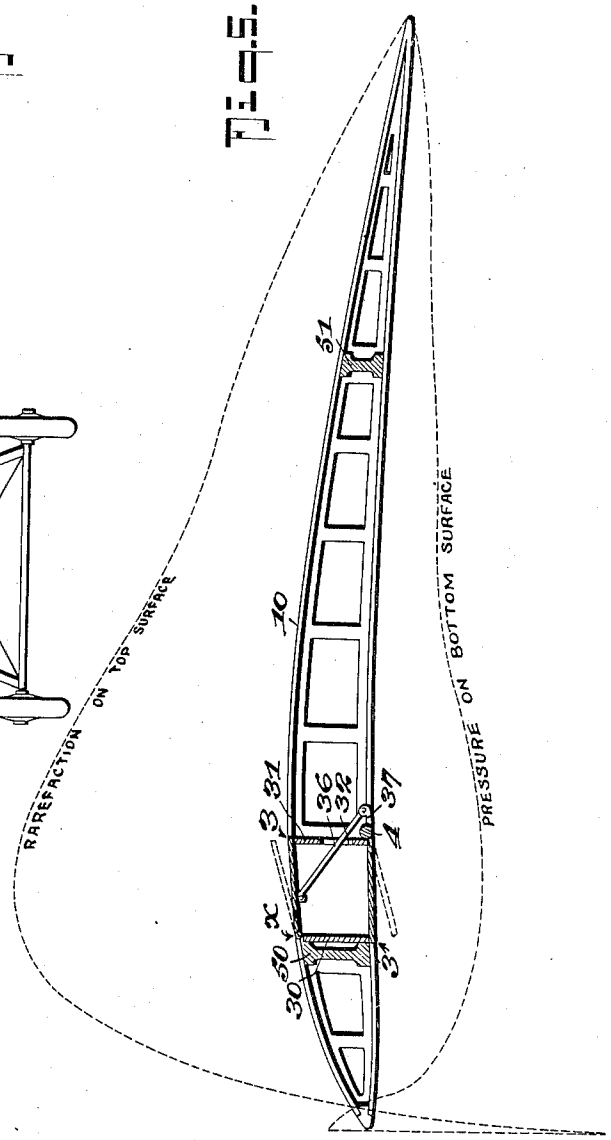


Fig. 5.

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AEROPLANE-STABILIZER.

1,280,195. Specification of Letters Patent. Patented Oct. 1, 1918.

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To all whom it may concern:

Be it known that I, WARREN S. EATON, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented a new and Improved Aeroplane-Stabilizer, of which the following is a specification.

This invention, which has reference to improvements in aeroplanes, is more especially designed for providing an improved means for stabilizing and in other respects controlling aeroplanes, while in flight.

Among its objects, my invention seeks to provide a very simple arrangement of shutter or valve controlled air passages elongated in parallelism with the front edge of the plane or planes, shutter or valve devices therefor and shutter control mechanism operable by the aviator for effecting such relative opening and closing adjustments of the shutters on both sides, whereby to release the under side pressure and take care of the rarefaction that occurs on the top surface, as the conditions may make necessary.

With other objects in view that will be hereafter stated, my invention consists in the peculiar construction and novel arrangement of parts hereinafter fully described, specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of so much of a conventional type of aeroplane as is necessary to illustrate a practical application of my invention.

Fig. 2 is a side elevation of the parts shown in Fig. 1 in the position when the shutters are open to relieve the lift on the high side of the aeroplane.

Fig. 3 is a front elevation of an aeroplane in which is embodied my invention, the relative positions of the shutters or valve controls at the opposite ends of the plane being indicated.

Fig. 4 is a detail cross section of the main plane taken substantially on the line 4—4 on Fig. 1 and illustrates the detail connection of the shutter or valve opening and closing means, and

Fig. 5 is a section taken on the longitudinal axis of the main plane, the lines of air pressure on the bottom surface and the rarefaction on top of the plane being indicated in broken lines.

Fig. 6 is a detail view of a portion of the mechanism by which the shutters are operated.

In the drawings, 10 designates the main or upper plane, 17 the lower plane, 12 the body, 13 the rudder, 14 the horizontal stabilizer, 16 the propeller, 18 the fin, and 6—6 the vertical struts, the general combination of the said parts referred to being of a conventional arrangement and they form *per se* no part of my present invention.

Referring now more particularly to Figs. 4 and 5, it will be noticed the top plane 10 in the longitudinal plane thereof is of the usual back bone or skeleton shape and includes front and rear I beams or cross braces 50—51.

In my construction, the plane 10 is provided along the opposite ends and at the front edge thereof with elongated slots or vertical air passages 3—3 and to provide for a rigid construction of that part of the plane in which the passages are formed, the said slots are located just back of the front I beam or cross brace 50 and, since, in practice, the said braces 50—51 are of skeleton shape, the front and rear walls of the passages 3 are formed by thin but solid transverse partition members 30—31, the rear one 31 of which has near its midway point a pair of vertical elongated slots 32, the purpose of which will be presently explained.

4—4 designate rock shafts located along the inner side of the plane just to the rear of the rear partition members 31—31 and each of the said shafts has a rearwardly extended crank 37 and a forwardly and downwardly projected crank arm 33, as is clearly shown in Figs. 3 and 4, by reference to which it will be also seen that to each arm 33 is connected one end of an actuating rod 34. The two rods 34 that connect at their upper ends with the levers 33 extend down and join with the levers 39 operated by a cam 80 on a rock shaft 8 that is rocked by a lever 9 located within convenient reach of the aviator. It is understood that in moving the lever 9 in one direction, the valves or shutters for one side of the main plane are opened while the shutters or vanes on the other side of the plane remain closed, it being also understood that the aviator may so manipulate the lever 9 as to vary the opening and closing adjustments of the shutters on the opposite sides to suit the conditions encountered, while flying.

By reason of the peculiar arrangement of

the features that constitute my invention, when the said features are applied, it being understood that each independent set of valves or shutters, there being one for closing over the lower side and one for closing over the top side of the said air passage, and the two upper shutters of each air passage being hinged as at x, and connected by a link 36 that passes through the apertures 33 in the back partition members 31—31 when the aeroplane lists to one side or the other, in order to right the plane, the valve or shutter that opens the lower end of the air passage at that side, in opening pulls the corresponding upper shutter to the open position through the medium of the link connection 38, it being understood that the aviator controlled action of opening or closing the shutters at one side has no effect on the corresponding shutters at the other side of the plane, the extent of opening or closing the said air passages being more or less, according to the degree of list, it being understood by those familiar with the aeroplane art that when the valves or shutters on the high side are opened, as stated, the air, which under ordinary conditions tends to act or apply pressure against the under surface of the plane, to raise the said plane of that particular side, is deflected, that is to say it is caused to pass through the plane, thereby nullifying the raising action at that side while correspondingly increasing the rarefaction on the top surface, as indicated.

In the drawing, I have illustrated a simple arrangement of my invention as combined with an ordinary type of aeroplane structure, but I wish it understood that the exact detail connection of the parts, as shown and described, may be readily modified or varied without departing from my invention as expressed in the appended claims.

What I claim is:

1. In an aeroplane, a main plane having air passages adjacent its leading edge and located one at each end of the plane, a set of upper and lower shutters for each air passage, link connections that join the said upper and lower shutters and means operable by the aviator for simultaneously adjusting the shutters of a set and locking the other set shut.

2. In an air craft, a main plane having an elongated passage therethrough at each end thereof and extended in parallelism with the front or leading edge of the plane, coacting upper and lower shutter members for both passage, means connecting the said coacting upper and lower shutter members for both passages, whereby to operate the said shutters in harmony but in alternate directions, and other means operable from the aviator's seat for effecting uniform shifting of the shutters or valves for their respective air passages, whereby to deflect the air pressure above and below the plane.

3. In an aeroplane, a main plane having air passages adjacent its leading edge and located one at each end of the plane, a set of upper and lower shutters for each air passage, link connections that join the said upper and lower shutters and means operable by the aviator for simultaneously adjusting the shutters of a set.

4. As an improvement in air craft; a main plane in which is included a front cross brace, vertical elongated air passages through the plane and in parallelism with the front edge thereof, each of said passages being formed between a solid front partition and a back partition having a vertical elongated slot near each end, an upper and a lower shutter for controlling each air space, a connection that joins the pair of shutters for each air space for causing them to raise and lower in unison, said connections including a rock shaft that forms the hinge for one of each set of the said shutters, said rock shaft including a crank arm and crank operating means including an aviator controlled lever.

WARREN S. EATON.