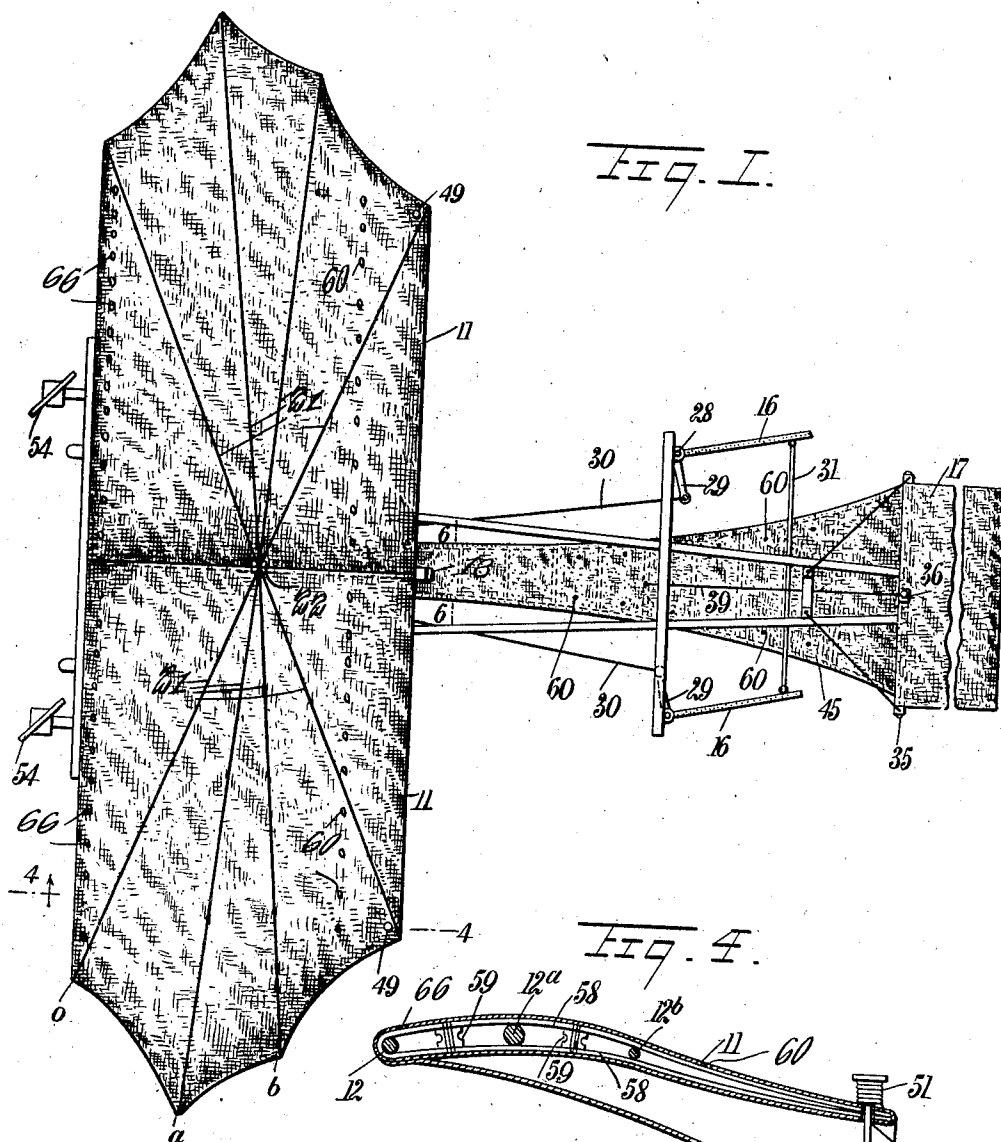


1,058,634.

Patented Apr. 8, 1913.

3 SHEETS—SHEET 1.



WITNESSES
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C. J. Mumdock

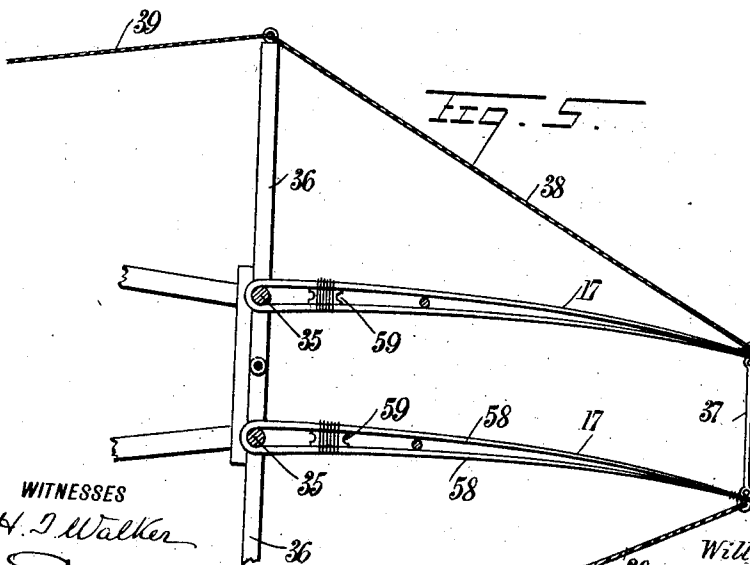
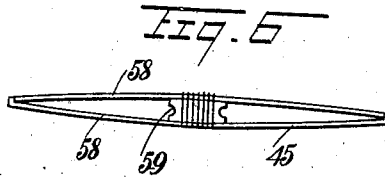
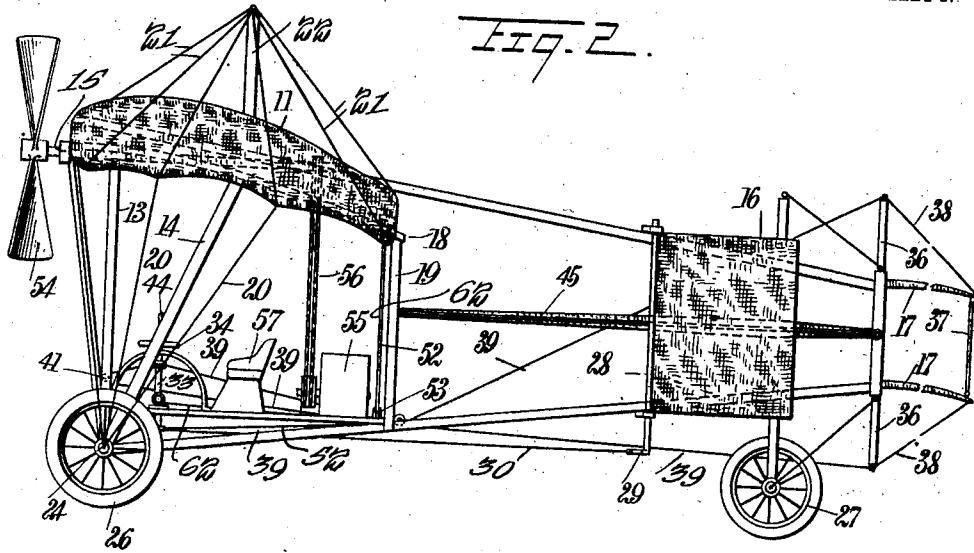
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APPLICATION FILED JAN. 11, 1912.

1,058,634.

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3 SHEETS-SHEET 2.



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3 SHEETS-SHEET 3.

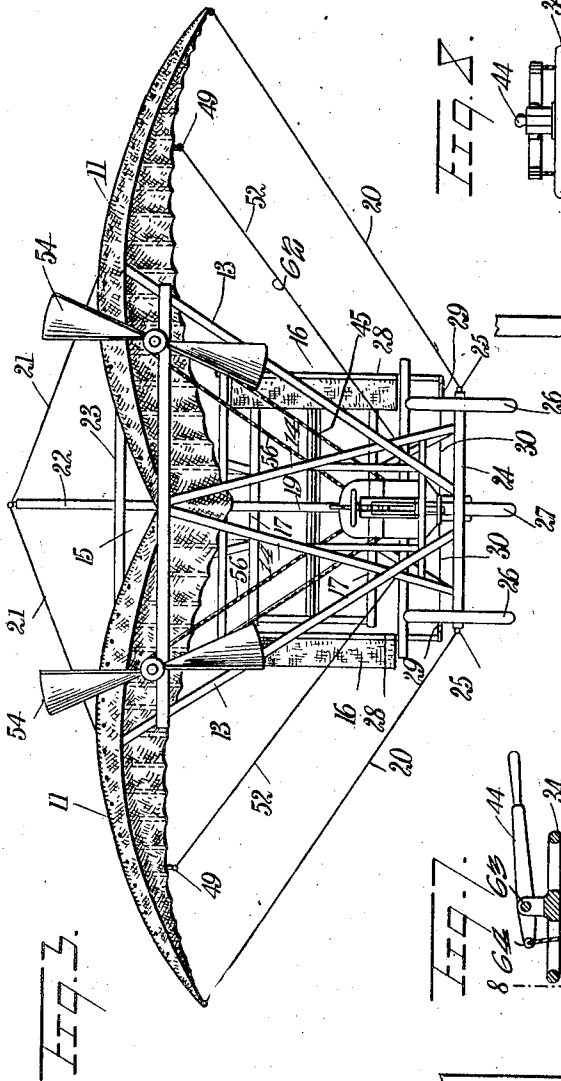


FIG. 3.

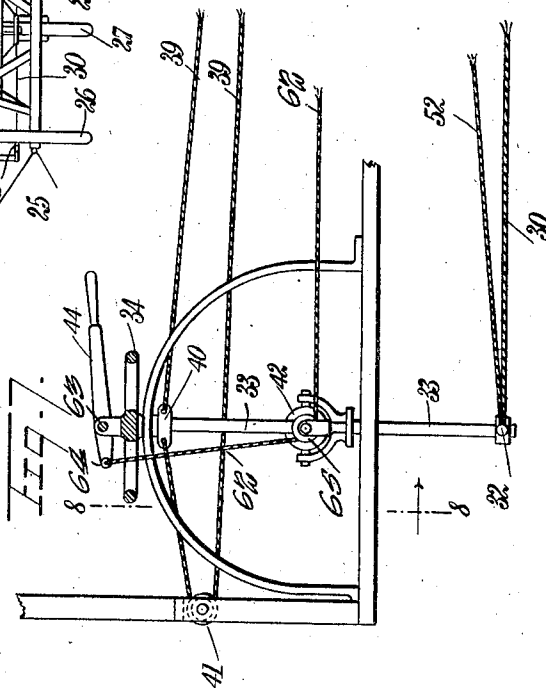


FIG. 4.

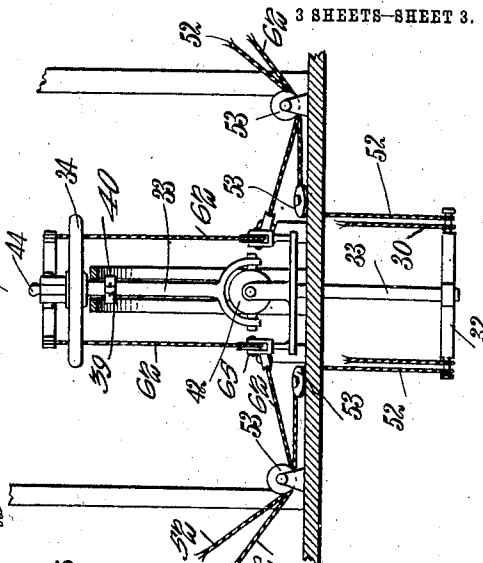


FIG. 5.

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AEROPLANE.

1,058,634.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed January 11, 1912. Serial No. 670,568.

To all whom it may concern:

Be it known that I, WILLIAM D. SCOTT, a citizen of the United States, and a resident of Springwells, in the county of Wayne and State of Michigan, have invented a new and Improved Aeroplane, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide means for producing a warping effect without impairing the structural strength of the carrying planes; to provide a mechanism universal in its operation for controlling the steering and warping devices harmoniously; to provide a tail carrying plane for steadying the horizontal poise of the machine; to provide a system of duplex steering rudders to augment the effectiveness thereof; to provide a structure for the planes which augments the strength without materially increasing the weight thereof; and to provide means for steadying the operation of the planes in their passage through the air.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a plan view of an aeroplane constructed and arranged in accordance with the present invention; Fig. 2 is a side elevation of the same; Fig. 3 is a front elevation of the same; Fig. 4 is a cross section of the main carrying plane, on an enlarged scale, taken on the line 4—4 in Fig. 1; Fig. 5 is a detail view, on an enlarged scale, showing in side elevation the levitating tail planes; Fig. 6 is a detail view, on an enlarged scale, showing in cross section the construction of the steadying planes, taken on the line 6—6 in Fig. 1; Fig. 7 is a detail view, on an enlarged scale, showing a fragment of the body structure having the operating mechanism thereon mounted; and Fig. 8 is a vertical section taken on the line 8—8 in Fig. 7.

As shown in the drawings, the invention is disclosed as embodied in the form of an aeroplane known as a monoplane. As seen, the main carrying planes 11, 11 are connected midway the structural frame and may be extended laterally therefrom to any desired distance. In the present invention, the

planes 11 are not provided with moving or warping sections in the sense that some portions of the planes are warped, twisted or pivotally mounted to be deflected. The structure of the planes 11 has throughout as rigid a frame as the character of the machine permits. The forward ribs 12 of the planes are reinforced and connected with the lower framing structure by means of the inclined braces 13, 13 and supporting struts 14, 14. The braces 13 and struts 14 are connected by a cross brace 15, in which cross brace are formed bearings for the propeller driving shafts. The structural frame is spider-like in form, being constructed from the lightest suitable material, and is converged to the rear of the main planes to support the laterally disposed horizontal steering planes 17, 17 and the vertical steering planes 16, 16. A ridge brace 18, as best seen in Fig. 2 of the drawings, is dipped toward the rear, and is held in position by a short strut 19. The planes 11, 11 are extended below the ridge brace 18, and thus dispose the said carrying planes in a desired position to effect the normal elevation of the machine. The outer ends of the planes 11 are guyed from beneath by cables 20, 20, and above by cables 21, 21. The cables 21 connect the outer ends of the planes 11 with a short mast 22, which is set up on the ridge brace 18 and there held in position by a cross brace 23. The cables 20, as best seen in Fig. 3 of drawings, are anchored at each end of the axle 24 to an eyelet 25. Upon the axle 24 is provided a journal for the wheels 26, 26. The wheels 26, 26 operate in conjunction with a wheel 27 to form a carriage for the machine when the same is resting on the ground.

The machine is steered by the planes 16, 16 and 17, 17. Each of the planes 16 is mounted upon a pivot rod 28. At the lower ends of the rods 28 are crank handles 29, to which guiding cables 30 are attached. Between the rear and outer edges of the planes 16 is extended a spreader rod 31. The rod 31 maintains the parallel relation of the planes 16. As best seen in Figs. 7 and 8 of the drawings, the cables 30 are connected with a tiller bar 32, which is mounted at the lower end of a tiller post 33. The tiller post 33, at the upper end, is provided with a hand wheel, by which the said post is rotated. The post 33, in rotating, swings the bar 32

on its center, drawing one of the crank handles 29 to the front, and the other to the rear, thus throwing the planes 16 in the same direction and to one side of the line of flight of the machine. As hereinafter explained, the tiller post 33 is formed in two sections united as shown in the drawings, to permit the upper end thereof to swing and thereby controllingly manipulate the planes 17, 17. From the foregoing, it will be seen that when the machine is in flight, the horizontal line of flight may be varied by rotating the wheel 34 to rock the tiller bar 32 and change the disposition of the vertical planes 16, 16.

The inclination of the machine is varied by raising or lowering the planes 17, 17. The planes 17, 17 are provided with pivot rods 35, 35, which rods are rigidly connected with short masts 36, 36. The outer edges of the planes 17 are connected by vertically disposed connecting rods 37, as best seen in Figs. 2 and 5 of the drawings. By reason of the connection through the rods 37, the two planes 17 are maintained in constant parallel arrangement. The planes are vertically reinforced by means of guy lines 38, 38.

To each of the masts 36 is connected an operating cable 39. The cables 39, 39 are led down through the frame of the machine, and are carried forward by guide pulleys to be anchored to a clip collar 40. The cables 39 connect the tiller post 33 and clip collar 40 with the ends of the upper and lower sections of the mast 36, as seen best in Fig. 2 of the drawings. The lowermost cable 39 is extended forward and reeved about a pulley 41, and returned to be connected, as shown in Fig. 7, with the clip collar 40. The clip collar 40 is rotatively mounted upon the upper section of the post 33. The upper and lower sections of the post 33 are connected by a knuckle joint 42. The joint 42 permits the upper section of the post 33 to be swung forward and back from the vertical line.

It will be seen that with a steering mechanism constructed and arranged substantially as above set forth, the tiller post 33 may be rotated to rock the tiller bar 32 and to throw the planes 16 to any desired position, and while in such position, the upper section of the post 33 may be rocked forward or backward without disturbing the set of the lower section of the post 33. This action is accommodated by the knuckle joint 42.

The operation of the machine is steadied by the employment of a horizontally-disposed steadying plane 45. The plane 45 is best seen in Figs. 1 and 2 of the drawings, and it will be noticed that the plane, starting with a diminished width at the forward end, is gradually widened to the width of the plane 17. The plane 45 prevents any

sudden jump of the rear end of the machine when the planes 17 are, through accident or inexperience, turned too suddenly. The sluggishness produced by this plane 45 would enable the aviator to correct his error before any serious damage resulted. A further effect produced is that it operates as a feather on the shaft of an arrow to maintain or steady the line of flight of the whole machine. It will be understood that this machine is substantially rigid.

It is desired, when turning a machine in midair in its horizontal flight, that provision should be made for rocking the machine on its longitudinal axis. This operation is known as warping. In the present machine, warping members 46 are provided at the outer end of each of the planes. As seen in Fig. 4 of the drawings, the members 46 are canvas strips, which are sewed to the forward edge of each of the planes 11 and across the same at a suitable distance from the outer edge of each of the planes. The rear edge of the member 46 is provided with a framing strip 48, which is hinged to the plane 11, and is pivotally connected at the extreme outer edge of the plane with the plunger 49. The plunger 49 is slidably mounted in a perforation 50 provided in the framing structure of the plane 11. The outer corner of the member 46 is depressed to the position shown in full lines in Fig. 4 by a warping cable 52. The cables 52 are each connected with the tiller bar 32, and are led over guide pulleys 53 to the outer or warping members 46.

By means of the rigging above described, it will be seen that in the proportion and as the tiller post 33 is rotated to rock the bar 32, the cables 30 and 52 on each side of the steering gear are drawn upon in the same degree. As will be noticed in Fig. 1 of the drawings, the crank handles 29 are turned inward toward the median line of the machine. To draw upon the outer end of the crank handle in this position throws the planes 16 to the position shown in said figure, which position will result in the right hand turning of the machine. Simultaneously, the pull on the cable 52 depresses the outer corner of the member 46 at the left of the machine. Dropping the lower edge of the member 46 on this side of the machine presents an added inclination for the levitation of the machine at this point, which ultimates in rocking the machine on its longitudinal axis to raise the left or rear side of the machine. As the machine is turning to the right, the proper action, as is known, is to lift the left wing which aids in banking around the curve. It will be understood that this warping of the members 46, 46 is simultaneous with, and proportioned to, the throw of the planes 16, 16. As the planes 16, 16 are righted to steer the machine in a

straight course, springs 51 take up the slack in the cables 52, and raise the plunger 49 and member 46 connected therewith against the under side of the plane 11.

5 The lever 44 is pivotally mounted by means of a pin 63 upon the upper end of the post 33. At the lower end, said lever is provided with a cross bar 64, to the ends of which are secured cables 62. This construction is best seen in Figs. 7 and 8 of the drawings. The cables 62 are passed under pulleys 65 in the knuckle joint 42. From the pulleys 65, as seen best in Fig. 8 of the drawings, the cables 62 pass under the pulleys 53, and from thence to the plungers 49. From the pulleys 53 to the plunger 49, the cables 52 and 62 are closely juxtaposed. In the drawings, in Figs. 2, 4 and 8, said cables are shown as being separated, this being an expedient to indicate the two cables. When thus equipped, the machine is operated in part by the lever 44 to warp both of the sections 46, and simultaneously to vary the levitation of the planes 11 to which the said sections are connected.

As seen in Figs. 1 and 3 of the drawings, the propellers 54 are mounted on two shafts, which are supported in the framework of the machine, and are driven from a motor 55 by means of a transmission mechanism embodying chains 56. As seen in the same figures of the drawings, the aviator's seat 57 is disposed just forward of the motor 55 and within convenient reach of the wheel 34 and lever 44.

It will be noted that the propellers 54 are disposed above the lower and rearmost edge of the planes 11. The propellers are thus arranged to produce a current of air directly against the inclined surface of the planes 11, and thus aid in the levitation of the same.

To make the planes more rigid in structure, without increasing the weight thereof, I arrange the structural parts in the manner shown in Figs. 4, 5 and 6. Referring to Fig. 4, which, as stated, is a cross section of the main carrying plane 11, it will be seen that lengthwise of the said plane are disposed braces 12, 12^a and 12^b. These braces vary in length, and terminate at the points *o*, *a* and *b* of the extended planes 11. Crossing these braces transversely are bowed ribs 58, 58. The ribs 58 are shaped to give the desired form in cross section to the planes 11. Intermediate the braces 12, 12^a and 12^b are disposed framing blocks 59. The blocks 59 are formed in any desired manner, and are rigidly secured to the ribs 58. The length of the intervals between the ribs 58, 58

depends upon the desired rigidity of the structure.

As seen in Fig. 6, blocks 59 are placed midway between the ribs 58, 58. The shape thus imparted in cross section to the plane 45 is slightly bulging at the median center of the plane and of the machine.

As seen in Fig. 5 of drawings, the arrangement of the blocks 59 is somewhat similar to the arrangement of said blocks in the structure of the main carrying planes 11, separating the ribs 58 toward the front of the planes.

The hollow space produced by this construction between the upper and lower skin or covering of the main and auxiliary planes is utilized by me to produce what I have found to be a steadying action for the planes while in flight through the air.

At the forward end of each of the planes, I construct openings 66, properly reinforced to prevent fraying or wear. These openings are provided to admit air while the machine is in flight. At the rear of each of the planes, and as in the plane 45, along the edge thereof, I form perforations 60, through which the partly-compressed air rushes, to, by its impact on the surrounding atmosphere, steady the operation or position of the planes so constructed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a machine such as described, carrying planes each having an upper and lower cover, said covers being spaced apart to form air spaces, and said planes being provided with passages disposed at the forward edge of said planes to admit air to the interior of said planes, and said planes being further provided with perforations adjacent the rear edge of each of said planes to deliver air to prevent rarefaction of the air through which the planes are passing.

2. In a machine such as described, a structural frame, a carrying plane mounted on said frame and forwardly upwardly tilted, said plane having a hollow structure provided with a receiving passage at the forward edge and delivery perforations adjacent the rear edge of said structure to avoid rarefaction due to the passage of the plane through the air.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM D. SCOTT.

Witnesses:

LOUIS OTT,
F. F. TERRY.