Oct. 21, 1930. E. H. LANIER 1,779,005

AEROPLANE

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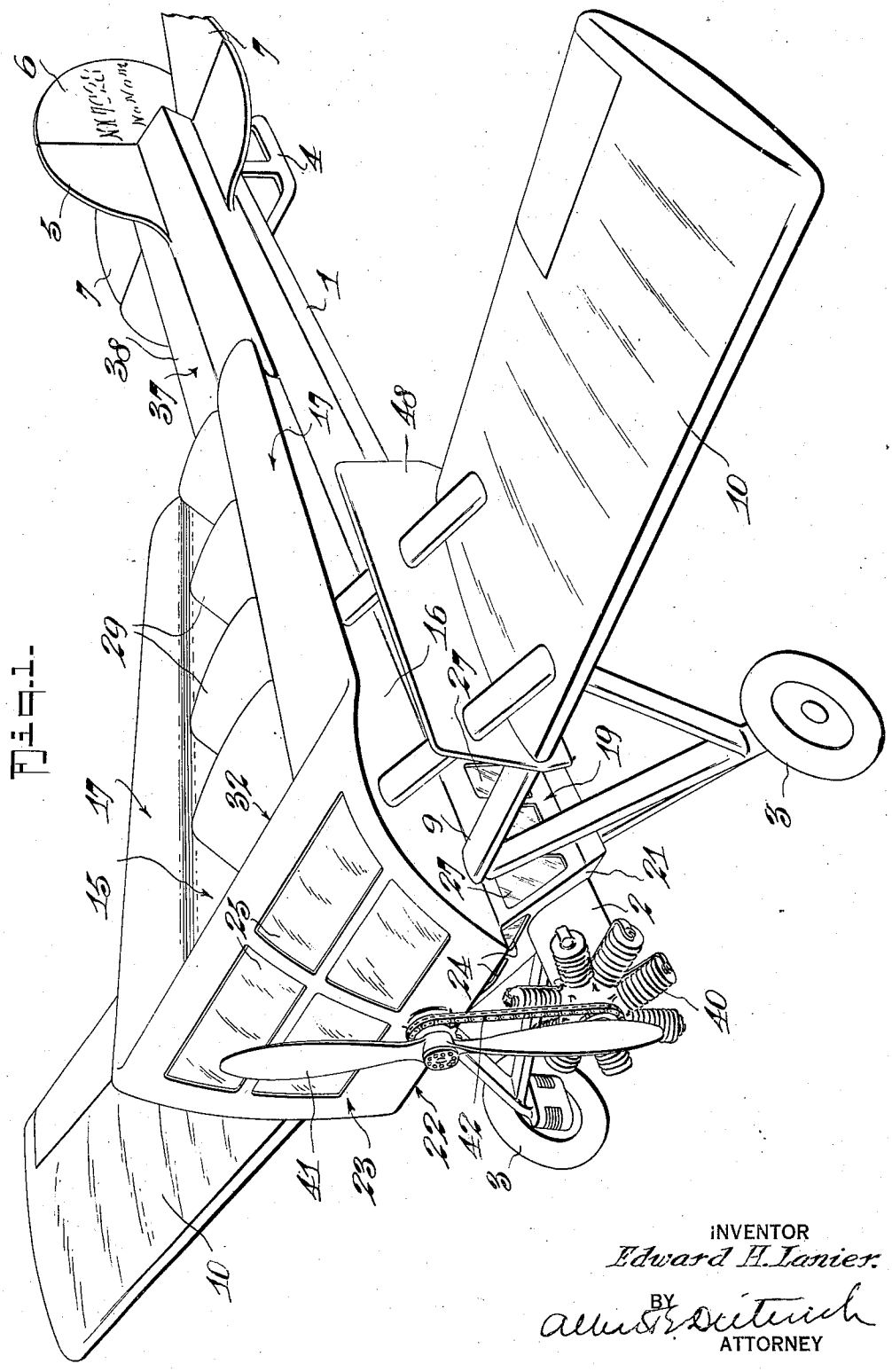


FIG. 1.

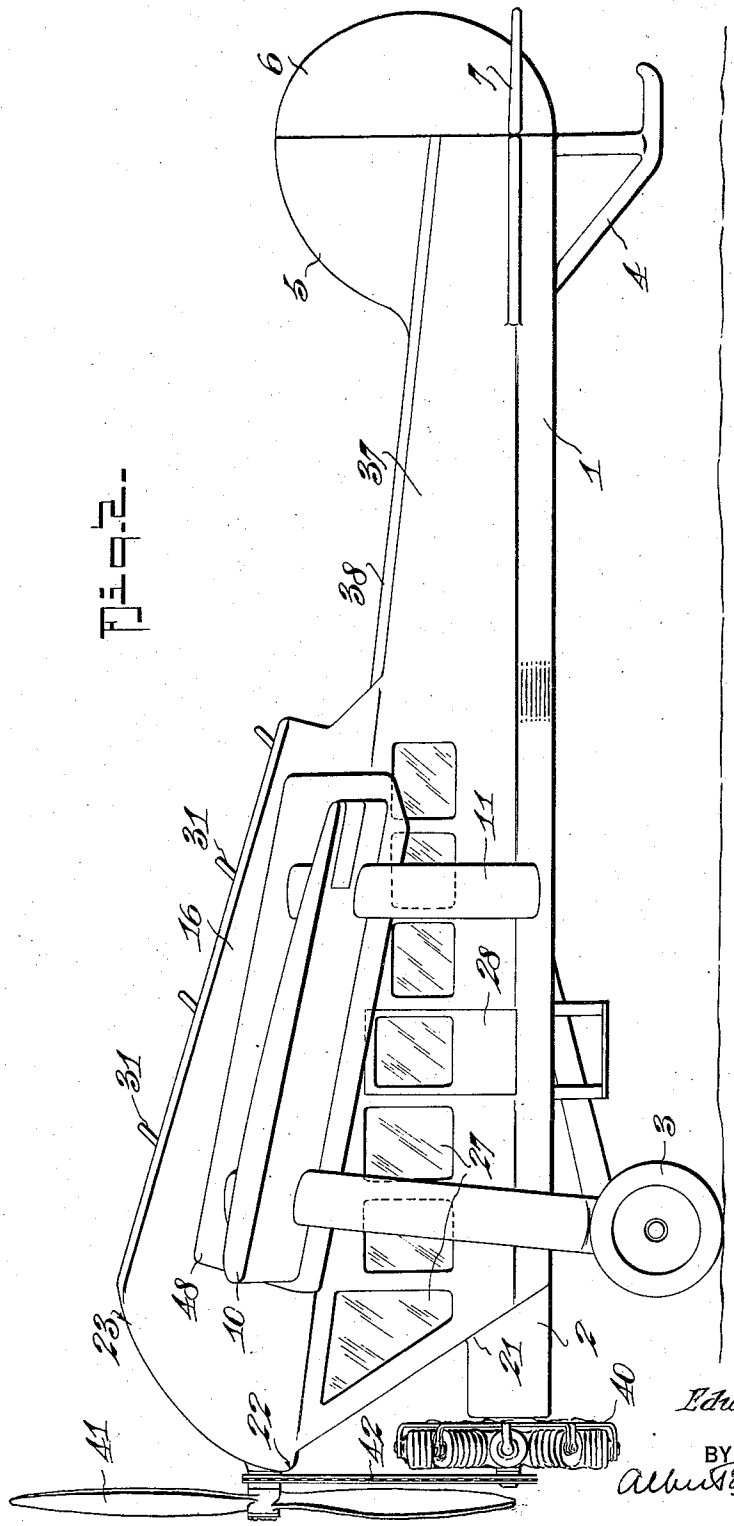
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Fig. 2.

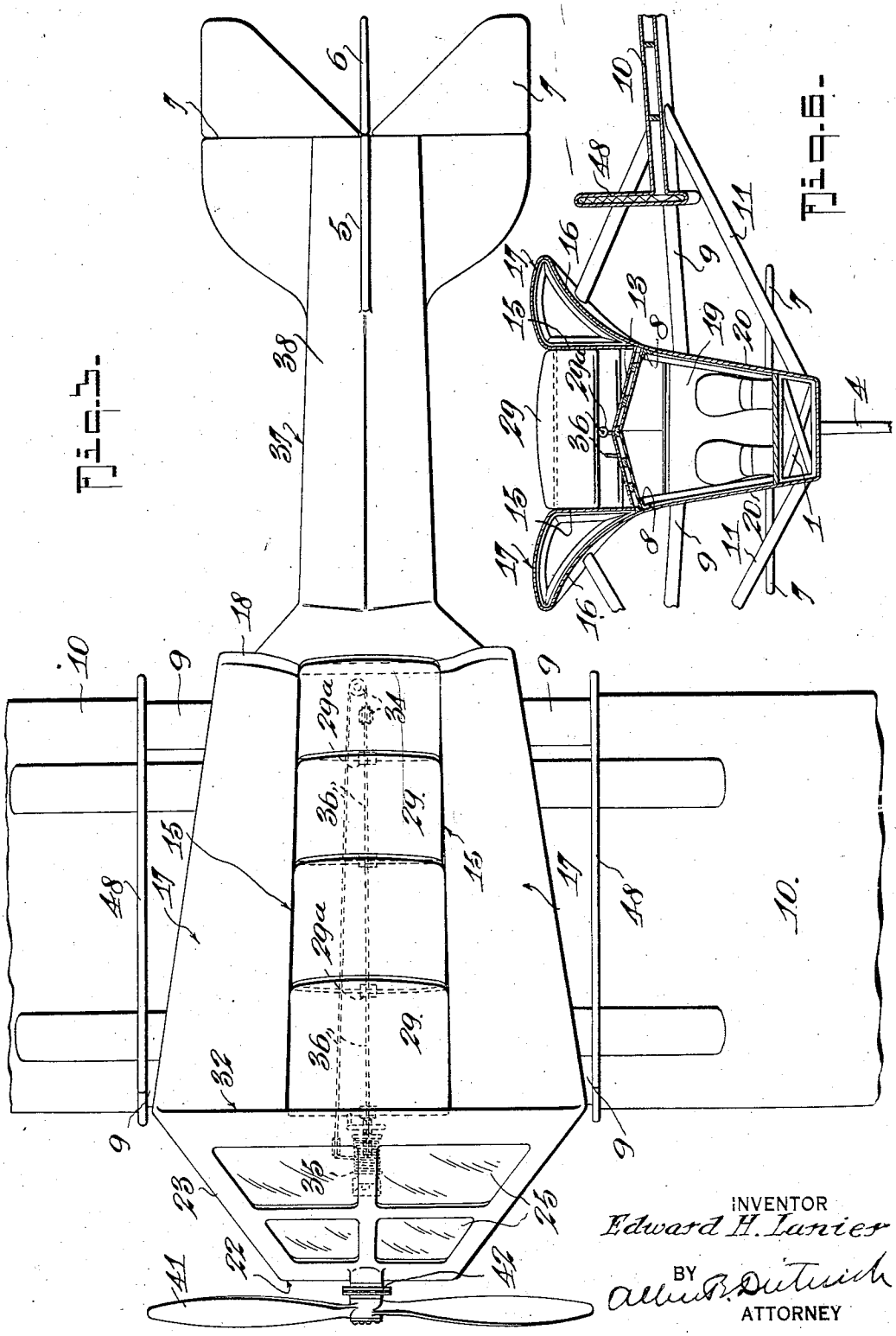


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AEROPLANE

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Fig. 4.

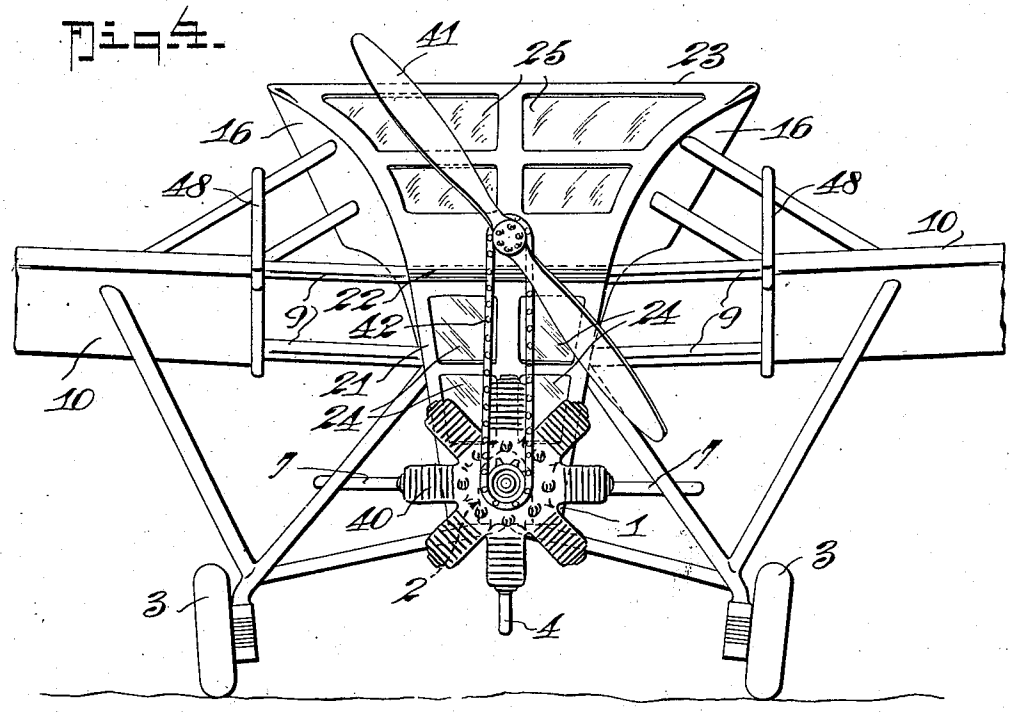
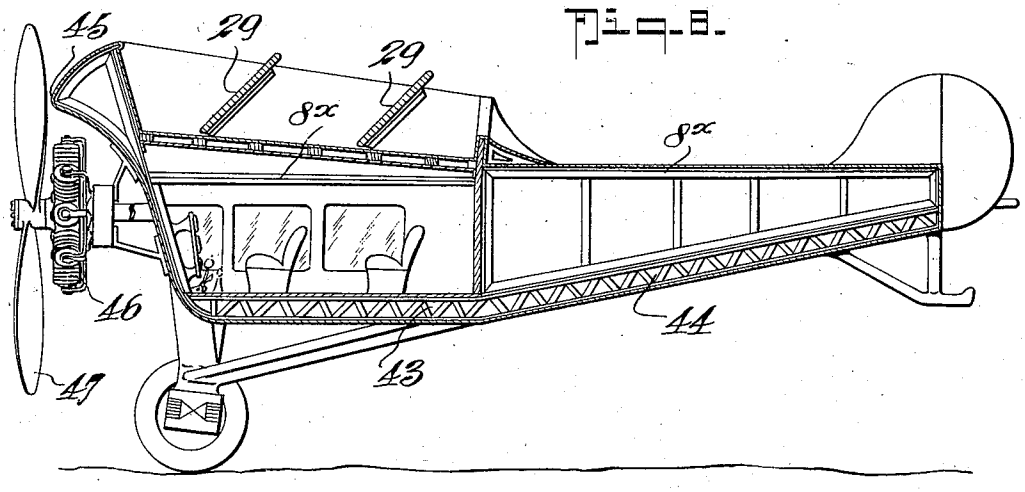


Fig. 8.



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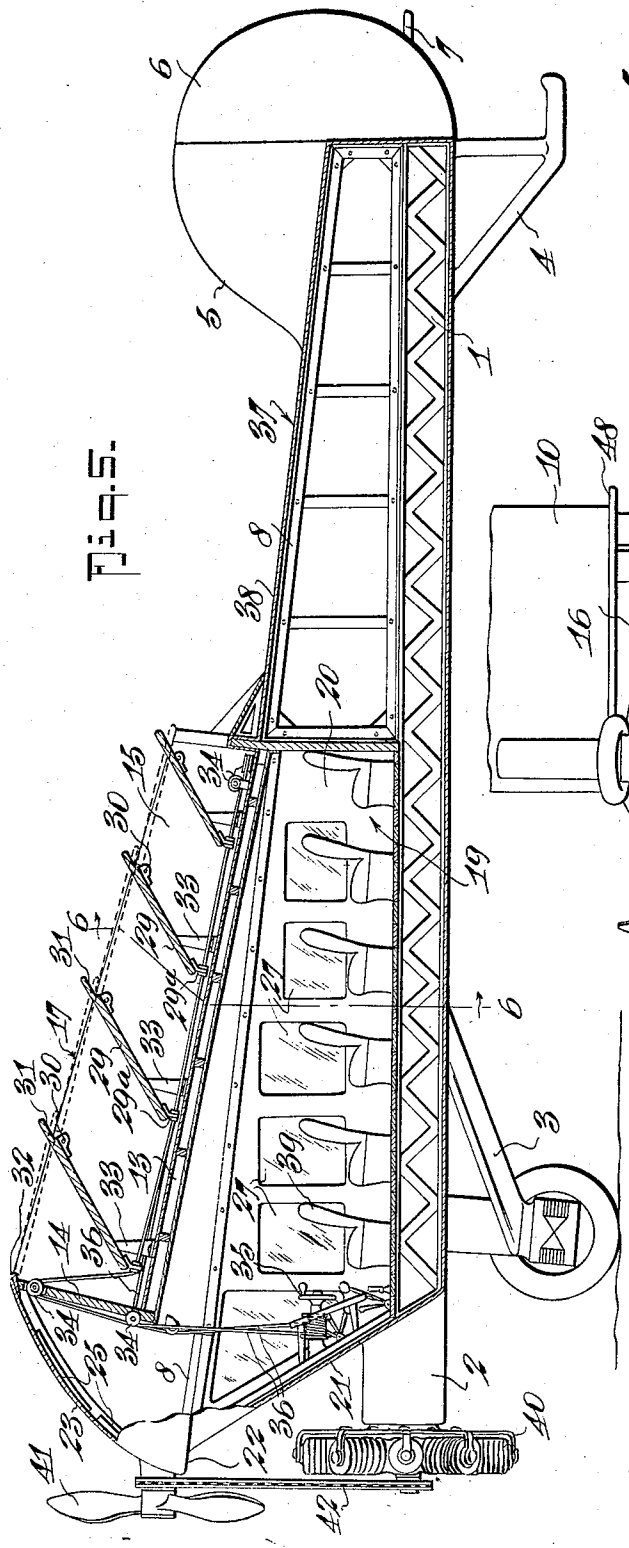


Fig. 5.

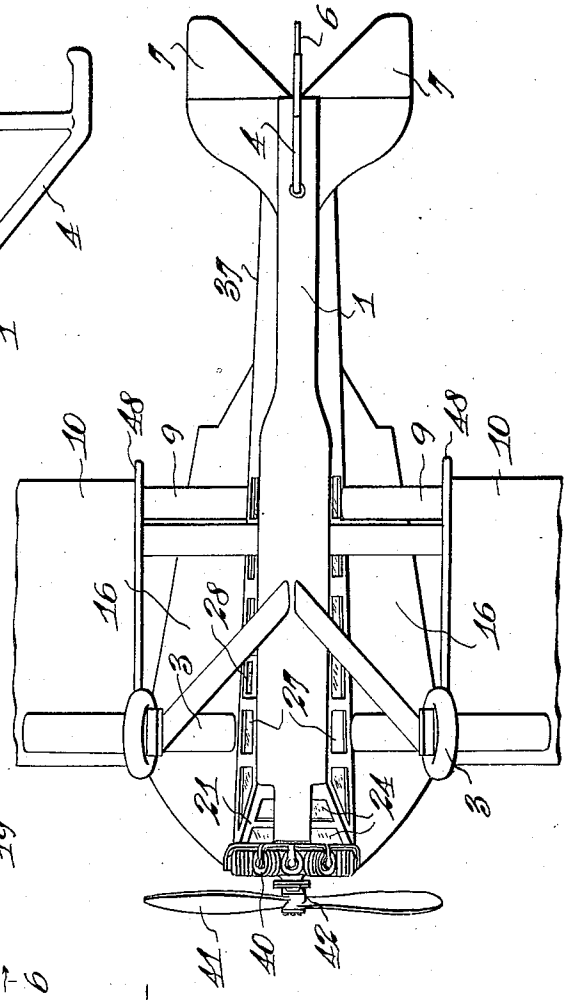


Fig. 7.

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UNITED STATES PATENT OFFICE

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AEROPLANE

Application filed April 7, 1930. Serial No. 442,401.

My present invention which relates to the art of aerial navigation has for its primary object to improve the aeroplane which constitutes the subject matter of my Letters Patent No. 1,750,529, issued March 11, 1930.

Further, it is an object to provide an aeroplane of a design and construction which is especially adapted for large machines of the commercial or passenger transport type and particularly to improve the lines, distribution of weight and propeller thrust.

Further, it is an object to provide an improved construction wherein adequate provision is made for visibility in front, sides and top of the cabin for the benefit of the pilot.

Further, it is an object to provide an aeroplane of the kind disclosed in my patent aforesaid, in which provision is made for more flare at the top outer sides of the vacuum chamber in order to create greater lifting force vertically and more balancing force laterally, always bearing in mind a true stream line design longitudinally.

A further object is to provide a convex or angled up floor for the vacuum chamber which also may constitute the roof of the cabin, thereby at the same time providing for more head room in the cabin and enabling the air to be drawn out of the vacuum chamber more freely than when a flat floor for the vacuum chamber is used.

Further, it is an object of the invention to provide the vacuum chamber with a set of air buffers or partitions which may be rigid, or, preferably, hinged so that they may be swung up to close the top of the vacuum chamber when desired, means being provided under control of the pilot for actuating the buffer-partitions at will to open or close the chamber.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is a perspective view of an aeroplane embodying my invention.

Figure 2 is a side elevation of the same.

Figure 3 is a plan of the same, parts of the wings being broken away.

Figure 4 is a front elevation of the machine.

Figure 5 is a central longitudinal vertical section thereof.

Figure 6 is a detail cross section on the line 6—6 of Figure 5.

Figure 7 is an inverted plan showing the contour of the keel when viewed from below.

Figure 8 is a central vertical longitudinal section of a modification of the invention.

In the drawings, in which like numerals of reference indicate like parts in all of the figures, 1 represents the keel which has a forward extension 2 on which the motor or engine is mounted. The landing gear is represented by 3 and the tail skid by 4. 5 is the usual vertical fin while 6 designates the rudders and 7 the horizontal stabilizers.

The fuselage includes the long runs 8 which are suitably braced transversely and 9 represents the wing beams which carry the wings 10, the latter being braced as at 11 as shown. The construction of the wings may be the same as in my patent hereinbefore mentioned.

The roof 13 of the cabin in this embodiment of the invention also constitutes the floor of the vacuum chamber that is located above the cabin. In the preferred embodiment of the invention herein illustrated, the cabin is built into the fore part of the fuselage, the after part 37 constituting the tail assembly.

The vacuum chamber which is located above the cabin has a front wall 14 and side walls 15, the outer surfaces 16 of which are flared outwardly and upwardly laterally from the cabin. The side walls of the vacuum chamber have their upper edges convexed as at 17. The rear wall 18 of the vacuum chamber is preferably slightly inclined upwardly and rearwardly from the floor 13.

The cabin 19 has side walls 20 which merge with the side walls of the vacuum chamber and it has a front wall 21 which constitutes

the lower wall of the nose of the machine. This front wall 21 extends upwardly and forwardly from the floor of the cabin to the tip 22 of the nose, and from that tip there is an upwardly and rearwardly extended (preferably curved) wall 23, the rear edge 32 of which overlies the wall 14.

The front wall 21 of the cabin is provided with windows 24 and the wall 23 is likewise provided with windows 25. As illustrated best in Figure 5 of the drawings there is a space left between the front wall 14 of the vacuum chamber and the tip 22 of the nose so that the pilot on the seat 39 may have vision through the windows 25 as well as through the windows 24 and will thus be able to see above as well as in front and below.

The cabin 19 is also provided with windows 27 in its sides and a door 28 for the usual purposes.

Air buffers 29 are mounted in the vacuum chamber and these air buffers may be held fixed in position or, preferably, they are hinged at 30 and are provided with heels 31 so that when the buffers are moved on the hinges upwardly the heel 31 of one buffer will overlie the free edge of the next buffer to the rear and thus enable the buffers to act as a closure for the top of the vacuum chamber when desired. The fore buffer 29, when in closed position, underlies the projection 32 of the wall 23, which projection acts also as a stop. The heel 31 of the rear buffer, when in the closed position, engages the upper edge of the wall 18 as a stop.

Suitable stops 33 on the floor of the vacuum chamber are provided to limit the downward movement of the buffers to their maximum working position where they function as air buffers or deflectors.

In order to operate the air buffers at the will of the pilot I may provide a winch 35 on which is wound an operating cable 36 that passes over suitably located idler pulleys 34 and is connected to the several buffer lugs 29^a whereby when the winch 35 is turned in one direction the buffers 29 may be moved to the closed position (see dotted lines in Figure 5), and when moved in the other position they are brought to the position indicated in full lines in Figure 5.

It will be noted that the tail assembly is closed at the top as well as at the sides, bottom and rear end, the top closure being indicated by 38.

The motor or engine 40 is preferably located on the extension 2 of the keel while the propeller 41 is preferably mounted on a shaft projecting from the nose tip 22 and is driven from the motor 40 by a sprocket and chain drive 42.

In the modified form of the invention illustrated in Figure 8 the front portion 43 of the keel is substantially parallel to the long runs 8^x while the rear portion 44 of the keel extends from the rear of tht cabin upwardly and rearwardly. Furthermore in this embodiment the vacuum chamber has its nose 45 forwardly extended to overlie the motor 46 which is mounted to approximate alignment with the horizontal plane containing the long runs, the propeller 47 in this instance being directly mounted on the motor shaft.

The wings 10 of the aeroplane may be, as before intimated, of the same construction as in my patent aforesaid, and the channel vanes 48 are also provided to leave the air channels between those vanes and the sides of the fuselage and vacuum chamber.

It will be noted by reference to Figure 7 that the keel 1 is widest from the front end of the cabin and from the rear end it tapers toward the tip of the tail. Furthermore, the keel where it extends in front of the cabin is narrowed.

The cabin and vacuum chamber side walls are relatively parallel longitudinally and the air channel vanes are relatively parallel with the keel longitudinally to reduce drag to a minimum and allowing a free flow of air through the air channel to the tail assembly.

A large proportion of the weight of the entire plane is located at the lowest level below the wing lift and the vacuum chamber forces. The propeller thrust is approximately on a line with the wing supporting lift and the vacuum chamber forces.

In the preferred arrangement the engine is located on the keel and the propeller on the nose of the vacuum chamber and connected with the engine by a suitable power transmitting connection (either chain or shaft drive). While some power may be lost by this method of driving there is a distinct advantage in having the engine located at a low point of gravity and the propeller thrust on a line with the supporting wing lift and the vacuum chamber forces. However, the engine and propeller unit can be mounted on the nose of the plane if desired and if more than one engine is used the engines may be mounted to the right and left to the vertical center as is done in planes now in common use.

It will also be observed that by virtue of the construction shown and described, vision for the pilot is amply provided for by windows constructed of any suitable transparent material and located to the right, left, front and above the pilot.

When the plane is moving at slow speed or the engine is throttled down, there is a tendency for the air to flow down into the vacuum chamber from above. The provision of the air buffers, however, causes this air to be deflected upwardly and rearwardly, thus preventing it from entering the vacuum chamber to any considerable extent. One or more buffers may be used though I prefer to use a plurality of them, particularly where

they are of the hinged kind and are also employed for the purpose of closing the top of the vacuum chamber.

It will be noted that the buffers do not extend to the bottom of the vacuum chamber as this would create pockets and prevent a free easy suction of air from the chamber.

By building up the top longitudinal edges of the vacuum chamber side walls in oval form they prevent, in a very effective way, air currents from curling over into the vacuum chamber.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation and advantages of my invention will be clear to those skilled in the art to which it relates.

What I claim is:

1. In an aeroplane wherein is provided an elongated body, stabilizers, a rudder, wings, and landing gear; a vacuum chamber at the top of the body and open at the top, the walls of said chamber being so inclined as to deflect the air currents over and away from the open top of said chamber and producing an area of negative pressure above said chamber, and an air buffer located within said chamber.

2. In an aeroplane wherein is provided an elongated body, stabilizers, a rudder, wings, and landing gear; a vacuum chamber at the top of the body and open at the top, the walls of said chamber being so inclined as to deflect the air currents over and away from the open top of said chamber and producing an area of negative pressure above said chamber, air buffers movably located within said chamber, and means in part within said elongated body and connected with said buffers for adjusting their positions.

3. In an aeroplane wherein is provided an elongated body, stabilizers, a rudder, wings, and landing gear; a vacuum chamber at the top of the body and open at the top, the walls of said chamber being so inclined as to deflect the air currents over and away from the open top of said chamber and producing an area of negative pressure above said chamber, air buffers movably located within said chamber, and means in part within said elongated body and connected with said buffers for adjusting their positions, said buffers being formed and mounted so as to be moved into position to close the top of said chamber.

4. In aeroplanes, an elongated fuselage enclosing a cabin, wings extending laterally from said fuselage, flight directing and stabilizing means, and an open top chamber located above the fuselage, the walls of which chamber are arranged to deflect the air currents so as to produce an area of low pressure over said chamber, and an air buffer within said chamber.

5. In aeroplanes, an elongated fuselage enclosing a cabin, wings extending laterally from said fuselage, flight directing and stabilizing means, an open top chamber located above the fuselage, the walls of which chamber are arranged to deflect the air currents so as to produce an area of low pressure over said chamber, the floor of said chamber being peaked along the center longitudinal line.

6. In aeroplanes, an elongated fuselage enclosing a cabin, wings extending laterally from said fuselage, flight directing and stabilizing means, an open top chamber located above the fuselage, the walls of which chamber are arranged to deflect the air currents so as to produce an area of low pressure over said chamber, the floor of said chamber being peaked along the center longitudinal line, and air buffers within said chamber.

7. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, and a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin.

8. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, and a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, and air buffers within said chamber.

9. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, and a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber and means in part located in said cabin and in part passing through said nose, and in part located in said chamber for moving

said buffers to change their positions for the purposes described.

10. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, and a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber, and means in part located in said cabin and in part passing through said nose, and in part located in said chamber for moving said buffers to change their positions, said means comprising hinge axes for the buffers located adjacent the top of said chamber, a winch in said cabin, a cable connecting said winch with said buffers, and pulleys over which said cable passes.

11. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber and means in part located in said cabin and in part passing through said nose and in part located in said chamber for moving said buffers to change their positions, said buffers adapted when in one position to close said chamber, and stops limiting the movements of said buffers.

12. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber, and means in part located in said cabin and in part passing through said nose and in part located in said chamber for moving said buffers to change their positions, said means comprising hinge axes for the buffers located adjacent the top of said chamber, a winch in said cabin, a cable connecting said winch with said buffers, pulleys over which said cable passes, said buffers adapted when in one position to close said chamber, and stops limiting the movements of said buffers.

13. In an aeroplane wherein is provided an elongated body, stabilizers, a rudder, wings, and landing gear; a vacuum chamber above the body and open at the top, the walls of said chamber being so inclined as to deflect the air currents over and away from the open top of said chamber and produce an area of negative pressure above said chamber, and an air buffer located within said chamber, said buffer extending from adjacent the top of said chamber toward but terminating short of the bottom of the same.

14. In an aeroplane wherein is provided an elongated body, stabilizers, a rudder, wings, and landing gear; a vacuum chamber above the body and open at the top, the walls of said chamber being so inclined as to deflect the air currents over and away from the open top of said chamber and preduce an area of negative pressure above said chamber, air buffers movably located within said chamber, and means in part within said elongated body and connected with said buffers for adjusting their positions, said buffers extending from adjacent the top of said chamber toward but terminating short of the bottom of the same.

15. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of a chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, a bottom wall extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber and means in part located in said cabin and in part passing through said nose and in part located in said chamber for moving said buffers to change their positions, said buffers extending from adjacent the top of said chamber toward but terminating short of the bottom of the same.

16. In aeroplanes, a fuselage having a keel and enclosing a cabin at the front part, an open top chamber above the cabin, and a nose in front of said chamber and said fuselage, said nose including a front edge spaced from said chamber, a top wall extending from said front edge to the top edge of the front wall of said chamber, a bottom wall

extending from said front edge to the keel of said fuselage, thereby leaving a space between said front edge and said chamber, said top and bottom walls of the nose having windows in line of vision of a pilot located within the cabin, movable air buffers within said chamber and means in part located in said cabin and in part passing through said nose and in part located in said chamber for moving said buffers to change their positions, said buffers adapted when in one position to close said chamber, and stops limiting the movements of said buffers, said buffers extending from adjacent the top of said chamber toward but terminating short of the bottom of the same.

17. In aeroplanes, a fuselage comprising an enclosed body having stream line long runs at the top, stream line side walls and a keel at the bottom, the fore part of said keel being approximately parallel to the long runs and the aft part inclining upwardly and rearwardly, said body including a cabin in the fore part of the fuselage, a motor and propeller mounted in front of said body in approximate alignment with the horizontal plane containing said long runs, wings extending laterally of said long runs, and an open top chamber over the fore part of said fuselage.

18. In aeroplanes, a fuselage comprising an enclosed body having stream line long runs at the top, stream line side walls and a keel at the bottom, the fore part of said keel being approximately parallel to the long runs and the aft part inclining upwardly and rearwardly, said body including a cabin in the fore part of the fuselage, a motor and propeller mounted in front of said body in approximate alignment with the horizontal plane containing said long runs, wings extending laterally of said long runs, and an open top chamber over the fore part of said fuselage, said chamber having a forwardly extended nose overhanging said motor.

19. In aeroplanes, a fuselage comprising an enclosed body having stream line long runs at the top, stream line side walls and a keel at the bottom, the fore part of said keel being approximately parallel to the long runs and the aft part inclining upwardly and rearwardly, said body including a cabin in the fore part of the fuselage, a motor and propeller mounted in front of said body in approximate alignment with the horizontal plane containing said long runs, wings extending laterally of said long runs, and an open top chamber over the fore part of said fuselage, said chamber having its walls formed to produce an area of negative pressure above the chamber.

20. In aeroplanes, a fuselage comprising an enclosed body having stream line long runs at the top, stream line side walls and a keel at the bottom, the fore part of said keel being approximately parallel to the long runs and the aft part inclining upwardly and rearwardly, said body including a cabin in the fore part of the fuselage, a motor and propeller mounted in front of said body in approximate alignment with the horizontal plane containing said long runs, wings extending laterally of said long runs, and an open top chamber over the fore part of said fuselage, said chamber having its walls formed to produce an area of negative pressure above the chamber, and air buffers within said chamber.

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