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R. H. CHATTIN

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FLYING MACHINE

Filed July 12, 1929

2 Sheets-Sheet 1

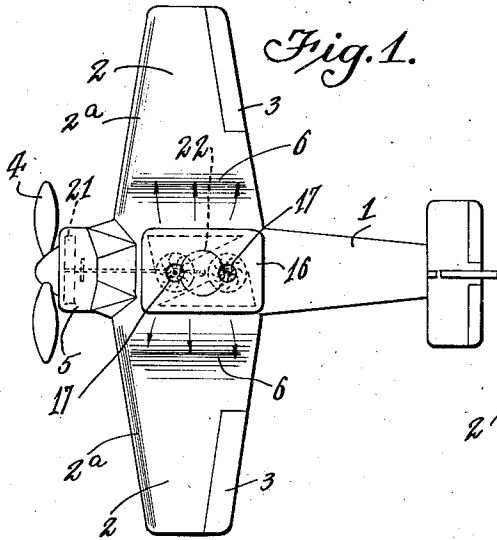
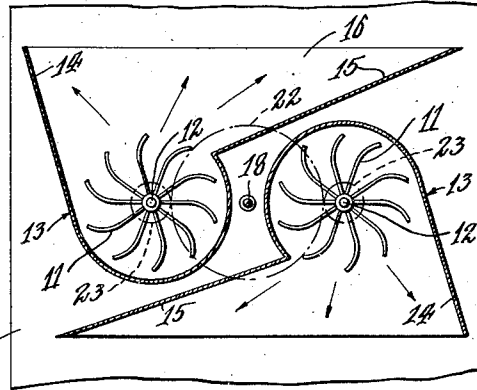


Fig. 2.

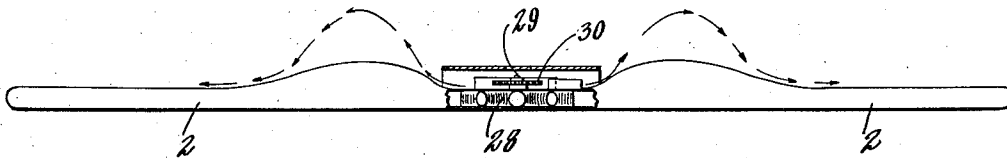


Fig. 7.

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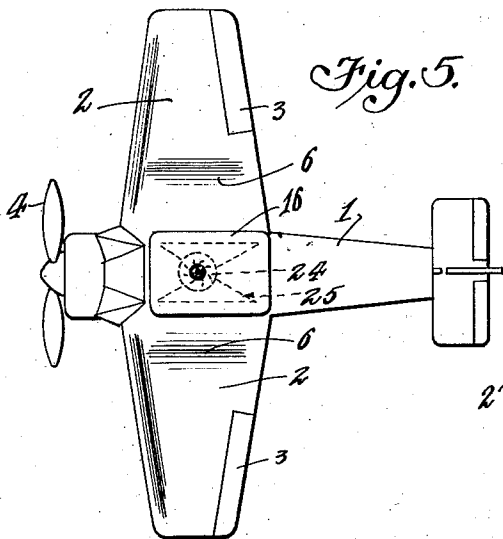
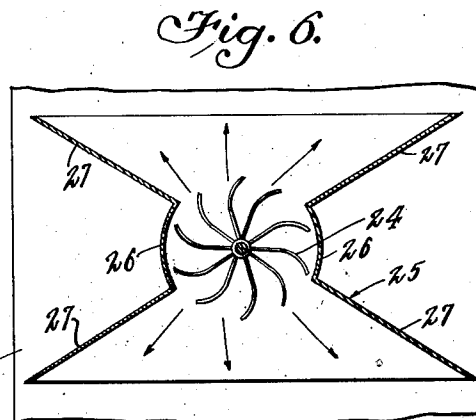
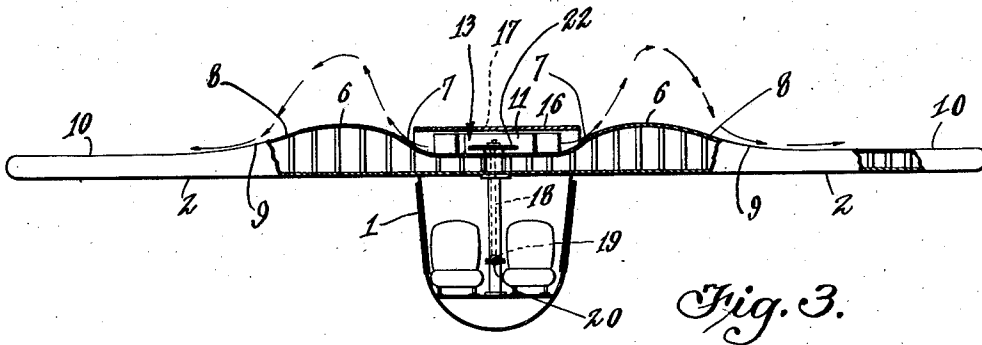
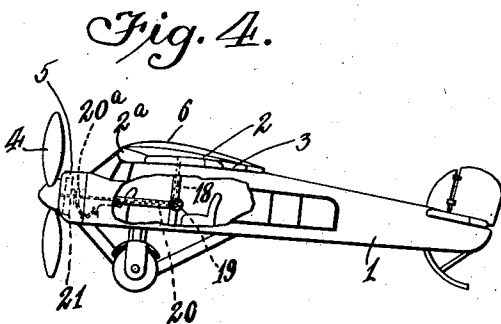
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FLYING MACHINE

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This invention relates to a flying machine and while the invention is particularly applicable to aeroplanes, the invention is capable of being applied to any type of flying machine carrying a supporting plane which exerts a buoyant effect by reason of the advance of the plane or wing through the air.

One of the difficulties that arises in the operation of aeroplanes as now built is that unless the aeroplane is proceeding at about 40 miles per hour, it is not readily controlled. The result of this is that landings must be made at approximately this speed. Modern aeroplanes also have the objection that they must maintain a relatively high flying speed to maintain proper control, but it would be desirable frequently if the aeroplane at a height could maintain itself aloft at a relatively low speed to give more time for making observations from a particular point. It is also desirable to be able to alight or take off at a low speed, as this reduces the necessary length of runway and makes for safety.

The general object of this invention is to produce a flying machine having means for increasing the lifting or buoyant effect of a wing; also to provide means whereby the buoyant effect of a wing or plane will not depend entirely upon the speed of advance of the wing through the air.

A further object of the invention is to produce an aeroplane having means for enabling it to be driven under control at a relatively low speed.

Further objects and advantages of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient flying machine.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a plan of a flying machine of the aeroplane type, embodying my invention.

Figure 2 is a horizontal section upon an enlarged scale, taken just above the wing or plane.

Figure 3 is a view showing a portion of the aeroplane in vertical section, and further illustrating the invention.

Figure 4 is a side elevation upon a reduced scale, certain parts being broken away to further illustrate the details of the invention.

Figure 5 is a plan similar to Figure 1, but illustrating another embodiment of the invention.

Figure 6 is a horizontal section similar to Figure 2, but corresponding to Figure 5, and further illustrating details of the invention.

Figure 7 is a diagrammatic view of an aeroplane wing illustrating another embodiment of the invention as regards the driving means which is employed to attain my lifting effect on the wing.

Before proceeding to a detailed description of the invention, it should be stated that, while I have described the improvement as applied to a flying machine of the heavier than air type, the improvement could be applied on any flying machine which employs a wing to increase the buoyancy of the air ship.

If one considers the profile of the wing of an aeroplane as viewed in end elevation, it will be observed that the upper face of the wing presents an elevation or rounded ridge that extends throughout the length of the plane or wing adjacent its forward edge and the upper face of the wing inclines downwardly toward its rear edge. This form of profile is very important, because it has been found that as the wing is driven through the air, a considerable amount of the buoyancy of the wing is due to the formation of a partial vacuum immediately back of the high point of the rounded ridge referred to above. According to my invention, I provide the flying machine with a supporting wing having one or more ridges extending in a front and rear direction with respect to the direction of advance of the flying machine, and I provide means for projecting a current of air at a high velocity in an outward direction adjacent the upper face of the wing so that this current of air passes over the rounded ridge. The outward movement of this air has the effect of producing a partial vacuum in the space

above the plane and just over or beyond the ridge. In this way an increased buoyancy is developed in the wing which enables the aeroplane to have increased buoyancy although it may be moving through the air at a relatively low speed; in other words, I provide a profile for the wing as viewed in front elevation, combined with a substantially horizontally moving air current or currents that co-operate with these ridges to increase the lifting power of the wing.

When applying the invention to an aeroplane of a common type having a transversely elongated wing, I prefer to provide a rounded ridge extending in a front and rear direction on the upper side of the plane and located near the central front and rear axis of the aeroplane. I also provide means for projecting an air current in each direction outwardly from the central axis of the aeroplane toward the wing tips and so that these air currents pass over the rounded ridges. The outward movement of these air currents increases the partial vacuum formed over the wing or plane and increases its buoyancy.

Any suitable means may be employed for developing these laterally directed air currents, but in the present specification I have described the use of blower means for this purpose, located on the central front and rear axis of the aeroplane. If desired, this blower means may be driven from the traction motor of the aeroplane, but, if desired, a separate motor can be employed for driving this blower.

Referring more particularly to Figures 1, 2 and 4, 1 represents the fuselage of an aeroplane of common construction having a transversely disposed plane or wing 2. This wing should be provided with the usual ailerons 3. The forward part 2^a of the wing has the usual elevated ridge.

While my improvement may be employed on any type of aeroplane, having any number of traction motors, for the sake of simplicity I have illustrated the invention as applied to a single type motor driven aeroplane which employs a single driving screw 4 located at the front of the aeroplane and driven by a motor located at the point 5 just to the rear of the traction screw 4.

In applying my invention to an aeroplane of this type, I construct the upper face of the plane 2 with two ridges 6 that are located a short distance to each side of the longitudinal central axis of the fuselage. These ridges extend in a front and rear direction, as indicated in Figure 1, and are preferably rounded in profile (see Figure 3), that is to say, they are rounded ridges or humps with a relatively abrupt shoulder 7 formed on the side toward the central axis of the aeroplane and with a less steep or more inclined outer portion 8 that runs out on a

curve 9 of relatively large radius tangent to the straight outer portion 10 of the upper side of the wing.

In order to produce outwardly directed air currents to flow over these humps or ridges 6 in a lateral direction, as indicated by the arrows in Figure 1, I provide blower means (see Figures 1 and 2) preferably comprising two centrifugal blowers or fans 11 which are mounted to rotate on vertical shafts 12. These blowers are mounted in suitable housings 13 with walls 14 and 15 that form an angular space on the open side of the blower so that when the blowers are driven, air currents are projected outwardly, as indicated by the arrows in Figure 2.

The housing 13 includes a cover plate 16 having openings 17 through it directly above the fans so as to supply atmospheric air which passes down into the fans from above the plane. Of course, as the air currents are projected outwardly in this way, they will be deflected somewhat toward the rear of the aeroplane by the rush of air due to the speed of the plane. Nevertheless, the air currents pass in a lateral or transverse direction over these ridges, as indicated by the arrows in Figures 3 and 7, thereby producing a partial vacuum in the space above and slightly beyond the ridges.

The blower means may be driven in any desired manner. For example, I may provide a vertical shaft 18 which is driven through bevel gears 19 (see Figure 4) by a substantially horizontal extension shaft 20 which extends back from the motor 21. The vertical shaft 18 carries a relatively large gear wheel 22 at its upper end, which gear wheel meshes with driven pinions 23 carried by the shafts 12 of the blowers.

In Figure 6 I illustrate another embodiment of the blower means in which, instead of providing two blower fans, I provide a single blower fan 24. This entails a slight modification in the construction of the housing 25, which has curved walls 26 on its front and rear sides that enclose the fan, but present outwardly diverging or radial walls 27 which form two widening air ducts for guiding the air currents outwardly in the general direction of the arrows indicated in Figure 6.

This housing 25 includes a cover plate which will be provided with an opening similar to the openings 17 to supply the fan with atmospheric air from the space above the plane.

If desired, instead of driving the blower means from the traction engine 21 of the aeroplane, I may provide means for driving it with its own separate motor. See Figure 7, in which 28 represents a motor. This motor may be located within the wing, and its shaft 29 extends upwardly, carrying a gear wheel 30 corresponding to the gear

wheel 22 already described, and which may mesh with pinions on the twin blowers of the type shown in Figure 2. Obviously, if desired, the shaft 29 may be used as the shaft of a single blower, if the single type fan is employed of the type illustrated in Figure 6.

The aeroplane would have the usual controls for its rudder and elevator, which it is unnecessary to describe.

In the operation of the aeroplane, the outwardly projected air currents that pass laterally on the upper face of the plane, in passing over the rounded edges 6 are deflected in an upward direction, producing a partial vacuum in the neighborhood of the ridges on the upper side of the plane, thereby increasing the lifting effect of the plane.

With an aeroplane having this improvement, when the aeroplane is advancing at a low speed, the blowers will still continue to develop these laterally directed air currents, which will maintain a considerable buoyant effect of the aeroplane, giving it greater buoyancy than it would have at that speed for the plane.

In order to enable the aeroplane of the type shown in Figure 1 to fly when desired without utilizing the buoyancy that my blowers develop, I provide the shaft 20 with a clutch 20^a that may be opened at will to discontinue the driving of the blowers.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:

1. A flying machine having a transversely disposed supporting wing and having a ridge extending in a front-and-rear direction on each side of the middle front-and-rear axis of the wing, and means located substantially on the said axis of the wing for projecting air currents transversely to the direction of advance of the wing and over the said ridges, and cooperating with the ridges to develop a partial vacuum on the upper side of the wing beyond the ridges.

2. A flying machine having a transversely disposed supporting wing and having a rounded ridge extending in a front-and-rear direction on each side of the middle front-and-rear axis of the wing, and blower means located substantially on the said axis of the wing for projecting air currents transversely to the direction of advance of the wing and over the said ridges, and cooperating with the ridges to develop a partial vacuum on the upper side of the wing just beyond the ridges.

3. A flying machine having a transversely disposed supporting wing and having a rounded ridge extending in a front-and-rear direction on each side of the middle front-

and-rear axis of the wing, a centrifugal blower mounted for rotation on a substantially vertical axis with an air inlet on its upper side, with means for directing air currents from the blower transversely to the direction of advance of the wing and over the said ridges, cooperating with the ridges to develop a partial vacuum on the upper side of the wing beyond the said ridges.

4. A flying machine having a transversely disposed supporting wing and having a rounded ridge extending in a front-and-rear direction on each side of the middle front-and-rear axis of the wing, a centrifugal blower located substantially on the said axis to rotate on a vertical axis, a cover plate above the blower means having an air inlet for admitting air to the blower, said blower means having means for directing air currents from the blower transversely to the direction of advance of the wing and over the said ridges, and cooperating with the ridges to develop a partial vacuum on the upper side of the wing beyond said ridges.

5. A flying machine having a supporting wing with a rounded ridge extending in a front-and-rear direction on the upper side of the wing, and means located on the side of the ridge toward the middle front-and-rear axis of the flying machine for projecting an air current transversely to the direction of advance of the wing and over the said ridge, and cooperating with the ridge to develop a partial vacuum on the upper side of the wing beyond the ridge.

6. A flying machine having a transversely disposed supporting wing with a rounded ridge extending in a front-and-rear direction on each side of the middle front-and-rear axis of the wing, a blower housing disposed substantially on the said front-and-rear axis of the wing having a cover plate on its upper side with an air inlet for the blower, and a centrifugal blower located under the opening operating to project air currents transversely to the direction of advance of the wing and over the said ridges, cooperating with the ridges to develop a partial vacuum on the upper side of the wing beyond the ridges.

Signed at Los Angeles Calif., this 2nd day of July, 1929.

RICHARD H. CHATTIN.