

May 15, 1928.

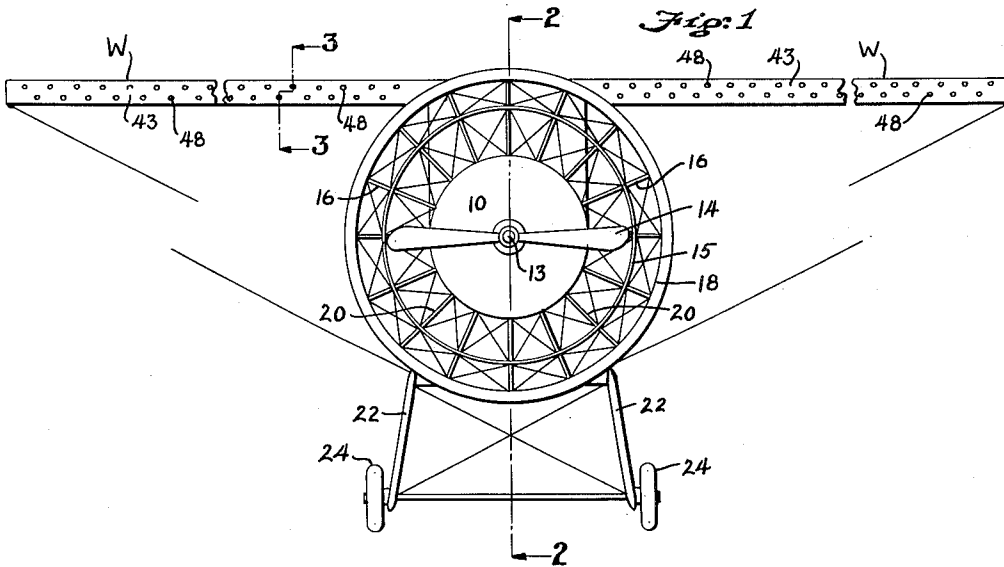
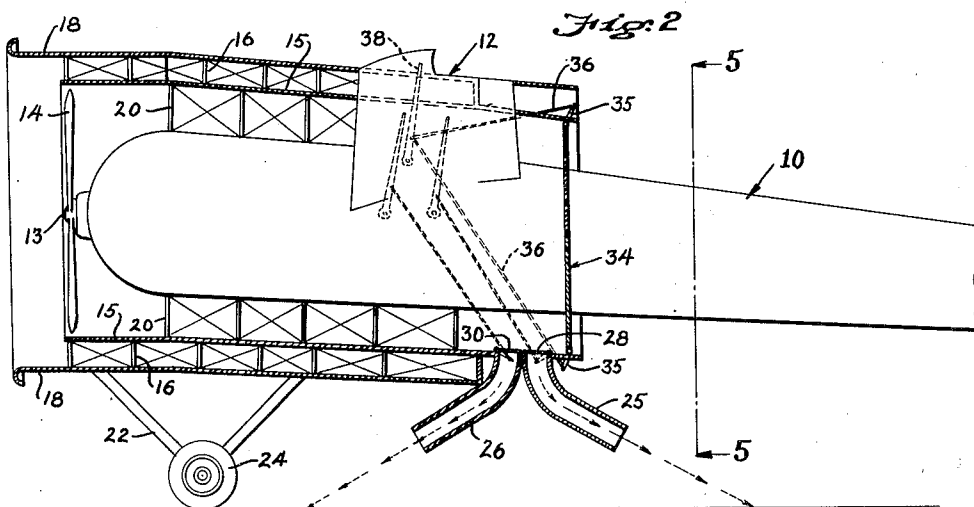
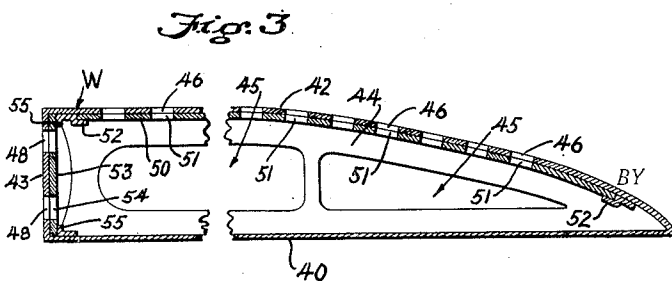
1,669,495

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AEROPLANE

Filed June 8, 1925

2 Sheets-Sheet 1



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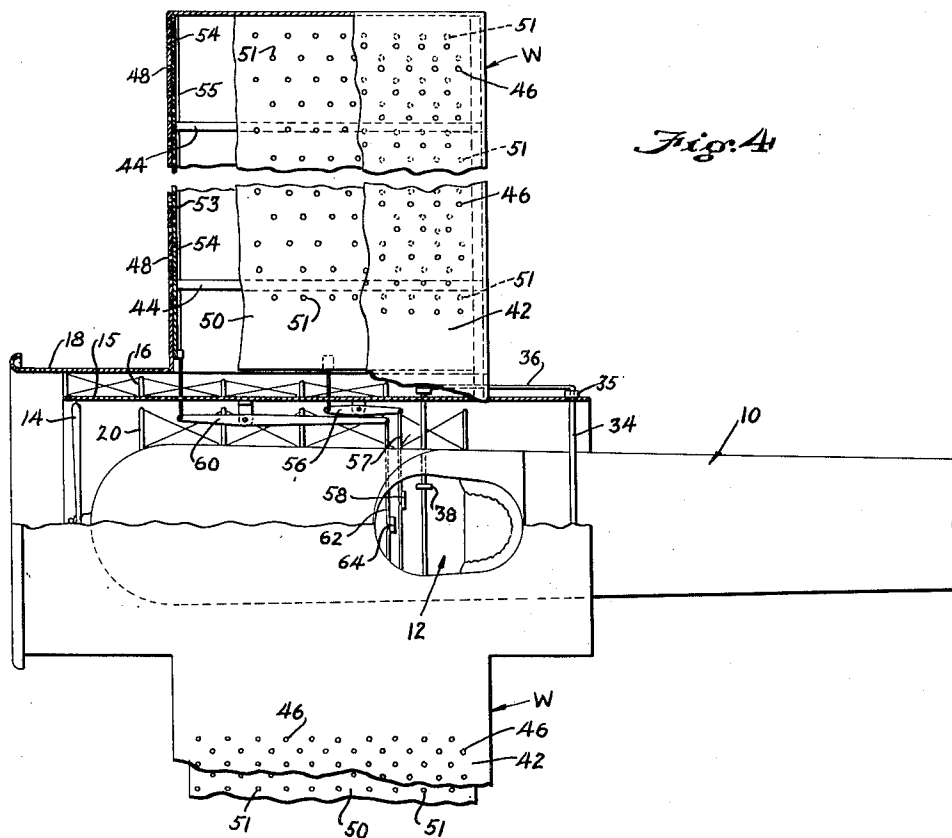
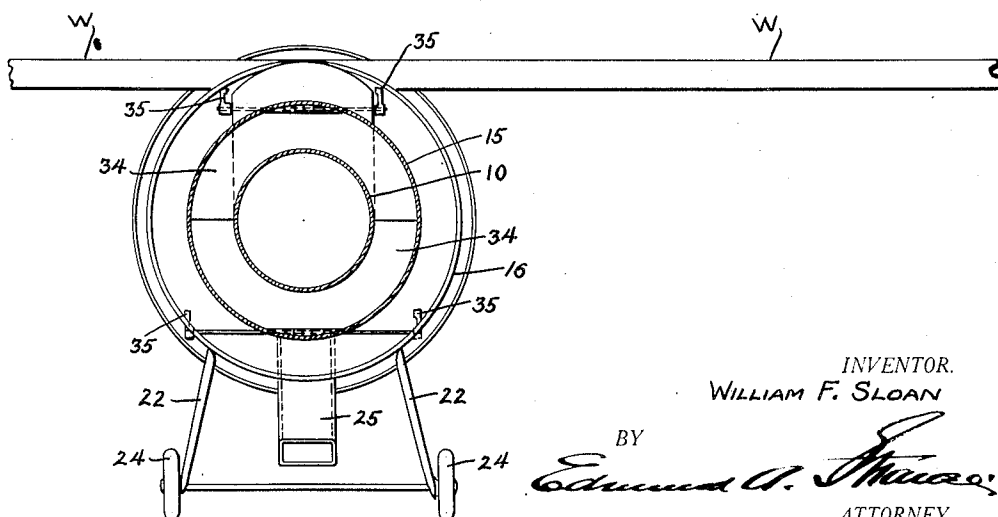


Fig. 4

Fig. 5



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Patented May 15, 1928.

1,669,495

UNITED STATES PATENT OFFICE.

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AEROPLANE.

Application filed June 8, 1925. Serial No. 35,591.

This invention relates to aircraft of the plane type wherein movements of the craft are controlled by adjustment of wings and rudder.

5 It has been the practice heretofore in the manufacture of aeroplanes to produce those structures which for the most part have been handled solely by such wing and rudder movements. It is, however, just as practicable to employ for the purpose of elevating an aeroplane the influences of vacuum in order that the plane may be lifted by atmospheric pressure, as it is to propel the plane forward by producing a vacuum in front thereof by means of a propeller in order that the plane may be projected forward by atmospheric pressure exerted at the rear.

It is therefore the chief object of the present invention to provide for the lifting of aeroplanes by formation of partial vacuum above the wings so that atmospheric pressure working upon the under sides of the wings may assist in elevation of the planes.

Another object of the invention is to provide for the formation of a partial vacuum along the front edges of the wings for propulsion of an aeroplane forward by atmospheric pressure from the rear in addition to the usual method of propulsion whereby partial vacuum is created in front of the propeller by high speed rotation thereof.

A further object is to confine the blast produced by the propeller and to use at least a part of the effect thereof for the purpose of assisting further to elevate the plane when desired or for the purpose of checking or stopping forward movement thereof.

Having these objects in view, I have developed the present construction which comprises an aeroplane provided with a plurality of wings. Each of the wings however is of a hollow construction in which a partial vacuum is adapted to be produced, the upper walls of each wing being provided with a plurality of apertures adapted to be opened and closed by means of sliding shutters or the like for control of the passage of air therethrough. Also, if desired the front edge of the wings may be provided with apertures through which the passage of air may be controlled by means of independently actuated sliding shutters. The chambers or spaces within the wings are connected by means of conduits with the region in front of the propeller of the aeroplane, so that there may be a tendency to form a par-

tial vacuum in the chambers within the wings, which vacuum will extend thence by way of the apertures to the outer regions directly in front of or above said wings. According as a partial vacuum is developed above the wings, or in front of the wings, the effect of atmospheric pressure will be to lift the wings or to move the same forward and of course transmit such movement to the plane as a unit; and if the effect is produced in both directions a resultant movement forward and upward will be had. A tubular member is provided about the fuselage or body of the machine in front of which member the propeller is located so that the blast of air to the rear produced by the propeller is confined and made to travel between the fuselage and said tubular member, thus insuring the direction of travel of the air and insuring uniformity of direction of travel of the plane. At the rear of the tube, a pair of short conduits is provided, one of which projects downward and rearward and the other of which projects downward and forward, and preferably valves are provided for directing a part of the air blast from the propeller selectively through one of said conduits, a blast to the rear serving to assist elevation of the aeroplane and a blast forward serving to aid in checking or stopping forward movement of the plane by reason of the back pressure or recoil pressure from the respective conduit. A gate or shutter for at least partially closing the space between the tube and the fuselage may be provided for insuring direction of a sufficient portion of the blast through the downward conduit selected.

The invention resides further in the various combinations and arrangements of parts and in the features of construction illustrated in the accompanying drawings, described herein, and pointed out in the appended claims, it being obvious that various modifications may be made within the scope of said claims and that the invention is limited only as defined by the claims.

In the drawings wherein one embodiment of the invention is disclosed by way of example,

Fig. 1 is a front elevation of an aeroplane of the present invention;

Fig. 2 is a longitudinal section therethrough taken on line 2—2 of Fig. 1;

Fig. 3 is a cross section through a wing taken on line 3—3 of Fig. 1;

Fig. 4 is a view showing parts in plan and parts in horizontal section; and

Fig. 5 is chiefly a rear elevation taken from the line 5—5 of Fig. 2 and showing the fuselage in cross section.

The aeroplane shown has a body or fuselage 10 provided with a cock-pit 12 for the operator, the forward portion of said fuselage housing the power plant, not indicated, from which projects the end 13 of a power shaft upon which is mounted the propeller 14. The forward portion of the fuselage 10 is supported in and spaced from a tubular member 15 by means of a trussed open frame 20, the forward end of said member 15 receiving the propeller 14 the blast from which is directed rearward alongside the fuselage for discharge at the rear. In this manner said blast is confined and guided and the direction of travel of the plane is made more certain. The tubular member 15 is in turn supported within an outer shell 18 which extends slightly forward of said tube 15 and is spaced therefrom by means of a trussed frame 16 which carries on its under side a structure 22 for the mounting of landing wheels 24.

At the rear of the tubular member 15 there is mounted a downwardly and rearwardly extending discharge conduit 25 adapted to discharge a portion of the blast downward toward the ground and at an angle to the rear for the purpose of assisting elevation of the craft under the recoil or back pressure resulting from the discharge, while forward of said conduit 25 there is mounted a second conduit 26 which extends downward and forward for the purpose of directing a portion of the discharged blast downward and forward to assist in checking or stopping forward movement of the craft. Valves 28 and 30 are provided for the conduits 25 and 26 respectively which valves are adapted to be opened or closed from the cockpit 12 to control discharge therethrough, while a shutter or gate 34 is provided for closing or partly closing the annular space between the rear end of tube 15 and the fuselage 10 to insure forcing of a part of the blast through either of the conduits 25 and 26 when the respective valves 28 or 30 are opened. This shutter 34 comprises a pair of semiaircular members hinged to the rear end of the tube 15 and actuated through the medium of short arms 35 and thrust rods 36 from a lever 38 in the cock pit.

At opposite sides of the shell 18, the wings W are secured. Each of these wings which is hollow and is in communication with the annular space between tube 15 and shell 18, is composed of an imperforate lower wall 40, an upper curved wall 42, a front wall 43 and a series of partitions 44 which space said walls and prevent their collapse. The partitions 44 are provided with openings 45 for

the passage of air, and the top wall 42 is apertured at 46 while the front wall 43 is apertured at 48 for entrance of air. A sliding plate or shutter 50 carried in guides 52 is provided for the purpose of controlling the passage of air through the apertures 46 or plate 42, the slide 50 being provided with registering apertures 51, while a sliding plate or shutter 53 apertured at 54 to register with apertures 48 in wall 43 is carried in guides 55 for control of air passage through said apertures 48. The shutter 50 is operable by means of a lever 56 and link 57 from a "stick" or lever 58 in the cockpit, while the shutter 53 is similarly actuated by a lever 60 and link 62 from a "stick" 64.

In operation, the propeller 14 produces a vacuum forward thereof sufficient to enable atmospheric pressure at the rear of the machine to propel the same forward in the usual manner. The effect of this reduced pressure or partial vacuum is transmitted to the interior of the wings W through the annular space between the tube 15 and shell 18, due to the fact that said shell extends forward of the tube. Thus the sliding shutter 50 is moved to the position shown in Fig. 3 to uncover the openings 46 for registry with openings 51, and the shutter 53 is moved to closed position, said partial vacuum or reduced pressure in the hollow wings will be extended through said openings 46 to the upper surface of the plane, thereby allowing atmospheric pressure on the under sides of the wings to produce a lifting effect of exactly the same character as that which propels the craft forward under influence of the propeller, although of reduced value. If the front shutter 53 be placed in the open position of Fig. 3 and the shutter 50 be closed, a like effect will be transmitted to the forward edge of the plane wings through openings 48, thus assisting in forward movement. And if both shutters 50 and 53 be moved to open position as in Fig. 3, the resultant movement will be both upward and forward in addition to the normal effect of the propeller. Further, by opening the valve 28 leading to the rear conduit 25 and partially closing the gates 34, elevation will be assisted as above described through discharge of a part of the blast from said conduit 25, while closing of the valve 28 and opening of the valve 30 for discharge of a part of the blast through conduit 26 will tend to check forward movement of the plane as also described above. These effects taken with the confining and guiding of the air blast from the propeller rearward through the tube 15, serve effectually to control the movements of the craft, without necessarily requiring movements of the wings. By providing for actuation of the shutters 50 independently of each other, and for actuation of the shutters 53 independently of each other, turning

and tipping movements of the craft may be obtained also.

From the foregoing, it will be seen that I have provided aeroplane structure capable of producing all required movements merely by control of vacuum and pressure effects furnished by the propeller.

What I claim is:

1. An aeroplane consisting of a fuselage having a propeller at its forward end, a pair of wings connected to the fuselage adjacent its front end, said wings being hollow and having apertures through their upper surfaces, a member disposed about the propeller and extending forward thereof to form a forward zone, the spaces within the wings being connected with the zone forward of the propeller.

2. An aeroplane having wings and a propeller, a member disposed about the propeller and extending forward thereof to form a forward zone, said wings being hollow and having apertures through their upper surfaces, the spaces within the wings being connected with the zone forward of the propeller for the purpose of forming a partial vacuum in the wings and immediately above the same for elevation of the aeroplane, and means for controlling passage of air through said apertures.

3. An aeroplane having wings and a propeller, a member disposed about the propeller and extending forward thereof to form a forward zone, said wings being hollow and having apertures in the forward edges thereof, and conduits connecting the spaces within the wings with the zone forward of the propeller for the purpose of forming a partial vacuum in the wings and immediately in front thereof to assist propulsion.

4. An aeroplane having wings and a propeller, a tubular member surrounding the propeller and extending forward thereof to form a forward zone, said wings being hollow and having apertures in the forward edges thereof, conduits connecting the spaces within the wings with the zone forward of the propeller for the purpose of forming a partial vacuum in the wings and immediately in front thereof to assist propulsion, and means for controlling passage of air through said apertures.

5. An aeroplane having wings, a propeller and a fuselage, a tubular member in the rear of the propeller and about said fuselage for confining and directing the blast produced by the propeller, a tubular member surrounding the propeller and extending forward thereof to form a forward zone, said wings being hollow and having apertures in the upper surface thereof, the spaces within the wings being connected with the zone in front of the propeller and at the front of said tubular member whereby a suction effect may be produced in the wings by the propeller.

6. An aeroplane having wings, a propeller and a fuselage, a tubular member in the rear of the propeller and about said fuselage for confining and directing the blast produced by the propeller and a conduit directed downward and forward and connected with the under side of said tubular member for discharge of a portion of the blast there-through to assist in checking forward movement of the craft.

In witness that I claim the foregoing I have hereunto subscribed my name this 18th day of May, 1925.

WILLIAM F. SLOAN.