J. E. SHERIFF.

AIRSHIP.

APPLICATION FILED JUNE 2, 1911.

1,025,210.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

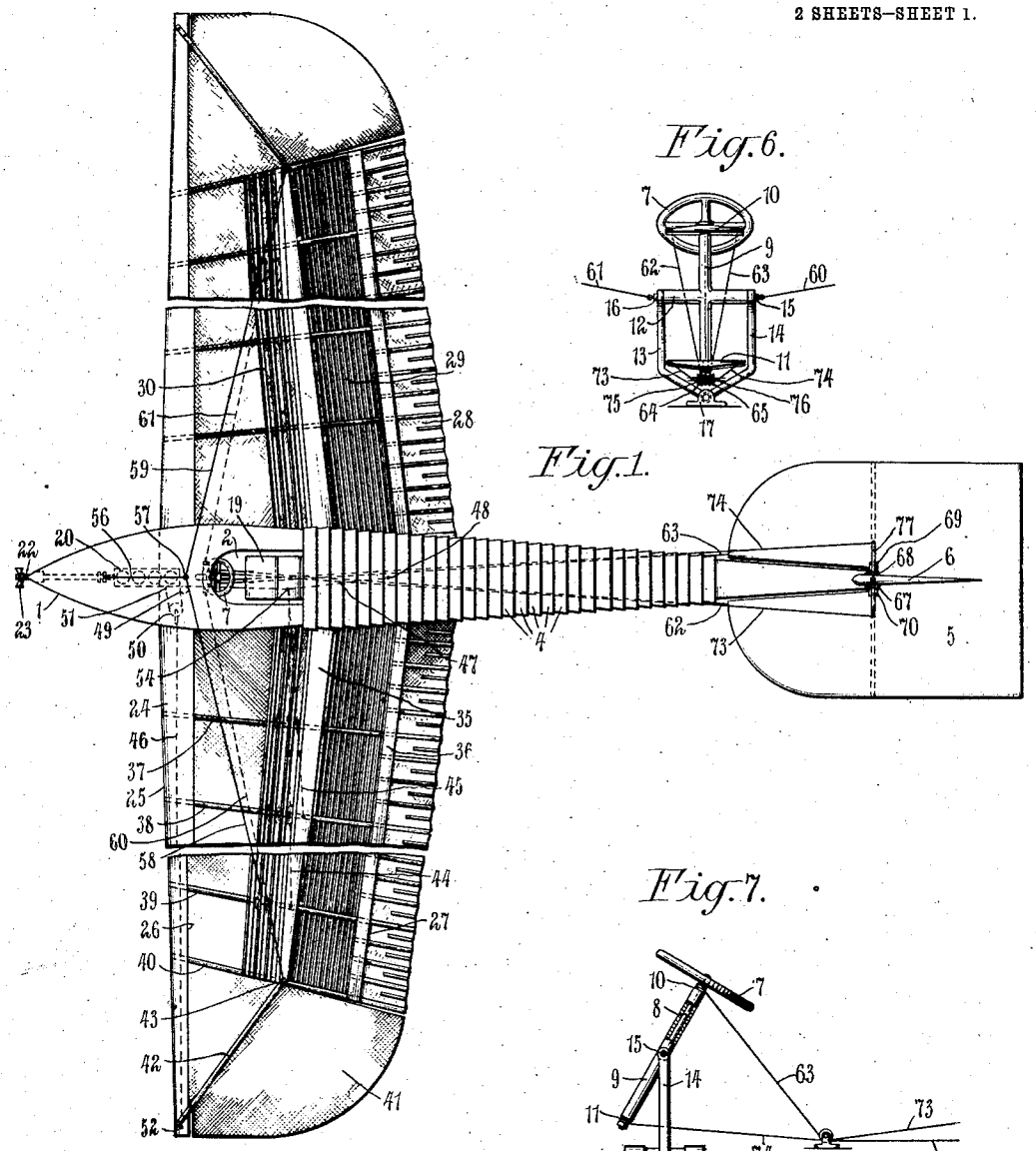
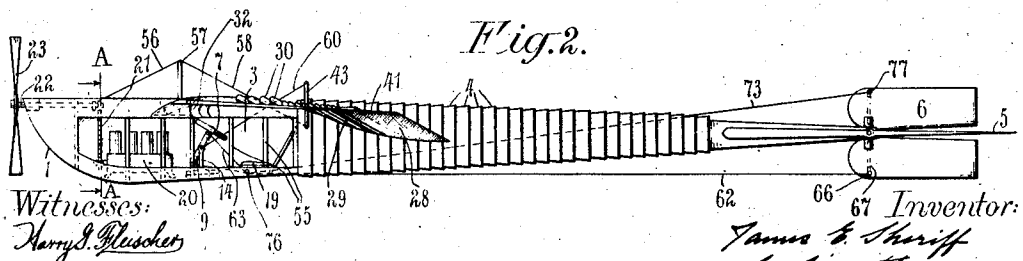


Fig. 6.

Fig. 1.

Fig. 7.

Fig. 2.



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James E. Sheriff
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2 SHEETS—SHEET 2.

Fig. 3.

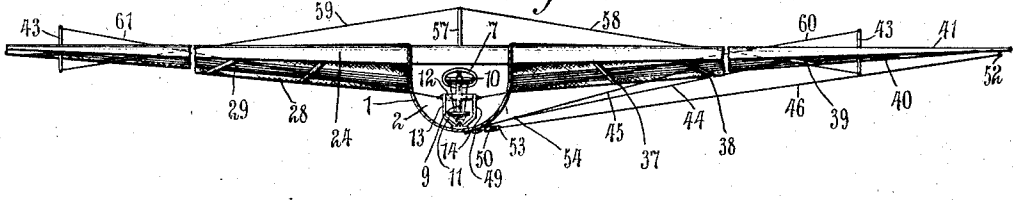


Fig. 4.

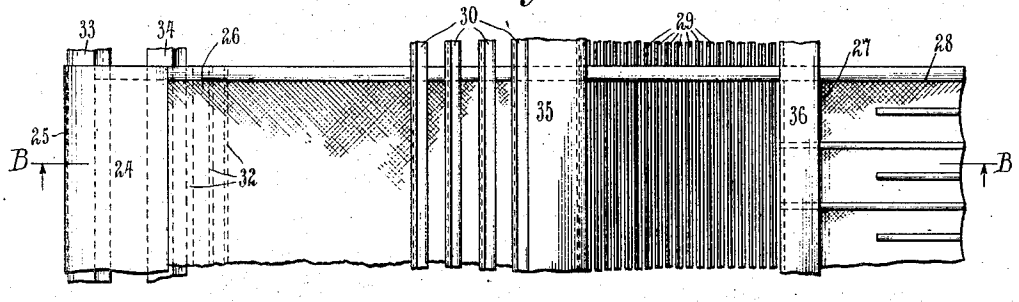


Fig. 5.

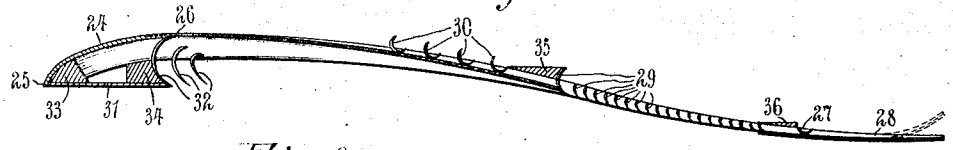


Fig. 9.

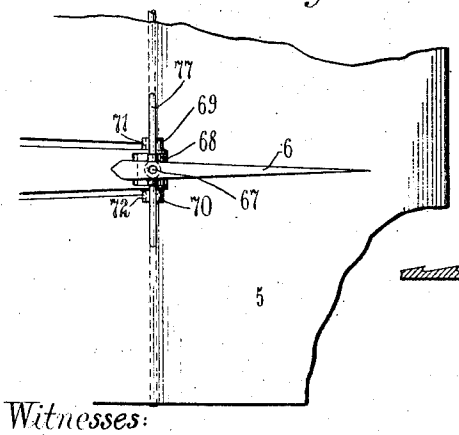


Fig. 8.

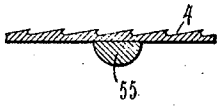
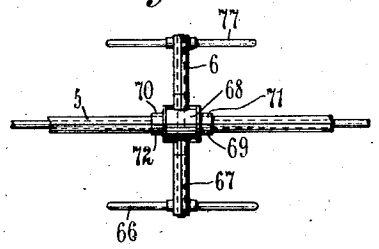


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES E. SHERIFF, OF PROVO, UTAH.

AIRSHIP.

1,025,210. Specification of Letters Patent. Patented May 7, 1912.

Application filed June 2, 1911. Serial No. 630,753.

To all whom it may concern:

Be it known that I, JAMES E. SHERIFF, a citizen of the United States, and resident of Olmsted, Provo, in the county of Utah and State of Utah, have invented a new and useful Airship, of which the following is a specification.

My invention relates to an air ship of the heavier than air type, with the object in view of producing an air ship that will soar, to wit: be sustained by the force or reaction of a moving wind or other surrounding medium, and also be propelled forward against the moving surrounding medium by the said surrounding medium, and to this end, to provide a structure which will extract power from some portion of the moving surrounding medium that does not bear directly upon or touch or push backward on the ship.

My invention contemplates forming the sails so that eddies will be produced both above and below the sails, and keeping these eddies in motion by the moving surrounding medium, and providing a larger amount of surface for the eddies to react upon than is provided for the current to act upon, since the forwardly moving portions of the eddies may have a lower velocity than the current in which the ship is moving.

A practical embodiment of the invention is represented in the accompanying drawings, in which,

Figure 1 is a top plan view partially broken away. Fig. 2 is a view in side elevation. Fig. 3 is a section in the plane of the line A—A, Fig. 2, the engine being removed. Fig. 4 is a partially enlarged top plan view of one of the sails. Fig. 5 is a section through the same in the plane of the line B—B, Fig. 4. Fig. 6 is an enlarged view of the steering wheel and its connections, showing the same in front elevation. Fig. 7 is a view of the same in side elevation, partly in section. Fig. 8 is an enlarged partially longitudinal section through the wall of the body and one of the ribs, and Figs. 9 and 10 are enlarged views in detail in plan and rear elevation of the rudder bearings at the stern of the ship.

The sails which spread out from the body in the form of wings, are provided with static propellers and sustentation surfaces and are so shaped that an eddy will be formed above each sail, said eddy having a lower barometer pressure than the surrounding medium and an eddy will be formed on the under side of each sail well forward, having a higher barometric pressure than the eddy on the upper side.

The body 1 which has the general outline of a cigar as looked at in plan and a hyperbolic curve only at its prow, is built of suitable strong material as light as consistent with strength, and is provided with a cockpit 2 located in the neighborhood of the greatest beam, which is well forward, as clearly shown in Fig. 1, the sides of the cockpit being formed of some suitable transparent material, preferably non-explosive celluloid, denoted by 3. To the rear of the cockpit, the body assumes a form substantially cylindrical in cross section and gradually tapers as it extends rearwardly, the exterior of the body being provided with a series of annular static propellers 4, shown clearly in Fig. 8. At the extreme rear end of the body, horizontal and vertical rudders, the former denoted by 5 and the latter by 6, are so hinged as to be under the control of the operator from the cockpit 2, as will be hereinafter more particularly explained.

In the cockpit 2, the steering wheel 7 is located, its shaft 8 extending downwardly within a sleeve 9 and carrying fixed thereto, cross-bars 10 and 11, see Fig. 6. The sleeve 9 is hung by means of a cross sleeve 12, in the upper ends of the branches 13 and 14 of a U-shaped support by means of suitable trunnions or pintles 15, 16. The U-shaped support in which the sleeve 9 is hung is itself journaled in bearings 17, 18, fixed to the floor of the cockpit so as to permit the steering wheel sleeve 9 in which it is mounted, and the U-shaped support in which the sleeve is journaled, to rock bodily to the right and left as may be desired. The cockpit has also located therein a seat 19 for the operator within convenient reach of the steering wheel and in front of the steering wheel there is located the engine 20, the shaft of which is connected by a sprocket chain 21 with the propeller shaft 22 on which is fixed the propeller 23.

The sails are similar in construction and a description of one will suffice for both.

The upper portion of the entering edge of the sail, denoted by 24, see Fig. 5, is preferably a parabolic curve with the vertex at 25 and the other end of the parabolic curve at

26. From this point the surface of the sail is deflected gradually downward and rearward to the point 27 where the flexible edge 28 of the sail is attached. Along this top surface there are located two groups of static propellers, one denoted by 29 and the other by 30.

The lower portion of the entering edge of the sail is straight or inclined slightly upward, as shown at 31, and immediately to the rear of this horizontal under surface of the sail, there are located static propellers, in the present instance, a group of three, denoted by 32.

The body of the sail consists of some suitable thin material and is supported by four spars denoted respectively by 33, 34, 35 and 36, extending from the body of the ship outwardly and connected by sprits, in the present instance, four sprits, denoted respectively by 37, 38, 39 and 40, extending from the front edge of the sail toward the rear edge of the same. At the outer end of the sail there is a trailing rudder 41 secured on a rocking shaft 42 which is operated by means of a vertical lever 43 extending above and below the sail and connected by suitable operating cables with the steering wheel mechanism.

Semi-automatic transverse stability is secured by the arrangement of the cable guys 44, 45, 46 and 47. The guy 47 is secured at 48 and leads thence forward, passing around the guy pulley 49 and thence around the movable pulley 50, and is secured again at 51. The guy 46 is attached at the under side of the outer end of the sail at 52 and extends thence to the shackle 53 on the pulley 50 to which it is secured. The guys 44 and 45 are secured to the guy 47 at 54.

In case of a current bearing harder under the portsail than under the starboard sail, the guys 44, 45, having the advantage of leverage over the guy 46, will cause the trailing edge of the portsail to rise and the outer portion of the entering edge will be lowered, thus decreasing the angle of incidence.

The body structure is made strong by means of suitable transverse ribs 55, see Fig. 8.

A cable guy 56 leads from the forward portion of the body to the top of a hinged post 57 to the top of which the sail operating cables are attached. The sail operating cables 58, 59, lead in opposite directions from the hinged post 57, to the lower ends of the upright levers 43, and cables 60, 61 lead from the upper ends of the upright levers 43 to the branches 14 and 13 respectively of the U-shaped portion of the steering mechanism. It follows, therefore, that when it is desired to lift the port rudder 41, the steering wheel and the mechanism in which it is mounted may be swung bodily to starboard, thereby drawing on the cable 60, tilting the lever 43 in a direction to rock the shaft 42 and lift the rudder 41, the cable 46 being at the same time drawn in a direction to tilt the hinged post 57 to port and thereby draw on the cable 59 and tilt the upright lever of the starboard sail in a direction to lower the rudder on that sail. It will be noted that the cables 58 and 60 cross and that the cables 59 and 61 cross in order to accomplish this end.

Cables 62, 63, see Fig. 6, lead from the opposite ends of the cross bar 10 on the steering wheel of the ship, downwardly to sheaves 64, 65, beneath the seat of the operator and thence crossing each other, lead rearwardly to the opposite ends of a cross-arm 66 on the lower end of a rudder post 67 which passes through or into the upper and lower sections of the vertical rudder 6 and rocks in a bearing 68, see detail Figs. 9 and 10, which bearing 68 in turn rocks in suitable bearings 69, 70, fixed at the stern of the ship. The horizontal rudder 5 is fixed to rock, together with the bearing 68 and the vertical rudder, in the bearings 69 and 70, the bearing 68 being provided with suitable trunnions 71, 72, for that purpose.

Cables 73, 74, lead from the opposite ends of the cross-arm 11 on the steering wheel shaft, see Fig. 6, to sheaves 75, 76, beneath the seat of the operator and thence crossing each other lead to the opposite ends of the cross-arm 77 on the rudder post 67 above the bearing 68 and above the horizontal rudder 5. To deflect the bow of the ship downwardly, the steering wheel is rocked forward in the U-shaped frame, thereby pulling on the cables 62, 63, and hence on the lower end of the rudder post 67, causing the horizontal rudder 5 to rock together with the vertical rudder, on the trunnions 71, 72, thereby depressing the rear portion of the rudder 5 and lifting the forward portion of it.

To deflect the prow of the ship upwardly, the reverse motion of the steering wheel takes place, that is pulling it to the rearward, which motion will pull on the rudder post above the horizontal rudder 5, rocking the horizontal rudder in a direction to lift the rear part of the rudder and lower the front part of it. To deflect the ship to starboard, the steering wheel is turned to the right, thereby drawing on the cables 63, 74 and slacking on the cables 62, 73, swinging the vertical rudder 6 to starboard. To deflect the ship to port, the steering wheel is turned to the left, thereby drawing on the cables 62, 73, and slacking on the cables 63, 74, which operation will swing the vertical rudder to port.

In operation, the current of the surrounding medium striking the upper portion of

the entering edge of the sail is deflected upward and the result is a vacuous eddy over the greater portion of the top of the sail. The air in the lower portion of this eddy passing rapidly forward, is resisted by the static propellers 29, 30, (static with relation to the ship) and its course changed and power obtained. The lower side of the entering edge of the sail, which, as stated, is preferably horizontal or slightly higher at its after end than at its forward end, permits the current in which the ship is moving to pass unobstructed and forms an eddy to the rear of the horizontal edge 31 on the under side of the sail. The eddy so formed in passing forward, strikes the static propellers 32, see Fig. 5, and is deflected backward and power is obtained from it if the ship is moving forward and sustaining force is derived from it if the ship is standing still in the current. The current on the under side, furthermore, acting on the static propellers 32, forms a siphon increasing the velocity of the eddy to the rear of these static propellers and also has a similar effect as it passes along under the sail to the rear of said static propellers 32. The current will rise somewhat after passing the static propellers 32, owing to the space to the rear of the static propellers being at a slightly lower barometric pressure than the current itself, the current being at a higher barometric pressure than the surrounding medium due to the angle of incidence of the sail. The current will strike the under surface of the sail about midway of the width of the sail and passing rearwardly from this point will siphon fluid through the static propellers 29, thus increasing the degree of vacuum on the upper side of the sail. The flexible trailing edge 28 of the sail also acts as a static propeller, the current flowing upwardly and deflecting it as shown in dotted lines in Fig. 5. The static propellers 4 formed on the exterior of the hull back of the beam also serve to utilize the eddies after the beam to assist in pushing the ship forward. The outside surface of the hull forward of the beam is preferably polished or made smooth to reduce its friction.

What I claim is:

1. An air ship provided with a sail, the front or entering edge of the sail being directed forward and downward, the trailing edge of the sail being free to assume an upward and backward position and static propellers forming a portion of the body of the sail and open to the atmosphere above and below the sail.

2. An air ship provided with a sail, the front or entering edge of the sail being directed forward and downward, the trailing edge of the sail being free to assume an upward and backward position and static propellers located between the said forward and downward and upward and backward portions of the sail and open to the atmosphere above and below the sail.

3. An air ship provided with a sail, the forward portion of the sail constructed to dip, the after portion of the sail constructed to rise and static propellers passing through the sail, leaving spaces between them open to the atmosphere above and below the sail.

4. An air ship provided with a sail, the forward portion of the sail constructed to dip, the after portion of the sail constructed to rise and curved static propellers passing through the sail and open to the atmosphere above and below the sail.

5. An air ship provided with a sail, the forward portion of the sail constructed to dip, the after portion of the sail constructed to rise and static propellers passing through the sail and having their upper and lower edges directed rearwardly, the said static propellers being open to the atmosphere above and below the sail.

6. An air ship provided with a sail, the forward portion of the sail constructed to dip, the after portion of the sail constructed to rise, and static propellers passing through the sail with their upper and lower edges directed rearwardly, the rearwardly directed upper edges of the said static propellers forming part of the upper surface of the sail and the rearwardly directed lower edges of the static propellers forming part of the lower surface of the sail.

7. An air ship provided with a sail, the upper surface of which is convex forward and free to assume a concave shape rearward and static propellers located on said upper surface after the point of greatest convexity and forward of the part which is free to assume a concave shape.

8. An air ship provided with a sail, the entering edge of the sail directed forward and downward and the trailing edge of the sail constructed to point backward and upward and static propellers located on the surface of the sail aft the said entering edge and forward of the trailing edge.

9. An air ship provided with a sail, the upper surface of which, beginning at the entering edge first curves upward and backward, then trends downward and backward to a trailing edge constructed to curve backward and upward, and static propellers, the upper edges of which form part of the downward and backward upper surface of the sail and whose lower edges form part of the lower surface of the sail.

10. An air ship provided with a sail, the upper surface of which, beginning at the entering edge, first curves upward and backward, then trends downward and backward, and is then constructed to curve backward and upward, and the lower surface of which

beginning at the trailing edge is constructed to curve downward and forward and then trend upward and forward, and static propellers, the upper edges of which form part of the downward and backward trending upper surface of the sail and the lower edges of which form part of the upward and forward trending lower surface of the sail.

11. An air ship provided with a sail, the body of which is constructed to assume reverse curves from front to rear, a series of static propellers on the upper side of the sail, a series of static propellers on the lower side of the sail and a series of static propellers passing through the sail.

12. An air ship provided with a sail, the body of which is constructed to assume reverse curves from front to rear, a series of static propellers consisting of rearwardly directed curved surfaces located on the upper side of the sail and a series of static propellers consisting of rearwardly directed curved surfaces passing through the sail and open to the atmosphere above and below the sail.

13. An air ship provided with a sail, having the upper portion of its forward edge curved and the lower portion flat and a series of static propellers located on the under side of the sail above and in proximity to the rearward termination of said flat lower portion of the forward edge.

14. An air ship provided with a sail having its forward edge curved on the upper side in the form of a parabolic curve and flat on the lower side, a series of static propellers consisting of rearwardly directed curved surfaces located on the upper side of the sail, a series of static propellers, consisting of rearwardly directed curved surfaces located on the under side of the sail and a series of static propellers consisting of rearwardly directed curved surfaces extending through the sail and open to the surrounding medium above and below the sail.

15. An air ship provided with a sail having static propellers consisting of rearwardly directed curved surfaces on its upper and lower sides and a trailing rear edge free to flex under the pressure of the current in contact with the sail.

16. An air ship provided with suitable supporting sails, the body of the ship gradually increasing in cross section from the stem for a distance less than one-half the length of the ship and then gradually decreasing in cross section toward the stern, the forward tapering portion being smooth on the exterior and the rearwardly tapering portion provided with static propellers consisting of rearwardly directed curved surfaces.

17. An air ship provided with a sail, the outer front edges of which are constructed to flex, a guy leading from said outer front edge inwardly, a pulley on the end of said guy, guys leading inwardly from the middle portion of the sail and a connection between said last named guys and said pulley giving an advantage of purchase in favor of the said guys leading to the middle portion of the sail, whereby abnormal pressure on the middle of the sail will cause the deflection of the outer edge.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twentieth day of May, 1911.

JAMES E. SHERIFF.

Witnesses:

F. J. FAVOND,

JOSEPH W. BISHOP.