J. H. ROGERS.

AEROPLANE.

APPLICATION FILED SEPT. 30, 1908.

924,833.

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Fig. 1.

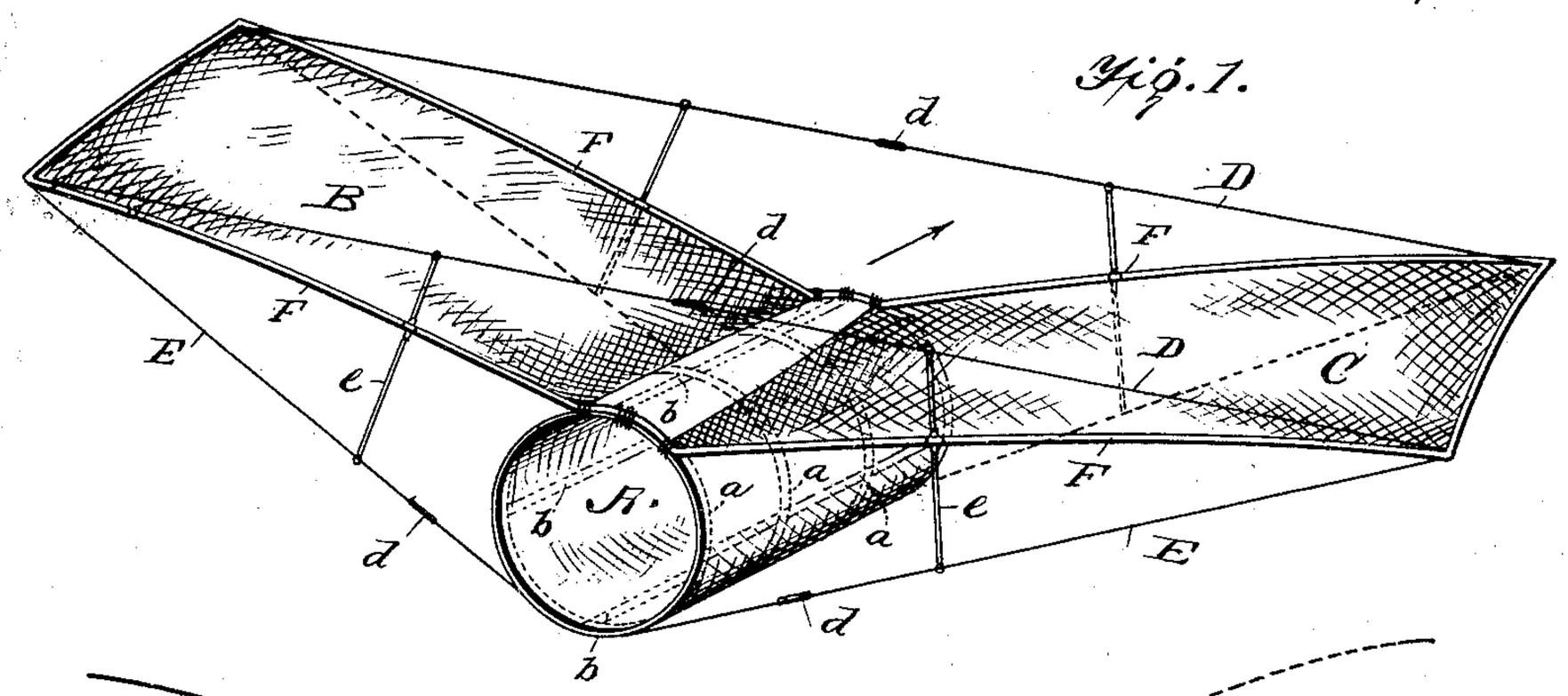


Fig. 2.

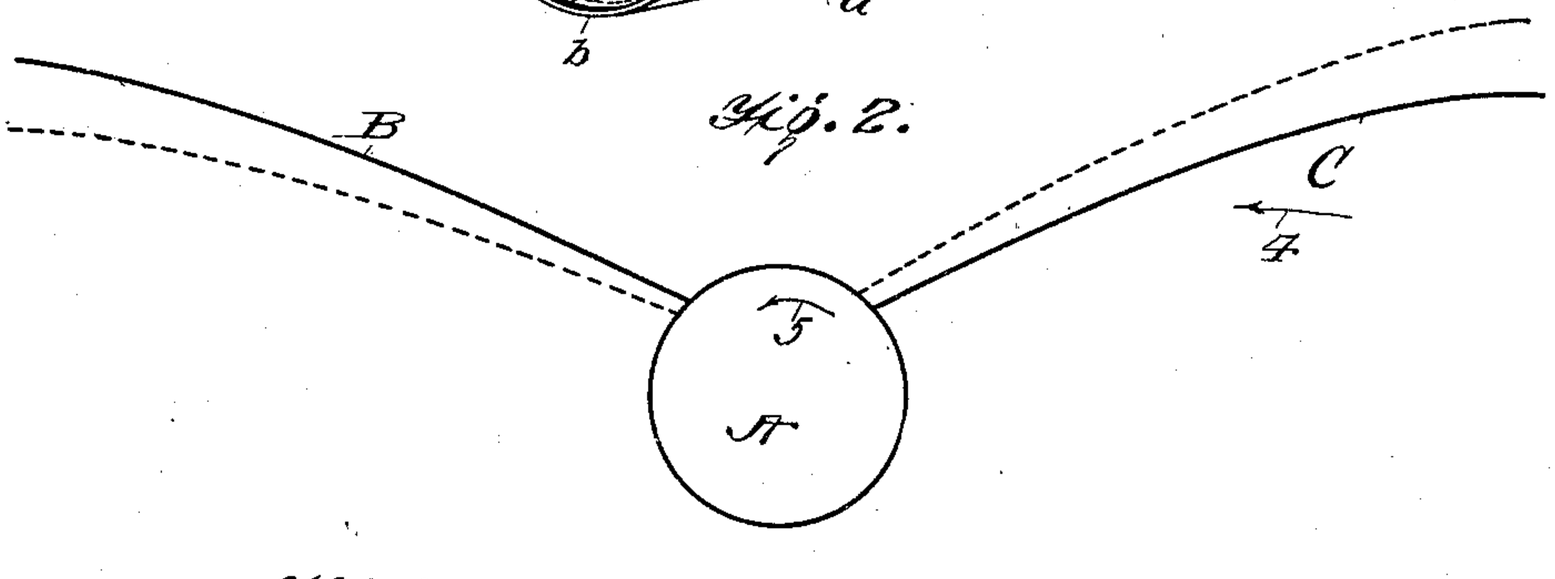


Fig. 3.

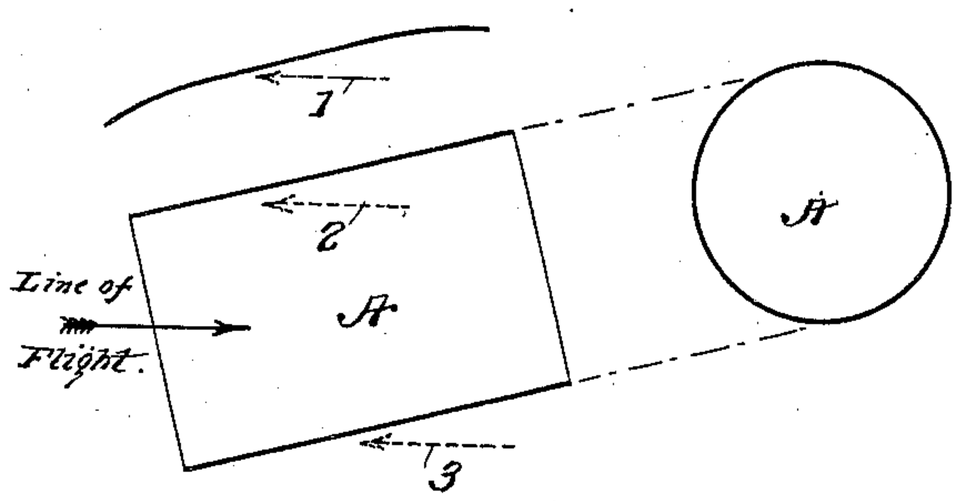


Fig. 5.

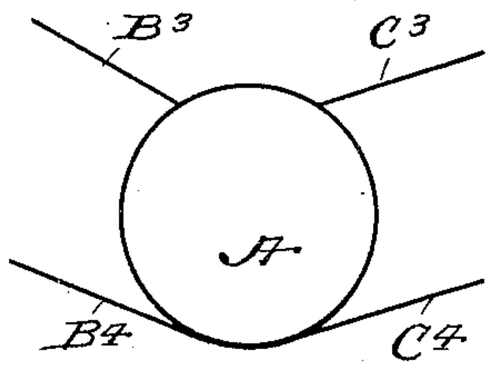
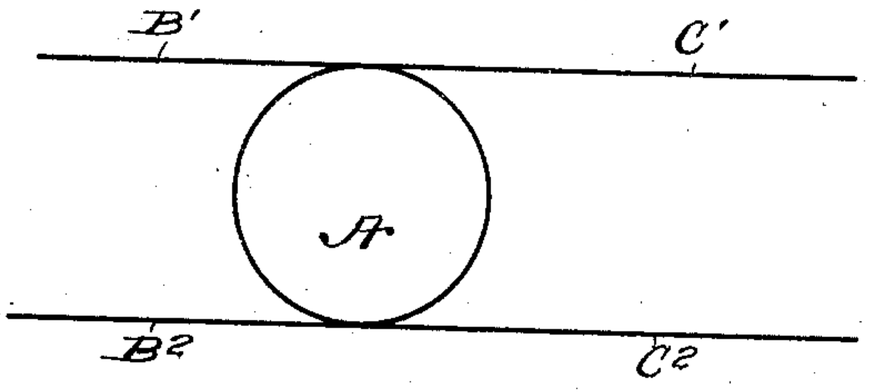


Fig. 4.



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AEROPLANE.

No. 924,833. Specification of Letters Patent. Patented June 15, 1909.

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To all whom it may concern:

Be it known that I, JAMES HARRIS ROGERS, a citizen of the United States, residing at Hyattsville, in the county of Prince George and State of Maryland, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

My invention is in the nature of an improvement in aeroplanes, designed to combine and harmonize two essential conditions of successful flight, namely: soaring capacity on the one hand and stability of equilibrium as against disturbing influences on the other hand. The capacity of the aeroplane to fly from the motive power carried by the same has already been demonstrated, but the ability of such aeroplane to take care of itself and descend safely when the application of its motive power is suddenly arrested has not yet been satisfactorily provided for. Furthermore, the best form of the aeroplane for flight is still very subject to disturbing side currents and eddies in the air.

My invention is designed to provide for these difficulties so as to secure a safe aeroplane of the self propelled type, and it consists in the combination with two laterally extending aeroplane wings; of a centrally located cylinder arranged with its longitudinal axis in the vertical plane of the line of flight at right angles to the laterally extended wings and rigidly connected thereto at their inner ends, the two wings and central cylinder being strongly and lightly made and suitably connected by braces and tension wires to form a stiff integral truss, each of said wings being made with its greatest dimension at right angles to the longitudinal axis of the cylinder and extending outwardly and upwardly from the cylinder, as hereinafter more fully described with reference to the drawings, in which,

Figure 1, is a perspective view of the aeroplane from the rear; Fig. 2, is an end view shown diagrammatically; Fig. 3, is a section taken vertically through the center in the line of flight and Figs. 4 and 5, are diagrammatic illustrations of modifications.

In the drawings A represents the central cylinder and B and C are the two aeroplane wings, which trend upwardly and outwardly at equal angles with a slight curve. These wings are each in length about three times the diameter of this central cylinder, *i. e.*, with a central cylinder of eight feet in diameter the wings from the cylinder to the outer tips would each be twenty-four feet in length. The width of the wings, measured fore and aft, is, as shown, exactly equal to the length of the cylinder, although this is not essential. The wings, however, should have their greater dimensions at right angles to the longitudinal axis of the tube, *i. e.*, at right angles to the line of flight, like a bird's wing, so as to get a transverse impact upon the relatively still air and a quick reactionary clearance therefrom in the rear without dragging dead air. The wings are also rigidly attached to the tube as hereafter described.

The cylinder A and wings B, C, may be made of aluminum or of a light frame-work covered by any suitable fabric. As shown, the cylinder is formed of a plurality of hoops or rings *a*, *a* and longitudinal bars *b*, *b*, covered with fabric and the wings are formed with stiff marginal frames F, covered with fabric. The frames F are preferably arched slightly in the middle to fit over the top surface of the cylinder to which they are firmly secured by lashings to the rings *a*. D, D, are tension wires connecting the extreme outer ends of the wings and E, E, are similar tension wires connecting the outer ends of the wings to the lower side of the cylinder. In these tension wires are arranged turnbuckles *d*, having screw threaded connections to take up slack. Connecting the aeroplane frames F and the upper and lower tension wires D, E, are vertical struts *e*. When thus constructed it will be seen that the aeroplane becomes a truss well adapted to preserve its integrity and to sustain a considerable load when in flight, the light character of the tension members securing a minimum of weight for the machine.

I will now proceed to describe the physical principles involved in the construction of the aeroplane. The laterally extended wings, copied after the bird and used in all successful aeroplanes, soar by the resultant effect of the angle of incidence against the relatively still air whose inertia allows the plane to glide upwardly and over the same, as is well known. It is important however, that each wing should have its greatest dimension at right angles to the line of flight, or the longitudinal axis of the cylinder. That this may be better understood, I would state that if the aeroplane wing has its greatest length in the line of flight, when such aeroplane is rap-

idly advanced through the air, the air that impinges against the front end of such longitudinal aeroplane will be driven downwardly by the first impact and as the rear part of such longitudinally arranged wing passes over the now downwardly moving air it finds little or no buoyant effect therefrom, for this body of air has already had its inertia overcome by the initial impact and as it is now moving downwardly, it gives little or no upward reactionary lift to the rear end of the plane. If, however, the aeroplane wing is greatly longer transversely to the line of flight than it is in the line of flight, as in the present invention, the maximum initial impact of the wing on still air gives a strong upward reactionary thrust before the inertia of the air has been overcome, so that a strong upward lift is given to the wing with a quick clearance of the air at the rear, the time of impact being very short and very quick and acting upon practically still air. Under this principle of physics, the ideal aeroplane wing would be one of extreme length transversely to the line of flight and very little width in a fore and aft direction, but owing to the difficulty of strongly bracing such excessive length of wing, I make each wing by preference about three times the length of the diameter of the central cylinder, which with a trussed construction may be made strong enough for flight.

Referring to Fig. 3, the arrows 1, 2, 3, illustrate the effect of the air on my aeroplane. The arrow 1 shows the angle of incidence acting against the full area of the two laterally extended wings. This furnishes the principal part of the buoyant effect. The buoyant effect is, however, aided by the air represented by the arrow 2, which strikes inside of the upper part of the cylinder and the air represented by the arrow 3, striking the convex lower and outer side of the cylinder. The air current represented by these arrows, 2 and 3, however, has something more than a buoyant effect, for it gives the box-kite effect and imparts great stability to the machine to resist lateral darting, since the stream of air passing through the cylinder holds it steady against side movement. Furthermore, and most important, this cylinder has a correlated value with the wings, which is best described by reference to Fig. 2. If at any time a lateral current or eddy in the air strikes the machine in the direction of the arrow 4, more or less at right angles to the line of flight, my invention guards against overturning and disastrous results, as follows: The impact of the wind in the direction of arrow 4, has a tendency to turn the aeroplane over by rocking it about its longitudinal axis to the dotted position; but with my invention the aeroplane does not turn over, because the tendency to rock sidewise turns the cylinder concentrically about its own axis and being a cylinder, all of whose sides are equidistant from the center, it remains in its own plane of revolution and the full value of the impact arrow 2, of Fig. 3, for lifting effect is still maintained in any rotary change, to buoy up the aeroplane and this effect and the resultant up-lift on wing C of Fig. 2, cause such side gust of wind to lift up the aeroplane bodily, causing it to rise instead of turning over. Furthermore, any tendency of the wing C to rock upwardly to the dotted position not only turns the cylinder coaxially and allows it to continue its lifting effect, but, as the wing B descends in this movement to the dotted position, it finds, as it nears the horizontal, a harder bearing against the subjacent air by its forward advance and so the aeroplane becomes self righting.

It will be seen that the wings rise above the level of the cylinder as they extend outwardly, but if desired, the wings may be straight and tangential to the top of the cylinder, as seen in Fig. 4. I prefer the wings to rise as they extend outwardly so that the tension wires D, D, may directly connect the outer ends of the wings to complete the truss construction and for this further function, that with this construction if the motive power of the aeroplane is discontinued by accident or otherwise, the machine will settle down and descend, on an even keel as it were, like a parachute, and thus prevent the planes from turning turtle or descending edgewise, which makes a rapid and disastrous fall.

I have shown mono-plane wings in Figs. 1, and 2, which, in my aeroplane, possess a stability that ordinary mono-planes having a single wing on each side, do not possess, but I would have it understood that I may use two or more pairs of wings, one set at the top of the cylinder and the other at the bottom, as seen in Figs. 4, and 5, if desired.

It will be understood that my aeroplane is to be equipped with power appliances and with one or more horizontal rudders for rising and descending, and one or more vertical rudders for turning, which, being already old, are not claimed by me and need not therefore be shown. The motive power may also be placed in any suitable relation, either inside the cylinder or below the same with the propeller shafts extending either in rear or in front, and with suitable runners or skids for alighting and for rising may also be employed, these also being old and not claimed by me.

My invention as herein described is an aeroplane capable of use when equipped with a suitable motor mechanism, as a flying machine or applicable for use as a kite when held by a cord.

I am aware that it has been proposed by another inventor to combine with a central cylinder two oppositely projecting wings in the same plane, each of which wings had its

greatest dimension in a fore and aft direction parallel to the axis of the cylinder, and I make no claim to that construction.

I claim—

1. An aeroplane comprising a central tube of circular cross section having two rigidly attached wings extending from opposite sides of the same, each of the wings having its greatest dimension at right angles to the longitudinal axis of the tube and of greater length than the tube.

2. An aeroplane comprising a central tube of circular cross section having two rigidly attached wings extending from opposite sides of the same, each of the wings having its greatest dimension at right angles to the longitudinal axis of the tube and of greater length than the tube and said tube being formed as a true cylinder with both ends open.

3. An aeroplane comprising a central tube of circular cross section having two wings extending from opposite sides of the same, each of the wings having its greatest dimension at right angles to the longitudinal axis of the tube and said tube being formed as a true cylinder with both ends open, the circular front end terminating at the front edge of the aeroplane wings and the circular rear end terminating at the rear edge of the aeroplane wings.

4. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same, the wings having their greatest dimensions at right angles to the longitudinal axis of the tube and extending outwardly and upwardly.

5. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same, the wings having their greatest dimensions at right angles to the longitudinal axis of the tube and extending outwardly and upwardly; tension wires connecting the outer portion of the wings together above the central tube, and tension wires connecting the outer portions of the wings to the lower portion of the tube.

6. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same, the wings having their greatest dimensions at right angles to the longitudinal axis of the tube and extending outwardly and upwardly; tension wires connecting the outer portion of the wings together above the central tube, and tension wires connecting the outer portions of the wings to the lower portion of the tube and strut braces connecting the upper and lower tension wires and the wing frames to form a light truss construction.

7. An aeroplane comprising a central tube of circular cross sections having one pair of laterally extended wings connected to the upper portion of the said tube and another pair of laterally extended wings connected to the lower portion of the tube, said wings having their greatest dimensions at right angles to the axis of the tube.

8. An aeroplane, consisting of a relatively short middle tube, upwardly and outwardly extending wings having their greatest dimensions at right angles to the tube and a trussed frame-work connecting the whole in rigid unitary relation.

9. An aeroplane, consisting of a relatively short middle tube, upwardly and outwardly extending wings having their greatest dimensions at right angles to the tube and a trussed frame-work connecting the whole in rigid unitary relation, the wings being in length approximately three times the diameter of the tube.

10. An aeroplane, consisting of a relatively short middle tube, upwardly and outwardly extending wings having their greatest dimensions at right angles to the tube and a trussed frame-work connecting the whole in rigid unitary relation, the upper members of the truss being formed as tension wires extending across the tube at a point above the same.

11. An aeroplane comprising a central tube of circular cross section having two wings extending from opposite sides of the same, said tube being formed as a true cylinder with both ends open, each of said wings having its greatest dimension at right angles to the longitudinal axis of the tube, the circular front end of the tube terminating at the front edge of the aeroplane wings and the circular rear end terminating at the rear edge of the aeroplane wings.

12. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same and extending outwardly and upwardly.

13. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same and extending outwardly and upwardly; tension wire connecting the outer portion of the wings together above the central tube, and tension wires connecting the outer portions of the wings to the lower portion of the tube.

14. An aeroplane comprising a central tube of circular cross sections having two wings extending from opposite sides of the same and extending outwardly and upwardly; tension wires connecting the outer portion of the wings together above the central tube, and tension wires connecting the outer portions of the wings to the lower portion of the tube and strut braces connecting the upper and lower tension wires and the frames to form a light truss construction.

15. An aeroplane comprising a central tube of circular cross sections having one pair of laterally extended wings connected

to the upper portion of the said tube and another pair of laterally extended wings connected to the lower portion of the tube.

16. An aeroplane comprising a central tube of circular cross section having two wings extending from opposite sides of the same, said wings having their greatest dimension at right angles to the longitudinal axis of the tube. both of said wings being made with a stiff marginal frame arched in the middle to fit the transverse curvature of the central tube and rigidly attached thereto.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HARRIS ROGERS.

Witnesses:
EDWD W. BYRN,
F. A. MILLIGAN.