

NEW ZEALAND

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

"IMPROVEMENTS IN FLYING MACHINES."

I, THOMAS AUGUSTUS DRING, of Sunny Bank, Trowbridge, Wilts, England, Accountant, do hereby declare the nature of my invention for "Improvements in flying machines" and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:-

This invention relates to flying machines of the heavier-than-air type, and it has primarily for its object enabling such machines to rise directly in the vertical plane and also to soar or poise.

I attain this end by utilising the underlying principle which governs the flight of such insects as the humble-bee and the house-fly, which lift and propel themselves by creating vortices in the air immediately above their bodies. The wings of these insects when in action each have a rotary motion in a conical path mainly or entirely above the level of the body, the apices of said paths being coincident with the roots of the wings. The actions and reactions produced in the air by this movement of the wings sustain the insect against the downward pull of gravity, and as the insect has the power of varying the angle of rotation of its wings it can:— (a) lift itself in a vertical plane; (b) travel forwards or backwards by varying the angle of rotation of its wings; and (c) turn to the right or the left by inclining one rotating wing forwards and the other backwards.

I carry this principle into practice by using two or more devices adapted to produce in the air the same effects as are produced by the wings of these insects. These devices — which I call "vortex-lifters" — each consists of a shaft adapted to be rapidly rotated and carrying one or more blades or vanes which spring from a common hub or centre and extend beyond the end of said shaft at an angle with its axis, said blades or vanes being so shaped and arranged that their outer and/or inner edges or surfaces lie at an acute angle with the axis of the shaft so that during rotation said blades or vanes take a coned path about their axis of rotation.

In the accompanying drawing, which shows by way of illustration some methods of carrying this invention into practice, Fig. 1 is a diagrammatic view in side elevation, partly in section, showing one form the machine may assume; Fig. 2 is a diagrammatic view in plan thereof; and Fig. 3 is a transverse section on line A,A, Fig. 1; Figs. 4 and 5, 6 and 7, 8 and 9, 10 and 11 are views in elevation and plan respectively showing various ways the blades or vanes of the vortex lifter may be arranged. Throughout the views similar parts are marked with like letters of reference.

Referring to Figs. 1, 2 and 3. The body d of the machine, which may be made of any suitable construction and material, preferably takes the form of a boat and is provided with four "vortex lifters", two being arranged towards one end of the machine and the other two towards the other end, the arrangement being such that with each pair operating alike and set to lift vertically the machine will be lifted on an even keel. The two shafts c of each pair of "vortex lifters" are preferably driven by an independent motor e, but this is not obligatory. The motors may be of any suitable type and construction. On each side of each motor e is a gear case f which carries the shaft c of the "vortex lifter" and a shaft h at right angles thereto, said two

shafts being geared together by a worm and worm wheel or other suitable gearing. The shafts *h* are mounted in suitable bearings *h1*, *h1* which are mounted on the framework of the machine in such a manner that the lifting stresses can be imparted through them, and said shafts are connected with the crank-shaft *e1* of the motor *e* by universal joints *l*. The two gear cases of each pair are connected to two controlling wheels *m* and *n* by any suitable mechanism so that the simultaneous inclination of the two "vortex lifters" in the same direction can be effected by one of the said wheels, and the inclination of said "vortex lifters" in opposite directions by the other wheel. A convenient mechanism is that shown in the accompanying drawing which consists of a quadrant *o* pivoted on a plate *p* adapted to slide in suitable guides and to be moved therein by means of the wheel *m*, said plate being connected to the gear cases *f* by means of the links *p1* and the rocking levers *p2*. Gearing with the quadrant *o* is a shaft *e2* on which the wheel *n* is mounted.

In the construction illustrated one pair only of the "vortex lifters" are arranged to have their angles of inclination varied for the purpose of propelling and steering in the horizontal plane, the other two being mounted in fixed bearings, but all four may be so mounted and connected without departing from the spirit and scope of this invention.

The "vortex lifters" may either be constructed and arranged to operate in identically the same manner as the wings of the insects hereinbefore referred to, in which case each has a single blade or vane as shown in Figs. 8 and 9, said blade being given a rotary movement in a conical path about a fixed point, and at the same time prevented from rotating about its own axis by mechanism such as that shown in aforesaid views, which consist of a shaft *c1* on which is mounted the blade or vane *a*, of a fixed shaft *c2* to one end of which the shaft *c1* is attached by means of a suitable universal joint *c3*, of a driving shaft *s* mounted outside the fixed shaft *c2*, and of a plate *t* mounted on the driving shaft *d* and carrying an eccentrically arranged bearing *v* for the shaft *c1*. To avoid the complication which this construction involves the "vortex lifters" may have one or more pairs of blades or vanes as shown in Figs. 4, 5, 6 and 7 which are arranged to rotate about a common axis one blade or vane *a* of each pair being arranged with its surface at right angles to the direction of its motion and the other blade or vane *a1* of each pair with its surfaces edgewise to the direction of its motion. A further modification is to employ one or more blades or vanes all set with their surfaces at right angles to the direction of motion as shown in Figs. 10 and 11 in which views three such blades or vanes are shown.

Although the machine has been described as having a plurality of "vortex lifters", it will be evident that only one such device may be employed if the shape and construction of the machine is such that its resistance to rotation in the air is sufficient to overbalance the thrust of the "vortex lifter".

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Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is

1. In flying machines, providing for the direct lifting and supporting of such machines by the employment of one or more devices - herein referred to as "vortex lifters"- for producing vortices in the air above or in close proximity to the body of said machines.

2. In a flying machine as specified in Claim 1, arranging the vortex lifters so that their angle of operation can be varied for the purpose also of either propelling and/or steering the machine in the horizontal plane.

3. In a flying machine as specified in Claim 1, arranging the axes of each pair of vortex lifters in such relation to the body of the machine and to each other that inter-action will take place between the currents of air discharged from the vortices.

4. In a flying machine, vortex lifters as herein described and illustrated by Figs. 4, 5, 6 and 7.

5. In a flying machine, vortex lifters as herein described and illustrated by Figs. 8 and 9.

6. In a flying machine, vortex lifters as herein described and illustrated by Figs. 10 and 11.

7. In a flying machine, the combination of one or more vortex lifters each consisting of a shaft adapted to be rotated, one or more blades or vanes mounted on said shaft so that they extend beyond the end of said shaft and lie at an angle with its axis, said blades or vanes being so shaped and arranged that their outer and/or inner edges and/or surfaces lie at an acute angle with the axis of the shaft so that when rotating they take a coned path about the axis of rotation, and means for varying the angle of inclination of said vortex lifters, as set forth.

8. The improved flying machine, substantially as herein described and illustrated in the accompanying drawing.

Dated this 31st day of May 1910

Henry Hughes
AGENT FOR THE APPLICANT.

True copy

Henry Hughes

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FIG. 1.

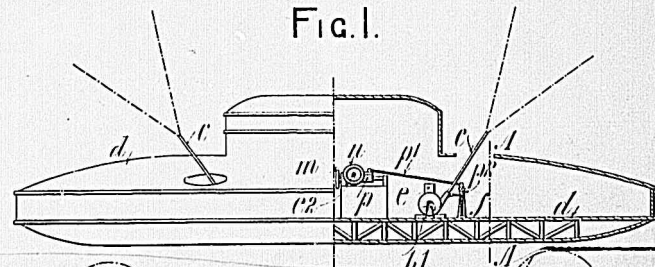


FIG. 2.

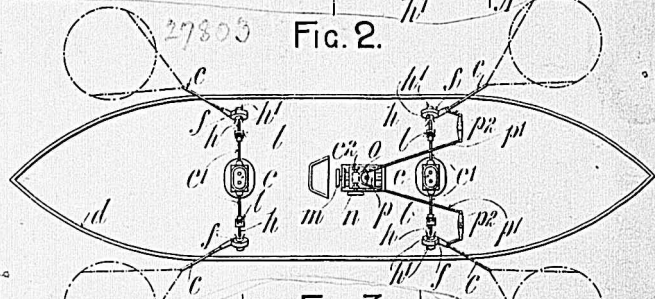


FIG. 3.

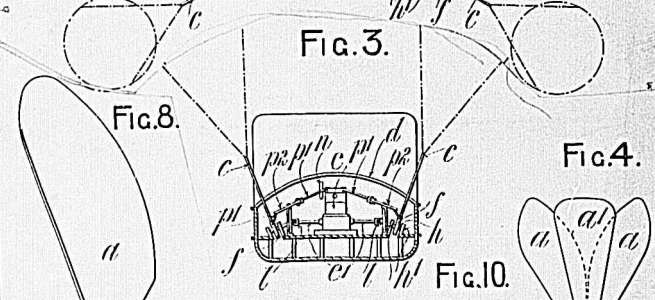


FIG. 8.

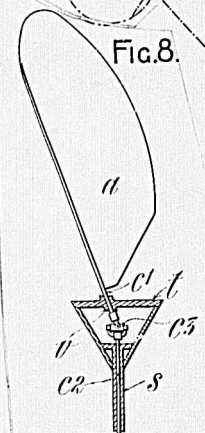


FIG. 4.

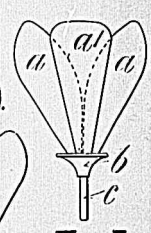


FIG. 5.

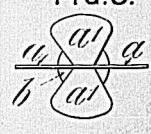


FIG. 6.

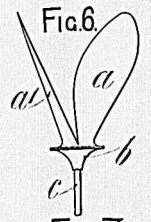


FIG. 7.

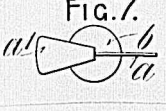


FIG. 11.

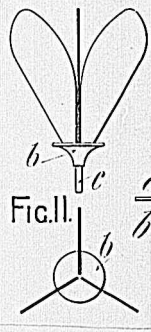
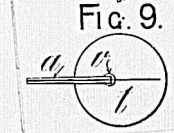


FIG. 9.



Henry Hughes
AGENT FOR THE PATENT.

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