July 16, 1935. H. NISHI 2,008,464

ARRANGEMENT FOR STARTING FLIGHT REQUIRING NO GLIDING

Filed Aug. 13, 1934

Fig. 1.

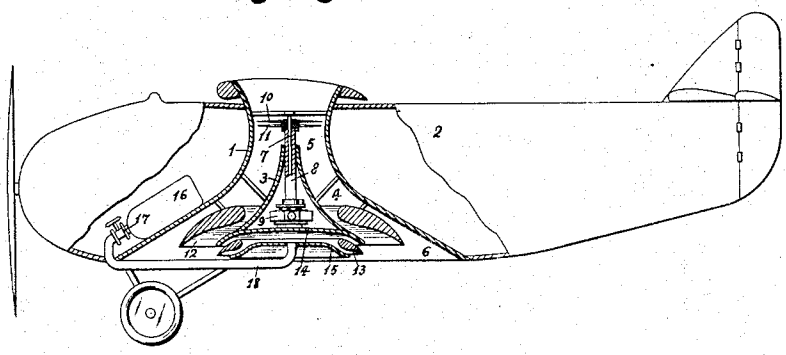


Fig. 2.

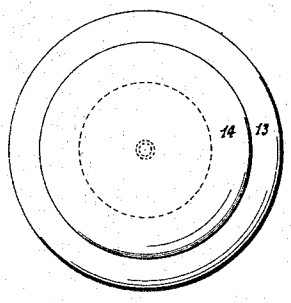
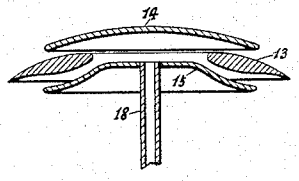


Fig. 3.



INVENTOR.

H. Nishi

BY

Marks & Clerk

ATTORNEYS.

Patented July 16, 1935 2,008,464

UNITED STATES PATENT OFFICE

2,008,464

ARRANGEMENT FOR STARTING FLIGHT REQUIRING NO GLIDING

Hirohisa Nishi, Kimilidera-Mura, Kaiso-Gun, Wakayama-Ken, Japan

Application August 13, 1934, Serial No. 739,700
In Japan August 22, 1933

1 Claim. (Cl. 244—18)

This invention relates in general to flying machines or aeroplanes and more particularly to improvements in arrangements for the starting flight requiring no gliding, and has for its object to provide an arrangement enabling a flying machine to suddenly leave the ground or water.

My invention has special reference to and consists of improvements in the arrangements described in the specification of my patent application No. 674,953, filed June 8, 1933.

In the accompanying drawing:—

Fig. 1 is a diagrammatic side view of a flying machine equipped with an arrangement embodying this invention, partly in section to show the arrangement.

Fig. 2 is a plan view of an aerofoil adapted to force a jet of compressed air thereon and its associates, in detail and enlarged scale.

Fig. 3 is a vertical sectional view of Fig. 2.

Referring to the drawing, 1 represents an upright cylindrical air duct which is largely flared at the lower part and disposed within the body 2 of a flying machine with its vertical axis passing through the center of gravity of said machine. Within the air duct 1 there is provided a conical member 3 having a peripheral wall co-operating with the inner wall of said air duct to form between them an annular passageway 4 extending downwardly from an air inlet 5 to an outlet 6. The telescoping propeller shafts 7 and 8 are operatively connected with a driving engine 9 mounted within the conical member and extend upwardly through the apex of said conical member.

Upon the upper end of the shafts 7 and 8 are mounted propellers 10 and 11 respectively. The propellers are arranged to be driven synchronously in opposite directions to propel air through the inlet 5 and thus, their velocities and moments of inertia produce substantially equal and opposite torques which overcome the gyroscopic and torsional reaction which would otherwise develop.

An annular wing aerofoil 12 is substantially horizontally disposed in the lower part of the annular passageway 4, so as to cause the current of air propelled by the propellers to impinge upon both surfaces of said aerofoil, thereby creating a negative pressure above and a positive pressure below of said aerofoil.

A second aerofoil 13 which is substantially similar to the aerofoil 12 is disposed beneath and concentrically relative to aerofoil 12 in the lower part of the air duct 1. The bottom wall 14 of the conical member 3 is curved outwardly to form a convex surface for an upper deflector for the air jet for the aerofoil 13. A lower deflector 15 which is curved downwardly is disposed beneath and concentrically relative to the aerofoil 13 for the air jet for said aerofoil. On the outer wall of the air duct 1 or in any other convenient position is an air reservoir 16 for compressed air. The reservoir 16 and the lower deflector 15 are connected by a pipe 18 with a valve 17 and opening in the center of said lower deflector.

When the propellers 10 and 11 are driven in opposite directions, a large volume of air is drawn into the inlet 5 and forced downwardly through the annular passageway 4 to impinge upon both surfaces of the annular wing aerofoil 12. This will create a partial vacuum or reduced pressure above and an increased pressure below said aerofoil, whereby a lifting force will be exerted on the machine.

For leaving suddenly the ground or water, compressed air is jetted out into the space between the upper and lower deflectors 14 and 15 from the air reservoir 16 by opening the valve 17, whereby the air jet is caused to impinge upon both surfaces of the aerofoil 13. This will also create a partial vacuum or reduced pressure above and increased pressure below the aerofoil 13, which will temporarily exert a lifting force thereon, so that the flying machine can suddenly leave the ground or water. After having left the ground or water in this manner, the lift of the flying machine will be controlled by the action of the aerofoil 12 alone co-operating with the propellers 10 and 11.

It may be reckoned that if air currents impinge upon an annular wing aerofoil having an area of one square meter at a speed of thirty meters per second, a lifting force enough to lift a weight of one hundred kilogrammes will be obtained, and according to this reckoning the volume of the air reservoir 16 and the pressure of the compressed air may be calculated. The air reservoir may be replenished with compressed air by means of the rotating shaft for the main propeller in front of the machine, or by a separate engine and any other suitable device.

This invention may be applied to a flying machine for the purpose of starting flight when the machine is unable to leave the ground or water on an ordinary gliding course due to an excessive load on the machine.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I claim:—

An arrangement for the starting flight requiring no gliding comprising a fuselage provided with a downwardly flaring cylindrical air duct, a conical member fixed within said duct, the bottom of which constitutes an inverted dished-like air deflector, another inverted dished-like air deflector spaced beneath the first mentioned deflector, and an annular wing arranged between said deflectors and means for supplying compressed air in jetted formation centrally through the lower deflector and onto the wing between the deflectors.

HIROHISA NISHI.