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J. F. NORDBERG
AIRPLANE CONSTRUCTION

Filed Aug. 28, 1926

2 Sheets-Sheet 1

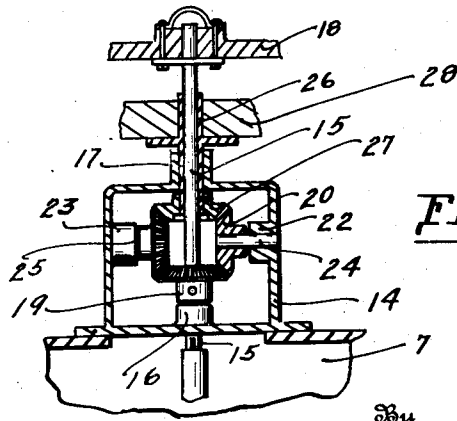
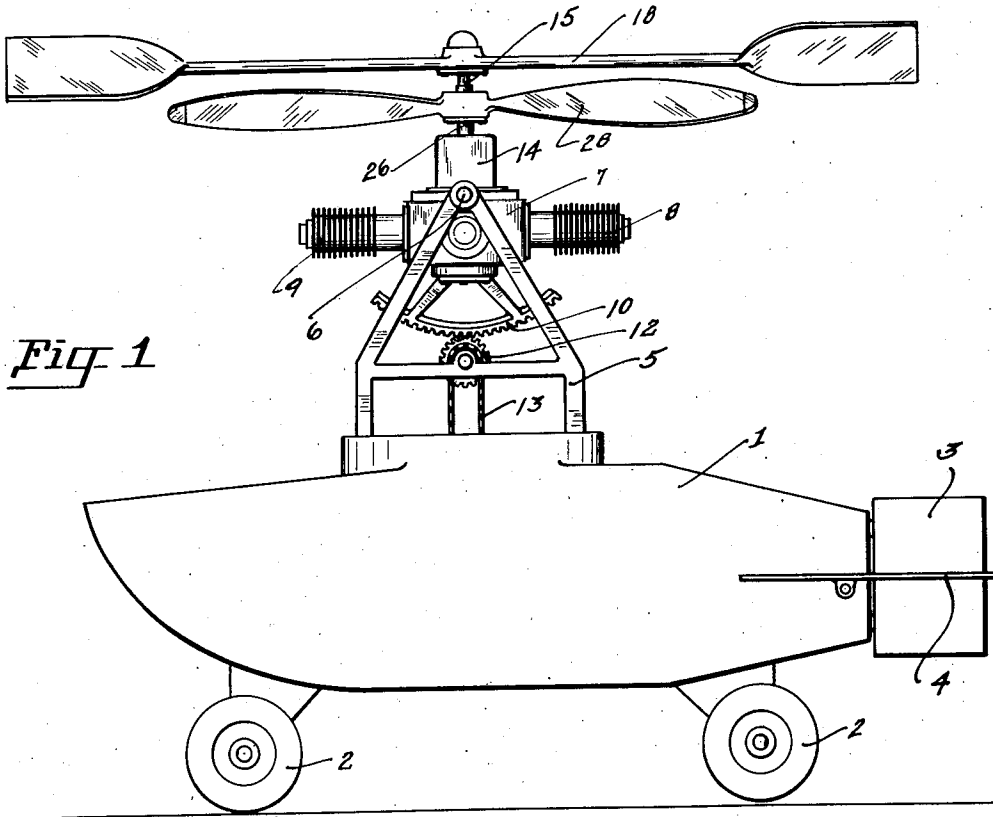


Fig 3

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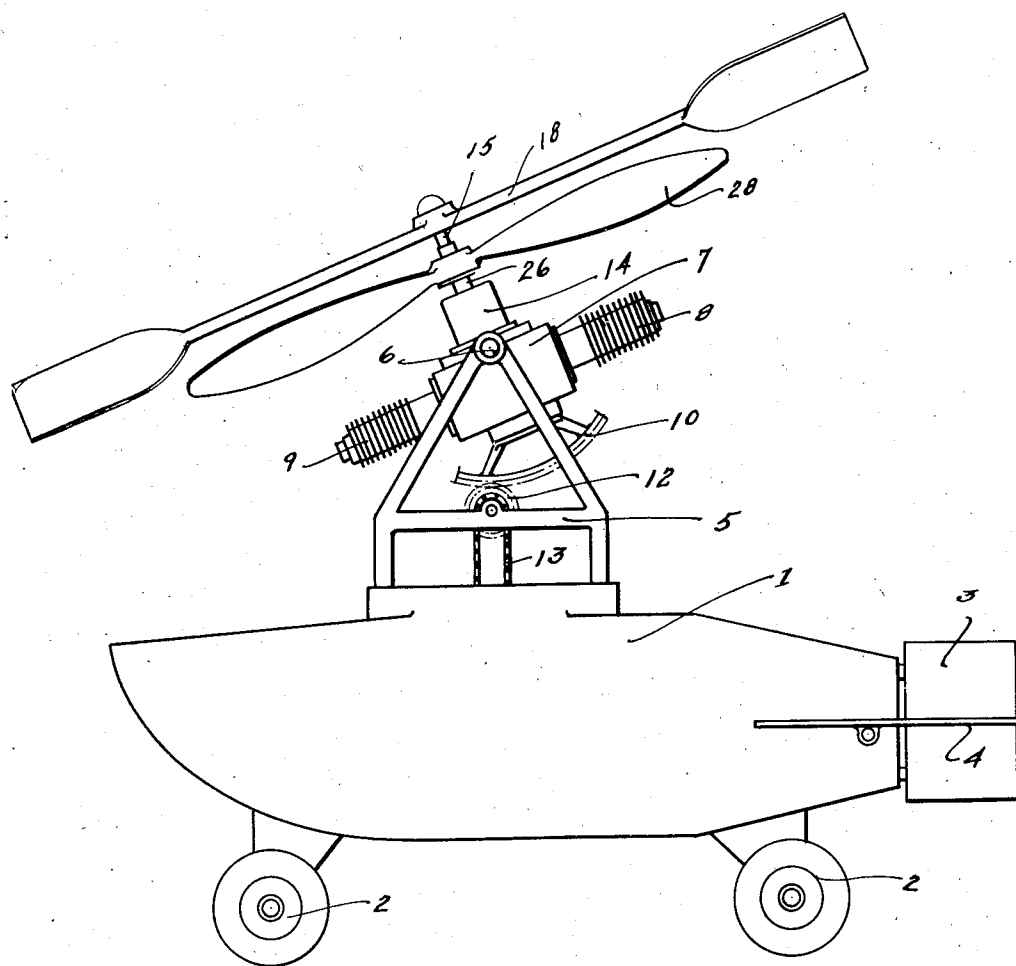


Fig. 2

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UNITED STATES PATENT OFFICE.

JOHN F. NORDBERG, OF PORTLAND, OREGON.

AIRPLANE CONSTRUCTION.

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My invention relates to air plane construction and has for its primary object the lifting and propelling of the air plane and related devices.

5 A further object of my invention consists in providing simple and efficient means for the direct lifting and the propelling of the air vehicle by the same means and the driving of the propellers from the same primary shaft.

10 A still further object of my invention consists in providing propellers mounted upon the same shaft but driven in opposite directions thus stabilizing the device and eliminating the tendency prevalent in some drives to a partial rotation of the air vehicle itself, due to the fact that the rotation of the propeller at a high rate of speed and with tremendous power exertion has a tendency to cause a partial rotation of the air vehicle.

15 A still further object of my invention consists in providing propellers of different diameters of rotation so that one of the propellers will be cutting the air at a different distance from the center of rotation than the other, and each of the propellers being rotated in a different direction.

20 A still further object of my invention consists in providing a suspended body from the motor frame and wherein the angle of suspension may be governed by the operator of the vehicle. The desired angle of suspension depending upon the rate of rise desired to the rate of forward propulsion.

25 With these and incidental objects in view, the invention consists in certain novel features, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment for carrying out the process as hereinafter shown with reference to the drawings which accompany, and form a part of this specification.

In the drawings:—

30 Fig. 1 is a side elevation of an air vehicle of my new and improved design in position of suspension and propeller for a direct rise from the ground.

35 Fig. 2 is a side elevation with the body reposing at an angle to that of the power plant and the propellers. In this position the air vehicle will be lifted and at the same time will be propelled forward.

40 Fig. 3 is a cross section view of the propeller shafts and the housing for the same.

This view also illustrates a preferred form of drive for the propeller shafts.

Like reference characters refer to like parts throughout the several views.

1 is the body of the vehicle having supporting wheels 2 for supporting the same when in contact with the earth or other solid supporting media. 3 and 4 being direction steering rudders. The body is directly secured to a supporting frame 5 that is held in suspension about the journal shaft 6. The power plant is secured in the frame 7, and the power unit is encased within the oppositely disposed members 8 and 9. A quadrant 10 is associated with the frame 7 and is in registering alignment with the locating element 12. The object of the quadrant and the registering locating element is to determine the relative angles of the body and the power frame. For lifting in a vertical direction only the body and the power frame will be in vertical alignment whereas if angularity of drive to arise is desired the body and the central line of the driving shaft will be at an angle to each other as indicated in Fig. 2. The locating element is manipulated through the medium of a tiller chain 13. The gear set is encased within the housing 14 secured to the power frame 7 by suitable fastening elements. Rotation is imparted to the main propeller shaft 15 by the power unit and is journaled within suitable bearings 16 and 17. A primary propeller of the screw type is mounted upon the outboard end of the main propeller shaft 15 and the spread of the blade members are greater than the secondary blade members. Secured to the main propeller shaft 15 is a driving bevel gear 19 and is in driving relation with the driven gears 20 and 21. Hubs 22 and 23 are formed on the inner surface of the housing 14 and stub shafts 24 and 25 are journaled therein and serve as supporting elements for the driven gears 20 and 21. A sleeve shaft 26 is in working relationship with the primary propeller shaft and is driven through the medium of gear 27 in working relationship with the driven gears 20 and 21. The secondary propeller 28 is mounted upon the sleeve shaft 26 and is of a lesser spread than that of the primary propeller and is driven in the opposite direction to that of the primary propeller through the action of the gears. My form of construction is susceptible of a close

coupled construction and one that permits of great stability and ease of control not heretofore obtained.

While the form of construction herein shown and described is admirably adapted to accomplish the objects primarily stated, it is not intended to confine the invention to the specific form herein described, as it is susceptible of embodiment in various limited ways all coming within the scope of the claims which follow.

What I claim is:

1. In air plane construction, an air plane body provided with a centrally disposed vertically extending frame work, said frame work being provided with a horizontal shaft the axis of which is at right angles to the axis of the body; an engine pivotally carried by said shaft, a drive shaft rotated by said engine, a sleeve shaft about the drive shaft, a train of gears connected between the drive shaft and the sleeve shaft adapted for rotating the sleeve shaft in a direction opposite to the direction of rotation of the drive shaft, a propeller carried by the sleeve shaft the blades of which are adapted to create an air pressure immediately adjacent thereto; and a propeller carried by the drive shaft the blades of which

are adapted for creating an air pressure exterior and immediately adjacent the pressure created by the first mentioned propeller.

2. In air plane construction, an air plane-body provided with a centrally disposed vertically extending frame work, said frame work being provided with a horizontal shaft the axis of which is at right angles to the axis of the body; an engine pivotally carried by said shaft, a drive shaft rotated by said engine, a sleeve shaft about the drive shaft, a train of gears connected between the drive shaft and the sleeve shaft adapted for rotating the sleeve shaft in a direction opposite to the direction of rotation of the drive shaft, a propeller carried by the sleeve shaft the blade of which are adapted to create an air pressure immediately adjacent thereto; a propeller carried by the drive shaft the blades of which are adapted for creating an air pressure exterior and immediately adjacent the pressure created by the first mentioned propeller; and means for rocking said engine together with the drive and sleeve shafts in a vertical plane relative to the aforesaid body.

JOHN F. NORDBERG.