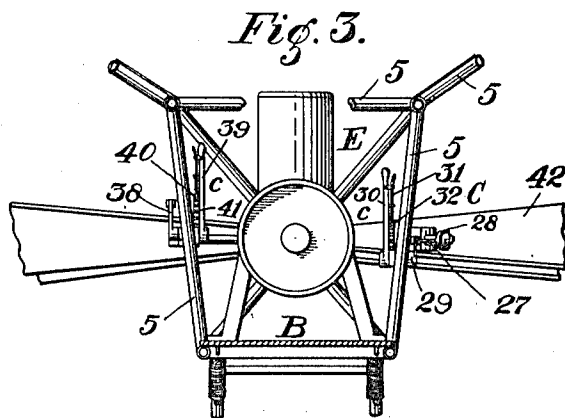
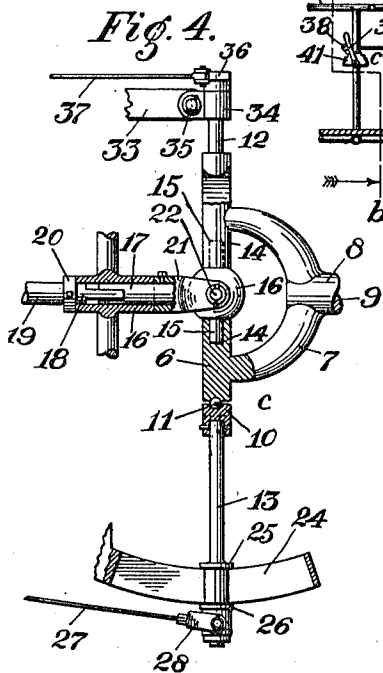
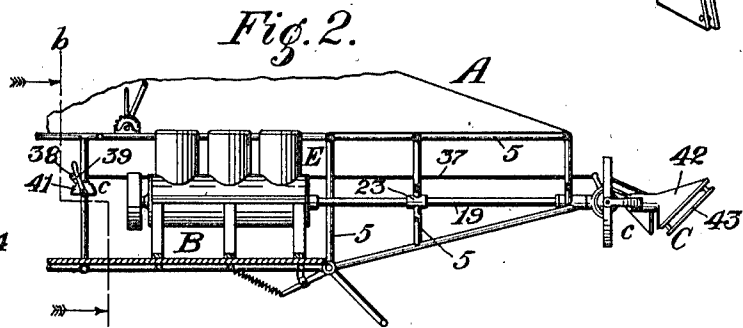
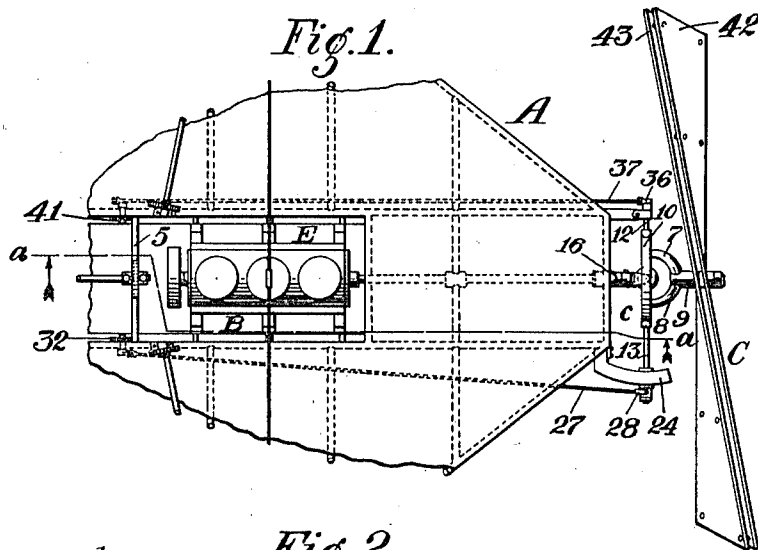


V. G. DE YBARRONDO.
 MEANS OF PROPULSION.
 APPLICATION FILED AUG. 30, 1910.

1,001,332.

Patented Aug. 22, 1911.



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UNITED STATES PATENT OFFICE.

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MEANS OF PROPULSION.

1,001,332.

Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed August 30, 1910. Serial No. 579,689.

To all whom it may concern:

Be it known that I, VINCENT C. DE YBARRONDO, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Means of Propulsion, of which the following is a specification.

This invention has for its object to provide improvements in means of propulsion, more particularly related to flying machines and other mechanism and apparatus for navigating the air, which will be superior in point of degree and facility to control, positiveness in operation, relative lightness and simplicity of construction, and adaptability to varying conditions incident to use and service; and which will be generally superior in point of efficiency and serviceability.

With the above and other objects in use, the invention consists in the novel provision, construction, formation, combination and association of parts, members and features, all as hereinafter described, shown in the drawing, and finally pointed out in claims.

The present invention was originally described, disclosed and claimed, in a parent application for patent for air ships, filed by me January 11, 1910, Serial No. 537,546.

In the drawing:—Figure 1 is a fragmentary top plan view of a flying machine provided with means of propulsion embodying the invention; Fig. 2 is a side elevation of the same, partly in longitudinal section for clearness of illustration, the section being taken upon the line *a— a* Fig. 1; Fig. 3 is an enlarged vertical transverse sectional view taken upon the line *b— b*, Fig. 2, parts being broken away for clearness of illustration; and, Fig. 4 is a fragmentary plan view of a portion of the construction at the right hand end of Figs. 1 and 2, the same being upon an enlarged scale and being partly in section for clearness of illustration. In both of the sectional views above specified, the line of vision is in the direction of the appended arrows.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, "A" designates a portion of the main supporting plane of a flying machine, of the monoplane type, from which is suspended a deck "B" upon which motive

means "E" are mounted, the same operating the propeller "C" which is an element of the means of propulsion constituting the invention. All of the parts are connected together and braced by suitable frame members 5, the form and arrangement and connection of which is not concerned in the invention.

In the drawing various incidental features of flying machine construction are shown, mainly fragmentary, and these are also not concerned in the invention.

c designates the controlling means for the propeller "C".

The propeller "C" is so mounted that the same may be deflected from its normal position in which it acts to cause direct longitudinal movement of the flying machine, into downwardly, upwardly, and oppositely laterally facing positions in which it may act to depress or elevate the forward end of the flying machine, or to deflect the latter laterally in either direction from a straight-away course; all as determined by the agency of the control means *c*; and the same comprises an annulus or wheel 6 from the forward face of which projects a semi-circular frame 7, the central portion of which is formed into a mounting 8 for the shaft 9 of the propeller "C". The annulus 6 is rotatively mounted within an outer annulus 10, a ball race being provided between the two annuli as clearly shown in Fig. 4 at 11. The outer annulus is provided with oppositely projecting elongated bearings, 12 and 13, respectively. The inner annulus 6 is provided with diametrically opposed heads 14, which receive loosely opposed projecting stub-shafts 15 upon a ball 16 with opposed portions of the surface of which the heads 14 loosely engage so as to be capable of rotation upon the stub-shafts 15. The forward end of the main plane "A" is provided with a bearing 16 which receives rotatably two interior locking clutch members, 17 and 18, respectively, the clutch member 18 being connected with or formed upon a power shaft 19 extended from and actuated by the motive means "E". A collar 20 locked to the shaft 19 limits forward longitudinal movement of the clutch member 18. The clutch member 17, entering the bearing 16 from the opposite end, carries at its forward end a fixed yoke 21, the arms of which receive rotatably

the respective end portions of bearings 22 projecting oppositely from the ball 16 and rectangularly with respect to the stub-shafts 15. The power shaft 19 extends rearwardly of the main frame of the machine through a suitable bearing 23 and is directly connected with a motor "E" which may be of the hydro-carbon explosive type or of any other suitable nature.

The elongated bearing 13 of the outer annulus 10 is received at its outer end within a segmental keeper 24 forwardly of the forward end of the frame; said outer end of said bearing having a suitably flanged sleeve 25 acting as a bearing within the keeper 24. Outwardly of the keeper 24, a collar 26 is loosely applied to the bearing 13. A connecting rod 27 extends from a yoke 28 which is loosely pivotally connected with the outer end of the bearing 13, rearwardly to a crank arm 29 the shaft of which is provided with a lever arm 30 pivotally mounted upon the frame; said lever arm carrying a dog 31 which co-acts with a toothed sector 32 mounted upon the frame, to constitute a well-known form of operating and controlling means. Oscillation of the lever arm 30 causes longitudinal movement of the connecting rod 27 to move the sleeved end of the bearing 13 within the segmental keeper 24, and causes the propeller "C" to face laterally of the longitudinal medial axis of the main frame or of the machine. The swinging movement of the bearing 13 last described, which carries with it in such movement the annuli 6 and 10 and the bearing 12, together with the mounting 8 of the propeller shaft, is permitted by the pivotal mounting of the bearing 12 upon a bracket 33, arranged forwardly from the main frame; the outer end of the bearing 12 being surrounded by a sleeve 34 having split ends pivotally connected with the bracket 33, as at 35. The outer end of the bearing 12 is provided with a crank arm 36 from which extends rearwardly a connecting rod 37 pivotally connected at its rearward end with a crank arm 38 the shaft of which is supported upon a frame member and is provided with a lever arm 39 provided with a dog 40 which co-acts with a toothed sector 41. Oscillation of the lever arm 39 causes the crank arm 36 to rock, causing the consequent rocking or oscillation of the bearings 12 and 13, the annuli 6 and 10, and the mounting 8 of the propeller shaft. By this rocking movement the propeller is caused to face downwardly and upwardly with respect to the longitudinal central portion of the main plane or frame of the machine.

The propeller "C" is provided with two-part blades 42 and 43, respectively, the parts of the blades being relatively spaced slightly to provide for an air space there-

between, whereby the thrust area of the propeller is largely increased, although its total working zone is slightly greater than that necessary for the operation of a propeller having one-part or unitary blades. The propeller is set to operate in such manner as to expend the power generated thereby in traction upon the machine.

The operation, method of use and advantages of the improved means of propulsion constituting the invention will be readily understood from the foregoing description taken in connection with the accompanying drawing and the following statement: Through the control means *c* the propeller "C" may face to predetermined degrees upwardly, downwardly or laterally in either direction; and either upward or downward adjustment may be combined with either lateral adjustment for resultant adjustment composite of both manipulations. In adjusting the propeller "C" to cause the same to face upwardly or downwardly, the bearing 12, together with the bearing 13 and the intermediate parts and features, is rocked through the agency of the crank arm 36, the connecting rod 37 and the lever arm 39. Lateral facing of the propeller "C" in either direction is caused through the agency of the connecting rod 27 and the lever arm 30. In whatever plane of rotation the propeller may be located, such rotation is caused by the rotation of the power shaft 19 which in turn rotates the clutch members 17 and 18, the yoke 21, the ball 16 and the heads 14, which receive the bearings 15 upon the ball 16; the mounting 8 for the fixed shaft 9 of the propeller being thereby rotated; and the said rotation takes place as between the annulus 6 and the annulus 10, which are separated by the ball race 11.

I do not desire to be understood as limiting myself to the specific provision, construction, formation, combination and relative arrangement of parts, members and features shown and described; but reserve the right to vary the same, in adapting the improvements to varying conditions of use, without departing from the spirit of the invention and the terms of the following claims:

Having thus described my invention, I claim and desire to secure by Letters Patent:

1. Improved means of propulsion, comprising a propeller, an annular propeller support, an annulus within which the annular propeller support is rotatively mounted, means for rotating the annular propeller support, means for adjusting the annulus laterally, and means for adjusting the annulus pivotally.

2. Improved means of propulsion, comprising an annular propeller support, an annulus within which the propeller support

is rotatively mounted, a power shaft, and a clutch one member of which is connected with the power shaft and one member of which is doubly pivotally connected with the annular propeller support; said annulus being provided with bearings one of which is pivotally and rotatably mounted and the other of which is slidably and rotatably mounted, means for rotating one of

said bearings, and means for slidably adjusting the other of said bearings. 10

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

VINCENT C. DE YBARRONDO.

Witnesses:

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RICH. G. V. MYTTON.