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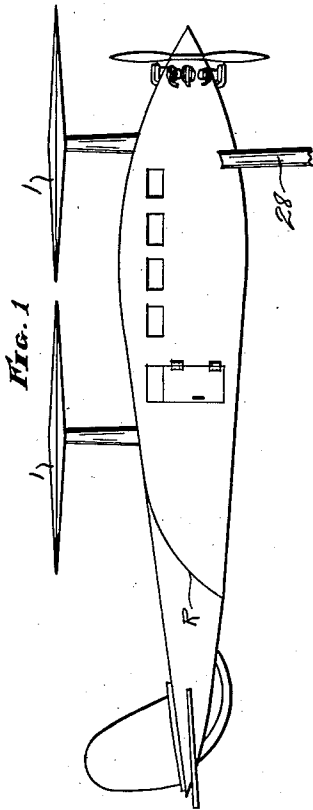
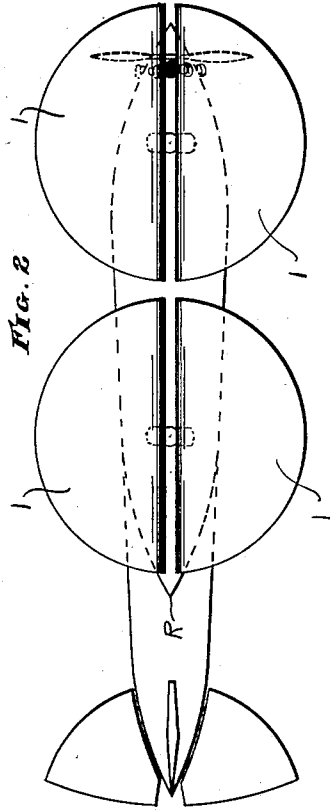
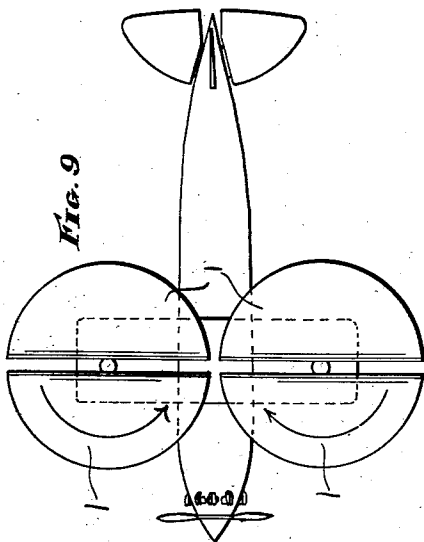
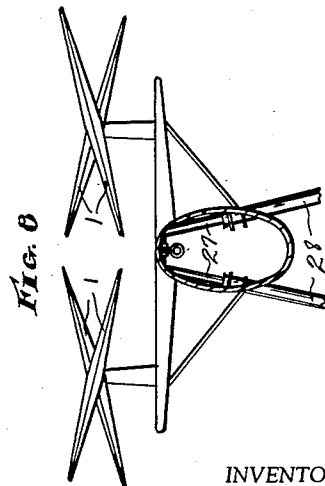
I. J. MARRIAGE

1,989,708

AIRSHIP

Filed Oct. 28, 1929

4 Sheets-Sheet 1



INVENTOR.

Ira J. Marriage

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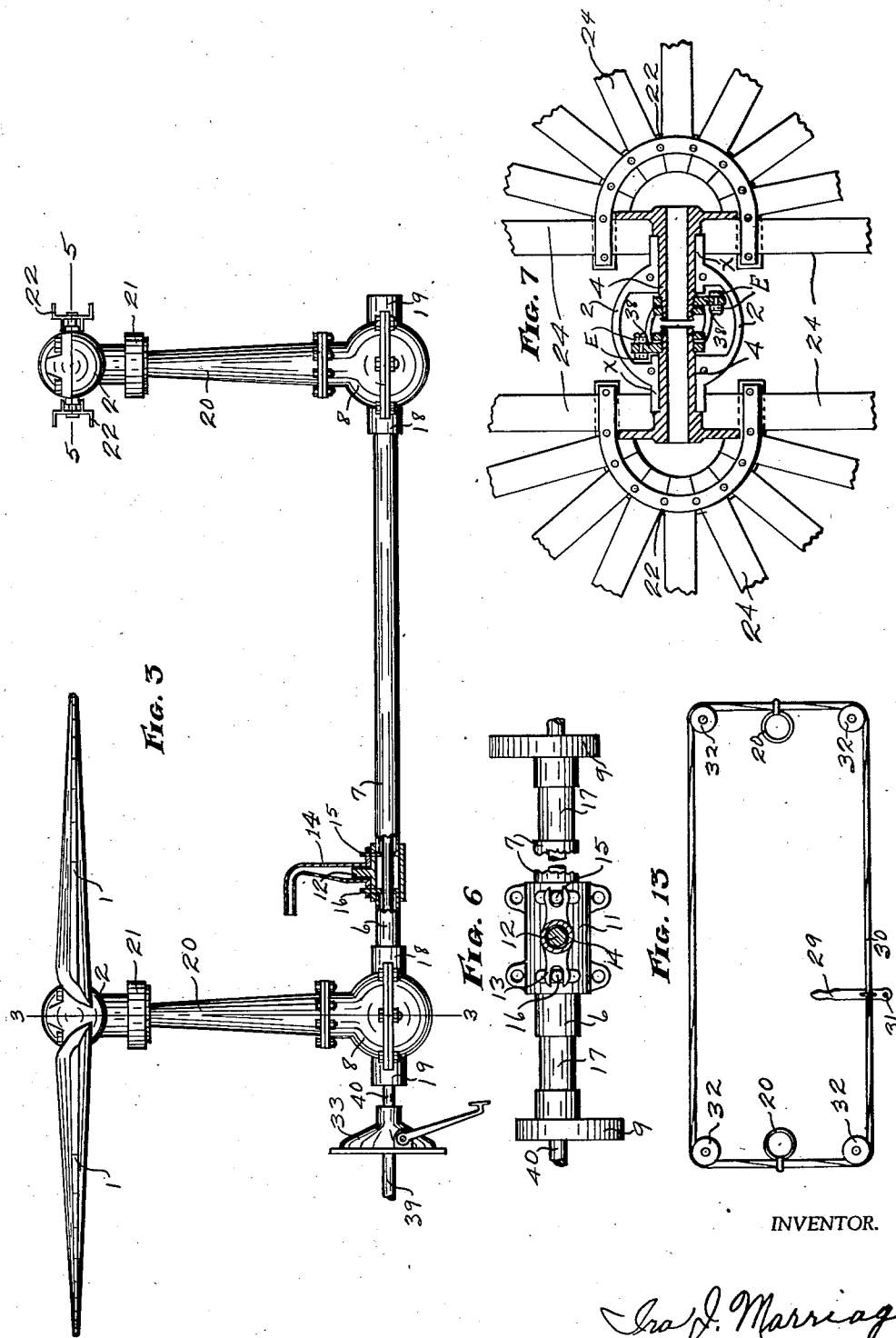
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4 Sheets-Sheet 2



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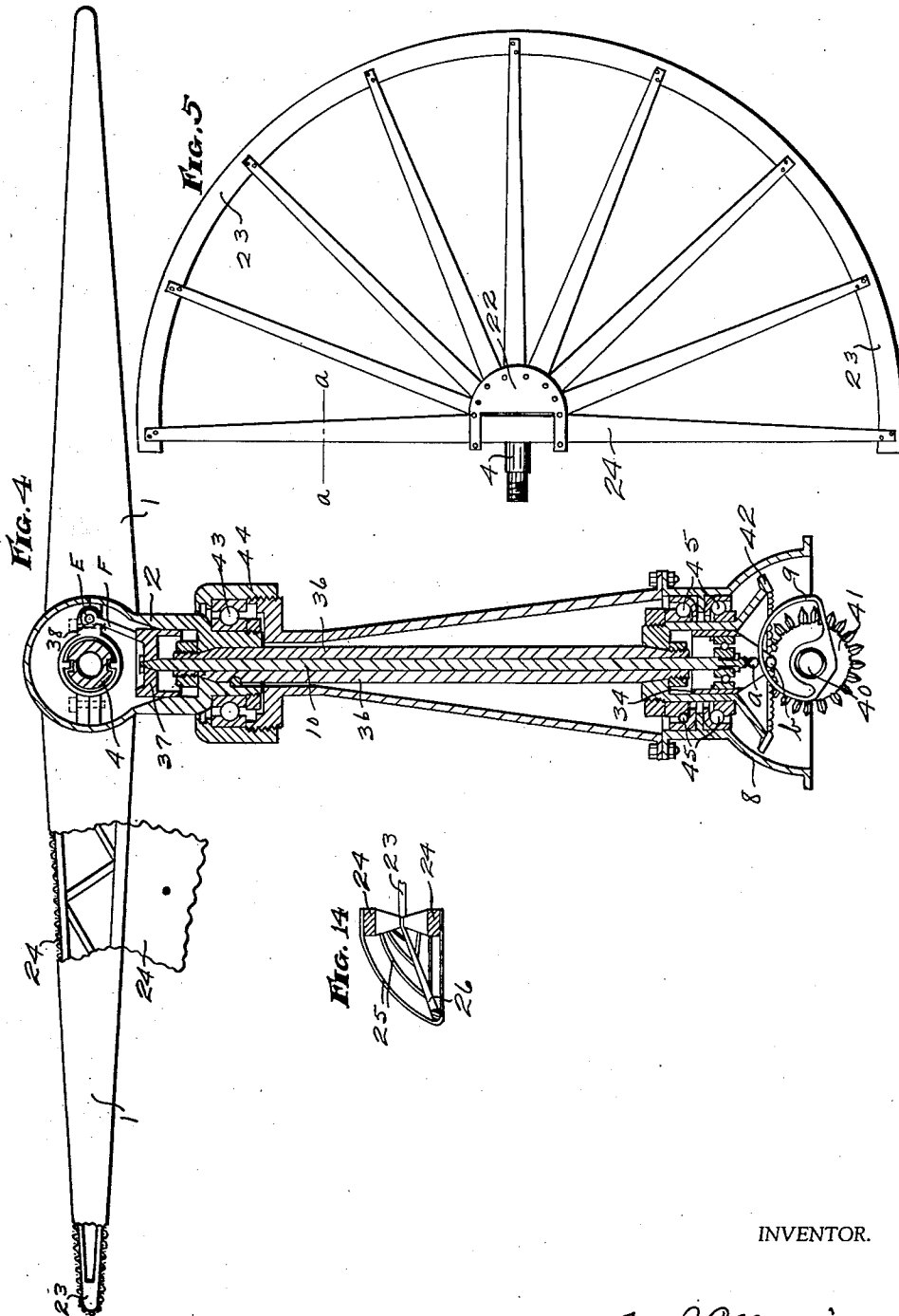
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4 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,989,708

AIRSHIP

Ira J. Marriage, Mullinville, Kans.

Application October 28, 1929, Serial No. 403,012

4 Claims. (Cl. 244—19)

The object of this invention is to provide a means by which an air-ship can rise vertically and then sustain itself in mid-air while maneuvering as follows:

5 Hover in a given position; move either forward or backward at speeds from very slow to very rapid; turn to the right or to the left while moving forward or backward without the aid of a tail, or even revolve to the right or to the left in a pivotal action, and alight gently from a high perpendicular position either with or without the aid of the motor.

10 A further object of my invention is to guide the vertically inclined driving shafts on which the wings are mounted.

15 These and other objects will hereinafter be more fully explained, reference being had to the accompanying drawings forming a part of this specification, and in which like characters will apply to like parts in the different views.

Referring to the drawings:

Fig. 1 is the side view of the air-ship proper.

Fig. 2 is a plan view of Fig. 1.

25 Fig. 3 is an enlarged detail view of the vertical propeller shafts and shaft connections therefor, parts removed for convenience of illustration.

Fig. 4 is an enlarged sectional view in detail of the vertical shaft housing and propeller.

30 Fig. 5 is a plan view of one section of the propeller frame.

Fig. 6 is an enlarged fragmentary plan view of the horizontal drive shaft housing and propeller control lever, sectionally shown.

35 Fig. 7 is an enlarged plan view of the propeller assembly partly in section and other parts removed.

Fig. 8 is a modified end view of an air-ship showing the tilt of the propeller sections.

Fig. 9 is a plan view of Fig. 8.

40 Fig. 10 is a modified form of reversing the propeller blades, parts removed for convenience of illustration.

Fig. 11 is a sectional plan view of Fig. 10 taken on line C—C, looking in the direction of the arrows.

Fig. 12 is a sectional view taken on line D—D in Fig. 10, looking in the direction of the arrows.

45 Fig. 13 is a plan view of the shifting means for the propeller shafts from a vertical plane transversely to the longitudinal axis of the fuselage.

Fig. 14 is an enlarged sectional view of the propeller frame work taken on line A—A in Fig. 5.

My invention herein disclosed consists in the construction and assembly of parts as follows.

55 The two sets of wings 1 and 1, when tilted, as

in Fig. 1, are driven in a whirling motion for lifting ship upwards and retaining same in mid-air, each set of wings having an opposite motion to the other in order to stabilize the ship. These wings can be adjusted to a more level plane after the ship gains sufficient momentum either forward or backward, then the clutch in bell-housing 33 may be released, after which the wings are used as planes for sailing.

The mechanism which controls the tilting of the wings is arranged so as to tilt same in reverse angles to that required for lifting, thereby making it possible to take advantage of the under air pressure when alighting with a dead motor. When descending, these wings may be tilted in reverse, and the displacement of air will cause them to whirl at a terrific speed, thus providing momentum for an opposite tilt when near the ground, causing them to lift and facilitate landing.

The foregoing performances are made possible by the following described coordination of mechanisms:

In Figs. 3 and 6 the shifting-lever 14 being journaled to pintle 12 in the center of clamp-coupling 11, serves as a rigid support for same. The pegs 15 and 16 which protrude upwards through and above the slotted openings in clamp-coupling 11, are attached rigidly to connections 6 and 7 and are held in proper position between the forks 13 and 13 by same; thus by twisting the lever 14 to the right or to the left on the pintle 12, the connections 6 and 7 are forced to turn in arcs opposite to each other, but when the lever 14 is moved toward the right or toward the left on the same axis with the connections 6 and 7 then both said connections with their eccentric mountings follow the same arc in unison. When the connections 6 and 7 are fully assembled, the two bearing points 17 and 17 are journaled in the two bearings 18 and 18, thereby holding the eccentrics 9 and 9 in a central position in the gear-housings 8 and 8. (See illustrated eccentric 9 in Fig. 4.)

The sleeve 34 in Fig. 4 is forked at the lower end, and is held in position straddle of the eccentric 9 by means of two pins at points *a* and *b*, above and below the eccentric rim; push-rod 10 being journaled in sleeve 34 to bearing 35, extends upwards thru the center of torque-shaft 36 into the driving-head 2, and is firmly secured to the adjusting-sleeve 37. This adjusting-sleeve being equipped with two forked arms as *f* in Fig. 4, which extend upwards from opposite edges, and having eyelets *E* and *E* in the forks, serve as an adjuster to the wings 1 and 1, by means of the

upper forks E and E (see Fig. 7) being journaled to levers 38 and 38, which protrude out at right angle from the wing pintles 4 and 4, being firmly secured to same. These wing-pintles 4 and 4 are journaled in the bearings X and X of driving-head 2, (see Fig. 7) and therefore have the same axis. This being the case it can readily be seen that when forks E and E are journaled to pintle-levers 38 and 38, which have their positions on opposite sides of said axis, that any movement up or down of the adjusting sleeve 37, will move the pintles 4 and 4 in opposite arcs, thus moving or tilting wings 1 and 1 in reverse pitches to their axes.

Not only does each wing in each wing-assembly take a pitch opposite to that of the other, but each set of wings in each wing-assembly takes reverse pitches to those in the other assembly. These latter positions are necessary because one wing-assembly is rotated clockwise and the other counterclockwise. The object in rotating one wing-assembly clockwise and the other counterclockwise is for the purpose of stabilizing the air-ship.

There are two good methods of assembling the mechanisms for obtaining the results or manners of adjustment just explained: first, the eccentrics 9 and 9, as seen in Fig. 6, are mounted at the ends of connections 6 and 7 in a manner so as to be opposed to one another when said connections are forced to describe arcs simultaneously to the right or left, thereby causing one eccentric to lift push-rod 10 and assembly, while the opposite motion is produced on the other push-rod assembly; furthermore, when the lever 14 is twisted to the right or to the left, the connections 6 and 7 are shifted in opposite arcs to one another, by means of the shifting forks 13 and 13, thereby causing eccentrics 9 and 9 to work simultaneously, describing their arcs in opposite directions which moves each push-rod 10, and assembly, up at the same time or down at the same time.

When the wings are in their tilted positions lifting, this last action described above, may be necessary for the purpose of producing positions more oblique to one set of wings and less oblique to the other, for the purpose of balancing the air-ship and for maneuvering.

To rock the propeller shafts from a vertical position as a turning means for the ship, I have arranged a cable 30 to engage on sheave wheels 32 that are pivotally carried on the frame-work of the fuselage or other convenient frame-work, the said cable is positioned in working relation to each of the vertical shafts 20—20 and secured thereto, and to rock the same transverse to the longitudinal axis of the fuselage, the said cable is moved longitudinally through the medium of a lever 29 that is pivoted to a suitable bearing 31, the cable being attached to the lever at an intermediate joint approximately as shown, by which means when the lever is rocked to and fro with the cable line of travel the said vertical shafts and propellers carried thereby are rocked in opposite directions, it being understood that the rocking movement will engage in the elongated slots in the upper hull of the fuselage near each end thereof as shown by dotted lines in Fig. 2.

The segment of motor shaft 39, in Fig. 3, is shown in order to give the position which it holds in relation to the rest of the driving mechanisms and assemblies. Note the bell-housing 33 in which the clutch is housed and in which the main driving-shaft 40 is journaled. This main driving-shaft 40 is also journaled in bearings 19 and 19,

thus giving it a straight line from the bell-housing through both gear-housing assemblies 8 and 8.

The drive pinion 41 is shown in Fig. 4, is mounted rigidly to shaft 40, and holds its position in mesh with the bevel gear 42 at its periphery nearest the bearing 19 of each gear housing; therefore when the drive-shaft is being rotated each bevel gear 42 is being rotated in an opposite circle to the other. Note also that the torque-shaft 36 is secured rigidly at its lower end to the center of the bevel gear hub, and at its upper end to the center of the hub of driving-head 2, thereby providing a means by which the wing assembly is rotated. The torque-shaft-housing 20 answers as a rigid support to the torque-shaft 36, by being attached to the upper end of the neck of gear-housing 8, and holding a bearing 43 at its upper extremity, by means of a threaded bearing-cage 44 which is screwed on securely, in which the hub of driving-head 2 is journaled. The thrust bearings 45 which are seated in the neck of gear-housing 8, provide a substantial journal for the hub of gear 42, in addition to carrying the weight of the body of air-ship, which is suspended from the torque-shaft 36 and journaled on the outside of the gear-housing bearings 18 and 18 and 19 and 19.

The forward and rearward motions of the air-ship, are controlled by means of a reversible propeller (see Figs. 10, 11, and 12) mounted on the motor-shaft 39. This propeller can be adjusted at will, through the use of a forked lever which engages the two pegs 46 and 46, on the adjusting collar-bearing 47, which is securely journaled to the adjusting-sleeve 48. This adjusting-sleeve is equipped with two arms, as 49 shown in Figs. 10 and 12, extending upwards from opposite edges and having forked eyelets at their extremities, which journal to the collar arms 50 and 50. The sleeve ends of the propeller-blades 51 and 51 are journaled in the head-bearings 52 and 52 of the propeller driving-head 53, and are held securely by the shifting-collars 50 and 50 and nuts 54 and 54; therefore when the adjusting-sleeve 48 is moved forward toward the propeller, the blades 51 and 51 being journaled on the same axis, are compelled to describe reverse arcs to said axis, giving them forward pitches to any desired amount from a neutral position. When moving the sleeve 48 rearward, an opposite effect is produced from that just described.

The plate 55 which is bolted onto the front end of the propeller-head bearings, (see Fig. 10) is for the purpose of giving added strength to hold bearings 52 and 52 more rigid.

Referring back to Figs. 1 and 2, it will be seen that the rear end of the fuselage will be changed from the conventional style to a shape similar to the lines at the letter R.

Having thus described the invention, what I claim as my invention and desire to secure by Letters Patent is—

1. In an air-ship, the combination with a fuselage; a main driving shaft extending longitudinally inside, near a central position, with driving pinions secured thereto and engaged with bevel gears; hollow torque-shafts secured to the hubs of said bevel-gears and extending upwards through crosswise, slotted openings in the roof of fuselage, at right angle with the main drive-shaft; driving-heads mounted at the upper ends of torque-shafts; bearings provided in alignment at right angle to the line of torque-shafts, in said driving-heads; pintles secured in said bearings, with one wing mounted to the head of each

pintle, and one lever secured rigidly to each said pintle, in positions at the opposite ends from the wing-mountings parallel to the wings, said levers being enclosed inside of said driving-head.

- 5 2. In an air-ship, the combination with a fuselage; a power driving assemblage journaled with-
ing gear-housings; gear-housings joined together
by journaled sleeve-connections; outer journal-
10 bearings on gear-housings having the same axes
as the main driving-shaft; bearings that are
rigid with the fuselage and journaled on said
outer bearings; upright torque-housings rigidly
attached to gear-housings; an endless cable at-
15 tached to both torque-housings and held in posi-
tion at right angles to both by pulleys; means by
which cable may be held firm and shifted at
will, thus holding the torque-housings in perpen-
dicular positions, and in tilted positions opposite
20 to each other from a perpendicular line.
3. In an air-ship, the combination with a fuse-
lage; main driving mechanisms journaled in
housings; outer housing bearings journaled to
the fuselage; wing driving-heads secured to
driving mechanisms in a position above the fuse-

lage; semi-circular wings with convex surfaces,
arranged in circular assemblies and being at-
tached pivotally to the driving-heads on opposite
sides thereof; an adjustable sleeve inside of each
driving-head, with upright arms journaled to the
wing-pintle-levers; a push-rod, rigidly secured
to each said sleeve, at its upper end and journaled
to a forked sleeve at its lower end; an eccentric
secured to each forked sleeve and mounted to the
ends of two sleeve connections; means for turn-
10 ing said sleeve-connections and eccentrics simul-
taneously in either direction to vary the pitch of
the wings.

4. In an air-ship wing, the combination with
a main frame; a tubular pintle, said pintle being
15 equipped with a flanged head on one end, and a
short lever attached at right angle near the other
end; spokes constituting the main frame, at-
tached to the head of said pintle in two cor-
responding sections forming a half circle, and an
20 outer circular rim being attached to and between
the outer ends of said spokes; the outer surfaces
of said wing when covered being convex shaped.

IRA J. MARRIAGE.