

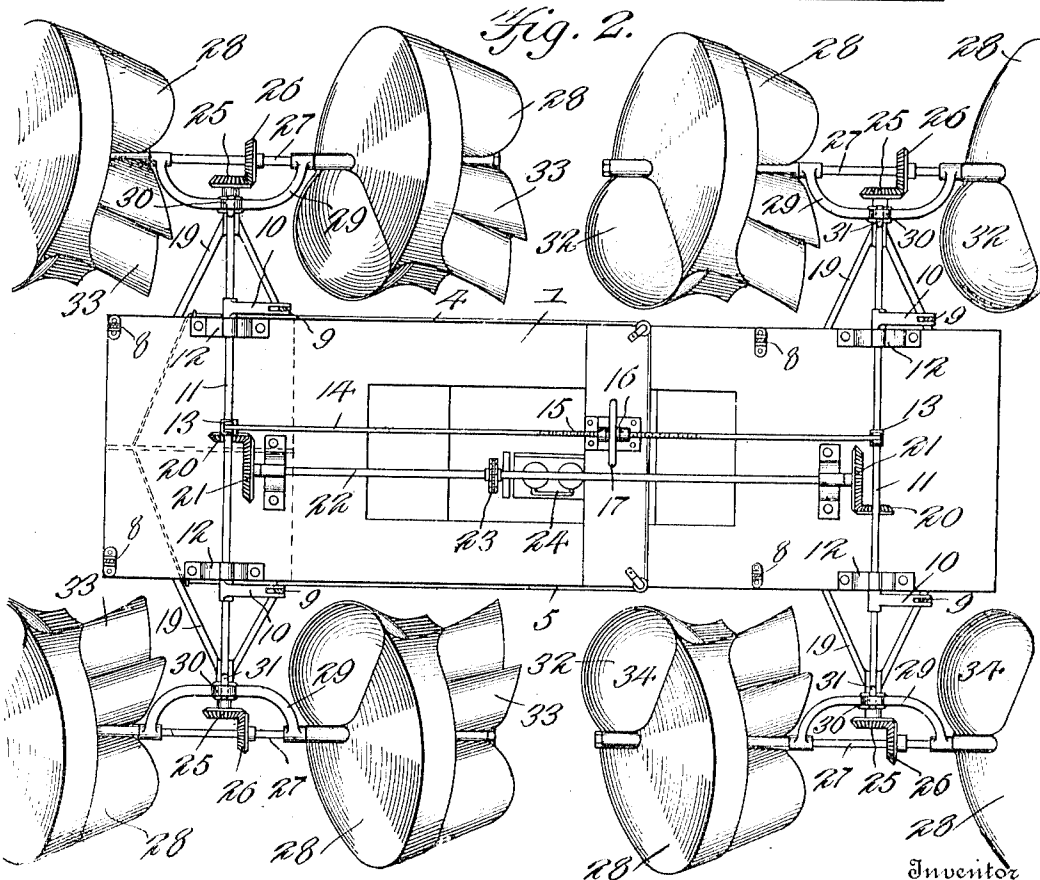
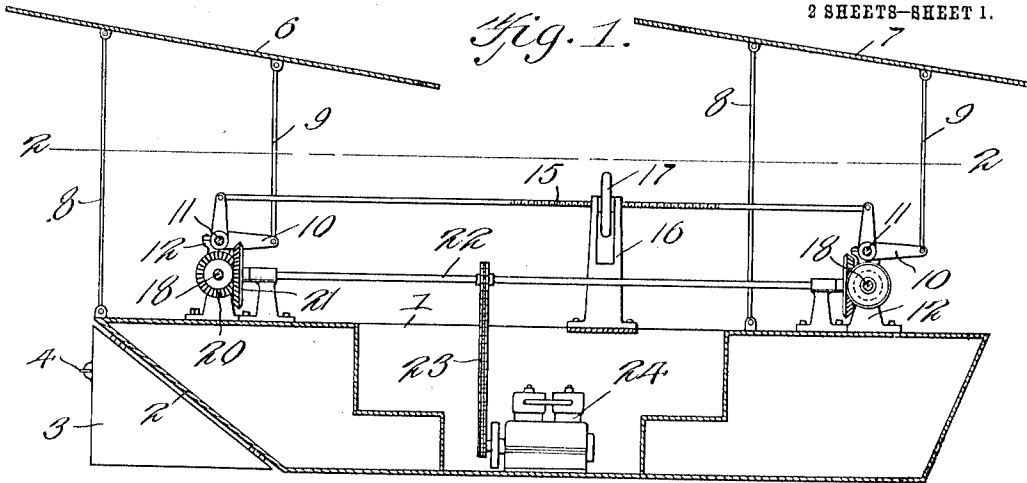
A. SUGDEN.
AEROPLANE.

APPLICATION FILED MAY 25, 1910. RENEWED DEC. 27, 1912.

1,063,843.

Patented June 3, 1913.

2 SHEETS—SHEET 1.



Inventor
Albert Sugden

Witnesses
Frank B. Hoffman

C. C. Hines

By

Victor J. Evans

Attorney

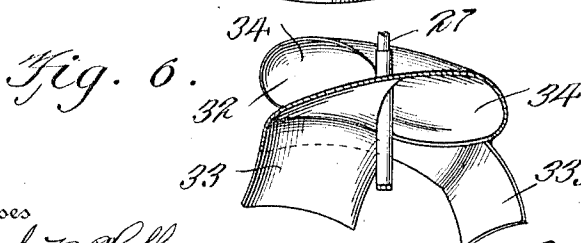
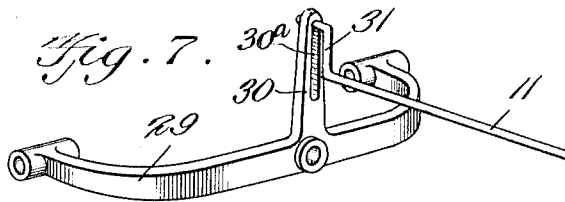
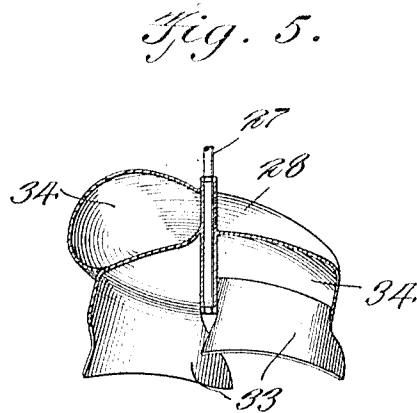
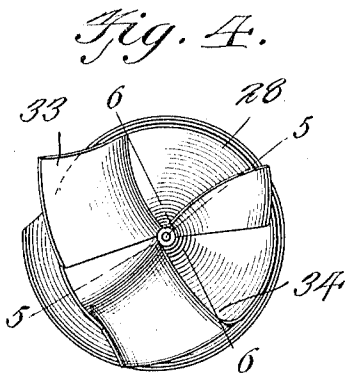
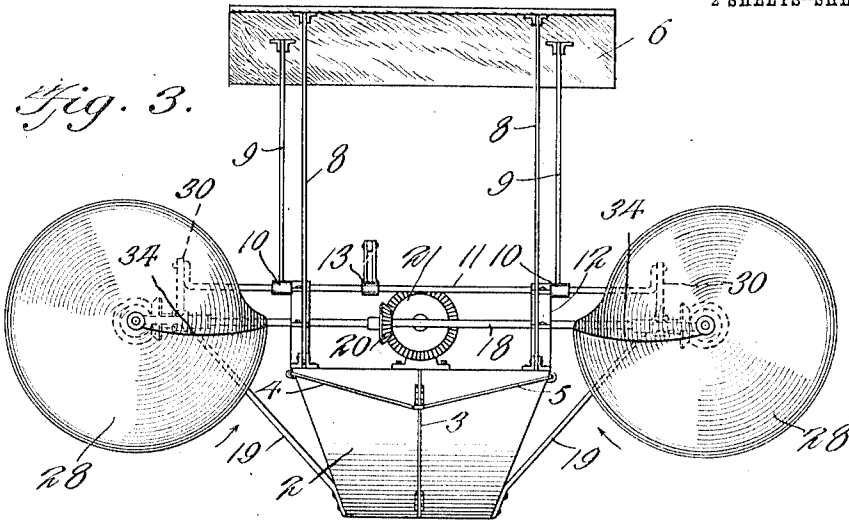
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UNITED STATES PATENT OFFICE.

ALBERT SUGDEN, OF STRATFORD, ONTARIO, CANADA.

AEROPLANE.

1,063,843.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed May 25, 1910, Serial No. 563,340. Renewed December 27, 1912. Serial No. 738,968.

To all whom it may concern:

Be it known that I, ALBERT SUGDEN, a subject of the King of Great Britain, residing at Stratford, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention relates to flying machines of the aeroplane type, and contemplates the provision of supporting planes adjustable to vary the line of flight and to steer the machine in a vertical direction and propelling means designed to give effective driving power and also adjustable to facilitate ascension and general steering in a vertical direction.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a central, vertical longitudinal section of a flying machine embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front elevation of the machine. Fig. 4 is a rear elevation of one of the propellers. Fig. 5 is a longitudinal section thereof on the line 5—5 of Fig. 4. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a view of one of the bracket yokes.

Referring to the drawings, 1 designates the frame of the machine, herein shown in the form of a boat-shaped car having a sloping forward end or overhang 2 beneath which is arranged a vertical rudder 3 for steering the machine in a horizontal plane. The said rudder is hinged or pivoted to the end 2 and is connected with operating cords or ropes 4 and 5 leading rearwardly into the car and by means of which the rudder may be swung laterally in either direction.

Flat or suitably curved following planes 6 and 7 are provided to sustain the machine in flight, said planes being normally inclined at an angle to the horizontal, as shown. Each plane is pivotally supported from the frame in advance of its longitudinal center by a link 8 and is pivotally connected in rear of its longitudinal center by a link 9 with a crank arm 10 on a transverse rock shaft 11 journaled in bearing brackets 12 on the car, said links normally extending vertically and the crank arms horizontally to support the planes in their normally inclined positions, shown for

straight flight. Other crank arms 13 normally project upward from the shafts 11 in a vertical plane and are connected by a longitudinally extending link rod 14, having a threaded central portion 15 passing loosely through the arms of a bifurcated bracket 16. An operating wheel or unit 17 is held between the arms from longitudinal movement on the shaft and has a threaded hub engaging said threaded surface 15, whereby the rod may be moved either forward or backward to tilt the planes to a greater or less angle up or down, whereby their angle of incidence may be varied to vary the lift or steer the machine in a vertical plane.

The shafts 11 are disposed above transverse transmission shafts 18 journaled in the brackets 12 and in brackets 19 beyond the sides of the car, which shafts 18 carry beveled pinions 20 meshing with beveled gears 21 on the ends of a longitudinal drive shaft 22, having a chain drive connection 23 with a suitable motor 24. On the projecting ends of each shaft 18 are beveled pinions 25 meshing with similar pinions 26 on longitudinally extending propeller shafts 27, each of which has fixed thereto a pair of propellers 28, arranged one in advance of the other. The propeller shaft is journaled in a bracket yoke 29 centrally mounted to swing in a vertical plane on the adjacent bracket 19, said yokes having upwardly extending arms 30 connected with L-shaped cranks 31 on the ends of the rock shafts 11. The arms 30 have segmental slots 30^a loosely receiving the extremities of the cranks and so formed that while the arms and cranks have different centers of rotation they will turn substantially in the same arc without binding.

By the construction and arrangement described the sets of propellers on each side of the frame are driven outwardly and in an opposite direction to the sets of propellers at the opposite side of the frame, and both sets of propellers may be tilted or inclined simultaneously with the planes and in the same direction to facilitate the propulsion and steering of the machine in either an upward or downward direction. Each propeller comprises a hollow body having a front propeller blade or wing 32 arranged at one side of its center and a series of rear propeller blades or wings 33 properly pitched for propulsive effect. The hollow body is partitioned to form a spiral passage

34 extending from front to rear thereof, the front end of said passage being partially surrounded by the blade 32, while the rear end thereof is partially surrounded by one 5 of the blades 33, said blades forming the front and rear terminal walls of the passage. It will thus be apparent that in addition to the propulsive effect of the blades, a current of air will flow through the spiral passage 10 and form in effect a screw of air on which the propeller will travel, thereby reducing slippage and increasing the force of propulsion.

Having thus described the invention, I 15 claim:—

1. In a flying machine comprising a frame, front and rear inclined planes tiltably mounted on the frame, front and rear transverse rock shafts, connections between 20 the planes and shafts whereby a rocking of the shafts will tilt said planes, transverse drive shafts, longitudinally extending propeller shafts journaled upon the ends of the drive shafts and in gear with said drive 25 shafts, propellers carried by said propeller shafts, connections between the rock shafts and propeller shafts, a rod connecting the

rock shafts, whereby the latter may be actuated to tilt the planes and propellers through said connections in unison, and an operating device for shifting the said rod. 30

2. A flying machine comprising a frame, front and rear inclined planes tiltably mounted on the frame, transverse rock shafts arranged below said planes, connections between the planes and the rock shafts, whereby upon the rocking of the latter the planes may be tilted, yokes upon the ends of the rock shafts, propeller shafts journaled in said yokes, transverse drive shafts, gearing between said drive shafts and the propeller shafts, propellers mounted upon the respective propeller shafts, an operating rod connecting the rock shafts, whereby the latter may be actuated to tilt the planes and 45 propellers in unison, and an operating device having a threaded engagement with said rod.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT SUGDEN.

Witnesses:

JAMES W. FOOT,
ALBT. GILBERT.