J. ARDO.

MULTIPROPELLER AEROPLANE.

APPLICATION FILED AUG. 1, 1921.

1,417,017.

Patented May 23, 1922.

2 SHEETS—SHEET 1.

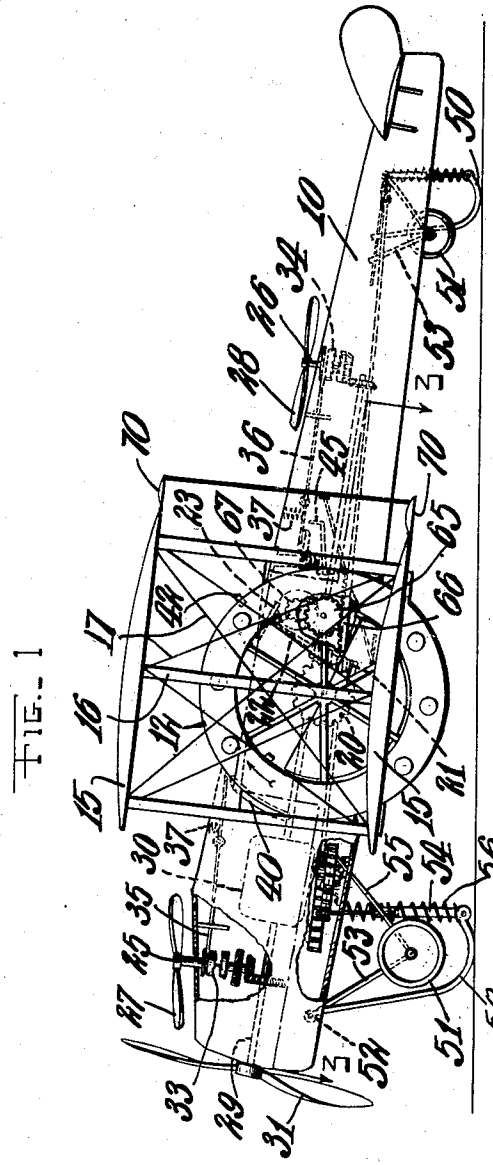


FIG. 1

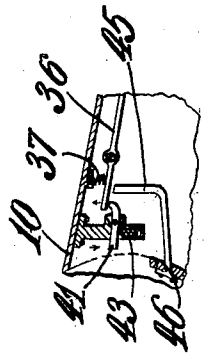


FIG. 5

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2 SHEETS—SHEET 2.

FIG. 2

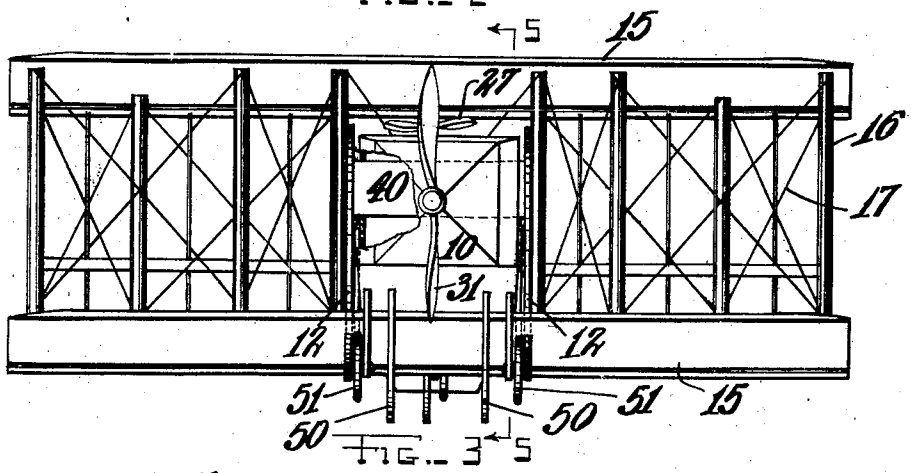


FIG. 3

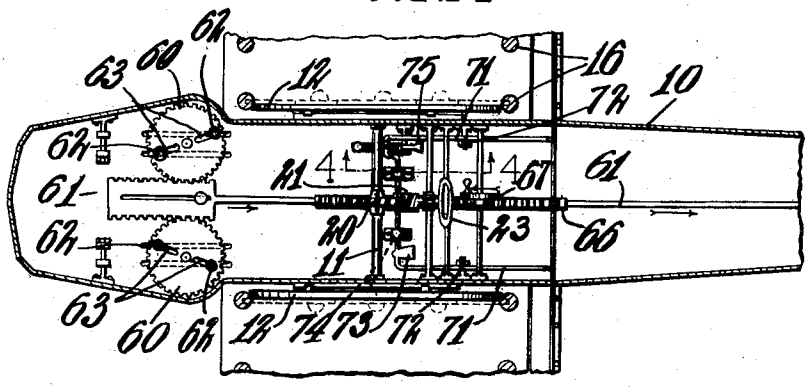
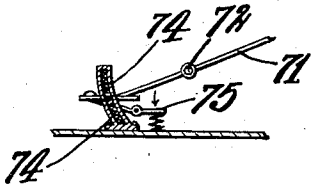


FIG. 4



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UNITED STATES PATENT OFFICE.

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MULTIPROPELLED AEROPLANE.

1,417,017. Specification of Letters Patent. Patented May 23, 1922.

Application filed August 1, 1921. Serial No. 488,779.

To all whom it may concern:

Be it known that I, JOSEPH ARDO, citizen of the United States, residing at Newhall, in the county of McDowell and State of West Virginia, have invented certain new and useful Improvements in Multipropelled Aeroplanes, of which the following is a specification.

This invention relates to aeroplanes having particular reference to the features of adjustability of various parts.

The invention has for an object to provide a novel means for adjusting the angle of incidence of the wings or planes.

A further object is the provision of a pair of lifting screws which are automatically started or stopped when certain adjustments are made in the angle of incidence of the planes.

A further object is the provision of skid and wheel means adapted to be raised and lowered by a common operating means imparting inverse movement thereto.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

Fig. 1. of the drawings is a side view, with certain exterior parts broken away, of an aeroplane having the invention applied thereto.

Fig. 2. is a front view with part of the body broken into transverse section.

Fig. 3. is a fragmentary horizontal section on the line 3—3 of Fig. 1.

Fig. 4. is a fragmentary longitudinal section on the line 4—4 of Fig. 3.

Fig. 5. is a fragmentary longitudinal section, taken along the line 5—5 of Fig. 2, and illustrating the means for operating the clutch of the rear lifting propeller.

As here shown my improved aeroplane comprises a body 10 of usual form. Suitably journaled in this body is a transverse shaft 11 to the ends of which are fixed wheels 12. To these wheels are fixed a pair of planes 15 rigidly braced by suitable struts 16 and ropes or wires 17, this mounting permitting the two planes to swing as a unit around shaft 11 to vary their angle of incidence. To adjust these planes a worm gear 20 is fixed on shaft 11 and is engaged by a worm pinion 21 on a substantial vertical shaft 22 having a handwheel 23 on its upper end.

Fixed on suitably journaled vertical shafts 25 and 26 are front and rear lifting propellers 27 and 28 respectively, these shafts being connected by bevel gearing to a longitudinal drive shaft 29 driven by a motor 30. Fixed to the front end of shaft 29 is a tractor propeller 31. Shafts 25 and 26 are each formed in two sections adapted to be connected in a well known manner by clutches 33 and 34 of ordinary construction, these clutches being operated by levers 35 and 36 which are engaged by springs 37 to normally hold the clutches open, the clutches being closed by elements carried by the wheels 12. To close the front clutch the rear end of lever 35 is engaged by a segmental bar 40 fixed to and extending between the wheels 12. To close the rear clutch 34 the end of the lever 36 is adapted to be engaged by one end of a short, centrally pivoted, lever 41 whose other end is adapted to be engaged by a bar 42 fixed to and extending between the wheels 12. A spring 43 normally urges lever 41 to inoperative position.

The bars 40 and 42 are adapted to actuate the clutches 33 and 34 when the wheels 12 are swung to increase the angle of incidence of the planes. The rear clutch 34 is likewise adapted to be closed when the angle of incidence of the planes is decreased, this being accomplished by means of an angular finger 45 fixed to a third bar 46 extending between the wheels 12. It will be understood that suitable slots will be provided in the body 10 to accommodate these bars.

I also provide the aeroplane with front and rear skids 50, and front and rear wheels 51, the wheels and skids being connected together to be shifted inversely in unison between raised and lowered positions. The skids 50 are pivotally attached at one end as at 52 to the aeroplane body, while the wheels 51 are mounted on the free ends of arms 53 pivotally attached to the body co-axial to the skids. Connected to the free ends of the skids 50 and arms 53 are struts 54 and 55 which extend upwardly through suitable slots in the floor of the body, the upper ends of these struts being given a longitudinal movement in opposite directions in unison. The skid struts 54 are of two part telescopic construction expanded by springs 56 which provide a cushion for landing. This longitudinal movement is accomplished by means

of gears 60 mounted on the floor of the body 10 and engaged by a double-faced rack bar 61 slidable longitudinally in said body. The upper ends of the struts 54, 55 are attached to studs 62 carried by said gears and slidable in radial slots 63 therein. The rack bar 61 is operated by means of a gear 65 meshing with an intermediate toothed part 66 of the rack bar and engaged by a pinion 67 to which is secured a suitable handle for rotation.

The planes 15 preferably have ailerons 70 hinged to their rear edges and depressed by a lever 71 fulcrumed as at 72 and provided with a foot pedal 73. Springs 74 act to hold the ailerons in neutral position. The ailerons my be raised by a foot lever 75 engaging the pedal 73.

In the operation of the aeroplane the planes are tilted to their greatest angle of incidence at the start of a flight thus causing both parts 40 and 42 to engage the respective levers 35, 36 and operate both of the lifting screws. When rapid ascent is not desired the planes are swung to a smaller angle of incidence and bar 42 disengaged from lever 36, the rear lifting propeller thus becoming inactive.

Having thus described my invention what I claim as new and desire to protect by Letters Patent of the United States is as follows:

1. In an aeroplane, a pair of wheels, pivoted arms on which said wheels are mounted, a pair of skids pivoted on a common axis with said arms, struts engaged at one end with the free ends of said arms and skids, the struts engaged with the skids being longitudinally resilient, and a common operating mechanism for said arms and skids, whereby the same are moved in opposite directions in unison.

2. In an aeroplane, a pair of wheels, pivoted arms on which said wheels are mounted, a pair of skids pivoted on a common axis with said arms, struts engaged at one end with the free ends of said arms and skids, the struts engaged with the skids being longitudinally resilient, and a common operating mechanism for said arms and skids, whereby the same are moved in opposite directions in unison, said mechanism including a longitudinally reciprocable member having an operative engagement with the other ends of the said struts to move the same longitudinally of the aeroplanes.

3. In an aeroplane, a pivoted arm, a wheel mounted thereon, a skid pivoted at one end co-axially to the said arm, struts pivotally attached at one end to the free ends of said skid and arm respectively, a gear wheel having a pair of radial slots therein, studs slidable in said slots and having the opposite ends of said struts connected thereto, and a slidable rack bar engaged with said gear to rotate the latter, for the purpose specified.

4. In an aeroplane, wheels and skids, and a common operating mechanism for said wheels and skids adapted to raise and lower the same and to move said wheels and skids inversely in unison.

5. In an aeroplane, wheels and skids, and a common operating mechanism for said wheels and skids adapted to raise and lower the same and to move said wheels and skids inversely in unison, said means including struts connected to said wheels and skids, gears having radial slots, studs slidable in said slots and having the struts attached thereto, and a double faced rack engaging said gears.

In testimony whereof I have affixed my signature.

JOSEPH ARDO.