

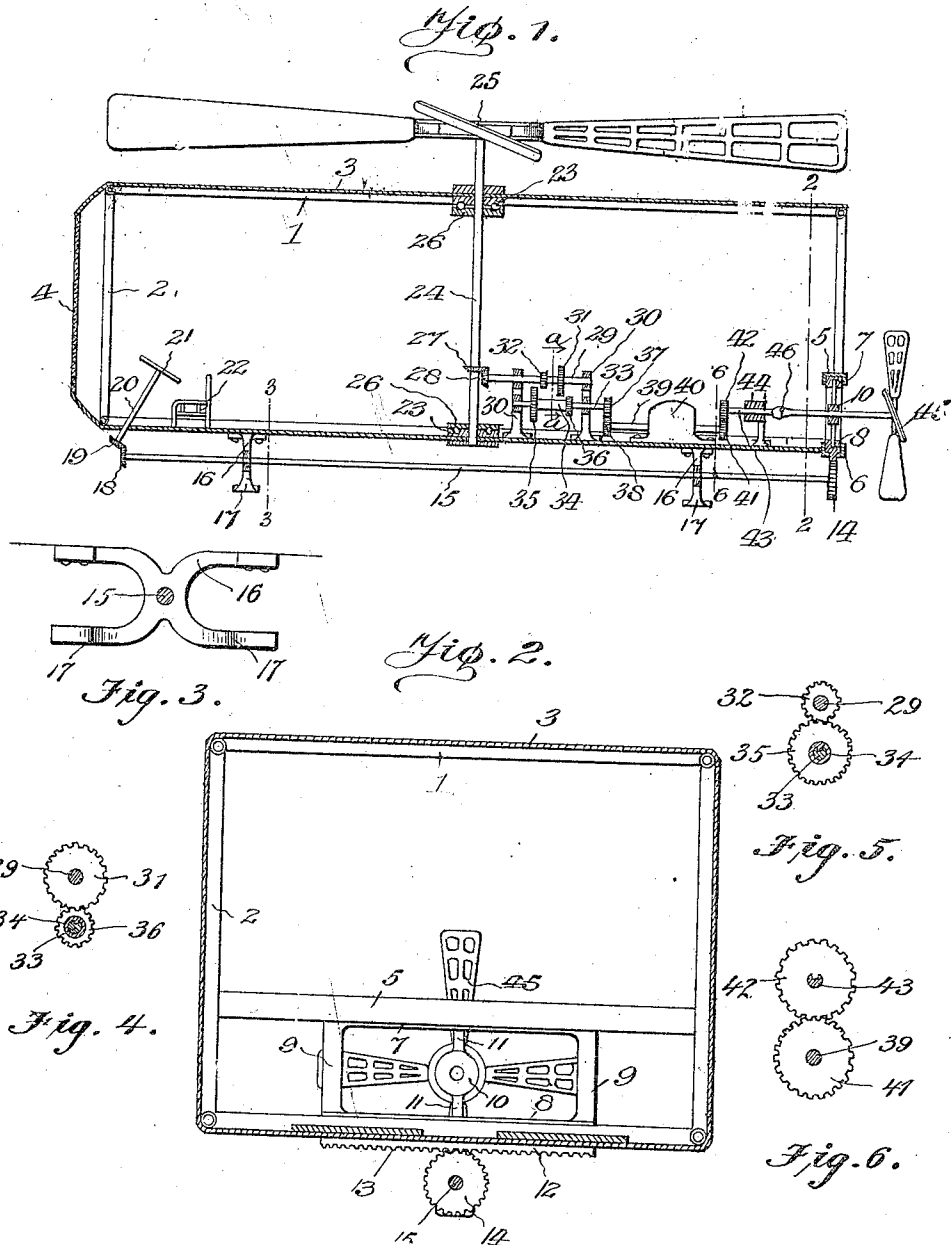
L. WINTERS & S. HOFSTETTER.

AIRSHIP.

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995,750.

Patented June 20, 1911.



WITNESSED
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UNITED STATES PATENT OFFICE.

LINCOLN WINTERS AND SAMUEL HOFSTETTER, OF FREEPORT, ILLINOIS.

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To all whom it may concern:

Be it known that we, LINCOLN WINTERS and SAMUEL HOFSTETTER, citizens of the United States, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Airships, of which the following is a specification.

Our present invention relates to flying machines, and more particularly to flying machines of that class known as helicopters, our object being to provide certain improvements in the lifting, driving and steering mechanisms whereby to promote more ready and efficient operation.

With this in mind our invention resides in the details of construction set forth in the accompanying drawing, in which—

Figure 1 is a central vertical section through an air-ship provided with our improvements. Fig. 2 is a cross-section there-through on the line 2—2 of Fig. 1. Fig. 3 is a fragmentary detail taken on the line 3—3 of Fig. 1. Fig. 4 is a detail section on line a—a of Fig. 1, looking in the direction of the arrows. Fig. 5 is a similar view looking in the opposite direction, and Fig. 6 is a detail section illustrating the driving gears in elevation.

Referring now to these figures, the frame of our improved machine may be constructed in any suitable manner, for instance by means of horizontal and vertical rods 1 and 2, of suitable material, and a covering 3 around these rods, constituting a top, sides and base, the forward end of the frame having a transparent section 4 in order that the helmsman may see ahead.

Extending transversely across the rear end of the frame, at its base, are upper and lower parallel channel members 5 and 6 respectively, within and between which is disposed a rectangular frame comprising upper and lower bars 7 and 8, and upright pieces 9, this frame supporting an intermediate bearing block 10 having vertical stems 11 swiveled in said upper and lower frame bars 7 and 8. The lower channel member 6 is provided with a longitudinal slot, and the lower frame bar 8 has a rib 12 extending downwardly through said slot and having a lower rack 13, with which engages the steering gear 14 mounted on the rear end of the steering shaft 15. This steering shaft 15 extends longitudinally beneath the frame, and is supported by bearings in the form of brackets

16, secured to, and depending from, the frame, and through which the shaft 15 extends, these brackets 16 having depending legs 17 below said shaft, for the purpose of supporting the ship when upon the ground. Upon the forward end of the steering shaft 15 is secured a beveled gear 18 with which meshes a similar gear 19 upon the lower end of the steering post 20 which extends upwardly within the frame and is provided with a hand wheel 21 immediately in front of the helmsman's seat 22.

Extending vertically through the frame, and through upper and lower transverse braces 23, is the shaft 24 for the lifting propeller 25 secured upon the upper end thereof above the frame, this shaft 24 having plates 26 secured thereon beneath each of the braces 23, and between which and said braces are disposed balls in races, in order to form bearings to take up the thrust of the shaft. Secured upon the shaft 24 is a beveled gear 27, with which meshes a similar gear 28 mounted upon a shaft 29 which extends through brackets 30 and is provided with large and small gears 31 and 32 respectively. The brackets 30 also support a counter-shaft 33 parallel with shaft 29, and on which is splined a sleeve 34, this sleeve carrying large and small gears 35 and 36 respectively, and being movable to engage its said gears 35 and 36 with the gears 32 and 31 respectively, of shaft 29. Upon the end of shaft 33 is secured a gear 37, in mesh with a gear 38 mounted upon one end of the motor shaft 39 extending from the motor 40. In this manner the speed of rotation of shaft 24 may be controlled by movement of sleeve 34 and engagement of the different pairs of gears. The opposite end of the motor shaft 39 is provided with the gear 41, adapted to be engaged by a gear 42 splined upon the inner end of the horizontal propeller shaft 43. This shaft 43 extends through a bracket 44 and also through the swiveled bearing block 10 before described, and carries upon its upper end, the driving propeller 45, and is further provided, between bracket 44 and bearing block 10, with a universal joint 46.

From the foregoing it will be seen that the connections, while being simple and inexpensive, will effectively perform the functions assigned thereto. It will be at once apparent that the speed of the lifting propeller may be readily controlled, and that

the driving connections to the driving propeller may be readily established and disengaged, by moving the gear wheel 42. It will also be seen that, by means of the universal joint 46, the outer portion of shaft 43, and the propeller 45, may be swung at an angle by means of the steering connections first described, whereby to form a very simple propeller and rudder in one.

10 We claim:

1. In an air-ship of the helicopter type, the combination of a frame, a vertical shaft mounted therein, a lifting propeller carried by said shaft, a horizontal shaft mounted in said frame, a driving propeller secured upon the latter shaft, a motor, driving connections between the motor and the vertical shaft embodying means to control the speed of rotation of said shaft, driving connections between the motor and the horizontal shaft, embodying a movable element to establish and disrupt said connections, said horizontal shaft having an intermediate universal joint, a transversely movable frame in which the outer portion of said horizontal shaft is mounted, and steering connections for moving said movable frame whereby to form a rudder of the driving propeller.

30 2. In a air-ship of the helicopter type, the combination of a frame, a vertical shaft mounted therein, a lifting propeller secured upon said shaft, a horizontal shaft having an intermediate universal joint, a motor, connections between said motor and the said horizontal and vertical shafts, upper and

lower transverse channel pieces extending across the rear end of the frame, the lower one of which is provided with a longitudinal slot, a rectangular frame mounted to slide in said channel pieces and provided with a lower rib extending through the said longitudinal slot, and having a rack upon its lower face, a bearing member swiveled vertically in said latter frame and through which the outer portion of the horizontal shaft extends, and steering connections, embodying a steering shaft having a gear upon its rear end in engagement with the rack face of said rib.

3. In an air-ship of the helicopter type, the combination of vertical and horizontal shafts, propellers carried thereby, means to drive said shafts, said horizontal shaft and its said driving propeller, being movable so as to form a rudder, and steering connections for moving said shaft propeller embodying a steering shaft projecting longitudinally beneath the frame, and brackets depending from the frame and forming bearings for said steering shaft, and having portions thereof projecting beneath the said steering shaft and forming supports for the ship when it is upon the ground.

In testimony whereof we affix our signatures in presence of two witnesses.

LINCOLN WINTERS.
SAMUEL HOFSTETTER.

Witnesses:

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