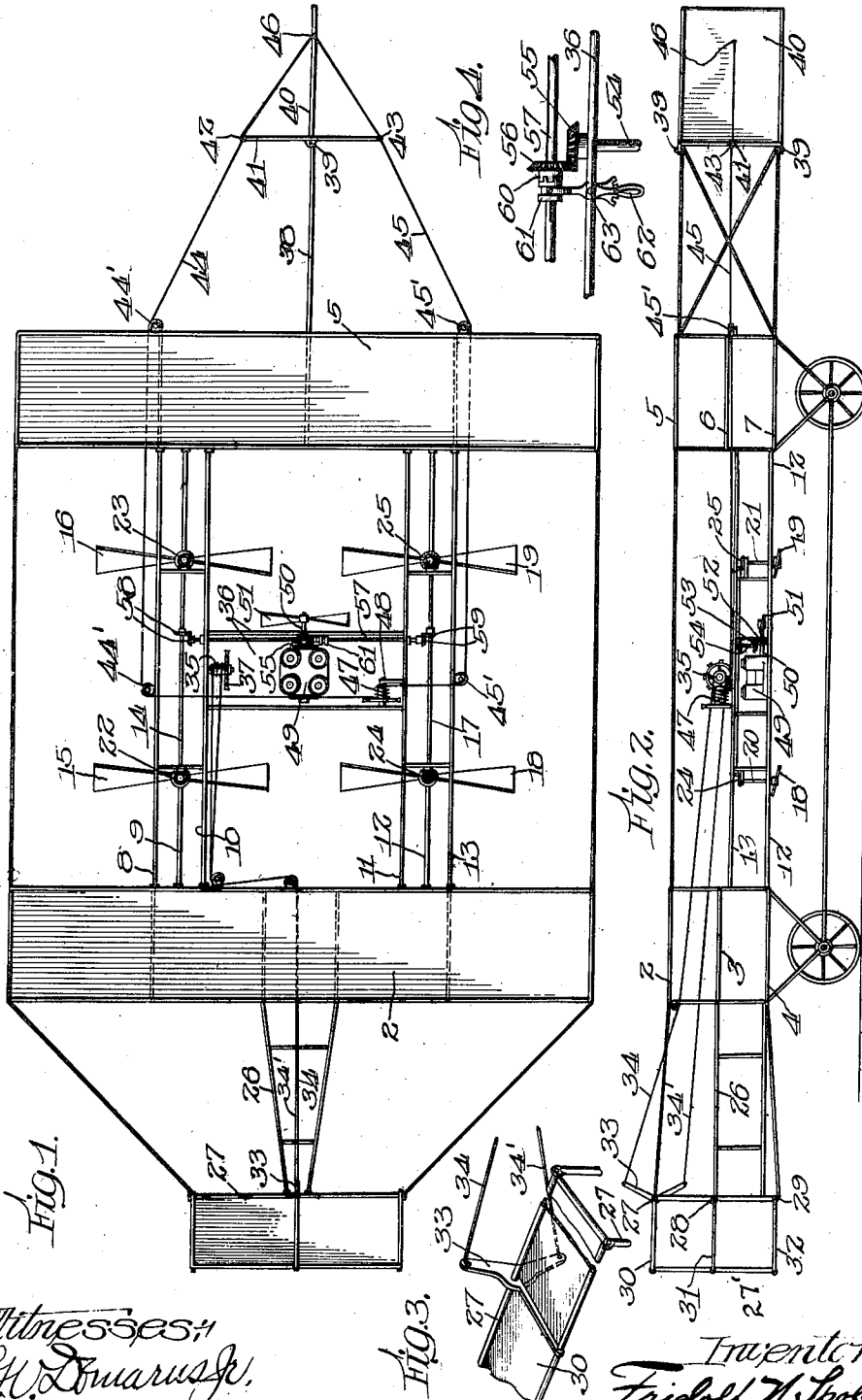


F. N. SPOLANDER.
AERIAL CRAFT.

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UNITED STATES PATENT OFFICE.

FRIDOLF N. SPOLANDER, OF CHICAGO, ILLINOIS.

AERIAL CRAFT.

1,012,927.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRIDOLF N. SPOLANDER, a subject of the King of Sweden, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Aerial Craft, of which the following is a specification.

My invention relates to air-ships and has particular reference to the aeroplane type thereof.

The object of the invention is to provide an improved construction of this type to better and more quickly effect the rising movement, to accomplish this within a narrower field than heretofore, to better balance the ship, to increase the plane surfaces and to place the loads of engine, passenger or passengers, driving shafts and propellers intermediate, or between, the planes.

With the above-named general objects in view my invention consists in the novel construction, combination and arrangement of parts hereinafter described in detail, illustrated in the accompanying drawing and incorporated in the appended claim.

In the drawing—Figure 1 is a plan view of an aerial craft embodying my invention. Fig. 2 is a side elevation thereof, Fig. 3 is a perspective detail view representing the forward steering planes broken away. Fig. 4 is a side elevation of the central driving mechanism, broken away, and same is shown on an enlarged scale.

In the several views 1 and 2 is shown a ship having a double set of carrying planes, between which planes are arranged the passenger's platform, the propellers, their shafts, the engine and all the heavy parts, in such a manner as to properly balance the weights between the planes. The forward planes consist of a series of three superposed planes 2, 3 and 4, and the rear series consist of similarly arranged planes 5, 6 and 7. These forward and rear plane-sets are connected by a suitable frame-work such as rods 8, 9 and 10 on the one side and rods 11, 12 and 13 on the other side, which may be trussed, braced, or strengthened in any suitable manner, and the particular construction of which is not material for the purpose of the present invention.

Arranged in a vertical plane between the rods 8 and 10, and parallel thereto is a shaft 14 which has bearings mounted on the intermediate rod 9. This shaft drives a pair

of propellers 15 and 16 which are arranged horizontally on short shafts such as the shafts 20 and 21 in Fig. 2, the shafts 20 and 21 being driven by bevel gears 22 and 23 keyed, respectively, to the ends of the shaft 14 and the upper ends of the shafts 20 and 21. At the opposite side, or between the rods 11 and 13, is a second shaft 17 which corresponds to the shaft 14 on the first-named side, and is similarly arranged by having bearings on the intermediate rod 12. Bevel gears 24 and 25 on the shaft 17 and on vertical shafts 20 and 21 drive propellers 18 and 19 on the lower ends of the latter shafts, as shown in Fig. 2.

Rigidly secured, in any suitable manner, to the forward planes 2, 3 and 4, is a forwardly projecting frame or truss 26 which carries the vertical steering planes 30, 31 and 32. These are pivotally mounted at, respectively, 27, 28 and 29 on the forward end of the frame or truss 26. A bell-crank lever 33 is keyed to the pivot shaft 27 of the upper plane 30 and the forward edges of the planes 30 to 32 are pivotally connected to one or more vertical rod or rods 27' whereby the pivotal movement of the upper plane imparted to it by the bell-crank lever 33, is transmitted to the other two planes 31 and 32 of the series. The lever 33 is operated by means of a rope or cable having an upper run or leg 34 connected with the upper end of the lever 33 and a lower leg or run 34' connected to the lower end of said lever. The middle portion of the cable is wound on a drum 35 mounted on a passenger's or driver's platform 36. The drum is rotated to swing the lever 33 in either direction by means of a handle or crank 37.

From the rear set of planes 5, 6 and 7, is projected a frame, truss or tail-piece 38 to which at 39, 39 is pivoted a vertically disposed rudder 40 which is provided with a cross-bar 41. A steering rope or cable with runs 44 and 45 has its ends secured to the rudder at 46 and to the ends 42 and 43 of the cross-bar. This rope or cable passes over pulleys 44' and 45' on the intermediate plane 6 and the frame-rods as shown in Fig. 1. This rope, like the rope 34 and 34' is wound on a drum 47 rotated by a crank 48 to swing the rudder.

49 represents the engine mounted on the middle of the platform 36.

50 is the engine driving-shaft carrying the usual vertically disposed rudder 51 for

propelling the craft forwardly. On the engine-shaft 50 is keyed a bevel gear 52 meshing with a bevel gear 53 keyed to a short vertical shaft 54 shown on an enlarged scale in Fig. 4 with the bevel gear 53 on its lower end (Fig. 2) broken away. On the upper end of said vertical shaft 54 is keyed a bevel gear 55. The latter is in mesh with a bevel gear 56 which is loosely mounted on a transverse shaft 57 driving both the propeller shafts 14 and 17 by means of pairs of bevel gears 58 and 59 on, respectively, the ends of the shaft 57 and the shafts 14 and 17, one member of each pair of gears 58 and 59 being keyed to the propeller shaft and the other member keyed to one end of the transverse shaft 57. On the gear 56 loosely mounted on the transverse shaft 57, is a clutch-member 60 and adjacent to said member a companion clutch member 61 is splined so that it may be thrown into or out of engagement with the clutch-member 60 to communicate the motion of the gear 56 to the transverse shaft and herewith the lifting propellers 15, 16, 18 and 19. The clutch-member 61 is moved into or out of engagement with the member 60 by means of a lever 62 fulcrumed at 63 on the platform 36 a part of the edge of which is shown in Fig. 4. When the clutch-member 61 is engaged with its companion member 60 the motion of the vertical shaft 54, driven by the propeller shaft 51, will be communicated to the lifting propellers and all of the five propellers shown will then be in motion to lift the vessel and at the same time start its forward gliding movement which latter movement is designed to aid the lifting force of the four lifting propellers

while the vessel is rising. After the desired height has been reached the lever 62 will be operated to throw out the clutch-member 61 and stop the lifting propellers. The battery of lifting propellers is made relatively very strong for the purpose of not only causing a nearly vertical rise from a limited inclosure or field but to provide for a gentle drop in alighting. The lifting propellers are, as shown in Fig. 2, elevated from the ground by means of the usual carrying wheels.

Having described my invention, I claim as new and desire to secure by Letters Patent—

In combination, a plurality of forward superposed and rear superposed planes, a frame-work of rods connecting said series of forward and rear planes, an operator's platform connected at its ends, and spanning, the space between said rods midway between said forward and rear planes, an engine and propeller for forward propulsion supported on said platform, a series of lifting propellers and driving shafts therefor supported on the rods connecting said forward and rear planes, means forward and aft for steering the vessel, and flexible connections with said means operable from the operator's platform, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRIDOLF N. SPOLANDER.

Witnesses:

M. C. ALLEN,
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