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AIRSHIP.

APPLICATION FILED SEPT. 15, 1909.

987,624.

Patented Mar. 21, 1911.

3 SHEETS—SHEET 1.

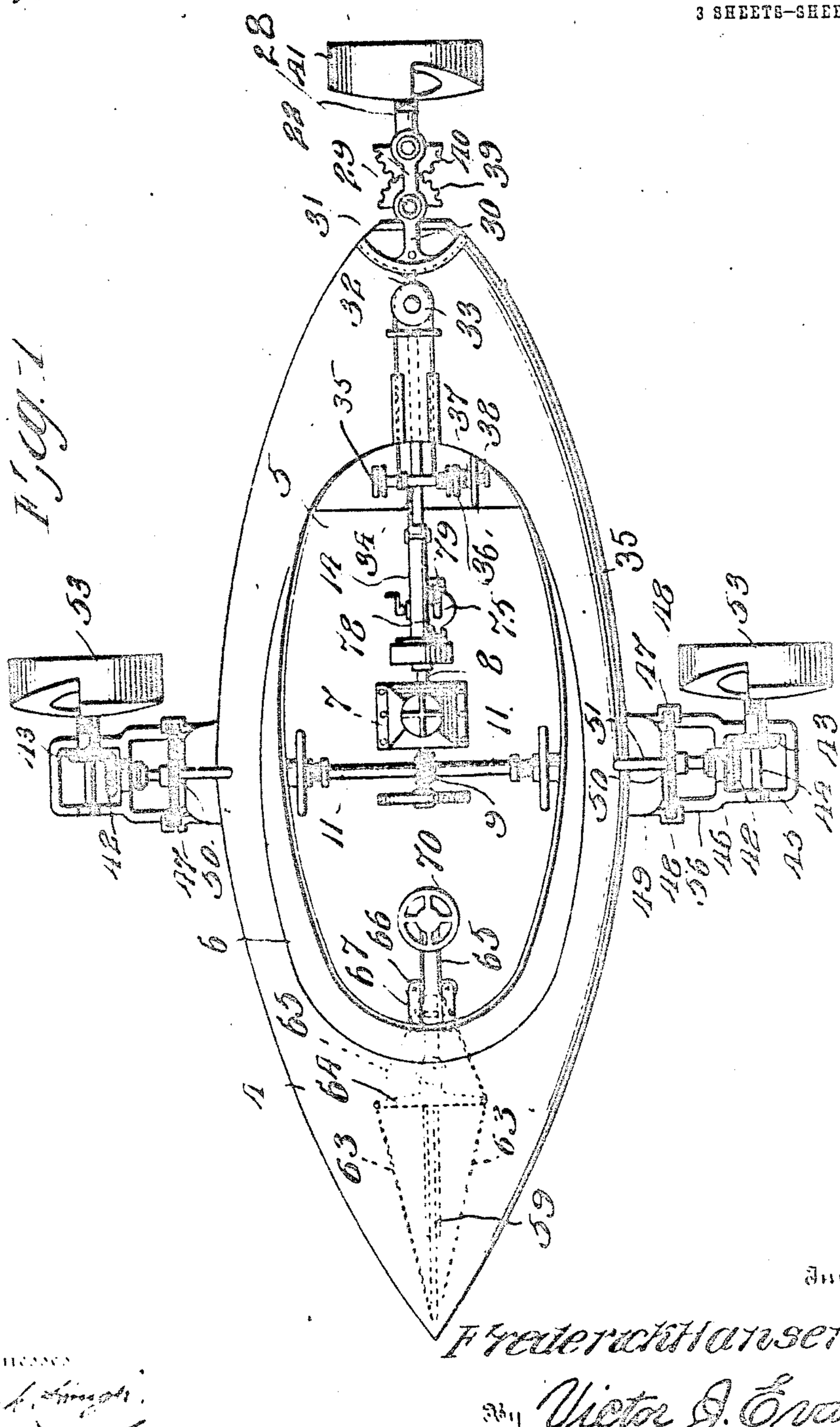

Fig. 1.

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3 SHEETS—SHEET 2.

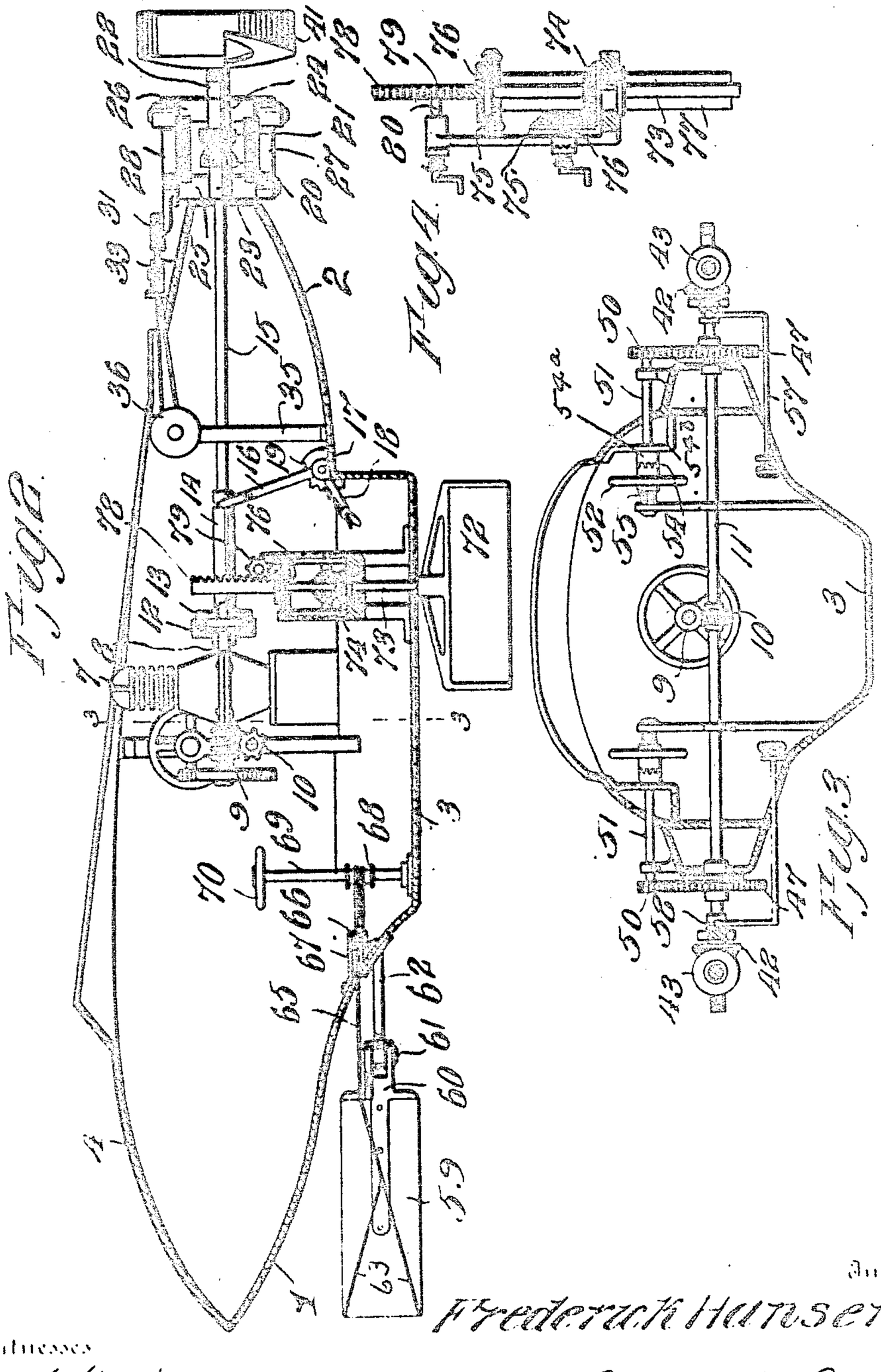

Fig. 2.

Fig. 3.

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Fig. 5.

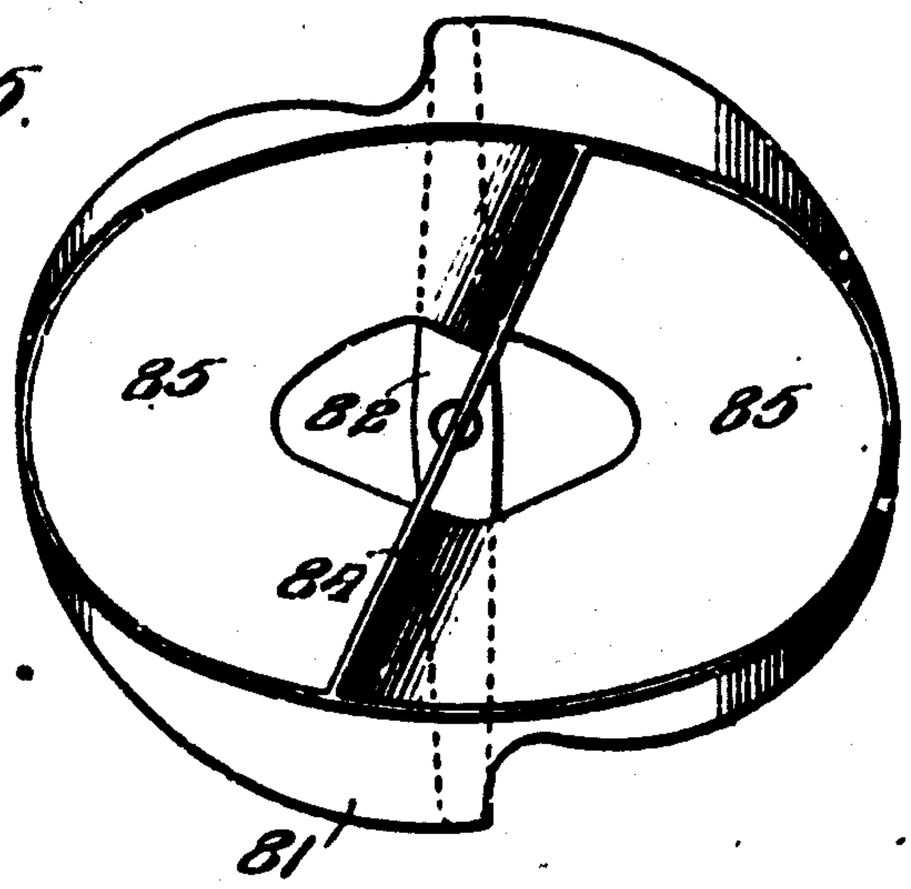


Fig. 7.

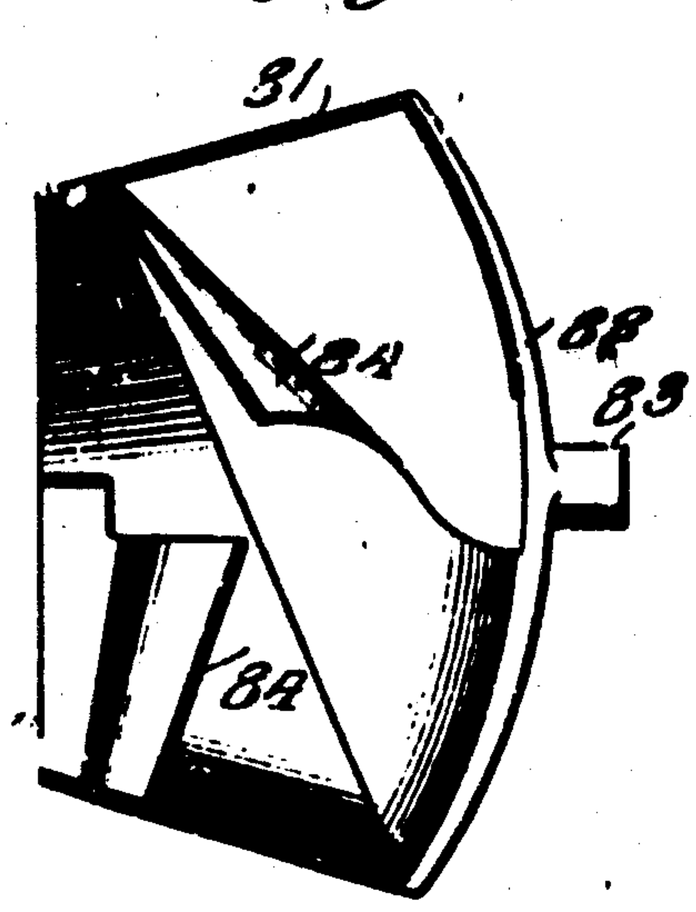
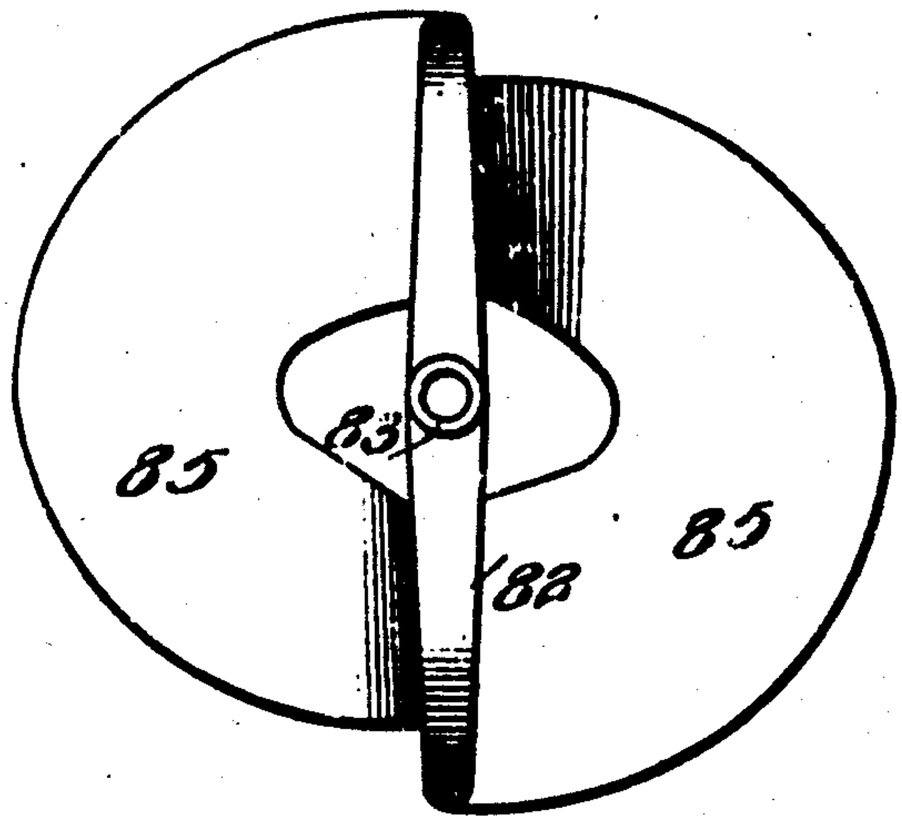


Fig. 6.



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AIRSHIP.

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To all whom it may concern:

Be it known that I, FREDERICK HANSEN, 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 Airships, of which the following is a specification.

This invention relates to air ships or flying machines, the object of the invention being to provide a novel form and construction of flying machine including driving or propelling mechanism of a novel character and arrangement, a portion of the propelling mechanism being utilized for the purpose of steering or directing the same in the desired course or line of travel.

The machine also embodies means for setting or posing and maintaining the equilibrium of the machine, the entire mechanism being under the immediate control of the driver or operator who occupies the cabin of the mechanism which forms an extension on the bottom of the main body of the machine and communicates with the interior of the hull thereof.

With the above and other objects in view the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a plan view of an air ship embodying the present invention. Fig. 2 is a vertical longitudinal section through the same. Fig. 3 is a vertical cross section through the machine on a line 3—3 of Fig. 2. Fig. 4 is a detail vertical cross section showing the means for operating the bottom fin. Fig. 5 is a rear elevation of one of the propellers. Fig. 6 is a front elevation of the same. Fig. 7 is a diametrical section through the propeller.

The body of the hull of the machine is substantially in the shape of a boat and in fact is designed to rest upon a body of water and be propelled while resting in the water as well as in the air and to that end the hull comprises a forwardly and upwardly inclined bow portion 1, a rearwardly and upwardly inclined rear counter or stern portion 2 and a depressed cabin portion 3 located between the bow and stern and adapted to accommodate the operator and crew in addition to the motor or engine and driving mechanism hereinafter described. By preference the upper portion or deck 4 is provided with an opening 5 which is partially or wholly surrounded by a coaming 6.

Mounted about centrally within the hull is an engine or motor 7, 8 designating the engine shaft which extends longitudinally of the hull in line with the propeller shaft hereinafter described. The engine shaft 8 is also provided at one side of the engine with a worm 9 which meshes with and drives a pinion 10 on a cross shaft 11 which extends transversely on the boat and is designed for driving the propellers arranged at opposite sides of the boat and hereinafter more particularly referred to. To the rear end of the engine shaft 8 there is secured one member 12 of a clutch, the other member 13 of which is secured to the forward end of a sleeve 14 having a feathered connection with the forward section 15 of the main longitudinal propeller shaft. The sleeve 14 is adapted to slide lengthwise on the shaft 15 by means of a shifting fork or lever 16 fulcrumed at 17 and provided with a thumb latch lever 18 the latch of which engages a gear segment 19 as shown in Fig. 2.

At its rear extremity the section 15 of the propeller shaft carries a cone-shaped pinion 20 which meshes with a corresponding cone-shaped pinion 21 on the forward extremity of the rear section 22 of the propeller shaft. The two sections 15 and 22 of said propeller shaft are mounted respectively in bearings 23 and 24 on a jointed frame embodying the forward stationary upright bar 25 and the rear upright swinging bar 26, the last named bar 26 being connected by links 27 and 28 to the opposite ends of the forward bar 25. By reference to Fig. 1 it will be seen that one of said links is in the form of a lever which is fulcrumed at 29 on the end of the bar 25 and is provided with a forwardly extending arm 30 having an arcuate cross head or steering segment 31 to which are connected cross steering ropes or cables 32 which pass around opposite sides of a pulley 33 and lead forward within the hull of the machine where they are wrapped in opposite directions around a steering shaft 34 journaled in suitable bearing standards 35. The shaft 34 is controlled and operated by a hand steering wheel 36 feathered to slide

thereon and rotate therewith and having a clutch face 37 which is adapted to be thrown into and out of engagement with a corresponding clutch face on the bracket 35 lock the wheel and shaft against rotation, as shown in Fig. 1, the wheel 36 being adapted to be moved outward for release in a direction lengthwise of the shaft 34 against the tension of a spring 38 which operates to maintain the clutch faces referred to in engagement with each other.

The upright bars 25 and 26 are provided on their adjacent sides with upper and lower sets of gear segments 39 and 40 which are in constant mesh with each other and which serve to maintain the proper relation between the bars 25 and 26 and the pinions 20 and 21. The teeth of these pinions are so formed that said pinions are in constant driving mesh with each other regardless of the angle of the rear section 22 of the propeller shaft relatively to the section 15 of said shaft. This enables the steering propeller 41 to be turned to any desired angle by means of the steering connections above described without disturbing the driving relations of the sections of the propeller shaft.

The transverse shaft 11 passes through suitable bearings in opposite sides of the hull and carries at each extremity a bevel wheel 42 which meshes with a corresponding bevel wheel 43 on a side propeller shaft 44 extending at right angles to the shaft 11 as shown in Fig. 1. The shaft 44 is mounted in a swiveled tilting frame 45 which also has a bearing 46 for the shaft 11. To the inner end of the frame 45 is secured a spur wheel 47 which is adapted to turn within U-shaped guides or keepers 48 on a bracket 49 extending laterally from the adjacent side of the hull. Meshing with the wheel 47 is a pinion 50 which is mounted on a shaft 51 parallel to and arranged above the shaft 11, the shaft 51 extending inwardly through the side of the hull and being provided with an operating hand wheel 52 by means of which the operator may turn the shaft 51 and pinion 50 and also turn the wheel 47 for the purpose of varying the angularity of the frame 45 and correspondingly varying the pitch or angularity of the shaft 44 and the propeller 53 which is mounted fast on said shaft 44. The wheel 52 is feathered to slide upon and rotate with the shaft 51 and is provided with a clutch face 54 to engage a corresponding clutch face 54a on a bracket member 54b secured to the hull or frame of the vessel. Said wheel is adapted to be moved inwardly and withdraw the clutch faces from engagement against the tension of a spring 55, which normally holds the clutch members interlocked to maintain the wheel and shaft 51 in adjusted position against casual movement. Upon the release of the wheel 52 from the clutch member 54a the shaft 51 may be turned for the purpose above described.

Each of the gears 42 is provided with a sleeve 56 having a feathered engagement with the shaft 11 and adapted to slide lengthwise thereon so that the wheel 42 may be thrown into and out of engagement with the wheel 43 to provide for stopping and starting the side propellers 53. The gear 42 and its sleeve 56 may be shifted by means of a hand operating rod 57 having a terminal fork which engages a groove 58 in the sleeve 56 as shown in Figs. 1 and 3. The operator may thus throw either or both of the side propellers into or out of operation and thereby control the direction of movement of the machine.

At the front of the machine there is arranged a vertical steadying plane or rudder 59 mounted on a rearwardly extending arm 60 having a pivotal joint at 61 with a bracket arm 62 extending forward from the front of the hull. Stays 63 extend from the front of the plane 59 backward to a cross head 64 as shown by dotted lines in Fig. 1 from the extremities of which ropes or cables 65 extend rearward between guide pulleys 66 on brackets 67 to and are wound in reverse directions around a drum 68 on a shaft 69 provided with a hand wheel 70. This enables the steadying plane to be shifted laterally to one side or the other as may be found expedient in order to assist in steadying and steering the machine.

72 designates a bottom fin which is arranged under the body of the vessel and is provided with an upwardly extending stem 73 which passes through a bevel gear 74 having a splined engagement therewith. The gear 74 meshes with a corresponding bevel gear 75 on a hand operated shaft 76 by turning which any desired angle of obliquity of the fin 72 may be obtained to one side or the other as may be desired. The stem 73 is connected at its upper end to a cross head 75 which is recessed to receive a head 76 on the upper extremity of the stem 73, whereby said stem may be turned in the cross head 75. The cross head is movable up and down between parallel guides 77 and projecting upward from said cross head is a rack bar 78 which meshes with a pinion 79 mounted on a hand operated shaft so that by turning the shaft 80, the fin 72 may be elevated and depressed as may be found expedient to give greater or less pressure to the machine on the current of air through which the machine passes. The up and down adjustment of the fin 72 does not interfere with the operativeness of the mechanism for turning the fin 72 partially around a vertical axis.

Each of the propellers 41 and 53 is constructed by preference as shown in Figs. 5 and 7 inclusive in which it will be observed

that the propeller comprises an outside frusto-conical casing or rim 81 combined with a diametrical bar or brace 82 at the front, which is formed with a centrally located hub 83 bored to receive the propeller shaft. At the opposite or rear side, the propeller is provided with a diametrical bar or web 84 arranged at an angle to the front cross bar 82 as shown in Fig. 5 and extending between the bars 82 and 81 are two blades 85 which have a pitch which gradually increases from the cross bar 82 to the diametrical bar 84. The air is gathered in immediately adjacent to the front cross bar 82 and is then caught by the blades 85 and swept rapidly rearward toward the diametrical bar 84 at the edge of which it is liberated from the propeller, the air in passing through the propeller being confined between the blades 85 and the frusto-conical rim or shell 81 of said propeller.

Having thus described the invention what is claimed as new is:—

1. In an air ship, the combination with a machine frame, and a motor thereon, of a propeller shaft geared to the motor shaft and embodying a front section and a rear section, a swinging frame mounted to turn on a vertical axis and embodying normally alined bearings for the sections of the propeller shaft, cone-shaped gears on the adjoining ends of the shaft sections adapted to remain in mesh under varying angular relations of the shaft sections, gear segments serving to maintain the meshing engagement between said pinions, and means for swinging the frame in which the propeller shaft sections bear, whereby one section of the propeller shaft may be swung to any desired angular relation to the other propeller shaft section.

2. An air ship embodying a main frame, a motor mounted thereon, propelling mechanism geared to the motor, a normally vertical fin located beneath the main frame, means for varying the angle of said fin relatively to the longitudinal axis of the main frame, and means for elevating and depressing said fin relatively to the main frame.

3. An air ship comprising a main frame, a motor thereon, a propeller shaft geared to the motor and a propeller mounted on said shaft and embodying a hollow frusto-conical rim or outer shell, a cross bar extending diametrically across the front of the rim, a cross bar extending diametrically across the rim at the rear edge thereof at an angle to the first-named cross bar, and a plurality of spirally disposed blades each connected at one edge to said front cross bar and at the opposite edge to said rear cross bar.

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

FREDERICK HANSEN.

Witnesses:
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J. J. COUGHLIN.