April 6, 1926. 1,579,656

A. J. HARPSTRITE

AIR, LAND, AND WATER CRAFT

Filed April 28, 1925 3 Sheets-Sheet 1

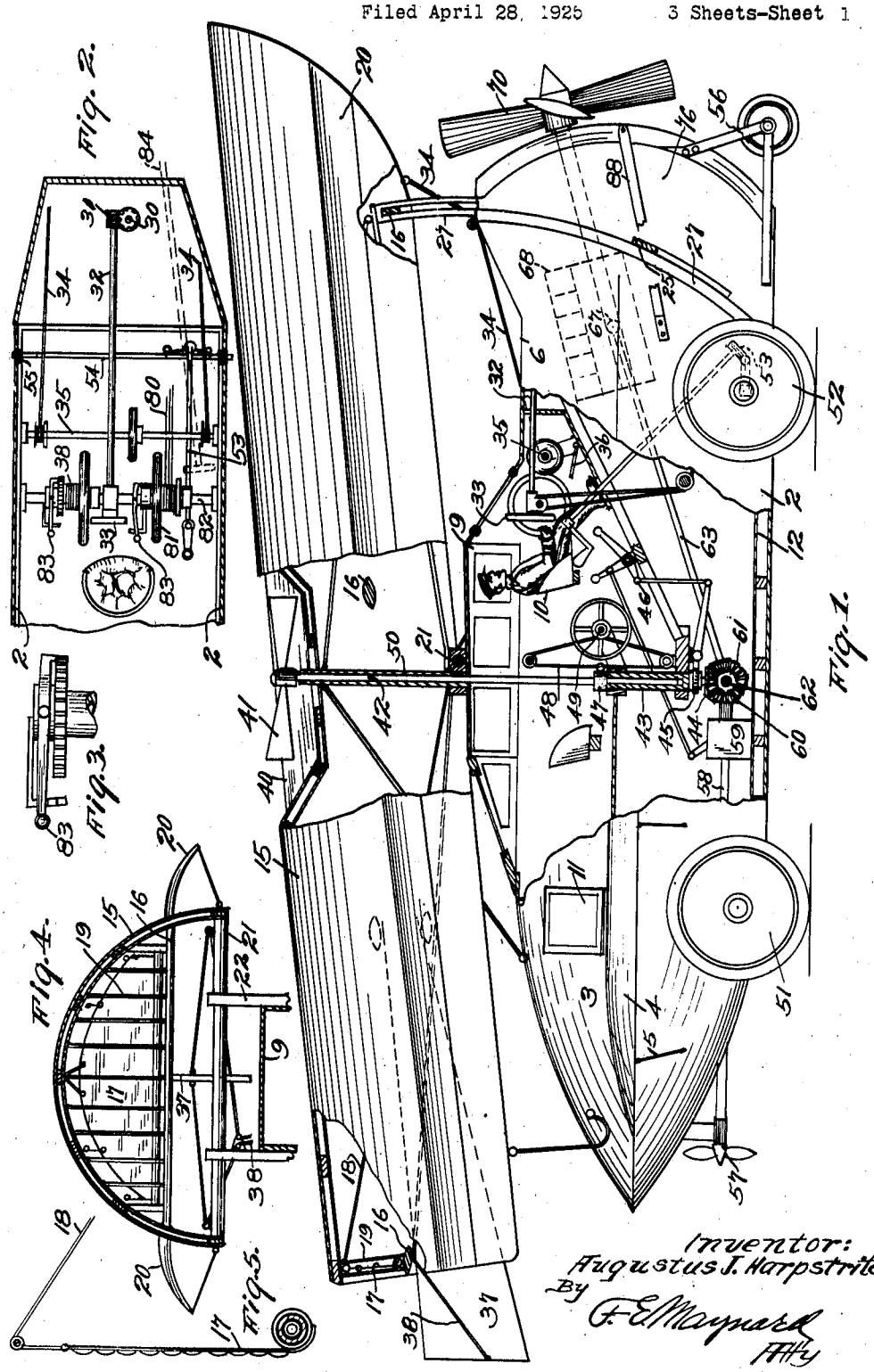


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Inventor:
Augustus J. Harpstrite
By F. E. Maynard
Atty

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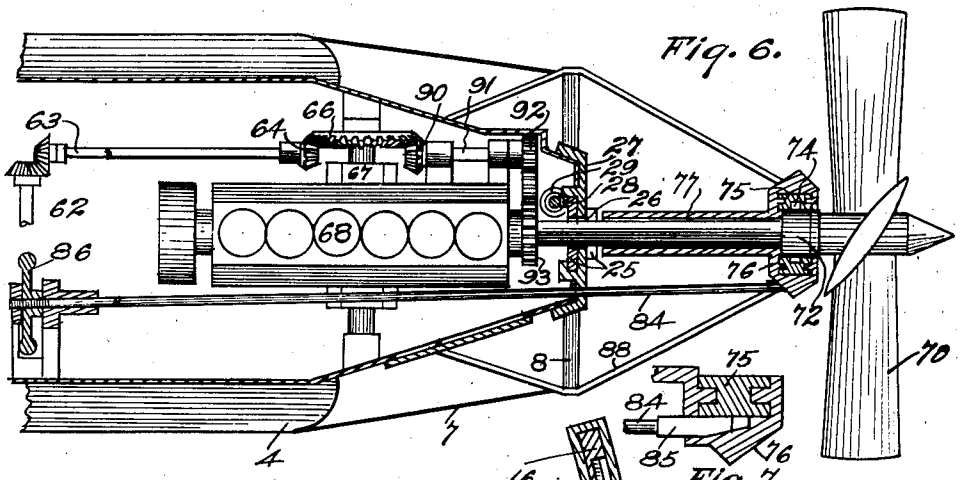


Fig. 6.

Fig. 7.

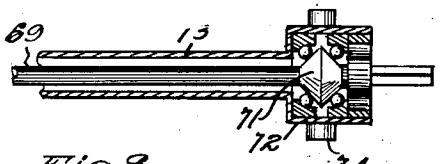


Fig. 8.

Fig. 9.

Inventor:
A. J. Harpstrite;
By A. E. Maynard
Atty

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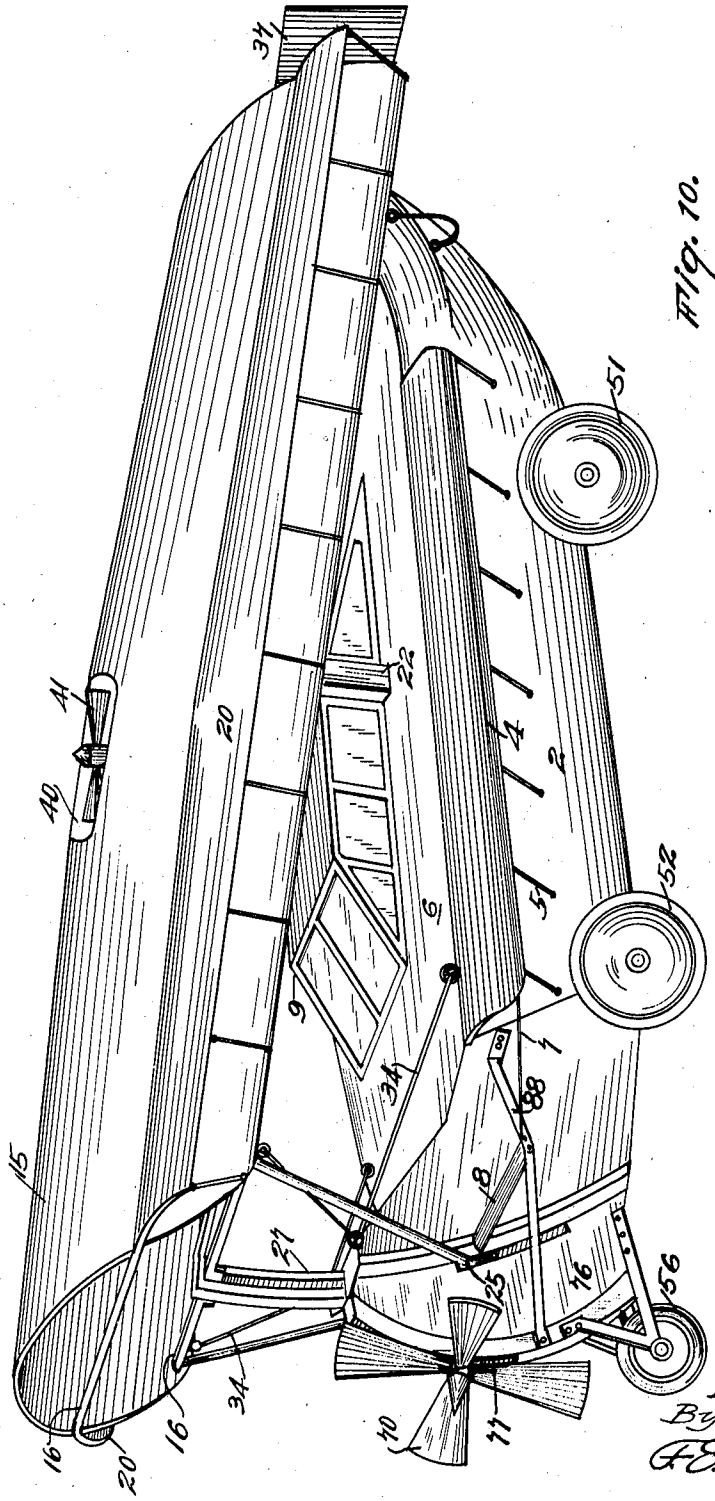


Fig. 10.

Inventor:
A. J. Harpstrite;
By
F. E. Maynard,
Atty.

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UNITED STATES PATENT OFFICE.

AUGUSTUS J. HARPSTRITE, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FREDERICK A. HARPSTRITE, OF LOS ANGELES, CALIFORNIA.

AIR, LAND, AND WATER CRAFT.

Application filed April 28, 1925. Serial No. 26,482.

To all whom it may concern:

Be it known that I, AUGUSTUS J. HARPSTRITE, a citizen of the United States, and resident of Los Angeles, county of Los Angeles, State of California, have invented new and useful Improvements in an Air, Land, and Water Craft, of which the following is a specification.

This invention relates to an air, land and water craft.

An object is to provide a craft which may fly, ride on water and run on land, and has a tilting main flying plane and includes a body provided with a tractor air propeller having angular adjustment in the bow of the body. An object is to provide a lock for securing the propeller in adjusted angle. Another object is to provide a motor pivotally mounted as nearly on its center of gravity as possible and having its shaft on the axis of the boat and carrying the tractor propeller.

Other objects and advantages will be made manifest in the following specification; modifications, variations and adaptations being deemed within the scope of the invention.

Figure 1 is a side elevation of the craft, partly broken away; the tractor propeller and plane being tipped up for rising.

Figure 2 is a plan of the controls in the cock-pit. Figure 3 is a detail of a control latch. Figure 4 is a transverse section of the plane. Figure 5 is an edge view of the air anchor or checking curtain. Figure 6 is a plan and section showing the motor and the tractor propeller. Figure 7 is a detail showing the propeller locking bolt. Figure 8 is a detail of the drive shaft bearing. Figure 9 is a vertical section of the prow, showing the plane and propeller adjusting slides. Figure 10 is a perspective of the craft.

The craft comprises a boat body having side wall 2 joining a sloping deck 3 having rigid side wings 4 braced at 5 and having tension lines 7 attached to a crossbeam 8 at the prow. This has a foredeck 6 in front of a pilot transom 9 from which the pilot has a clear view while occupying the seat 10.

An inner floor 12 forms tanks for carrying multiple supplies of fuel, oil and water, so that should one tank spring a leak, the other has a safety reserve.

Watertight doors and covers 11 for manholes are provided where access to interior is desired.

To obtain speed in flight, and also increase safety, an elongated, tunnel-shaped top, main flying plane 15, of approved structural embodiment to reduce air resistance, is provided. The skeleton includes substantial cross-beams 16 on the endmost of which is arranged a rollable air-anchor or transverse curtain 17 having leashes 18 running to the pilot's controls in the cock pit. Bars 19 form front and rear stays for the extended curtain when it is used to retard flight. Stabilizing, lateral wings 20, curving down, are fixed along the main plane, and spring outward therefrom well above its side edges, and from the ends of crossbeams 16. The plane 15 is mounted, rearwardly of its longitudinal center, on an axle 21 journaled in posts 22 extending up from the boat.

Positive means are provided to vary the angle of incidence, and auxiliary control means are provided in case the former means give way. The positive means includes a slide 25, slotted up or down at 26, and being slidable in a bow standard 27 which is curved concentric to the axle 21, as is slide 25. The latter is securely attached at its top to a cross-beam 16 of the plane 15, and has a rack 28 engaged by a gear 29 on a shaft 30 geared at 31 to a rod 32 extending back to the cock-pit and having a hand wheel 33. Thus the plane can be tipped up or down and held by the positive, non-reversing worm gearing.

The auxiliary plane control means includes a pair of reins 34 attached to the plane and to a winding shaft 35 which may have a brake 36.

Direction of flight is controlled by a tail rudder 37 whose lines 38 run down to the pilot.

The top of the plane is recessed at 40 to provide for retraction of an upper propeller 41 on a shaft 42 which is telescopic in a step-shaft 43 having a loose gear 44 and a clutch 45 for locking it on the shaft 43 at will, by the pilot, through lever 46.

A means for raising and lowering the splined shaft 42 is provided. This includes a collar 47 attached to an endless cable 48 secured on a spool shaft 49 back of seat 10. A guide tube 50 supports the shaft 43.

For land travel the boat has wheels 51—52, the latter having steering gear 53, including a link 54 in stuffing boxes 55 in the boat walls 2.

A nose wheel 56 is used to aid in landing.

A water propeller 57 has a shaft 58 with a clutch 59 to lock on a gear 60. This gear meshes with a gear 61 on the counter shaft 62 which is geared to a lateral shaft 63, Figure 6. Gear 44 engages with driver gear 61.

The shaft 63 extends upward and forward and has a pinion 64 engaging loose gear 66, mounted on a transverse trunnion 67 on which a motor 68 is mounted with its shaft on the axis of the boat, and is bodily tiltable.

The motor shaft 69 is extended forward and carries the tractor propeller 70.

This shaft 69 has an end thrust bearing 71 in a box 72, on the end of a tube 73, having pivot lugs 74 which are journaled in a curved slide 75 concentric on the trunnion center and moving in a rigid guide 76 slotted at 77 to receive the shaft tube 73. The slide has a tooth-rack 78 engaged by a pinion 79 by which the slide may be raised and lowered to change the angle of the propeller as to the boat. The motor tilts with the propeller.

Means are provided to shift the propeller slide by its pinion and here includes a cable 80 running back to a control wheel 81, loose on a solid brace 82. The control wheels may be held by latches 83.

A bolt 84 has a wedge head 85 to jam in against the propeller slide 75 and lock it after desired adjustment. The bolt has a nut-wheel 86 back in the cock pit.

Diamond bracing 88 is used to strengthen the various parts where necessary.

The loose gear 66 engages a pinion 90 on a stud-shaft 91 having a gear 92 driven by a driver 93 on the motor shaft 69. Thus the sun gear 66 is driven irrespective of the tilting of the motor.

It is understood that oil, fuel and water supplies may be led to the adjustable motor through flexible conduits.

What is claimed is:

1. A flying craft having a tractor propeller and a motor whose shaft carries the propeller, the motor being trunnioned, and means for tilting the motor and its shaft to change the angle of incidence of the propeller, and an independent locking means to hold the shaft at adjusted angle and having a remote control device for operating the locking means while the craft is in flight.

2. A flying craft having a motor trunnioned transversely and having its shaft extended, a propeller fixed on the shaft and a slide in which the shaft has a bearing and by which the angle of the shaft may be varied and a remote control, locking means to set the slide.

3. A flying craft having a tiltable motor with an extended shaft, a bearing close to the outer end of the shaft, a propeller on the outer end of the shaft and close to the bearing, a slide carrying the bearing, means combined with the slide to tilt the shaft and the motor, and a lock operative by a remote control for fastening the slide.

4. A flying craft having a motor whose shaft has a propeller, a mount for the motor, and means to tilt the motor and its shaft to change the angle of the motor propeller axis, a counter-shaft, and a drive means connecting the tiltable motor shaft and the counter shaft.

5. A flying craft having a motor whose shaft has a propeller, a mount for the motor, and means to tilt the motor and its shaft to change the angle of the motor propeller axis, a counter-shaft, and a drive means connecting the tiltable motor shaft and the counter shaft and a top propeller driven by the counter shaft.

6. A flying craft having a motor whose shaft has a propeller, a mount for the motor, and means to tilt the motor and its shaft to change the angle of the motor propeller axis, a counter-shaft, and a drive means connecting the tiltable motor shaft and the counter shaft and a water propeller driven by the counter shaft.

7. A craft having an air, tractor propeller, a motor having a shaft, a trunnion mount for the motor, a slide concentric to the trunnion, a bearing in the slide for the shaft and which is close up to the propeller to steady it, and means to adjust the slide and tilt the propeller, the shaft and the motor as a unit, said slide having a rack, gear means engaging the rack to actuate it, and a remote control lock for the slide.

8. A craft having an air, tractor propeller, a transversely trunnioned motor on whose shaft the propeller is mounted and tiltable therewith to vary its line of pull, a guide concentric to the trunnion of the motor, and a bearing movable along the guide and supporting the outer end of the propeller shaft close up to the propeller, and operating means connected to the slide whereby to

vary the shaft angle during flight, and remote control locking means to hold the shaft at adjusted angle.

9. A craft having a tractor propeller motor trunnioned in its bow and having its shaft extended through the nose of the bow, a prow shell having a slotted guide concentric to the motor trunnion, a slide in the guide and means for shifting the slide to vary the angle of the shaft, a shaft bearing member in the slide; said slide forming a closure for the shaft slot in the prow guide.

AUGUSTUS J. HARPSTRITE.