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HANDBOOK OF INSTRUCTIONS

FOR

18-FOOT SWAMP GLIDERS

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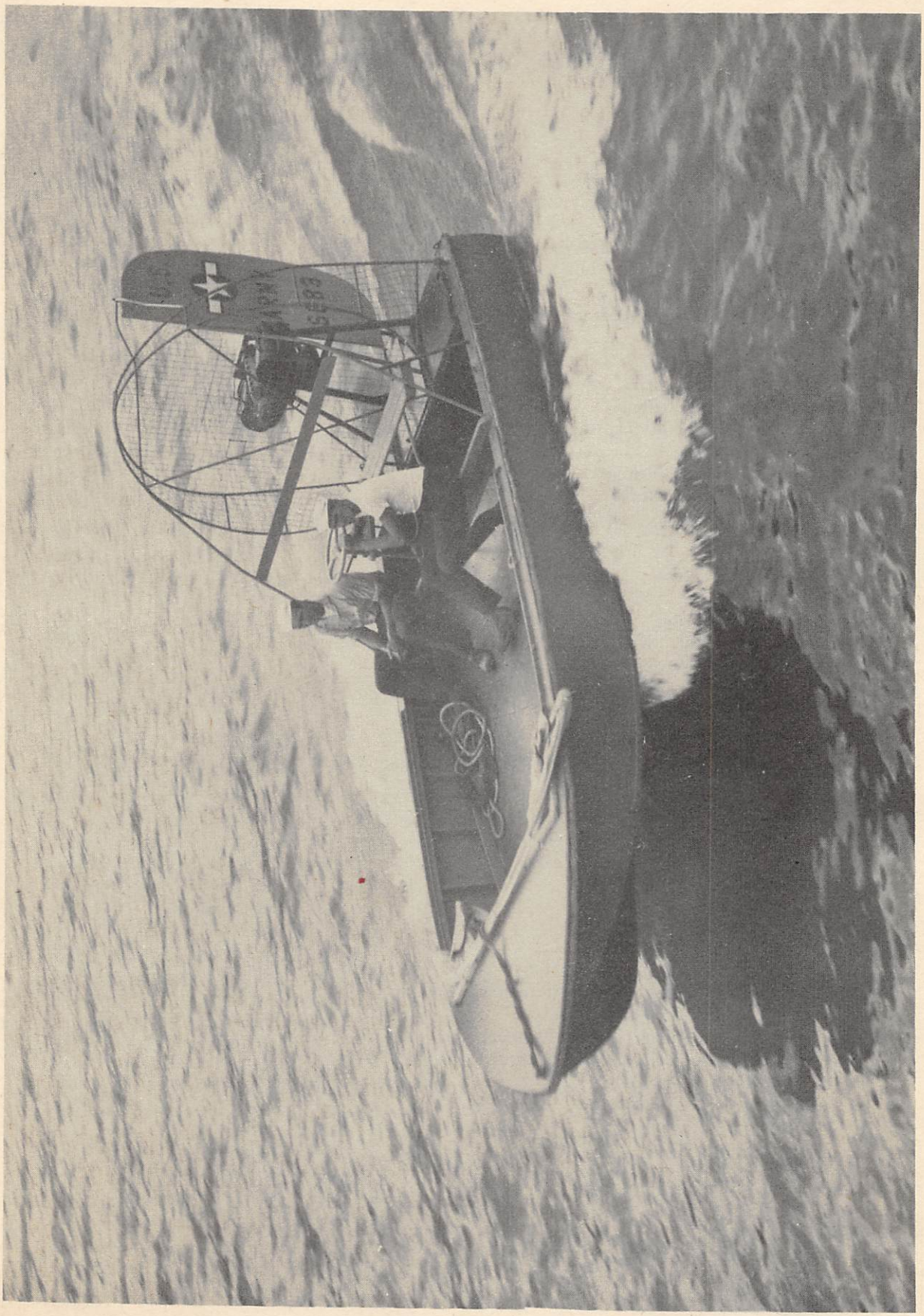


Figure 1—18-foot Swamp Glider, Design No. 415

SECTION I
DESCRIPTION

1. INTRODUCTION.

This Handbook covers the Operation, Service, and Maintenance of the 18-foot Swamp Glider, Design 415, used by the Army Air Forces for rescue operations. (See figure 1.) The text and illustrations were prepared from approved plans and data supplied by the manufacturer, Prigg Boat Works, Miami, Florida.

The swamp glider described in this Handbook is equipped with a Continental 0-170 Engine. Earlier models of the swamp glider are powered by Lycoming 4-cylinder, 75 horsepower engines. For operation of the Lycoming engine, consult the manufacturer's Handbook of Operating and Servicing Instructions.

2. GENERAL DESCRIPTION.

a. TYPE.—The 18-foot swamp glider, design 415, is intended for rescue use in shallow and grass-infested waters where conventional boats cannot be operated. It can also be operated in open deep water, but not for off-shore, long-range duty. The hull is the flat-bottomed, hydroplane type. The boat is powered by a Model 0-170 Continental aircraft engine which drives a 6-foot wooden aircraft propeller. It is steered by an air rudder mounted in the propeller's wash.

b. ARRANGEMENT.—The engine is mounted on a frame at the stern. The propeller extends forward from the engine and is shielded by a wire screen guard. The operator's seat extends across the boat in front of the propeller guard, above the gunwales, high enough to give the operator forward vision over average swamp grass. The steering wheel and engine controls are mounted in the center of the boat immediately forward of the seat. The entire boat is an open cockpit except for a small deck across the bow and another across the stern under the engine mount.

3. LEADING PARTICULARS.

Over-all length	18 ft 7 in.
Beam	7 ft 5 in.
Draft	3 in.
Displacement, loaded	1654 lb
Weight, complete	1125 lb
Speed, loaded	20 to 25 mph
Range	135 statute miles
Running hours at full power	4½
Carrying capacity	Crew of 2 and 5 litters

4. HULL.

(See figures 2 and 3.)

a. The keel is made of 1⅝ x 2¾-inch mahogany, rabbeted to receive the planking. The stem is of steam bent oak, rabbeted, the apron measuring 1 x 2¾ inches and the outside measuring ¾ x 1 inch.

b. The chines are of ⅞ x 2-inch rabbeted mahogany. The chine breast hook is sawn 2-inch mahogany, fastened with bolts.

c. Bottom and side framing are of ¾ x 2½-inch mahogany, spaced on 18-inch centers. The gussets are of ¼-inch marine plywood. They are fastened to both side and bottom frames across the entire width of the boat, forming watertight bulkheads between each frame up to the floor line.

d. The sheer clamp is ⅝ x 2-inch mahogany, bolted to the stem.

e. The transverse floor beams are ¾ x 1¼ inch mahogany, glued and screwed to the top of the gussets.

f. The cockpit coaming is ¾ x 1¼ inch mahogany.

g. The sheer rub-strip is ½ x 1½-inch marine plywood.

h. The splash board is ½ x 3-inch marine plywood.

i. The removable cockpit flooring and the decks are of ¼-inch marine plywood supported by ⅝ x 2-inch wooden strips.

j. The bottom and side planking is ⅜-inch marine plywood.

k. All fastenings are made with brass screws or bolts. The frame sections are put together with plywood glue and all joints and butts are sealed with cloth and marine glue.

l. The engine mount, seat supports, and propeller guard supports are made of welded steel tubing.

m. The bottom, sides, and cockpit flooring are painted battleship grey. The decks, seat, and interior are painted yellow.

5. POWER PLANT.

a. ENGINE SPECIFICATIONS.

Type	Horizontally Opposed, 4 Cycle, Overhead Valve, Air Cooled
Number of Cylinders	4
Rated Brake Horsepower and RPM	65/2300
Bore	3⅞ in.
Stroke	3⅝ in.
Piston Displacement	171 cu in.
Compression Ration	6.3:1
Direction of Crankshaft Rotation (viewed from after end)	Clockwise
Magneto	Scintilla, Type SF4R
Carburetor	Stromberg, Model NA-S3A1
Fuel	Specification No. AN-F-23, Grade 73, or U.S.A. Specification No. 2-103-B, Grade 80
Oil	U.S.A. Specification No. 2-104-B, Grade 30 (preferred), or Specification No. AN-VV-O-446, Grade 1080 Summer, Grade 1065 Winter

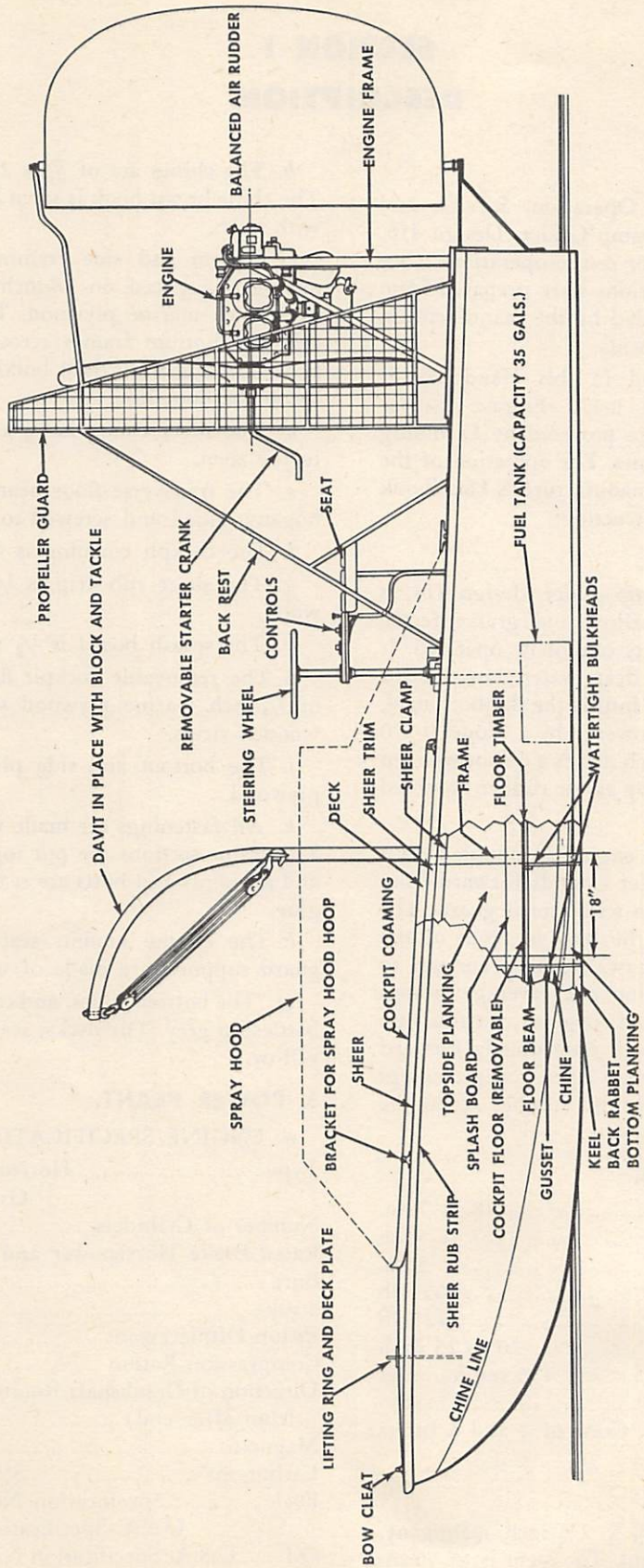


Figure 2—Profile

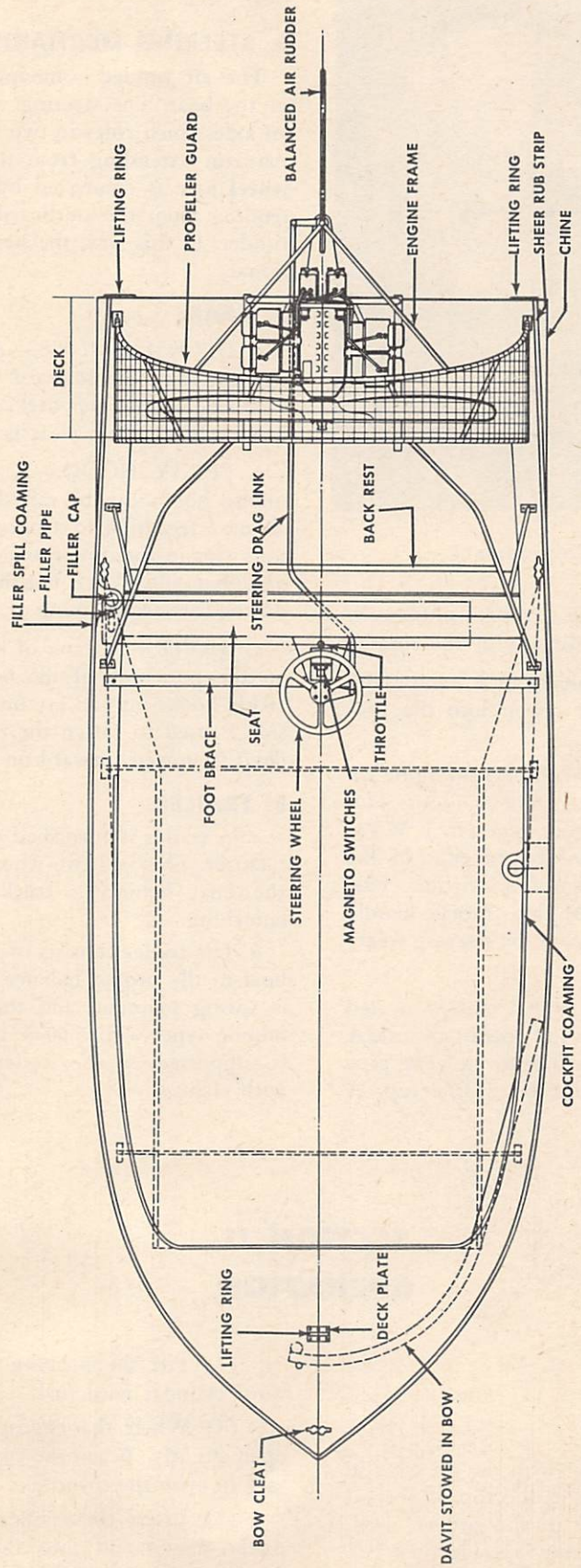


Figure 3—Plan

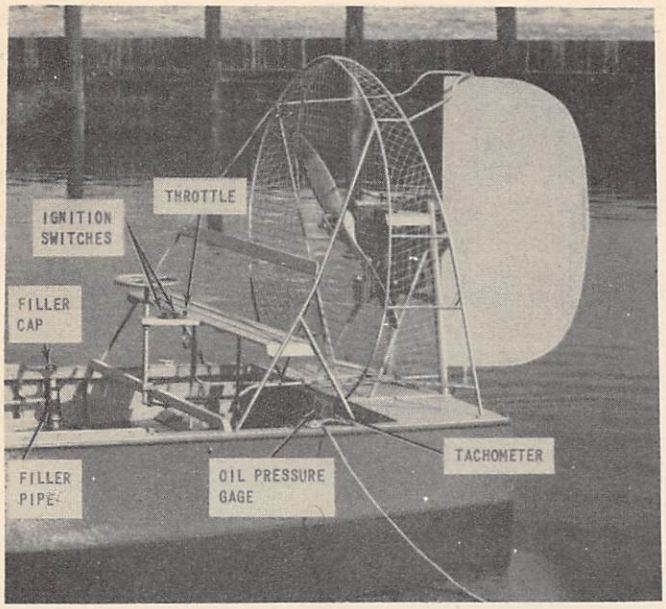


Figure 4—Machinery Arrangement

b. PROPELLER.—The propeller is a Banks-Maxwell, 2-blade, 6-foot, propeller, driven directly by the engine.

c. CRANK.—The engine is cranked by a hand crank which fits through the propeller screen into the propeller hub.

d. INSTRUMENTS AND CONTROLS.—Engine instruments and controls include a tachometer (Jones Motorola No. 1018) and an oil pressure gage (E. J. Willis No. P-1507) mounted under the forward edge of the stern deck; and two single-pole ignition switches (Pass and Seymour No. 4521) and a push-pull throttle handle (E. J. Willis No. P-1614) mounted on the steering wheel pedestal. (See figure 4.)

e. FUEL SYSTEM.—A 35-gallon fuel tank is located under the floor boards forward of the operator's seat. A filler pipe leads up to the starboard gunwale. The pipe has a removable strainer in it just below the cap. A sediment strainer in the fuel line is located under the stern deck.

6. STEERING MECHANISM.

The air rudder is mounted on brackets at the stern of the boat. The steering wheel is directly mounted to an axle which rides in two brackets in front of the seat. An arm extending from the port side of the steering wheel axle is connected by a drag link to an arm extending from the starboard side of the bottom of the rudder. In this way, the steering action is made conventional.

7. GEAR.

a. DECK FITTINGS.—A lifting ring is fastened in the center of the forward deck and one is fastened on each side of the after deck, port and starboard. A 5-inch hollow brass tie-up cleat is installed on the bow.

b. SPRAY HOOD.—A canvas spray hood on steel tubing hoops can be raised to cover the entire cockpit about 2 feet high to a point just forward of the operator's seat in the center and back to cleats aft of the seat on either side. When not in use, it is folded and stowed on the forward coaming of the cockpit.

c. DAVIT.—A davit of steel tubing fits into brackets on the port side of the boat amidships. A block and tackle hooks into an eye on the davit and a cleat on the side is used to fasten the tackle. When not in use, the davit is stowed forward on the port side of the boat.

8. TRAILER.

a. A trailer is furnished with each boat by the manufacturer. This is a two-wheeled trailer designed to carry the boat behind a truck or tractor and facilitates launching.

b. The trailer consists of an iron frame to support the boat in the proper balance for easy handling. The axle is spring mounted and the wheels are standard automobile type, with 6.00 x 16 pneumatic tires. The boat is supported on the trailer by chocks and is fastened with clamps.

SECTION II
OPERATION

1. ENGINE.

a. STARTING.

(1) Check the fuel supply.

(2) Check the level of the oil with the oil gage in the oil filler cap. This is located on the top of the oil sump. If the oil is low, add oil to the proper level. Use oil conforming to U. S. Army Specification No. 2-104-B, grade 30. Refer to section III, paragraph 1.*b.* (3).

(3) Fill the priming cup on the right-hand forward cylinder with fuel.

(4) When the engine is cold, crack the throttle open slightly. When the engine is warm, it is not necessary to open the throttle.

(5) Insert the cranking handle through the propeller screen and into the propeller hub. With the ignition switches "OFF," turn the engine over three or four times to prime it.

(6) Turn on both ignition switches and turn the engine over with the hand crank until it starts.

(7) Allow the engine to warm up before running it at full throttle. Check the oil pressure on the gage as soon as the engine starts. Pressure should be registered in a few seconds. Wait until the pressure holds steady at between 35 and 40 psi before advancing the throttle.

b. UNDER WAY.

(1) The engine will turn at 2300 rpm at full throttle, but speeds over 2000 to 2100 rpm are not recommended for normal cruising.

(2) The oil pressure should hold steady at 35 to 40 psi during operation.

(3) Slow down the engine and allow it to idle a while to cool it before turning off the ignition switches. When the switches are turned off, the engine may continue to turn over a few times due to the heat of the cylinders, until the heat is dissipated.

2. MANEUVERING.

a. Since there is no neutral drive on the engine, the boat will tend to move whenever the engine is running. Therefore, the boat should be tied securely to the dock while the engine is being started and warmed up. After the engine is warm and the boat is ready to be cast off, turn "OFF" the engine. Cast off the boat from the dock and then start the engine again. Being warm, it should start easily. This procedure eliminates the danger of swinging the boat into the dock when it is cast off while the engine is running.

b. The boat responds very quickly to the rudder and the amount of wind can affect the steering qualities of the rudder greatly. Do not turn the rudder too quickly or too far until thoroughly familiar with its operation. Too sharp a turn at high speeds will skid the boat around sharply or even cause it to spin dangerously. The minimum safe turn at full speed is about 50 feet diameter. For sharper turns at high speed, cut down the throttle before turning the rudder, then open the throttle again after the turn has begun. At low speeds, the boat can safely turn in its own length.

c. When operating the boat under extreme conditions, handle it in a way that will not abuse its light construction. Although the boat will glide over grass hummocks and sandbars and will withstand considerable pounding in rough water, it must be remembered that this sort of handling puts a strain on the hull. Such operations should be reserved for emergencies only.

d. Approach the dock at the slowest practicable idling speed. If there is no strong wind, cut off the engine before the boat reaches the dock and glide in to the mooring place. When a strong wind interferes with the maneuverability of the boat, it is permissible to drive the boat up to the dock at slow idling speed. In either case, care should be taken not to damage the boat by driving it too hard against the dock.

3. GEAR.

a. DAVIT AND LITTERS.

(1) Insert the davit in the brackets on the port side of the boat, and attach the block and tackle to the davit arm. The davit can be pivoted in its brackets to swing loaded litters or other objects aboard. (See figure 5.)

(2) The swamp glider can carry a maximum of five wire basket type litters. Five litters are fitted in as follows: three abreast, forward, running fore-and-aft; two athwartships aft, in front of the operator's seat. (See figure 5.)

b. SPRAY HOOD.—Raise the spray hood on the forward hoop, fasten the after hoop to the brackets on the coaming, and tie the two tie lines to the cleats on the coaming aft. Fasten the hood on the sides with the spring grommets and pins. When not in use, fold the hood and stow it around the forward coaming of the cockpit, lashed securely in place.

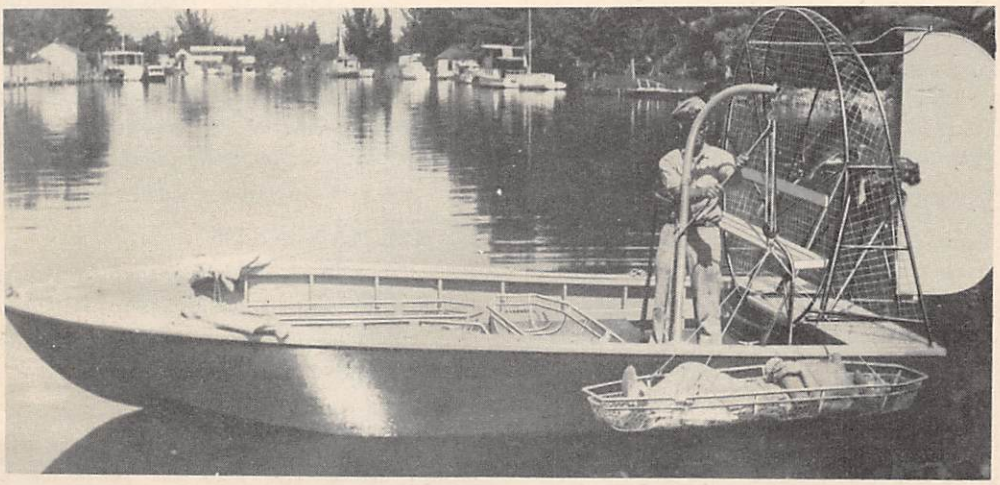


Figure 5—Using Davit to Lift Litter Aboard

SECTION III

SERVICE, INSPECTION, AND MAINTENANCE

1. ENGINE.

(See figures 6 and 7.)

a. DAILY.

(1) Check the oil level. Replenish the oil supply as necessary.

(2) Examine the engine for signs of oil throwing.

(3) Check the security and operation of the carburetor air intake and its control valve.

(4) Inspect the carburetor to make sure there is no fuel leakage at connections or plugs. Clean the fuel filter bowl if necessary.

(5) Make sure the throttle connection is tight and safetied and it is not binding.

(6) Check the condition of all wiring and make sure the terminals are tight.

(7) Inspect the entire engine to make sure all nuts, bolts, and manifolds are tight and that all plugs are safetied.

b. 25-HOUR (NAVY 30-HOUR).

(1) IGNITION AND ELECTRICAL SYSTEM.

(a) Remove the magneto breaker cover and clean the breaker housing.

(b) Inspect the magneto for damaged breaker felts or cushions.

(c) Check that the magneto has not been lubricated too much. Clean and dry the breaker mechanism to make sure that oil will not touch the contacts.

(d) Make sure that all necessary safety wire and cotter pins are installed.

(e) Check the security of spark plug elbow terminal nuts. Use the elbow wrenches Nos. 30A5279-1 and 30A5279-2.

Note

When checking the elbow assembly, be careful not to rotate the barrel with respect to the shell. Do not check the tightness of the elbow by twisting the body of the elbow.

(2) FUEL SYSTEM.

(a) Lubricate the throttle shaft bearings. Use oil conforming to Specification No. AN-O-6.

(b) Remove the fuel filter bowl and clean the screen and bowl. After replacing the bowl, refill it with fuel. Check the bowl to make sure there are no leaks or bubbles. Tighten and safety the bowl.

(c) Remove the float chamber, the fuel passage drain plug, the fuel strainer plug, and the strainer from the carburetor. Clean the strainer. Run fuel through the strainer and drain plug opening to flush out water and sediment.

(3) OIL SYSTEM.

(a) While the engine is hot, drain the oil and refill it with clean oil of the proper grade. This is to be done at each 25-hour inspection unless the daily inspection indicates an earlier change. On engines equipped with Fram oil filters, do not change the oil until the 100-hour inspection, unless its condition indicates an earlier change is required.

(b) Either Specification No. AN-VV-O-446 or U. S. Army Specification No. 2-104-B oil may be used in this engine, but these oils are not to be mixed. If U. S. Army Specification No. 2-104-B oil is to be used in an engine previously serviced with Specification No. AN-VV-O-106 oil, proceed as follows:

1. Drain the engine and refill it with U. S. Army Specification No. 2-104-B oil, grade 30.

2. After 10 hours of running, drain the oil and refill the engine with new oil.

3. After an additional 15 hours of running, drain and refill the engine again. Change the oil every 25 hours thereafter.

(c) Check the oil sump for security and proper safetying of all nuts.

(4) VALVES.

(a) At the first 25-hour inspection after the engine is installed, inspect the valve mechanism as follows:

1. Remove the rocker box covers.

2. Inspect the rocker arms for cracks, excessive side or end play, or signs of rubbing against other parts.

3. Check the condition of the springs and spring washers and the security of the spring seat retaining locks.

4. Make sure all oil passages are open. Check that the interior of the rocker boxes are completely covered with engine oil.

5. Reinstall the rocker box covers.

(5) MANIFOLDS.

(a) Check the intake manifold for proper mounting and for security of the two plain nuts and palnuts.

(b) Inspect the security of the rubber hose connections and clamps on the intake pipes and elbows.

c. 50-HOUR (NAVY 60-HOUR).

(1) IGNITION AND ELECTRICAL SYSTEM.—Inspect all the wiring for breaks in the insulation and damaged terminals. Replace units of wiring as necessary.

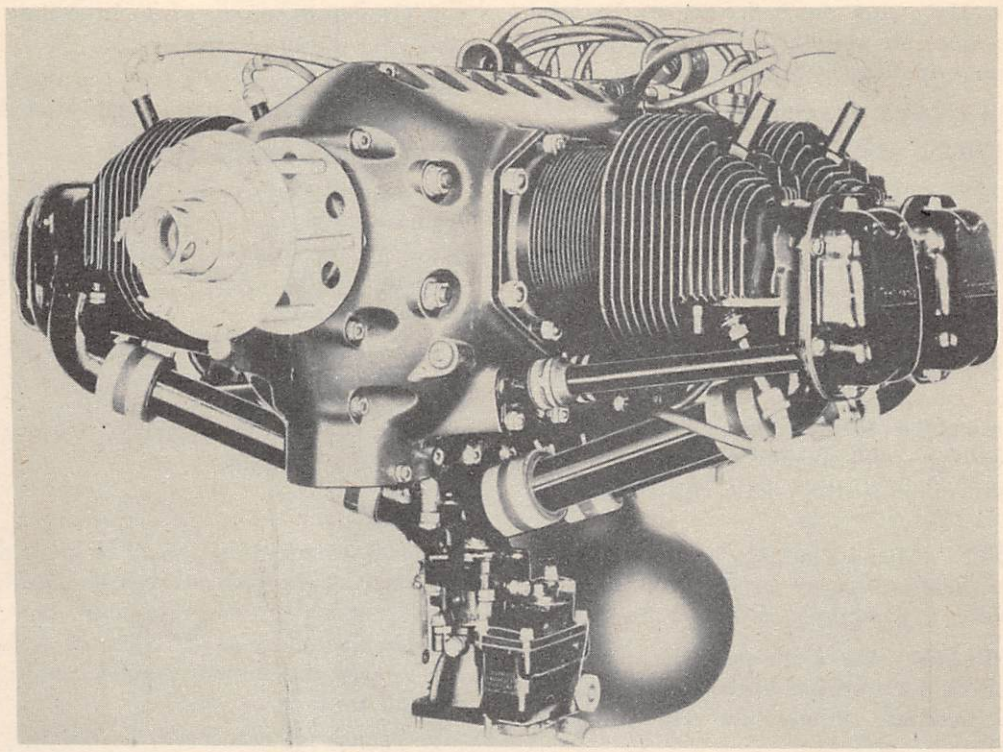


Figure 6—Three-quarter Left Front View of Engine

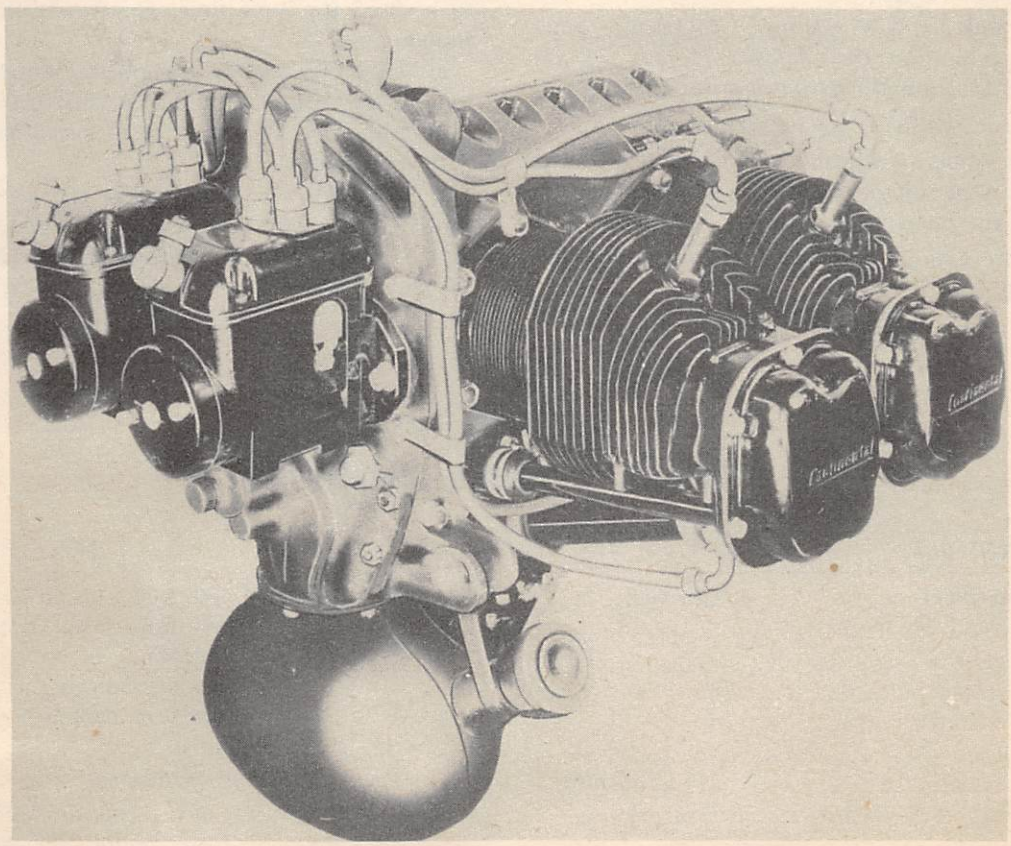


Figure 7—Three-quarter Right Rear View of Engine

(2) COOLING SYSTEM.—Inspect the air deflectors for cracks. Make sure the deflectors are fastened tightly and do not rub against the cylinder fins. Inspect the cylinders for damaged or broken fins.

d. 100-HOUR (NAVY 120-HOUR).

(1) IGNITION AND ELECTRICAL SYSTEM.

(a) Remove and clean the spark plugs. Replace the spark plugs as necessary.

(b) Replace the spark plug gaskets with serviceable ones.

(2) OIL SYSTEM.

(a) Clean the oil screen and the oil suction tube screen.

(b) On engines with K-500 Fram oil filters, drain and refill the oil sump at the 100-hour inspection. Replace the Fram filter element, part No. 4800-PB1/2, class 03-1.

(3) VALVES.—After the initial 25-hour inspection of the valve mechanism, inspect it every 100 hours in the same way. Refer to paragraph 1.*b.* (4) of this section.

(4) PROPELLER.—Check the propeller hub bolts for tightness. Check the propeller for track (alignment) and make the necessary adjustments. The propeller should track within 1/8 inch.

(5) GENERAL.—Check the tightness and condition of the engine mounting bolts.

2. FILLING FUEL TANK.

a. The fuel tank holds 35 gallons. Use gasoline conforming to Specification No. AN-F-23, grade 73, or U. S. Army Specification No. 2-103-B, grade 80.

b. Do not refuel while the engine is running.

c. Permit no smoking within the immediate vicinity of the boat. Only personnel engaged in refueling should remain aboard the boat.

d. Have a fire extinguisher near the fuel tank filler while refueling.

e. Clean the area around the filler cap.

f. Ground the nozzle of the filler hose securely before removing the filler cap.

g. Do not remove the tank cap until filling is about to start and replace it immediately after the tank is filled.

3. STEERING MECHANISM.

a. Inspect the security of the link rod connections regularly. The rod should be fastened securely to the wheel and the rudder but should not bind. Inspect the operation of the wheel and the mounting of the rudder in the same way.

b. Keep the wheel brackets, the rudder brackets, and the link rod connections lubricated enough for free working. Use hard graphite grease conforming to Specification No. VV-G-671 or VV-G-671A, or Specification No. AN-G-6.

4. HULL.

a. The swamp glider should be given the same care as any small, light boat as regards cleanliness, painting, security of fittings, and care of the bottom. It is recommended that the boat be operated at least once every day to keep the engine in good condition and prevent the hull from drying out.

b. Because of the boat's light weight and quick response to wind, care should be taken when the boat is moored. If possible, moor it in a boat house where it will be away from rough water, wind, and bright sunlight. Remove the boat from the water when it is not to be used for some time. This is easily done with the trailer.

c. When the boat is left outside, do not let it stand long in the bright sunlight, as this dries out the hull. If it cannot be kept in a shed, keep the boat covered with a tarpaulin.

d. When the spray hood has become wet with salt water, hose it off with fresh water and allow it to dry in the erected position before stowing it. Never stow the spray hood when it is wet.

SECTION IV
ENGINE TROUBLE SHOOTING

TROUBLE	*CAUSE*	*REMEDY*
ENGINE DOES NOT START	No fuel	Check fuel level in tank.
		Check fuel flow at carburetor; see that float is not stuck and that jets are not clogged.
		Make sure tank cap vent holes are open.
	Underpriming	Fill primer cup.
	Overpriming	Open throttle, turn off ignition, and turn engine backwards to unload cylinders.

TROUBLE	*CAUSE*	*REMEDY*
	Defective ignition	Examine wiring for breaks. Examine spark plugs for oil fouling. Check clearance of magneto breaker points (.015 inch). Clean points. See that they are not pitted. Check ground terminal. It may be shorting inside housing. The magnetos may be out of time with engines. Refer to T. O. No. 02-40BA-2.
	Cold oil	Turn engine over several times to break oil drag. Apply heat to cylinders or inject small quantities of very light oil into cylinders through spark plug holes.
	Engine too hot	Do not prime. Turn engine over backwards as in "Overpriming," preceding.
	Faulty valve action	Examine valve stems for signs of gumming or sticking open. Check operation of rocker arms. Examine valves for broken or bad springs and worn or bent push rods.
LOW OIL PRESSURE	Too little oil	Check oil level and add oil.
	Clogged screens	Inspect and clean rear case oil screen and screen in end of oil suction tube.
	Leak in oil system	Inspect oil suction line and connections.
	Faulty relief valve	Inspect valve to make sure plunger is working smoothly and seating well and that control spring is functioning properly. Clean valve if necessary.
LOW POWER	Faulty propeller action	Check track and balance of propeller.
	Faulty ignition	Check ignition system.
	Manifold leaks	Check connections of carburetor and intake manifold for air leaks.
	Faulty throttle valve	Check that throttle valve opens fully.
	Poor fuel flow	Check fuel lines and carburetor operation.
	Faulty tachometer	Have tachometer checked.
ROUGH RUNNING	Faulty propeller action	Check propeller balance, track, and installation on hub and shaft.
	Bad spark plugs	Remove and inspect plugs. Refer to T. O. No. 03-5E-1.
	Faulty ignition	Check magneto operation. Inspect ignition cables for signs of breaking down at high speeds.

TROUBLE	*CAUSE*	*REMEDY*
	Faulty valve operation	Inspect valves for evidence of sticking or lagging.
	Faulty carburetor	Check carburetor operation.
	Loose engine mounting	Check mounting for looseness or broken members.
POOR ACCELERATION	Engine cold	Warm up engine before advancing throttle.
	Idling jet set too lean or plugged	Clean jet or reset.
	High float level	Reset.
	Worn intake valve guides	Replace valve guides.
	Worn piston rings	Replace rings.
POOR IDLING	Air leaks in carburetor and intake manifold joints	Squirt raw gasoline from an oil can on the joints while engine is running between 400 and 500 rpm. A leak will draw gasoline in and increase rpm momentarily.
	Leaking primer jets	Clean, adjust, or replace.
	Idling jet set too lean or plugged	Clean or reset.
	Worn intake valve guides	Replace.
	Worn piston rings	Replace.