OUTBOARD MARINE CORPORATION

100 Pershing Road
Waukegan, Illinois 60086

EVINRUDE MOTORS
4143 N. 27th Street
Milwaukee, Wisconsin 53216

JOHNSON MOTORS
200 Sea Horse Drive
Waukegan, Illinois 60086

GALE 3 HP (ONE CYLINDER)

Year Produced	
1955	3D11-3D12
1956	3D13
1957	3D14
1958	3D15B
1959	3D15B
1960	3D16B
1961	3D17B
1962	3D18B
1963	3D19B

CONDENSED SERVICE DATA

TUNE-UP	
Hp @ rpm	3.0 @ 4000
Bore—Inches	2⅛
Stroke—Inches	1½
Number of Cylinders	1
Displacement—Cu. In.	5.32
Spark Plug	
Champion	J4J
AC	M24K
Auto-Lite	A21X
Electrode Gap	0.030
Magneto	
Point Gap	0.020
Timing	See Text
Carburetor	
Make	Own
Adjustment	See Text
Fuel—Oil Ratio	24:1

SIZES—CLEARANCES POWER HEAD	
Piston Rings	
End Gap	0.005-0.015
Side Clearance	0.001-0.0035
Piston Skirt Clearance	0.0025-0.004
Crankshaft Bearing Diameter	
Main Bearing	0.8100-0.8105
Crankpin	0.8100-0.8105
Crankshaft Bearing Diametral Clearance	
Upper Main Bearing	0.002-0.003
Lower Main Bearing	0.0015-0.0025
Crankpin	0.0005-0.0015
Piston Pin Diametral Clearance In Rod	0.0003-0.001

LOWER UNIT	
Drive Shaft Diameter	0.3738-0.3750
Diametral Clearance	0.0015-0.0035
Propeller Shaft Bearing Diametral Clearance	0.001-0.0035

TIGHTENING TORQUES (All Values In Inch-Pounds)	
Connecting Rod	60-66
Flywheel Nut	360-480
Spark Plug	240-246
Starter Housing Mount	60-84
Starter Ratchet	72-96

LUBRICATION

The power head is lubricated by oil mixed with the fuel. Use ⅓ pint of outboard motor oil (or a good grade of SAE 30, "Type MM" motor oil) to each gallon of gasoline. Mix gasoline and oil thoroughly, using a separate container, before pouring mixture into fuel tank.

The lower unit gears and bearings are lubricated by grease contained in the gear case. Use a good grade of outboard gear grease. To fill, remove the plugs from both sides of gearcase and force grease into forward (starboard side) hole until grease comes out the other hole. Tighten the gearcase plugs securely after filling.

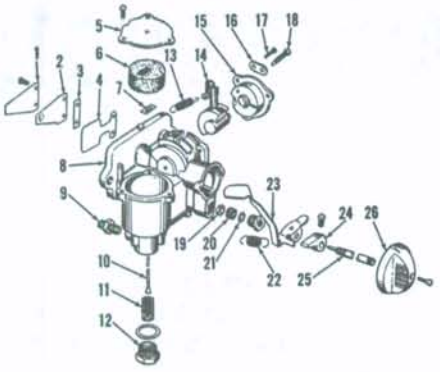


Fig. OM1-1—Exploded view of the integral float type carburetor used on all models. Float valve seat is machined in carburetor body.

1. Reed stop
2. Upper reed
3. Spacer
4. Lower reed
5. Bowl cover
6. Float
7. Float lock
8. Body
9. Connection
10. Inlet needle
11. Strainer
12. Plug
13. Spring
14. Throttle valve
15. Cover
16. Friction plate
17. Cover screw
18. Adjusting screw
19. Spacer
20. Packing
21. Washer
22. Spring
23. Primer lever
24. Primer cam
25. High speed needle
26. Knob

FUEL SYSTEM

CARBURETOR. The integral float type carburetor shown in Fig. OM1-1 is used. The float valve seat is machined into bottom of carburetor body (8). If seat is damaged, carburetor body must be renewed. Float valve extends through float (6) and bowl cover (5), and is manually depressed by primer lever (23) to supply the starting fuel.

To disassemble the carburetor, remove high speed knob (26) and primer cam (24); then slip primer lever (23) from high speed needle. Remove carburetor bowl cover (5) and strainer plug (12). Use a soft, light hammer or other light tool and tap float valve (10) flush with top of float (6); then withdraw valve downward out of carburetor. Lift float (6) and lower lock (7) from carburetor bowl. Remove the three screws retaining throttle valve cover (15) to carburetor, then withdraw throttle valve assembly as a unit.

Assemble by reversing the disassembly procedure. Insert float valve through bottom of bowl and install lower lock (7) in lower groove in shaft. On most carburetors, the float level is positively fixed by machined grooves in float valve shaft. If shaft is not grooved, set float locks so that top of float is ½-inch below top of float bowl with valve in closed position. Install and lightly seat the high speed needle (25); then back needle out ½-turn. Without moving needle, install primer lever (23) and spring (22); then install primer cam (24) with cam pointing upward as shown in Fig. OM1-2. Leave $\frac{1}{16}$-inch clearance between primer cam and primer lever as shown at (C—Fig. OM1-3). Install knob (26) with arrow pointing upward as shown in Fig. OM1-2.

After carburetor is installed, warm engine and move operating lever (L—Fig. OM1-3) to high speed position. Turn high speed knob (K) either way until engine operates smoothly. Move operating lever (L) to slow position and turn the slow speed adjusting screw (A) in or out until smoothest slow speed operation is obtained.

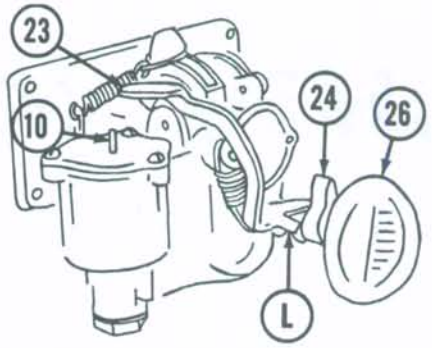


Fig. OM1-2—Carburetor is primed for starting by turning knob (26) counter-clockwise until primer cam (24) contacts tab (L) on primer lever (23) depressing lever to contact inlet needle (10).

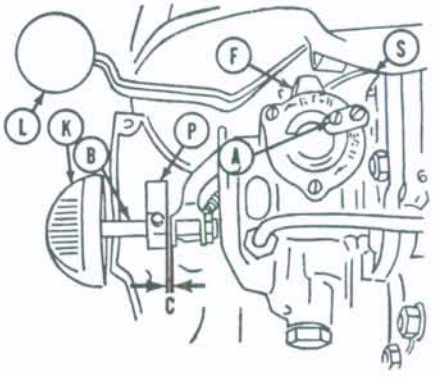


Fig. OM1-3 — View of carburetor showing points of adjustment.

A. Slow speed adjustment
B. High speed needle
C. Clearance
F. Cam follower
K. Knob
L. Speed control lever
P. Primer cam
S. Armature plate cam

SPEED CONTROL LINKAGE. The speed control lever rotates the magneto armature plate to advance the timing. A cam (S—Fig. OM 1-3) attached to armature plate moves the cam follower (F) to open the throttle as timing is advanced. Synchronization of ignition and carburetor throttle is fixed and not adjustable. Make sure that all throttle linkage is free and does not bind, also that primer lever (23—OM1-2) does not contact needle valve (10) when high speed needle is adjusted for operation.

REED VALVES. The inlet reed valve unit (1 through 4—Fig. OM1-1) is attached directly to carburetor body. Reed valve should be checked whenever the carburetor is removed for service. Reed valve (4) should seat very lightly against carburetor body throughout its entire length, with the least possible tension. Renew reed petal if broken, cracked, warped, rusted or bent. Do not attempt to bend or straighten reed petal. Seating surface of carburetor body should be smooth and flat.

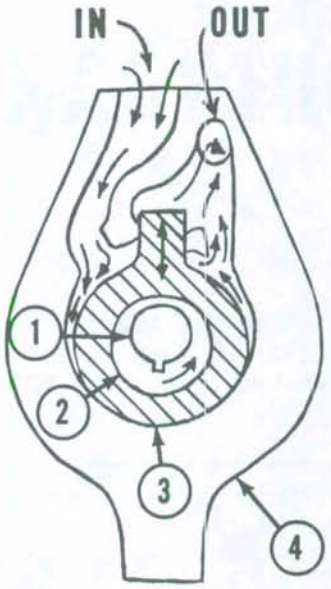


Fig. OM1-4—Schematic view of rubber rotor type water pump showing method of operation. Rotor (3) oscillates in housing (4) due to shape of cam (2) on propeller shaft (1).

IGNITION

Breaker point gap should be 0.020 and can be adjusted after removing starter and inspection hole cover at top of flywheel.

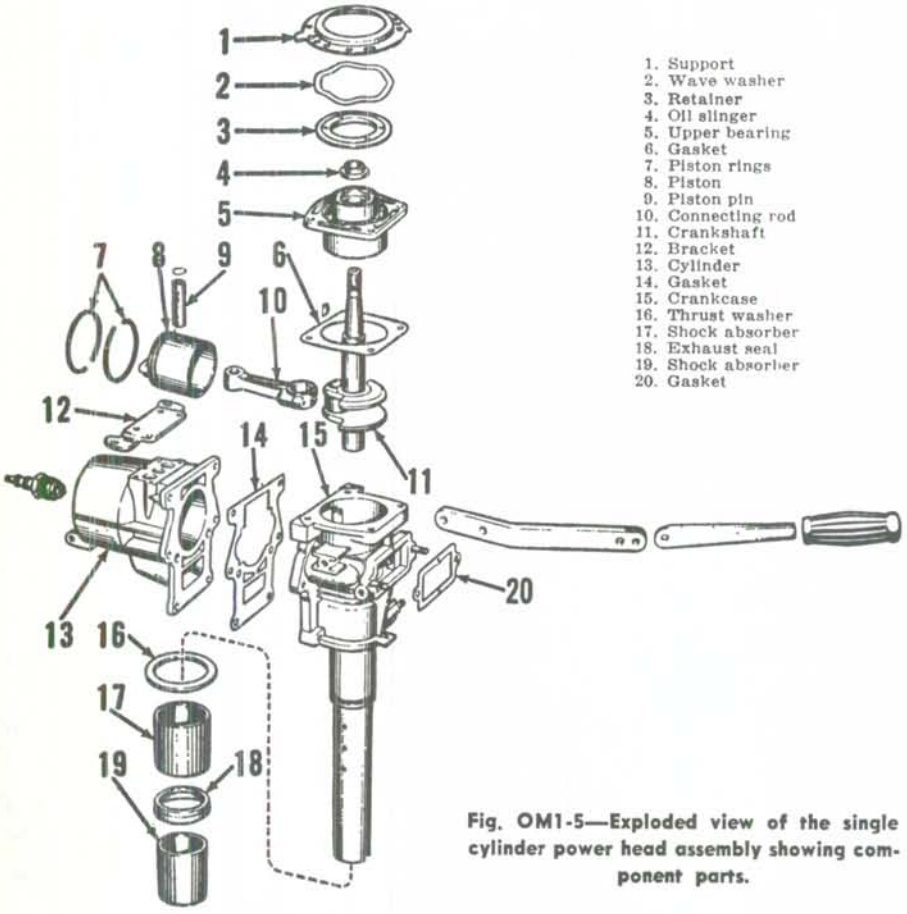
For a quick test of magneto condition, remove the spark plug and hold spark plug wire about ⅛-inch away from cylinder. Have someone spin the motor and note the condition of the spark. Although in bright daylight the spark may not be visible, a distinct snap will be noted as spark jumps the gap. If spark is weak or erratic, adjust the points as outlined above. Be sure to note point condition. If points are in good condition and properly adjusted and a satisfactory spark is not obtained, remove the flywheel and carefully examine the condition of the points, condenser and coil wiring, and the insulation on the magneto coils. Look for broken or worn insulation or broken wires. Also check for loose or corroded connections. Renew any parts which are damaged or in poor condition.

COOLING SYSTEM

WATER PUMP. The power head is cooled by a positive displacement, rubber rotor type water pump as shown in Fig. OM1-4. The water pump mounts on rear of lower unit gear housing and is driven by an eccentric cam which is keyed to the propeller shaft.

The eccentric cam (2) rotates with propeller shaft (1) to move the rubber rotor (3) back and forth in the machined housing (4). Water is prevented from recirculating by the projecting lug on rotor and is thus forced into water tube leading to power head as propeller shaft rotates.

When cooling system problems are encountered, first check the water inlet for plugging or partial stoppage; then, if not corrected, check the condition of the water pump, water passages, gaskets and sealing surfaces.



1. Support
2. Wave washer
3. Retainer
4. Oil slinger
5. Upper bearing
6. Gasket
7. Piston rings
8. Piston
9. Piston pin
10. Connecting rod
11. Crankshaft
12. Bracket
13. Cylinder
14. Gasket
15. Crankcase
16. Thrust washer
17. Shock absorber
18. Exhaust seal
19. Shock absorber
20. Gasket

Fig. OM1-5—Exploded view of the single cylinder power head assembly showing component parts.

POWER HEAD

R&R AND DISASSEMBLE. The power head crankcase and drive shaft tube are a one piece assembly and should not be separated. To remove the power head from lower unit, loosen the shock absorber clamp screw and the driveshaft tube clamping screws and lift the driveshaft tube up out of lower unit. Refer to Fig. OM1-5.

Remove the screws retaining the cylinder assembly (13) to crankcase and withdraw the cylinder, leaving the piston and connecting rod assembly attached to crankshaft. Do not remove the cylinder rear end cover. It is almost impossible to establish a seal between cover and cylinder. If a coolant leak exists, renew the cylinder. Remove piston and connecting rod assembly and the crankcase upper bearing assembly (5). It may be necessary to pry the bearing loose by working carefully around the bearing, being careful not to damage bearing or crankcase. After bearing (5) and the connecting rod and piston assembly have been removed, crankshaft can be withdrawn upward out of crankcase and tube assembly.

REASSEMBLE. Because of the two cycle design, crankcase must be completely sealed against both vacuum and pressure. Cylinder must be sealed against water leakage, and exhaust surfaces against water leakage and pressure.

Whenever power head is disassembled, it is recommended that all gasket surfaces be carefully checked for nicks and burrs or warped surfaces which might interfere with a tight seal. Gasket surfaces may be lapped, if necessary to provide a smooth surface. For lapping, use a regular lapping block or a sufficiently large piece of smooth plate glass. Lay a sheet of No. 00 emery cloth on the lapping block, then place the surface to be lapped on the emery cloth. Apply very light pressure and use a figure eight motion, checking frequently to determine progress. Do not remove any more metal than is necessary. Finish lap using lapping compound or worn emery cloth. Thoroughly clean the parts with new oil on a clean soft rag; then wash with soapsuds and clean rags.

Lubricate piston and all bearings during assembly. Use new gaskets, coated evenly and sparingly on both sides with Perfect Seal No. 4, or other good, non-hardening sealer. Tighten the retaining screws evenly and securely.

PISTON, PIN, RINGS & CYLINDER. Before detaching connecting rod from crankshaft, make sure rod and cap are marked for reassembly in the same position to each other as they occupied before disassembly.

The aluminum piston is fitted with two rings which are interchangeable and may be installed either side up. Pistons and rings are available in standard size only. The recommended piston ring end gap is 0.005-0.015. Recommended ring to groove clearance is 0.001-0.0035. The 2.1215-2.1220 diameter piston skirt should have 0.0025-0.004 clearance in cylinder bore. Renew piston, rings and/or cylinder assembly if they are worn, scored, or if clearance is excessive.

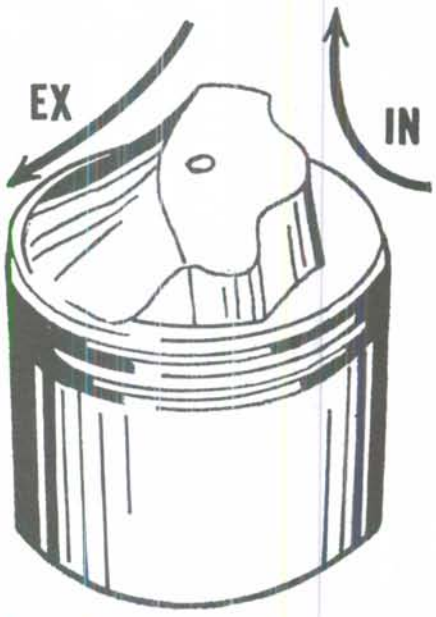


Fig. OM1-6—Baffle on top of piston head is designed to properly direct the flow of incoming mixture and exhaust discharge. Piston must be installed as shown, with relation to cylinder ports.

EX. Exhaust port IN. Inlet port

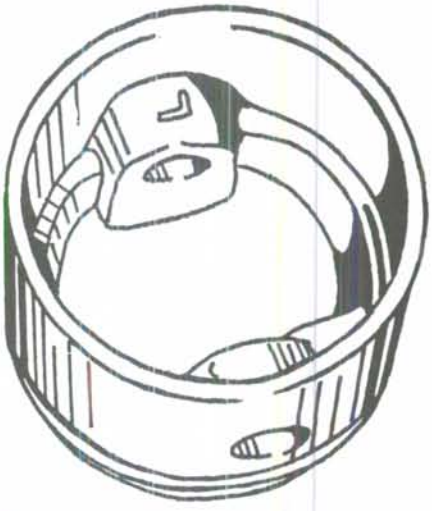


Fig. OM1-7—View of lower side of piston showing the "L" marking which indicates "Loose" piston pin boss. See text.

When reassembling, piston should be installed with the long, tapering side of piston head to the bottom, toward exhaust port. See Fig. OM1-6. One pin boss in some pistons is a press fit while the other boss is a slip fit, to prevent distortion of piston as motor warms up. Loose pin boss is indicated by an embossed "L" as shown in Fig. OM1-7. When removing piston pin, remove both retaining rings and drive from marked boss of piston. Reinstall pin through loose boss first. Some piston pins have a closed end which should be installed upward, toward intake port side of cylinder. Thoroughly lubricate all friction surfaces during assembly.

CONNECTING ROD, BEARINGS AND CRANKSHAFT. Before detaching connecting rod from crankshaft, make sure rod and

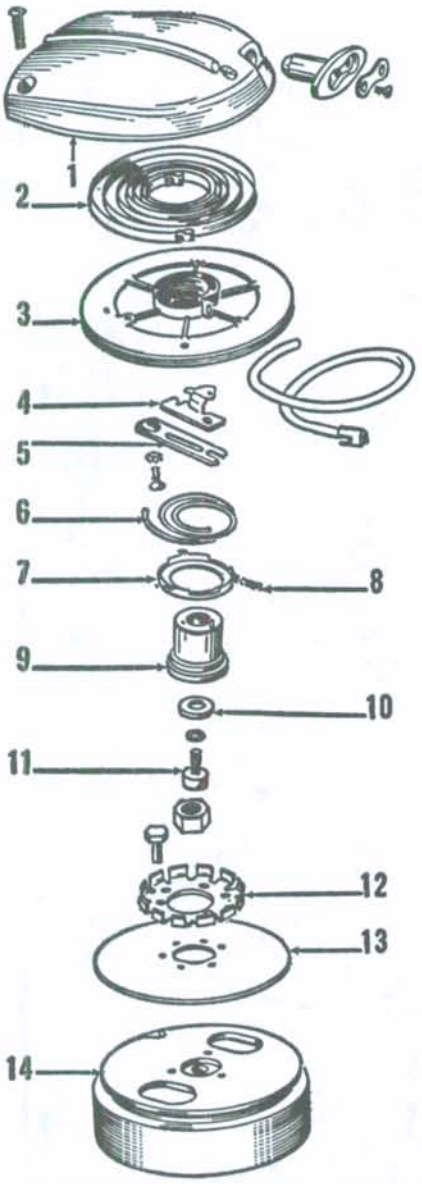


Fig. OM1-8—Exploded view of manual starter of the type used.

1. Housing
2. Recoil spring
3. Pulley
4. Pawl
5. Retainer
6. Friction spring
7. Equalizer cup
8. Spring
9. Spindle & pin
10. Washer
11. Screw
12. Ratchet
13. Cover
14. Flywheel

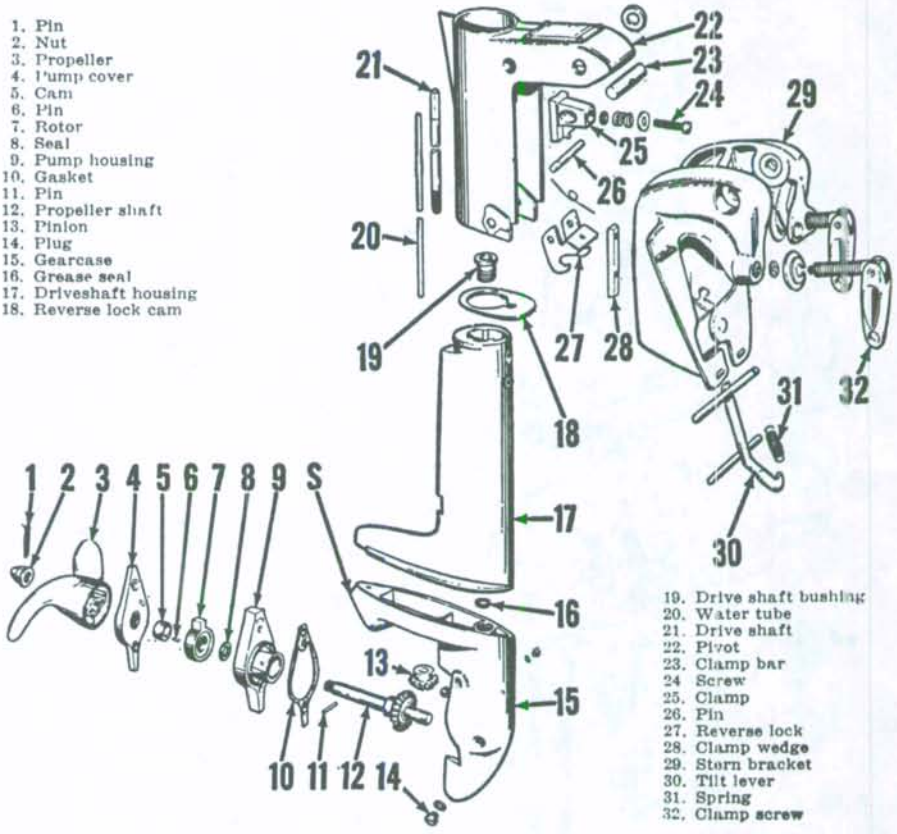
cap are properly marked for correct assembly in the same relative position.

The connecting rod rides directly on the crankshaft crankpin. Crankshaft main bearings are cast into crankcase (15—Fig. OM1-5) and upper bearing assembly (5). If clearance is excessive, renew the castings and/or crankshaft.

Refer to CONDENSED SERVICE DATA table for dimensional data and clearances. If crankshaft or bearings are scored, out-of-round or worn, renew the parts concerned. All bearings and friction surfaces should be lubricated during assembly.

MANUAL STARTER

Fig. OM1-8 shows starter typical of the type used. When installing a new starter cord or spring, invert the assembly in a vise and wind the spring by turning the starter pulley counter-clockwise until spring is completely wound. Reverse the pulley one complete turn and install the cord.



1. Pin
2. Nut
3. Propeller
4. Pump cover
5. Cam
6. Pin
7. Rotor
8. Seal
9. Pump housing
10. Gasket
11. Pin
12. Propeller shaft
13. Pinion
14. Plug
15. Gearcase
16. Grease seal
17. Driveshaft housing
18. Reverse lock cam
19. Drive shaft bushing
20. Water tube
21. Drive shaft
22. Pivot
23. Clamp bar
24. Screw
25. Clamp
26. Pin
27. Reverse lock
28. Clamp wedge
29. Stern bracket
30. Tilt lever
31. Spring
32. Clamp screw

Fig. OM1-9—Exploded view of stern bracket and lower unit showing component parts.

LOWER UNIT

PROPELLER AND DRIVE PIN. Drive pin protection of motor and propeller is carefully engineered for each unit. Protection depends on drive pin material as well as size. Although, in an emergency, the drive pin may be replaced by one of any material, the correct drive pin should be installed as soon as possible to insure maximum performance and efficiency. The following table gives drive pin material, dimensions and factory part number. Propeller diameter, pitch and number of blades can be used when renewing or straightening parts.

REMOVE AND REINSTALL. When servicing the lower unit, pay particular attention to water pump and water tubes with respect to air or water leaks. Leaky connections may interfere with proper cooling of the motor. Water leaks also may permit the inside of driveshaft casing to fill up with water which can find its way into the gearcase where it washes out the lubricant.

Use Fig. OM1-9 as a guide when overhauling the lower unit. To service the water pump or propeller shaft and gears, remove cotter pin (1), nut (2) and shear pin (11); then, disassemble the water pump. Check for plugging in water inlet hole in propeller hub and in pump cover (4). To remove the gearcase housing (15) from exhaust and driveshaft housing (17), first remove the power head as outlined in the appropriate section. Withdraw driveshaft (21) and, using a long screwdriver, remove bushing (19) which attaches gearcase to driveshaft housing. Remove the screw located in exhaust outlet, indicated by (S), then withdraw the gearcase housing, being careful not to damage the water tube.

When reassembling, make sure that all gasket surfaces are smooth and free from nicks and burrs, and use a non-hardening type sealer such as Perfect Seal No. 4. Sealing surfaces without gaskets must be smooth and free from nicks, burrs and hardened cement. Apply a light even coat of hardening sealer such as Sealer 1000, available from Marprox Corporation, P. O. Box 955, Sheboygan, Wisconsin. Refer to CONDENSED SERVICE DATA table for repair specifications.

STEERING TENSION. Steering tension can be adjusted by turning screw (24—Fig. OM1-9) until motor is easy to steer, but will maintain a set course.

	Propeller			Drive Pin			
Year	Dia.	Pitch	No. Blades	Dia.	Length	Material	Part No.
1955-1956	6½	6	2	⅛	⅞	Stainless Steel	29-210
1957-1963	6⅜	6⅞	2	⅛	13/16	Stainless Steel	203230