WEST BEND

THE WEST BEND COMPANY
HARTFORD DIVISION
Hartford, Wisconsin

CONDENSED SERVICE DATA

Series / Year Produced	25, 30 hp	30 hp	35 hp	40, 45 hp
1956	1609403, 1609413, 1609601, 1609602, 1609611, 1609612	.....	.....	.....
1957	.....	160421, 160431, 160621, 160631, 160801, 160811	.....	.....
1958	.....	.....	35801, 35811, 35821, 35831, 35841, 35851, 35861, 35871	.....
1959	.....	.....	35901, 35911, 35921, 35931, 35941, 35951, 35961, 35971, 35981, 35982, 35991, 35992	40901, 40902, 40911, 40912, 40961, 40962, 40963, 40971, 40972, 40973
1960	25021, 25031	.....	.....	40001, 40011, 40121, 40131, 40061, 40071
1961	25121, 25131	.....	.....	40101, 40111, 40121, 40131, 40161, 40171
1962	25121, 25131	.....	.....	40103, 40113 40163, 40173
1963	3030, 3032	.....	.....	4532, 4533 4536, 4537

NOTE: COMMODORE Outboard Motor Model 403201 is similar in design and construction to WEST BEND 40 hp motors. Service procedures outlined in this section will also apply to Model 403201 COMMODORE Motors.

TUNE-UP

Engine rpm	4000	4000	4500	4750
Bore—Inches	3	3	3⅛	3⅛
Stroke—Inches	2⅔	2.707	2.707	2¾
Number of Cylinders	2	2	2	2
Displacement—Cu. In.	37.71	38.26	41.49	42.18
Compression @ Cranking Speed (average)	85 psi	110 psi	110 psi	See Note
Spark Plug				
Champion	H8J	H8J	H8J	H8J, J4J*
Electrode gap	0.030	0.030	0.030	0.030
*1961 Models				
Magneto				
Point gap	0.020	0.020	0.020	0.020
Timing	See text	See text	See text	See text
Carburetor				
Make	Tillotson	Tillotson	Tillotson	Tillotson
Model	OM	OM	OM	OM
Adjustment	See text	See text	See text	See text
Fuel—Oil Ratio	24:1	24:1	24:1	24:1

NOTE: Before 1961—110 psi; after 1960—120 psi.

SIZES — CLEARANCES

Piston Rings				
End gap	0.008-0.015	0.008-0.015	0.008-0.015	0.008-0.015
Side clearance	0.002-0.003	0.002-0.003	0.002-0.003	0.002-0.003
Piston to Cylinder				
Clearance	0.002**	0.002	0.002	0.005
Piston Pin				
Diameter	0.6875-0.68765	0.6875-0.68765	0.6875-0.68765	0.6875-0.68765
Clearance (Rod)	0.0007-0.001	0.0007-0.001	0.0007-0.001	0.0007-0.001
Clearance (Piston)	0.0001-0.0006	0.0001-0.0006	0.0001-0.0006	See Text

**1956—25 hp=0.004

SIZES—CLEARANCES (Cont'd)

Crankshaft Journal Diameters				
Upper & Lower Main Bearing	1.1245-1.1250	1.1245-1.1250	1.1245-1.1250	1.1245-1.1250
Center Main	1.1391-1.1395	1.1391-1.1395	1.1391-1.1395	1.1391-1.1395
Crankpin	1.1391-1.1395	1.1391-1.1395	1.1391-1.1395	1.1391-1.1395
Crankshaft Bearing Clearance				
All	Roller brng.	Roller brng.	Roller brng.	Roller brng.
Crankshaft end play	0.001-0.006	0.001-0.006	0.001-0.006	0.001-0.006
Rod Side Clearance	0.015-0.025	0.015-0.025	0.015-0.025	0.015-0.025

TIGHTENING TORQUES

(All Values in Inch-Pounds)

Connecting Rod	150	150	150	150
Flywheel Nut	600	600	600	600
Cylinder head	270	270	270	270
Spark Plug	264-276	264-276	264-276	264-276
Standard Screws				
No. 10-24	30	30	30	30
No. 10-32	35	35	35	35
No. 12-24	45	45	45	45
¼-20	70	70	70	70
5/16-18	160	160	160	160
⅜-16	270	270	270	270

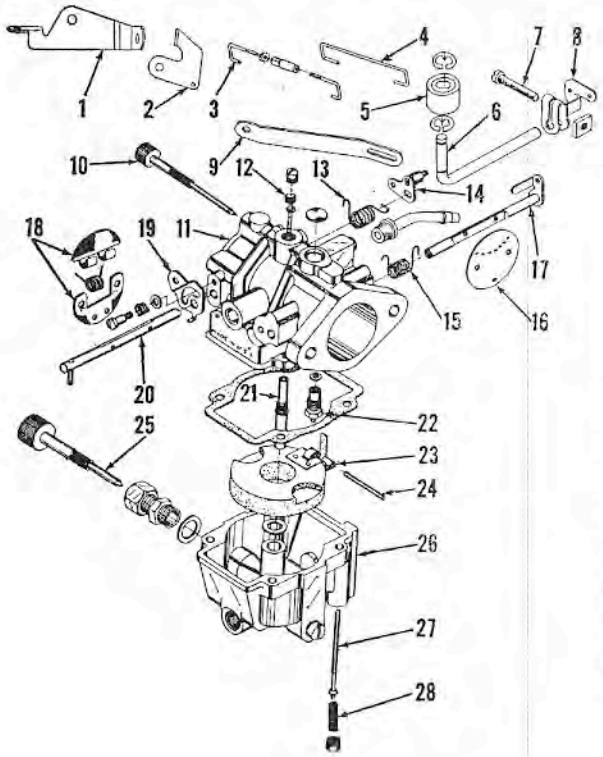

Fig. WB50 — Exploded view of Tillotson model OM carburetor.

1. Bracket
2. Economizer lever
3. Economizer link
4. Throttle link
5. Follower roller
6. Cam follower
7. Clamp screw
8. Follower arm
9. Choke link
10. Idle needle
11. Body
12. Idle tube
13. Choke spring
14. Choke lever
15. Spring
16. Throttle valve
17. Throttle shaft
18. Choke valve
19. Pickup lever
20. Choke shaft
21. Main nozzle
22. Inlet needle & seat
23. Float
24. Float shaft
25. High speed needle
26. Float bowl
27. Power jet valve
28. Valve spring

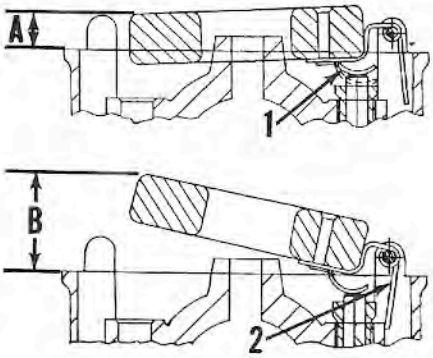

Fig. WB51—Adjust float height by bending tang (1) until distance (A) measures 13/32-inch. Adjust float drop by bending tang (2) until distance (B) measures ⅞-inch.

LUBRICATION

The power head is lubricated by oil mixed with the fuel. One-third pint of two-cycle engine oil should be mixed with each gallon of gasoline. Marine white or automotive white gasoline is recommended; if not available, use a good grade of regular gasoline. Gasoline and oil should be thoroughly mixed, using a separate container, before filling fuel tank.

The lower unit gears and bearings are lubricated by oil contained in the gear case. Only West Bend "Customized" Gear Lubricant or other approved outboard gear lubricant should be used. The gear case should be drained and refilled every 100 hours or once each year, and fluid maintained at the level of upper (vent) plug hole.

To fill the gearcase, have the motor in upright position and fill through the lower plug hole in starboard side of gearcase until fluid reaches level of upper vent plug. Reinstall and tighten both plugs securely, using new gaskets if necessary, to assure a water tight seal.

FUEL SYSTEM

CARBURETOR. Tillotson, type OM carburetors are used. Refer to Fig. WB50. Normal initial setting is one turn open for both the idle mixture adjusting needle (10) and the high speed mixture needle (25), on models so equipped. The 1963, 30 and 45 horsepower models are equipped with fixed main jets instead of high speed mixture needle (25). Carburetor must be readjusted under load, after motor is warm, for best high speed and low speed performance.

To adjust the float, remove and invert the carburetor body (11). With body inverted and inlet needle valve closed, measure the distance (A—Fig. WB51). This distance should be 13/32-inch. Adjustment is made by bending the curved tang (1) which contacts inlet needle. NOTE: Do not attempt to adjust float height by pressing on the float.

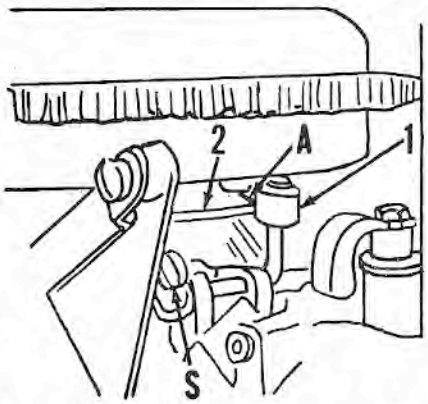

Fig. WB52—Schematic view of throttle linkage showing adjustments. Refer to text.

1. Cam follower
2. Throttle cam
A. Scribe line
S. Clamp screw

The inlet needle closes on a synthetic rubber seat, and accurate adjustment is not possible. After adjusting the closed position (A), adjust maximum float drop (B) to 7/8-inch by bending the straight tang (2).

Tillotson model numbers and parts lists are as follows:

Model OM-2B
Repair kit RK-306
Gasket set GS-109
Inlet needle and seat 010491

Model OM-2C
Repair kit RK-323
Gasket set GS-109
Inlet needle and seat 010491

Model OM-5A
Repair kit RK-346
Gasket set GS-109
Inlet needle and seat 010491

Model OM-7A; 7B
Repair kit RK-366
Gasket set GS-109
Inlet needle and seat 010491

Model OM-9A
Repair kit RK-388
Gasket set GS-141
Inlet needle and seat 010491

Model OM-11A
Repair kit RK-388
Gasket set GS-141
Inlet needle and seat 010491

Model OM-12A
Repair kit RK-388
Gasket set GS-141
Inlet needle and seat 010491

Model OM-13A
Repair kit RK-424
Gasket set GS-141
Inlet needle and seat 010491

Model OM-16A
Repair kit RK-464
Gasket set GS-141
Inlet needle and seat 012259

Model OM-20A
Repair kit RK-556
Gasket set GS-141
Inlet needle and seat 012259
High speed jet (0.096) Standard 012947
High speed jet (0.088) High Alt. E-16271
High speed jet (0.080) High Alt. E-16333
High speed jet (0.076) High Alt. E-16334

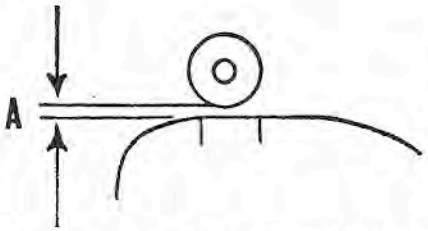

Fig. WB53 — On 40 horsepower models, clearance (A) should measure 0.020, when follower is located between synchronizing scribe lines as shown.

Model OM-21A
Repair kit RK-555
Gasket set GS-164
Inlet needle and seat 012259
High speed jet (0.069) Standard 012515
High speed jet (0.067) High Alt. 011397

SPEED CONTROL LINKAGE. The speed control lever or grip is connected to the magneto stator plate or distributor breaker plate to advance or retard the ignition timing. Throttle linkage is synchronized to open the throttle as ignition timing is advanced. It is very important that the throttle linkage be properly synchronized for best performance.

To synchronize the linkage, refer to Fig. WB52. With the engine not running, loosen the clamping screw (S) on throttle control bellcrank.

On 1956 model 25 horsepower motors and all 30 and 35 horsepower motors; move the speed control grip or lever until the scribe mark (A) on throttle cam (2) is aligned with roller on cam follower (1). Move cam follower until it just contacts cam at the scribe mark; then tighten screw (S).

On 1960 and later 25 horsepower models, the cam follower roller should be adjusted to contact the throttle cam $\frac{1}{16}$-inch ahead of the scribe mark.

On all 40 and 45 horsepower motors, refer to Fig. WB53. Center the cam follower roller between the two scribe marks on throttle cam as shown; then adjust the linkage so that a clearance (A) of 0.020 exists between throttle cam and follower roller.

On 35, 40 and 45 horsepower models, the economizer linkage moves the cam follower roller away from throttle cam at wide open position. Full throttle position is adjusted by means of the adjustable economizer link (3—Fig. WB50). To adjust the economizer linkage, remove the air silencer so that carburetor throttle valve can be observed.

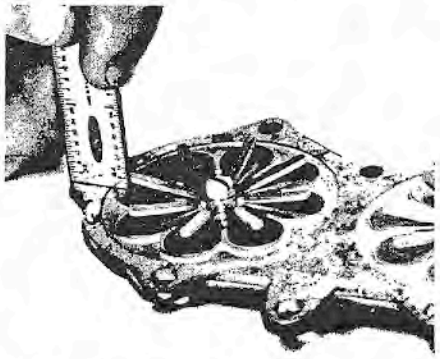

Fig. WB54 — When installing inlet reed valves, adjust reed stops to 11/64-inch when measured as shown.

Move the speed control lever or grip as far as it will go toward the fast position. Adjust the link (3) until the throttle valve (16) is wide open (horizontal).

REED VALVES. The inlet reed valves are located on reed plate between inlet manifold and crankcase. The reed valve assembly should be checked every time the carburetor is removed for service. The reed petals should seat very lightly against the reed plate throughout their entire length, with the least possible tension. Check seating visually. Reed stop setting should be 11/64-inch when measured from end of stop to seating surface of reed plate as shown in Fig. WB54.

Renew reeds if petals are broken, cracked, warped, rusted or bent. Never attempt to bend a reed petal or to straighten a damaged reed. Never install a bent or damaged reed. Seating surface of reed plate should be smooth and flat. When installing reeds or reed stop, make sure that petals are centered over the inlet holes in reed plate; and that reed stops are centered over petals.

FUEL PUMP. All models are equipped with two diaphragm type fuel pumps which are mounted on transfer port covers and hooked in parallel. Pressure and vacuum pulsations from the crankcase are directed through port (1—Fig. WB55) to the rear of diaphragm (2). When the powerhead piston moves upward in its cylinder, vacuum in the crankcase draws the diaphragm inward and fuel enters the pump through filter (6) and the inlet reed valve (4) in reed plate (3). As powerhead piston moves downward, pressure forces the diaphragm outward into fuel chamber, and fuel passes through the

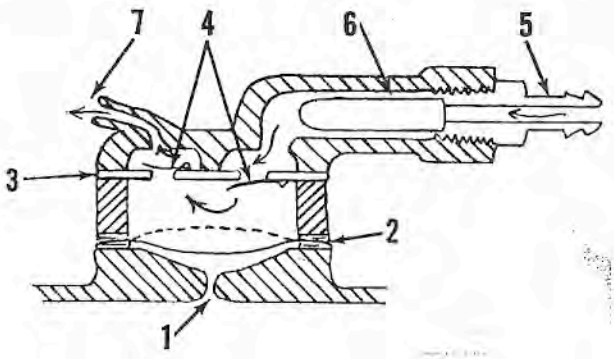

Fig. WB55 — Schematic view of the diaphragm type fuel pump. Two pumps are used. Check valves are of the reed type.

1. Pressure port
2. Diaphragm
3. Reed plate
4. Check valves
5. Inlet fitting
6. Filter
7. Outlet

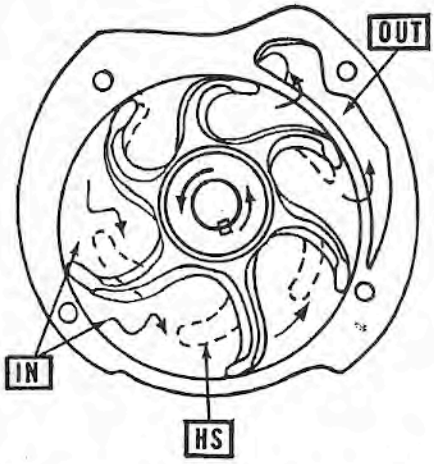

Fig. WB56—Schematic view of rubber impeller type water pump showing principle of operation. The offset housing and flexing impeller blades causes pump to operate by positive displacement at slow speeds. At high speeds, impeller blades remain curved (HS) and pump operates by centrifugal action.

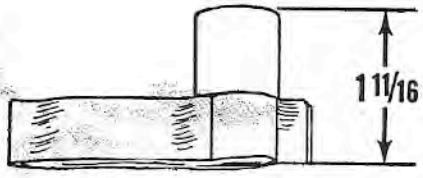

Fig. WB57 — When installing water pump housing seal, press retaining ferrule on housing until total height is 1 11/16-inch as shown.

outlet reed valve into carburetor line (7). Defective or questionable parts should be renewed. Reeds (4) should seat lightly and squarely on reed plate (3). Diaphragm should be renewed if air leaks are found, or if deterioration is evident.

IGNITION

MAGNETO. Breaker point gap should be 0.020 for each set of points, and can be adjusted after the flywheel is removed. Both sets of points must be adjusted exactly alike.

For a quick test of magneto condition, remove the spark plugs and hold spark plug wire about ⅛-inch away from cylinder head. Have someone spin the motor and note the condition of spark. Although spark may not be visible in bright daylight, 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 spark is weak although points are in good condition and properly adjusted, examine the point, 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.

On some 1957, 30 horsepower models, two generator coils are mounted on the magneto stator plate.

BATTERY IGNITION. Some 35, 40 and 45 horsepower motors with electric starter are equipped with a flywheel mounted alternator-generator and battery ignition. Each cylinder is equipped with a complete, separate ignition system consisting of breaker points, condenser and coil.

Breaker points and condenser are mounted on a breaker plate underneath the engine flywheel in the position normally occupied by the magneto. Breaker point gap should be 0.020 for each set of points, and can be adjusted after flywheel is removed. Both sets of points must be adjusted exactly alike.

Check to see that points and condenser are in good condition; and check for faulty insulation, broken wires or loose or corroded connections.

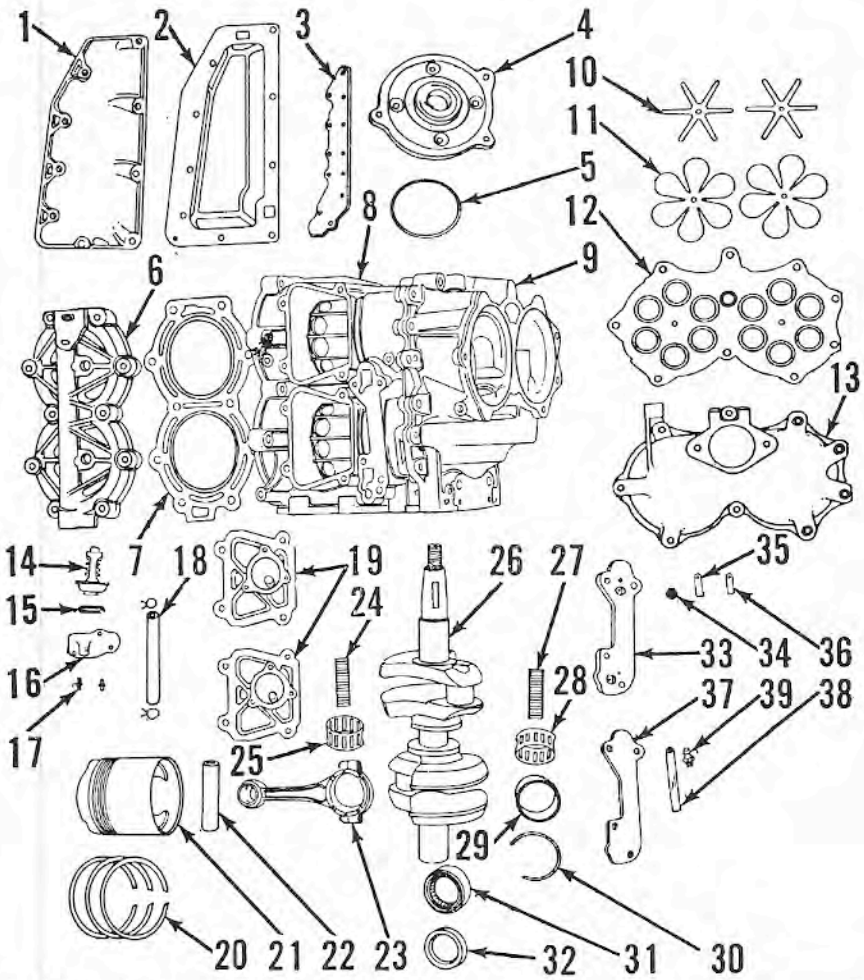

Fig. WB58—Exploded view of power head and associated parts. Shown is 40 horsepower model. Others are similar.

1. Exhaust cover
2. Exhaust cover
3. Water jacket cover
4. Upper bearing cage
5. Sealing ring
6. Cylinder head
7. Gasket
8. Cylinder half
9. Crankcase half
10. Reed stop
11. Reed petals
12. Reed plate
13. Inlet manifold
14. Thermostat
15. Grommet
16. Thermostat cover
17. Fitting
18. Water line
19. Transfer port covers
20. Piston rings
21. Piston
22. Piston pin
23. Connecting rod
24. Needle rollers
25. Bearing cage
26. Crankshaft
27. Needle rollers
28. Bearing cage
29. Outer race
30. Retaining ring
31. Lower bearing
32. Lower seal
33. Reed plate
34. Drain screen
35. Reed petal
36. Reed stop
37. Drain cover
38. Drain line
39. Drain fitting

COOLING SYSTEM

WATER PUMP. All motors are equipped with a rubber impeller water pump of the type shown in Fig. WB56. The water pump is mounted in the lower unit drive shaft housing (upper gearcase).

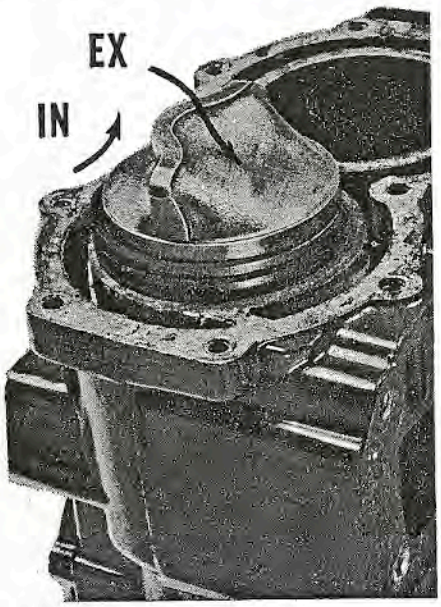

Fig. WB59 — Piston correctly installed in cylinder, showing relation of piston baffle to inlet and exhaust ports.

When cooling system problems are encountered, first check the thermostat on models so equipped. Check the water inlet for plugging or partial stoppage, then if not corrected, remove the lower unit gearcase and check the condition of water pump, water passages and sealing surfaces.

One pump housing kit is being used to service all models from 5½ to 40 horsepower. This kit contains two water line seals and a retaining ferrule. When renewing the pump housing, install the seal with the largest inside diameter; then press the ferrule in place over seal until upper edge of ferrule is $1\frac{11}{16}$ inches from bottom of housing as shown in Fig. WB57.

THERMOSTAT. On all 40 and 45 horsepower motors, a powerhead mounted thermostat is used to control the coolant temperature. To remove or service the thermostat, remove the cover (16—Fig. WB58) and withdraw the thermostat (14).

POWER HEAD

R&R AND DISASSEMBLE. To overhaul the power head, clamp the motor on a stand or support and remove the engine cover (shroud), intake silencer and control panel. Remove flywheel, starter, magneto or alternator and the carburetor. Remove all interfering wiring and linkage, and as many screws as possible retaining inlet manifold, exhaust covers, transfer port covers, cylinder head, etc., before detaching power head from lower unit.

Remove the screws which secure the power head to lower unit. NOTE: The exhaust cover on rear of motor leg must be removed for access to the rear securing screw. Lift off the power head assembly. Refer to Fig. WB58 for an exploded view of power head.

Crankshaft and pistons can be removed after removing upper bearing cage (4); then removing crankcase front half (9). Exhaust covers (1 & 2), exhaust water jacket cover (3), transfer port covers (19) and crankcase drain cover (37) should be removed for cleaning and inspection if major repairs are to be performed. Pry lugs are provided adjacent to the retaining dowels, for removing the crankcase front half.

Engine components are now accessible for removal and overhaul as outlined in the appropriate following paragraphs. Assemble as outlined in the ASSEMBLY paragraph.

ASSEMBLY. When reassembling, make sure all joint and gasket surfaces are clean, free from nicks and burrs and hardened cement or carbon. Because of the two-cycle design, crankcase and inlet manifold must be completely sealed against both vacuum and pressure. Exhaust manifold and cylinder head must be sealed against water leakage and pressure. Mating surfaces of exhaust areas between power head and motor leg must form a tight seal.

Whenever power head is disassembled, it is recommended that all gasket surfaces, and mating surfaces without gaskets, be carefully checked for nicks and burrs and warped surfaces which might interfere with a tight seal. The cylinder head, head end of cylinder block, and some mating surfaces of manifolds and crankcase may be checked, and lapped if necessary, to provide a smooth surface. Use a regular lapping block or a sufficiently large piece of smooth plate glass. Lay a sheet of No. 00 emery paper on the lapping block, then place the surface to be lapped on the emery paper. 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 paper. Thoroughly clean the parts with new oil on a clean, soft rag then wash with soapsuds and clean rags.

Mating surfaces of crankcase may be checked on the lapping block, and high spots or nicks removed, but the surface must not be lowered. If extreme care is used, a slightly damaged crankcase may be salvaged in this manner. In case of doubt, renew the part.

A heavy, non-fibrous grease should be used to hold loose needle bearings in position during assembly. All friction surfaces should be lubricated with new engine oil. Check frequently as power head is being assembled, for binding or locking of the working parts. If binding or locking is encountered, remove the cause before proceeding with the assembly.

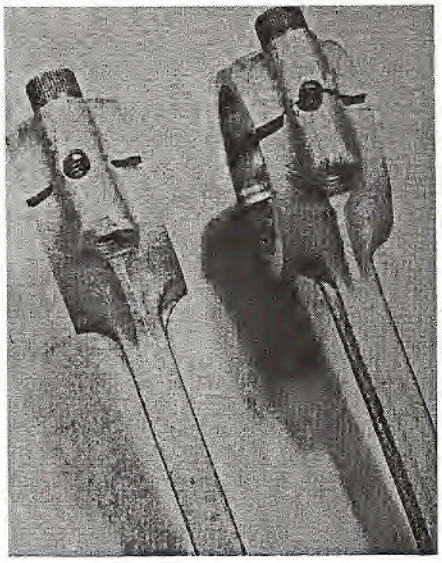

Fig. WB60—Assembled views of fractured connecting rod showing correct and incorrect cap installations.

Gasket and sealing surfaces should be lightly and carefully coated with a non-hardening gasket cement. Make sure entire surface is coated, but avoid letting excess cement squeeze out into crankcase, bearings, or other passages. When installing crankcase screws, tighten those next to the main bearings and dowels first. Refer to CONDENSED SERVICE DATA table for clearances and tightening torques.

PISTONS, PINS, RINGS AND CYLINDERS. Piston is fitted with three rings which should be installed with the beveled inner edge toward closed end of piston. Recommended ring end gap is 0.008-0.015, with a maximum wear limit of 0.020. Piston rings should have 0.002-0.003 side clearance in piston grooves, with a wear limit of 0.0045.

The full floating piston pin in all models except 40 and 45 horsepower motors should have 0.0007-0.001 clearance in connecting rod and 0.0001-0.0006 clearance in piston. On 40 and 45 horsepower motors, piston pin is a tight press fit in piston.

When installing piston in cylinder, the long, tapering side of baffle on piston head should be installed on port side of cylinder block, toward the exhaust ports as shown in Fig. WB59. All friction surfaces should be lubricated with new engine oil when assembling.

CONNECTING RODS, BEARINGS AND CRANKSHAFT. Before detaching connecting rods from crankshaft, make certain that rod and cap are properly marked for correct assembly to each other and in the correct cylinder. The loose needle bearings at crankpin end of connecting rod should be kept with each assembly and not intermixed if reused.

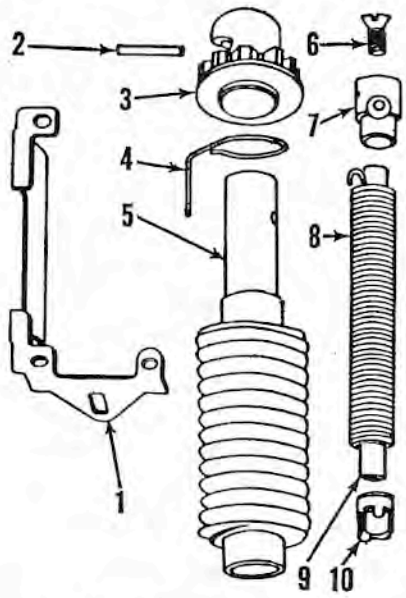

Fig. WB61—Exploded view of recoil starter of the type used.

1. Rope guide
2. Drive pin
3. Drive pinion
4. Pinion spring
5. Starter spool
6. Locking screw
7. Spring drive
8. Recoil spring
9. Guide post
10. Retainer

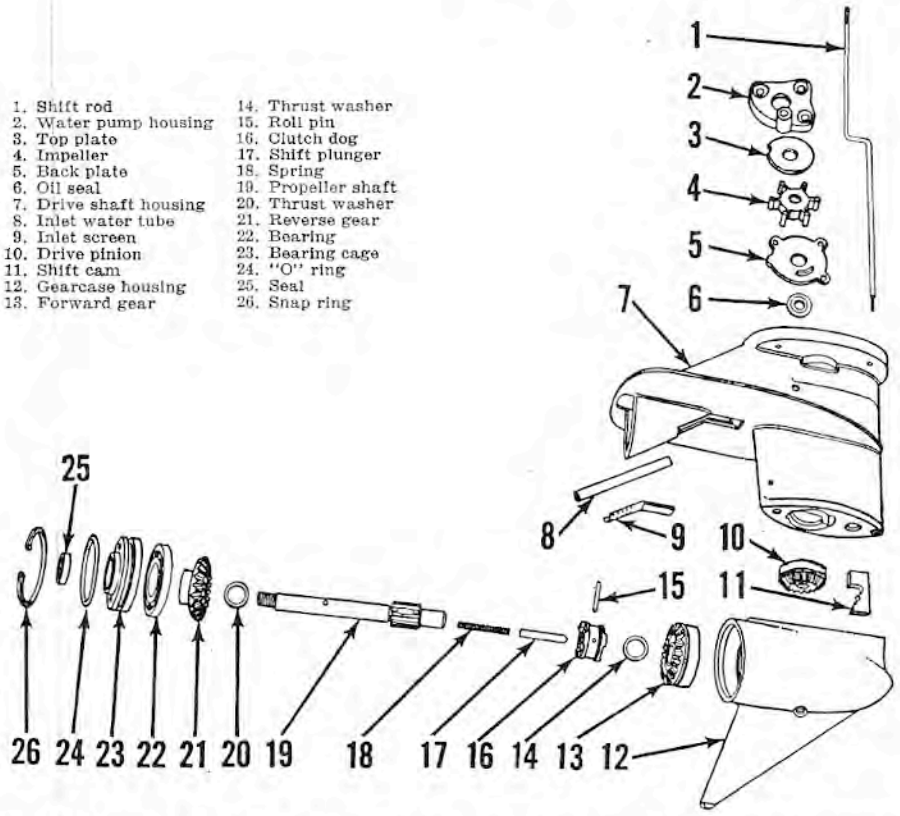

Fig. WB63—Exploded view of lower unit gearcase, drive shaft housing and associated parts used on early models.

The forged steel connecting rod contains a double row of uncaged needle rollers in the 1956, 25 horsepower motor. Assemble the bearings with flat ends together, toward center of bearing. On all other motors, the connecting rod bearing consists of a split cage and 16 loose needle rollers. On all motors, the parting faces of rod and cap are not machined, but are fractured, as shown in Fig. WB60, to provide positive location. When installing cap, make sure the correlation marks are aligned; then shift cap back and forth slightly while tightening, until fracture sections are in perfect mesh. When properly installed, the parting line is practically invisible as shown in the left hand view. Rod side play on crankpin should be 0.015-0.025, with a wear limit of 0.040.

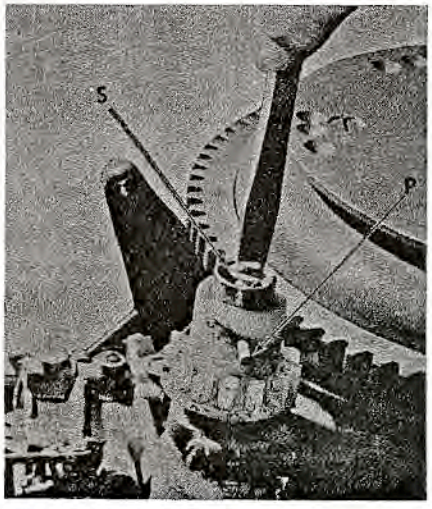

Fig. WB62—To disassemble the starter, first remove lock screw (S) and install special tool before attempting to remove drive pin pin (P). Refer to text.

The crankshaft upper main bearing is a part of bearing cap (4—Fig. WB58). The center main bearing on 1956 model 25 horsepower motors consists of 26 loose needle rollers which are contained in a split outer race. On all other motors the sixteen loose needle rollers are contained in a split cage and housed in a two-piece outer race secured by a retaining ring. In some motors, the bearing cage and rollers are interchangeable with the connecting rod bearings. The center main bearing race on all motors is separated by fracturing. When assembling the bearing, work the two halves of outer race back and forth a slight amount until the fracture lines are in mesh, then install the retaining ring. The lower main bearing is of the caged roller type.

Recommended crankshaft end play is 0.001-0.006, with a wear limit of 0.011. Pistons and rings for all motors are available in 0.010 oversize, as well as standard. All other parts are available in standard size only.

When assembling, follow the procedures outlined in the ASSEMBLY paragraph. Tightening torques are listed in the CONDENSED SERVICE DATA table.

MANUAL STARTER

Fig. WB61 shows an exploded view of the recoil starter assembly. Starter pinion (3) engages a starter ring gear on the flywheel. See Fig. WB62.

To disassemble the starter, first remove the engine cover, then remove screw (S—Fig. WB62) in top of starter shaft. NOTE: This screw retains pin (P). Thread the special "T" handle tool (West Bend, T3139) in threaded hole from which screw (S) was removed. Tighten the tool until it bottoms; then turn tool handle slightly counterclockwise to relieve recoil spring tension, and push out pin (P). Allow the tool and starter drive (7—Fig. WB61) to turn clockwise until recoil spring is unwound; then pull up on tool to remove the recoil spring and components. Guide post (9) and spring retainer (10) can be lifted out after recoil spring is removed.

Recoil spring, pinion (3) or associated parts can be renewed at this time. To renew the starter rope, remove the clamps retaining spool (5) to the starter bracket; then remove the spool. Thread rope through hole in lower end of spool (5) and install the hooked retainer approximately ½-inch from end of rope. Pull the attached end tight and fully rewind the rope in spool grooves; then reinstall the spool. Install drive pinion, pack recoil spring with lubriplate or similar grease then reinstall the recoil spring and attaching parts. Use the "T" handle tool to

1. Oil seal
2. Bearing cage
3. Sealing ring
4. Bearing
5. Reverse gear
6. Thrust washer
7. Propeller shaft
8. Shift shaft
9. Detent ball
10. Clutch dog
11. Cross pin
12. Retaining ring
13. Thrust washer
14. Forward gear
15. Gearcase housing
16. Pivot pin
17. Shift yoke
18. Shift pivot
19. Pin
20. Coupling
21. Drive pinion
22. Pin
23. Driveshaft housing
24. Water inlet
25. Inlet tube
26. Oil seal
27. Lower shift rod
28. Back plate
29. Impeller
30. Top plate
31. Water pump body
32. Coupling
33. Locknut
34. Intermediate shift rod

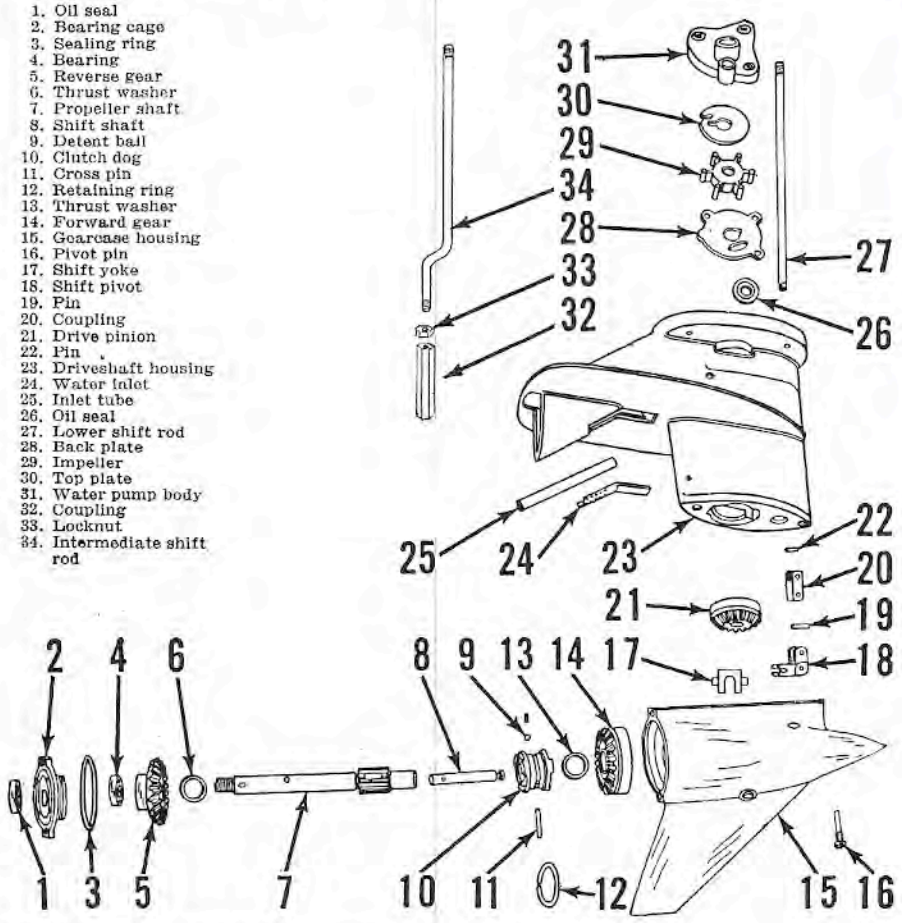

Fig. WB64—Exploded view of lower unit gearcase, drive shaft housing and associated parts used on late models.

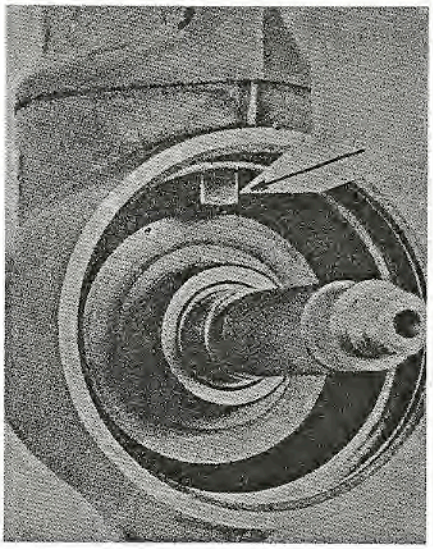

Fig. WB65—Lower unit gearcase with propeller shaft bearing cage removed. Stud nut (arrow) must be removed before gearcase can be detached from driveshaft housing.

wind the recoil spring counter-clockwise eight full turns. Align the pin holes in pinion (3), spool (5) and spring drive (7) and reinstall pin (2); then remove the tool and secure the pin with locking screw (6).

LOWER UNIT

PROPELLER AND DRIVE PIN. Shear pin protection is carefully engineered for each unit. Protection depends on shear pin material as well as size. Although, in an emergency, the shear pin may be replaced by one of any available material, the correct shear pin should be installed as soon as possible to insure maximum performance and protection. Spare shear pins should always be carried.

All models before 1958 use a ¼ x 1 13/32 inch stainless steel shear pin, manufacturer's part number 16048. All models after 1957 use a ¼ x 1 15/64 inch stainless steel shear pin, part number A16047. All 25 horsepower motors use a 10⅜ x 11½ inch three blade propeller. All 1957, 30 horsepower motors use a 10⅜ x 12 inch three blade propeller. All 35 and 40 horsepower motors before 1960 use a 10½ x 12 inch propeller; and later models fit the propeller for best performance under applicable conditions.

R&R AND OVERHAUL. To remove the lower unit gearcase and drive shaft housing from lower motor leg, loosen the locknut (B—Fig. WB69) on upper shift rod, and disconnect the coupling (C). Remove the screws retaining the driveshaft housing (upper gearcase) to motor leg and remove the complete lower unit drive assembly. Refer to Fig. WB63 or Fig. WB64. On early 35 and 40 horsepower models, remove interfering shift linkage. On 25, 30 and late 40 horsepower models, turn shift rod (1—Fig. WB63 or 34—Fig. WB64) to clear water pump housing. On all models, disassemble and remove water pump.

Remove the propeller and shear pin. Remove any burrs or rust from exposed end of propeller shaft. Remove the propeller shaft bearing cage as follows:

On early models, remove snap ring (26—Fig. WB63) and thread two screws into holes in bearing cage (23). Use a puller to remove the bearing cage. On late models, the bearing cage (2—Fig. WB64) is retained to gearcase by cap screws instead of snap ring.

After bearing cage has been removed, the lower gearcase can be removed from driveshaft housing. To remove the gearcase, remove the rear stud nut from INSIDE gearcase as shown by arrow, Fig. WB65, and the front stud nut from top of driveshaft housing. Remove shift rod (1—Fig. WB63) on early models or intermediate shift rod (34—Fig. WB64) and coupling (32) from late models, then separate the driveshaft and gearcase housings.

To complete the disassembly, refer to the appropriate following paragraphs:

Early Models: Propeller shaft, gears, bearings and shift mechanism can be removed after housings are separated. An internal expanding puller and slide hammer may be required to remove the front gear (13—Fig. WB63). In some cases, gear may be removed by heating gearcase with a torch, then jarring open end on a block of wood to dislodge the gear and bearing assembly. When installing front gear and bearing assembly, assemble the bearing cage (23), without "O" ring (24) over rear of propeller shaft; install thrust washer (14) and gear assembly (13) on front of shaft; then use the propeller shaft as a piloted driver. Backlash and mesh position of the gears are not adjustable.

Assemble by reversing the disassembly procedure. Adjust the gear shift rod coupling until gear shift control rod (Fig. WB67) is horizontal in the neutral position, then check to see that forward and reverse gears engage fully.

Late Models: To disassemble the removed gear housing assembly, first remove the rear gear (5—Fig. WB64) and thrust washer (6); then withdraw propeller shaft (7) with clutch assembly installed. Shift arm yoke (17) will be free when propeller shaft is removed. Remove drive pinion and bearing assembly (21) and front gear and bearing (14). Remove the shift pivot pin (16) from starboard side of gearcase, and withdraw shift rod assembly (27) with linkage (18, 19, 20 & 22) attached.

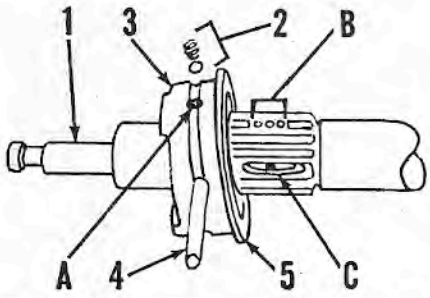

Fig. WB66—Assembling the shift mechanism to propeller shaft. Refer to text.

1. Shift shaft
2. Detent
3. Clutch dog
4. Cross pin
5. Retaining ring

A. Detent hole
B. Detents
C. Shift slot

To disassemble the propeller shaft and shift clutch assembly, remove the retaining ring (12) from clutch dog (10). NOTE: Detent ball and spring (9) will be released when retaining ring is withdrawn. Do not lose the spring or ball. Remove the tapered cross pin (11) by driving on the end which contains the grooves; then withdraw the shift pin (8) and clutch dog (10).

To assemble the propeller shaft, refer to Fig. WB66. Install the retaining ring on one edge of clutch dog (3) and assemble to propeller shaft making sure the detent hole (A) is aligned with the detents (B) in propeller shaft splines. Insert the shift shaft (1) and align the pin hole with slotted hole (C) in propeller shaft. Align the cross pin hole in clutch dog and insert the small end of cross pin (4) through clutch dog (3), slotted hole (C) and pin hole in shift shaft (1). Drive the cross pin into position. Install the detent ball and spring (2) in detent hole (A), and hold in place with screwdriver or punch until secured by retaining ring (5).

To reassemble the gearcase, install the shift rod (27—Fig. WB64) with coupling (20) and pivot (18) attached; then install pivot pin (16). Assemble forward gear thrust washer (13) and gear (14) on propeller shaft; then install shift arm yoke (17) in slot in front end of shift shaft (8). Carefully guide the propeller shaft assembly in gearcase, making sure the tabs on shift yoke (17) engage the fork slots in shift pivot (18).

On early 35 and 40 horsepower models which use the front gearcase mounting stud as a shifting pivot, install the stud until center line of pin hole in stud is 9¼ inches from mounting surface of gearcase and at right angles to propeller shaft as shown in Fig. WB68.

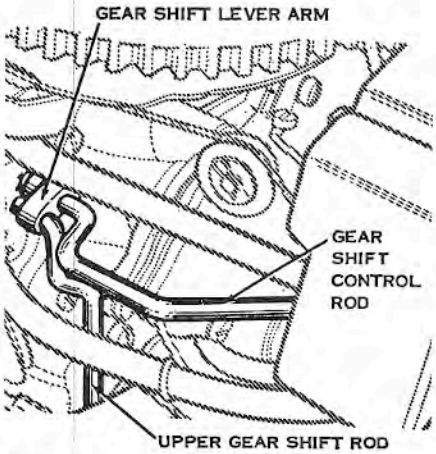

Fig. WB67 — Adjust the gear shift rod on early models until the gear shift control rod is horizontal in the neutral position.

On late 25, 40 and 45 horsepower models, assemble gearcase housing to drive shaft housing and install propeller shaft bearing cage (2—Fig. WB64) to complete the installation of the gearcase. Install the water pump assembly by reversing the disassembly procedure; then assemble the intermediate shift rod as follows:

Install coupler (32) to lower shift rod (27) until it bottoms. Start the intermediate shift rod (34) and locknut (33) into upper end of coupler. Push down on shift rod and turn the propeller shaft until fully engaged in forward gear; then thread intermediate shift rod into coupler until bend in rod is $\frac{1}{16}$-⅛-inch above water pump body. Turn the rod until upper offset is to the rear and approximately 28° to the right of driveshaft centerline; then tighten the locknut (33).

On all late models, after completing the assembly, adjust the shift rod coupling by referring to Fig. WB69. Install the locknut (B) and reverse lock arm on upper shift rod and install the coupling turnbuckle (C) to its approximate original position. Move the shift lever to "Forward," "Neutral" and "Reverse" positions, while marking the position where intermediate shift rod emerges from motor leg as shown at (A). The distance between the three scribe marks must be equal. If it is not, adjust by turning the turnbuckle (C) as required. When the correct adjustment has been obtained, tighten the locknut (B).

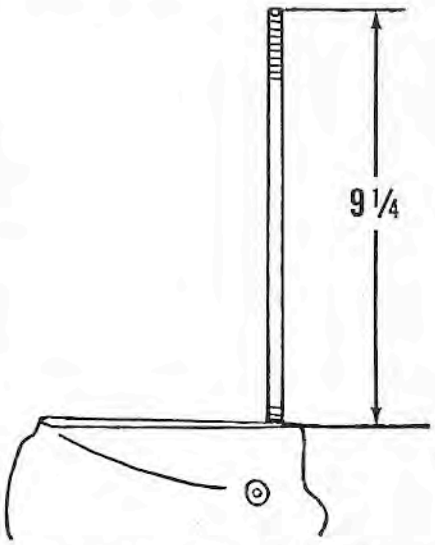

Fig. WB68—On early 35 and 40 horsepower models which use front stud as shift pivot, stud must be threaded into housing until center of pivot hole is crosswise and 9¼-inches from mounting surface as shown.

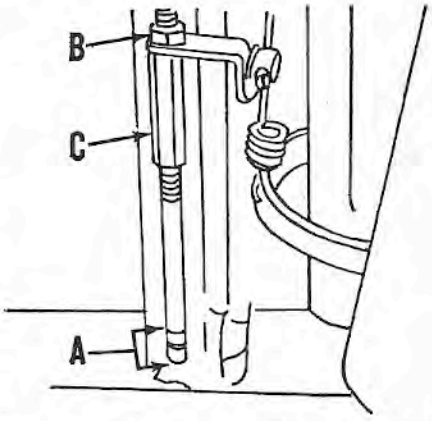

Fig. WB69 — To adjust the shift linkage, scribe a line on intermediate shift rod in "Forward," "Neutral" and "Reverse" positions (A). Equalize by loosening locknut (B) and threading connecting turnbuckle (C) out or in.

ELECTRICAL UNITS. Refer to the separate, ELECTRICAL SYSTEM section at end of WEST BEND group for wiring diagrams and service information on components.