

# McCULLOCH

McCULLOCH CORPORATION  
Los Angeles 45, California

MODEL  
MAC 15

Bore  
2 1/8

Stroke  
1 3/8

Displacement  
4.9

## MAINTENANCE

**SPARK PLUG.** Use a Champion J-8J or equivalent spark plug. Set electrode gap to 0.025.

**CARBURETOR.** Refer to Fig. MC103 for exploded view of Tillotson HC series carburetor used on the MAC 15. View of fuel mixture adjustment needles is shown in Fig. MC102.

For initial adjustment, open both the idle and main fuel adjustment needles one full turn. With engine warm and running, make final adjustments as follows: Adjust idle fuel needle to obtain smooth, rapid acceleration without hesitation or excessive heavy smoke. Adjust the idle speed stop screw so that the engine idles at just below clutch engagement speed. With the saw under a cutting load, adjust the main fuel needle to an overly rich setting so that engine runs rough, then slowly lean the main fuel mixture until engine smooths out under load.

**MAGNETO AND TIMING.** Components of the flywheel type magneto are shown in the exploded view in Fig. MC106.

Ignition timing is fixed and non-adjustable. Adjust breaker point gap to 0.018. Re-check gap after tightening breaker plate mounting screws. Condenser capacity should be 0.18-0.22 mfd.

Armature air gap should be adjusted to 0.010 whenever servicing magneto.

**LUBRICATION.** Engine is lubricated by mixing oil with the fuel. Mix 1/2-pint of McCulloch oil with each 1 1/4 gallons of regular gasoline; if McCulloch oil is not available, mix 1/2-pint of non-detergent medium grade SAE 30 motor oil with each gallon of regular gasoline.

Fig. MC103—Exploded view of Tillotson HC series carburetor used on MAC 15 chain saw. Carburetor is gravity fed from fuel tank; no fuel pump is used.

1. Idle fuel needle
2. Throttle shaft
3. Fuel inlet
4. Gasket
5. Fuel strainer
6. Gasket
7. Throttle disc
8. Fuel lever pin
9. Clip
10. Throttle shaft arm
11. Choke shaft
12. Seal
13. Inlet valve seat
14. Inlet valve
15. Cover
16. Diaphragm
17. Gasket
18. Fuel lever
19. Spring
20. Expansion plug
21. Cup plug
22. Carburetor body
23. Choke disc
24. Choke detent
25. Idle speed screw
26. Packing
27. Washer
28. Spring
29. Main fuel needle

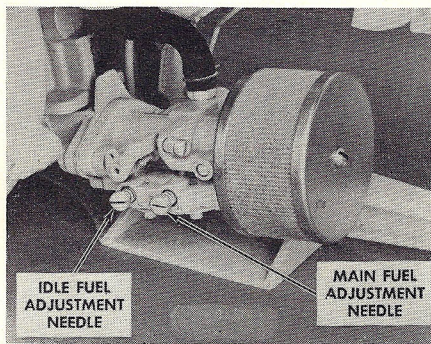
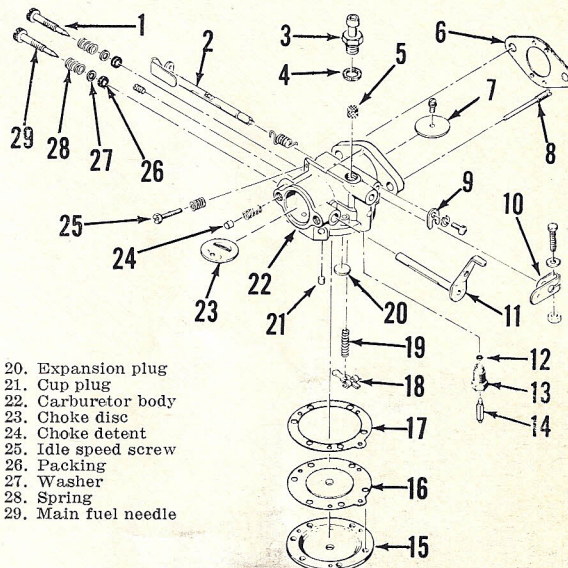


Fig. MC102 — View of fuel adjustment needles on MAC 15 carburetor.

Fill chain oiler reservoir with a good grade of SAE 30 motor oil in temperatures above 40° F., and use SAE 10 motor oil in temperatures below 40° F. When cutting wood with high sap or pitch content, the chain oil can be diluted with kerosene. However, never use kerosene in excess of 50% of the oil-kerosene mixture.

**CARBON.** Clogged exhaust ports or muffler openings will cause loss of power. The muffler should be removed and scraped free of carbon at regular intervals. If the cylinder exhaust ports need cleaning, turn the engine so that piston is at top dead center and clean the exhaust ports with a wood scraper. Be careful not to scratch piston or damage cylinder.

## REPAIRS

**CONNECTING ROD.** Connecting rod and piston assembly is removed from bottom of crankcase after removing the crankshaft. Crankpin bearing consists of 24 loose needle roller bearings. Piston pin is a press fit in connecting rod.

Inspect the connecting rod for scoring of the crankpin bearing surface or twisting or bending of rod. Discard connecting rod if

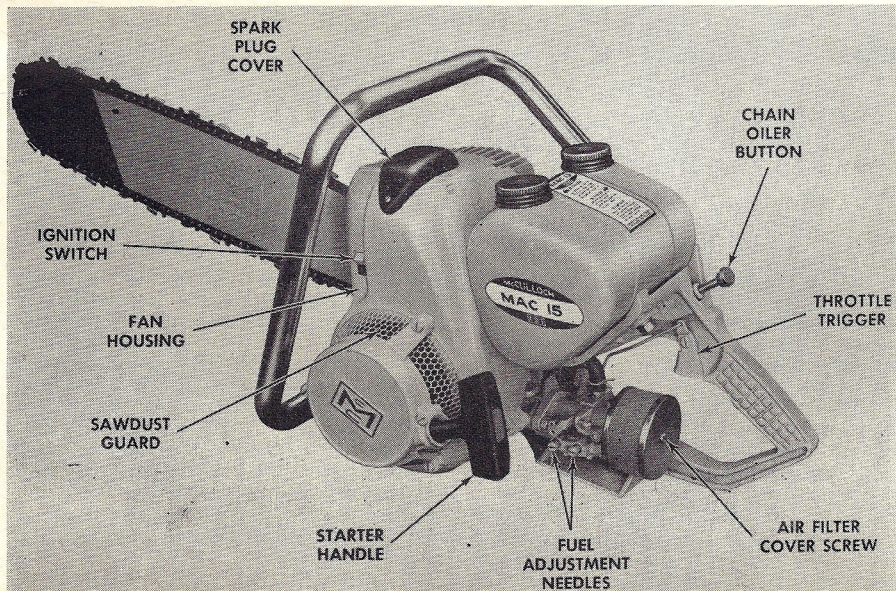


Fig. MC101 — View of McCulloch MAC 15 chain saw.

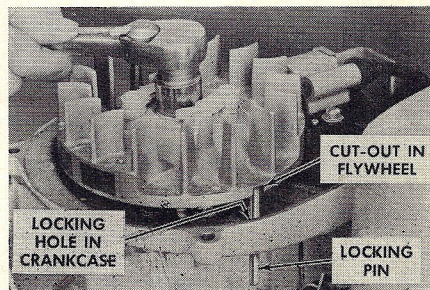


Fig. MC104 — View showing method of locking engine flywheel to remove flywheel retaining nut.

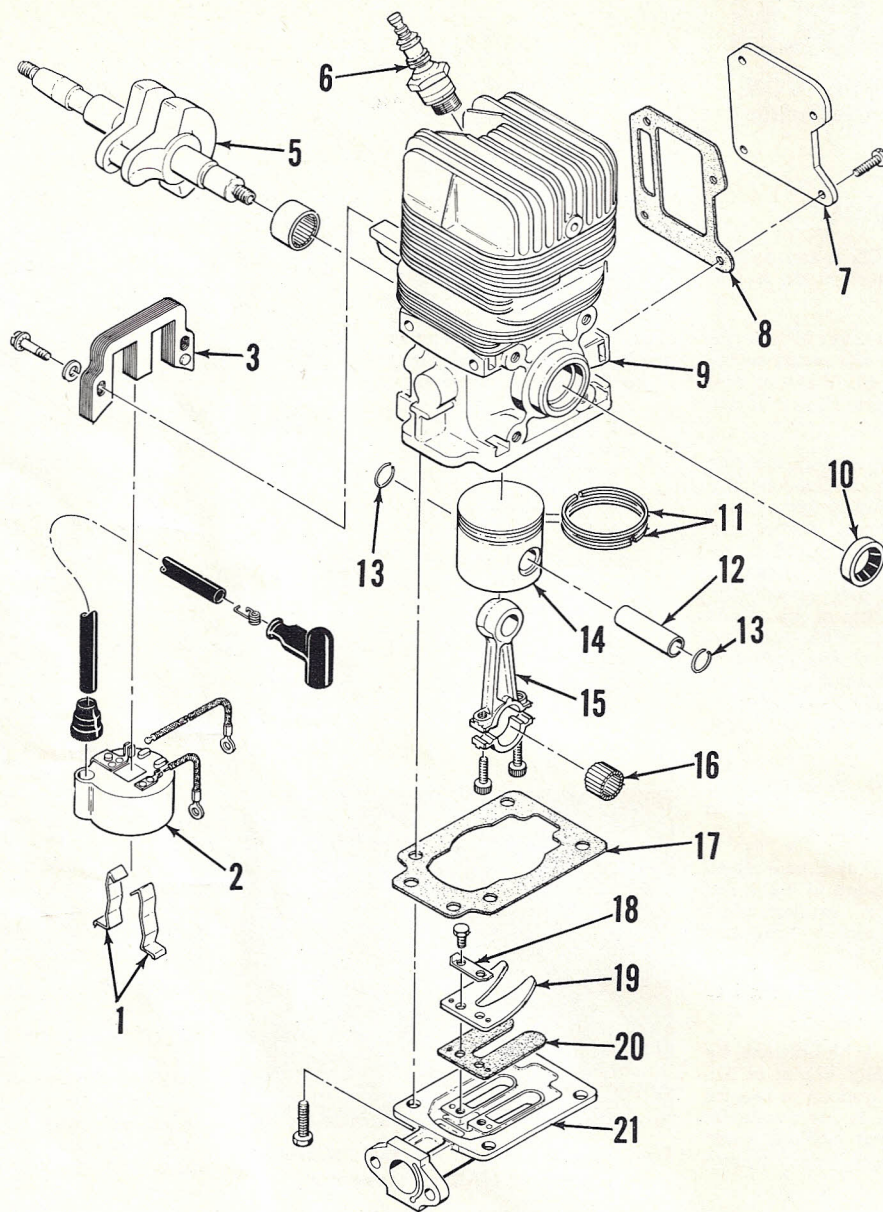


Fig. MC105 — Exploded view of MAC 15 power head.

- 1. Coil clips
- 2. Ignition coil
- 3. Armature
- 5. Crankshaft

- 6. Spark plug
- 7. Crankcase cover
- 8. Gasket
- 9. Cylinder

- 10. Seal
- 11. Piston rings
- 12. Piston pin
- 13. Snap rings

- 14. Piston
- 15. Connecting rod
- 16. Needle rollers (24)
- 17. Gasket

- 18. Lock plate
- 19. Reed guard
- 20. Reed valve
- 21. Reed valve plate

any of these defects are found. The 24 crankpin needle rollers should be renewed as a set if any roller is damaged, worn or burned.

When reinstalling connecting rod to crankpin, coat the rod bearing surface with a light film of grease such as Lubriplate and stick 12 of the needle rollers to the rod. Coat the rod cap with light film of grease and stick the remaining 12 rollers to cap. Be sure the pins on rod and cap are aligned. Parting line of rod and cap is fractured to provide a dowel effect of the meshing of the rod and cap surfaces. When cap is correctly installed, the parting line is practically invisible and no catch points can

be felt by rubbing finger nail across the parting line. Wiggle the cap while tightening retaining screws to properly mesh the uneven surfaces. Tighten cap retaining screws to a torque of 65-70 inch-pounds.

**PISTON, PIN AND RINGS.** Piston and piston rings are available for service in standard size and 0.020 oversize only. Desired piston skirt to cylinder wall clearance, measured at right angle to piston pin, should be 0.0025-0.005; maximum allowable clearance is 0.010. Ring end gap should be 0.004-0.012, and ring side clearance in groove should be 0.0015-0.004.

Piston is equipped with Oilite piston pin

bushings which are retained in the piston by snap rings. Piston pin is retained by being a press fit in the connecting rod.

When reassembling piston and connecting rod, heat the connecting rod in an oven or with heat lamp to a temperature of approximately 300° F. Be sure the bushing retaining snap rings are in place in the piston. Lightly oil the piston pin, align connecting rod in piston and press pin into piston and rod so that ends of pin are in line with the outer ends of the piston pin bushings.

Install piston and rod assembly into cylinder with closed end of piston pin towards

exhaust ports in cylinder wall. Lubricate piston and rings prior to installation. The bevel in bottom end of cylinder bore will act as a ring compressor.

**CYLINDER.** The cylinder should be renewed or rebored to 0.020 oversize if taper or out-of-round condition exceeds 0.005; if cylinder is scored, scratched, pitted or scuffed; if exhaust or intake ports are pounded; if new rings will not seal and engine lacks power; or if piston skirt to cylinder wall clearance exceeds 0.010. Standard cylinder bore diameter is 2.125-2.126.

**CRANKSHAFT.** The crankshaft is supported in a needle roller bearing in the crankcase and a ball bearing in the crankcase cover. When removing crankshaft, first detach connecting rod from crankpin and push piston and rod assembly to top of cylinder. Move lower end of rod to open side of crankcase and turn the crankshaft so that throws will clear rod and press crankshaft and crankcase cover out of crankcase. Then, press crankshaft and ball bearing out of crankcase cover.

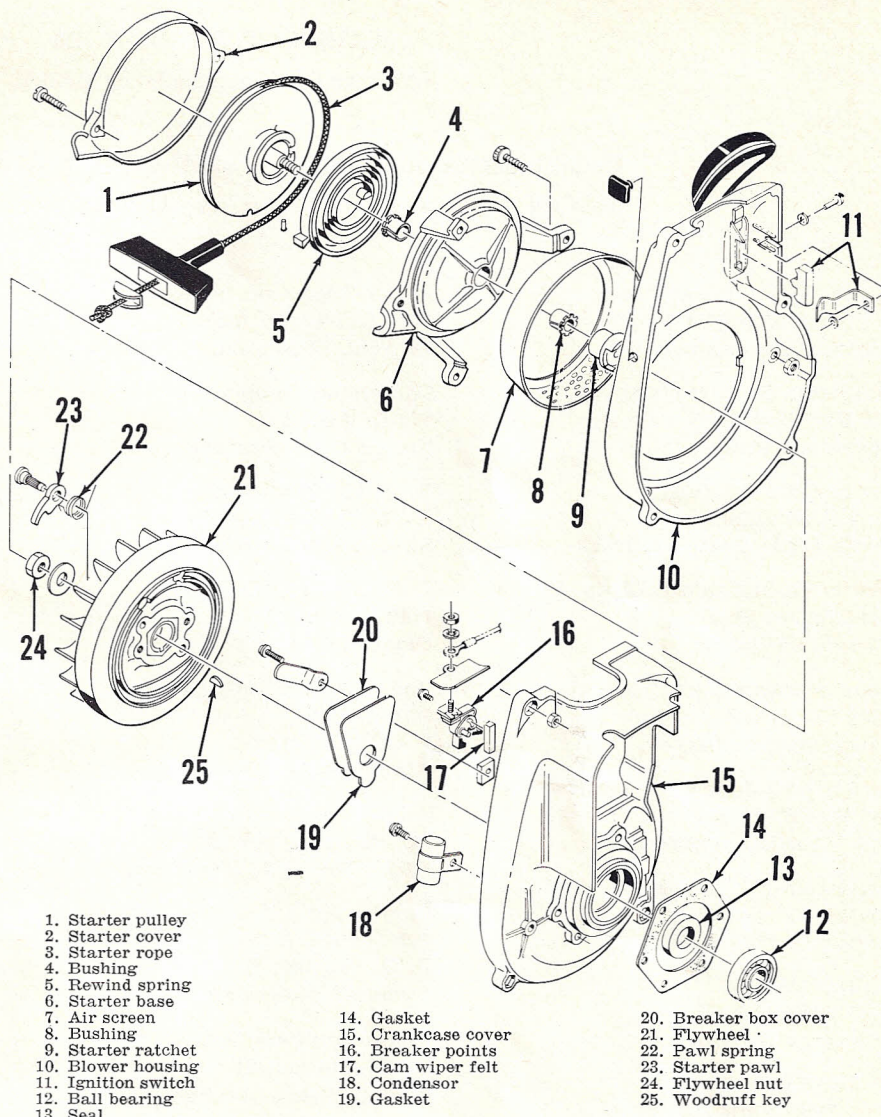
Renew the ball bearing main if rough or excessively worn. Bearing is a press fit on crankshaft. When renewing bearing, support crankshaft under throw and press bearing onto shaft until bearing contacts shoulder on throw.

Renew the caged needle roller bearing in crankcase if any roller is pitted, scored or has flat spots, or if excessively worn. To install new bearing, heat crankcase to about 180° F. in oven or under heat lamp and press needle bearing into bearing insert in crankcase. Press on lettered end of bearing cage only. Install new seal with lip towards inside of crankcase and with outer face flush with boss on outside of crankcase. Be sure that there is approximately 1/8-inch clearance between lip of seal and end of needle bearing cage.

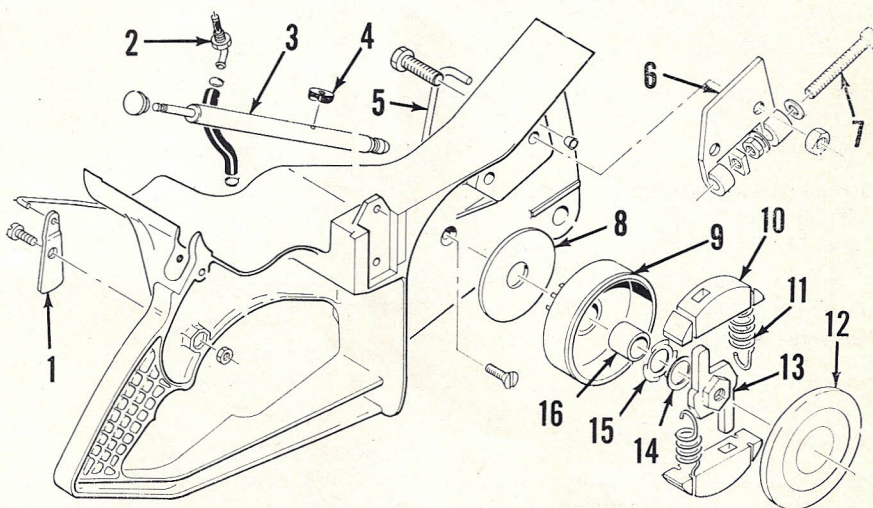
When reassembling, heat crankcase cover plate to about 180 to 200° F. in oven or under heat lamp before pressing crankshaft and bearing assembly into end plate. Allow cover plate to cool and heat crankcase to 180-200° F. Install piston and connecting rod assembly, fasten cover gasket to crankcase cover plate with gasket cement and press the crankshaft and cover plate assembly into crankcase. NOTE: Use a seal protector or tape ends of crankshaft to prevent damage to seals when installing crankshaft with seals already installed.

**REED VALVES.** The dual reed inlet valves seat on the adapter plate (21—Fig. MC105). Renew valve reed if rusted, pitted or cracked or if reed does not seal against seat. Be sure to place smooth side of reed against seat. Tighten the retaining screws to a torque of 30-35 inch-pounds and bend the lock plate (18) against the screw heads.

**CLUTCH.** Refer to Fig. MC107 for exploded view of the drive clutch assembly used on the MAC 15 chain saw. To remove the clutch assembly, pry the clutch cover (12) off of the drum (9), lock the flywheel as shown in Fig. MC104, and turn rotor (13—Fig. MC107) clockwise to remove. Clutch drum and sprocket assembly (9) is equipped with a renewable Oillite bushing (16). When reassembling, be sure that spring (15) and washer (14) are placed in order shown.



**Fig. MC106 — Exploded view of MAC 15 starter, magneto and crankcase cover.**



**Fig. MC107 — Exploded view of MAC 15 direct drive clutch, main frame and related parts.**