# McCULLOCH

**McCULLOCH CORPORATION**
**Los Angeles 45, California**

| MODELS | Bore | Stroke | Displ. | Drive Type |
|---|---|---|---|---|
| D-30, D-36 & Super 44 | 2 1/8 | 1 3/8 | 4.9 | Direct |
| 1-40, 1-41, 1-42, 1-43, 1-45, 1-46 & 200 | 2 1/8 | 1 3/8 | 4.9 | Direct |
| 1-50, 1-51 & 250 | 2 1/8 | 1 3/8 | 4.9 | Direct |
| 55, Super 55, Super 55A | 2 1/8 | 1 3/8 | 4.9 | Gear |
| 1-60, 1-61, 1-62, 1-63 & 640 | 2 1/8 | 1 3/8 | 4.9 | Gear |
| Super 44A, 1-52, 1-53 & 380 | 2 1/8 | 1 1/2 | 5.3 | Direct |
| 1-70, 1-71, 1-72 & 440 | 2 1/8 | 1 1/2 | 5.3 | Direct |
| 1-80, 1-81, 1-81HD & 1-82 | 2 1/8 | 1 1/2 | 5.3 | Gear |
| 1-75 | 2 1/8 | 1 5/8 | 5.8 | Direct |
| 1-85 | 2 1/8 | 1 5/8 | 5.8 | Gear |
| 1-76 & 740 | 2.165 | 1.635 | 6.04 | Direct |
| 1-86 & 840 | 2.165 | 1.635 | 6.04 | Gear |

## MAINTENANCE

**SPARK PLUG.** Recommended spark plug for model 1-85 is Champion J4J. Recommended spark plug for all other models is Champion J8J, AC M45 or Autolite A7X. Set electrode gap to 0.025.

**CARBURETOR.** All models are equipped with either McCulloch or Tillotson diaphragm type carburetors with integral fuel pump.

On some early production models, a plunger type choke as shown in Fig. MC28 was used. Later production models were equipped with carburetors having a conventional disc type choke. Current production models 250, 380, 440, 640, 740 and 840 do not have a choke; but rich starting fuel-air mixture is obtained by use of a primer as shown in the exploded view in Fig. MC27C. When the primer plunger is depressed, fuel will be pumped directly into the carburetor throat when engine is turned with starter.

A fuel collector (see Fig. MC28A) is used with primer-equipped carburetors to catch the fuel spit back out of the carburetor and to return it back into the carburetor throat. On models 440, 640, 740 and 840, the collector is attached to the air box instead of carburetor and fuel is fed back through a tube connected between the collector and carburetor.

On models having a flexible hose fuel pick-up, the weighted pick-up head can be fished out through the filler cap opening

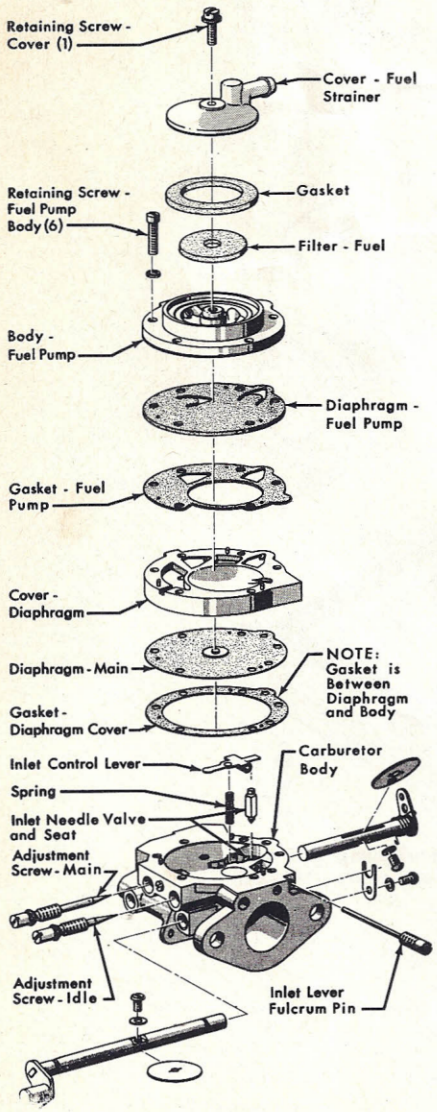



**Fig. MC27 — Exploded view of McCulloch carburetor used on model Super 44 and some other early models of this series.**

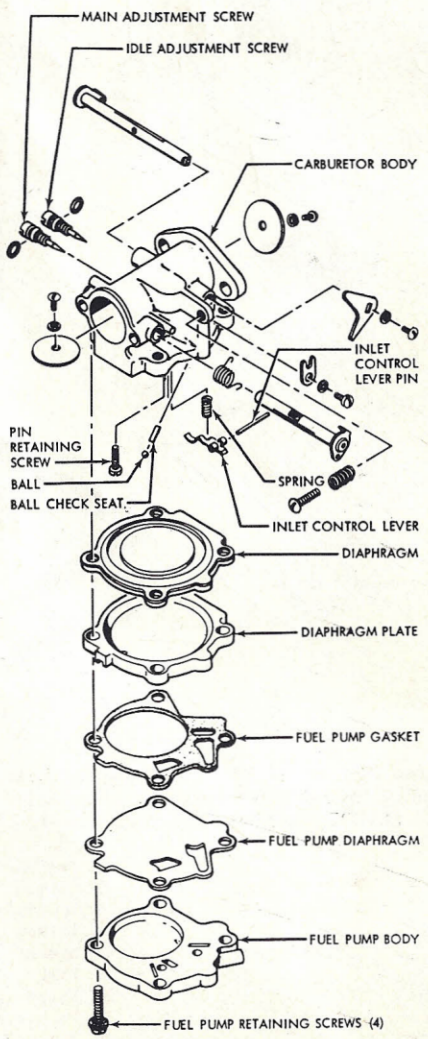



**Fig. MC27A—Exploded view of McCulloch carburetor used on model Super 44A and later McCulloch models of this series.**

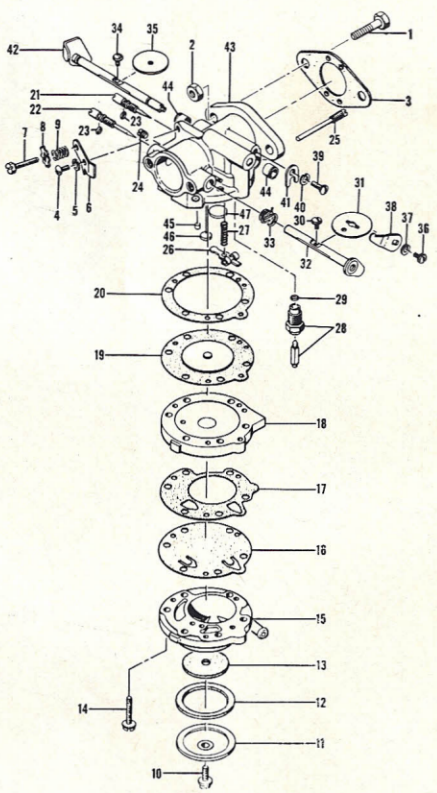


**Fig. MC27B—Exploded view of Series HL Tillotson carburetor used on some later models.**

3. Gasket
6. Idle screw bracket
9. Spring
11. Fuel strainer cover
12. Gasket
13. Fuel filter element
15. Fuel pump body
16. Fuel pump diaphragm
17. Gasket
18. Cover
19. Fuel diaphragm
20. Gasket
21. Idle needle
22. Main needle
23. "O" ring
24. Drain plug
25. Inlet lever pin
26. Inlet lever
27. Spring
28. Needle, seat & gasket
31. Choke disc
32. Choke shaft
33. Spring
35. Throttle disc
38. Throttle shaft lever
42. Throttle shaft
43. Carburetor body



Illustrations courtesy of McCulloch Corp.

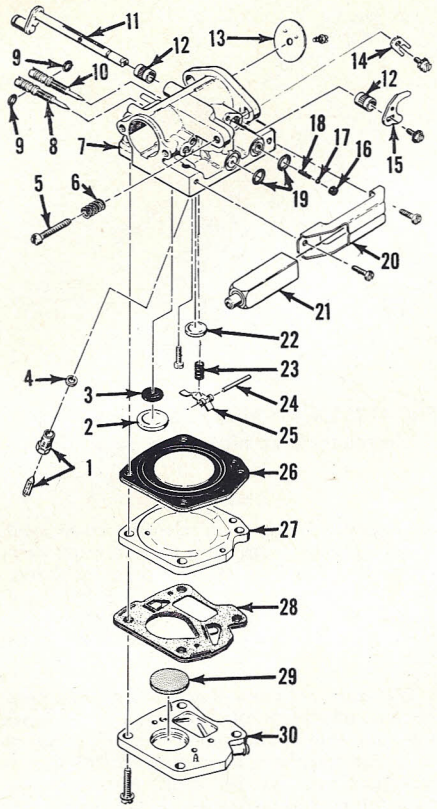



**Fig. MC27C—Exploded view of McCulloch carburetor equipped with a fuel primer instead of conventional choke. Carburetor shown is for Model 740; carburetors used on other late production models are similar.**

1. Inlet valve
2. Expansion plug
3. Capillary seal
4. Sealing washer
5. Idle speed screw
6. Spring
7. Carburetor body
8. Main fuel needle
9. "O" rings
10. Idle fuel needle
11. Throttle shaft
12. Bushings
13. Throttle disc
14. Retainer
15. Throttle arm
16. Valve seat
17. Check valve
18. Spring
19. "O" rings
20. Bracket
21. Fuel primer
22. Expansion plug
23. Spring
24. Diaphragm lever pin
25. Diaphragm lever
26. Fuel diaphragm
27. Diaphragm cover
28. Pump diaphragm
29. Filter
30. Pump body

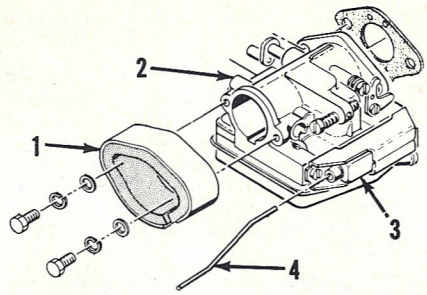



**Fig. MC28A—A fuel collector is used on some current production units to collect fuel spit back out of carburetor, and to return this fuel back into the carburetor throat.**

1. Fuel collector
2. Carburetor
3. Primer assembly
4. Primer rod




**Fig. MC29—The fuel pick-up used on some models can be fished out of the filler opening of tank with a wire hook and filter element can be cleaned or renewed without disassembling fuel tank.**

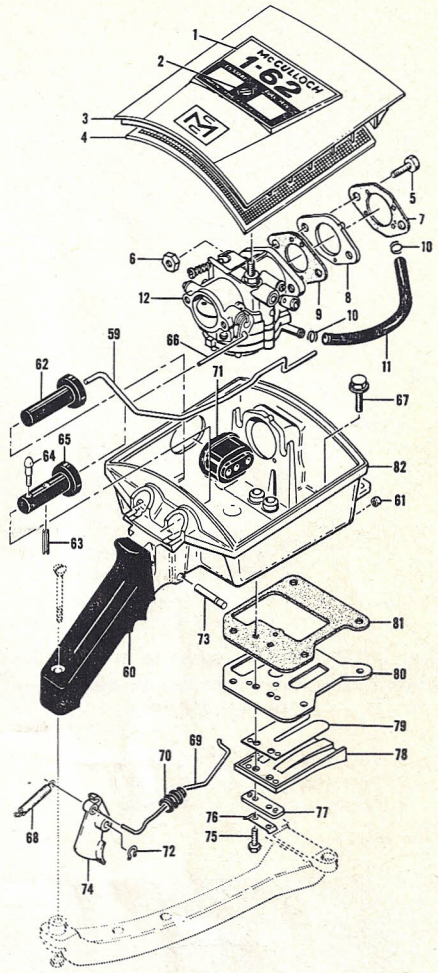



**Fig. MC29A—Air box with air filter element, carburetor and reed valve on model 1-62. Some other models are similar.**

3. Cover
4. Air filter
12. Carburetor
62. Chain oiler button
65. Choke button
74. Throttle trigger
78. Reed stop
79. Reed
80. Reed plate
82. Air box

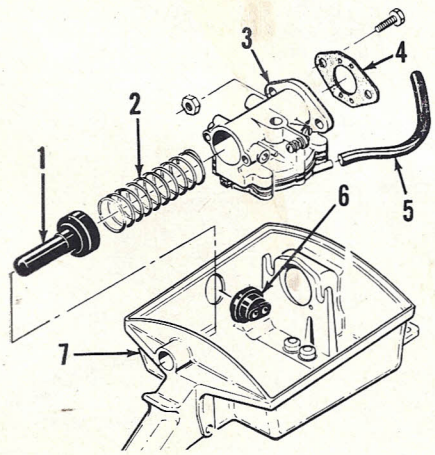



**Fig. MC28 — A plunger type choke (1) is used on some earlier models instead of conventional disc type choke.**

2. Spring
3. Carburetor
4. Gasket
5. Fuel tube
6. Grommet
7. Air box

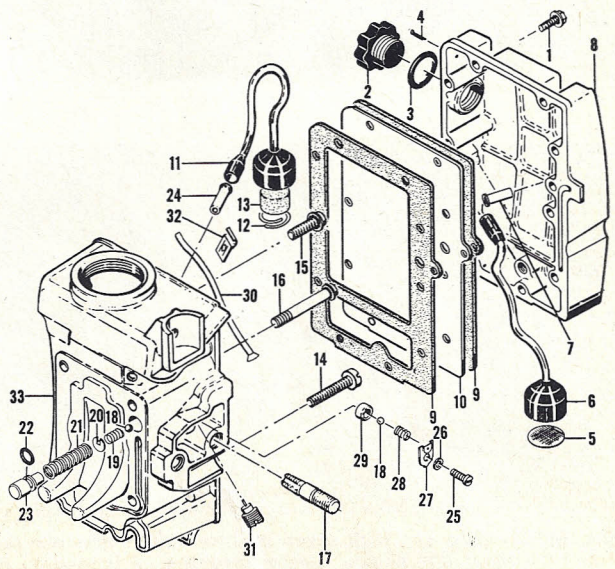



**Fig. MC29B — Fuel and chain oil tank assembly typical of direct drive models where fuel tank is not part of air box as in Fig. MC29A.**

5. Oil screen
6. Oil pickup
8. Chain oil tank
9. Gasket
10. Plate
11. Fuel pickup
13. Fuel filter
18. Ball check valve
19. Spring
23. Chain oiler piston
27. Valve retainer plate
33. Fuel tank

Illustrations courtesy of McCulloch Corp.

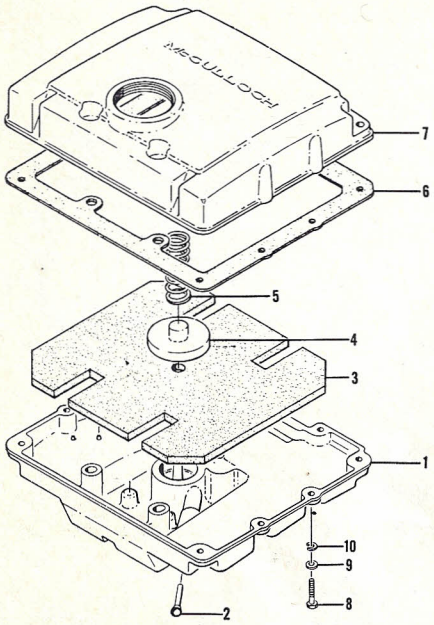



**Fig. MC29C — Fuel tank on transmission drive models where separate air box is used as in Fig. MC29A.**

1. Fuel tank
3. Fuel wick
4. Clamp
5. Spring
6. Gasket
7. Cover

for cleaning or renewing filter element as shown in Fig. MC29.

Initial fuel mixture adjustment for all models is 1¼ turns open on main adjustment needle and ¾-turn open on idle adjustment needle. Turn idle speed adjustment screw in to open the throttle to maximum idle speed. Make final adjustments with engine warm and running. Access to adjustment points will be as shown in Fig. MC30 or Fig. MC31.

With air filter cover removed, adjust idle speed regulating screw so that engine idles at just below clutch engagement speed. Then adjust idle needle for best engine performance at this speed. If engine then does not accelerate properly, slowly turn idle needle counter-clockwise until the engine will accelerate rapidly and smoothly. Readjust the idle speed regulating screw if necessary.

Reinstall the air filter element and cover. With saw engine running under a cutting load, adjust the main fuel needle until the engine runs smoothly and evenly at cutting speeds. This setting should be between 1 and 1½ turns open.

**GOVERNOR.** View of typical governor installation on models so equipped is shown in Fig. MC31A. To check governor adjustment, remove blower housing and depress the throttle trigger; the governor spring should move the air vane to a position ¼-inch away from the flywheel vanes. If necessary to adjust the governor, proceed as follows: Remove air cleaner cover and filter element. Loosen the set screw on governor arm (See Fig. MC31A), hold carburetor throttle shaft in wide open position and tighten the set screw while holding governor air vane ¼-inch away from flywheel vanes.

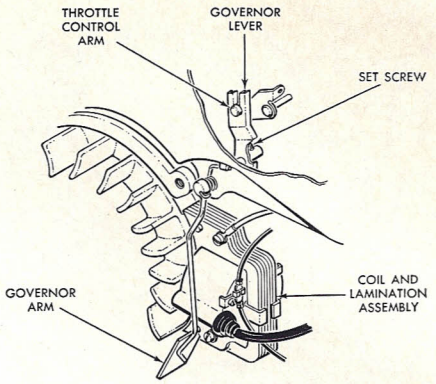



**Fig. MC31A — Typical air-vane governor installation on models so equipped.**

Governor air vane shaft should have only enough end play after adjustment to allow free movement throughout range of operation. End play can be controlled by moving governor arm on the shaft. Check to see that when throttle trigger is released, carburetor throttle shaft arm contacts idle speed stop screw; and when throttle trigger is fully depressed, governor spring moves carburetor throttle to wide open position and governor air vane is ¼-inch away from flywheel vanes.

**MAGNETO AND TIMING.** On models D44, Super 44, 55, Super 55, Super 55A, Super 44A, 1-70 and 1-80, the magnet is cast in the flywheel and contact breaker is located in a breaker box outside of engine. Breaker contact gap is approximately 0.018, but actual gap should be such that contacts just start to open when engine is at firing point which is determined on all models as follows: Refer to Fig. MC32. Insert a ¼-inch

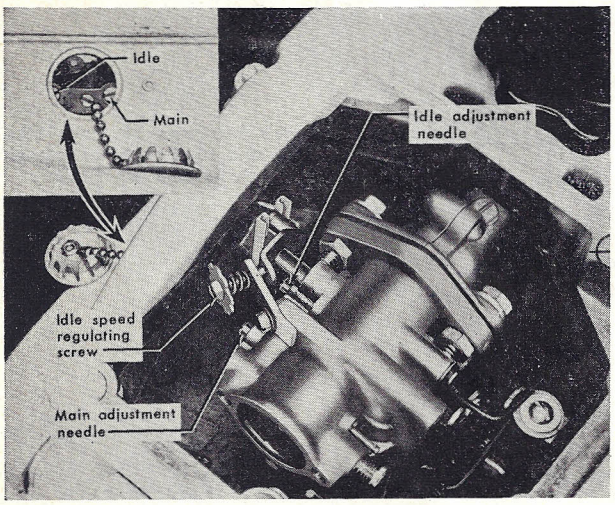



**Fig. MC30 — Carburetor adjustment points on those models not having rubber grommet around fuel adjustment needles as in Fig. MC31.**

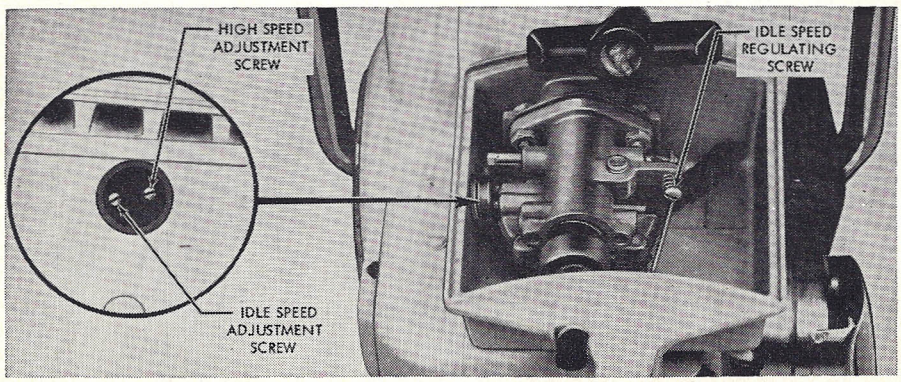



**Fig. MC31—Idle and high speed mixture adjustments are on side of carburetor used on MAC-D30 engine. Similar arrangement is used on some other models.**

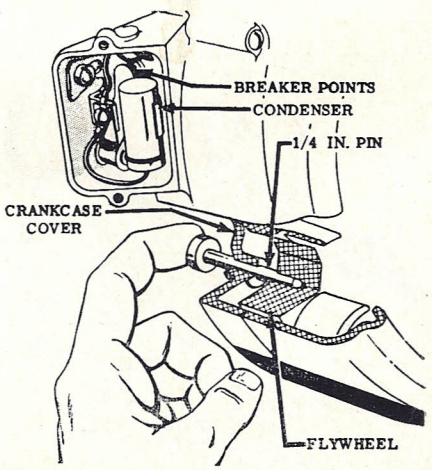



**Fig. MC32—To adjust point gap on models with external breaker box, place crankshaft in firing position by inserting ¼-inch pin into bored hole in flywheel. Then adjust points until they are just starting to open with crankshaft in this position.**



Illustrations courtesy of McCulloch Corp.

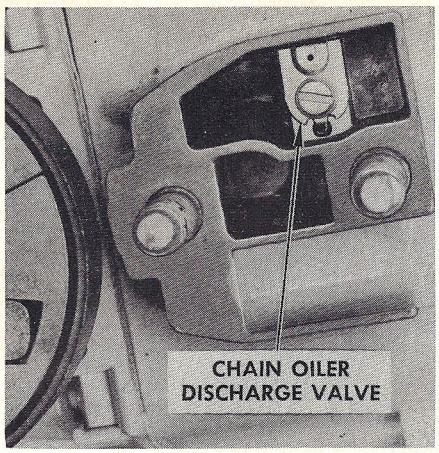



**Fig. MC33 — Location of chain oiler discharge valve. Refer to Fig. MC34 for exploded view of valve. Valve should be cleaned if chain oiler pump does not work properly.**

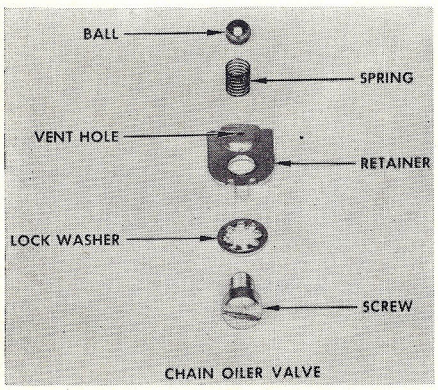



**Fig. MC34 — Exploded view of chain oiler valve assembly. Refer to Fig. MC33 for location of valve.**

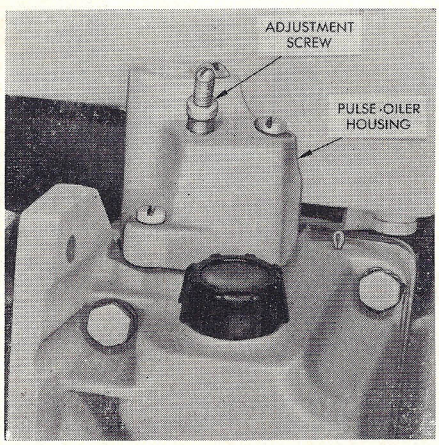



**Fig. MC35 — Some late model direct drive saws are equipped with an automatic chain oiler pump, which is actuated by crankcase pulsations. Output of pump can be adjusted from zero to 3 cu. in. of oil per minute. Note location of adjustment screw. At maximum output, pump will empty chain oiler tank in about ten minutes. Refer to Fig. MC49A for exploded view of pump.**

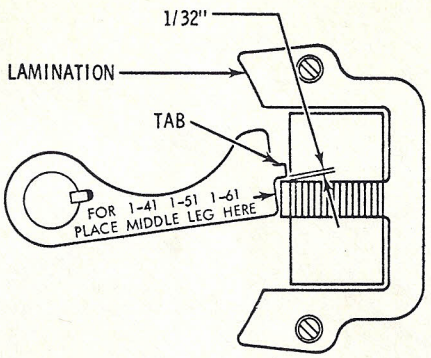



**Fig. MC36 — Using special timing gage to adjust breaker point gap. Points should be closed when timing gage contacts middle leg of armature laminations and should open when gage is moved 1/32-inch away from center leg. Gage is installed on crankshaft in place of flywheel and using flywheel key. If gage is not available, adjust breaker point gap to 0.018.**

pin through hole in crankcase cover then slowly rotate flywheel while pushing pin against flywheel. When pin fully enters timing hole in flywheel, breaker contact points should just start to open. Adjust contact point gap to obtain this position. Then withdraw pin and rotate engine until points are open to maximum gap. At this time, the gap should be within the range of 0.018-0.020. If gap is not within these limits, some part of the breaker system is worn and should be renewed. Clearance (air-gap) between the coil laminations and the engine flywheel is 0.008-0.012. Desired gap is 0.010. Clearance is adjusted by means of the 3 coil mounting screws as shown in Fig. MC38.

On all other models, the magnet is cast in the flywheel and the contact breaker points assembly is located directly behind the flywheel. Flywheel must be removed in order to set breaker point gap. McCulloch recommends that the breaker point gap be adjusted with a special timing indicator as shown in Fig. MC36. However, if a special timing indicator is not available, adjust breaker point gap to 0.018 which will provide satisfactory timing. Clearance (air-gap) between coil laminations and flywheel should be 0.010 and is adjusted as shown in Fig. MC38.

**LUBRICATION.** Gasoline and oil should be mixed thoroughly using ½-pint of McCulloch engine oil with 1¼ gallons of gasoline. SAE 30 non-detergent motor oil can be used in place of McCulloch engine oil but must be mixed with gasoline in ratio of ½-pint of oil to one gallon of gasoline.

On models MAC-D30, D-36, 1-40, 1-50 and 1-60, the chain is automatically lubricated by a condensate oiling system which extracts oil from the fuel mixture and pumps it continuously to the chain by crankcase pressure. This chain oiling method requires a 10 to 1 fuel-oil ratio instead of the 20 to 1 ratio used for models with separate oil supply. On models with this automatic chain oiler, use one pint of McCulloch engine oil with each 1¼ gallons of gasoline or one pint of SAE 30 motor oil with each gallon of gasoline.

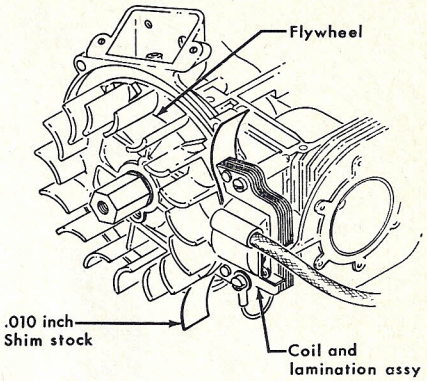



**Fig. MC38 — To adjust magneto air gap, turn flywheel so that magnet is under coil. Then loosen coil mounting screws, place 0.010 feeler gauges between flywheel and outer edges of coil laminations and retighten screws.**

Fill chain oiler tank on other models with a good grade of SAE 30 motor oil for temperatures above 40° F. or SAE 10 motor oil for temperatures below 40° F. When cutting wood with high sap or pitch content, chain oil can be diluted up to 50% with kerosene.

On transmission drive models, use SAE 140 gear oil in temperatures above 40° F., SAE 90 gear oil in temperatures between 10 and 40° F., and dilute SAE 90 gear oil with up to 50% kerosene when cutting in temperatures below 10° F.

**CARBON.** If a lack of power and decrease of exhaust noise is noted, it is likely that the muffler and exhaust ports need cleaning. Clean ports with a wooden scraper. A metal scraper may be used on muffler.

## REPAIRS

**CONNECTING ROD.** On models with integral cylinder and cylinder head as shown in Fig. MC44A, the piston and connecting rod assembly must be removed from the bottom. Remove engine bottom cover or fuel tank, detach connecting rod from crankpin, remove crankshaft assembly and then withdraw rod and piston through bottom opening in crankcase. Be careful not to lose the 24 needle roller crankpin bearings.

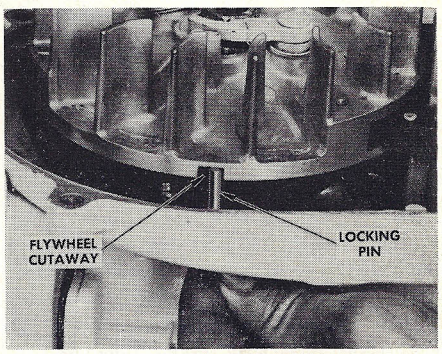



**Fig. MC38A — Flywheel can be locked to remove flywheel or clutch retaining nut on most models. To lock flywheel, insert pin through hole in crankcase cover and into cut-away in flywheel as shown.**

Illustrations courtesy of McCulloch Corp.

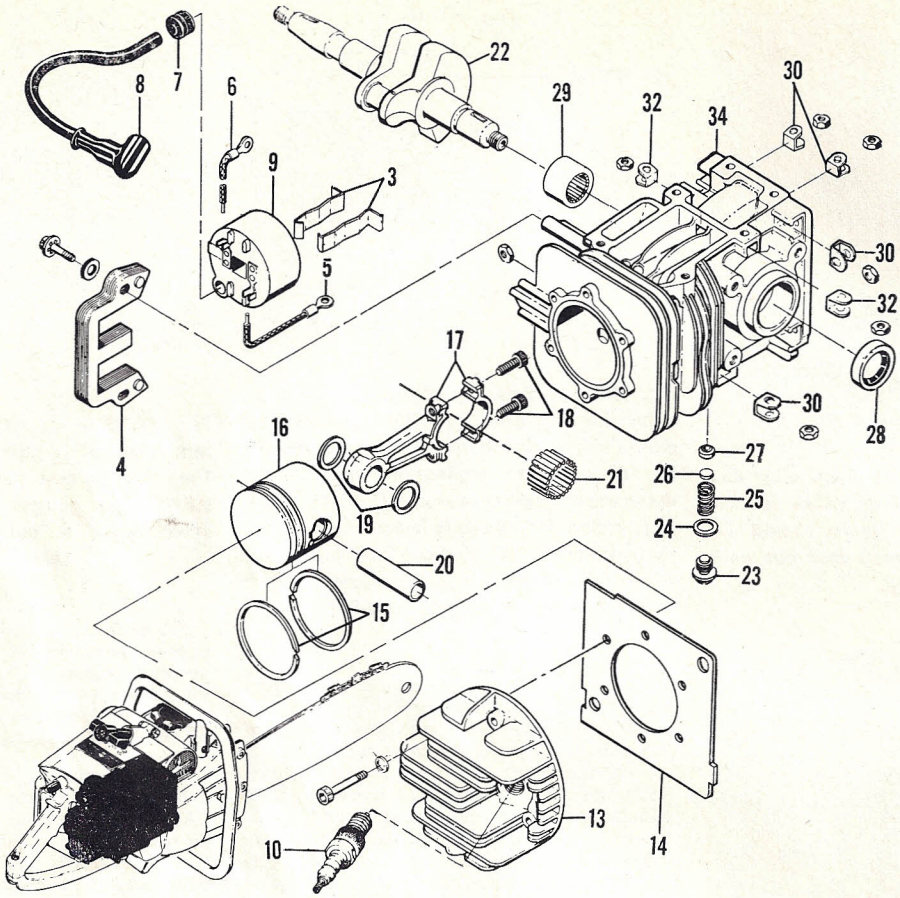



**Fig. MC39 — Powerhead assembly D36 engine. Note that piston pin has no retaining snap rings but is locked in piston by a press type fit in connecting rod.**

4. Coil lamination
5. Ground wire
6. Primary wire
7. Grommet
8. Spark plug wire
9. Ignition coil
13. Cylinder head
14. Head gasket
15. Piston ring set
16. Piston
17. Connecting rod
18. Allen screw
19. Spacer washer
20. Piston pin
21. Needle rollers
22. Crankshaft
23. Valve body
24. Valve gasket
25. Valve spring
26. Valve disc
27. Valve seat
28. Oil seal
29. Needle bearing
32. Nut retainer
34. Cylinder & crankcase

Piston and rod assembly is removed from above on all other models.

All models have 24 uncaged needle rollers at the crankpin. Clearance between end of needles and side of crankpin journal should be 0.008-0.018. Total clearance between rollers should be 0.008-0.010. Side clearance between rod and crankshaft should be 0.100-0.110. Crankpin nominal diameter is 0.6298.

To assemble rod to crankshaft, stick 12 rollers in the rod and 12 rollers in the cap with grease. After rod is in place against crankpin, place cap on rod in correct alignment and tighten cap screws finger tight. Parting faces of rod and cap are fractured (not machined) to provide the dowel effect of the meshing of the consequent uneven surface. It is advisable to wiggle the rod cap back and forth while tightening to make sure the interstices of the fractured joint are in perfect mesh. When properly meshed no "catch points" will be felt when finger nail is rubbed along the parting line. Torque rod cap screws to 65-70 inch-pounds.

**PISTON, PIN, RINGS AND CYLINDER.** Pistons and rings are available in standard size as well as 0.010, 0.020 and 0.030 oversizes for all models except D-30, 1-40 and 200. Pistons and rings for these models are catalogued in 0.020 oversize and standard size only.

Cylinder should be renewed or rebored to next oversize and/or new piston installed when clearance between cylinder and piston skirt is 0.010 or more; when cylinder taper or out-of-round exceeds 0.005; or when cylinder is scored, scratched, pitted or scuffed.

Desired clearance between piston skirt and cylinder is 0.0025-0.0045. Maximum permissible taper or out-of-round at completion of reboring operation is 0.0007. Ring end gap should be 0.004-0.012. Install chrome plated ring in top groove of piston.

The piston pin is retained by a press fit in the connecting rod on all models. Piston is fitted with either non-renewable Oilite piston pin bushings or renewable needle

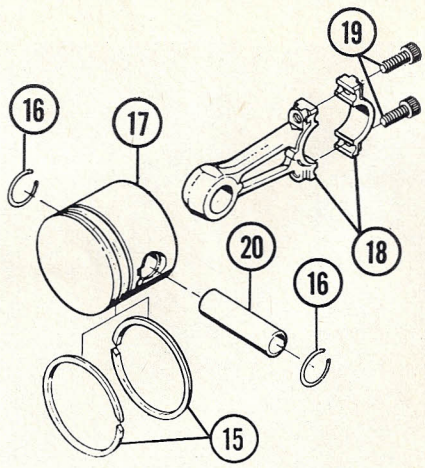



**Fig. MC40—Connecting rod, pin and piston details of model MAC-D30. Some other models are similar. Lower end of rod rides on needle rollers not shown. Oilite piston pin bushings (not shown) are retained in piston by snap rings (16). Piston pin is retained by being a press fit in the connecting rod. Other details of power head are same as D36 shown in Fig. MC39.**



Illustrations courtesy of McCulloch Corp.

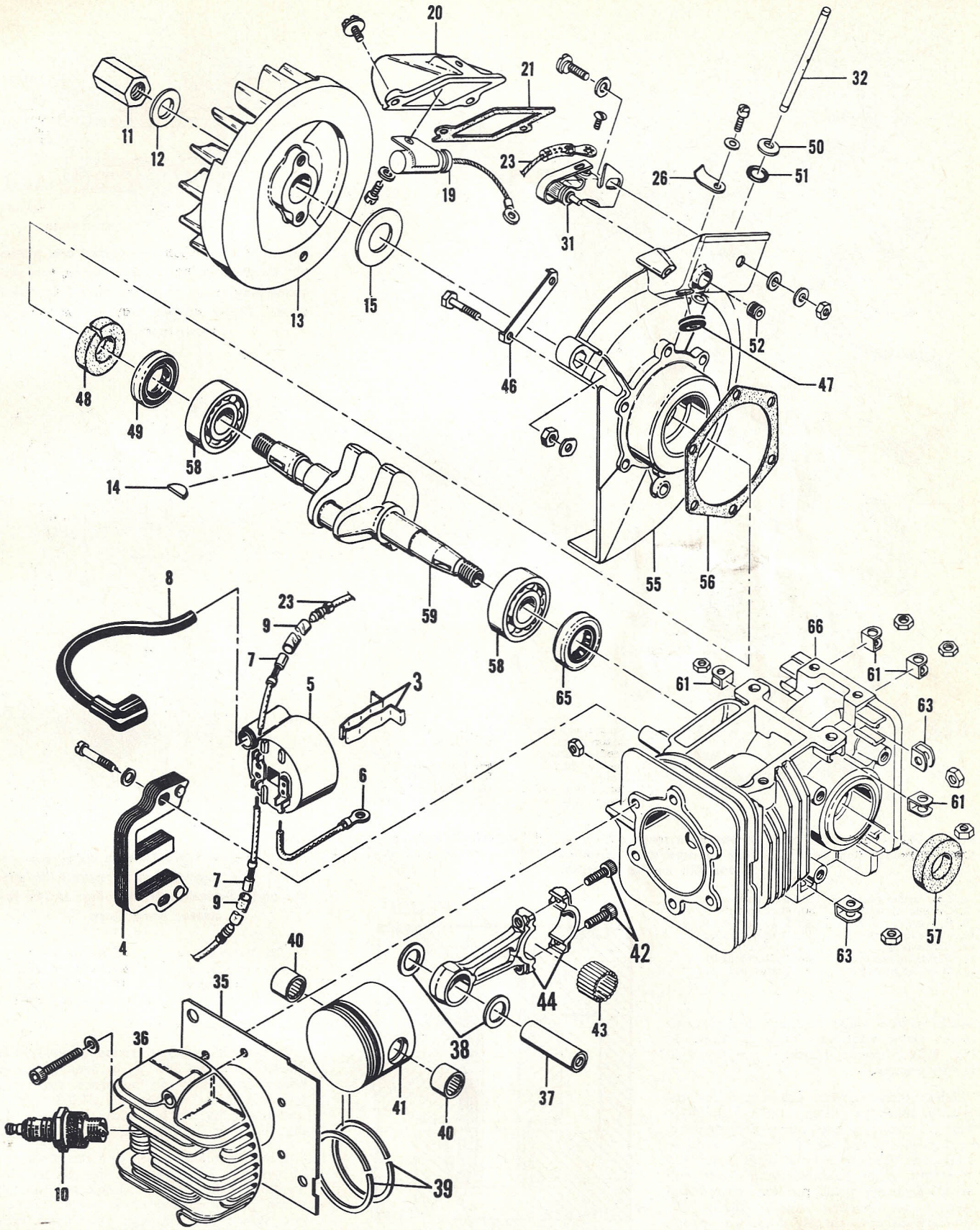
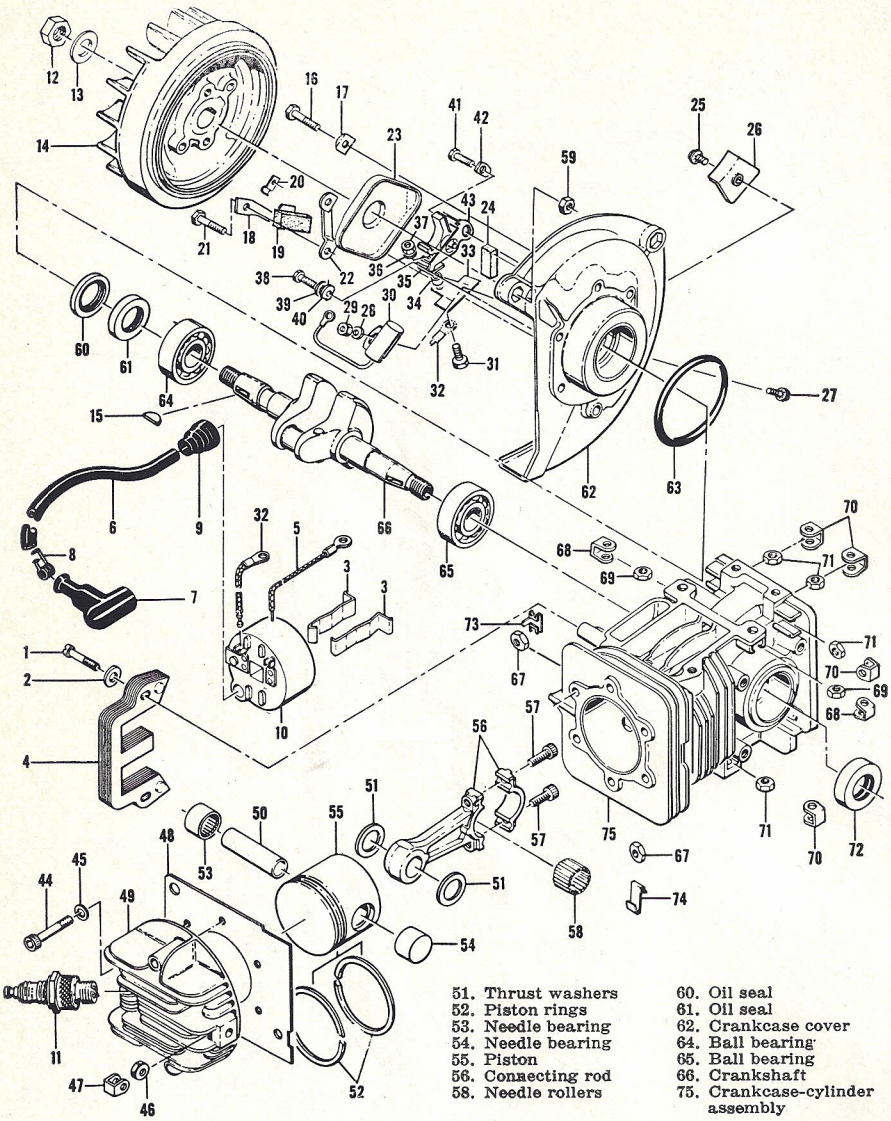



**Fig. MC40A — Exploded view of powerhead from model Super 44A; other earlier production models are similar. This model features external breaker points which are accessible after removing breaker box cover (20). Closed end of piston pin (37) must be towards exhaust port side of cylinder as both needle bearings (40) are open end type.**

3. Coil retainer
4. Coil laminations
5. Ignition coil
6. Ground wire
9. Sleeve
13. Flywheel
15. Dirt shield
19. Condenser
20. Breaker box cover
23. Primary wire
26. Condenser spring
31. Ignition breaker assembly
32. Breaker pushrod
38. Thrust washer
39. Piston ring set
40. Needle bearing
42. Allen head screw
43. Needle rollers
46. Lockplate
47. Grommet
48. Oiler felt
49. Oil seal
50. Retainer
51. Seal
52. Bushing
55. Crankcase cover
56. Gasket
57. Sprocket seal
58. Bearing (ND3203)
63. Nut retainer
65. Crankcase seal
66. Cylinder & crankcase

Illustrations courtesy of McCulloch Corp.



51. Thrust washers
52. Piston rings
53. Needle bearing
54. Needle bearing
55. Piston
56. Connecting rod
58. Needle rollers
60. Oil seal
61. Oil seal
62. Crankcase cover
64. Ball bearing
65. Ball bearing
66. Crankshaft
75. Crankcase-cylinder assembly

**Fig. MC42 — Exploded view of engine assembly from model 1-82 McCulloch chain saw. Breaker points and condensor are located under flywheel. Note position of closed end piston pin needle bearing.**

4. Coil laminations
5. Grounding wire
6. Spark plug wire
10. Coil assembly
11. Spark plug
14. Flywheel assembly
23. Breaker box cover
24. Felt cam wiper
30. Condensor
32. Primary coil wire
43. Breaker point assembly
49. Cylinder head
50. Piston pin

bearings. The Oilite bushings are retained in the piston with snap rings as shown in Fig. MC40; needle bearings are press fit in the piston.

When disassembling piston and rod assembly, heat the piston and rod to about 300° F. under a heat lamp concentrating heat on closed end needle bearing when so equipped. Press pin from piston and rod assembly. When equipped with closed end needle bearing, press pin and closed end bearing out together. NOTE: Closed end needle bearing is usually damaged beyond further use whenever it is removed.

To install new needle bearings, heat piston under a heat lamp or in oven to about 200° F. and press the bearings in so that inner ends of bearing cages are flush with bosses in piston. Press on lettered end of bearing cages only.

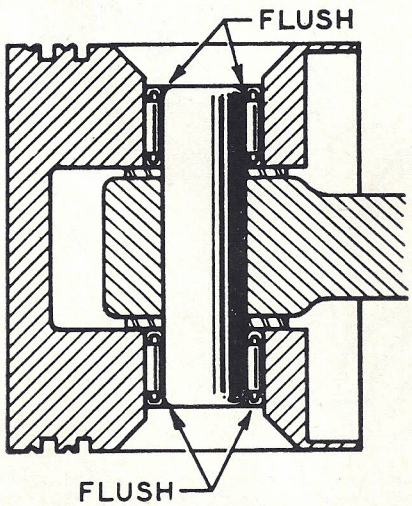



**Fig. MC43 — Position piston pin bearings as indicated when both bearings are open end needle bearing assemblies. Refer to Fig. MC43A when one closed end needle bearing is used.**

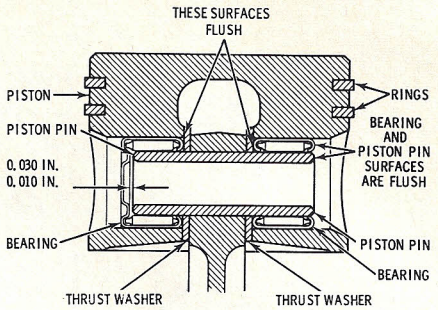



**Fig. MC43A—When one closed end piston pin needle bearing is used, piston, pin and connecting rod must be assembled as shown above. Thrust washers may not be used in some assemblies.**

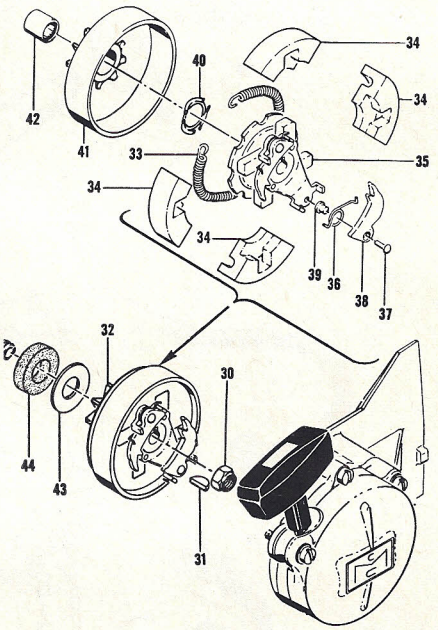


**Fig. MC44 — Typical clutch installation on direct drive models having starter on output end of crankshaft. See Fig. MC45 for starter breakdown.**

33. Clutch spring
34. Clutch shoes
35. Clutch rotor
36. Spring
38. Starter pawl
40. Spring washer
41. Clutch drum
42. Needle bearing

To assemble piston to connecting rod, heat the rod to about 300° F. in oven or under heat lamp, lightly oil the piston pin, align rod (and thrust washers, if used) in piston and press the pin into place as shown in Fig. MC43 or Fig. MC43A.

When installing piston and rod assembly in cylinder, be sure that the closed end needle bearing or the closed end of the piston pin is placed towards the exhaust port side of the cylinder. On models with integral cylinder head, the bottom end of the cylinder is tapered to act as a ring compressor. A ring compressor should be used on models with removable cylinder head.

**CRANKSHAFT.** The crankshaft is supported in either two ball bearings or two



Illustrations courtesy of McCulloch Corp.

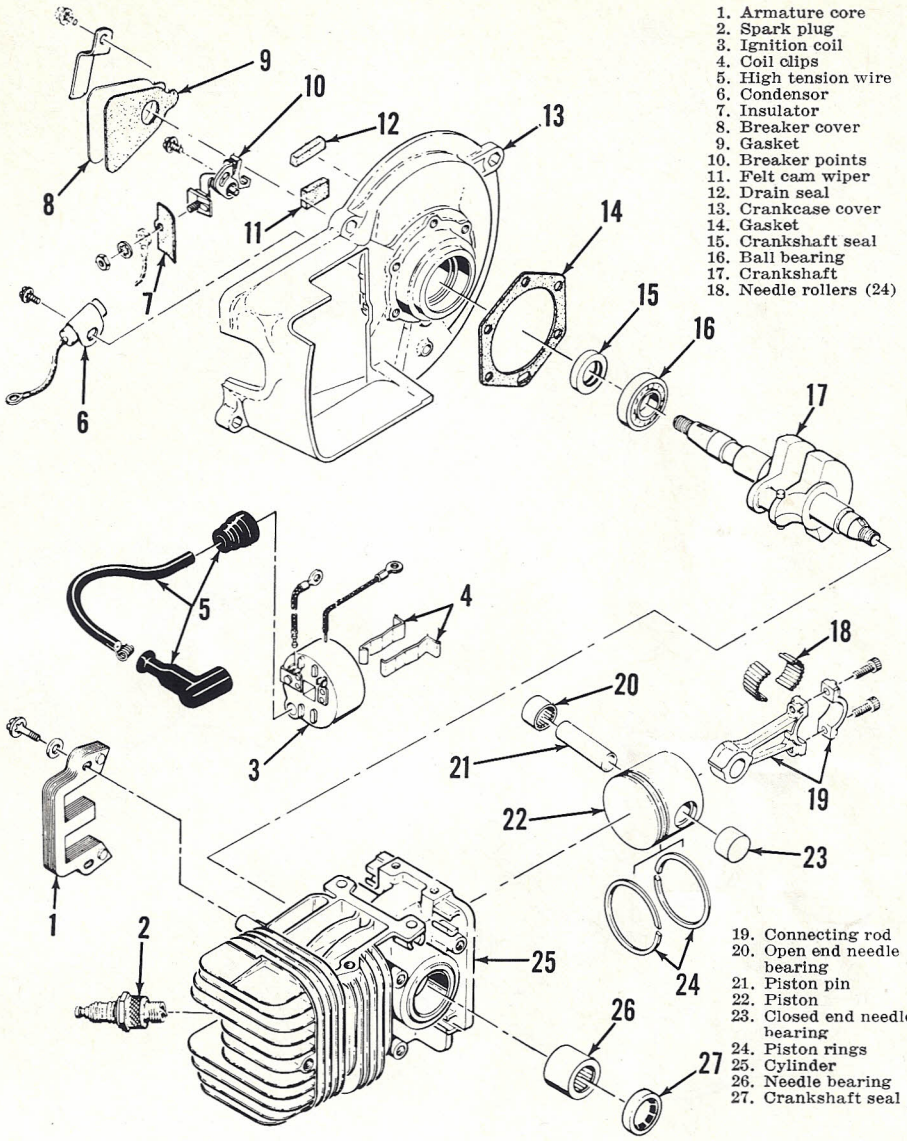



**Fig. MC44A—Exploded view of powerhead assembly from Model 640 chain saw. This model and other late production units feature integral cylinder and cylinder head. Some models are equipped with ball bearing on output end of crankshaft instead of needle bearing (26). Model 200 is equipped with Oilite piston pin bushings (See Fig. MC40) instead of needle bearings (20 and 23).**

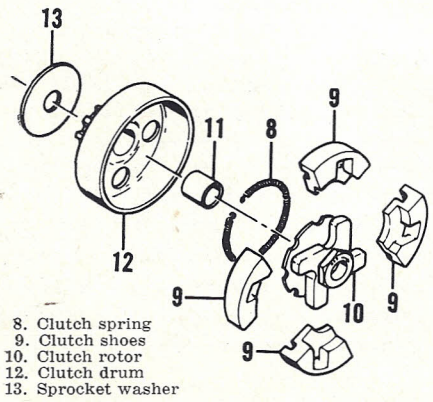



**Fig. MC44B — Exploded view of typical direct drive clutch used on models having starter on flywheel side of engine.**

caged needle roller bearings; or on some models, in one needle bearing and one ball bearing.

The crankshaft should be rejected if needle bearing race at rod journal and main journal (on models equipped with needle roller main bearings) are not perfectly smooth. Ball bearings used on some models should be a press fit on crankshaft and in crankcase and crankcase cover. NOTE: Before installing any bearings in crankcase or cover, the crankcase or cover should be heated to 180-200° F. in an oven or under heat lamp or damage may result.

**VALVE SYSTEM.** A reed type intake valve is used on all models. The smooth side of the valve reed should face the valve plate as in Fig. MC49.

**CLUTCH.** Typical clutch installation for direct drive models is shown in Fig. MC44. Centrifugal force expands clutch shoes against the drum at about 2500 to 3000 RPM. Inspect clutch shoes for excessive wear or burrs that would score drum. Renew all four shoes if one or more are rejected. Inspect drum and renew if worn excessively or is scored.

Typical installation of clutch on gear train transmission models is shown in Fig. MC45. Centrifugal force expands clutch shoes (29) against friction disc (26) instead of against drum as on direct drive models. Wear on clutch shoes and friction disc is corrected by installing progressively larger oversize disc retaining rings (25). Check for fit of disc retaining ring as in Fig. MC46. If ring can be turned easily with fingers, install a larger wire diameter retaining ring. Use as large a size of ring as necessary to eliminate free movement of ring. Renew shoes and friction disc when largest oversize ring

Illustrations courtesy of McCulloch Corp.

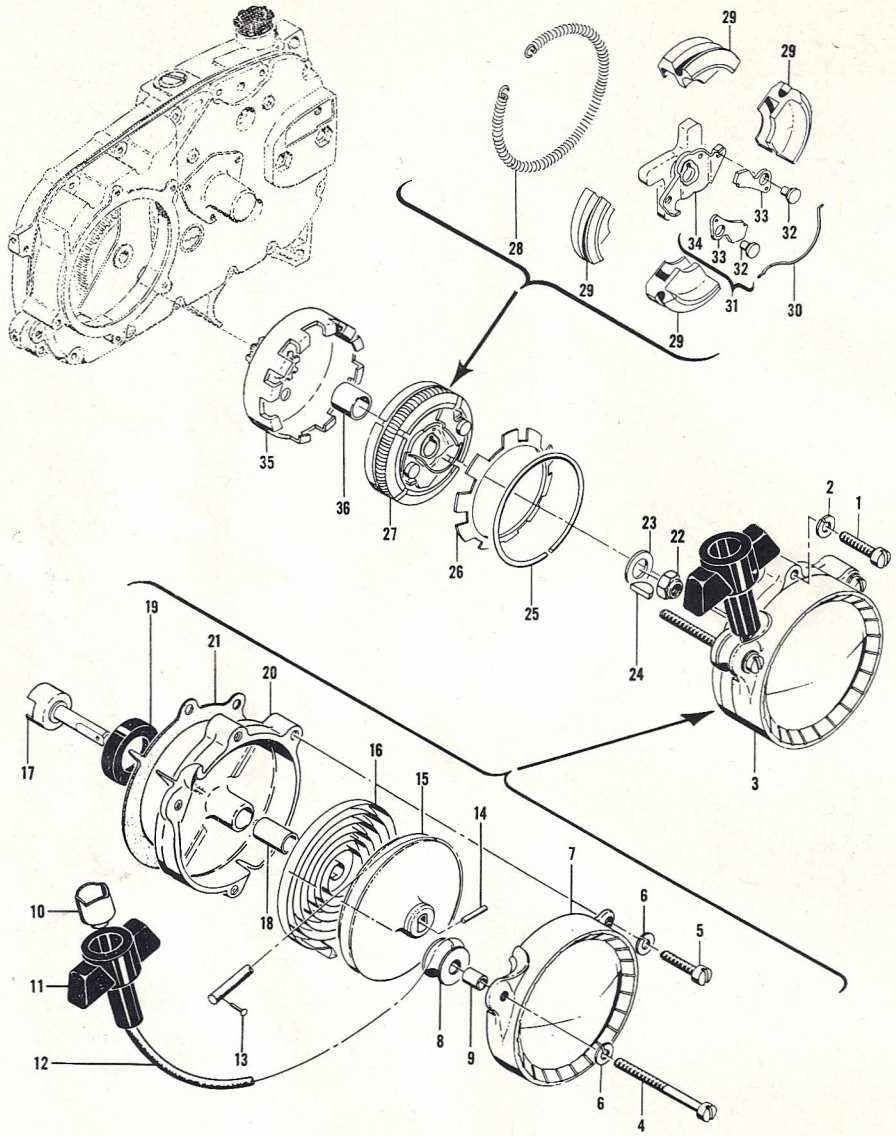



**Fig. MC45 — Typical starter and clutch installation on transmission drive models.**

7. Starter cover
8. Starter rope pulley
9. Bearing
14. Pin
15. Starter drum
16. Rewind spring
17. Starter shaft
18. Bearing
19. Seal
20. Starter base
21. Gasket
25. Retaining ring
26. Friction disc
28. Clutch spring
29. Clutch shoes
30. Spring
32. Pins
33. Starter pawls
34. Clutch rotor
35. Clutch drum
36. Bearing

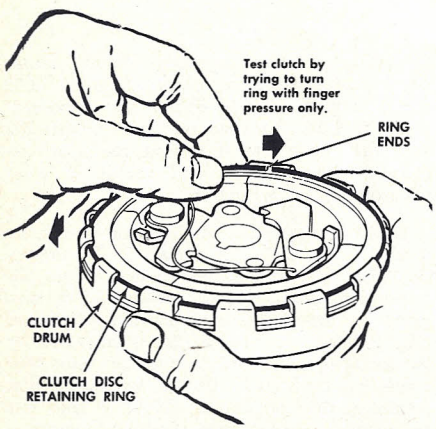



**Fig. MC46 — Test fit of clutch retaining ring by trying to turn ring with finger pressure only. Install oversize ring if one installed can be turned easily.**

available will not eliminate free movement. NOTE: Do not completely remove screws from starter housing when removing starter to gain access to clutch. To reinstall starter, pull on starter cord and release while placing starter on transmission so that starter shaft will mesh with and engage clutch.

**TRANSMISSION.** Exploded view of early production gear drive transmission is shown in Fig. MC47. Current production transmission for models 640 and 840 is shown in Fig. MC47A. Models 640 and 840 are equipped with an automatic chain oiler pump that operates whenever the chain is turning.

Disassembly and overhaul procedure is evident from reference to exploded views and inspection of unit. Transmission components can be reversed to offset the cutter bar as shown in Fig. MC48. NOTE: On models 640 and 840, the chain oiler pump will not function when placed on reverse side of transmission. Before installing pump in this position, lubricate plunger cavity with Lubriplate or similar grease as the pump will not receive lubrication otherwise. If saw is to be operated for a long period of time with the cutter bar in offset position, the pump plunger (41—Fig. MC47A) should be removed.

Refer to LUBRICATION paragraph in MAINTENANCE section for transmission lubrication information.



Illustrations courtesy of McCulloch Corp.

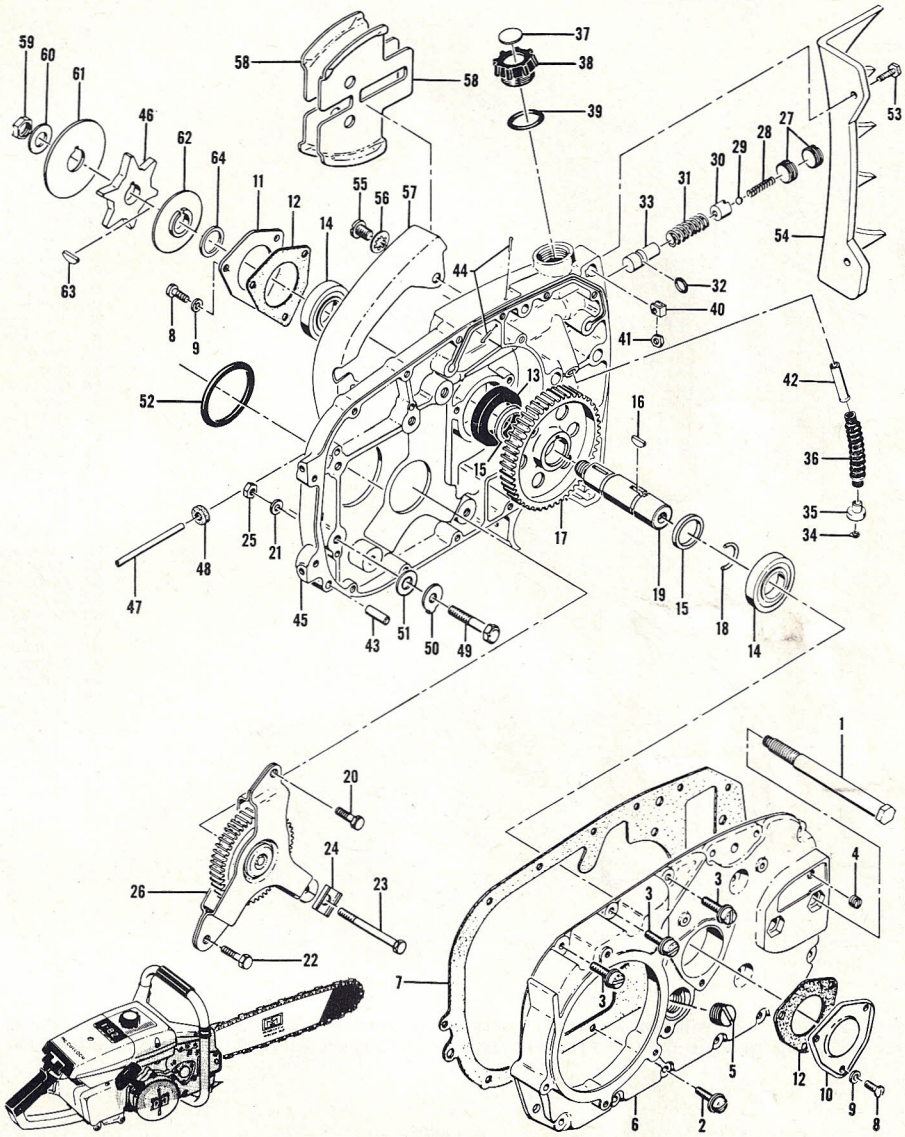
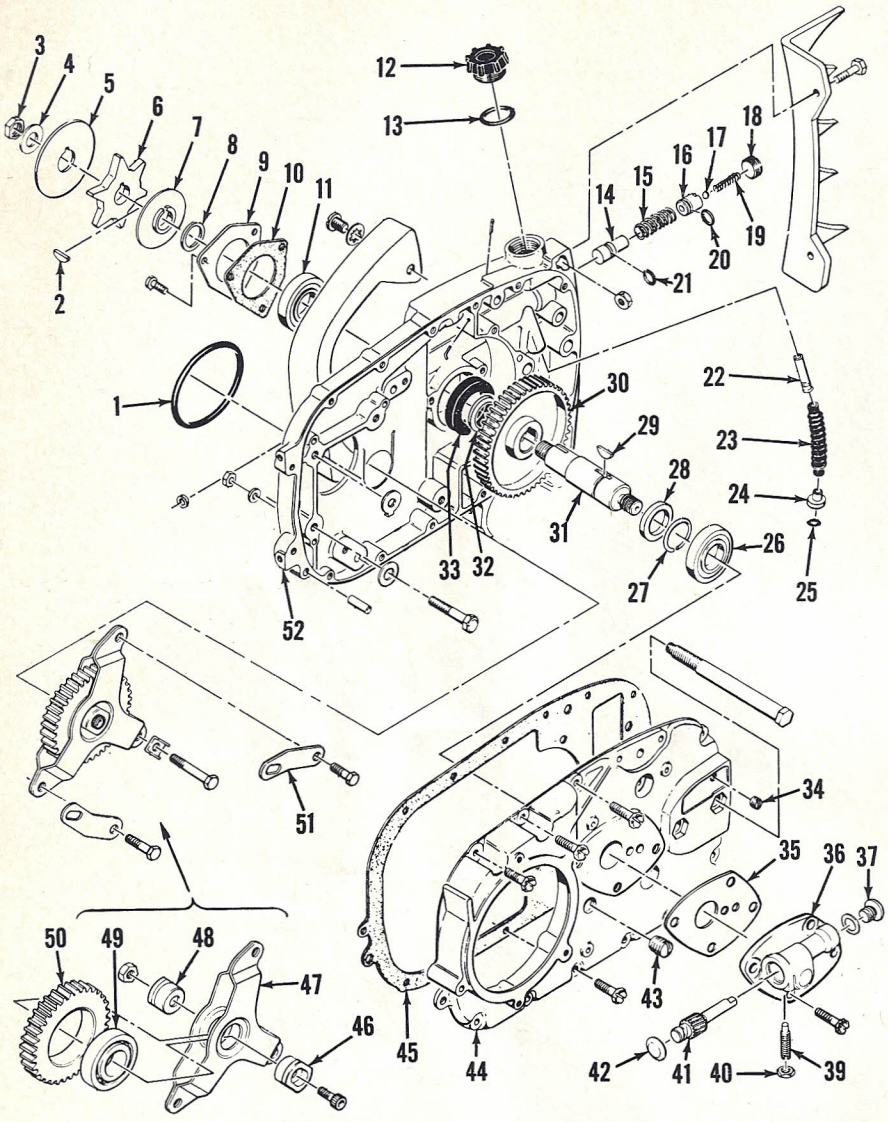



**Fig. MC47 — Exploded view of gear-train transmission from model 1-82 chain saw. Transmissions on other early models are similar. Transmission input gear (not shown) is a part of clutch drum assembly (35—Fig. MC45). Refer to Fig. MC47A for exploded view of late production transmission.**

5. Oil filler plug
6. Cover
7. Gasket
10. Cover
11. Retainer
12. Gasket
13. Oil seal
14. Bearing
17. Output gear
19. Sprocket shaft
26. Idler assembly
27. Plug
28. Spring
29. Ball check valve
30. Valve body
31. Spring
32. "O" ring
33. Oiler piston
35. Oil pickup
38. Oiler tank cap
45. Gearcase
46. Chain sprocket
47. Oiler rod
54. Spike
57. Chain guide
58. Gearcase protector
61. Chain guide
62. Sprocket shroud
64. Sprocket spacer

Illustrations courtesy of McCulloch Corp.




1. "O" ring
2. Woodruff key
3. Nut
4. Washer
5. Sprocket washer
6. Chain sprocket
7. Sprocket washer
8. Spacer
9. Bearing retainer
10. Gasket
11. Ball bearing
12. Oil filler cap
13. "O" ring
14. Oil pump piston
15. Spring
16. Pump body
17. Check valve
18. Plug
19. Spring
20. "O" ring
21. "O" ring
22. Tube
23. Hose
24. Oil pick-up
25. Screen
26. Ball bearing
27. Snap ring
28. Spacer
29. Woodruff key
30. Gear
31. Shaft
32. Spacer
33. Oil seal
34. Oiler plug
35. Gasket
36. Oiler pump body
37. Plug
39. Special screw
40. Jam nut
41. Plunger
42. Expansion plug
44. Cover
46. Bearing hub
47. Idler yoke
48. Bearing hub
49. Idler bearing
50. Idler gear
51. Idler strap
52. Gearcase

**Fig. MC47A — Exploded view of transmission used on Models 640 and 840. Shims for oil pump plunger plug (37) are available in thicknesses of 0.005, 0.015 and 0.025.**

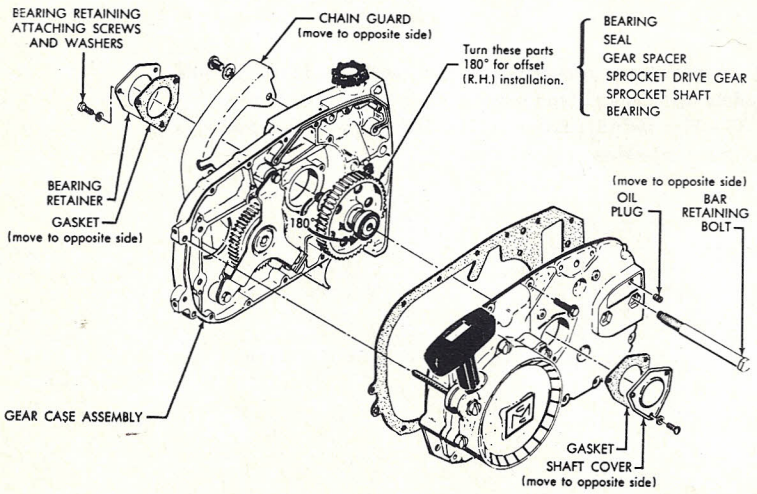



**Fig. MC48 — Chain guide bar can be offset for cutting closer to ground by reversing transmission components as shown. When reversing components of late production models (See Fig. MC47A), automatic chain oiler pump becomes inoperative and pump must be packed with grease such as Lubriplate as it will not otherwise be lubricated.**

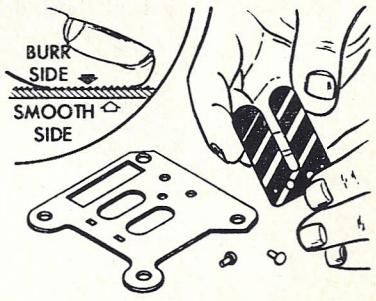



**Fig. MC49—Valve reed should be installed with smooth side toward reed plate.**



Illustrations courtesy of McCulloch Corp.

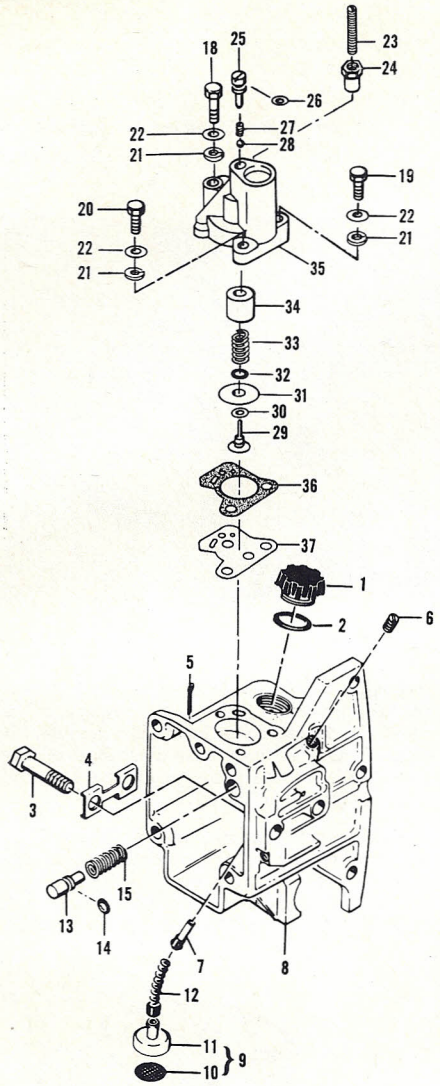



**Fig. MC49A — Exploded view of the automatic chain oiler pump used on Models 440 and 740. Refer also to Fig. MC35. Note location of cap screws (18, 19 and 20) when disassembling pump so that they can be reinstalled in same location; all three screws are different lengths.**

1. Filler cap
2. "O" ring
6. Plug
7. Tube
8. Oil reservoir
10. Screen
11. Oil pick-up
12. Hose
13. Hand pump plunger
14. "O" ring
15. Spring
23. Adjusting screw
24. Nut
25. Screw plug
26. Washer
27. Spring
28. Check ball
29. Pump piston
30. Washer
31. Piston ring
32. "O" ring
33. Spring
34. Sleeve
35. Pump body
36. Gasket
37. Protector plate

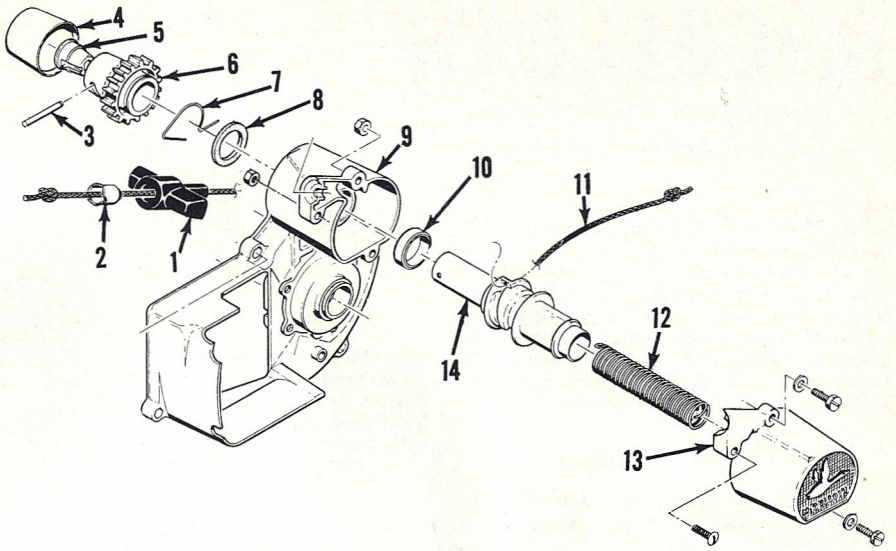



**Fig. MC49B — Exploded view of center-mounted rewind starter used on some earlier production models.**

1. Handle
2. Cup
3. Driving pin
4. Cover
5. Plug
6. Pinion gear
7. Detent spring
8. Seal
9. Crankcase cover
10. Bushing
11. Starter rope
12. Rewind spring
13. Cover
14. Starter drum

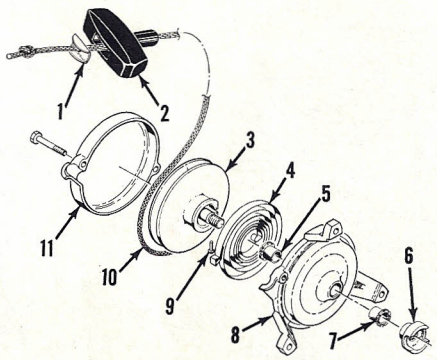



**Fig. MC49C — Exploded view of blower housing mounted rewind starter used on some direct drive models.**

1. Cup
2. Rope handle
3. Pulley
4. Rewind spring
5. Bushing
6. Ratchet
7. Bushing
8. Starter base
9. Rivet
10. Rope
11. Cover

Illustrations courtesy of McCulloch Corp.