

# HOMELITE

Model	Bore mm (in.)	Stroke mm (in.)	Displacement cc (cu. in.)	Drive Type
XL-12	44.4 (1.75)	34.9 (1.375)	54.1 (3.3)	Direct
Super XL, Super XL-AO, SXL-AO, Old Blue, Big Red	46.0 (1.8125)	34.9 (1.375)	58.2 (3.55)	Direct

## MAINTENANCE

**SPARK PLUG.** Model XL-12 is equipped with a Champion CJ8 spark plug while Model Super XL Automatic uses a CJ6. For heavy duty service, a Champion UTJ11P gold-paladium tip spark plug can be used.

For all models, set spark plug electrode gap to 0.025 inch (0.63 mm).

**CARBURETOR.** A Tillotson HS, Walbro SDC or Zama diaphragm carburetor is used. Refer to CARBURETOR SERVICE section for service procedures and exploded views.

Initial adjustment of idle mixture screw is 1 $\frac{3}{4}$  turns open and for high speed mixture screw is 1 $\frac{1}{4}$  turns open. Adjust idle mixture screw and idle speed screw so engine idles just below clutch engagement speed. Make high speed mixture adjustment with engine warm and under cutting load. It may be necessary to readjust one mixture screw after adjusting the other mixture screw as the functions of the idle and high speed mixture screws are related.

**MAGNETO AND TIMING.** A Wico or Phelon flywheel type magneto with external armature is used on early models while late models are equipped with solid state ignition. The solid state ignition system is serviced by renewing the spark plug and/or ignition module. Air gap between ignition module and flywheel is adjustable. Adjust air gap by loosening module retaining screws and place a 0.015 inch (0.38 mm) shim stock between flywheel and module. Remove shim stock.

Note the following on breaker-point equipped models: Units equipped with Phelon magneto will have a letter "P" stamped after the serial number. The Wico and Phelon magnetos are similarly constructed, so care should be taken to properly identify magneto before ordering service parts. Breaker-points and condenser are located behind flywheel.

Armature core and stator plate are riveted together and are serviced only as a unit. Stator plate fits firmly on shoulder of crankcase; hence, armature air gap is nonadjustable.

Late production Wico magneto stator plates are built to retain a felt seal (5—Fig. HL33); the seal cannot be used with early production Wico stator plates. All Phelon stator plates are built to retain the felt seal (5).

Magneto stator plate has slotted mounting holes, and should be rotated as far clockwise as possible before tightening mounting screws to obtain correct ignition timing of 30 degrees BTDC. Set breaker point gap to 0.015 inch (0.38 mm). Condenser capacity should test 0.16-0.20 mfd.

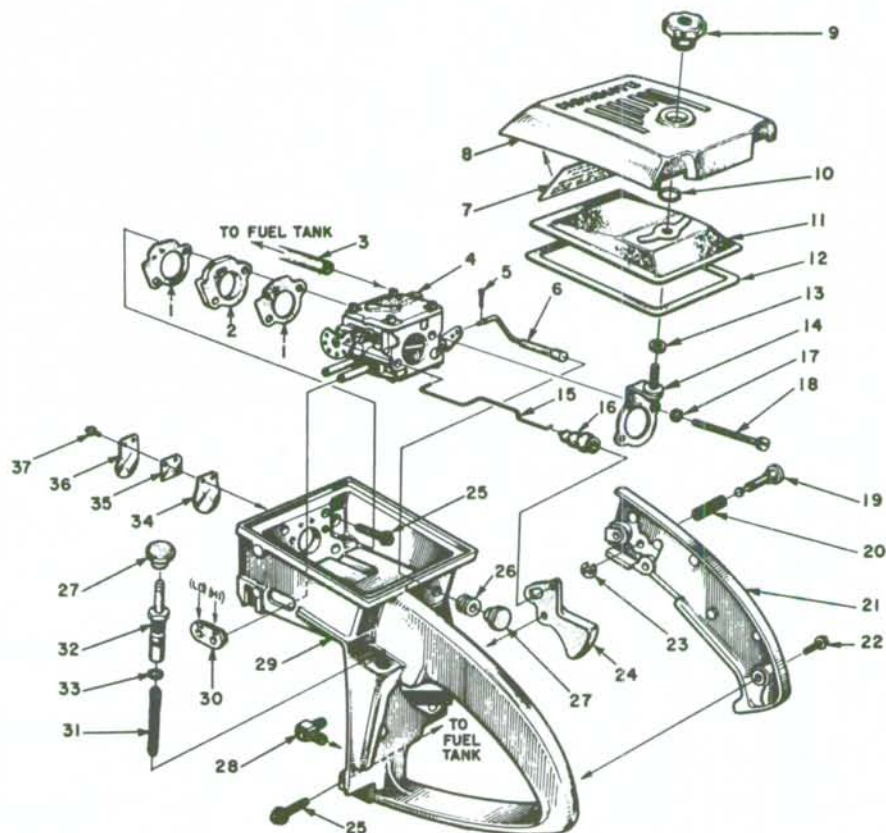


Fig. HL30—Exploded view of air box (throttle handle) and related parts on models with flat reed intake valve (34). Refer to Fig. HL31 for models equipped with pyramid reed valve.

- |                 |                    |                        |                  |
|-----------------|--------------------|------------------------|------------------|
| 1. Gasket       | 10. Snap ring      | 19. Throttle latch pin | 29. Air box      |
| 2. Insulator    | 11. Filter element | 20. Spring             | 30. Grommet      |
| 3. Fuel line    | 12. Gasket         | 23. Snap ring          | 31. Spring       |
| 4. Carburetor   | 13. Gasket         | 24. Throttle trigger   | 32. Pump plunger |
| 5. Cotter pin   | 14. Bracket        | 26. Grommet            | 33. "O" ring     |
| 6. Choke rod    | 15. Throttle rod   | 27. Choke button       | 34. Reed valve   |
| 8. Filter cover | 16. Boot           | 28. Check valve        | 35. Reed back-up |
| 9. Nut          |                    |                        | 36. Reed stop    |



**CAUTION:** Be careful when installing breaker-points not to bend tension spring any more than necessary; if spring is bent excessively, spring tension may be reduced causing improper breaker-point operation. Late Wico units have a retaining clip and flat washer to secure breaker arm on pivot post.

**LUBRICATION.** The engine is lubricated mixing oil with unleaded gasoline. Recommended oil is Homelite® two-stroke oil mixed at ratio as designated on oil container. If Homelite® oil is not available, a good quality oil designed for two-stroke engines may be used when mixed at a 16:1 ratio,

however, an antioxidant fuel stabilizer (such as Sta-Bil) should be added to fuel mix. Antioxidant fuel stabilizer is not required with Homelite® oils as they contain fuel stabilizer so the fuel mix will stay fresh up to one year.

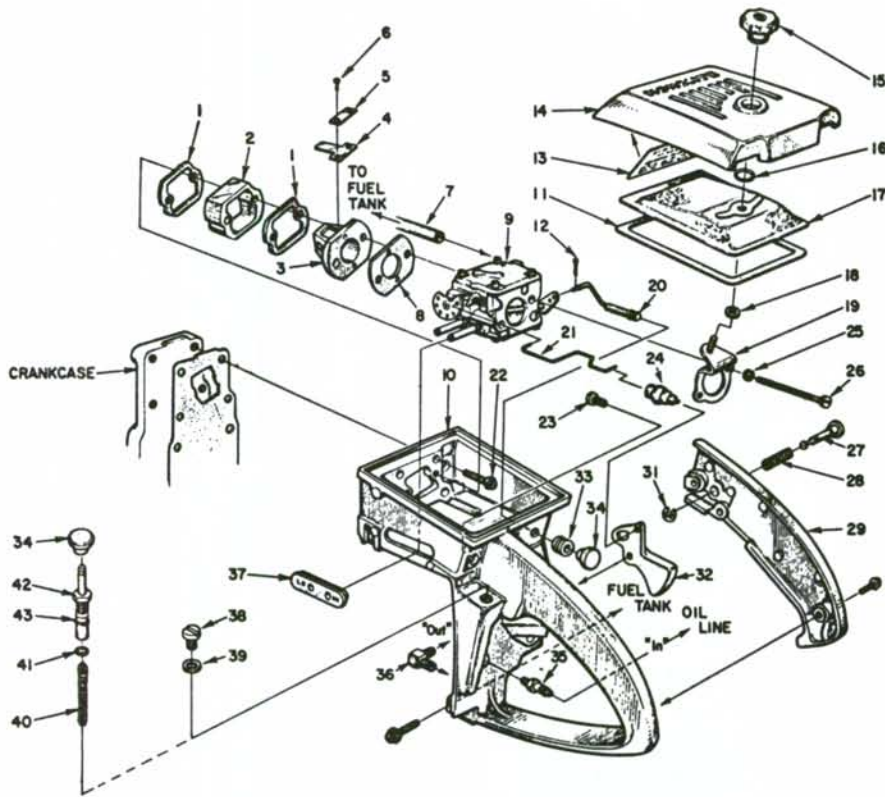
Fill chain oiler reservoir with Homelite® Bar and Chain oil or a light weight oil (no heavier than SAE 30). In cold weather, chain oil can be diluted with kerosene to allow easier flow of oil through pump and lines.

**CARBON.** Muffler and cylinder exhaust ports should be cleaned periodically to prevent loss of power due to carbon build up. Remove muffler and scrape free of carbon. With muffler removed, turn engine so that piston is at top dead center and carefully remove carbon from exhaust ports with a wooden scraper. Be careful not to damage chamfered edges of exhaust ports or to scratch piston. **Do not** run engine with muffler removed.

**REPAIRS**

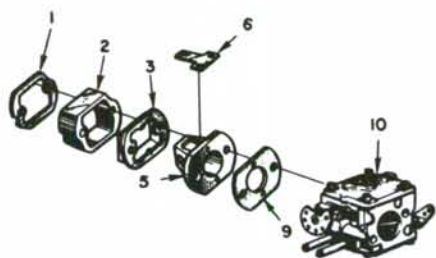
**TIGHTENING TORQUE VALUES.** Tightening torque values are as follows:

- 4/40 Reed & stop to chamber . . . . . 5-6 in.-lbs. (0.6-0.7 N·m)
- 4/20 Oil line plate or shield to tank . . . . . 5-6 in.-lbs. (0.6-0.7 N·m)
- 8/32 Throttle handle cover . . . . . 40-48 in.-lbs. (4.5-5.4 N·m)
- 8/36 Connecting rod . . . . . 55-66 in.-lbs. (6.2-7.5 N·m)
- 10/32 Muffler cap . . . . . 50-60 in.-lbs. (5.6-6.8 N·m)
- 10/32 Bearing retainer . . . . . 55-66 in.-lbs. (6.2-7.5 N·m)
- 10/32 Screen to rotor . . . . . 50-60 in.-lbs. (5.6-6.8 N·m)
- 10/32 Drivecase cover . . . . . 55-66 in.-lbs. (6.2-7.5 N·m)



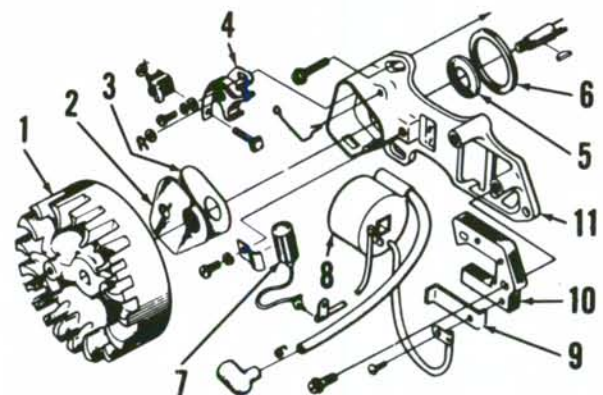
**Fig. HL31—** Exploded view of air box and throttle handle assembly for models equipped with pyramid reed type intake valve. Idle speed adjusting screw (23) on some models, is located in air box instead of on carburetor body; remove idle speed adjusting screw and spring from new service carburetor before installing carburetor on these models. Early type aluminum reed seat is shown; refer to Fig. HL32 for late type plastic (Delrin) seat and moulded reed retainer.

- |                     |                      |                        |                           |
|---------------------|----------------------|------------------------|---------------------------|
| 1. Gaskets          | 11. Gasket           | 24. Boot               | 36. "Out" check valve     |
| 2. Spacer           | 14. Cover            | 27. Throttle latch pin | 37. Grommet               |
| 3. Reed seat        | 17. Filter           | 28. Spring             | 38. Plug (AO models)      |
| 4. Valve reeds (4)  | 18. Gasket           | 29. Handle cover       | 39. Gasket                |
| 5. Retaining plates | 19. Bracket          | 30. Snap ring          | 40. Spring (manual oiler) |
| 6. Fuel line        | 20. Choke rod        | 31. Throttle trigger   | 41. "O" ring              |
| 7. Gasket           | 21. Throttle rod     | 32. Grommet            | 42. Manual pump plunger   |
| 8. Carburetor       | 22. Idle speed screw | 33. "In" check valve   | 43. "O" ring              |
| 9. Air box          |                      |                        |                           |



**Fig. HL32—** View showing late type Delrin plastic reed seat (5) and moulded reed retainer (3). Reeds (6) are held on pins protruding from seat by the retainer. Refer to text for assembly instructions.

- |                  |                |
|------------------|----------------|
| 1. Gasket        | 6. Reeds (4)   |
| 2. Spacer        | 9. Gasket      |
| 3. Reed retainer | 10. Carburetor |
| 5. Reed seat     |                |



- |                   |
|-------------------|
| 1. Flywheel       |
| 2. Cover          |
| 3. Gasket         |
| 4. Breaker-points |
| 5. Felt seal      |
| 6. Gasket         |
| 7. Condenser      |
| 8. Ignition coil  |
| 9. Coil clip      |
| 10. Armature core |
| 11. Stator plate  |



- 10/32 Pulley to fan housing . . . . .50-60 in.-lbs. (5.6-6.8 N·m)
- 10/32 Flanged inner race for pulley . . . . .55-66 in.-lbs. (6.2-7.5 N·m)
- 10/32 Carburetor to chamber . . . . .50-60 in.-lbs. (5.6-6.8 N·m)
- 12/24 Handle bar to fuel tank . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 12/24 Bracket to drivecase . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 12/24 Stator to crankcase and cylinder . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 12/24 Drivecase to crankcase . . . . .80-96 in.-lbs. (9.0-10.8 N·m)

- 12/24 Carburetor chamber to fuel tank . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 12/24 Muffler to cylinder . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 1/4-20 Fuel tank to crankcase . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 12/24 Fan housing to fuel tank . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 1/4-28 Cylinder nuts . . . . .100-120 in.-lbs. (11.3-13.6 N·m)
- 12/24 Pawl studs to rotor . . . . .80-96 in.-lbs. (9.0-10.8 N·m)
- 1/4-20 Handle bar to bracket . . . . .100-120 in.-lbs. (11.3-13.6 N·m)
- 1/4-20 Bumper screws . . . . .80-96 in.-lbs. (9.0-10.8 N·m)

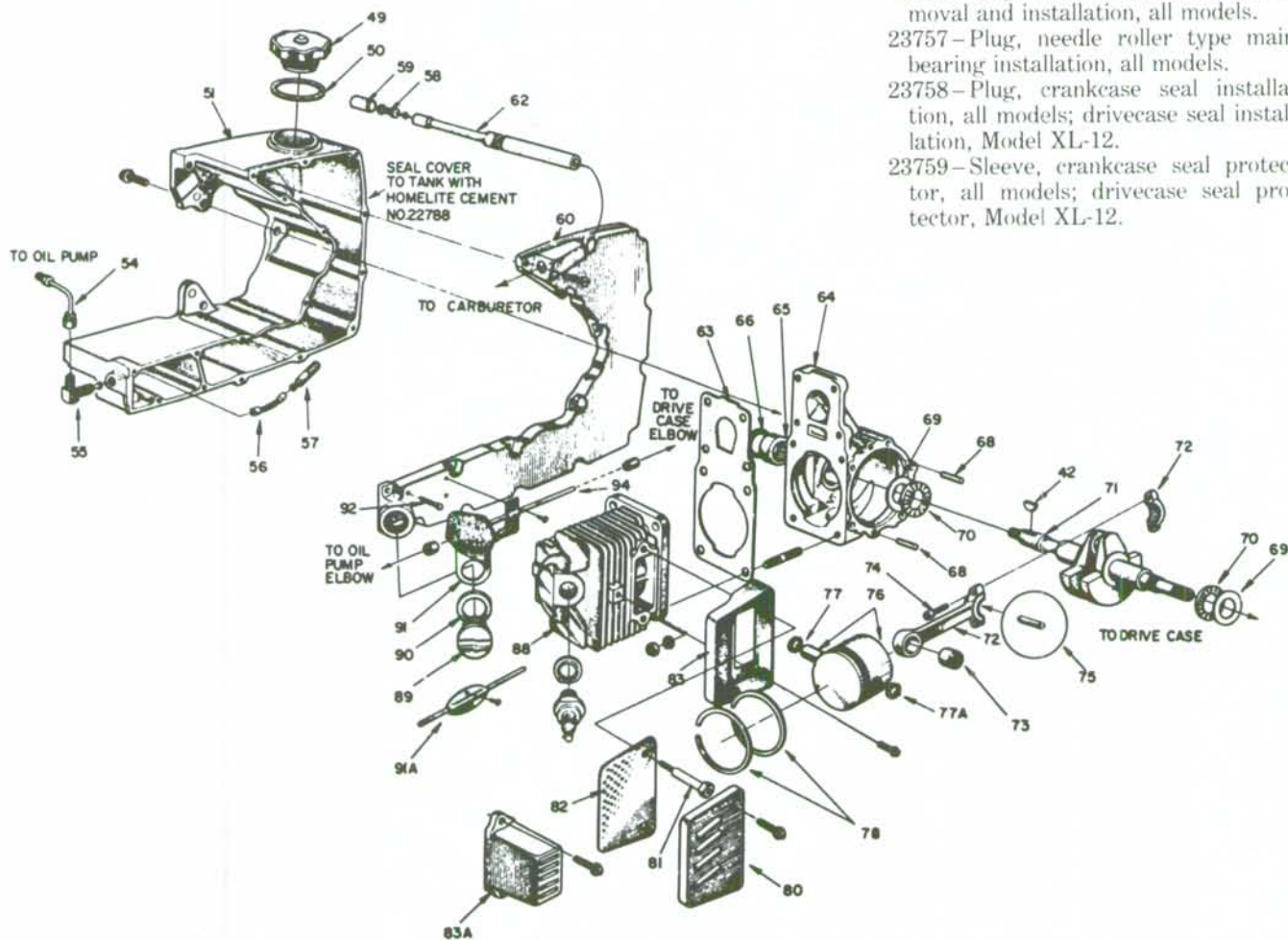
- 3/8-24 Clutch nut . . . . .150-180 in.-lbs. (16.9-20.3 N·m)
- 5/8-32 Clutch . . . . .150-180 in.-lbs. (16.9-20.3 N·m)
- 5/16-24 Rotor nut . . . . .150-180 in.-lbs. (16.9-20.3 N·m)
- 1/2-20 Clutch to crankshaft . . . . .150-180 in.-lbs. (16.9-20.3 N·m)
- 14 mm Spark plug . . . . .250-300 in.-lbs. (28.2-33.9 N·m)
- Clutch spider . . . . .180-216 in.-lbs. (20.3-24.4 N·m)

**HOMELITE SERVICE TOOLS.**

Listed below are Homelite tool numbers, tool description and model application of tools for servicing.

**Tool No. Description & Model Usage**

- 04197 - Carburetor tester
- 17789 - Carburetor repair tool kit.
- 22820-1 - Bearing collar for A-23137.
- 23136 - Body for A-23137.
- 23756 - Plug, connecting rod bearing removal and installation, all models.
- 23757 - Plug, needle roller type main bearing installation, all models.
- 23758 - Plug, crankcase seal installation, all models; drivecase seal installation, Model XL-12.
- 23759 - Sleeve, crankcase seal protector, all models; drivecase seal protector, Model XL-12.



**Fig. HL34 - Exploded view showing power head and fuel tank construction of Model XL-12; refer to Fig. HL35 for Model Super XL Automatic. Dowel pin (68) are used on later models. Refer to text. Single or two-piece muffler may be used. Shield (91) is not used on later models.**

- |                   |                        |                          |                   |                    |                           |
|-------------------|------------------------|--------------------------|-------------------|--------------------|---------------------------|
| 42. Woodruff key  | 58. Fuel pickup        | 66. Crankshaft seal      | 80. Muffler cap   | 73. Needle bearing | 84. Piston rings          |
| 49. Fuel tank cap | 59. Fuel filter        | 68. Dowel pins           | 81. Special studs | 74. Rod cap screws | 90. Gasket                |
| 50. Gasket        | 60. Tank cover (late)  | 69. Thrust washers       | 82. Baffle        | 75. Needle rollers | 91. Shield                |
| 51. Fuel tank     | 62. Flexible fuel line | 70. Thrust bearings      | 83. Muffler body  | 76. Piston & pin   | 91A. Plate                |
| 54. Oil line      | 63. Gasket             | 71. Crankshaft           | 83A. Muffler      | 77. Snap ring      | 92. Cotter pin (breather) |
| 55. Check valve   | 64. Crankcase          | 72. Connecting rod & cap | 88. Cylinder      | 77A. Snap ring     | 94. Oil line              |
| 56. Oil line      | 65. Needle bearing     |                          | 89. Oil cap       |                    |                           |



- 23800—Sleeve, crankcase seal installation, all models; drivecase seal installation. Model XL-12.
- 23819—Plug, clutch drum needle bearing installation, all direct drive models.
- 23843—Sleeve, drive seal installation, Model Super XL Automatic.
- 23844—Sleeve, drive seal protector, Model Super XL Automatic.
- 23845—Plug, drivecase seal installation, Model Super XL Automatic.
- 23846—Anvil, crankshaft installation, Model Super XL Automatic.
- 23884—Sleeve, bearing and shaft, Model Super XL Automatic.
- 94194—Compression gage.
- A-23137—Jackscrew, crankshaft assembly and installation, all models except XL-12.
- A-23841-A—Wrench, guide bar stud insert, Model Super XL Automatic.
- A-23934—Wrench, clutch plate removal and installation, all late production.
- A-23949—Remover, piston pin with Spirol pin at exhaust side of piston.
- A-23960—Remover and locking bracket, rotor (flywheel), all models.
- JA-31316-4—Test spark plug.

**COMPRESSION PRESSURE.** For optimum performance on all models, cylinder compression pressure should be 130-155 psi (896-1069 kPa) with engine at normal operating temperature. Engine should be inspected and repaired when compression pressure is 90 psi (620 kPa) or below.

**CONNECTING ROD.** Connecting rod and piston assembly can be removed after removing cylinder from crankcase. Refer to Fig. HL39. Be careful to remove all of the loose needle rollers when detaching rod from crankpin. Early models have 28 loose needle rollers; starting with serial number 207-1277, 31 needle rollers are used.

**NOTE: A different crankshaft and connecting rod are used on late models with 31 needle rollers.**

Renew connecting rod if bent or twisted, or if crankpin bearing surface is scored, burned or excessively worn. The caged needle roller piston pin bearing can be renewed by pressing old bearing out and pressing new bearing in with Homelite tool 23756. Press on lettered end of bearing cage only.

It is recommended that the crankpin needle rollers be renewed as a set whenever engine is disassembled for service. On early models with 28 needle rollers, stick 14 needle rollers in the rod and remaining 14 needle rollers in rod cap with light grease or beeswax. On late models with 31 needle rollers, stick 16 rollers in rod and 15 rollers in rod cap. Assemble rod to cap with match marks aligned, and with open end of piston pin towards flywheel side of engine. Wiggle the rod as cap retaining screws are being tightened to align the fractured mating surfaces of rod and cap.

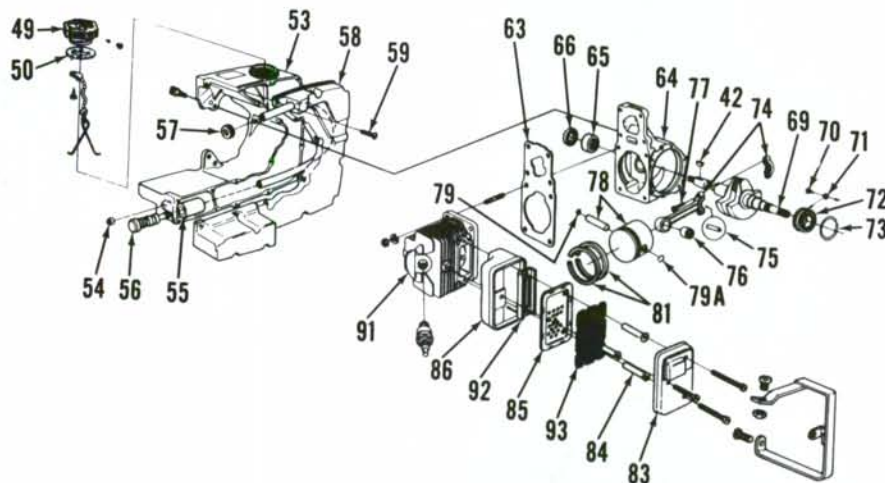
**PISTON, PIN AND RINGS.** The piston is fitted with two pinned compression rings. Renew piston if scored, cracked or excessively worn, or if ring side clearance in top ring groove exceeds 0.0035 inch (0.089 mm).

Recommended piston ring end gap is 0.070-0.080 inch (1.78-2.03 mm); maximum allowable ring end gap is 0.085 inch (2.16 mm). Desired ring side clearance in groove is 0.002-0.003 inch (0.05-0.08 mm).

Piston, pin and rings are available in standard size only. Piston and pin are available in a matched set, and are not available separately.

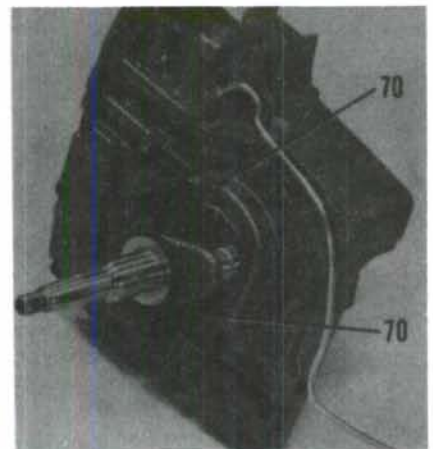
Piston pin has one open and one closed end and may be retained in piston with snap rings or a Spirol pin. A wire retaining ring is used on exhaust side of piston on some models and should be removed.

To remove piston pin on all models, remove the snap ring at intake side of piston. On piston with Spirol pin at exhaust side, drive pin from piston rod with slotted driver (Homelite tool A-23949). On all other models, insert a 3/16 inch (4.76 mm) pin through snap

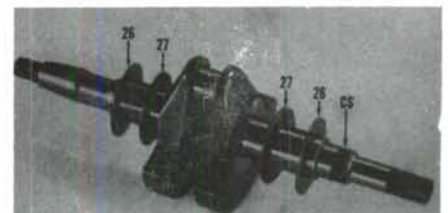


**Fig. HL35—Exploded view showing latest type fuel tank and later construction of power head; refer to Fig. HL34 for early units. Ball bearing (72) is retained on crankshaft by snap ring (73) and in drivecase by two screws (70) and special washers (71); refer to Fig. HL36. Latest models have 31 loose needle rollers (75) at crankpin; earlier models have 28 rollers. Tank cover (58) is sealed to tank (53) with cement (Homelite part 22788) and is retained with 16 screws (59). Later tanks are permanently bonded.**

- |                     |                     |                    |                    |
|---------------------|---------------------|--------------------|--------------------|
| 42. Woodruff key    | 59. Screws (16)     | 72. Ball bearing   | 79A. Snap ring     |
| 49. Fuel tank cap   | 63. Gasket          | 73. Snap ring      | 81. Piston rings   |
| 50. Gasket          | 64. Crankcase       | 74. Connecting rod | 83. Muffler cap    |
| 53. Fuel tank       | 65. Needle bearing  | 75. Needle rollers | 84. Special studs  |
| 54. Pipe plug       | 66. Crankshaft seal | 76. Needle bearing | 85. Baffle         |
| 55. Fuel filter     | 69. Crankshaft      | 77. Rod cap screws | 86. Muffler body   |
| 56. Pick-up head    | 70. Bearing screws  | 78. Piston & pin   | 91. Cylinder       |
| 57. Grommet         | 71. Special washers | 79. Snap ring      | 92. Plate          |
| 58. Fuel tank cover |                     |                    | 93. Spark arrestor |



**Fig. HL36—View showing crankcase removed from drivecase and crankshaft on models equipped with ball bearing at drive end of crankshaft. To remove crankshaft from drivecase, bearing retaining screws (70) must first be removed.**



**Fig. HL38—Be sure the steel thrust washers (26) are to outside of thrust bearings (27) when installing crankshaft on Model XL-12. Model Super XL Automatic does not use thrust washers or thrust bearings.**



ring at exhaust side and drive piston pin out as shown in Fig. HL40.

When reassembling piston to connecting rod, be sure to install closed end of piston pin towards exhaust side of piston (away from piston ring locating pin). Fit the Waldes Truarc snap ring in groove of pin bore with sharp edge out and turn ring gap towards closed end of piston.

**CRANKSHAFT AND BEARINGS.** On Model XL-12 the crankshaft is supported in two caged needle roller bearings and crankshaft end play is controlled by a roller bearing and hardened steel thrust washer on each end of the shaft. Refer to Fig. HL38. On Model Super XL Automatic, flywheel end of crankshaft is supported in a needle bearing in crankcase and drive end is supported in a ball bearing located in drivecase; end play is controlled by the ball bearing.

Maximum allowable crankshaft end play on models with thrust bearings (Fig. HL38) is 0.020 inch (0.51 mm); renew thrust bearings if end play is excessive. Normal end play is approximately 0.010 inch (0.25 mm).

Renew the crankshaft if any of the main bearing, crankpin bearing or thrust bearing surfaces or sealing surfaces are scored, burned or excessively worn. Renew the drivecase ball bearing

if excessively loose or rough. Also, reject crankshaft if flywheel keyway is beat out or if threads are badly damaged.

**CYLINDER.** The cylinder bore is chrome plated. Renew the cylinder if chrome plating is worn away exposing the softer base metal.

**CRANKCASE, DRIVECASE AND SEALS.** On all models, crankshaft seals can be renewed without disassembling crankcase, drivecase and crankshaft unit. With magneto armature and core assembly removed, pry seal from crankcase. Install new seal over crankshaft with lip of seal inward, then using driver sleeve, drive seal into crankcase. Seal in drivecase can be pried out after removing clutch assembly and, on models so equipped, the automatic chain oiler pump. Install seal with lip inward and drive into position with sleeve.

**NOTE: Use of seal protectors is recommended; if protectors are not available, wrap threads on crankshaft with thin plastic tape to prevent damage to seal lips.**

Crankcase can be removed from crankshaft and drivecase after removing cylinder, piston and connecting rod and removing retaining screws. On Model XL-12, crankshaft can be withdrawn from drivecase. On Model Super XL Automatic, remove the two bearing retaining screws (70—Fig. HL35) special washers (71), then press crankshaft and ball bearing (72) from drivecase. Remove snap ring (73), then press crankshaft out of the ball bearing.

Inspect the needle roller bearing in crankcase, and on Model XL-12, the needle roller bearing in drivecase. Bearings should be renewed if any needle roller has flat spots or is otherwise damaged, or if rollers are worn so any two rollers can be separated a width equal to thickness of one roller. Always press against lettered end of bearing cage when removing and installing needle roller bearings. Needle roller bearings

should be installed using appropriate installation plug.

Install new ball bearing on crankshaft using jackscrew or by supporting crankshaft at crank throw and installing bearing in a press. Groove in outer race of bearing must be toward crankpin.

Renew crankshaft seals before assembling crankshaft, crankcase and drivecase. Using installation plug, press seal into position with lip to inside of crankcase. On Model XL-12, install thrust bearings on crankshaft next to crankpin throw, then install the hardened steel rust washers at outer side of each thrust bearing. On Model Super XL Automatic, first assemble crankshaft and drivecase by placing seal protector on crankshaft, then pulling crankshaft and ball bearing into drivecase with jackscrew and adapters. Install two NEW bearing retaining screws and lockwashers. On Model XL-12, place seal protector on crankshaft and insert crankshaft in crankcase. Then, on all models, assemble crankcase to drivecase using new gasket.

**NOTE: On early production, crankcase was sealed to drivecase with an "O" ring; however, use of "O" ring has been discontinued and a gasket, rather than an "O" ring, should be used on all models.**

On all late production models, crankcase is fitted with dowel pins to provide a more positive alignment of crankcase and drivecase. Service crankcases are drilled for dowel pins, but dowel pins are not installed so crankcase can be used with early type drivecase not drilled for dowels. If renewing late type crankcase fitted with dowel pins, two new dowel pins must be obtained and installed in new crankcase; install dowel pins so they protrude 0.165-0.180 inch (4.19-4.57 mm) from crankcase.

**PYRAMID REED VALVE.** All models are equipped with a pyramid reed type intake valve with four reeds. Early production reed seat was made of

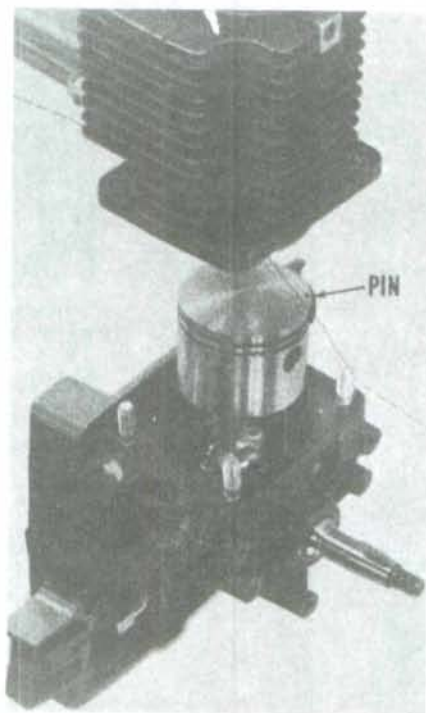


Fig. HL39—Piston and connecting rod assembly can be removed from crankpin after removing cylinder from crankcase. Note piston ring locating pin on intake side of piston.



Fig. HL40—After removing snap rings the piston pin can be tapped out using a  $\frac{3}{16}$  inch (4.76 mm) rod as shown or, on pistons with Spirol pin at exhaust side, by driving piston pin out with slotted driver (Homelite tool A23949).

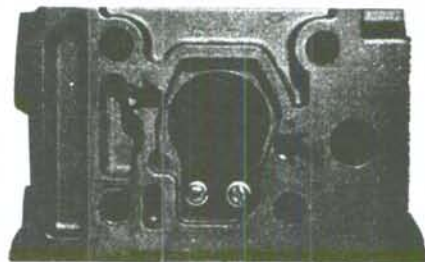
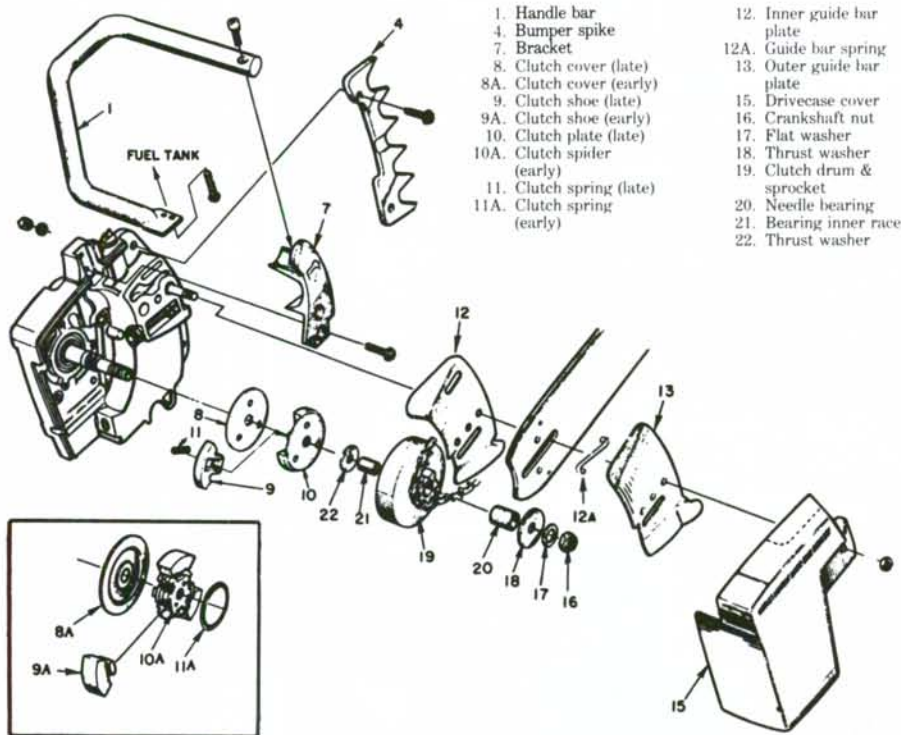


Fig. HL41—When installing reed valve on air box (models with flat reed intake valve only), be sure reed is centered between the two points indicated by arrows.





- 1. Handle bar
- 4. Bumper spike
- 7. Bracket
- 8. Clutch cover (late)
- 8A. Clutch cover (early)
- 9. Clutch shoe (late)
- 9A. Clutch shoe (early)
- 10. Clutch plate (late)
- 10A. Clutch spider (early)
- 11. Clutch spring (late)
- 11A. Clutch spring (early)
- 12. Inner guide bar plate
- 12A. Guide bar spring
- 13. Outer guide bar plate
- 15. Drivecase cover
- 16. Crankshaft nut
- 17. Flat washer
- 18. Thrust washer
- 19. Clutch drum & sprocket
- 20. Needle bearing
- 21. Bearing inner race
- 22. Thrust washer

Fig. HL42—Exploded view of typical direct drive clutch assembly. Late type clutch assembly (items 8, 9, 10 & 11) is interchangeable as a unit with early production clutch shown in inset at lower left corner.

aluminum and reeds were retained to seat by spring plates and screws.

Late production reed seat (see Fig. HL32) is made of Delrin plastic. The reeds fit onto pins protruding from the plastic seat and are held in place by a molded retainer, eliminating the retaining spring plates and screws.

Reeds, spring plates and retaining screws are available for servicing the early type aluminum reed seat. However, if the seat is worn or damaged beyond further use, the Delrin seat and molded retainer is used as replacement.

When assembling reeds to aluminum seat, apply Loctite to retaining screws to keep them from working loose. Renew the spacer gaskets and carburetor gasket and install the spacer, reed seal assembly and carburetor as in Fig. HL31.

To assemble and install Delrin reed seat and reeds, proceed as follows: Fit reed retainer (3—Fig. HL32) into spacer (2) so the pin on retainer clears cut-out in spacer. Using a drop of oil under each reed, stick the reeds to pyramid seat so holes in reeds fit over the pins molded into seat. Place the retainer and spacer over the reeds and seat so all parts are locked together, then install the valve assembly and carburetor with new gaskets (1 and 8).

**CLUTCH.** Refer to Fig. HL42 for exploded view of typical clutch assembly. Illustration shows late type clutch assembly using three compression springs (11) to hold shoes retracted in plate (10) and in insets at lower left corner, the early type clutch using garter type springs (11A) to hold shoes to spider (10A). The early type clutch (inset) and late type clutch are interchangeable as an assembly. Clutch plate (10) or spider (10A) is threaded to crankshaft.

If clutch will not disengage (chain continues to turn) with engine at idle speed, check for broken, weak or improperly installed clutch springs. If clutch slips under load and engine continues to run at high speed, excessive wear of clutch shoes is indicated.

On early production Model XL-12, clutch drum was equipped with an Oilite bushing. All later clutch drums, including service clutch drum for early XL-12, are fitted with caged needle roller bearings. When renewing early bushing type clutch drum, a new needle bearing inner race must also be installed.

Renew needle roller bearing inner race if wear marks are visible. Renew bearing in clutch drum if any roller has flat spots or is damaged, or if worn to extent that any two rollers can be separated the width equal to the thickness of one roller. Using installer

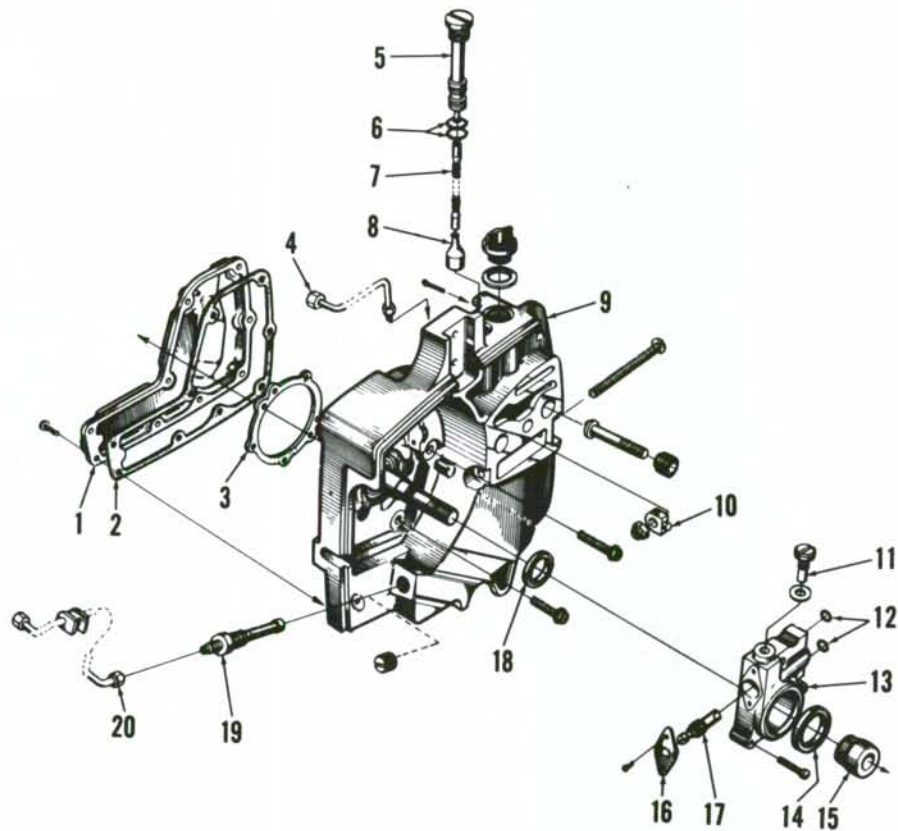


Fig. HL43—Exploded view of automatic chain oil pump on models so equipped.

- 1. Oil reservoir cover
- 2. Gasket
- 3. Gasket
- 4. Oil line
- 5. Oil line tube
- 6. "O" rings
- 7. Oil line
- 8. Oil filter
- 9. Drivecase
- 10. Bar adjusting pin
- 11. Cam screw
- 12. "O" rings
- 13. Pump body
- 14. Felt seal
- 15. Worm gear
- 16. Flange
- 17. Plunger
- 18. Crankshaft seal



plug, press against lettered side of needle bearing cage when installing bearing.

Refer to Fig. HL47 for assembly of late type clutch.

**AUTOMATIC CHAIN OILER PUMP.** Refer to Fig. HL43 for exploded view of typical automatic oiler pump installation, and to Fig. HL44 for schematic view showing pump operation.

The automatic oiler pump pump is accessible after removing the clutch assembly from crankshaft and disconnecting oil lines. Pump plunger (17-Fig. HL43) and body (13) are available as a complete assembly only which includes flange (16), cam screw (11), gasket, "O" rings (12), sealing felt (14) and flange retaining screws; however, all parts except plunger and body are available separately.

Inspect tip of cam screw (11) and cam groove on plunger (17) for wear and plunger bore in body and piston portion of plunger for scoring or wear. Renew pump assembly if body and/or piston is worn or damaged beyond further use.



Fig. HL44—Automatic oil pump worm gear (W) driven by crankshaft turns plunger (P) at 1/20 engine speed. As plunger turns, cam on end of plunger engages cam screw (C) causing the plunger to go back and forth. Flat end of plunger acts as inlet and outlet valve.



Fig. HL47—View showing easy method for installing late type clutch shoes and springs on clutch plate.

**REWIND STARTER.** Refer to Fig. HL49 or HL50 for an exploded view of early or late rewind starter. There were some models equipped with the early starter that used some of the components shown on the later starter. Service procedures for all of these starters are the same.

To disassemble starter, pull starter rope fully out, hold starter pulley from turning, pull all slack in rope out inner side of fan housing and allow pulley to unwind slowly until spring tension is relieved. Remove the slotted hex head screw retaining pulley to post and remove starter pulley and cup with flat retaining washer. Remove the rewind spring and, if so equipped, the spring

shields, from fan housing. Remove rope from pulley and handle.

Starter pulley post in fan housing is not renewable; a new fan housing must be installed if post is broken loose, or on mid-range production models without starter post bushing, if post is worn so that pulley is not held in proper position. Renew flanged bushing on early production models if bushing is worn excessively and fan housing is serviceable. Renew rope bushing if worn.

To reassemble, proceed as follows: Do not lubricate starter spring, but apply light oil sparingly to starter post, bushing (if used) and bore of starter pulley. Place outer shield (if used) in fan housing, then install rewind spring with

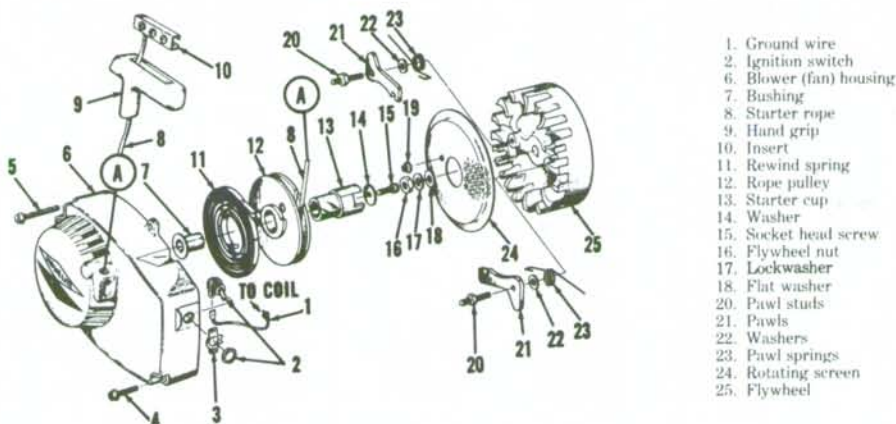


Fig. HL49—Exploded view of early rewind starter components and related parts. Starter unit is mounted on shaft (starter post) which is an integral part of the blower housing.

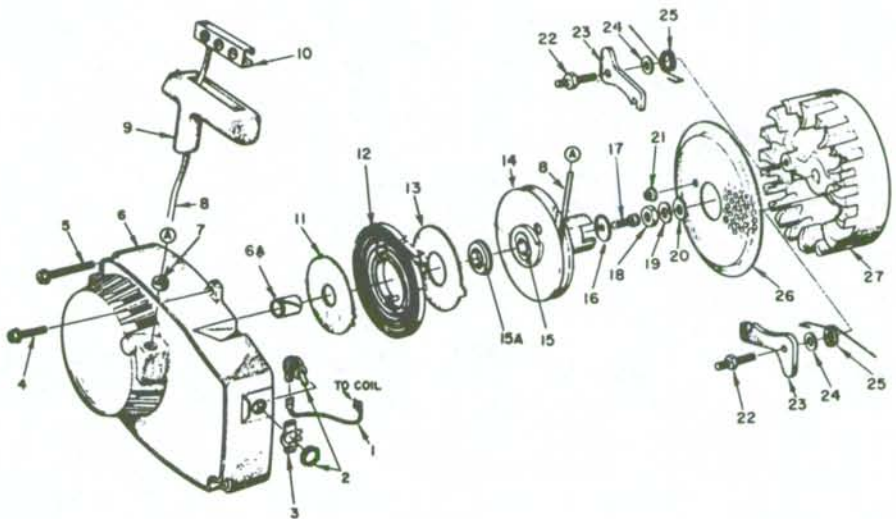


Fig. HL50—Exploded view of later production rewind starter.

1. Ground wire
2. Ignition switch
6. Blower (fan) housing
7. Bushing
8. Starter rope
9. Hand grip
10. Insert
11. Rewind spring
12. Rope pulley
13. Starter cup
14. Washer
15. Socket head screw
16. Flywheel nut
17. Lockwasher
18. Flat washer
20. Pawl studs
21. Pawls
22. Washers
23. Pawl springs
24. Rotating screen
25. Flywheel

1. Ground lead
2. "ON-OFF" switch
3. Switch plate
6. Fan housing
- 6A. Bushing
7. Rope bushing
8. Starter rope
9. Starter handle
10. Insert
11. Inner spring shield
12. Rewind spring
13. Outer spring shield
14. Starter pulley
15. Spring lock
- 15A. Spring lock bushing
16. Retaining washer
17. Hex head screw
18. Crankshaft nut
19. Lockwasher
20. Flat washer
21. Screen retaining nuts
22. Pawl studs
23. Starter pawls
24. Washers
25. Pawl springs
26. Air screen
27. Rotor (flywheel)



loop in outer end over spring post in fan housing and install inner spring shield (if used). Attach starter cord to pulley, insert rope through rope bore or bushing in fan housing and attach handle and insert to outer end of rope. Wind rope on-

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**Fig. HL51**—When installing starter pawls (21), be sure pawl return springs (23) are located in flywheel vanes so they are parallel to the pawls as shown.

to starter pulley. Place pulley and starter cup (with spring lock and spring lock bushing if integral pulley and lock are used) on starter post and be sure spring lock or pulley is properly engaged with rewind spring. Install retaining washer and hex head screw and tighten screw to 50 in.-lbs. (5.6 N·m). Pull rope out about two feet and hold pulley from turning. Locate notch in pulley at cord insert in housing and pull up loop of cord between notch and housing. Holding on to pulley, wind cord three more turns onto pulley by turning pulley, then let spring rewind pulley until handle is pulled against fan housing.



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