PARTNER

(PRIOR TO 1971)

PARTNER INDUSTRIES OF AMERICA, INC.
2737 West Fulton Street
Chicago, Illinois 60612

Model	Bore	Stroke	Displ.	Drive Type
R11	50.0 mm.	45.9 mm.	90.0 cc.	Direct
	1.968 in.	1.776 in.	5.49 cu. in.	
X21	50.0 mm.	45.9 mm.	90.0 cc.	Belt
	1.968 in.	1.776 in.	5.49 cu. in.	
R12	50.0 mm.	45.9 mm.	90.0 cc.	Direct
	1.968 in.	1.776 in.	5.49 cu. in.	
P15	50.0 mm.	45.9 mm.	90.0 cc.	Planetary
	1.968 in.	1.776 in.	5.49 cu. in.	
TS	45.0 mm.	44.0 mm.	70.0 cc.	Direct
	1.77 in.	1.73 in.	4.27 cu. in.	
R14	52.0 mm.	36.0 mm.	76.0 cc.	Direct
	1.95 in.	1.42 in.	4.63 cu. in.	
R16	44.0 mm.	36.0 mm.	55.0 cc.	Direct
	1.73 in.	1.42 in.	3.36 cu. in.	
R17	44.0 mm.	36.0 mm.	55.0 cc.	Direct
	1.73 in.	1.42 in.	3.36 cu. in.	

MAINTENANCE

SPARK PLUG. Recommended spark plug is Bosch W175T1 for models R11, X21, R12, P15 and TS, and WK175T1 for model R14. Use Champion CJ-6 for models R16 and R17. Electrode gap is 0.020 inch (0.5mm).

CARBURETOR. Tillotson diaphragm type carburetors having an integral fuel pump are used on all models. Application is as follows:

R11, X21 .... HL39A, HL39B, HL67A
R12, P15 ..... HL111A, HL163A
R14 ..... HS2A, HS2B, HS2C
TS HL143A
R16, R17 ..... HS47B

Refer to Tillotson section of SERVICE FUNDAMENTALS for service and exploded views of carburetors.

Normal needle settings for all models except model TS, R16 and R17 is ¾-turn open for low idle speed mixture screw and 1-turn for high speed mixture screw. For model TS, R16 and R17, both needles are opened ¾-turn.

MAGNETO AND TIMING. To check and adjust breaker points on models R11, X21, R12 and P15, remove fan housing and the dust covers (21A—Fig. PT12) from flywheel. Adjust the breaker point gap to 0.016 inch (0.4mm). The position of magneto stator plate controls ignition timing and points should just open (spark plug fires) when piston is ⅛-inch (3.0 mm) before top dead center.

To check and adjust breaker points on model R14, remove fan housing and the fan (30—Fig. PT7) from flywheel (29). Adjust the breaker point gap to 0.016 (0.4 mm). The position of magneto stator plate controls ignition timing and points should just open (spark plug fires) when piston is 1/16-inch (1.5 mm) before top dead center.

To check and adjust breaker points on model TS, remove fan housing, flywheel and dust cover (21—Fig. PT14). Adjust the breaker point gap to 0.016 inch (0.4 mm). The position of the magneto stator controls ignition timing and breaker points should just open (spark plug fires) when piston is 3/32-inch (2 mm) before top dead center.

To check and adjust breaker points on models R16 and R17, remove top housing, fan housing, air strainer, and flywheel. Adjust breaker point gap to 0.018 inch (0.45 mm). Ignition timing is fixed and cannot be adjusted, however, incorrect breaker point gap setting will affect ignition timing.

When renewing breaker points use Partner tool number 381 800 to remove flywheel on all models except model TS. To remove model TS flywheel use Partner tool number 382 412.

LUBRICATION. Engine is lubricated by mixing engine oil with the

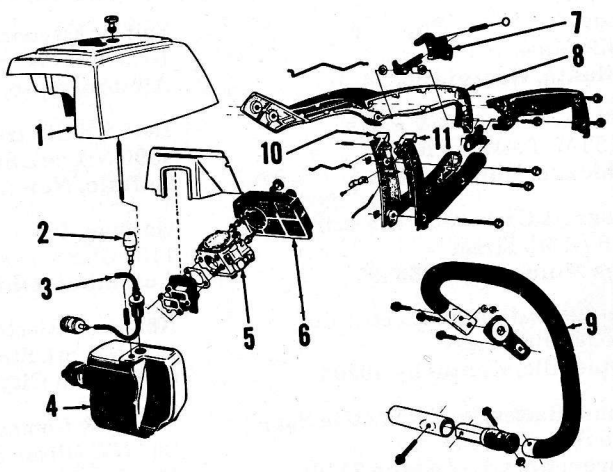


Fig. PT3–Exploded view of handle and fuel assemblies on R16 and R17 models.

1. Engine cover
2. Air vent
3. Fuel line
4. Fuel tank
5. Carburetor
6. Air filter
7. Throttle control
8. Rear handle
9. Front handle
10. Choke button
11. Stop button

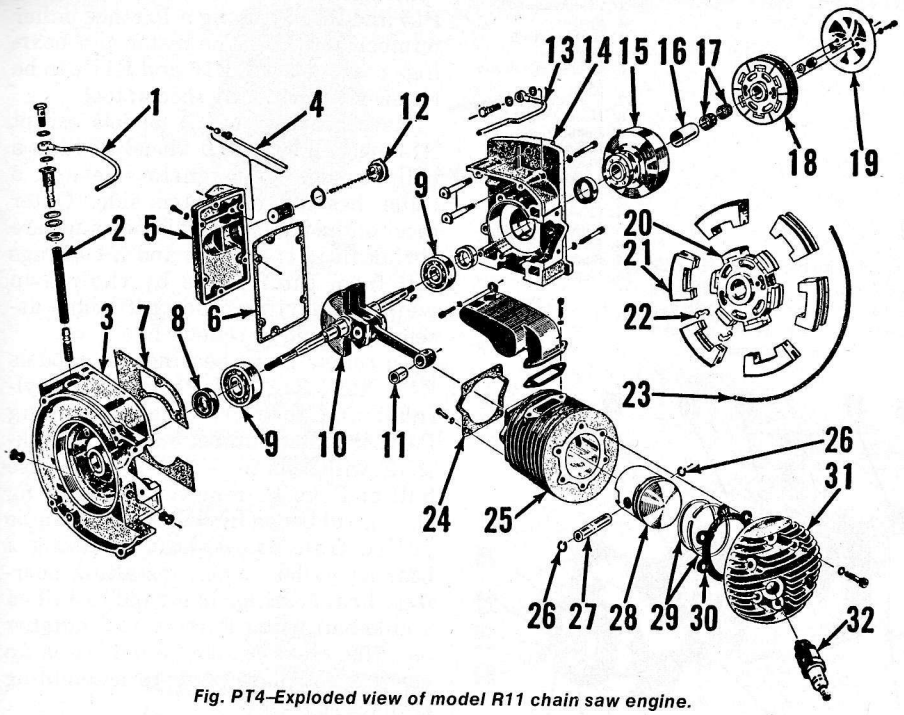
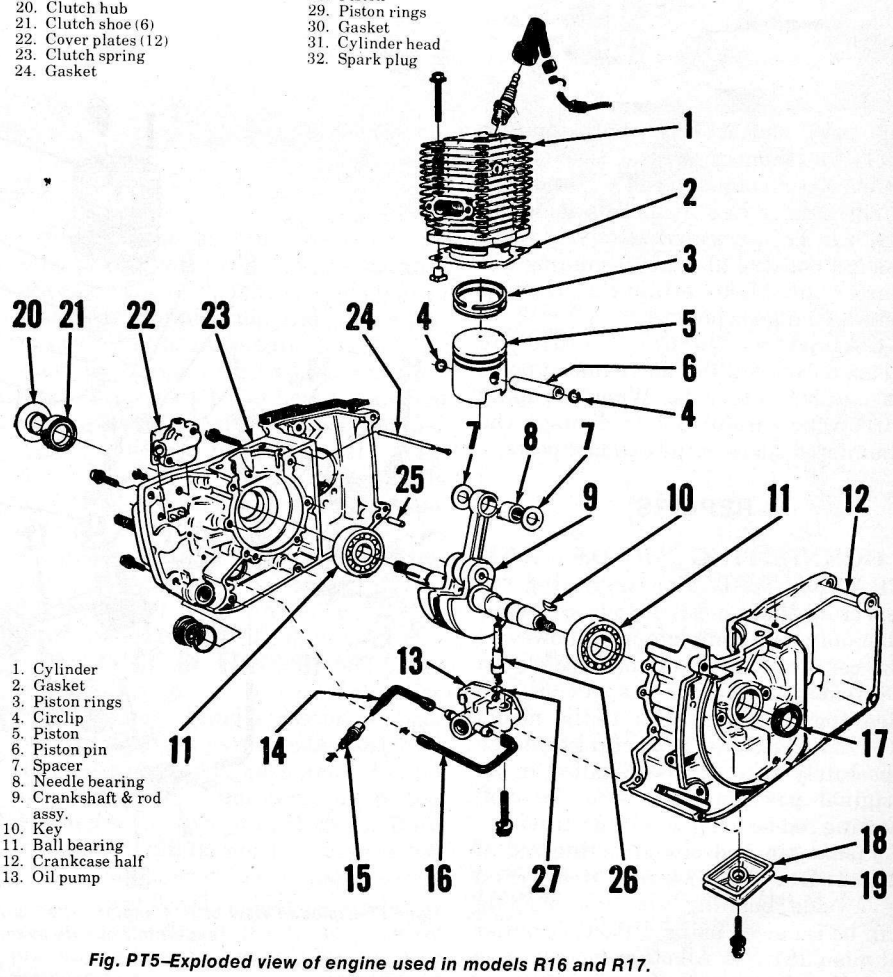


Fig. PT4–Exploded view of model R11 chain saw engine.

1. Oil suction pipe
2. Oil tank hose
3. Crankcase half
4. Air vent pipe
5. Oil tank
6. Gasket
7. Gasket
8. Seal
9. Bearing
10. Crankshaft & rod assembly
11. Pin bushing
12. Oil tank cap
13. Oil pressure pipe
14. Crankcase half
15. Clutch drum & sprocket
16. Bearing race
17. Needle bearings
18. Clutch assembly
19. Clutch cover
20. Clutch hub
21. Clutch shoe (6)
22. Cover plates (12)
23. Clutch spring
24. Gasket
25. Cylinder
26. Retainers
27. Piston pin
28. Piston
29. Piston rings
30. Gasket
31. Cylinder head
32. Spark plug

gasoline. For temperatures above 30°F., use SAE 40 non-detergent engine oil and for temperatures below 32°F., use SAE 30 non-detergent engine oil. For all models except model R14, mix one part oil with 25 parts of gasoline. For model R14 mix one part oil with 20 parts of gasoline. Use a separate container when mixing the oil and gas.

The cutting chain on models R11, X21 and TS is automatically lubricated by an oil pump mounted on the fan housing and driven by a key in end of crankshaft. The cutting chain on models R12, P15, R14, R16 and R17 is lubricated automatically by a pump located in the oil tank and driven by a push rod which is actuated by a cam on the crankshaft. Chain oil level should be checked and refilled each time fuel tank is filled. Use SAE 30 oil at temperatures above 40°. and SAE 10 oil at lower temperatures. Chain oil is contained in a compartment in the underside of the crankcase housing. Pump suction and pressure lines are transparent and visible on the outside on all except models R14, R16 and R17 which have the oil lines located within the oil tank. A visual inspection of these lines while saw is operating can be used to disclose a pump malfunction.



1. Cylinder
2. Gasket
3. Piston rings
4. Circlip
5. Piston
6. Piston pin
7. Spacer
8. Needle bearing
9. Crankshaft & rod assy.
10. Key
11. Ball bearing
12. Crankcase half
13. Oil pump

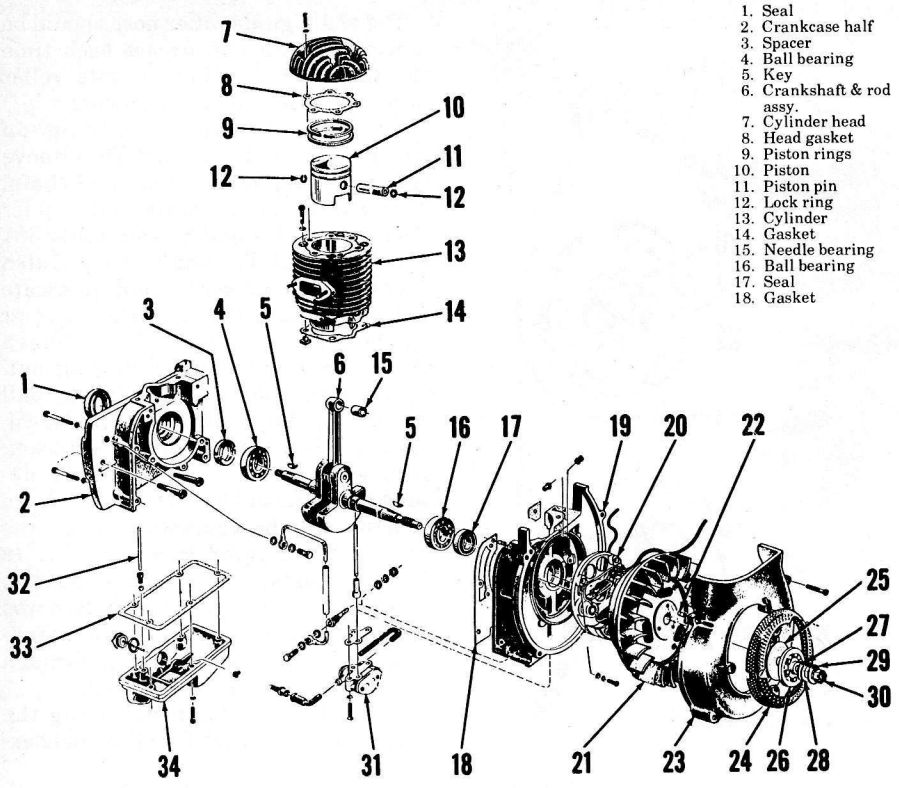
Fig. PT5–Exploded view of engine used in models R16 and R17.

14. Hose
15. Oil strainer
16. Hose
17. Seal
18. Gasket
19. Oil pump cover
20. Washer
21. Seal
22. Oil control valve
23. Crankcase half
24. Vent hose
25. Pin

The chain guide roller nose should be lubricated with gun grease each time the fuel tank is filled. Rotate roller nose as grease enters the bearing.

To lubricate clutch bearing on models R11, R12, R14 and TS, remove clutch housing chain guide and chain, then attach Partner puller 381 800 for models R11, R12 and R14, or puller 381 805 for model TS, and remove clutch drum. Clean bearings and lubricate with BRB Lifetime Mobilgrease, or equivalent. On model X21, remove clutch cover plate and retaining nut. Use Partner tool no. 381 800 to pull clutch. As clutch drum is withdrawn, slide the belt off the driven sprocket. Lubricate bearings as already described. On model P15, the clutch drum bearing can be lubricated when the gearbox is removed from saw and in the same manner as already described. The clutch bearing on models R16 and R17 is lubricated by oil in the crankcase fuel-oil mixture passing through an oil passage in the crankshaft.

Time interval for lubricating the clutch drum bearing for all models ex-



1. Seal
2. Crankcase half
3. Spacer
4. Ball bearing
5. Key
6. Crankshaft & rod assy.
7. Cylinder head
8. Head gasket
9. Piston rings
10. Piston
11. Piston pin
12. Lock ring
13. Cylinder
14. Gasket
15. Needle bearing
16. Ball bearing
17. Seal
18. Gasket
19. Crankcase half
20. Magneto
21. Flywheel
22. Pin
23. Fan housing
24. Screen
25. Disc
26. Flange
27. Washer
28. Spring washer
29. Spring washer
30. Nut
31. Oil pump
32. Air vent pipe
33. Gasket
34. Oil tank

Fig. PT6–Exploded view of R12 engine.

cept R16 and R17 is approximately every two months or after twenty-five gallons (U.S.) of fuel has been used.

The starter hub of models R11 and X21 can be lubricated after removing the fan housing and disassembling the starter hub. Make certain the oil pump driving flange is not lost.

CARBON. Carbon should be cleaned from muffler and exhaust ports at regular intervals. When scraping carbon, be careful not to damage the chamfered edges of the exhaust ports.

REPAIRS

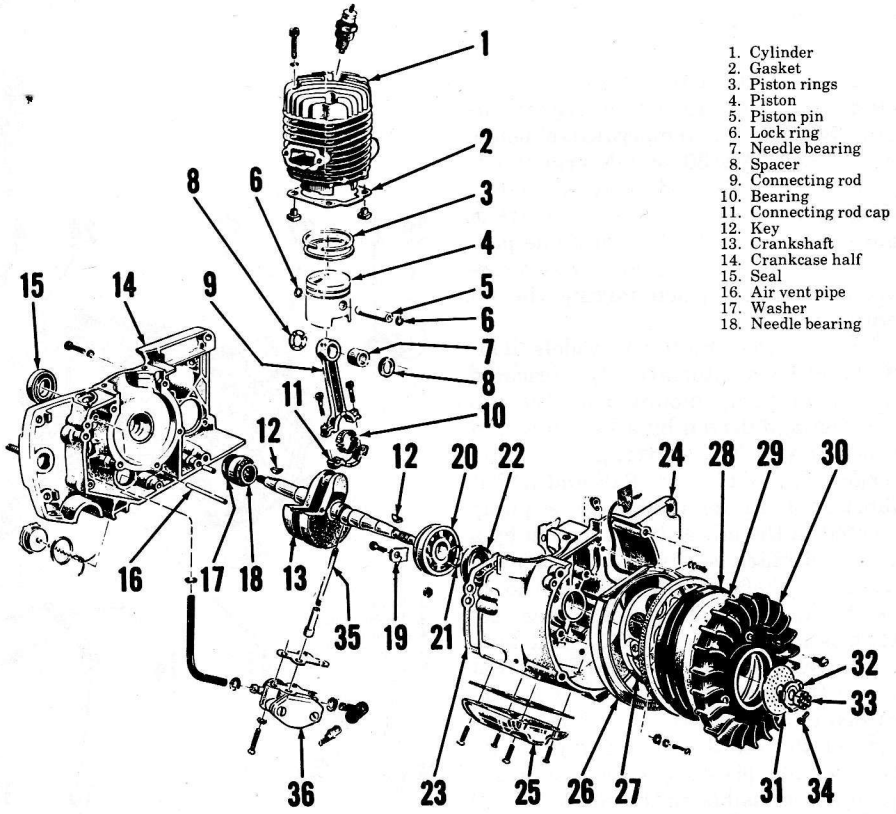
CONNECTING RODS AND CRANKSHAFT. The connecting rod and crankshaft for all models are available only as a complete unit; however, the connecting rod for model R14 can be disassembled for inspection and cleaning. See Fig. PT7. If the model R14 rod is removed from crankshaft, be absolutely sure cap is installed in its original position, otherwise the connecting rod bearing will be destroyed.

Piston pin end of connecting rod of models R11 and X21 are fitted with a renewable bushing and the bushing can be renewed using a Partner puller number 381 700. All other models have the piston pin end of connecting rod fitted with a needle bearing and bearing can be renewed on models R12, P15 and R14 by using a Partner puller number 381 718. The piston pin bearings of models TS, R16 and R17 can be renewed without any special tool.

Main bearings of all models except R14 are ball bearings. Model R14 has a ball bearing on magneto side and a roller bearing on clutch side. Outer races of the ball type main bearings are shrink fit in crankcase and if bearings fall from their bores by their own weight, bearings and crankcase assembly should be renewed.

To renew main bearings on models R11, X21, R12 and P15, remove cylinder and split crankcase by using Partner puller number 381 801. Crankshaft will remain with left crankcase half and can be removed by bumping with a rubber mallet. Bearings can be pulled from crankshaft by using a bearing puller. When installing bearings, heat bearings in oil and install on crankshaft using Partner tool number 381 709. Heat crankcase halves on an electric hot plate prior to assembling crankcase.

To renew main bearings on model TS, the cylinder must be removed and Partner tool number 381 912 used to separate crankcase and to push crankshaft from left crankcase half. See Figs. PT9 and PT10.



1. Cylinder
2. Gasket
3. Piston rings
4. Piston
5. Piston pin
6. Lock ring
7. Needle bearing
8. Spacer
9. Connecting rod
10. Bearing
11. Connecting rod cap
12. Key
13. Crankshaft
14. Crankcase half
15. Seal
16. Air vent pipe
17. Washer
18. Needle bearing
19. Bearing retainer
20. Ball bearing
21. Lock ring
22. Seal
23. Gasket
24. Crankcase half
25. Oil pump cover
26. Seal flange
27. Armature plate
28. Felt seal
29. Flywheel
30. Fan
31. Disc
32. Flange
33. Nut
34. Cotter pin

Fig. PT7–Exploded view of R14 engine. The connecting rod (9) and the crankshaft (13) are shown separately but are available only as an assembly.

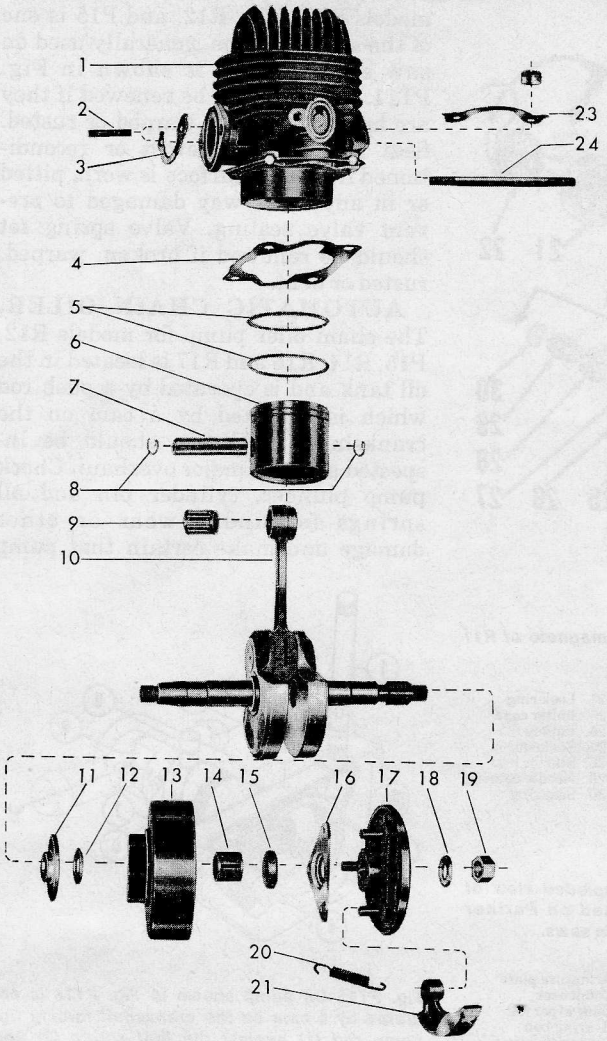


Fig. PT8–Exploded view showing cylinder, piston, crankshaft and rod and clutch assembly of the model TS engine.

1. Cylinder
3. Lock plate
4. Cylinder gasket
5. Piston rings
6. Piston
7. Piston pin
8. Snap rings
9. Piston pin bearing
10. Crankshaft & rod assy.
11. Flange washer
12. Washer
13. Drum & sprocket
14. Needle bearing
15. Tensioning ring
16. Retainer
17. Clutch hub
20. Clutch spring
21. Clutch shoe
23. Lock plate

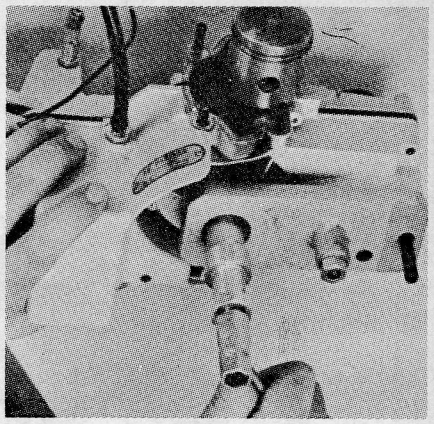


Fig. PT9–Use Partner tool number 381 912 as shown to separate crankcase. Same tool is used when crankcase is being joined.

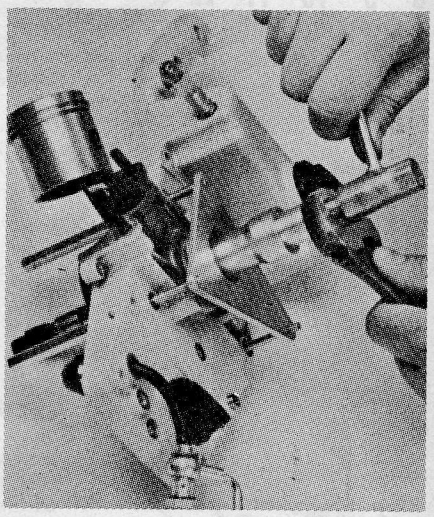


Fig. PT10–Partner tool number 381 912 shown being used to push crankshaft from left half of crankcase.

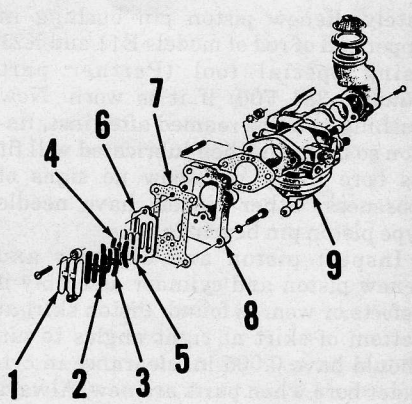


Fig. PT11–View of induction system used on models R11, X21, R12 and P15. Valve springs (3 & 4) are bowed and must be assembled so that the center of the springs are together and the ends are apart.

1. Valve retainer
2, 3 & 4. Valve spring set
5. Reed valve
6. Plate
7. Gasket
8. Flange
9. Carburetor

To renew main bearings on model R14, remove cylinder and separate the crankcase. Remove bearing retainer, pull crankshaft and ball bearing from left (magneto side) crankcase half, then remove bearing snap ring and pull bearing from crankshaft. To install ball bearing, heat the bearing in oil and install it on crankshaft using Partner tool number 381 709. The main bearing in right (clutch side) crankcase half is a roller bearing and the outer bearing race is shrink fit in the crankcase half. Heat the crankcase half to remove the bearing outer race.

To renew main bearings on models R16 and R17, remove cylinder and separate crankshaft. Remove crankshaft from crankcase half by tapping on opposite end of crankshaft. Heat crankcase halves to remove bearings. Heat new bearings and drive onto crankshaft using Partner drift no. 381 709. Heat flywheel side crankcase half and insert crankshaft assembly; then, install a new crankcase seal. Heat clutch side crankcase half and install being sure to fit oil pump pressure line in crankcase half before pressing together crankcase halves.

The crankcase must be perfectly sealed in a two stroke engine because leakage through the seals releases crankcase compression and causes loss of power. It is important therefore to exercise extreme care when renewing seals to prevent their being damaged during installation. If a sleeve (Partner number 381 500 for models R11, R12, X21 and P15; or 381 723 for models R14, R16 and R17) is not available, use tape to cover any splines, keyways, shoulders or threads over which the seal must pass during installation. Seals should be installed with lips facing inside (center of engine).

PISTON, PIN, RINGS AND CYLINDER. The piston is accessible after removing the cylinder assembly. Special tool (Partner part number 381 705) should be used to remove and reinstall piston pin. The aluminum alloy piston is fitted with two pinned rings. Ring end gap should be not less than 0.006 in. nor more than 0.040 inch. Rings should have 0.003 in. side clearance in the grooves. Reject piston pin and/or piston if there is any visible up and down play of pin in the piston bosses. Piston and pin are available sepa-

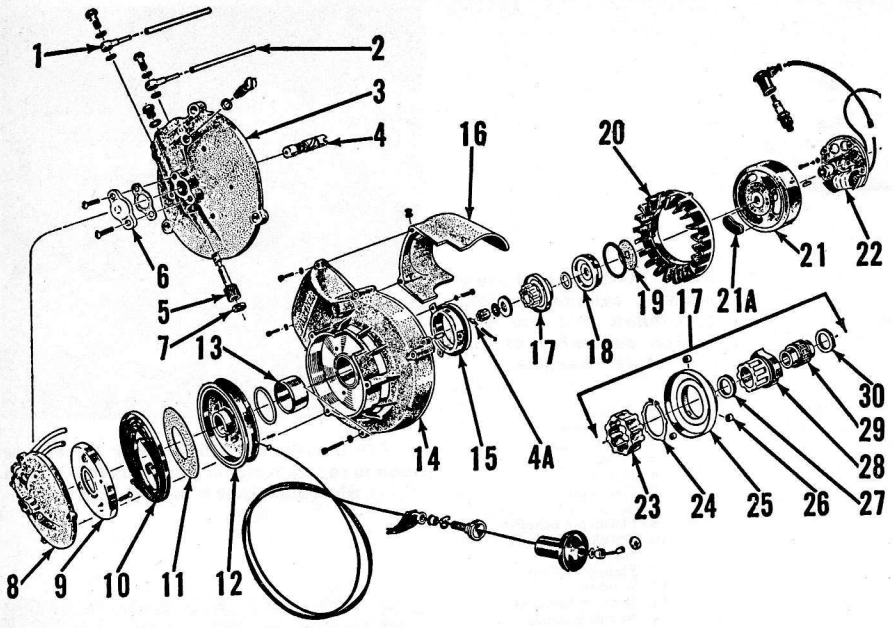


Fig. PT12–Exploded view of chain oiler pump, rewind starter, blower housing and magneto of R11 and X21 chain saw engines.

1. Oil line connector
2. Oil line
3. Pump housing
4 & 5. Pump plunger set
4A. Oil pump driving flange
6. Cover plate
7. Cover
8. Pump assembly
9. Cover
10. Rewind spring
11. Washer
12. Cable drum
13. Bushing
14. Blower housing
15. Cover
16. Cylinder shroud
17. Starter hub assembly
18. Starter drum
19. Disc
20. Fan
21A. Dust covers (3)
22. Breaker plate
23. Clutch ring
24. Lock ring
25. Roller cage
26. Rollers (3)
27. Seal ring
28. Starter hub
29. Needle bearing
30. Seal ring

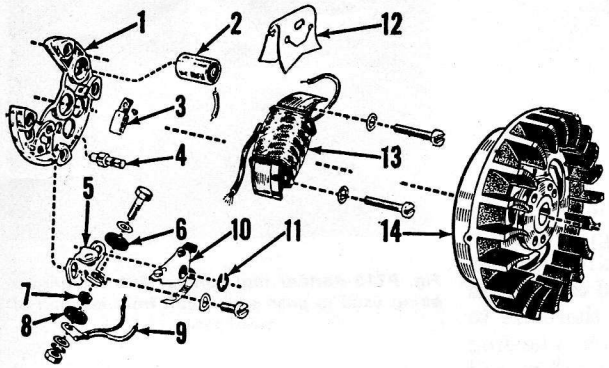


Fig. PT13–Exploded view of magneto used on Partner chain saws.

1. Armature plate
2. Condenser
3. Cam wiper felt
4. Bearing bolt
5. Contact breaker
6. Insulating washer
7. Insulating washer
8. Insulating washer
9. Grounding wire
10. Contact breaker arm
11. Snap ring
12. Insulator strip
13. Magneto coil
14. Flywheel & fan

rately. Renew piston pin bushing in upper end of rod of models E11 and X21 using special tool (Partner part number 381 700) if it is worn. New bushing must be reamed after installation so that pin when lubricated will fit its bore freely yet show no signs of looseness. Other models have needle type piston pin bearings.

Inspect piston and cylinder and renew piston and cylinder assembly if defects or wear is found. Piston skirt at bottom of skirt at right angles to pin should have 0.005 in. clearance in cylinder bore when parts are new. Always use new piston pin retaining snap rings when reassembling piston to connecting rod.

NOTE: All wearing parts of the engine are available as replacements in standard size only. The piston and cylinder are available only as a matched set.

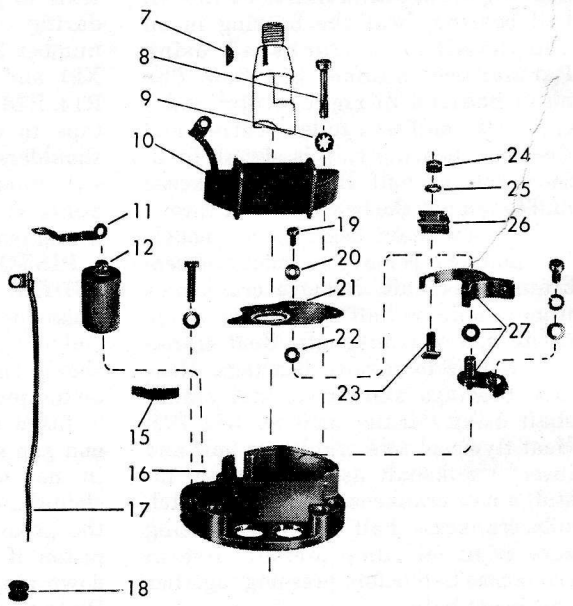


Fig. PT14–Exploded view of the magneto assembly used on model TS.

7. Woodruff key
10. Coil
11. Connector strip
12. Condenser
15. Felt wick
16. Armature plate
18. Grommet
21. Cover

REED VALVE. The reed valve of models R11, X21, R12, and P15 is one of the six petal type, generally used on saw engines, and is shown in Fig. PT11. Reeds should be renewed if they are broken, cracked, warped or rusted. Seat should be renewed or reconditioned if seating surface is worn, pitted or in any other way damaged to prevent valve sealing. Valve spring set should be renewed if broken, warped, rusted or bent.

AUTOMATIC CHAIN OILER. The chain oiler pump for models R12, P15, R14, R16 and R17 is located in the oil tank and is operated by a push rod which is actuated by a cam on the crankshaft. Oil pump should be inspected at every major overhaul. Check pump plunger, cylinder pin and all springs for undue wear or other damage and make certain that pump

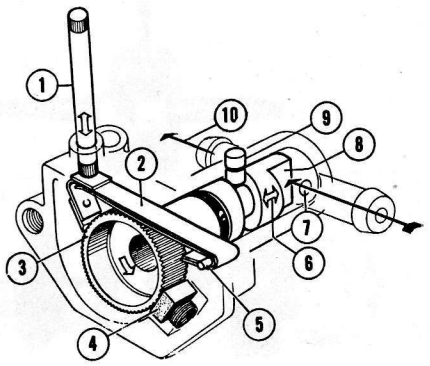


Fig. PT15–Oil pump shown in Fig. PT16 is actuated by a cam on the crankshaft forcing the pump rod (1) against the leaf spring (2) and turning pump cog (3) with a rachet type motion. Pin (9) working in a cam groove in the pump plunger converts the circular motion to a reciprocating pumping action. Slot (8) exposes the oil inlet (7) and outlet (10) on each revolution. On models R16 and R17 a control valve (22-PT5) is used.

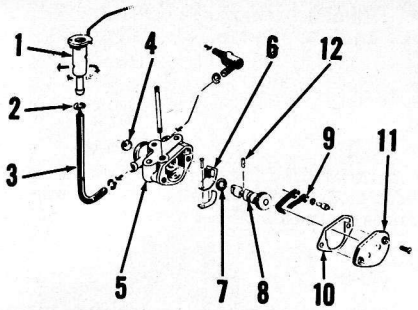


Fig. PT16–Exploded view of chain oil pump used on models R12, R14, R16, R17 and PT15. Refer to Fig. PT15 for operation of pump.

1. Oil cock
2. Lock ring
3. Oil hose
4. Cover (plug)
5. Housing
6. Pump bar set
7. "O" ring
8. Plunger
9. Pump spring set
10. Gasket
11. Cover

interlock spring set (9—Fig. PT16) properly actuates the plunger (8).

Length of pump rod for models R12 and P15 is 2.03 inches and should be renewed when worn to a length of 1.99 inches. Pump rod length for model R14 is 1.69 inches and should be renewed when worn to a length of 1.65 inches. Pump rod length for models R16 and R17 must be 1.38-1.39 inches.

The chain oiler for model TS is located in starter housing and pump is driven from end of crankshaft. See Fig. PT17. The extent of disassembly required will be determined by the service required. Pay close attention to wear washer (3).

GEARBOX. The model P15 saw is equipped with a planetary type gearbox (transmission) as shown in Fig. PT18. The unit can be disassembled as follows: Remove chain guide (bar) and chain and remove complete assembly from saw. Remove gear cover (5) and pull planetary unit from housing. Remove snap ring (21) and bump drum and shaft (19) from sun gear (20). Remove lock ring (29) and pull sprocket (23) from planet carrier (28). Any further disassembly required will be obvious. Planetary hub assembly (28) is available as a unit only.

When reassembling, use sealant on the two sprocket keys (14) to prevent oil leakage. Fill housing to level of oil plug (34) with Type A Automatic Transmission fluid.

Fig. PT17–Exploded view showing starter and oil pump assembly used on the TS model chain saw.

2. Cover
3. Wear washer
4. Gasket
5. Pump plunger assy.
6. Plug
9. Starter housing
10. "U" clip
11. Protector plate
12. Cover plate
13. Drive stud
14. Pawl
15. Starting-cord
16. Handle
17. Rewind spring
18. Pulley
19. Washer
20. Friction washer
21. Spring retainer
22. Spring
23. Friction plate
24. Brake arm
25. Spring
26. Washer
27. Fiber washer
28. Regulating-screw
29. Fiber washer
30. Plug

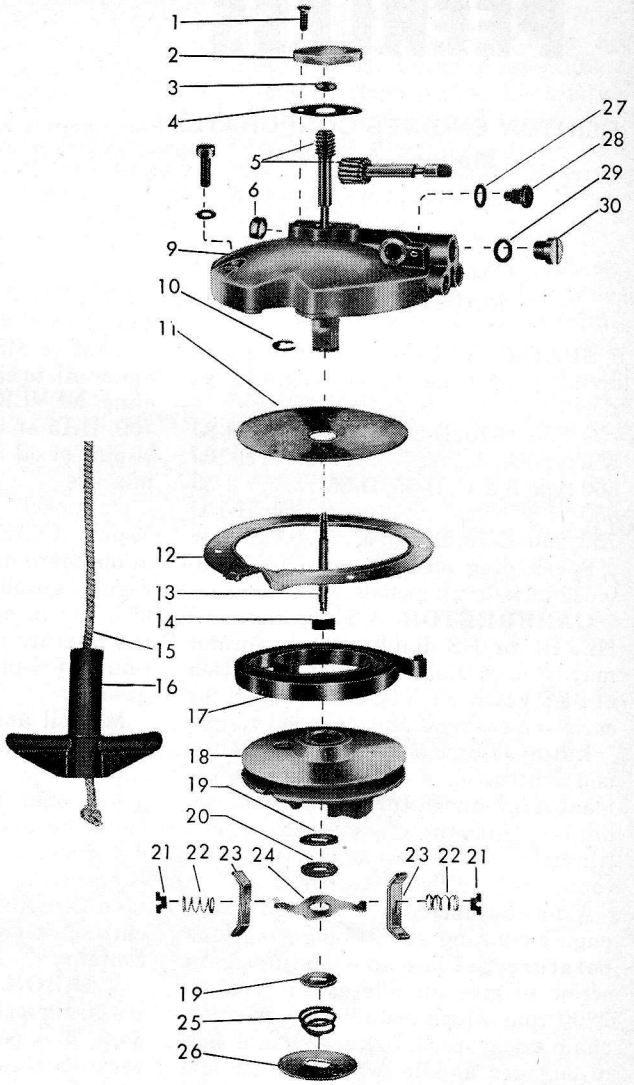


Fig. PT18–View showing the planetary gear reduction unit used on the P15 model chain saw.

1. Gear case
2. Ball bearing
3. Snap ring
4. Gasket
5. Gear cover
6. Seal
7. Protective cover
8. Clutch cover
9. Cap
10. Spike
11. Clutch shoe
12. Clutch hub
13. "O" ring
14. Key
15. Clutch spring
16. Seal
17. Washer
18. Needle bearing
19. Gear shaft (drum)
20. Sun gear
21. Snap ring
22. Washer
23. Sprocket
24. Needle bearings
25. Spacer
27. Cover
28. Planetary hub
29. Lock ring
30. Protective washer
31. Lock ring
32. Tension screw
33. Puller unit
34. Oil plug