

# PIONEER

Fig. PR3-1—Exploded view of OMC carburetor typical of type used on all models. Insulator block (1) and choke (9, 10 & 11) are used on late models.

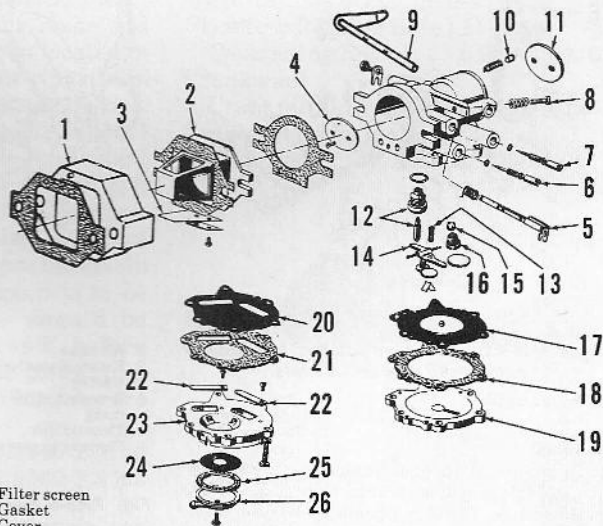
Model	Bore In.	Stroke In.	Displ. Cu. In.	Drive
700, 750, 1750, 1770, 1771	2 5/16	1 9/16	6.56	Direct
700-G, 850, 1850, 1870,	2 5/16	1 9/16	6.56	Gear

## MAINTENANCE

**SPARK PLUG.** Spark plug electrode gap should be 0.025 inch for all models except 1771 which should be 0.030 inch. Recommended Champion spark plug is J8J for 700 and 750 models, CJ6 for 1750, 1770 and 1771 direct drive models. Recommended Champion spark plug is J4J for 700-G and 850 models, CJ4 is recommended

1. Insulator block
2. Reed valve
3. Reed petal
4. Throttle plate
5. Throttle shaft
6. Idle mixture needle
7. High speed mixture needle
8. Idle speed stop screw
9. Choke shaft
10. Choke detent
11. Choke plate
12. Fuel inlet needle and seat
13. Lever spring
14. Fuel lever
15. Check valve
16. Valve seat
17. Fuel control diaphragm
18. Gasket
19. Plate
20. Fuel pump diaphragm
21. Gasket
22. Fuel pump valves
23. Lower cover

24. Filter screen
25. Gasket
26. Cover



## Pioneer

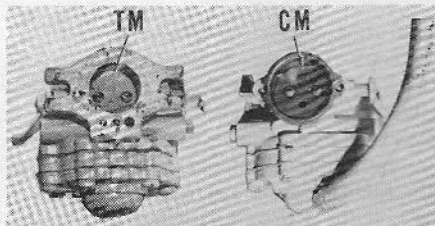


Fig. PR3-1A—Punch marks on throttle (TM) and choke (CM) plates should be toward top and outside of carburetors.

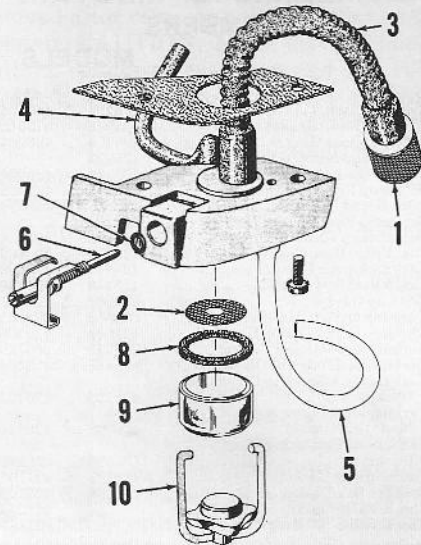


Fig. PR3-2—The fuel filter housing used on early models. Later models are not equipped with shut-off valve (6).

- |                       |                   |
|-----------------------|-------------------|
| 1. Pick-up and filter | 6. Shut-off valve |
| 2. Filter screen      | 7. "O" ring       |
| 3. Pick-up tube       | 8. Gasket         |
| 4. Hose to primer     | 9. Bowl           |
| 5. Hose to carburetor | 10. Bail          |

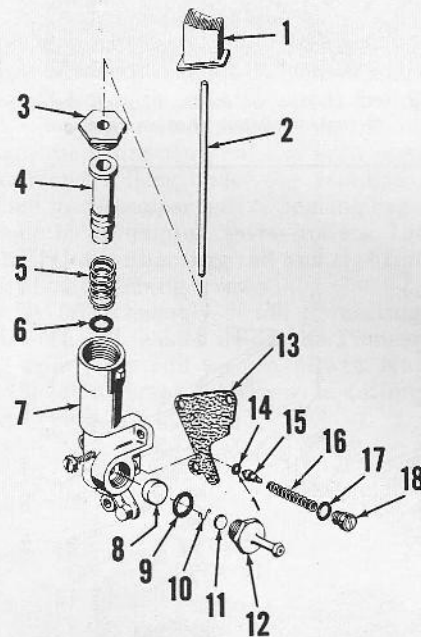
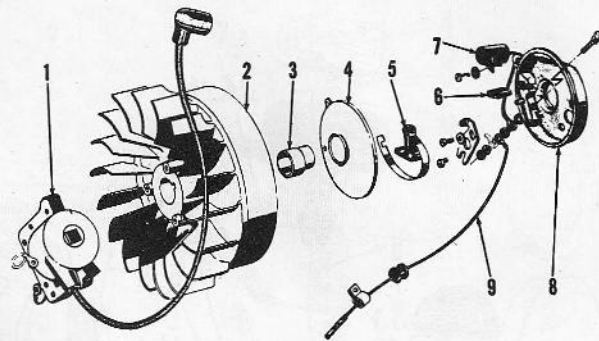


Fig. PR3-3—Exploded view of the fuel primer pump used on early models.

- |                  |                      |
|------------------|----------------------|
| 1. Primer button | 10. Clip             |
| 2. Rod           | 11. Inlet valve      |
| 3. Cap           | 12. Inlet housing    |
| 4. Piston        | 13. Gasket           |
| 5. Spring        | 14. "O" ring         |
| 6. "O" ring      | 15. Outlet valve     |
| 7. Body          | 16. Spring           |
| 8. Felt          | 17. Washer           |
| 9. "O" ring      | 18. Outlet valve cap |

Fig. PR3-6—Exploded view of magneto assembly. Make sure that wire (9) to kill switch is not shorted.

1. Coil and laminations
2. Flywheel
3. Cam
4. Cover
5. Breaker points
6. Oiler wick
7. Condenser
8. Housing
9. Switch wire



for 1850 and 1870 gear drive models. Spark plug should be tightened to 7-8 Ft.-Lbs. torque.

**CARBURETOR.** An OMC carburetor is used on all models. Saw models 700, 700-G, 750 and 850 are equipped with a fuel primer pump (Fig. PR3-3) and carburetor is not provided with a choke. Later saw models are equipped with a carburetor choke (9, 10 & 11—Fig. PR3-1). Saw models 750 and 850 are equipped with an air vane governor (Fig. PR3-5).

Idle mixture needle (6—Fig. PR3-1) and high speed mixture needle (7) should both be set approximately 1 turn out from lightly seated for 1750, 1770, 1771, 1850 and 1870 models;  $\frac{3}{4}$  turn out for earlier models. Clockwise rotation of both needles leans the mixture. Idle speed is adjusted at stop screw (9).

On all models, the carburetor is removed toward right (drive side). The longer end of fuel lever should be flush with diaphragm chamber floor. Fuel is filtered by pick-up screen (1—Fig. PR3-2) in tank, by filter (2) in bowl and again at the carburetor screen (24—Fig. PR3-1). Air leakage at fuel bowl may prevent fuel from reaching carburetor.

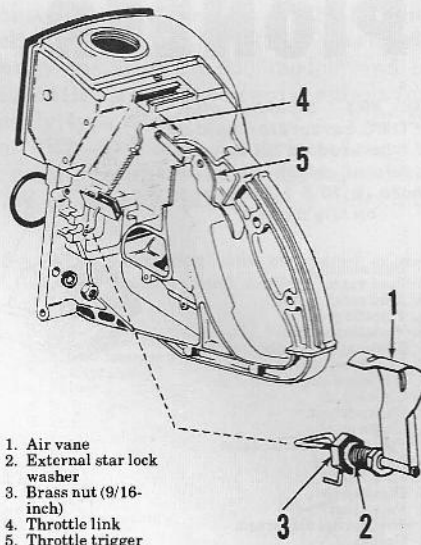


Fig. PR3-5—View showing parts of air vane governor used on some models.

1. Air vane
2. External star lock washer
3. Brass nut (9/16-inch)
4. Throttle link
5. Throttle trigger

## CHAIN SAWS

**MAGNETO AND TIMING.** The breaker points, cam and condenser are located under the flywheel. Flywheel retaining nut is left hand thread. Breaker point gap should be 0.020 inch and armature air gap (Fig. PR3-7) should be 0.008-0.012 inch. Condenser capacity should be 0.18-0.22 Microfarads. Ignition should occur (breaker points just open) at 30 degrees BTDC. Timing can be adjusted only by changing the breaker point gap. The flywheel nut should be tightened to 25-30 Ft.-Lbs. torque.

**LUBRICATION.** The engine is lubricated by mixing oil with the fuel. Mixing ratio should be 12:1 (1½ pints of oil with two gallons of gasoline) for 1750, 1771, 1850 and 1870 models. Other models should use a 16:1 mixture (½ pint of oil with each gallon of gasoline). Regular or premium grade gasolines are recommended. DO NOT use low lead gasolines. In some gasolines the amount of lead has been reduced and has been replaced with phosphorus. The use of these gasolines is not recommended.

OMC (Johnson or Evinrude) 2 CYCLE ENGINE OIL is recommended. A good quality SAE 30 or SAE 40 oil with an API classification MS, SB or SD may be used if the preferred oil is not available.

Proper and complete mixing of oil and gasoline is important. Pour about half of the amount of gasoline to be mixed into a clean metal container,

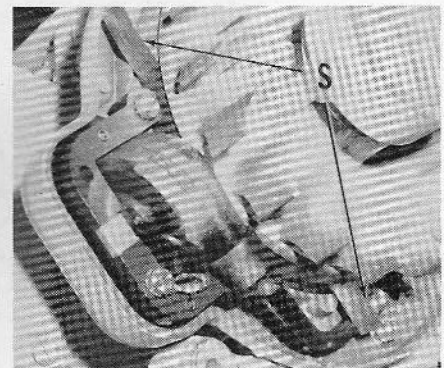


Fig. PR3-7—View showing method of checking air gap using shim stock (S).

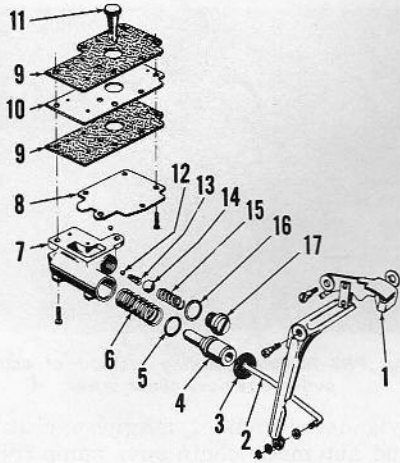


Fig. PR3-8—Exploded view of the manual chain oiler pump used on 700, 700-G, 750 and 850 models. Plug (11) is not used on later models.

- |                |                            |
|----------------|----------------------------|
| 1. Pump lever  | 11. Plug (early models)    |
| 2. Rod         | 12. Small check valve ball |
| 3. Felt        | 13. Tapered spring         |
| 4. Pump piston | 14. Large check valve ball |
| 5. "O" ring    | 15. Spring                 |
| 6. Spring      | 16. Washer                 |
| 7. Housing     | 17. End cap                |
| 8. Cover       |                            |
| 9. Gaskets     |                            |
| 10. Spacer     |                            |

add all of the oil required; then, stir or shake until thoroughly mixed. Add the balance of the gasoline to make the correctly proportioned mixture; Then, stir or shake until it is properly and permanently blended. DO NOT MIX DIRECTLY IN THE FUEL TANK.

The oil reservoir should be filled with Pioneer Chain Oil winter or summer grade, or if not available, use a good grade SAE 10 to SAE 40 motor oil depending upon prevailing temperature. The chain oiler pumps used are shown in Figs. PR3-8 and PR3-9.

To disassemble the automatic oiler pump on later models, it is necessary to remove the clutch and junction plate. (15—Fig. PR3-9). Remove retaining screw and lock plate (21), then pull the locating pin (22) out of housing bore. Body (17), "O" rings (18) and plunger (19) can be easily pulled from housing bore using a screw threaded into lower end of pump body.

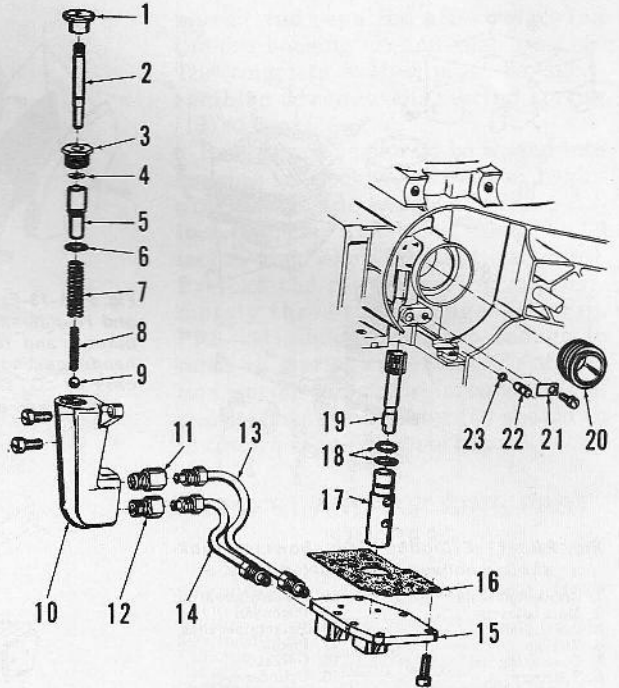
One "O" ring (18) is located in groove of pump body (17), the other "O" ring is located against chamfered area of body below the groove.

Align the annular groove in plunger (19), hole in body (17) and hole in housing before inserting locating pin (22).

**CARBON.** Exhaust ports and muffler should be cleaned approximately every two weeks of use or if a loss of power is noticed. Excessive carbon buildup may indicate an excessive amount of oil, an improper type of oil mixed with the fuel or a rich fuel-air mixture. The cylinder cooling fins should also be cleaned at least once each week.

Fig. PR3-9—View of manual and automatic oil pumps used on late models. Automatic oiler parts (17 thru 23) are not used on some models.

- |                                |
|--------------------------------|
| 1. Button                      |
| 2. Rod                         |
| 3. End cap                     |
| 4. Snap ring                   |
| 5. Piston                      |
| 6. "O" ring                    |
| 7. Piston spring               |
| 8. Check valve spring          |
| 9. Inlet check valve ball      |
| 10. Pump body                  |
| 11. Outlet check valve fitting |
| 12. Standard fitting           |
| 13. Pressure line              |
| 14. Suction line               |
| 15. Junction plate             |
| 16. Gasket                     |
| 17. Automatic oiler body       |
| 18. "O" rings                  |
| 19. Pump plunger               |
| 20. Worm gear                  |
| 21. Lock plate                 |
| 22. Locating pin               |
| 23. "O" ring                   |



REPAIRS

**TIGHTENING TORQUES.** Recommended tightening torques for all models are listed in the following table. All values are in inch-pounds unless otherwise noted.

Fan Housing to Crankcase	60-70
Flywheel Nut	25-30 Ft.-Lbs.
Connecting Rod Screws	60-65
Cylinder Base Nuts	70-80
Muffler to Cylinder	70-80
Clutch Nut	25-30 Ft.-Lbs.
Rear Handle to Crankcase	70-80
Handle Bar to Crankcase	60-70
Coil to Housing	25-35
Strut and Bar to Crankcase	80-110
Starter to Fan Housing	25-35
Oiler to Crankcase	15-25
Fuel Filter Base to Tank	25-35

**CYLINDER, PISTON, RINGS AND PIN.** Compression pressure at cranking speed should be 110-125 PSI with engine cold. Cylinder and cylinder head are one piece and attached to the crankcase with four studs and nuts. Some pistons use a pin located in the ring groove to prevent rings from turning, while other pistons do not. Pistons with ring locating pins should be installed with ring end gap toward rear (carburetor side of crankcase). Pistons without ring locating pins can be installed either way when new, but should be marked for installation in original position if old piston is to be reinstalled. All pistons should be heated to 200-250 degrees F. before removing or installing the piston pin.

Cylinder Bore I.D.	2.3145-2.3150
Piston Skirt Bore O.D.	2.3060-2.3065
Piston to Cylinder Clearance—	
Desired	0.008-0.009

Piston Ring End Gap—	
Models Without Pinned	
Rings	0.002-0.004
Piston Pin O.D.	0.6248-0.6250
Piston Pin Fit in	
Piston Bore	0-0.0005 interference
Piston Pin to	
Bearing Clearance	0.0005-0.0017

On models with pinned rings, the locating pin and ring end gap should be toward rear (carburetor side of crankcase). On all models, the opening in piston pin retaining clips should be centered toward closed end of piston.

**CONNECTING ROD.** Connecting rod can be separated and removed after removing the cylinder and piston. CAUTION: Make certain that all of the 12 rollers at crankpin end are removed. New crankpin bearing rollers should be used each time connecting rod is removed. The following specifications are in inches.

Crankpin Bearing Bore I.D. in the	
Connecting Rod	0.9100-0.9104
Crankshaft	
Crankpin O.D.	0.7199-0.7202
Crankpin Roller Bearing	
Clearance	0.0006-0.0017

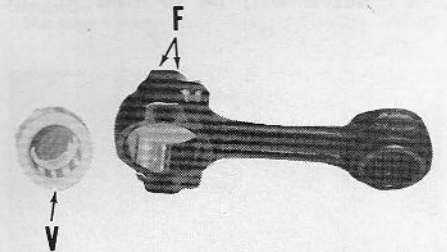


Fig. PR3-10—Machined side of connecting rod and cap is shown at (F). Parting surface (V) on bearing cage should form a "V" at one point when correctly assembled.

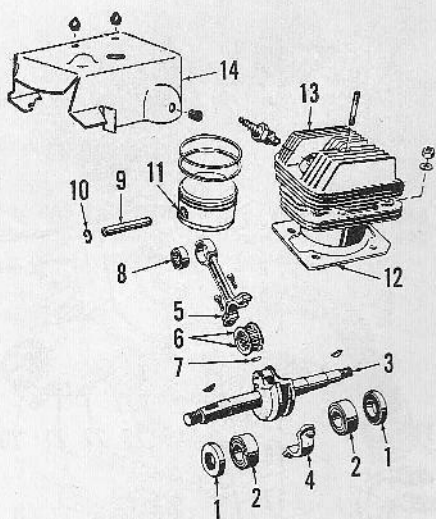


Fig. PR3-11—Exploded view showing crankshaft, cylinder and associated parts.

- |                             |                        |
|-----------------------------|------------------------|
| 1. Crankshaft seals         | 8. Piston pin bearing  |
| 2. Main bearings            | 9. Piston pin          |
| 3. Crankshaft               | 10. Pin retainer clips |
| 4. Rod cap                  | 11. Piston             |
| 5. Connecting rod           | 12. Gasket             |
| 6. Bearing cage             | 13. Cylinder           |
| 7. Bearing roller (12 used) | 14. Air shroud         |

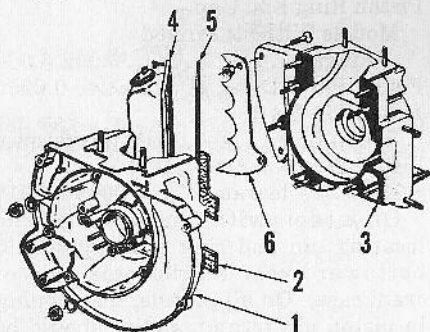


Fig. PR3-12—View of crankcase used on direct drive models.

- |                                |                         |
|--------------------------------|-------------------------|
| 1. Magneto side crankcase half | 4. Chain oil tank cover |
| 2. Gasket                      | 5. Gasket               |
| 3. PTO side crankcase half     | 6. Pivot grip           |

The mating surfaces of connecting rod and cap are fractured to provide correct alignment when reassembling. One side of connecting rod and cap is machined for identification when assembling. The crankpin bearing cage halves are also matched halves and can be correctly assembled only one way. One side of each half is machined so that when correctly assembled a "V" notch will be located at the

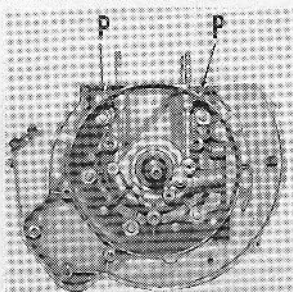


Fig. PR3-12A—Drive tapered pins (P) out before separating crankcase halves.

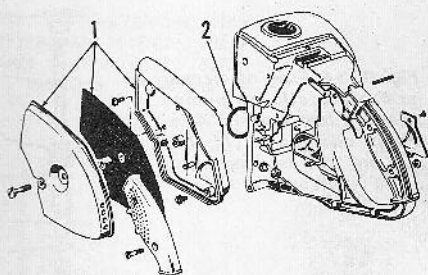


Fig. PR3-13—Exploded view of fuel tank, air box and rear handle typical of early models. Carburetor and reed valve are attached to the handle casting and casting is sealed to crankcase by "O" ring (2). Several variations of the air intake and filter (1) have been used.

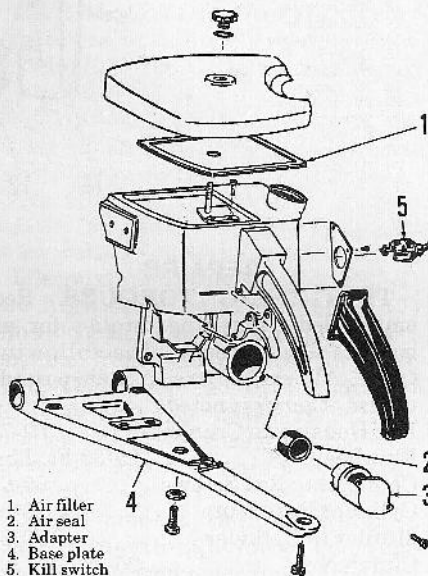


Fig. PR3-14—Exploded view of fuel tank, air box and rear handle typical of later models.

parting surface of the two halves.

To assemble, coat the machined bearing surface of connecting rod and cap. CAUTION: Be sure that grease is not on fractured surfaces. Install bearing cage in cap and install five of the bearing rollers in the cage. Position the connecting rod cap with cage half and rollers under the crankpin, then install upper half of bearing cage and the remaining seven rollers. Install the connecting rod and tighten the two attaching screws.

NOTE: Assembly of the connecting rod is much easier using the Pioneer connecting rod spoon (Part No. 426014) and special screw installing tool (Part No. 426024).

**CRANKCASE AND CRANKSHAFT.** Crankshaft can be removed from all models after removing the



Fig. PR3-16—View showing method of using puller to remove clutch driver.

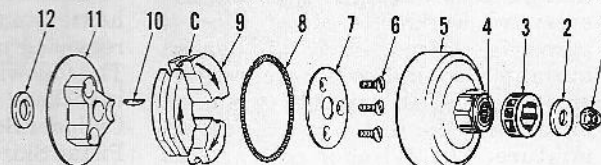
cylinder, flywheel, magneto, clutch and automatic chain oiler pump (Fig. PR3-9). Drive the two tapered aligning pins (Fig. PR3-12) out toward the chain (drive) side. Remove the five stud nuts that attach halves of crankcase together, then separate the halves. NOTE: The crankcase halves will probably be damaged if the halves are separated before removing the tapered aligning pins.

Crankshaft ball type main bearings should be a tight (interference) fit in crankcase and bearing housing bores. Area around bearings should be heated to 200-250° F. when removing or installing bearings. Metal sides of crankshaft seals should be toward outside with lip toward inside.

**DIRECT DRIVE CLUTCH.** Clutch drum (5—Fig. PR3-15), bearing (4) and shoes (9) can be removed after removing the cover, chain and nut (1). The chamfered end (C) of clutch shoes (9) should be on trailing end as shown. Bearing (4) should be lubricated with a small amount of Mobil Sovarex No. 1W or Shell Alvania No. 2 lubricant before installing clutch drum. Connection at ends of garter spring (8) should be at the middle of a clutch shoe. Do not have connection between clutch shoes. A puller can be used to remove the clutch driver from crankshaft as shown in Fig. PR3-16. Chamfered side of washer (12—Fig. PR3-15) should be toward engine.

**CLUTCH AND GEARBOX.** The clutch used on 700-G, 850, 1850 and 1870 models is contained in the gear case. It is necessary to remove the cover (2—Fig. PR3-17) in order to service the clutch, gears, bearings or shafts. Remove the handle bar, saw chain, guide bar and screws attaching

Fig. PR3-15—Exploded view of the clutch used on direct drive models.



- |             |                |           |                 |            |
|-------------|----------------|-----------|-----------------|------------|
| 1. Nut      | 5. Clutch drum | 7. Plate  | 9. Clutch shoes | 11. Driver |
| 2. Washer   | 6. Screws      | 8. Spring | 10. Key         | 12. Washer |
| 3. Sprocket |                |           |                 |            |
| 4. Bearing  |                |           |                 |            |

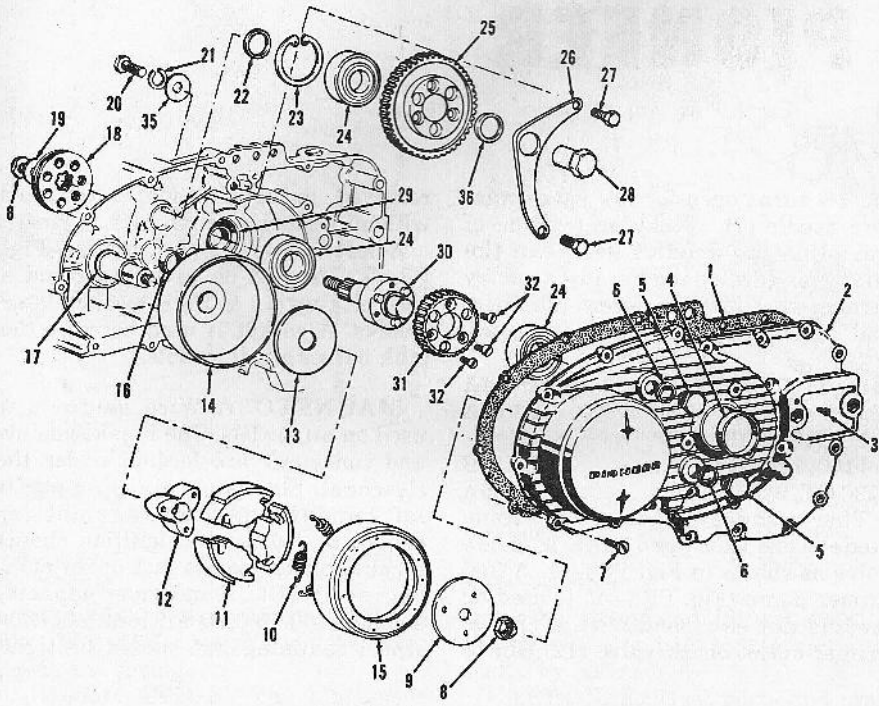


Fig. PR3-17—View of gear reduction transmission. Bearings (24) are tight fit on shaft (30) and in bores of cover and housing. Clutch cover (15) is not used on later models.

- |                               |                     |                   |                 |                  |
|-------------------------------|---------------------|-------------------|-----------------|------------------|
| 1. Gasket                     | 9. Washer           | gear              | 22. Spacer      | 29. Seal         |
| 2. Cover                      | 10. Clutch springs  | 16. Plug          | 23. Snap ring   | 30. Output shaft |
| 3. Oilier plug                | 11. Clutch shoes    | 17. Thrust washer | 24. Bearings    | 31. Output gear  |
| 4. Plug                       | 12. Clutch driver   | 18. Sprocket      | 25. Idler gear  | 35. Washer       |
| 5. Oil filler and level plugs | 13. Retainer plate  | 20. Spindle bolt  | 26. Brace plate | 36. Spacer       |
|                               | 14. Clutch drum and | 21. Lockwasher    | 28. Spindle     |                  |

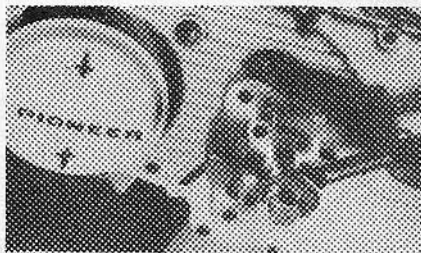


Fig. PR3-18—View showing method of using puller to remove cover from gearbox.

cover to the crankcase. Heat the gearcase cover around plug (4), then remove cover, leaving outside bearing (24) on shaft (30). Special puller (No. 471108) can be used as shown in Fig. PR3-18, to push the shaft out of cover instead of heating.

**REWIND STARTER.** Starter pawls (7—Fig. PR3-20) can be re-

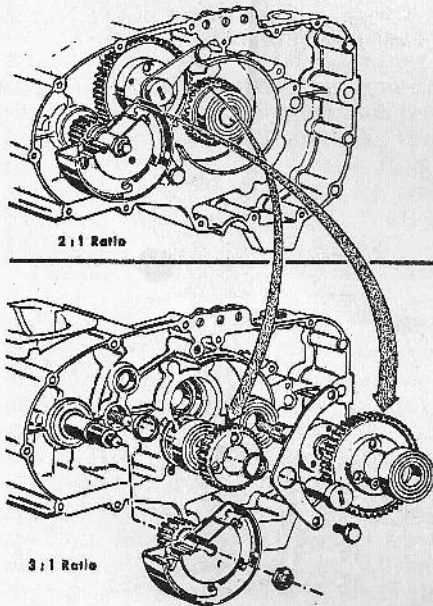


Fig. PR3-19—View showing installation of gears for 2:1 ratio and 3:1 ratio reduction.

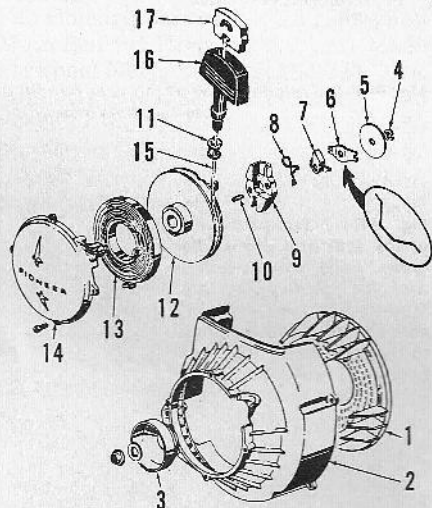


Fig. PR3-20—Exploded view of rewind starter. Friction spring (6) should be installed as shown.

- |                    |                       |
|--------------------|-----------------------|
| 1. Guard           | 10. Roll pin (2 used) |
| 2. Cover           | 11. Eyelet            |
| 3. Cup             | 12. Pulley            |
| 4. Snap ring       | 13. Rewind spring     |
| 5. Friction washer | 14. Starter housing   |
| 6. Friction spring | 15. Nylon cord        |
| 7. Pawl (2 used)   | 16. Handle            |
| 8. Pawl spring     | 17. Anchor            |
| 9. Pawl block      |                       |

moved and repaired after removing the fan housing (2) and snap ring (4). The complete starter must be disassembled to renew the rewind spring (13) or cord (15).

Rewind spring should be wound into housing in clockwise direction beginning at outside of spring. The 5/32-inch diameter nylon cord should be 52 inches long when free (not stretched). Preload the rewind spring approximately three turns. Edges (S—Fig. PR3-21) should be sharp enough to catch in starter cup. Ends (E) of friction spring should be around tips of starter pawls and center (C) should be in toward the rewind spring.

**GASKET AND "O" RING PART NUMBERS**

	700, 700G	750, 850	1750, 1850	1771
Exhaust Gasket	427600	427600	427600	427600
Cylinder Base Gasket	427523	427523	427523	427523
Rear Handle to Crankcase "O" Ring	425030	425030		
Gas Cap Gasket	425087	425087	425087	425087
Check Valve Gasket	427273	427273		
Check Valve "O" Ring	427281	427281		
Oil Pump Plunger "O" Ring	427360	427360	427360	428906
Oil Pump Base Gasket	427102	427102	427102	427102
Junction Plate Gasket			427102	427102
Exit Valve "O" Ring	308528	308528		308528
Oil Pump Disc Valve "O" Ring	202893	202893		202893
Primer Pump Body Gasket	427151	427151		
Primer Pump Plunger "O" Ring	427444	427444		
Carburetor Fuel Pump Gasket	309464	309464	309464	309464
Carburetor Metering Gasket	309463	309463	309463	309463
Lo & Hi Speed Needle "O" Rings	304598	304598	304598	304598
Carburetor Fuel Inlet Strainer Gasket	427369	427369		
Filter Bowl Gasket			427369	427369
Reed Valve to Carburetor Gasket	427137	427137		
Reed to Rear Handle Gasket	427136	427136		
Filter Clip "O" Ring	425028	425028		
Filter to Rear Handle Gasket	427124	427124	428828	428828
Gear Cover Gasket	427183		427183	427183
Plug Screw Gasket	170280			
Crankcase Gasket	427509		427509	427509
Oil Cap Gasket	425074	425074	425074	425074
Oil Tank Cover Gasket	427196		427196	427196
Rear Handle to Crankcase Gasket			428247	
Insulating Block Gasket			428752	
Reed Valve Body Gasket			427136	427136
Carburetor Mounting Gasket			427137	427137



Fig. PR3-21—Views of rewind starter partially assembled. Sharp edges (S) on starter pawls should be on side shown. Ends of friction spring are shown at (E).