PIONEER

model **650** direct drive chain saw

instruction manual

PIONEER

PIONEER SAWS DIVISION OF OUTBOARD MARINE AUSTRALIA PTY LIMITED
BANKSTOWN, N.S.W., AUSTRALIA

GENERAL INFORMATION

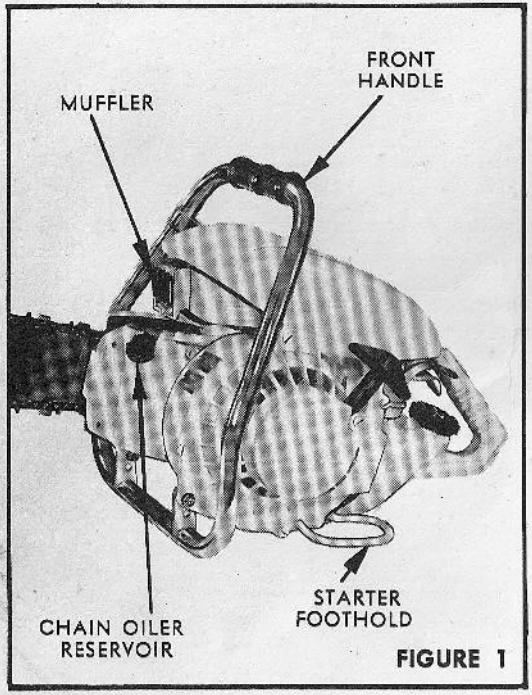


FIGURE 1

If you are a new owner, some of the terms applied to Power Chain Saws may need explanation, see (figure 1).

Throughout the pages following in this operator's Manual, you will find detailed instruction on the care and maintenance of your chain saw. Adherence to these instructions will give you better performance, lower maintenance costs and longer saw life.

Your Power Saw has received a factory run in, **but** the operator should treat the Saw as any new equipment for a break in period. Let the motor idle to warm up. Recheck all nuts for correct tension. The operator's initial care will pay off in longer life.

The following instructions are IMPORTANT and will add to the life of your chain and efficient operation.

BREAKING IN YOUR CHAIN

1. Install chain properly, with recommended chain tension. (See figure 5.)
2. Run chain at low speed for almost 5 minutes, giving plenty of OIL during period.
3. Switch off the engine and readjust the chain tension.
4. Recheck tension often until the chain is fully broken in.
5. Keep your chain well lubricated during cutting, at all times.
6. If possible, leave chain in an oil bath overnight. This ensures internal lubrication.
7. Keep your chain SHARP. A light touch up with the file will prevent the damage caused to cutters and side links by operating with a dull chain.

WARNING: Do not use reclaimed crankcase oil for chain and bar lubrication.

PREPARING YOUR CHAIN SAW FOR USE

It will be necessary to assemble the pivot grip, cutter bar and chain to the motor unit and properly adjust the chain tension.

1. Remove the strut assembly and outer and inner guide plates from the motor unit (figure 3).
2. Secure the pivot grip to the motor unit. This is optional equipment. See your service dealer.
3. Place the inner guide plate and cutter bar on the motor unit engaging them on the two mounting studs.
4. Assemble the chain to the sprocket and cutter bar making sure that the cutting teeth direction is correct (figure 4).
5. Replace the outer guide plate and strut assembly, but do not tighten permanently. The chain adjusting pin must engage into the cutter bar slot.
6. Tighten chain, using adjusting screw Fig. 3, until the chain can be pulled out of the bar about ½". When released it should snap back about ⅛" clearance between the top of the side straps and the bar rail on the lower side.
7. "Test tension and alignment by pulling chain along the bar. See Fig. 5."

Permanently tighten the two hexagonal nuts which secure the strut and cutter bar.

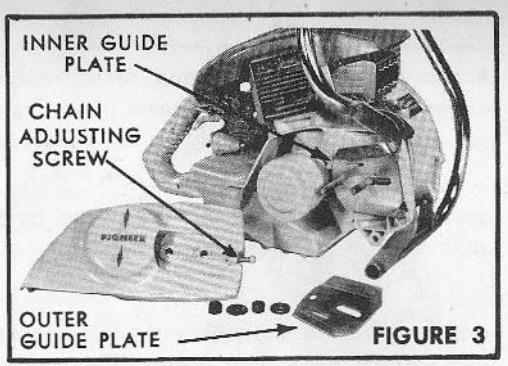


FIGURE 3

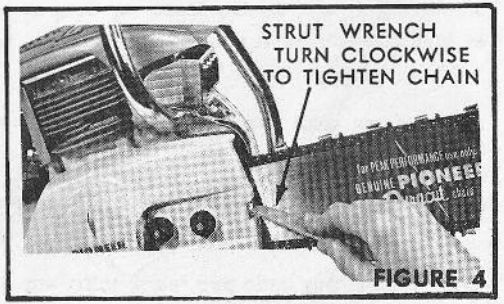


FIGURE 4

FUEL AND LUBRICATION

The lubrication of all internal moving parts of your Chain Saw is solely supplied by oil previously mixed with gasoline. Therefore you will realize the importance of properly preparing your fuel mixture. Factory recommendation is: 1 Part of SAE 30 or 40 motor oil to 16 parts of regular gasoline, or a ratio of 1 pint of oil to 2 gallons of regular gasoline. Do NOT use high test or leaded gasoline.
MIXING PROCEDURE: Pour into a clean metal container half the amount of gasoline to be mixed, then add all the oil required. Shake or stir until thoroughly mixed.

"NOTE: Do not leave fuel mixture in fuel tank reservoir if motor is stored for any length of time. Be sure to run your motor dry before storing."

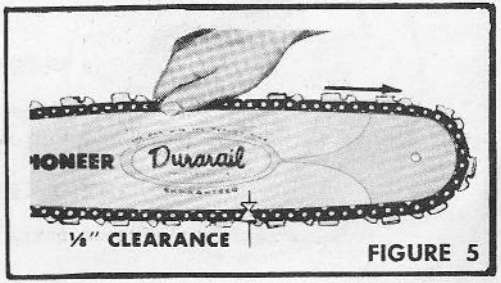


FIGURE 5

CHAIN OILER

Lubrication of the cutting chain is essential to minimize pitch fouling, wear and friction power loss. This is done through the chain oiler (figure 1) which is manually controlled, drawing its oil supply from a separate reservoir located at the cutting end of the motor unit. Good clean oil is a must. SAE 10 or 20 is recommended but because of locality, season and the timber being cut the weight of oil is variable. We recommend a penetrating oil with a tacky quality, in order that it will not be thrown off the end of the chain before accomplishing full lubrication.

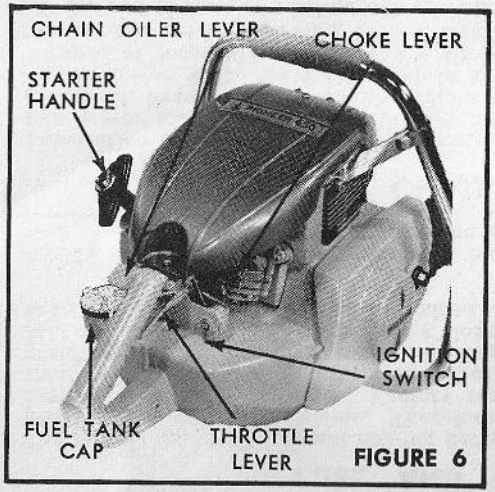


FIGURE 6

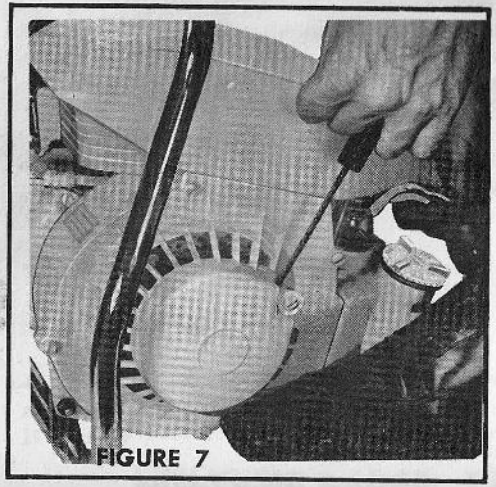


FIGURE 7

STARTING INSTRUCTIONS

1. Put fuel in the tank that is properly mixed as explained previously.
2. Fill the chain oiler reservoir. See CHAIN OILER.
3. To start the motor, place the chain saw in a convenient position where it will sit squarely and firmly when you pull the starter cord.
4. Choke by moving the choke lever down (figure 6).
5. Press the ignition switch to the ON position. (figure 6).
6. Take a firm hold on the pistol grip with the right hand, and open the throttle with your index finger (figure 7).
7. Take the starter handle in your left hand and place the left foot firmly on the starter foothold (figure 7).
8. Open the throttle and turn the motor over slowly once, then give starter firm sharp pulls, engaging it slowly.
9. When the motor starts, ease off on the throttle and move the choke lever up, to running position. If the motor is cold it may be necessary to choke the motor slightly for several seconds to obtain a satisfactory idle. Run the motor just fast enough to turn the chain and operate the oil pump lever until the chain is thoroughly lubricated.
10. Check your General Instruction page for important information on keeping your chain sharp and correctly tensioned at all times. Readjustment of tension during break-in period is a must.

    For the first several hours of operation treat your chain saw with care to prevent needless wear during the break-in period. Give it plenty of time to warm up before starting to cut, but use full throttle when cutting. Don't race motor when cutting small timber.

CARBURETOR ADJUSTMENTS

All carburetors are tested and adjusted at the factory. Little readjustment, if any, will be required.

1. Idle speed adjusting screw controls the idling speed only (figure 8). To adjust, back the screw off approximately two turns, then turn slowly to the right until the throttle arm just starts to move, then give an additional 1-1/2 turns to the right.

2. High speed adjusting screw controls fuel mixture when the throttle is open (figure 8). To adjust, shut off gently, then open 1 turn. This may vary slightly for individual chain saws under full load.

3. Slow speed adjusting screw controls the fuel mixture at idling speeds (figure 8). To adjust, shut off gently, then open 3/4 to one full turn. This may change slightly according to the individual chain saw and operator.

Excessive smoking, lack of power, and excessive vibration indicates that the carburetor fuel mixture adjustments are set too rich. No power, and stalls easily under load indicates that carburetor fuel mixture adjustments are set too lean.

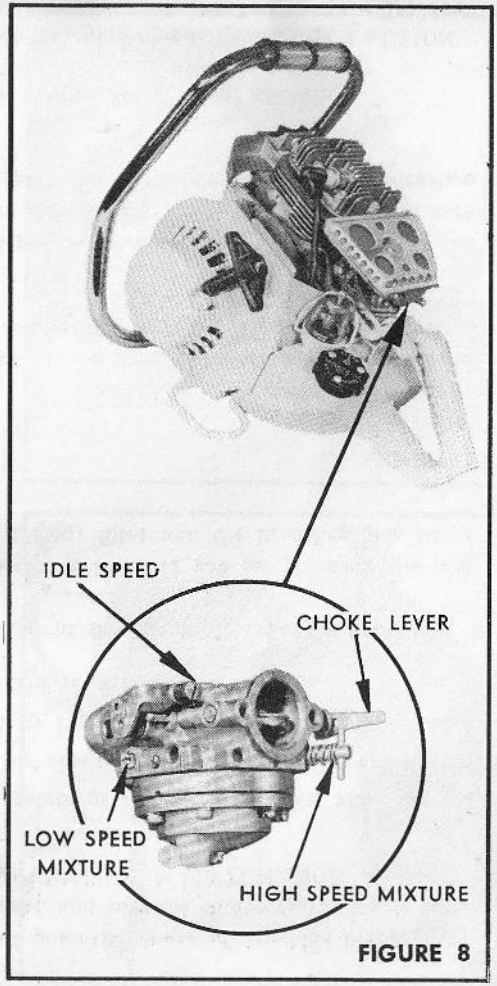


FIGURE 8

OPERATING INSTRUCTIONS

If you have not previously operated a chain saw cut a few stove lengths from a small log to get the feel of the chain saw action. When starting a cut, don't race the motor and jam the saw into the wood. Bring the motor up to full throttle, place the pivot grip against the timber being cut, and start the cut easily.

Your chain saw is a direct drive type and because of its high speed cutting action, don't exert pressure to force it through wood. A light, but firm touch will get more wood cut with less physical effort. When coming to the end of a cut, be prepared to release the throttle immediately after the cut is finished.

Be generous with the chain oil. Check the reserve supply frequently. In cutting pitchy wood or in cold weather, thin the chain oil with kerosene. The kerosene helps the oil flow more freely in cold weather and in pitchy wood it helps keep resin from fouling the chain.

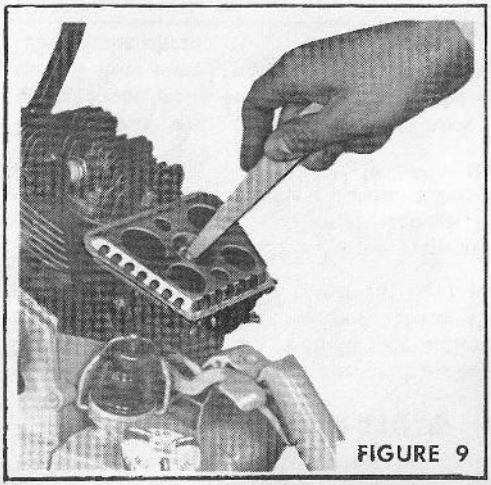


FIGURE 9

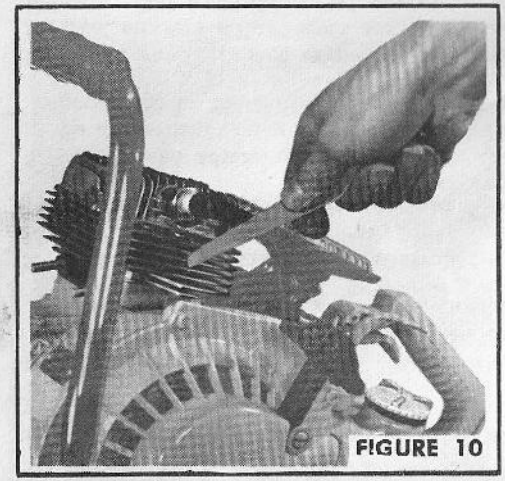


FIGURE 10

PREVENTIVE MAINTENANCE

Preventive maintenance is the elimination of potential cause of troubles before they occur. To realize the full value of investment and prevent unnecessary repair bills together with costly shut-downs, make PREVENTIVE MAINTENANCE A MUST.

Check your chain saw daily and set up a system of regular inspection and tune-up. Your motor is equipped with an efficient air cleaner. Depending on the amount of cutting, your filter will have to be cleaned by removing the element, washing same in clean fuel mixture, then tap lightly to remove excess moisture.

Replace filter element when any deterioration of the element screen is noted.

Clean off any dirt around the carburetor breather hole. If you are working the saw hard, it is a good idea to check and clean the air filter and the breather hole twice a day.

Periodic care and maintenance

1. CYLINDER AND HEAD FINS: At least once a week remove cooling shroud and give cylinder head and fins a good cleaning (figure 10). Tighten head nuts if required.

2. EXHAUST PORTS: Check for carbon deposits. Remove spark plug and locate the piston at its lowest point. Remove excess carbon with blunt edged tool, taking care not to burr or damage port area or cylinder sleeve (figure 14). Clean out carbon particles.

3. MUFFLER: Check for carbon. Replace the gasket if required.

4. IGNITION: (a) Check high tension wire for possible breaks or wear. (b) CAUTION: Excessive oil on the cam wiper felt may damage your breaker points. Replace felt or wash in clean gasoline, squeeze dry and add one drop only of clean oil.

Periodic care and maintenance. (cont.)

5. SPARK PLUG: Check for carbon, fouling and cracks. Keep clean and adjust spark plug gap to .025 inch.

6. MAGNETO: Do not inspect or adjust unless absolutely necessary. The quantity of spark from the spark plug will indicate magneto condition. Breaker point gap should be .020 inch. In event of removal all magneto parts must be replaced in correct setting and location. It is recommended that if magneto service work is required, the chain saw be taken to your local servicing dealer (figure 12).

7. CARBURETOR: Do not screw adjustments in body seat too tight. Remove the pump base portion for inspection and cleaning (figure 11). It is recommended that carburetor overhaul should be performed by your servicing dealer.

8. CLUTCH: The clutch is automatic, designed to apply at a predetermined motor speed. Do not slip clutch through overloading as it will wear out clutch shoes. Immediately release the throttle if chain is pinched.

9. CUTTER BAR: Make sure the bar is clean at all times to assure sufficient chain lubrication (figure 13). Check the cutter bar for wear at regular intervals and turn it over from time to time to make sure the wear is distributed evenly. As wear takes place, a sharp edge is left on the extreme edge of the groove and this should be removed with a flat file. Care must be exercised in servicing bar to prevent damage to chain groove. Use Bar Gauge No. 426235.

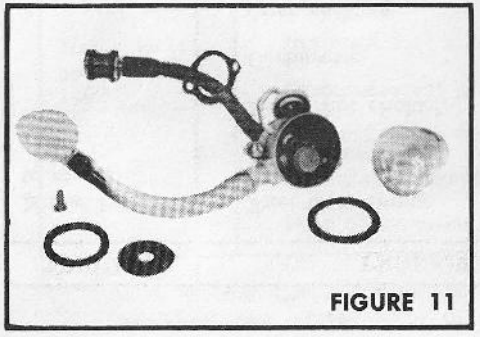


FIGURE 11

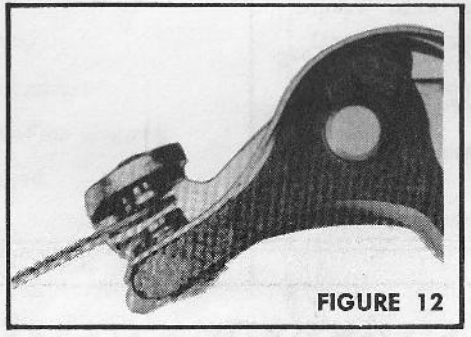


FIGURE 12

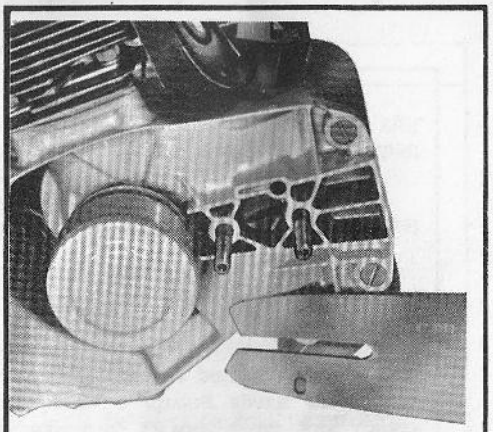


FIGURE 13

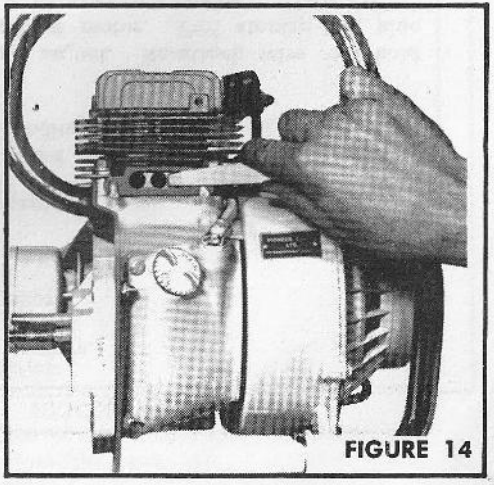


FIGURE 14

SERVICE DIAGNOSIS

TROUBLE	PROBABLE CAUSE	REMEDY
Motor fails to start.	Fuel tank empty.	Fill with correct fuel mixture.
	Ignition switch off.	Turn on or check for short.
	Motor not choked.	Move choke lever down.
	Carburetor.	See carburetor adjustments.
	Over choking.	Unchoke, open throttle and pull starter 3 or 4 times. If motor is continually flooding check for plugged carburetor breather.
	Spark plug.	Remove plug, clean and adjust. Re-attach wire and hold metal seat of plug against motor. Pull starter. A blue spark should jump gap between electrodes.
	Magneto.	Disconnect wire from spark plug. Hold so metal end is ¼ inch from clean metal surface. (Away from gas tank.) Pull starter. There should be a strong spark across the gap. If no spark the trouble is breaker points, coil, condenser, shorted wire, or switch.
	*Plugged or frost-covered pickup in fuel tank.	Remove and clean. Check for ice, water, and dirt in fuel tank filter screen and water trap felt.
	*Plugged impulse hole in carburetor or misaligned carburetor manifold gasket.	Remove and clean. Check for ice, water, and dirt in fuel tank filter screen and water trap felt.
	*Frozen gas line or ice in filter or carburetor	Remove and clean. De-ice additive used in prescribed proportion will counteract this. (One teaspoon to a full tank of fuel.)

*Probable causes indicate conditions which may be experienced during cold weather operation.

SERVICE DIAGNOSIS (CONT.)

TROUBLE	PROBABLE CAUSE	REMEDY
Motor cuts out, leans out or misfires.	Short circuit in ignition system.	Check all wires and connections.
	Partial stoppage in fuel system.	Clean out carefully and check carburetor.
	Fouled, wet or damaged spark plug.	Clean and adjust or replace.
	Magneto. Faulty breaker points, coil, condenser, ignition wire or connection.	Check.
	Inlet control lever sticking on the inlet control lever screw shaft.	Remove and clean control lever, or replace.
	Improper sequence of fuel pump diaphragm and gasket.	Fuel pump diaphragm must be next to fuel pump body.
	Dirty or leaking carburetor filter.	Remove and clean. Properly secure filter to fuel pump body.
	Dirt in fuel lines or carburetor passages.	Check and clean.
	Air leak in fuel lines.	Replace.
	†Improper inlet lever setting.	Adjust.
Motor lacks power.	Incorrect fuel mixture.	Drain tank, refill with correct mixture.
	Carburetor out of adjustment.	Adjust carburetor.
	Exhaust ports or muffler clogged.	Clean.
	Air Intake filter clogged.	Clean.
	Poor compression.	See your servicing dealer.

†Inlet Needle Lever Adjustment: The correct lever setting is level with the face of the diaphragm chamber. Adjust short part of the lever to obtain correct setting. Do not jamb the needle into the seat.

SERVICE DIAGNOSIS (CONT.)

TROUBLE	PROBABLE CAUSE	REMEDY
Motor overheats	Cylinder fins or air system clogged.	Clean.
	Incorrect fuel mixture.	Drain tank, refill with correct mixture.
	Carburetor lean.	Adjust.
	Loose cylinder head nuts.	Tighten.
	Leaking cylinder head or base gaskets.	Check and replace if necessary.
Chain stalls in cut.	Clutch slipping.	Check shoes , if worn replace.
	Improper filing or jointing.	Check filing and jointing instructions, or see your servicing dealer.
	Cutter bar and chain pinched in log.	Use wedge if necessary to open cut wider to free bar and chain.
Chain moves when throttle is closed.	Idling speed too fast.	Adjust idle speed. (page 5).
Chain cuts roughly or digs in.	Top and front angles on cutters incorrectly filed. Too much joint.	Check filing and jointing instructions, or see your servicing dealer.
Chain oiler stops pumping.	Dirt in pump assembly or discharge vent.	Remove and clean pump and feed line. Fill with clean oil. (SAE 10.)

NOTE: If motor idling is erratic or races away and then drops, it may indicate the possibility of excess air entering the crankcase. If this condition exists, the motor would continue to idle with the idle stop screw backed completely off. Check the following points: (1.) Cocked throttle shutter. (2.) Leaking carburetor gasket. (3.) Loose carburetor nuts. (4.) Leaking crankshaft seals. (5.) Improper carburetor adjustments.

⑦ PIONEER DURACUT CHAIN SHARPENING AND JOINTING ⑦

Sharpening

Tighten chain firmly on the cutter bar to hold secure. When sharpening take a firm grip on the file and use it with a steady thrust. Don't swing the file during the stroke. Keep consistent cutting angles (minimum 35°) on all teeth (figure 15). Make certain the file is also bearing against the top cutting face.

Keeping one fifth of the diameter of the file above the top cutting edge of the tooth will give a nice hollow ground cutting edge which will cut fast and dull slowly. Don't file off any more metal than necessary to give a sharp cutting edge.

Make sure your file is really sharp because the chain teeth are made of a heat treated steel alloy. Also, a dull file can surface harden the cutter edges and make them extremely hard to sharpen. Use only a sharp 7/32 inch full round file. Be careful to keep the cutting teeth the same length. If the teeth are not uniform, the longer ones will take a deeper bite and cause the saw to cut in an arc.

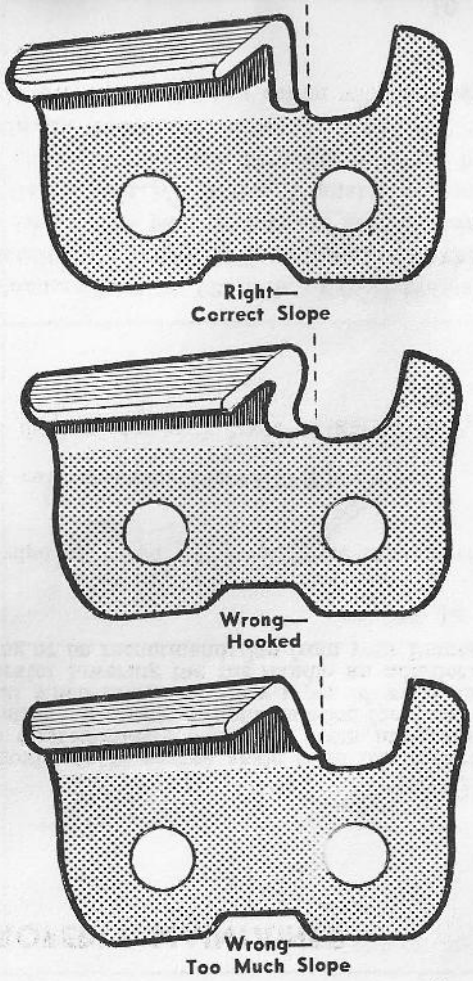
When you have finished sharpening the chain, slack off the chain slightly and run it free while oiling it heavily to make sure that all filings are flushed from the cutter bar groove. Be sure to re-tension chain correctly.

Chain Tension

The importance of correct chain tension cannot be overstressed. Check the instructions given under General Instructions carefully. PARTICULAR CARE must be used to properly break in a new Chain.

Correct chain tension is especially important on bar lengths of 32 inches and over, to prevent the chain jumping the bar and causing damage to the equipment and loss of time to the operator.

When the chain is correctly filed, properly lubricated, correctly jointed and proper chain tension maintained, it will cut smoothly and be easier on the motor, bar, chain and the operator.



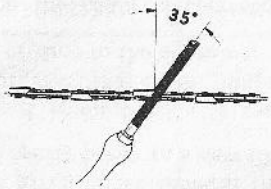


FIGURE 15

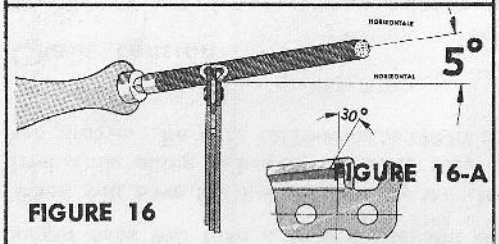


FIGURE 16

FIGURE 16-A

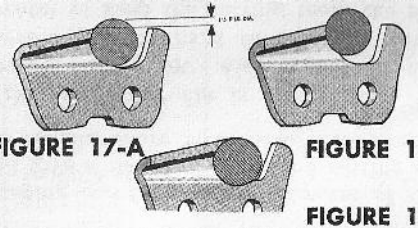
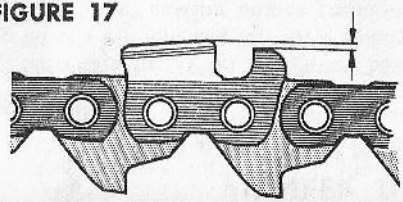


FIGURE 17-A

FIGURE 17-B

FIGURE 17-C

FIGURE 17



KEEP YOUR CHAIN PROPERLY MAINTAINED

1. Maintain top angle basic 35 degrees.
2. File with straight even strokes.
3. Keep all cutters the same length.
4. Use 7/32" full round file.

Filing with the tooth, to maintain the approximate 30 degree angle from the vertical as illustrated in Figure 16A. hold the file approximately 5 degrees from horizontal, with the handle low. "As in the case of jointing: Factory recommendation for general purpose calls for the 5° from the horizontal when filing. Various types of wood and cutting conditions may necessitate the operator lowering the file handle an additional 5°. This should only be changed after testing or on recommendation from your Pioneer dealer, (Figure 16)."

1. Use correct 7/32" full round file.
2. Keep 1/5 of file diameter above top edge of cutter. This produces the correct undercut, see Figure 17-A.
3. File held too high results in blunt slow cutting edge, (Figure 17-B).
4. File held too low results in thin, quick dulling edge with hook, (Figure 17-C).

Jointing

The chain is precision ground and has a standard joint of .025 inch. Experience has shown that .025 inch is best for average conditions. However, to suit particular cutting conditions the joint can be changed as long as the joint heights are kept uniform (figure 17). If you change the joint use Gauge Part No. 471135, available at your servicing dealer, and proceed with caution since the chain can be easily damaged by over filing. In filing the runners, maintain the rounded corners. Improperly filed runners will make some teeth cut more than others and the saw action will be rough and tend to cut off line.

CORRECT JOINT AND CUTTING ACTION

Maintain recommended depth of .025 on the depth gauge.

Check your joint reguarly. Make a practice of jointing your chain after every second filing. This will result in a fast cutting, smooth operating chain with less effort on your part. Visualize your cutters as a properly adjusted planer blade with ALL depth gauges jointed evenly. (Figure 18).

FIGURE 18

EXCESSIVE JOINT

Lack of care in jointing may result in excessive or uneven joint. This will cause the cutters to bite in, chain will grab, resulting in overloading of attachments, poor performance and damage to both chain and bar will result. In this illustration we have used a deep biting chisel to convey the action of excessive or uneven jointing with its accompanying chain result. (Figure 19).

FIGURE 19

INSUFFICIENT JOINT

FAILING TO CHECK OR JOINT REGULARLY. Cutters cannot bite into the wood, chain will not cut efficiently or to capacity. This will require extra pressure on your part resulting in excessive wear to the bottom of the cutters and links plus rapid wear to the cutter bar rails. Again using a chisel we illustrate the chain at work with insufficient joint. (Figure 20).

FIGURE 20

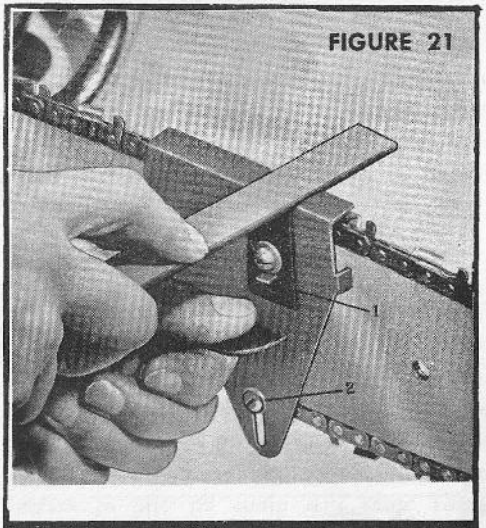


FIGURE 21


FIGURE 22

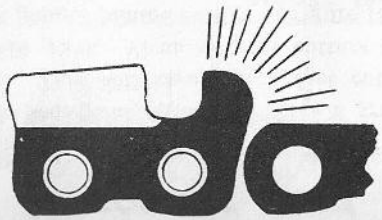


FIGURE 23

JOINTING

Two Methods in General Use

1. Using Jointing Gauge #470135 as illustrated is simple and accurate. First preset the adjustable plate, using the feeler gauge supplied, to the recommended joint. Next place jointing tool on top of the chain with the depth gauge protuding through the slot in the jointing plate and resting on the two cutters near the centre of the bar. Using a flat file, file the depth gauge to the level of the jointing tool plate. WARNING: Always work near the centre of the bar and move the chain each time, NOT the tool. This is necessary due to the contour of all cutter bars. To operate your jointing tool at various positions could give an uneven joint and a rough cutting chain. (Figure 21).

2. If the above mentioned Jointing Tool is not available place a straight edge, long enough to cover at least six cutters, on top of the chain. Next check the existing joint with a standard .025 feeler gauge. If you cannot insert the feeler give one stroke of a flat file and recheck. When correctly jointed you should just feel the drag between the straight edge and the top of the depth gauge. Repeat this step for each depth gauge throughout the entire chain. (Figure 22). This method of jointing chains is much slower and less accurate than with a proper jointing tool.

3. When filing the jointer runners, be sure and maintain the rounded corners (Figure 23). Not rounding the corners will cause rough cutting and tendency to cut out of line.

BAR AND CHAIN SERVICING

Tool No. 426235

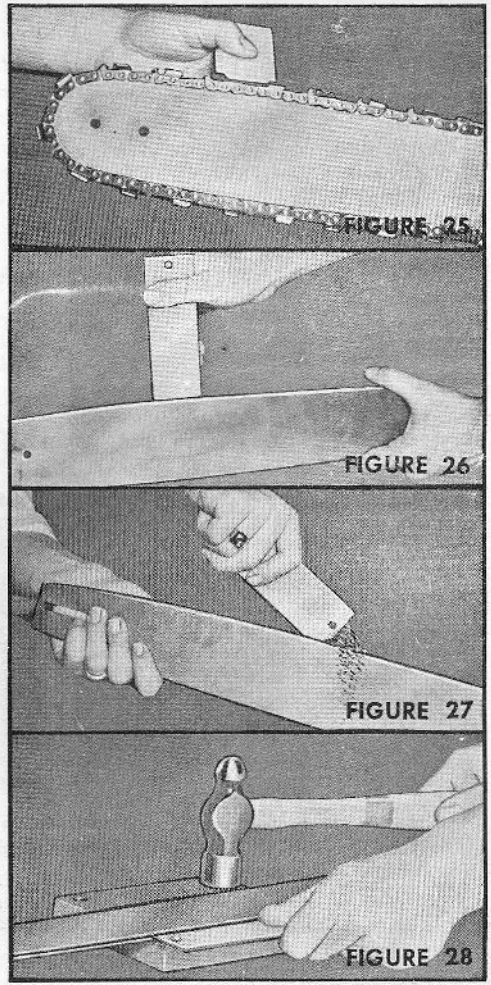
1. This illustration recommends the use of the die cut corner, sheared at 35° for the maintaining of correct top angle on all cutters. This important feature on chain filing is outlined in all chain instruction pieces and the Operator's Manual (Figure 25).

2. Front end of the cutter bar tool is marked to indicate the minimum safety depth of the bar groove to avoid the chain drive lugs riding on the bottom of the groove causing extensive chain and bar damage. (Figure 26).

3. By using either of the sharp corners of this tool the bar groove can be cleaned regularly. The removal of the accumulated sawdust, old oil and chain filings will overcome the common fault of a chain riding up in the groove resulting in both chain weave and breakage. (Figure 27).

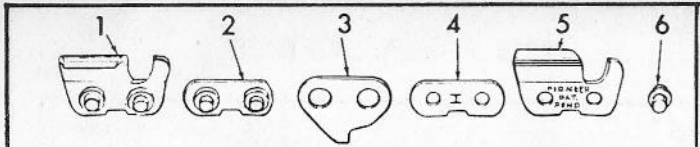
4. To carry out minor repairs such as a pinched bar, enter one corner of the tool in the groove near the pinched section, then tap the tool with a light hammer until the entire length of the gauge enters into the groove. While in this position lightly tap along the bar rail which will straighten out the pinch and give chain clearance.

   A further use for the side of this tool is to close up the rails to correct groove width, as illustrated, for proper chain performance. This overcomes chain weave and rapid deterioration of both the bar and chain. (Figure 28).

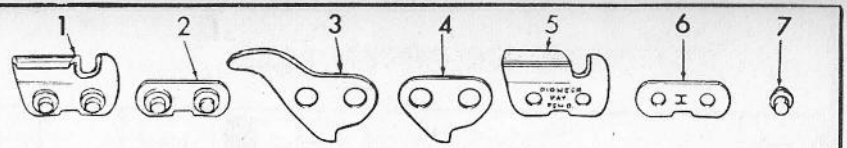


CHAIN DIAGNOSIS

TROUBLE	PROBABLE CAUSE	REMEDY
Chain stretched beyond adjustment.	Dull cutters. Lack of lubrication.	Remove a side and drive link. Increase lubrication.
Chain breakage.	Excessive pressure by operator. Excessive joint. Lack of lubrication. Dull cutters.	Replace damaged parts. Check balance of oil. Increase lubrication. Rejoint chain. File chain.
Chain stiff. Hard to tension.	Lack of lubrication. Poor maintenance.	Clean chain in solvent. Oil bath overnight. Check oil pump and vent holes.
Chain stalls in cut and/or scored drum.	Clutch slipping. Excessive pressure by operator. Clutch spring not releasing.	Check clutch shoes for wear. Check spring for tension. Apply less pressure, correctly filed chain will self-feed.
Chain cuts rough or digs in.	Cutter angles incorrectly filed. Too much or uneven joint.	Check your filing instructions. Refile to correct angles. Check joint, rejoint your chain.
Chain jumps bar.	Incorrect chain tension. Damaged cutter bar. Damaged drive links. Worn or damaged sprocket.	Correct chain tension. Check bar for damage, repair or replace. Check drive links for damage. Replace links or entire chain.
Chain cuts angle.	Cutter angles not the same on both sides. Uneven joint. Cutter bar rails uneven.	Refile cutters to same angle. Check rails, if worn have bar serviced or replace. Rejoint. Increase lubrication.
Worn drive sprockets.	Incorrect chain tension. Lack of lubrication. Dull cutters.	Replace sprocket. Correct chain tension. Increase lubrication. File cutters and joint chain.
Excessive wear drive links and/or side straps.	Lack of lubrication. Excessive tension. Dull chain. Worn sprocket.	Increase lubrication. Check oil pump. Extensive damage can be occasioned in a few hours. Check tension. File chain. Check sprocket.



C6EH-260 Type Chain



C6SH-260 Type Chain

ALWAYS USE GENUINE PIONEER BARS AND CHAINS

We have two types of chain available for your chain saw.

1. General Purpose - C6EH-260. Recommended for use where the length of the cutter bar is greater than the diameter of the timber being cut.

PIONEER SURE GUARD

2. Recommended for high production pulp areas. A smooth, fast cutting chain which greatly reduces kick back and grabbing.

Ref. No.	Part No. C6EH 260	Description
1	470831	Preset R. H. Cutter
2	470303	Preset Side Link
3	425248	Centre Link
4	425286	Side Link
5	426937	L. H. Cutter
6	425345	Rivet
	470823	Spares Kit
	426949	Chain Carton (Only)

Can. Pat. 1950 - 1955; U.S. Pat. 24,129; 2,508,784; 2,622,636.

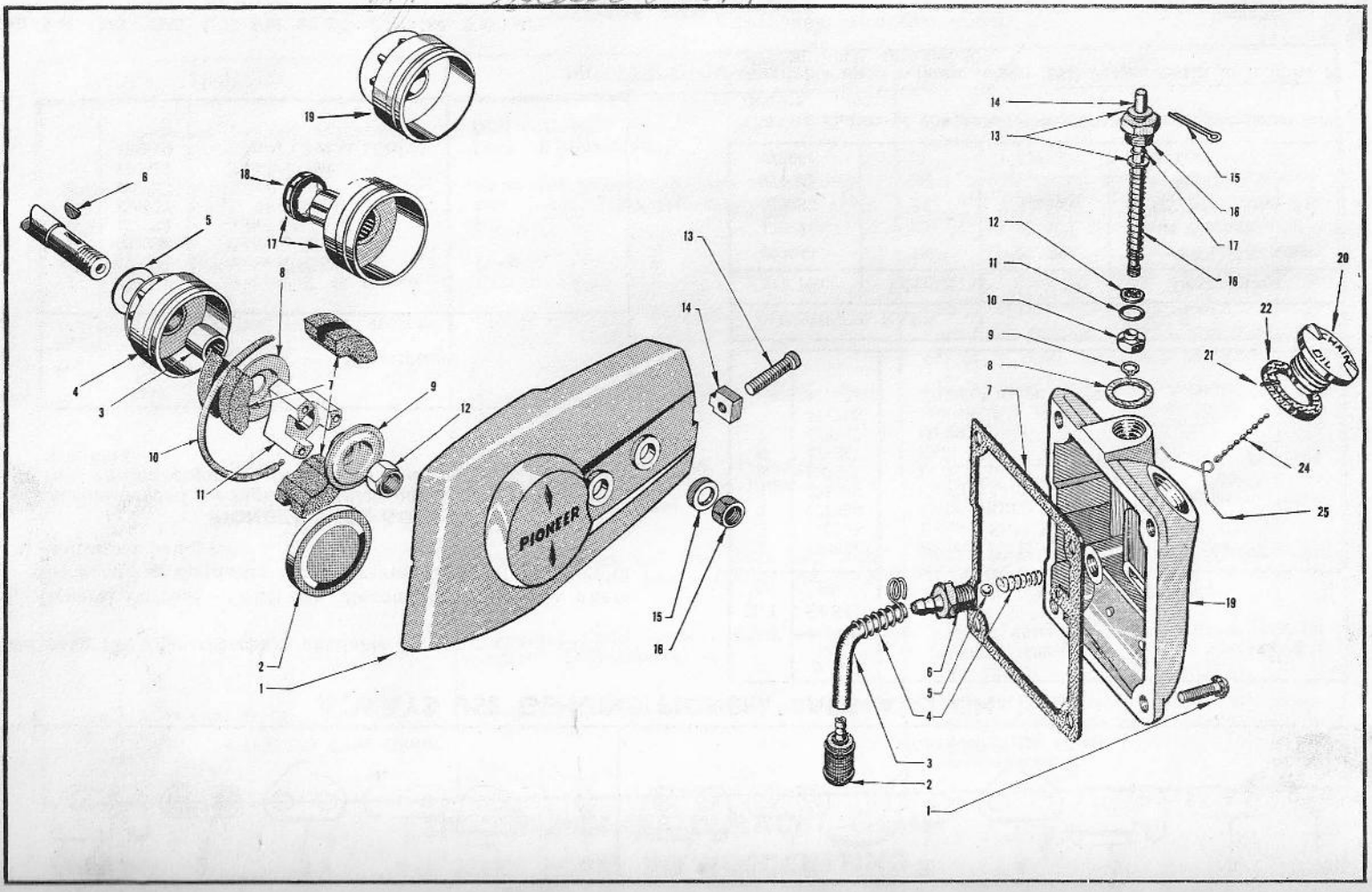
Ref. No.	Part No. C6SH 260	Description
1	470831	Preset R. H. Cutter
2	470303	Preset Side Link
3	427386	Sure Guard Centre Link
4	425248	Centre Link
5	426937	L. H. Cutter
6	425286	Side Link
7	425345	Rivet
	471208	Spares Kit
	427522	Chain Carton (Only)

CUTTER BARS		TOOLS	
Part No.	Length	Tool No.	Description
470060	*16"	425733	Spark Plug Wrench
470061	*20"	425580	Strut Wrench
470062	*24"	425598†	7/32" full round File
470063	*28"	471135†	Jointing Gauge
470064	*32"	426235†	Bar Tool

*Cutting chains of comparable length are available from your dealer.

Available upon request is the '261' Series chain in lengths of 20", 26", 32", 40" and 50"

†Available from your dealer.

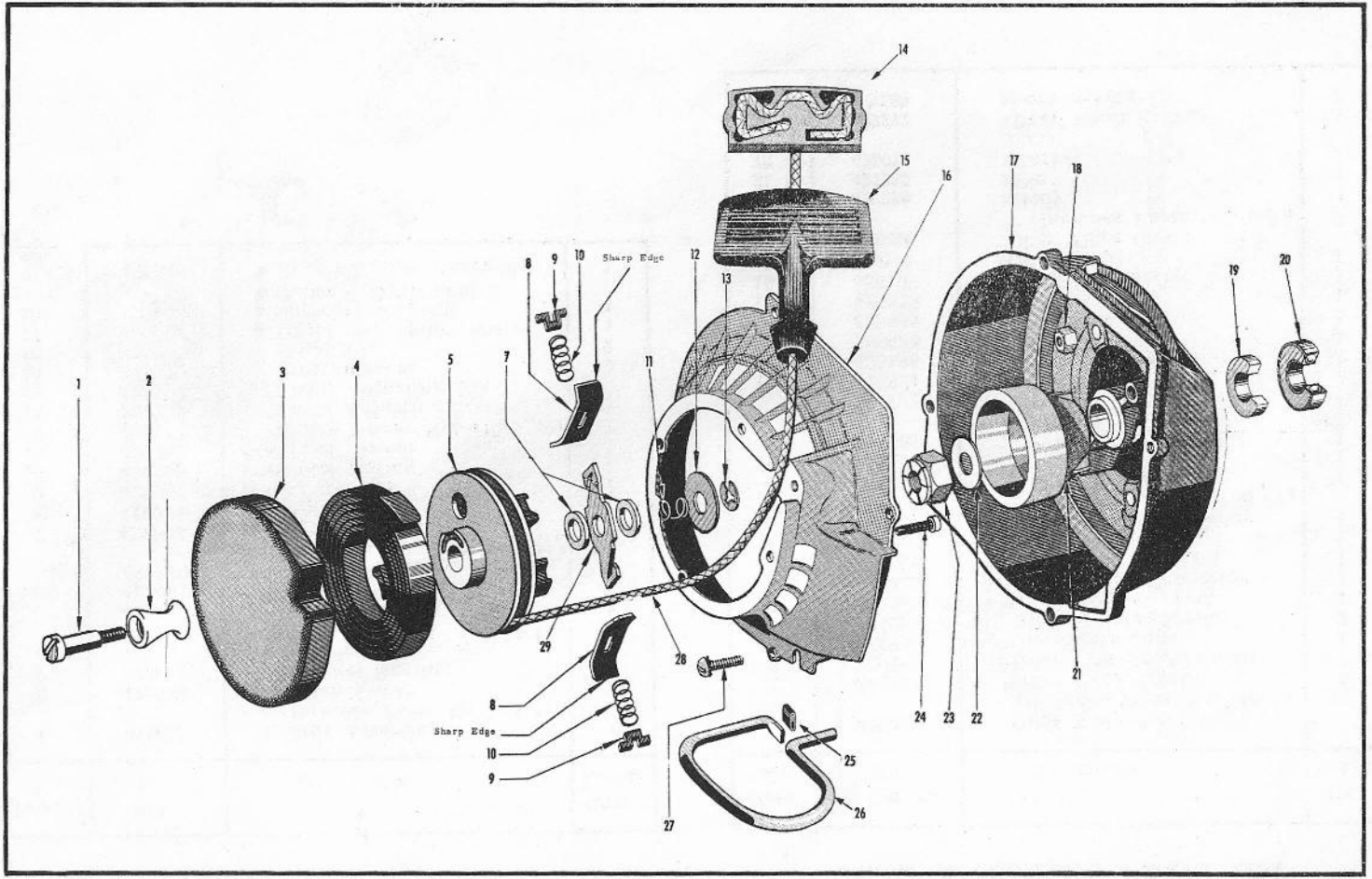

PIONEER
CHAIN OIL

CLUTCH PARTS LIST

Item No.	Ref. No.	Description	Qty. Req'd.
1	471257	Strut Assembly (Includes Parts Marked *)	1
2	425020	Clutch Cover	1
3	425091	**Sprocket Bearing	1
4	471295	Sprocket Assembly (Includes Parts Marked **)	1
5	425015	Inside Sprocket Washer	1
6	425061	Clutch Driver Key	1
	470789	Clutch Assembly (Includes Parts Marked ***)	
7	426963	***Clutch Shoe	3
8	426965	***Inner Plate	1
9	426966	***Outer Plate	1
10	426964	***Clutch Spring	1
11	426962	***Clutch Driver	1
12	425092	Clutch Driver Nut (Flexloc)	1
13	202190	*Chain Adjusting Screw	1
14	425672	*Chain Adjusting Pin	1
15	425116	Strut Washer	2
16	425031	Strut Nut	2
17	471009	▲ Drum and Spline Ass'y.	1
18	427252	▲ Sprocket Segment	1
		▲ Optional Equipment	
19	470340	▲ Star Sprocket Assembly	1

OILER ASSEMBLIES PARTS LIST

Item No.	Ref. No.	Description	Qty. Req'd.
	470430	Oiler Body Complete (Includes Parts Marked *)	
1	302948	*Oiler Body Screw	4
2	470193	*Oiler Pick-Up Assembly	1
3	426200	*Oiler Inlet Tube	1
4	426221	*Oil Ball Valve Spring	2
5	426227	*Oiler Ball	1
6	426220	*Oiler Intake Connector	1
7	426199	Oiler Body Gasket	1
8	425093	*Gland Nut Gasket	1
	470427	*Pump Plunger Assembly (Includes Parts Marked **)	1
9	425114	**Pump Piston Clip	1
10	426197	**Pump Piston	1
11	425095	**Pump Piston Gland ("O" Ring)	1
12	306522	**Washer	1
13	425021	**Gland Washer	2
14	426196	**Plunger Rod	1
15	304634	**Cotter Pin	1
16	425085	**Gland Nut	1
17	425028	***"O" Ring	1
18	426198	**Pump Spring	1
19	426119	*Oiler Body	1
	471284	Oiler Filler Cap (Includes Parts Marked x)	1
20	427589	xBody	1
21	427289	xPin	1
22	425074	xGasket	1
24	427277	xBead Chain	1
25	427288	xLock Spring	1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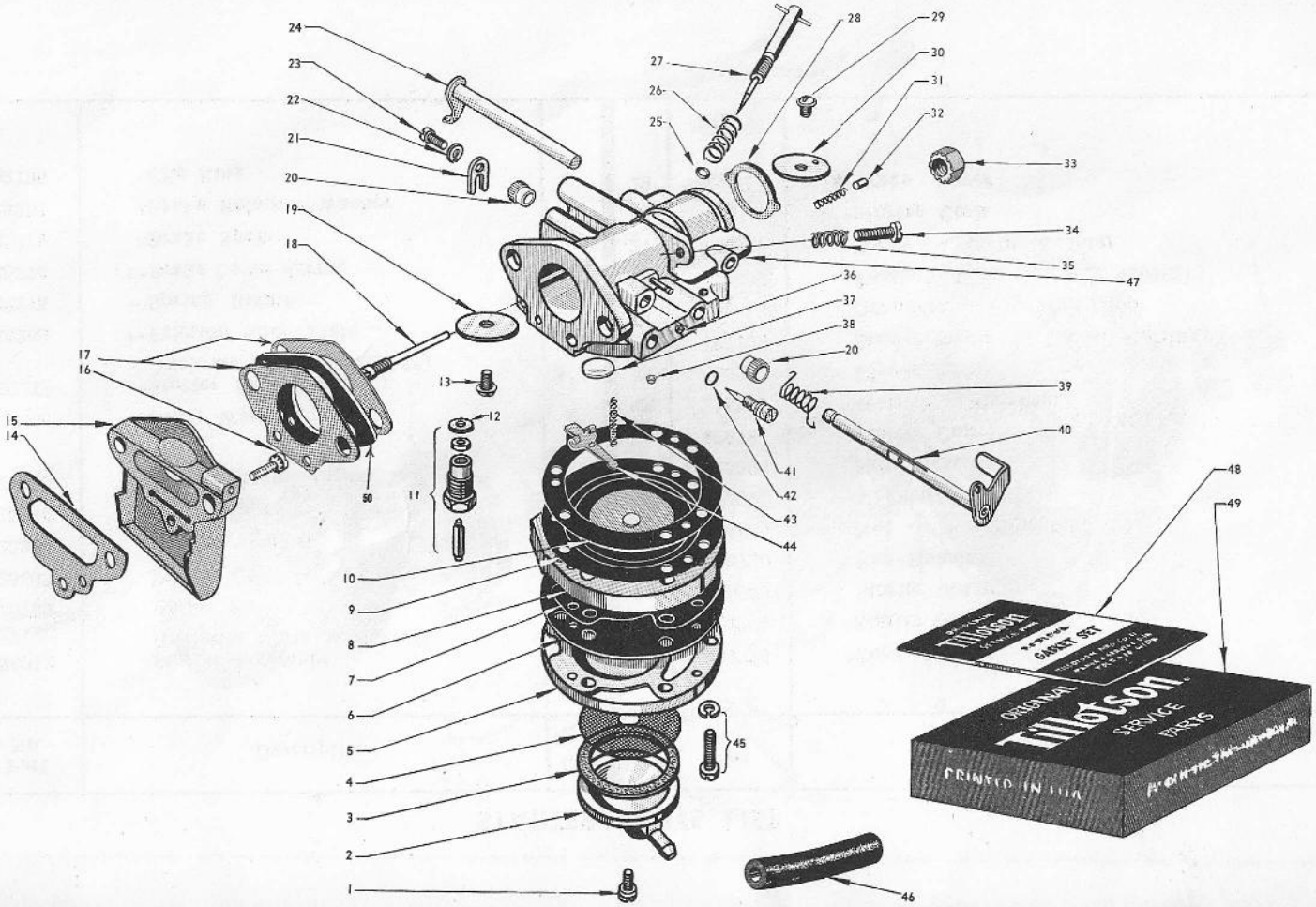
STARTER PARTS LIST

Item No.	Part No.	Description	Qty. Req'd	Item No.	Part No.	Description	Qty. Req'd.
	470012	Starter Assembly (Includes Parts Marked *)	1	14	304323	*Cord Anchor	1
				15	602773	*Starter Cord Handle	1
1	425709	Roller Pin	1	16	426783	Starter Adapter	1
2	425665	Starter Cord Roller	1	17	426120	Fan Housing	1
3	425275	*Starter Cover	1	18	304609	Nut — Fan Housing	4
4	425276	*Rewind Spring	1	19	425076	Magneto End Seal	1
5	425270	*Rotor Assembly	1	20	425066	Main Bearing	1
				21	426784	Starter Cup	1
7	427529	*Fibre Washer	2	22	304671	Washer — Flywheel	1
	470233	*Starter Pawl Assembly (Includes Parts Marked **)	1	23	425916	Flywheel Nut	1
				24	425708	Starter Screw — Thread Cutting	4
8	425269	**Friction Shoe Plate	2	25	426663	Grommet — Foothold Loop	1
9	425273	**Spring Retainer	2	26	470699	Foothold Loop (Includes 426663)	1
10	425274	**Brake Lever Spring	2	27	302948	Screw — Starter Adapter	4
11	425278	*Brake Spring	1	28	425271	*Starter Cord	1
12	425281	*Brake Retainer Washer	1	29	425272	**Brake Lever	1
13	202139	*Clip Ring	1				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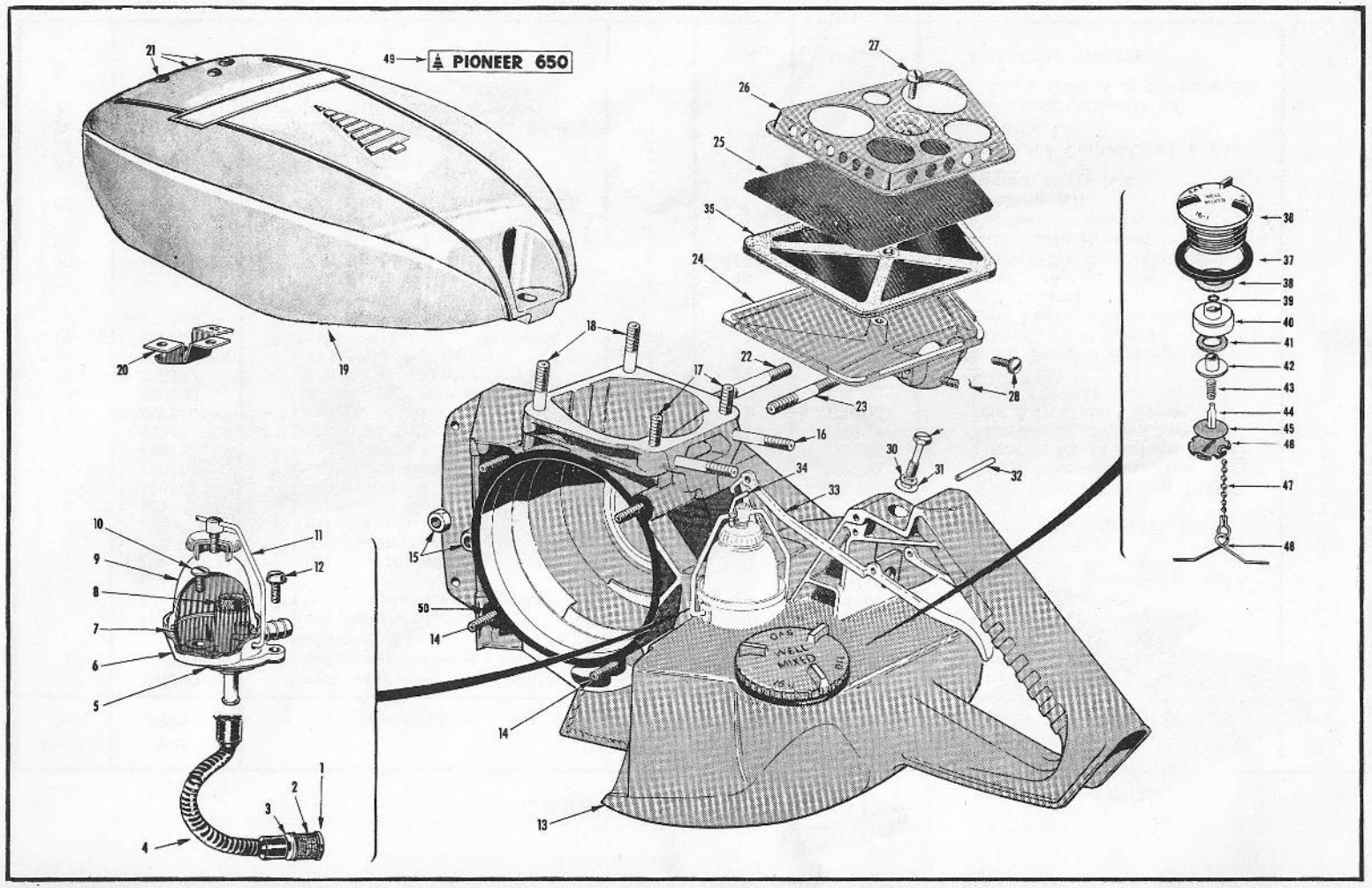
ORIGINAL
Tillotson
SERVICE
PARTS
GASKET SET

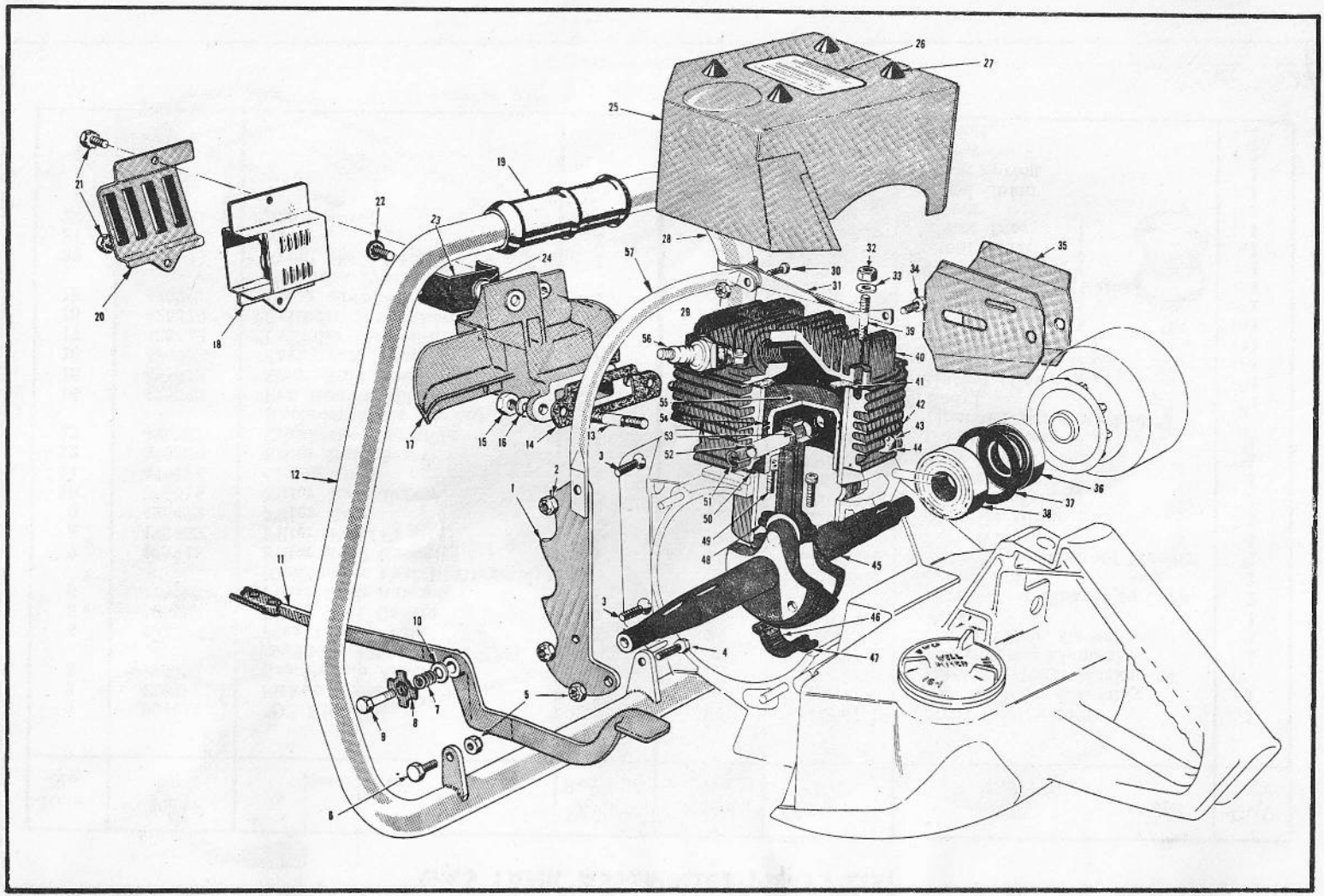
CARBURETOR PARTS LIST

Item No.	Ref. No.	Description	Qty. Req'd.	No. Item	Ref. No.	Description	Qty. Req'd.
	470860	Carburetor Assembly Complete		29	426145	Choke Shutter Screw	1
1	425741	*Fuel Strainer Cover Retaining Screw	1	30	425456	Choke Shutter	1
				31	425450	Choke Friction Spring	1
2	425492	Fuel Strainer Cover	1	32	425407	Choke Friction Pin	1
3	425493	**Fuel Strainer Cover Gasket	1	33	304609	Carburetor Nuts	2
4	425494	*Fuel Strainer Screen	1	34	425401	*Idle Speed Regulating Screw	1
5	425490	Fuel Pump Body	1	35	425386	*Idle Speed Regulating Screw Spring	1
6	426909	*Fuel Pump Diaphragm	1				
7	425506	**Fuel Pump Gasket	1	36	425391	Diaphragm Chamber Drain Screw	1
8	425744	Diaphragm Cover	1				
9	470361	*Diaphragm	1	37	425394	*Body Channel Welch Plug	1
10	425496	**Diaphragm Gasket	1	38	425501	*Body Channel Cup Plug	1
11	470118	*Inlet Needle, Seat and Gasket	1	39	425505	*Throttle Shaft Return Spring	1
12	425486	**Inlet Seat Gasket	1	40	470119	Throttle Shaft and Lever	1
13	426145	*Throttle Shutter Screw	1	41	470195	*Idle Adjustment Screw (Inc. 425502)	1
14	426123	Gasket—Adapter to C'case	1				
15	426193	Carburetor Adapter	1	42	425502	*Seal Ring	1
16	304606	Carb. Adapter Screw	1	43	425498	*Inlet Tension Spring	1
17	425046	**Carb. Gasket	2	44	425489	*Inlet Control Lever	1
18	470395	*Inlet Control Lever Pinion Screw	1	45	426146	Fuel Pump Body Screw and Lockwasher	6
19	425446	Throttle Shutter	1	46	426997	Fuel Line	1
20	425469	Throttle Shaft Bushing	2	47	470867	Carburetor Body Complete with Parts Pressed In	
21	425459	Throttle Shaft Clip	1				
22	425387	Throttle Shaft Clip Washer	1	48	470322	*Carburetor Gasket and Packing Kit	
23	425390	Throttle Shaft Clip Retaining Screw	1	49	470325	Repair Parts Kit	
24	470196	Choke Shaft and Lever	1				
25	425502	**Seal Ring	1			*Indicates Contents of Repair Parts Kit	
26	425747	*Main Adjustment Screw Spring	1				
27	470197	*Main Adjustment Screw (Inc. 425747 and 425502)	1			**Indicates Contents of Carb. Gasket & Packing Kit	
28	425669	Air Cleaner Gasket	1				
				50	425328	Insulating Gasket	1


PIONEER 650
GAS WELL MIXED OIL

GAS TANK ASSEMBLIES PARTS LIST

Item No.	Part No.	Description	Qty. Req'd.	Item No.	Part No.	Description	Qty. Req'd.
1	304614	"O" Ring	2	23	425027	*Strut Stud (Short)	1
2	425317	Pickup Screen	1	24	470742	Air Cleaner Assembly (Includes Parts Marked x)	1
3	470090	Gas Pickup Assembly (Includes 425317 & 304614)	1	25	470743	xAir Cleaner Element	1
4	427652	Flex Pickup Line	1	26	426875	xAir Cleaner Cover	1
5	425669	Filter Base Gasket	1	27	302948	xScrew	1
6	470740	Filter Base Assembly (Connectors Cast In Assembly)	1	28	308116	Screw—Air Cleaner to Carb.	2
7	425748	Filter Bowl Gasket	1	29	426869	**Shroud Bolt	1
8	470460	Filter Felt (Pkg. 10)	1	30	308134	**External Shakeproof Washer	1
9	425422	Filter Bowl	1	31	306407	**Flat Washer	1
10	306514	Filter Base Screw	1	32	426636	Throttle Hinge Pin	1
11	470194	Clamp Unit	1	33	426969	Throttle Trigger	1
12	305230	Filter Base Screw	1	34	426931	Throttle Link	1
13	470737	Crankcase Assembly (Includes Parts Marked *)	1	35	470925	Wire Screen Ass'y	1
14	425075	*Fan Housing Stud	4		471283	Gas Cap Assy. (Includes parts marked *)	1
15	425078	*Strut Stud Nut	2	36	427587	*Body	1
16	426702	*Carburetor Stud	2	37	425087	*Gasket (Gas Cap)	1
17	426642	*Cylinder Stud (Short)	2	38	427273	*Gasket (Valve Body)	1
18	425578	*Cylinder Stud (Long)	2	39	427281	*"O" Ring (Valve)	1
19	470742	Outer Shroud Assembly (Includes Parts Marked **)	1	40	427276	*Body (Valve)	1
20	425653	**Front Shroud Hook	1	41	427274	*Valve (Vacuum)	1
21	308014	**Rivet	3	42	427275	*Backing Plate (Valve)	1
22	426121	*Strut Stud	1	43	427280	*Spring	1
				44	427279	*Stem Valve	1
				45	427376	*Filter Disc	1
				46	427278	*Cover	1
				47	427277	*Bead Chain	1
				48	427213	*Lock Spring	1
				49	427554	Decal	1
				50	427193	Gasket	1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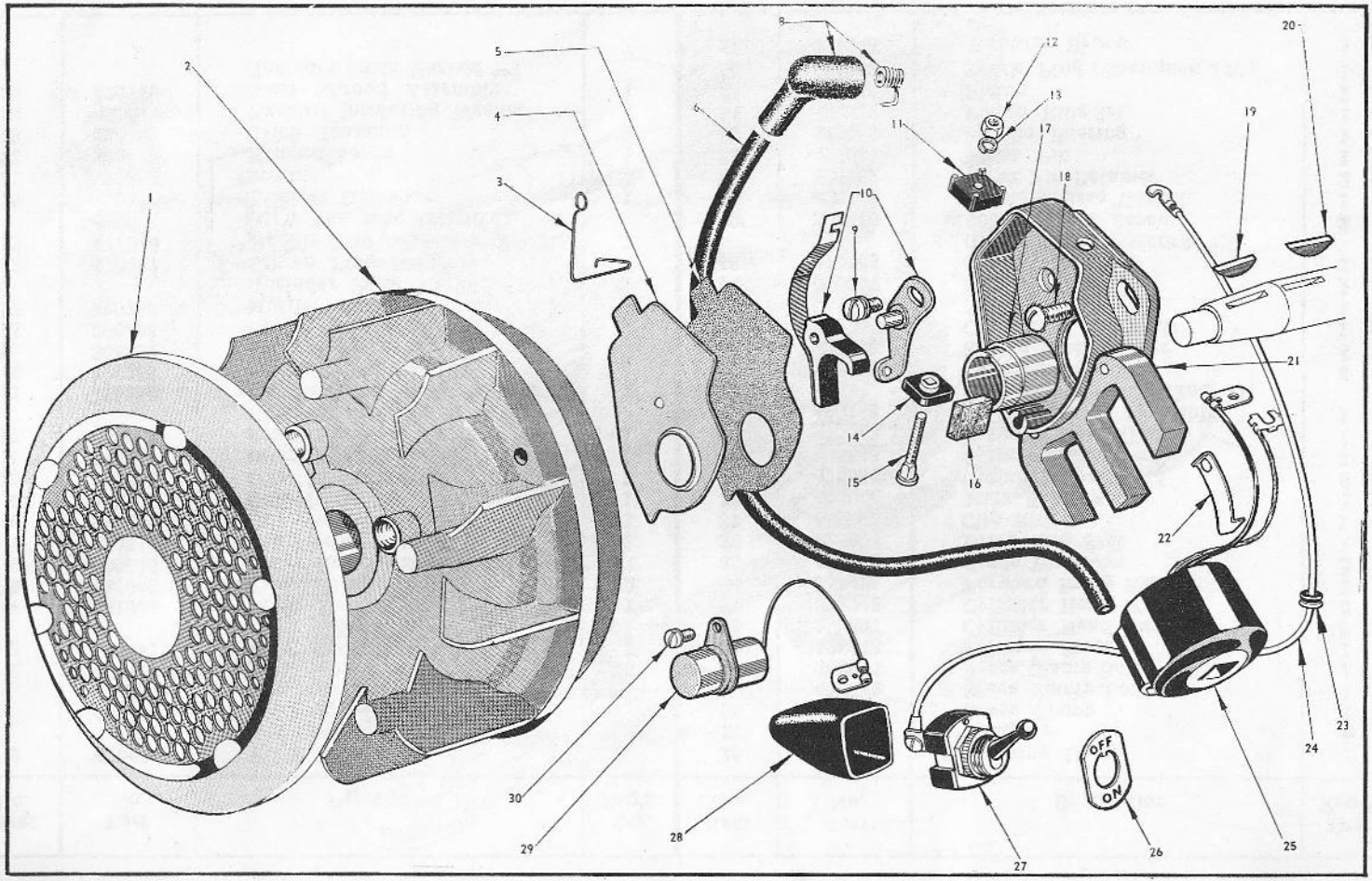
ENGINE PARTS LIST

Item No.	Part No.	Description	Qty. Req'd.	Item No.	Part No.	Description	Qty. Req'd.
1	470669	Pivot Grip—Eastern, c/w nuts & bolts	1	26	425978	**Warning Decal	1
				27	426746	**Bumpers	4
	470668	Pivot Grip—Western, c/w nuts & bolts		28	425661	Brace Clamp	1
				29	426942	Brace Clamp Locknut	1
2	425713	Pivot Grip Nut	2	30	300977	Brace Clamp Bolt	1
3	130491	Pivot Grip Screw	2	31	426873	Forward Brace	1
				32	306397	Cylinder Head Nut	6
4	131054	Front Handle Bolt (Long)	1	33	552743	Cylinder Head Washer	6
5	426942	Front Handle Nut	2	34	552421	Forward Brace Bolt	1
6	300635	Front Handle Bolt (Short)	1	35	425674	Guide Plate	2
7	425319	Oiler Lever Spring	1	36	425077	Drive End Seal	1
8	425680	Oiler Lever Pin Lock	1	37	425067	Clip Ring	1
9	425705	Oiler Lever Pin	1	38	425066	Main Bearing	1
10	425021	Oiler Lever Washer	1	39	425334	xCylinder Head Stud	6
11	470428	Oiler Lever Assembly	1	40	425648	Cylinder Head	1
12	470983	Front Handle Assembly (Includes Anchors & Grip)	1	41	425643	Cylinder Head Gasket	1
				42	470468	Cylinder Block Assembly (Includes Parts Marked x)	1
13	425334	xExhaust Stud	2				
14	426205	Exhaust Gasket	1	43	306397	Cylinder Base Nut	4
15	306397	Exhaust Nut	2	44	306396	Spring Lock Washer	4
16	306396	Spring Lock Washer	2	45	470755	Crankshaft Assembly	1
17	470739	Muffler Assembly (Includes Parts Marked *)	1	46	470926	Needles (Set of 12)	1
				47	470927	Bearing Cage Set	1
18	470787	*Screen Plate—Muffler	1	48	470168	Conrod Assembly (Includes Parts Marked xx)	1
19	471016	*Handle Grip Assembly (C/W 2-oz. tube adhesive)	1				
				49	304610	xxSocket Head Screw	2
20	426858	*Exhaust Deflector	1	50	426204	Cylinder Base Gasket	1
21	307613	*Screw	2	51	425062	Wrist Pin Retainer	2
22	304607	Exhaust Screw	1	52	425641	Wrist Pin	1
23	425655	Latch Trunnion	1	53	425060	xxNeedle Bearing	1
24	425649	Exhaust Insulating Washer	1	54	470777	Piston Ring Set	1
25	470745	Inner Shroud Assembly (Includes Parts Marked **)	1	55	425640	Piston	1
				56	076152	Spark Plug (Champion J8J)	1
				57	427343	Tubular Brace	1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MAGNETO PARTS LIST

Item No.	Ref. No.	Description	Qty. Req'd.	Item No.	Ref. No.	Description	Qty. Req'd.
	470438	Magneto Stator—Complete (Includes Parts Marked *)	1	15	425696	**Stud	1
				16	425694	*Cam Wiper Felt	1
1	426782	Rotating Screen	1	17	425687	Cam	1
2	426225	Flywheel	1	18	304605	Magneto Stator Screw	2
3	425698	*Breaker Box Cover Spring	1	19	425061	Flywheel Key	1
4	425689	*Breaker Box Cover	1	20	425100	Magneto Cam Key	1
5	425690	*Gasket	1	21	470183	*Stator Plate Group (Stator Plate and Coil Only	1
6	426232	*High Tension Wire	1				
				22	425701	*Coil Wedge Spring	1
8	580339	*Sparky Assembly	1	23	425338	Grommet	1
9	425693	*Breaker Plate Screw	1	24	470192	*Switch Wire Assembly (Includes 425338 Grommet)	1
10	470188	*Breaker Point Set	1				
	470186	*Terminal Connection Unit (Includes Parts Marked **)	1	25	470187	*Coil Group	1
				26	425729	On-Off Switch Plate	1
11	425699	**Stud Insulator—Outside	1	27	425101	Ignition Switch	1
12	425697	**Nut	1	28	425985	Switch Terminal Cover	1
13	425692	**Lockwasher	1	29	425702	*Condenser and Lead Wire	1
14	425700	**Stud Insulator—Inside	1	30	425360	*Condenser Clamp Screw	1

SAFETY PRECAUTIONS

Refuel your saw with the use of funnel on an area that has been cleared down to bare ground.

If gas is spilled on the saw, wipe it off or let it evaporate before starting the motor.

Move the saw 10 feet at least from the fueling spot before starting the motor.

Never ask anyone to hold the saw while starting the motor.

During operation keep inquisitive bystanders clear at all times.

Clear inflammable material away before cutting.

Let a hot saw cool before refueling.

Never start cutting until you have a clear place to work, a secure place to stand and a safe exit path from a falling tree.

Before starting motor examine carefully the lean of the tree, look up for loose limbs or bark and intertwined branches.

Wherever possible place the pivot grip against the tree or log before starting the cut.

When undercutting, wherever possible have chain in an inverted position.

Never operate a chain saw in a closed room as the exhaust fumes can be deadly.

Never touch or try to stop a moving chain.

Before you start the motor make sure the saw is not touching anything.

When removing saw from cut, shut the motor off before the chain leaves the tree.

When operating the chain saw be relaxed but in full control of the saw at all times.

Never carry your saw with the motor running when walking through a bushy area. A branch or twig may open the throttle and make the chain revolve.

Never operate the saw if the chain is dull or if repairs are needed.

Never attempt to sharpen or remove the chain while the motor is running.

Keep the muffler on the saw.

Keep the saw free of sawdust.

Keep the spark plug and wire connections tight.

Keep a filled fire extinguisher and shovel handy.

6 MONTHS WARRANTY

"We warrant, to the original purchaser, each new **PIONEER** engine of our manufacture to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at the factory — any part or parts thereof which shall, within six months from date of original purchase, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties and representations expressed or implied and of all other liabilities in connection with the sale or use of any engine.

This warranty shall not apply to any engine which has had repairs or modifications not authorised by our factory, nor which has been subject to misuse, negligence or accident, or operated in any way other than in accordance with our operating and maintenance instructions. Nor does the warranty extend to repairs made necessary by the use of inferior parts or accessories, or by the use of types of accessories not recommended by this Company nor does it apply to normal wear and tear.

The bars and chain are warranted separately for a period of thirty days against defects in material and workmanship under the same conditions heretofore mentioned.

We make no warranty in respect to trade accessories not of our manufacture, inasmuch as they are usually warranted separately by their respective manufacturers.

To make a claim under this warranty, contact the dealer from whom the saw was purchased, or the nearest authorised Pioneer saw dealer. All claims must be accompanied with the model and serial number of the saw. Engines or parts should be shipped by the dealer to the State Distributor, transportation charges prepaid."

To assure you of your WARRANTY, fill out the Warranty Cards and immediately forward them as directed.

CONSULT YOUR LOCAL SALES AND SERVICE DEALER

When a service problem arises do not hesitate to consult your local Pioneer Chain Saw Dealer. Your dealer was appointed after careful consideration of his ability in providing prompt and effective service. Only he can offer the complete technical knowledge and skill to maintain your chain saw in tip-top condition

Your dealer also stocks a complete line of genuine factory replacement parts. Therefore, when yo require replacement parts order them from your local dealer. **DO NOT RETURN MOTOR TO FACTORY.**

When ordering, specify:

1. Model and Serial Number of your chain saw.
2. Quantity, part number and description of part in full.
3. Complete shipping instructions.

REGISTER YOUR MODEL AND SERIAL NUMBER IN THE SPACES PROVIDED BELOW.

Model Number.....
Serial Number.....

Protect Your Warranty

Insist on Genuine Pioneer chains, bars, sprockets and replacement parts. Consult your Pioneer dealer for quality service.

Pioneer Saws Ltd., Peterborough, Ontario, Canada Pioneer Saws, Galesburg, Illinois, U.S.A. Outboard Marine Australia Pty. Limited, Bankstown, N.S.W., Australia -- Outboard Marine International S. A., Nassau, Bahamas -- Outboard Marine International Inc., Nassau, Bahamas -- Outboard Marine of Belgium, S.A., Bruges, Belgium.

OVER 25 YEARS OF PROGRESS & LEADERSHIP

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