

SERVICE MANUAL

PARTS CATALOG

McCULLOCH



IT'S A
McCULLOCH



CHAIN SAW

McCULLOCH MOTORS CORPORATION
6101 West Century Boulevard
Los Angeles 45, California

28998

Price -- 35c

JUNE 1953
2,000



**SERVICE
ORGANIZATION . . .**

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BY McCULLOCH MOTORS CORPORATION

To provide prompt and efficient service on McCulloch Motors products, authorized dealers and distributors are located throughout the United States and Canada. Each authorized dealer and distributor carries a stock of parts for McCulloch products. Each is equipped with tools for servicing, and all mechanics are factory-trained, assuring expert repair service.

The factory maintains a group of servicemen, who travel in company cars, calling on all distributors. These servicemen train both the distributors' and the dealers' mechanics on repair and maintenance work of McCulloch products.

McCulloch Motors Warranty

Be sure to fill in and mail the warranty card which accompanied the product at time of purchase. Unless the warranty card is returned to the factory, the warranty is not effective.

WARRANTY

For thirty days from purchase date, McCulloch Motors Corporation will replace for the original purchaser, free-of-charge, any part or parts found upon examination at any factory-authorized distributor or at our factory at Los Angeles, California to be defective under normal use and service, because of defects in material or workmanship.

All transportation charges on a part or parts submitted for replacement under this warranty must be paid for by the purchaser.

No service charges, labor, or other expenses will be allowed unless they have been previously approved and authorized by the factory. This warranty shall not apply to any part or parts which have been subjected to misuse, negligence, or accident; nor if it has been repaired or altered outside of our factory or authorized dealers or distributors.

**WARRANTY
INSTRUCTIONS . . .**

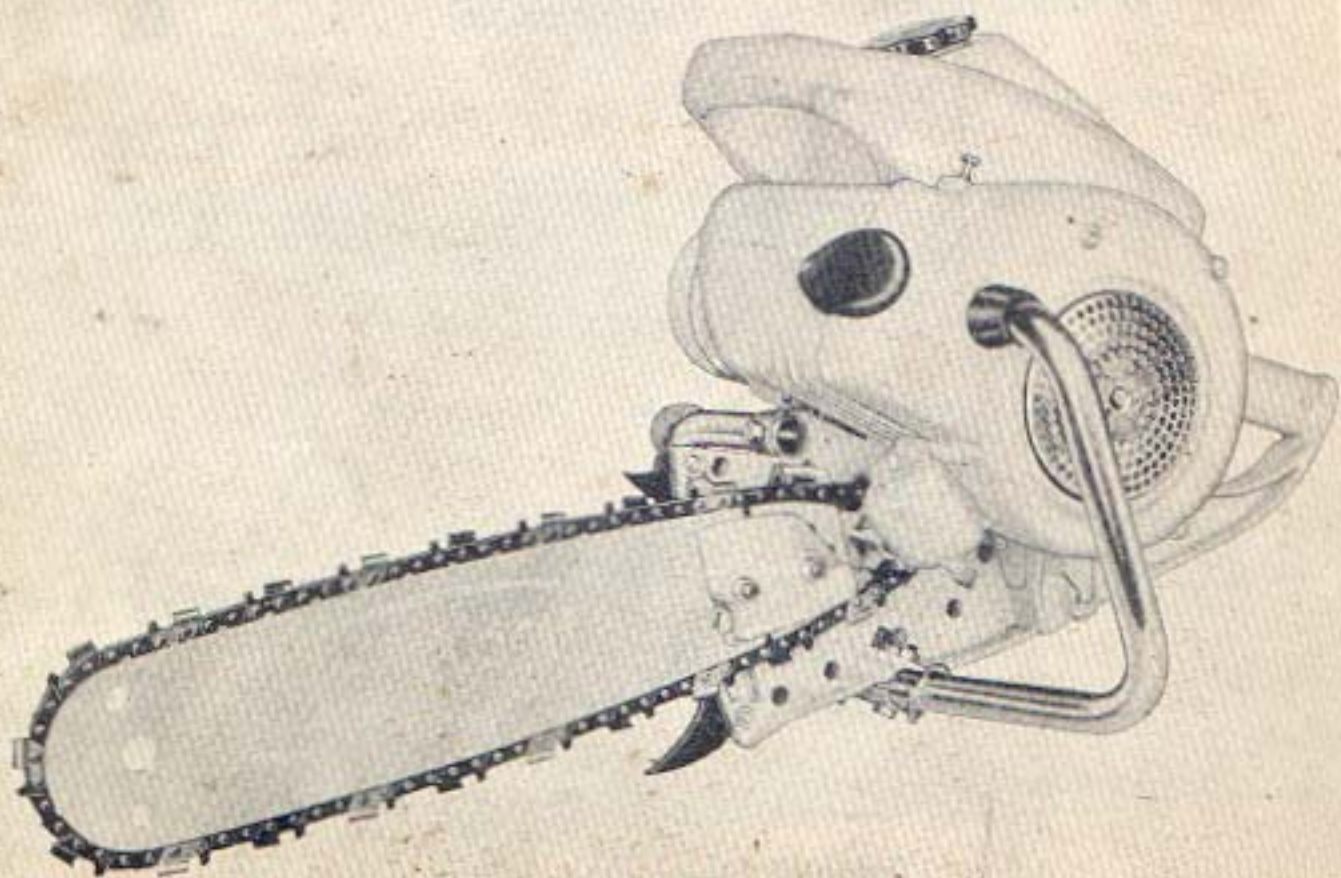
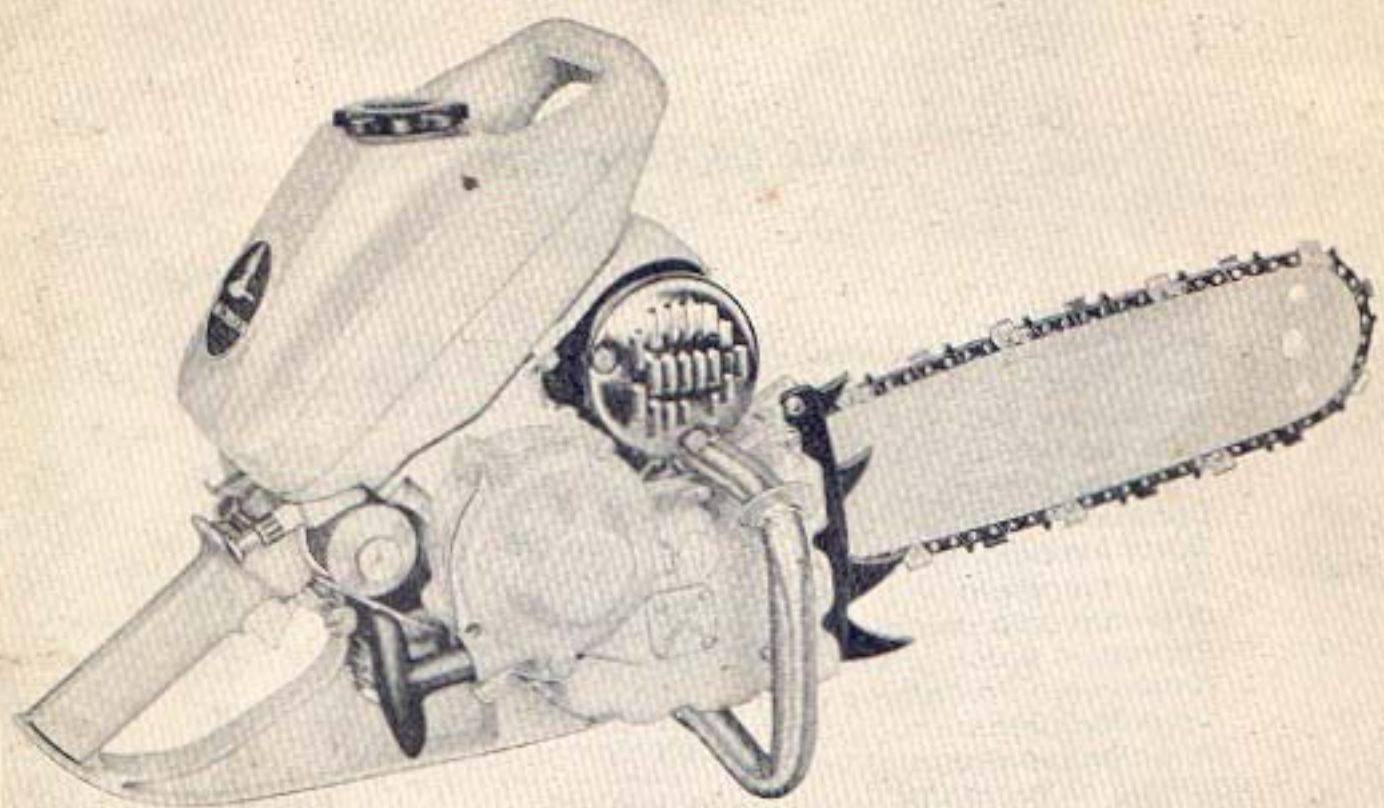
A part or parts covered under this warranty should be returned to the authorized dealer or to the authorized distributor. (See distributor list on back cover page of Manual). No parts are to be returned to the factory without written approval which can be obtained by writing a letter, giving the description and number of the part, the nature of the defect or failure, engine serial number, and the name and address of the purchaser. This is to be addressed to the Service Manager, McCulloch Motors Corporation, 6101 W. Century Boulevard, Los Angeles 45, California.

TABLE OF CONTENTS

	Page
Introduction.....	3
Your McCulloch Chain Saw	4
Upon Receiving Your Saw.....	5
Assembling Your Saw.....	7
Fuel and Lubrication.....	8
The Fuel System.....	9
Location of Controls.....	12
Safety Precautions	14
Fire Precautions.....	15
Operating Instructions	16
Preventive Maintenance	19
Maintenance Procedures	20
Chain Maintenance.....	25
Troubles and Remedies	30
Illustrated Parts List.....	35
Numerical Parts List.....	54
McCulloch Authorized Chain Saw Distributors	57



McCulloch Motors Corporation



INTRODUCTION

Designed for dependable service, your McCulloch Model 4-30 Chain Saw was engineered and assembled by a firm which for years has excelled in the manufacture of light-weight, two-cycle gasoline engines. Thousands of McCulloch engines are now powering various types of equipment which demand dependability and lightest possible weight.



A continuous program of product development and improvement is conducted by our Engineering and Research Departments to maintain the McCulloch reputation for advanced design. In combination with our modern manufacturing facilities, this assures our customers of the highest quality at quantity production prices.

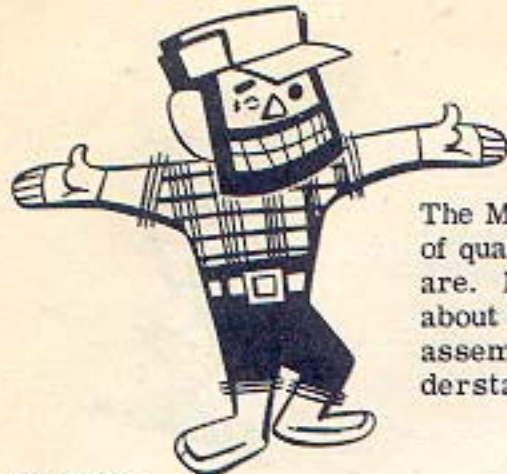
McCulloch Motors Corporation reserves the right to make changes in design or to make additions or improvements to its products without imposing any obligation upon itself to install them on previously manufactured products.

AS A MCCULLOCH OWNER YOU SHOULD:

- Read this instruction manual carefully and keep it available for ready reference.
- Use the proper fuel and lubricant at all times.
- Keep your chain saw clean.
- Carefully sharpen your chain at regular intervals.
- Periodically tighten all screws, nuts and bolts.
- Immediately repair or replace any damaged or broken parts.

AS A MCCULLOCH FLEET OWNER YOU SHOULD:

Select and train a good crew for saw operation. A careless or poorly instructed crew can needlessly damage your chain saws. A well-planned and enforced preventive maintenance program will increase production and reduce operating costs. The preventive maintenance section on page 19 of this manual will be of assistance to you in planning and carrying out such a program.



YOUR McCULLOCH CHAIN SAW

The McCulloch name on your Chain Saw signifies the highest standard of quality available. We hope you will be as proud of your saw as we are. Before you start using your new saw you will want to know more about it. The following paragraphs will further explain the various assemblies and their functions, which will greatly assist you in understanding proper saw operation.

ENGINE

Your Model 4-30 chain saw is powered with a one-cylinder, air-cooled, four horsepower, two cycle engine. Light-weight die castings of magnesium or aluminum are used to give it added strength. Precision bearings support the moving parts, insuring long wear and smooth operation. Ignition current is provided by a magnetized flywheel, special water-proof McCulloch coil, condenser and breaker assemblies. The efficient diaphragm type carburetor makes it possible to operate the saw in any position.

STARTER

The kickproof starter automatically rewinds each time the rope is pulled and released. The starter cable is covered with nylon plastic to insure smooth action and to prevent corrosion. This nylon covering also protects your hands, as does the durable rubber handle.

CLUTCH

The automatic clutch is actuated by centrifugal force. At idle speed the clutch shoes are fully disengaged from the clutch drum, preventing rotation of the chain. (This is an essential feature for your protection.) When the throttle is opened and the engine speed increases, centrifugal force causes the clutch shoes to

move outward and engage the clutch drum, which drives the sprocket and rotates the chain.

CHAIN OILER

The replaceable cartridge type chain oiler assembly supplies oil under positive pressure to your blade and chain. It is manually operated by thumb pressure. A weighted hose assembly in the chain oiler section of the gear case permits delivery of oil to the blade in all cutting positions.

BLADE AND CHAIN

The steel used in the manufacture of our McCulloch blades and chains is the finest available, and especially processed to insure long life. Component parts of the chain are assembled with heat treated roller-type rivets which by greatly increasing the bearing surface between the connecting links insure longer service life. The lower portion of the chain is guided in the milled slot of the blade. The cutting teeth are factory ground and can be resharpened with a straight round file or the McCulloch electric grinder. Instructions for chain sharpening may be found on page 25. With care and a little practice you can quickly learn to sharpen your chain. The ability of your chain to cut smoothly and efficiently depends on you.

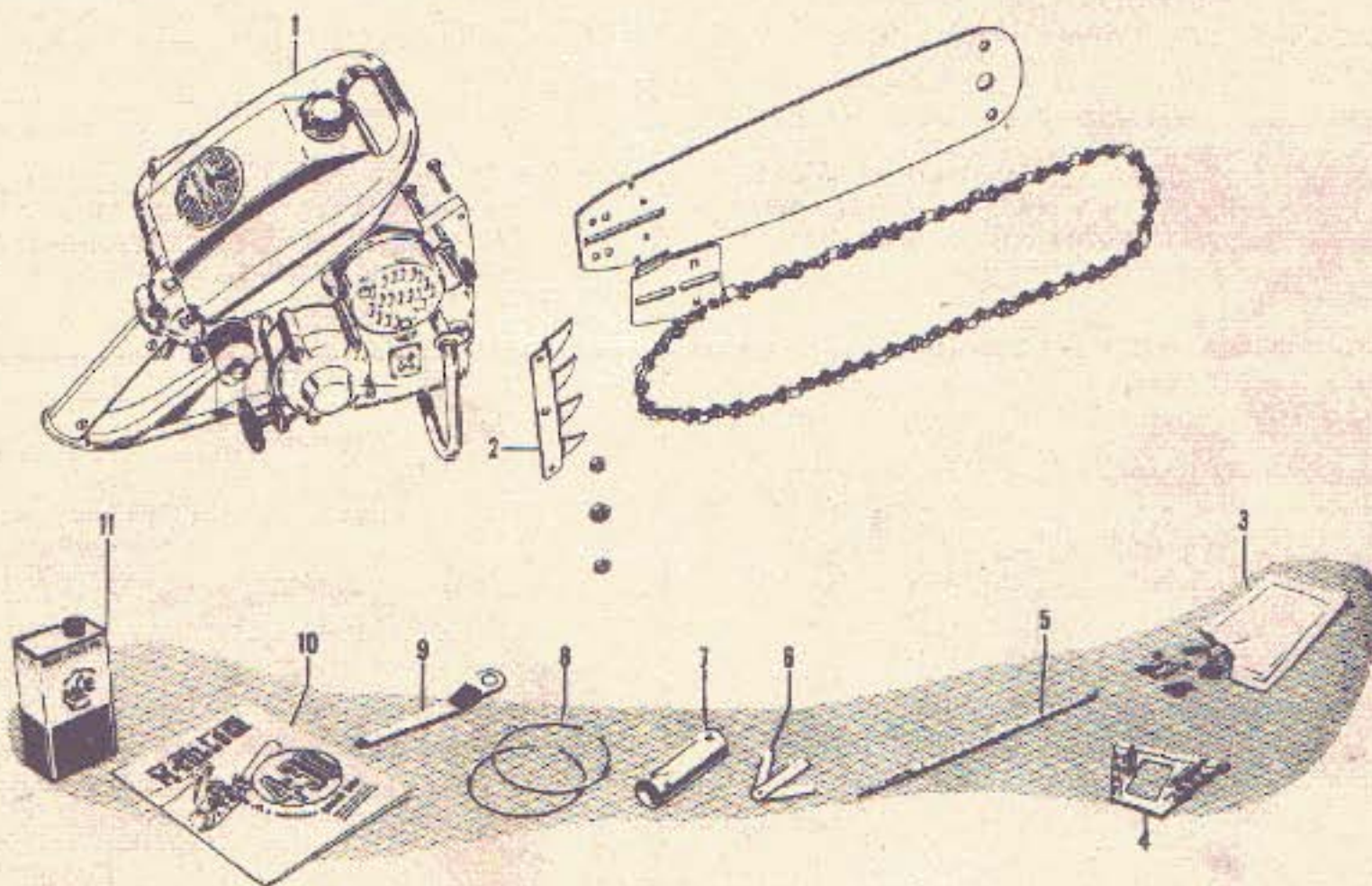
-
- READ your Instruction Manual thoroughly to assure proper assembly of the saw.
 - LUBRICATE the saw as instructed on page 8.
 - READ the starting instructions carefully before starting the engine for the first time.

UPON RECEIVING YOUR SAW

UNPACK THE UNIT CAREFULLY. Your McCulloch saw was thoroughly inspected and was in perfect condition when packed. If you should find any **BREAKAGE, DAMAGE, or SHORTAGE**, due to mishandling in transit, please, **DO NOT RETURN IT TO US.** We are not responsible for **ANY BREAKAGE, SHORTAGE, or DAMAGE** occurring during transportation.

Please hold equipment in original cartons, available for inspection at destination; otherwise, your claim for damages cannot be successful. File your claim with the Post Office, Express Company, or Forwarding Company, notifying your supplier who will furnish supporting documents.

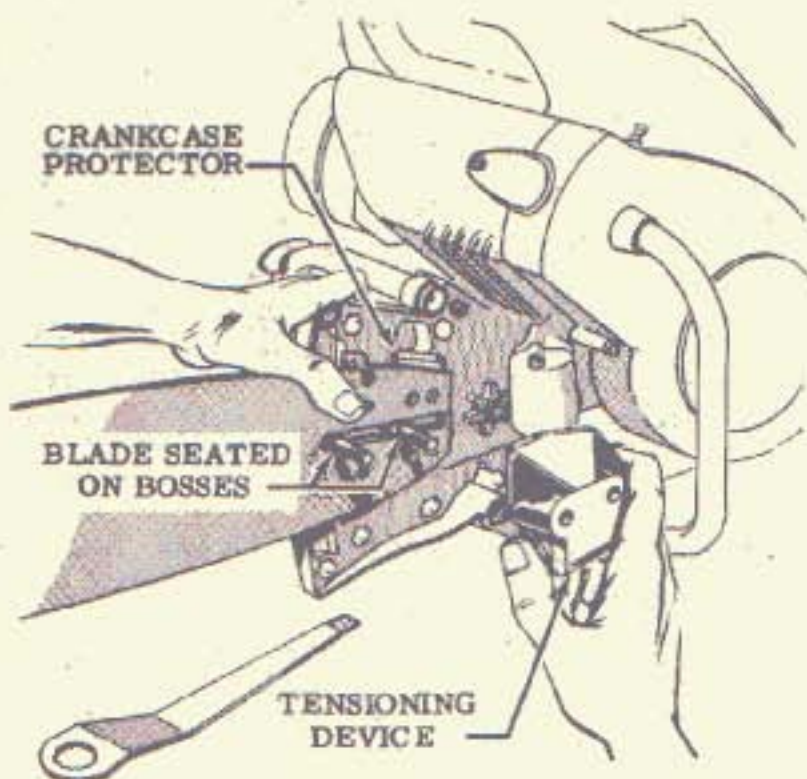
No deductions can be made from remittances for **BREAKAGE, DAMAGE or SHORTAGE**, occurring during transportation. You will receive the items shown in the illustration below.



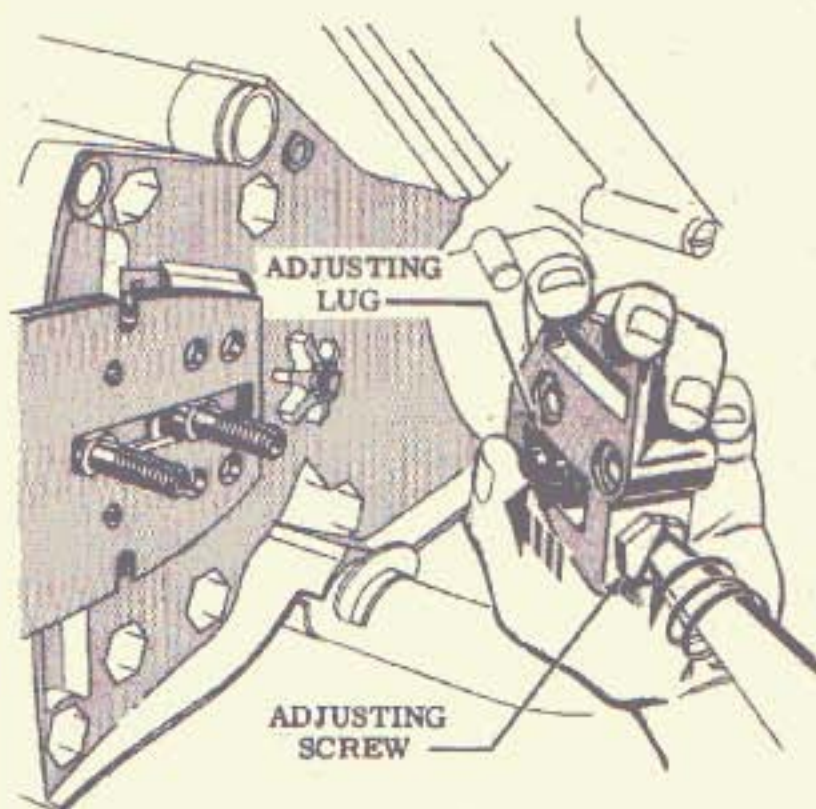
1. Your McCulloch Model 4-30 Saw
Assembly complete with crankcase protector, blade and chain.
2. A bucking spike with two attaching screws, 1/4 - 20 x 3/4 inch long, with corresponding nuts.
3. An envelope of spare parts for chain.
4. A metal chain filing guide.
5. One chain file:
5/16 inch dia with "HH" chain
1/4 inch dia with "HJ" chain

6. A set of feeler gages, for checking spark plug gap, breaker point gap, and coil-to-flywheel clearance.
7. A spark plug wrench.
8. Two clutch adjustment rings. Instructions for clutch adjustment are given in the preventive maintenance section.
9. Combination wrench and screwdriver.
10. An Instruction Manual with Parts Catalog.
11. A one-pint can of SAE 140 gear oil.

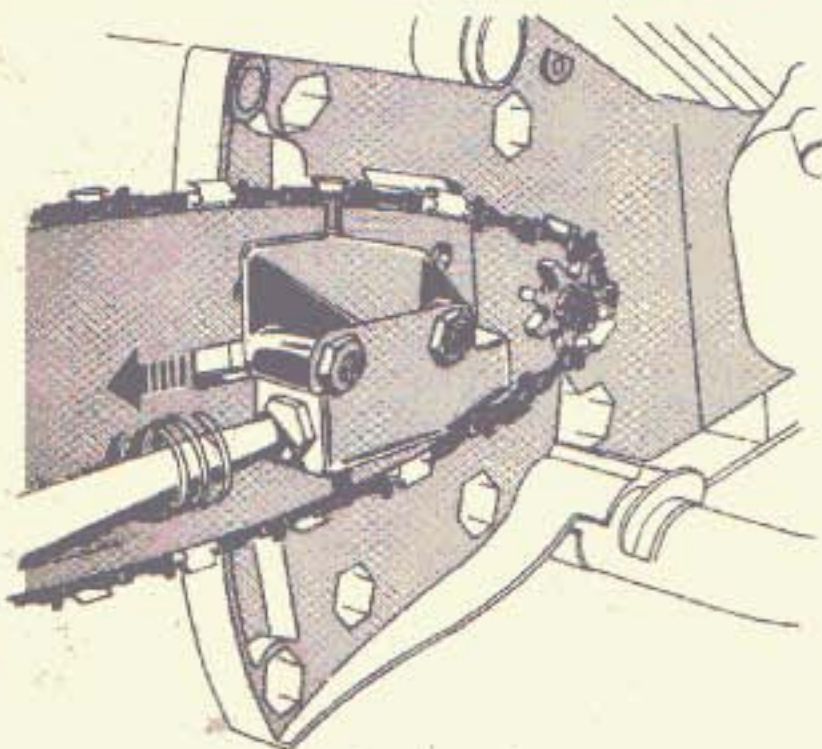
Saw and Equipment Supplied



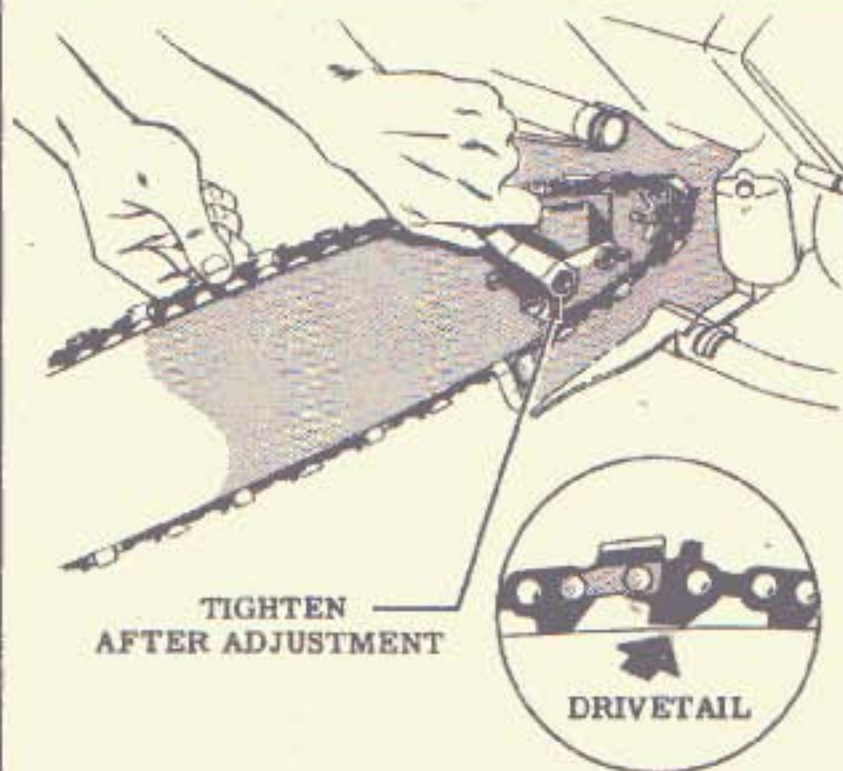
STEP 1. PLACE SLOTTED END OF BLADE OVER STUDS WITH OUTER END OF SLOT AGAINST STUD BOSSES.



STEP 2. TURN TENSIONING DEVICE ADJUSTING SCREW TO FULLY RETRACTED POSITION. INSTALL TENSIONING DEVICE AND NUTS. INSTALL CHAIN ON RETRACTED BLADE.

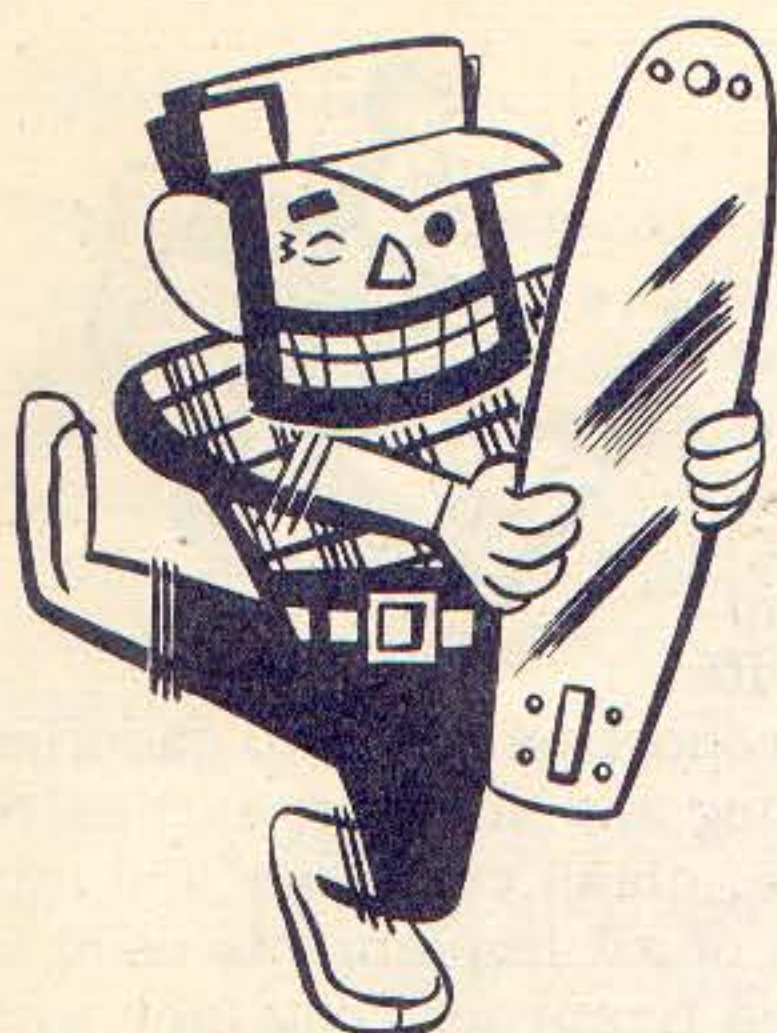


STEP 3. TIGHTEN CHAIN BY TURNING ADJUSTING SCREW IN OPPOSITE DIRECTION, EXTENDING BLADE.



STEP 4. EXTEND BLADE UNTIL ONE DRIVETAIL CLEARS TRACK. TIGHTEN NUTS SECURELY.

Installing Blade and Chain



ASSEMBLING YOUR SAW

The blade is held securely to the saw by an adjustable lockplate assembly and two hex nuts. The adjustable lockplate maintains the correct tension on the cutting chain and is known as a "chain tensioning device".

This lockplate assembly has two mounting holes for the blade studs. Clamping the blade in place, the chain tensioning adjustment is made by moving a threaded lug which fits into a corresponding hole in the blade. The threaded lug is screwed outward or inward, moving the blade accordingly.

A new chain will stretch noticeably during the first hours of cutting and then will stretch gradually over a period of cutting time. With this chain tensioning device, adjustments can be made readily. The blade may be moved outward after the chain has been in operation for some time by changing the location of the lockplate adjusting lug in the blade holes that are provided. When the adjusting lug reaches the limit of its travel in the forward hole, the blade can be moved an additional amount by locating the lug in the rear hole.

TO INSTALL THE BLADE:

1. Remove the adjusting lockplate from the saw.
2. Make sure the crankcase protector is in proper position on the two studs; then place the slotted end of the blade over the studs, making sure the blade is fully seated on the stud bosses. (See illustration.) Move the blade backward until the forward end of the slot rests against the forward stud.
3. Screw the adjusting lug of the lockplate all the way to the rear and install the lockplate on the studs. Clamp the blade in place using the washers and hex nuts provided, allowing enough looseness so that the blade may be moved by turning the adjusting screw.
4. Fit the chain into the groove along the top of the blade with the cutting edges of the teeth outward from the saw. Draw the chain around the curved end of the blade, fit it into the lower

groove and over the sprocket. Be sure the cutter teeth point in the correct cutting direction and install the master connecting pin in the chain.

5. The chain will hang slack on the retracted blade. Turn the adjusting screw on the chain tensioning device so that the blade moves outward, tightening the chain. To adjust the chain to the proper tension, lift it at the center of the blade until the drivetail of one depth gage just clears the track. Hold the chain in this manner and tighten the two hex retaining nuts securely.

CAUTION

DO NOT TIGHTEN CHAIN TOO TIGHT.
If the chain is too tight on the blade, the drag friction will cause a loss of power and will damage the blade and chain through overheating.

FUEL AND LUBRICATION

ENGINE



The internal moving parts of the engine are lubricated by oil which is mixed with the fuel. Use unleaded gasoline of a good grade with a minimum octane rating of 70. Mix the gasoline and oil in accordance with the Fuel Mixture Table shown below. Be sure to measure the proportion of oil to gasoline accurately. Insufficient oil in the fuel mixture will cause overheating and scoring; excessive oil will foul spark plugs and build excessive carbon. Use a large, clean container and mix thoroughly by shaking or stirring with a clean paddle. Cleanliness of all implements used in mixing is essential. We recommend using an underwriter's approved fireproof container with a strainer in the flexible spout. This helps to filter out any dirt or foreign matter when filling the engine fuel tank. Best results will be obtained with the specially-compounded McCulloch Oil. If McCulloch Oil is not available, use any good grade, non-detergent SAE 30 oil.

FUEL MIXTURE TABLE

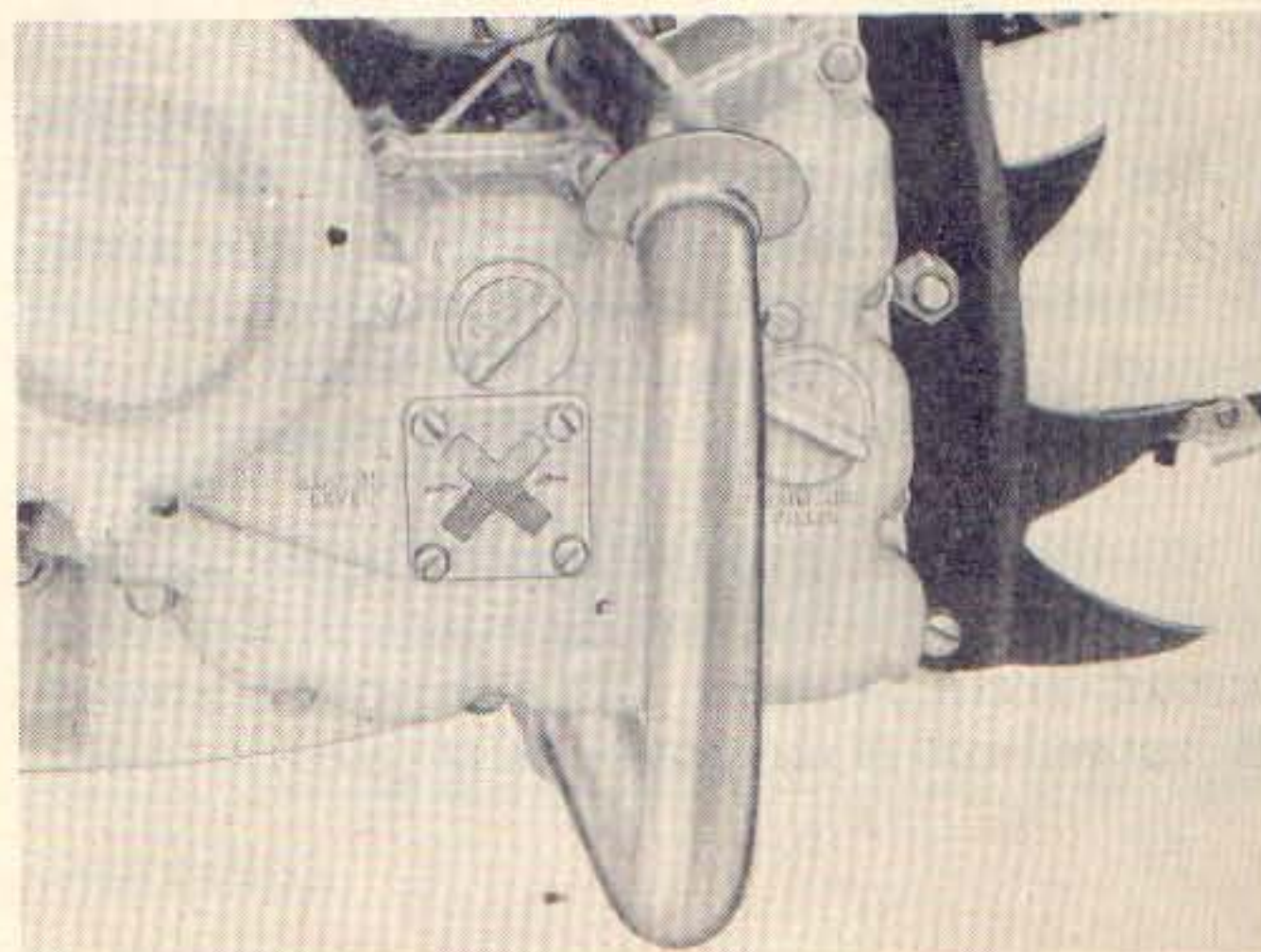
(Oil to Gasoline)

OIL QUANTITY	GASOLINE QUANTITY	
	(When Using McCulloch Oil)	(When Using Other Brands)
1/2 pint to	1-1/4 gallons	1 gallon
1 pint to	2-1/2 gallons	2 gallons
1 quart to	5 gallons	4 gallons
2 quarts to	10 gallons	8 gallons
3 quarts to	15 gallons	12 gallons
4 quarts to	20 gallons	16 gallons

Note: Do not alter the above recommended mixture for winter operation.

TRANSMISSION LUBRICATION

Do not run the saw engine without oil in the transmission section of the gear case. Transmission oil level may be observed through a window on the side of the gear case. With the saw resting on a level surface, the oil level should be even with the indicator line on the window. To fill, remove the gear oil filler plug (see illustration). Fill to the indicator line with SAE 140 gear oil. Check oil level daily.



CHAIN OILER

The chain is lubricated by the chain oiler pump which sprays oil to the upper groove of the blade and chain. Oil is pumped to the blade and chain by actuating the black push button located at the top of the pistol grip. Push in slowly and pause between strokes for the pump chamber to fill with the next charge of oil.

Fill the chain oil section of the gear case with clean oil of good quality. (See illustration.) The chain oil filler cap is attached to the filter screen by means of a chain. It is

THE FUEL SYSTEM

The fuel system is comprised of the following assemblies - fuel tank, primer, fuel pump, diaphragm chamber and that part of the crankcase containing the main air intake section, idle mixture passage, power mixture passage, throttle plate, venturi section, and fuel adjusting controls.

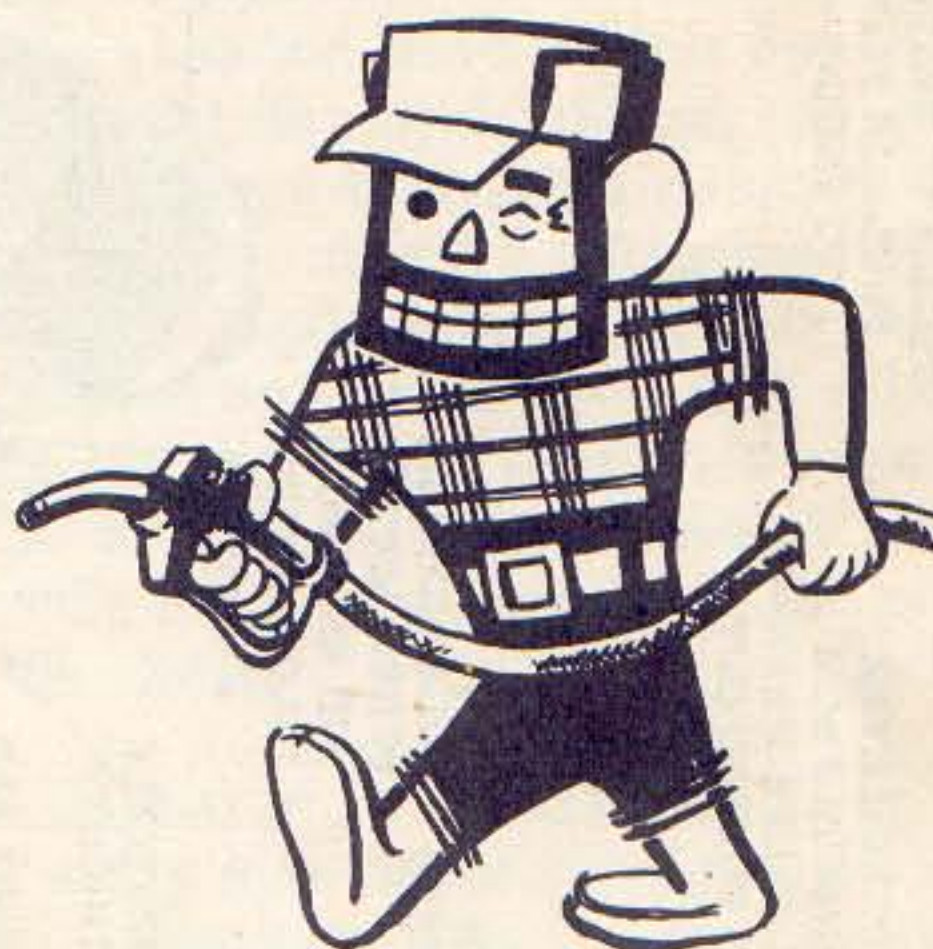
FUEL TANK

The fuel tank holds approximately 3-1/2 pints and will supply fuel to the carburetor with the saw in any position. A swivel tube fitting within the tank revolves through a full circle of 360°. The weighted end of this tube is always immersed in the fuel and feeds directly to the fuel pump. The fuel tank cap is vented through a small hole in the center. This small hole must be kept open at all times to allow air to enter the tank, displacing the fuel as it is used.

recommended that the following weight of oils be used at the temperature specified. Above 40°F use SAE 30 weight oil. Below 40°F use SAE 10 weight oil. If cutting conditions require (such as in heavy pitch wood), further thinning may be necessary. Under such conditions we recommend a mixture of 50% oil and 50% kerosene.

NOTE

Thinning the oil with a greater quantity of kerosene than specified is not recommended.



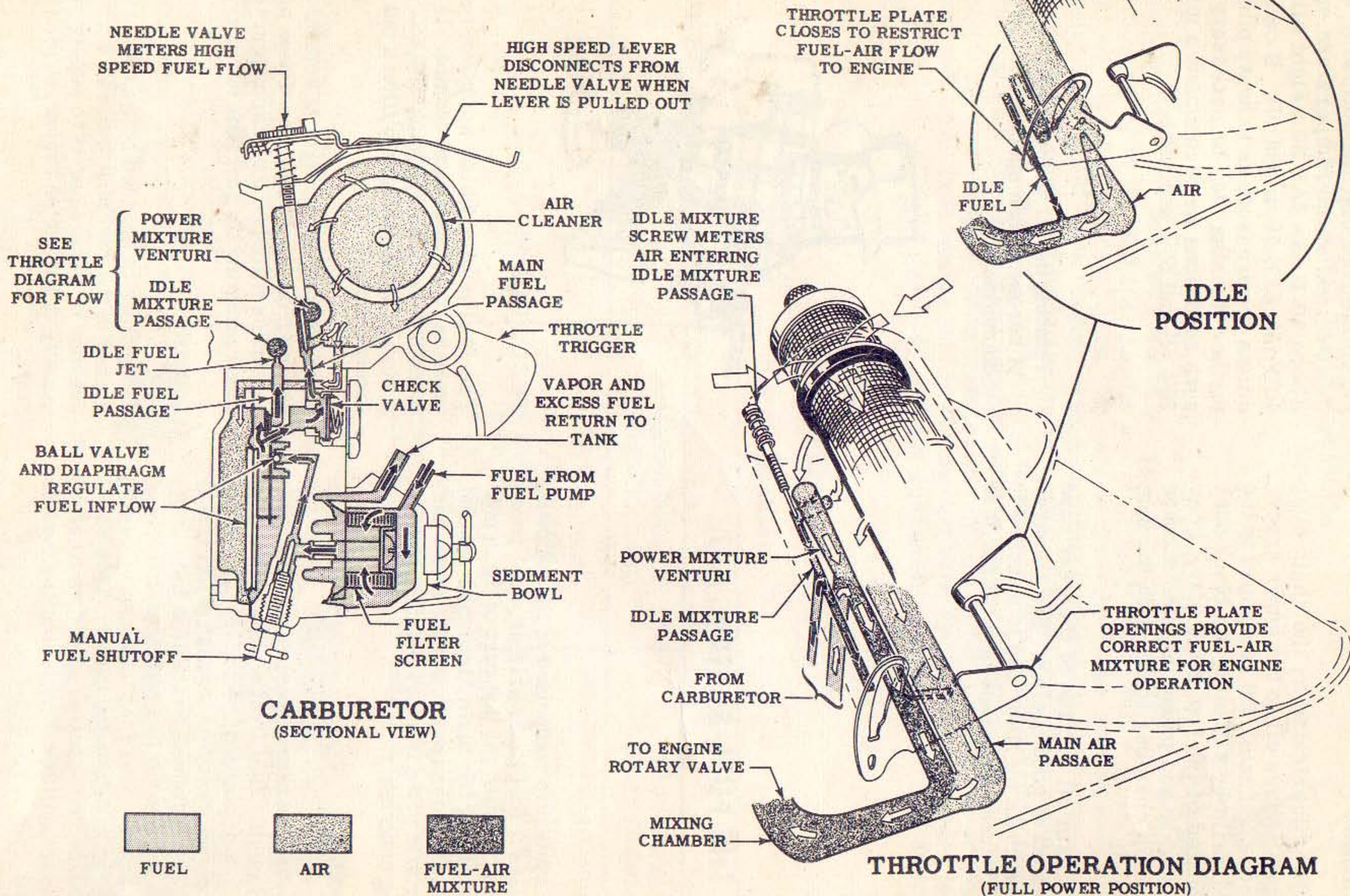
FUEL PUMP

The fuel pump, which supplies fuel under pressure to the diaphragm chamber, is mounted to the bottom of the fuel tank with four screws. A screen within the pump filters out dirt and foreign material.

The fuel pump diaphragm is actuated by pulsations from the crankcase. These pulsations are transmitted to the diaphragm through a tube connecting the fuel tank to the crankcase.

PRIMER

The primer is mounted beneath the right rear corner of the fuel tank with two screws. The purpose of the primer is to supply an excess quantity of fuel to the crankcase for the initial start.



Schematic Diagram of Fuel System

4-30 CARBURETOR DIAPHRAGM CHAMBER ASSEMBLY

Fuel under pressure from the fuel pump enters the sediment bowl. From here the fuel passes through a filter and enters a circular compartment consisting of two chambers. The outer chamber acts as a bypass trap to separate air and excess fuel from the fuel mixture and return it to the fuel tank. Evenly spaced around the inner chamber are three outlet passages to the outer chamber. The outer chamber completely encircles the inner chamber and has a take-off for the return tube to the fuel tank. Fuel under pressure flowing into the inner chamber is much in excess of that required by the engine. Therefore, all fuel entering this chamber cannot flow into the diaphragm section. The surplus fuel is forced into the outer chamber and is returned, through the fuel return line, to the fuel tank.

This recirculation of fuel removes any vapor or air from the carburetor and refilters the fuel. Vibrations and movements of the saw during operation can cause some vaporization of the fuel. The vapor or air escapes into the outer chamber and is returned to the fuel tank and dissipated.

The fuel shutoff valve is built into the carburetor body and shuts off the fuel supply. The T-handle for this valve is located at the bottom rear of the carburetor body. For normal operation, open this valve three or four turns. When the saw is not in use the fuel shutoff valve should be closed.

Fuel is drawn by engine suction from the diaphragm chamber to the idle or high speed fuel passages as required.

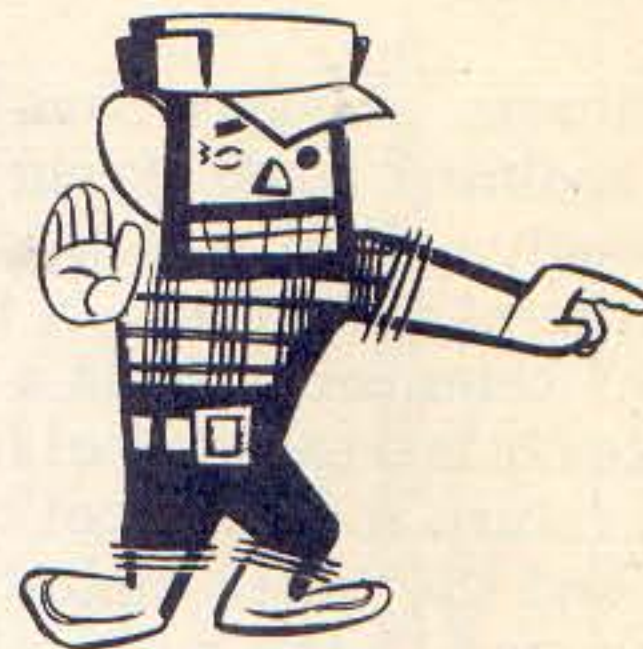
IDLE FUEL FLOW - Fuel from the wet side of the diaphragm passes through a small mesh filter and into the idle fuel passage in the

diaphragm body. An idle fuel jet in the top of this passage controls the flow of fuel used by the engine. The idle fuel then enters the idle mixture passage and is mixed with a quantity of controlled air. This idle air is drawn through a small hole from the air filter chamber and is controlled by the idle adjusting screw. The primary combustible mixture then flows directly through the throttle gate valve and into the venturi section where a greater amount of air from the air filter section is blended into the mixture for the final fuel-air mixture ratio used by the engine.

HIGH SPEED FUEL FLOW - The fuel flows from the wet side of diaphragm to a high speed passage, directly through a high speed check valve assembly. This valve consists of a spring-loaded disc which opens upon high speed fuel demand. From the check valve the fuel flows through a passage directly to the main fuel mixture adjusting needle. Here the fuel is again mixed with an amount of air controlled by this needle. The mixture flows on to the primary venturi where it is once more mixed with a volume of air and goes directly into the main venturi for consumption by the engine.

Atmospheric pressure has been equalized on the dry side of the diaphragm. This pressure is maintained by the passageway opening from the filtered air intake section through the dry side of the diaphragm. There is a passageway at the bottom of the diaphragm cover which contains a small filter through which the air is passed. By this means the dry side of the diaphragm is allowed to breathe and vary with the requirements of the engine. The diaphragm body assembly contains a built-in manual fuel shut-off valve to prevent the flow of fuel into the diaphragm chamber when the valve is closed. In normal operation it will be necessary to open the shut-off valve three or four turns.

LOCATION OF CONTROLS



All operating controls are conveniently located. The placement of controls is a result of careful engineering, practical experience and suggestions from the thousands of men who use our saws. Acquaint yourself with the operation of each control. You will find that many adjustments may be easily made while the engine is being operated.

1. **IGNITION SHUTOFF:** Push-pull switch button on top of fan housing at left side of engine. Pull out to start engine. Push in to stop engine.

2. **IDLE AIR MIXTURE SCREW:** Small slotted head screw, located directly above diaphragm chamber assembly on right side. See adjustment instructions on page 17.

3. **STARTER:** Mounted on right side of engine, with black rubber pull handle.

4. **FUEL SHUTOFF VALVE:** "T" handle needle valve, located on bottom rear of diaphragm chamber assembly.

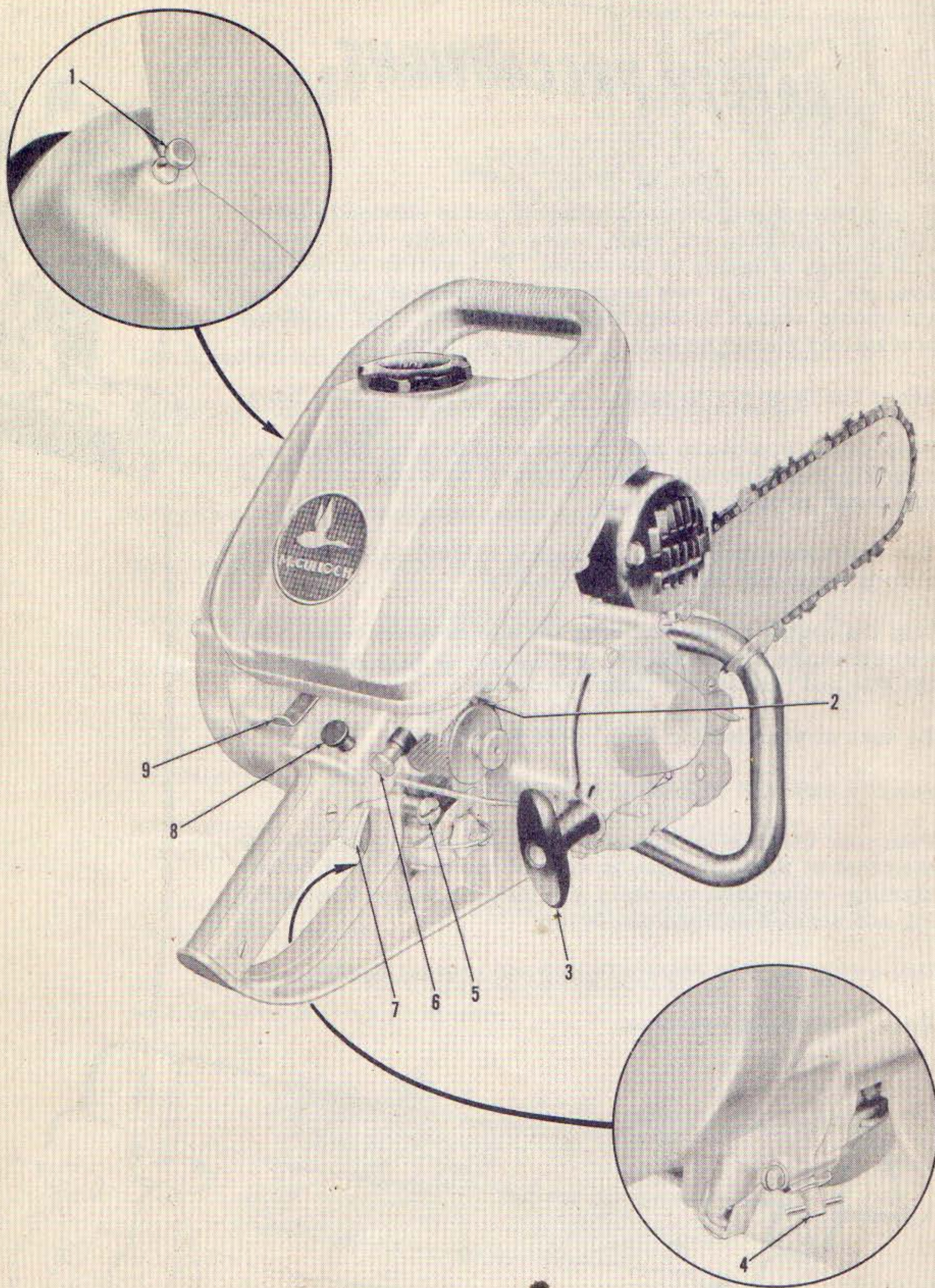
5. **IDLE SPEED CONTROL KNOB:** Large slotted head, knurled knob located at trigger. Can be turned with fingers or screw-driver.

6. **PRIMER:** Positive injection type actuated by push button located at right rear corner of fuel tank.

7. **THROTTLE:** Trigger type, conveniently located in the pistol grip.

8. **CHAIN OILER:** Actuated by black push button, located at top of pistol grip in position for thumb pressure. Positive displacement pump type.

9. **HIGH SPEED ADJUSTMENT CONTROL:** Lever at center rear of fuel tank. See adjustment instructions on page 16.



Location of Controls

SAFETY PRECAUTIONS

If your chain saw is operated properly and is efficiently maintained, it will give you many hours of trouble-free service with no risk of injury to personnel. It is well to remember, however, that chain saw equipment is potentially dangerous and should always be regarded with respect. The following precautions should be kept in mind at all times.

Never touch or try to stop a moving chain with your hand.

Keep your chain sharp and in good condition. A dull or improperly filed chain will cause the saw to buck and jump. This can result in personal injury.

The operator should start the engine without assistance. A moving chain can inflict serious injury.

Stop the engine before carrying the saw between cuts. This will eliminate the possibility of a branch or twig opening the throttle and causing the chain to revolve.

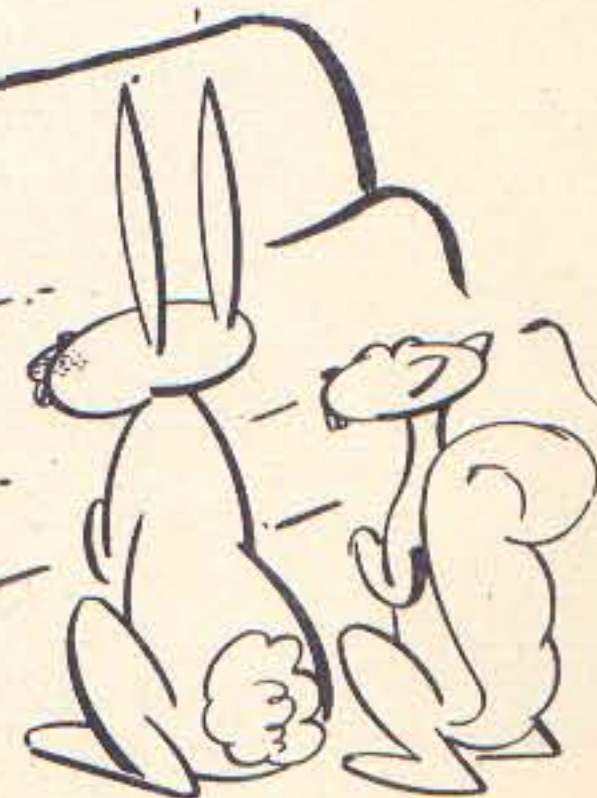
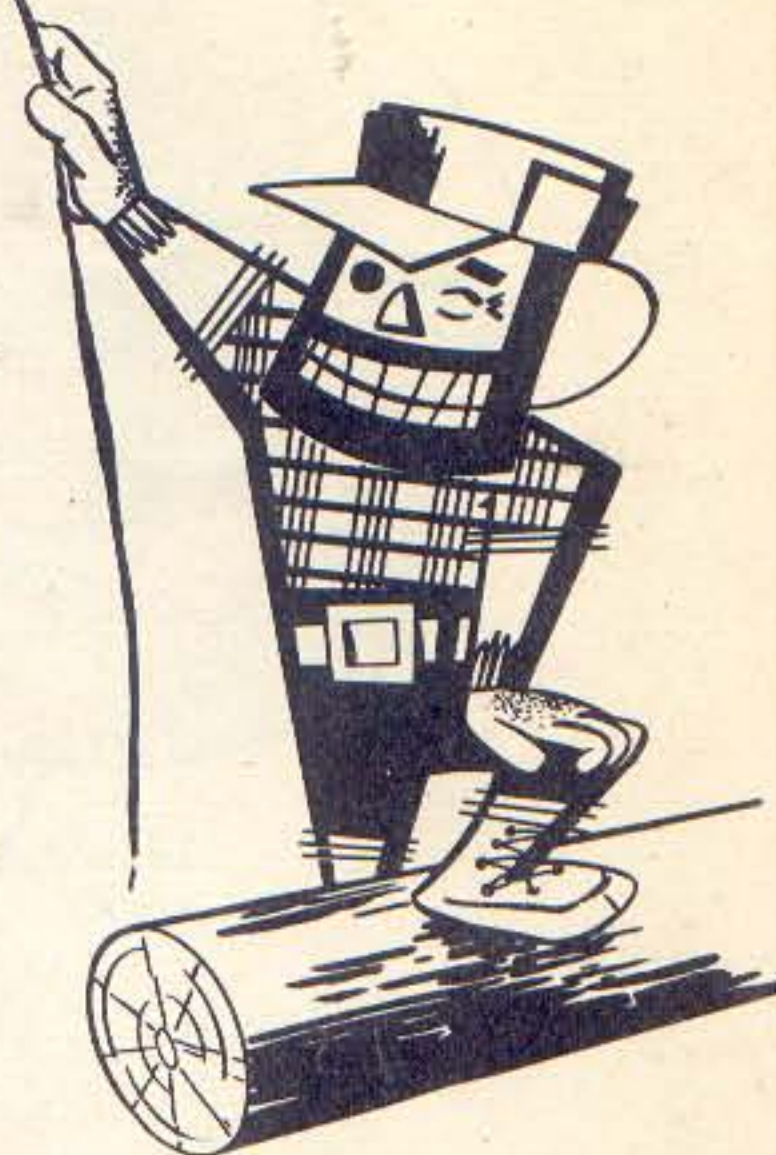
Be sure of your footing when operating the saw.

Select a safe exit path prior to felling the tree.

Plan your work before starting a cut. Be sure the bumper on the front of the gear case is against the log or tree before starting--otherwise the chain will jerk the engine toward the log and serious damage can occur.

Use wedges to help control felling and prevent binding.

Beware of falling branches.



FIRE PRECAUTIONS



Refuel saw on an area of mineral soil only.

Use funnel to fill tank and avoid spilling of inflammable fuel.

Use proper oil and gas mixture to minimize carbonization.

Do not start power saw at place of refueling.

Keep saw free of sawdust and inflammable material.

Keep muffler on the power saw and in good condition.

Keep spark plug and wire connections tight.

Keep a filled fire extinguisher with power saw at all times.

Clear inflammable material from point of saw cut.

Do not smoke in restricted areas.

Extinguish and break all burned matches. Extinguish and shred all used cigarettes.

Put out any fires started and report them to the foreman, together with causes.

All fires reported to the foreman should be filed as a record with the state protection agency.



BE ALERT AND FIRE CONSCIOUS. KEEP THE FOREST GROWING.

OPERATING INSTRUCTIONS

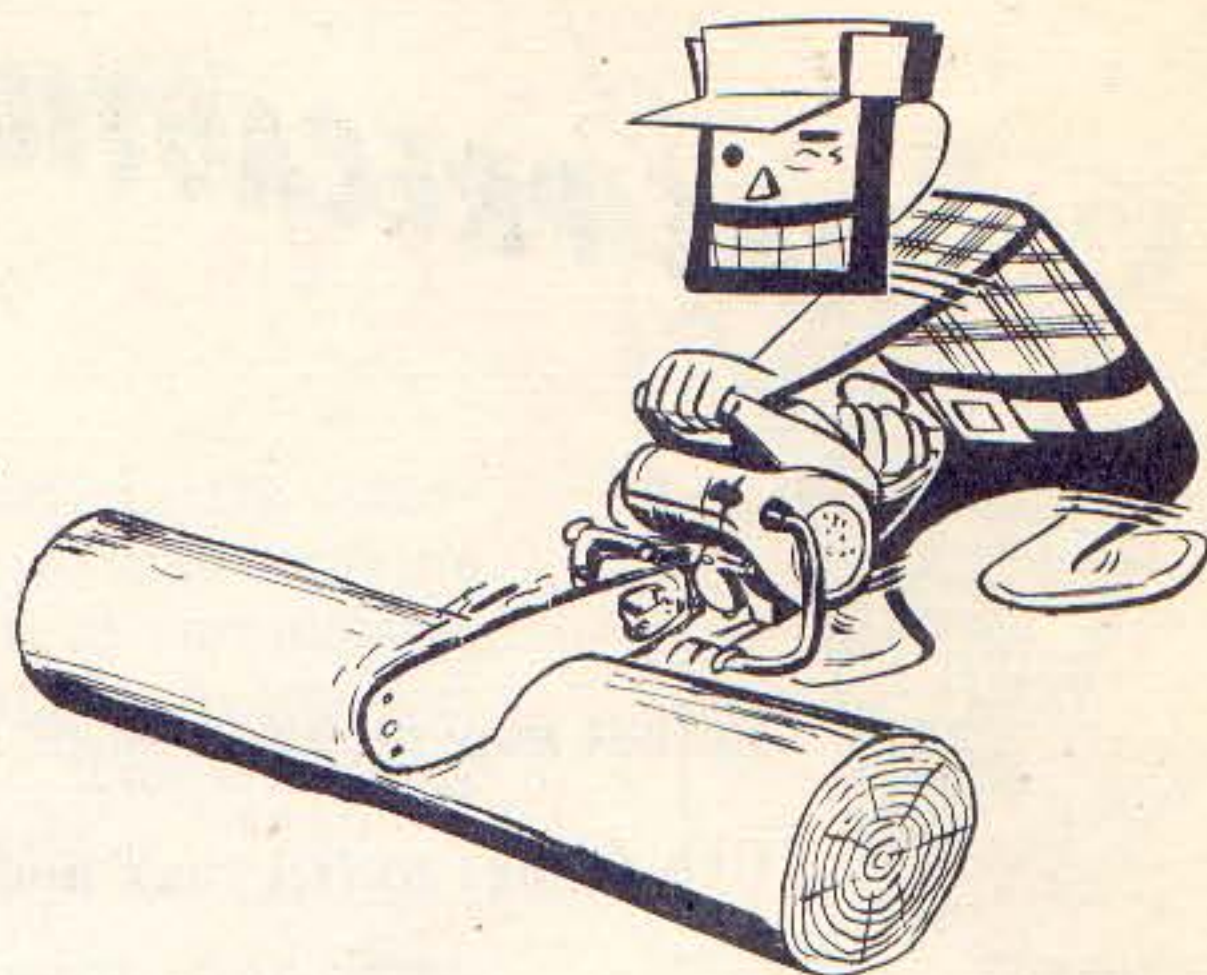
BEFORE STARTING

1. Fill fuel tank with correct gasoline and oil mixture. (See page 8.)
2. Be sure both the transmission and chain oil chambers have been filled with the proper lubricant.
3. Check the chain tension and make sure the blade is tightly clamped in place.

TO START ENGINE

1. Open FUEL SHUTOFF VALVE three-to-four turns to allow the fuel mixture to completely fill the sediment bowl.
2. Place the FUEL ADJUSTMENT CONTROL lever in the center or to the right of center position.
3. Press the PRIMER BUTTON inward two or three times. This will supply a quantity of fuel mixture to the engine for the initial start.
4. Pull out on IGNITION SWITCH.
5. Steady the saw with the left hand on the pistol grip. Force the throttle trigger back with the first finger - this opens the throttle. Pull the starter rope sharply to start the engine. The engine may start on the first few pulls. If not, it may be necessary to repeat the priming operation after cranking several times. Do not overprime or the engine will become flooded.

6. After engine starts, press the chain oiler button in several times or until a quantity of oil has entered the chain groove in the cutter bar. This will oil the chain sufficiently for the start of the cut. Periodic oiling during



the cutting operation should be made to insure proper chain lubrication.

STARTING A FLOODED ENGINE

1. Close FUEL SHUTOFF VALVE by turning clockwise.
2. Lay engine on right side (muffler down).
3. Hold THROTTLE TRIGGER full back and pull starter rope until engine starts.
4. After engine starts, return to the upright position and open FUEL SHUTOFF VALVE.

NOTE

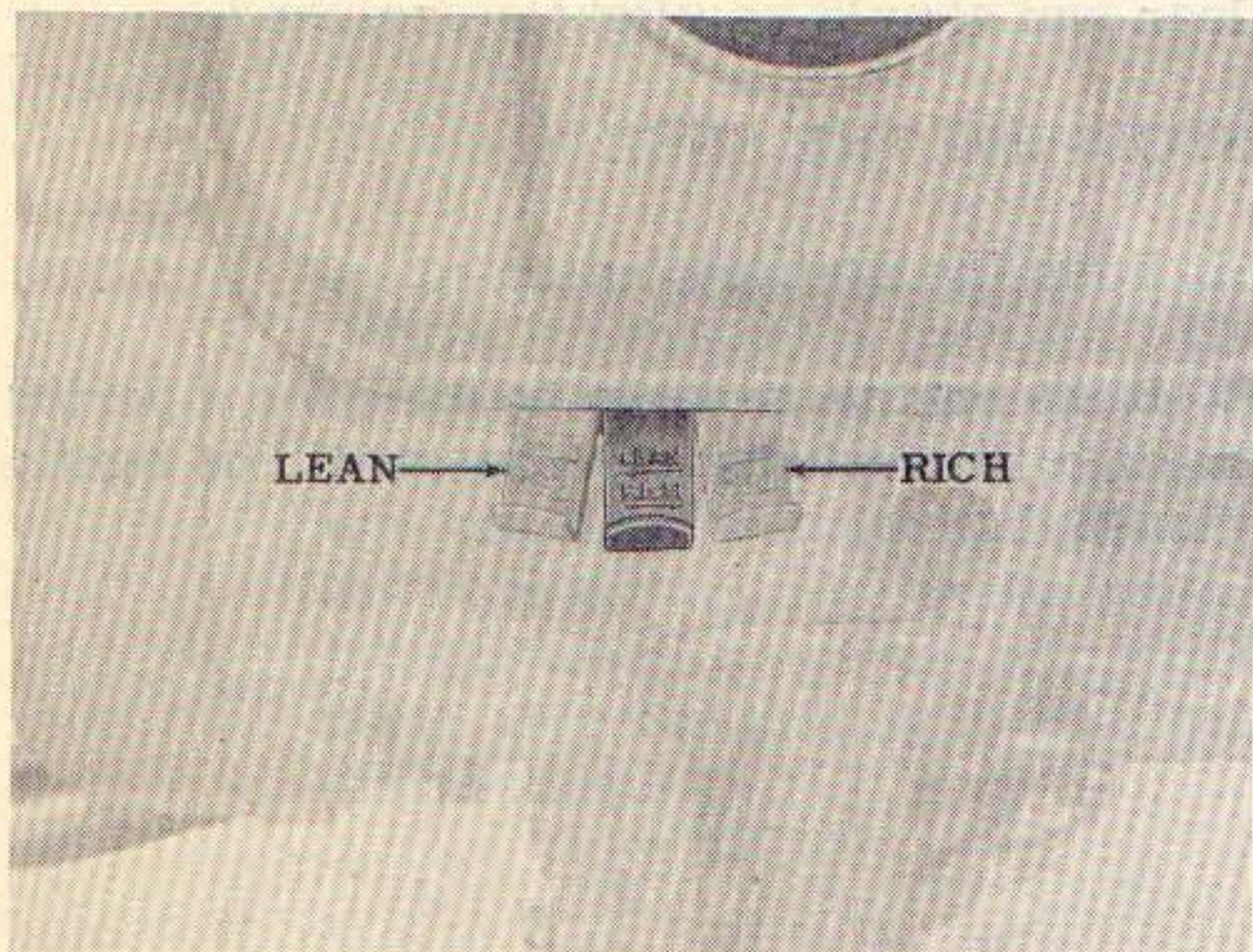
The High-Speed Adjustment has been made at the factory and the engine should run well with the lever in the center or NORMAL position. However, due to higher altitude or a change in climatic conditions it may be necessary to make minor adjustments.

HIGH-SPEED ADJUSTMENT

1. High speed adjustments must be made while the saw is actually cutting at full throttle.
2. After the engine is warm, adjust the FUEL

ADJUSTMENT CONTROL lever until the engine runs smoothly.

3. If the engine dies out due to a too rich or a too lean mixture setting, the lever should be moved to overcome this condition.



Fuel Adjustment Control Lever

The engine has a ratchet mechanism for re-locating the FUEL ADJUSTMENT LEVER with relation to the MAIN NEEDLE VALVE. If the engine cannot be made to run "RICH" enough with the fuel adjustment lever in the furthest "RICH" position, the lever may be relocated on the MAIN NEEDLE VALVE as follows:

With the FUEL ADJUSTMENT CONTROL LEVER in the furthest "RICH" position, pull down on the lever and at the same time move the lever as far as possible in the "LEAN" direction. Release the downward pressure and move the lever to the center position. Try running the engine with the new setting; and if the engine is not "RICH" enough, repeat the above procedure.

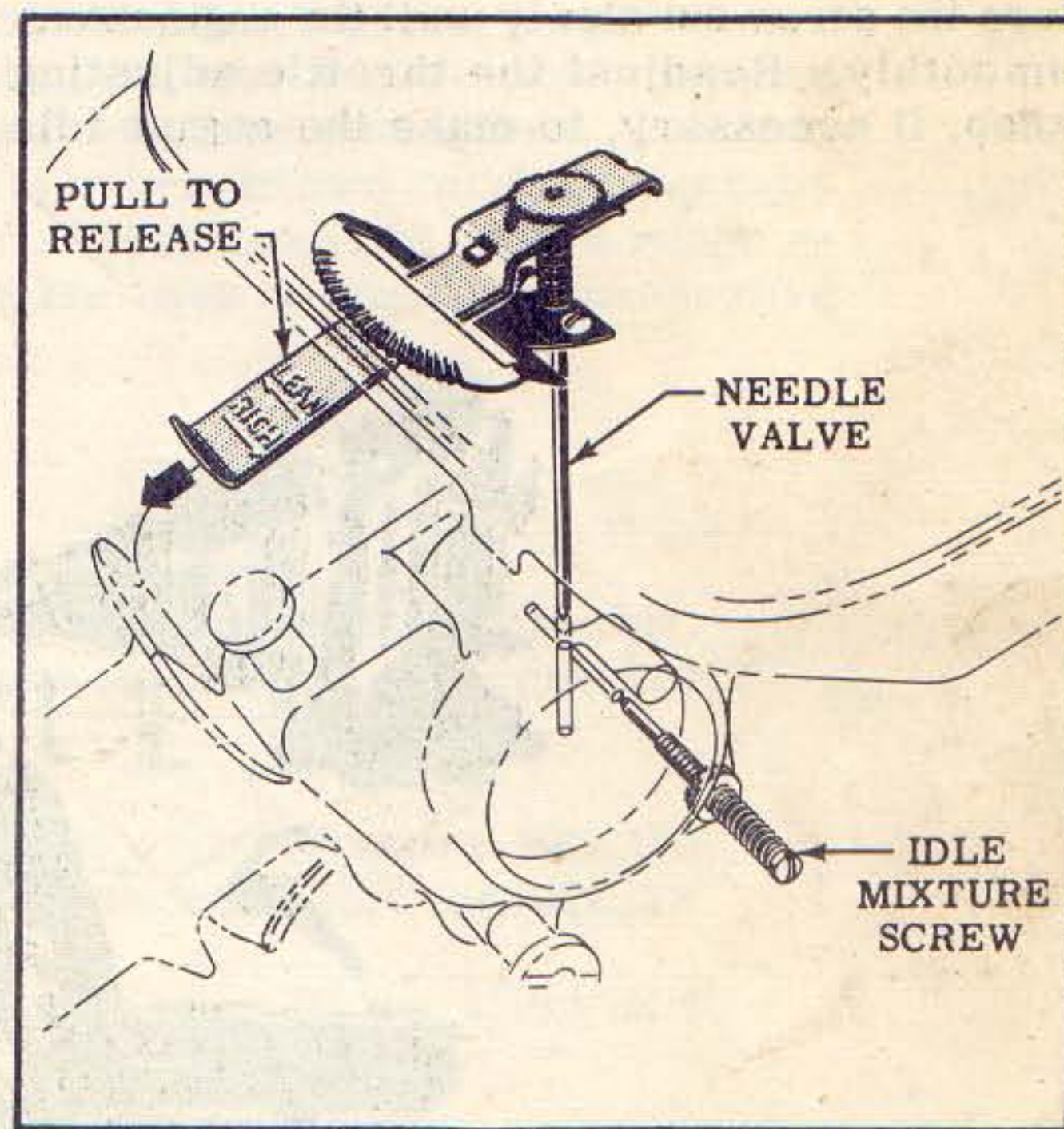
4. If the engine runs roughly and lacks power, the mixture is too rich and the lever should be moved to the left or toward "LEAN" to overcome this condition. If it is necessary to relocate the ratchet mechanism to gain additional adjustment, proceed as follows:

With the lever in the furthest "LEAN" position, pull the lever down and move it to the

furthest "RICH" position. Release the downward pressure and move the lever to the center position.

NOTE

It may help to remove the air filter and look in the air filter housing to watch the movement of the needle valve as the lever is being relocated.



Ratchet Mechanism

IDLE ADJUSTMENT

1. **THROTTLE ADJUSTING KNOB** - Located on the upper right side of the pistol grip just above the throttle trigger control, the throttle adjusting knob has a knurled rim with a slot milled across the face and may be turned by hand or with a screwdriver. This knob controls the position of the throttle trigger when the engine is idling. After the engine has warmed up and the high-speed adjustment has been made, the throttle adjusting knob should be turned until the engine idles at a speed which will not permit the chain to revolve on the cutter bar.

2. **IDLE AIR MIXTURE SCREW** - Located

forward of the throttle adjusting knob and above the carburetor diaphragm assembly, this is a spring-tensioned, slotted head screw. Use a screwdriver to adjust.

The engine must be warm and the high-speed adjustment made before the idle mixture can be properly adjusted.

Turn the idle air mixture screw in clockwise slowly until the mixture becomes so rich that the engine misses and is inclined to stop; then turn the screw out slowly until the engine runs smoothly. Readjust the throttle adjusting knob, if necessary, to make the engine idle

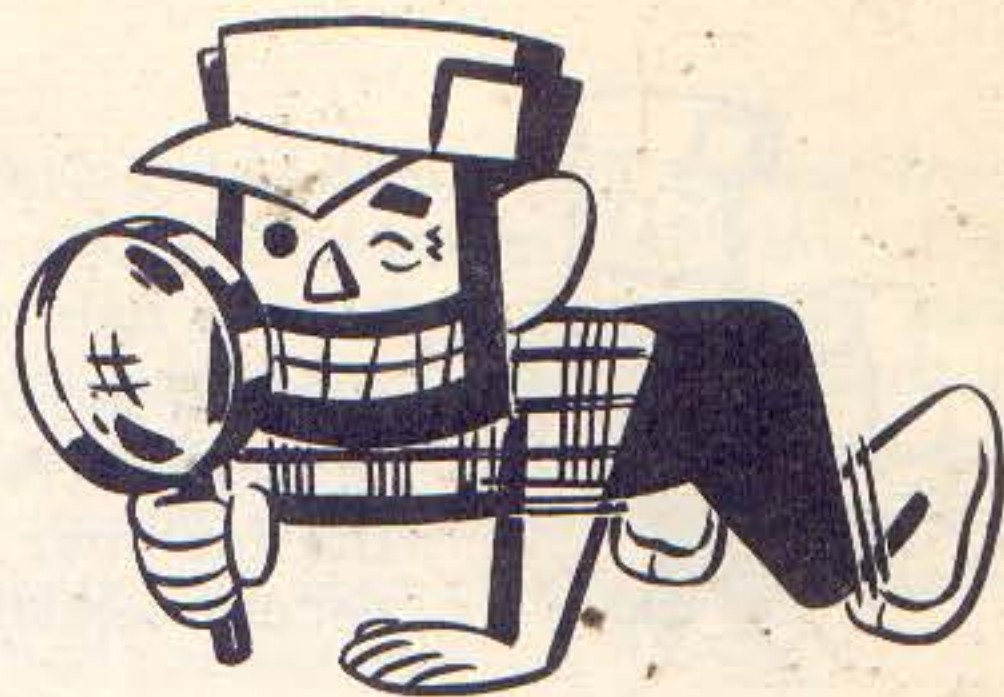
at the proper speed. The final adjustment should be made so that when the throttle trigger is moved from the idle to the full open position, the engine speed will increase without hesitation. If there is a hesitation in the increase of this speed, the idle mixture setting is too lean and should be slightly enriched.

STOPPING THE ENGINE

1. Push the ignition button in.
2. If the engine is not to be used for a period of time, the fuel shutoff valve should be tightly closed.



PREVENTIVE MAINTENANCE



Preventive maintenance is the elimination of the possible cause of trouble before it can create damage. Factories, railroads, truck lines and other users of machinery save many thousands of dollars yearly by preventive maintenance. As the owner of a chain saw, you too can save costly repairs and lost time by systematic inspection and servicing procedures. Inexpensive repairs can be made before a major breakdown occurs. Periodic lubrication will prevent excessive wear and the resultant cost of replacement. We are calling to your attention six ways of practicing preventive maintenance.

VISUAL: Check your equipment daily for signs of trouble, such as loose or bare wires, loose nuts and screws, cracked or broken parts.

LUBRICATION: Keep your equipment well-lubricated with the proper grease and oils, as recommended in this manual.

CLEANING: Keep your equipment clean. Do not allow dirt to accumulate.

HANDLING: Your chain saw is a precision tool. Do not abuse it by rough handling. Protect it from the weather. Do not try to use it for work heavier than it was designed for.

INSPECTION: Establish a time for periodic inspection. Check your operating controls, fuel lines, fuel tank, starter, ignition, blade, chain, chain oiler. You may find minor trouble in time to prevent major trouble and costly repairs.

SERVICING: Inspect your chain saw regularly. Tighten any loose parts. Replace worn parts. Keep your chain sharp at all times. If any doubt exists as to the proper servicing procedure, take your saw to your dealer.

DON'T BE SORRY. BE SURE!



MAINTENANCE PROCEDURES

Careful servicing of your equipment is one of the most important steps in preventive maintenance. For good performance and long service life for your saw, take the time to perform the maintenance procedures recommended in the following instructions.

AIR CLEANER

If you are operating the saw constantly, the air cleaner should be removed and cleaned twice a day. To prevent dirt and sawdust from falling into the air intake section while removing or installing the air filter, roll the saw so that the flywheel side is higher, which will allow the chips to fall away from the opening. To remove the air cleaner from the engine, unscrew the knurled knob. Pull out the air filter and shake out any sawdust or dirt. Wash the precleaner and air filter assembly in gasoline to which a small amount of oil has been added.

WARNING

Do not use this dirty fuel-oil mixture in the fuel tank.

When the gasoline evaporates, the oil in the mixture will remain as a film in the filter element to help in filtering out fine sawdust which could otherwise enter the carburetor.

CAUTION

Do not operate saw without having the air cleaner in place.

CARBURETOR SEDIMENT BOWL AND FILTER

The sediment bowl and filter should be cleaned frequently. Handle all parts very carefully. Note the exact position of the parts, as removed, to help you in reassembling them.

1. Close fuel shutoff valve. This will trap

gasoline in the carburetor diaphragm chamber and facilitate quick starting of the engine after cleaning has been accomplished.

2. Tip the saw engine on its side in the most convenient position for you to handle the parts.

3. Loosen the bail at the knurled knob and swing it free.

4. Pull the sediment bowl slightly away from the carburetor body, allowing the fuel within to drain.

5. Clean out the sediment bowl. The fuel lines need not be disconnected for this purpose. However it is advisable to remove the bowl entirely, inspect it for presence of foreign matter in the hose fittings and then place it on a clean cloth or in a clean pan with the other parts which will be removed.

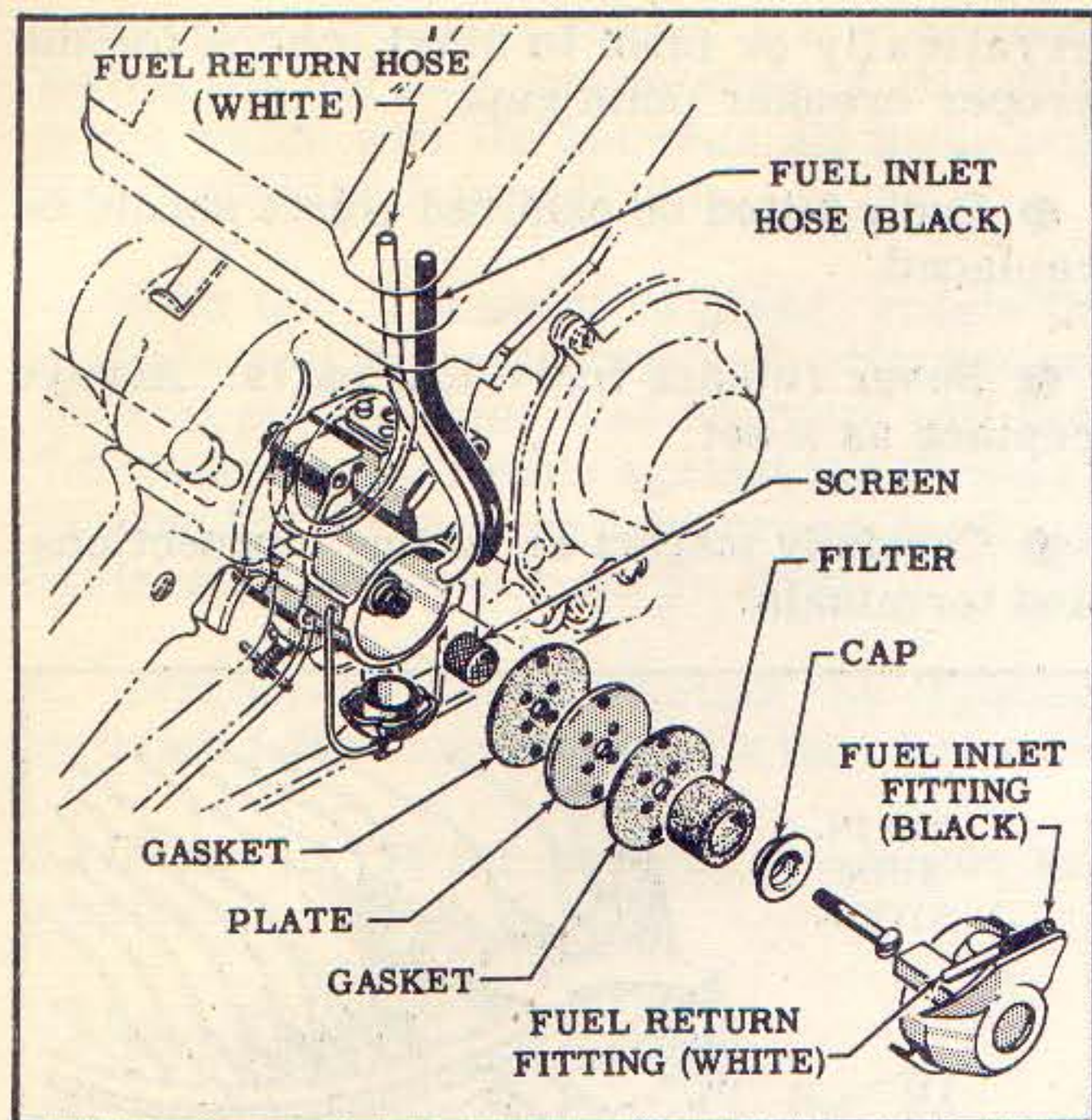
6. Remove filter attaching screw (see illustration). Filter cap, filter, gaskets, plate and screen may then be removed for cleaning and inspection. Carefully wash all parts in regular unleaded gasoline. Make sure hollow end of filter attaching screw is thoroughly clean. Reassemble parts as shown on illustration.

7. Tighten bowl securely to carburetor body with bail knob. If fuel lines have been disconnected, connect the black colored hose to the fuel inlet fitting (black), as shown on illustration, and connect white hose to return fitting (white).

8. Open fuel shutoff valve.

NOTE

When starting the engine following the draining of the bowl section, it may be necessary to provide additional fuel to the engine by priming.



Removing Carburetor Sediment Bowl

CARBURETOR DIAPHRAGM SECTION

Dirt will cause the diaphragm ball check valve to leak, if it is not kept clean. Under normal operation the leverage of the diaphragm linkage and the precision cut of the ball seat will prevent leakage at this point. If the engine floods or receives too much fuel, disassemble the carburetor diaphragm section and clean thoroughly.

To examine the carburetor diaphragm for proper setting, place the ball check assembly and diaphragm cover in proper position in the carburetor body and pull up gently on the metal disc in the center of the diaphragm until it reaches its full free travel. Sight across the edge of the carburetor body casting and see if the bottom of the inside metal disc is approximately in line with the casting edge (plus or minus 1/32-inch above or below the face of the casting). This will be the correct diaphragm setting. If the setting is incorrect, bend the actuating lever slightly in the necessary direction to obtain a correct setting. Inspect the diaphragm and make certain it is not ruptured, swollen or wrinkled. Replace a damaged diaphragm.

Keep the carburetor diaphragm section free of sawdust and other foreign material. The carburetor high speed fuel check valve may be readily removed for cleaning, inspection or replacement by unscrewing the hex head valve body, located above the filter bowl. Use compressed air only when cleaning carburetor chambers and passages.

The "T" handle shutoff valve utilizes a small "O" ring. This "O" ring should be maintained in good condition and free from cuts. If there is fuel leaking at the valve "T" handle, inspect the "O" ring. Replace if damaged or worn.

The idle fuel jet may be screwed out of the carburetor body, but must not be cleaned with anything which would injure or deface the inside diameter, as this ID must be maintained exactly; otherwise, trouble will be experienced in the operation of the engine. Rich idle may be caused by a damaged ball seat or enlargement of the ID of the idle fuel jet caused by using a wire or some other metallic object in cleaning. We again caution against cleaning with anything other than compressed air.

THROTTLE PLATE

A lean mixture condition, resulting in a fast idle, starving at high speed, or flat spot upon acceleration, can be caused by a looseness of the throttle plate at the main air passage. Air leakage at this point breaks the suction of fuel from the idle mixture passage and the power mixture passage, which leans out the combustible mixtures. The venturi plate beneath the flywheel must be sealed with a good gasket cement, and the attaching screws tightened securely. While tightening the screws, check the throttle for freedom of movement.

SPARK PLUG

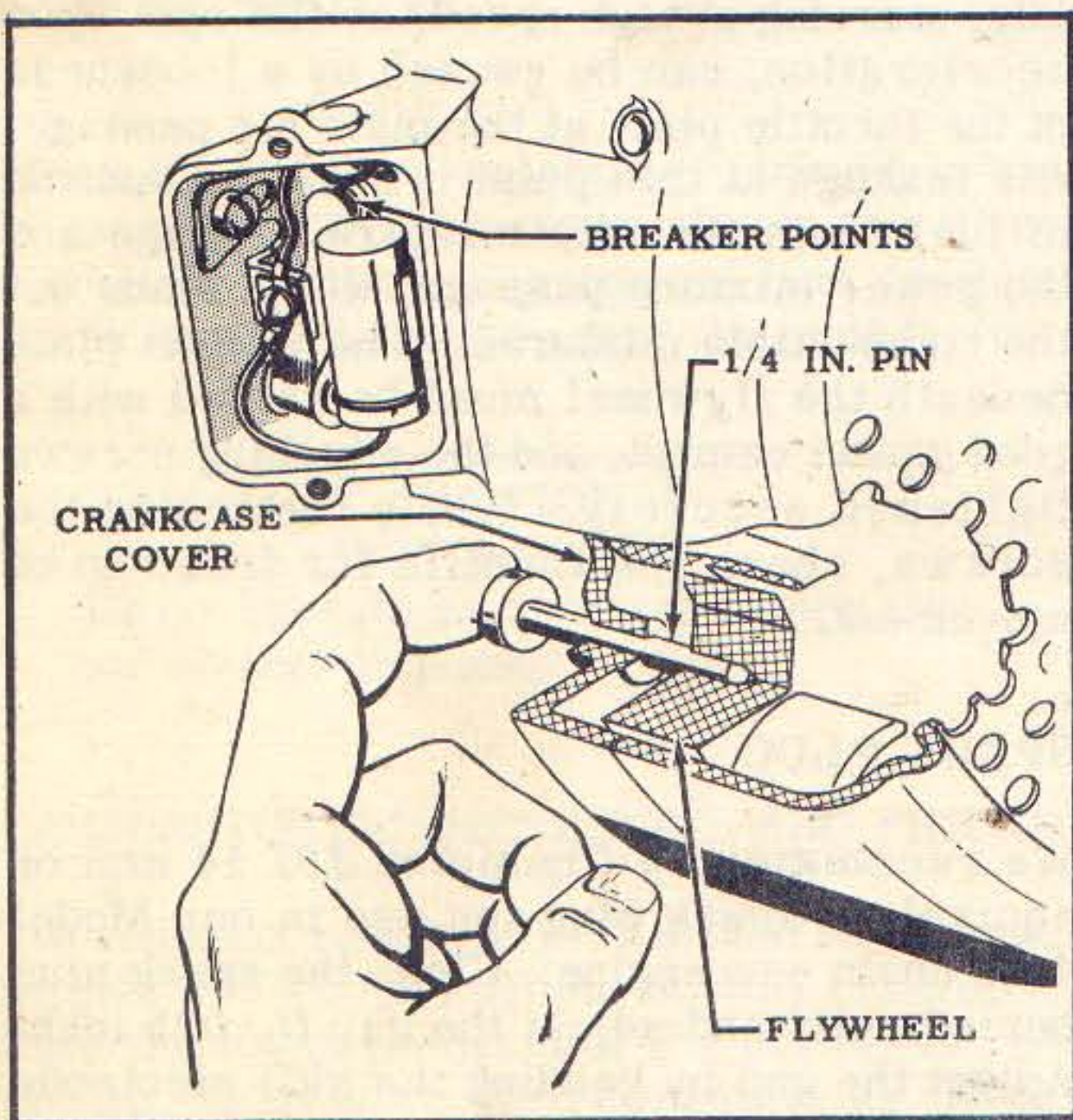
We recommend a Champion J8J 14 mm or equivalent spark plug for use in our Model 4-30 chain saw engine. Clean the spark plug periodically and adjust the gap to .025 inch. Adjust the gap by bending the side electrode

only. Do not attempt to bend the center electrode as it will crack the insulator.

Using dirty or corroded spark plugs will cause hard starting and poor operation. If the electrodes are burned, replace the spark plug.

BREAKER POINTS

The breaker points are housed in a box located on the forward left side of the engine. They are accessible by removing the breaker box cover and gasket. There is a hole in the crankcase cover, just behind the flywheel and below the breaker box. A locating hole in the back face of the flywheel is also provided. These holes are drilled to accommodate a 1/4-inch diameter cap screw or rod. Insert a rod or tool of proper diameter in the crankcase cover hole. Exert a slight inward pressure on the rod so it is pressed against the inside face of the flywheel. Slowly rotate the flywheel by pulling out on the starter rope until the rod engages the hole in the flywheel. This position will be exactly 25 degrees before top dead center. At this location the breaker points must be set so they just start to open. This insures a proper breaker point setting. No further breaker point adjustment is necessary. (See illustration.) If the engine runs



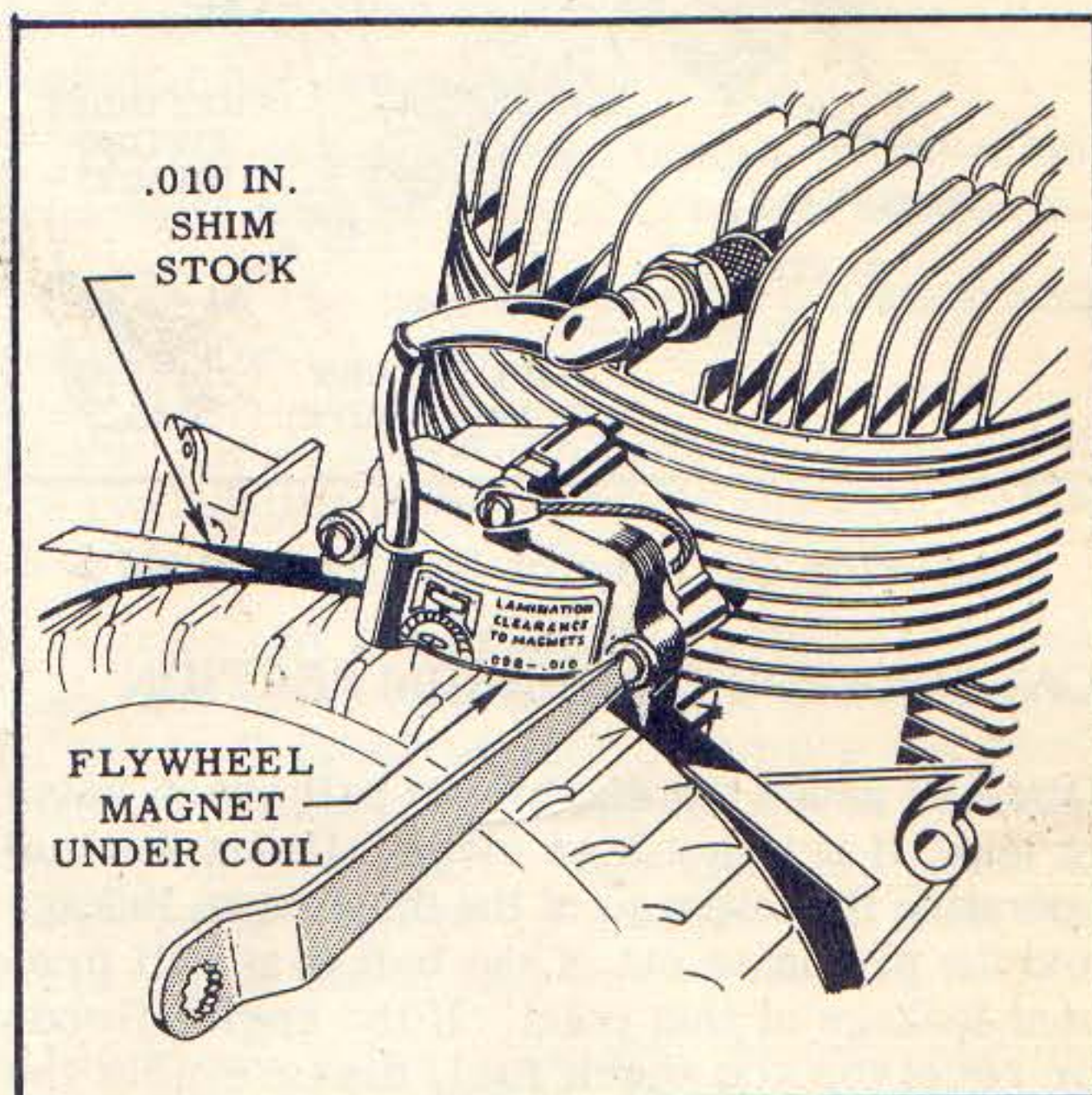
Adjusting Breaker Points

erratically or fails to start, check for the proper breaker point gap.

● Badly pitted or oxidized points should be replaced.

● Never replace individual parts. Always replace as a set.

● Carefully inspect all wiring, connections, and terminals.



Adjusting Coil and Lamination Assembly

COIL AND LAMINATION ASSEMBLY

The coil and lamination assembly is mounted on the cylinder within the fan housing and adjusted to have a .010 clearance from the outer rim of the flywheel. Normally, this unit will not require any maintenance other than keeping it clean. If service is necessary, remove the frame assembly and fan housing to adjust or replace this assembly.

If the coil and lamination assembly is removed for any purpose, or becomes loosened, readjust as follows:

1. Loosen all three mounting screws so coil is free to move.
2. Place a .010 feeler gage or shim under

each of the three pole pieces. For an accurate setting use one long narrow strip of .010 shim stock which will lie between all three pole pieces and the flywheel rim.

3. With the .010 shim in place, rotate the flywheel until the magnets are directly beneath the coil pole pieces. The magnets will hold the loosened coil firmly against the flywheel. Tighten the three mounting screws securely, preferably the center screw first.

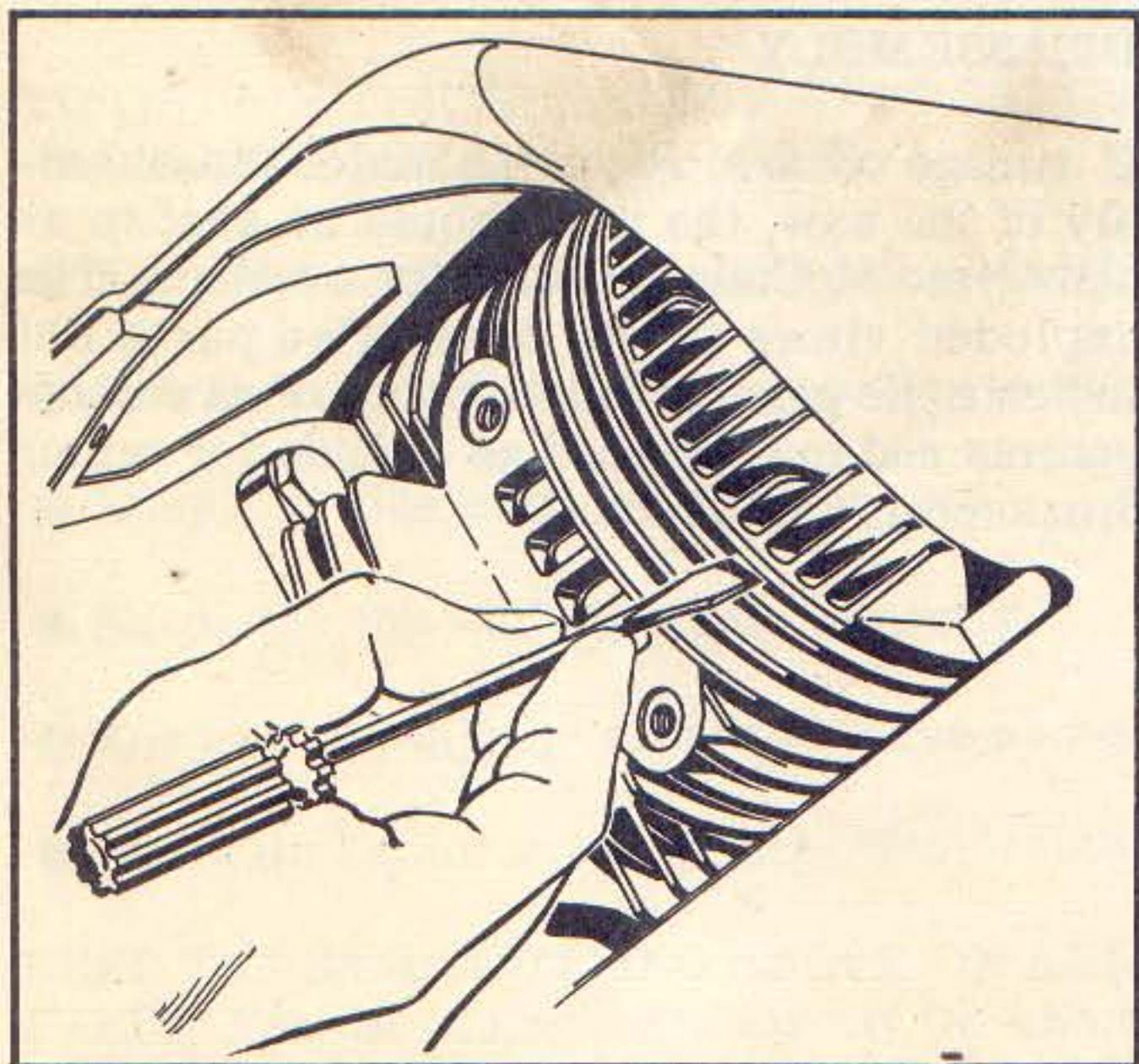
4. Remove the shim. Rotate the flywheel through a full circle and recheck the clearance.

5. Reinstall the fan housing and frame assembly.

CYLINDER FINS

The cylinder is cooled by air flowing over the cylinder fins from the blower-type flywheel. To insure proper cooling the fins must be free from sawdust, dirt, or any material which would obstruct the cooling air. The cylinder fins should be cleaned as often as necessary to insure proper cooling. Overheating the engine, due to clogged fins, will cause scoring of the piston and cylinder. To clean the fins, proceed as follows:

1. Remove the muffler and gasket.



Cleaning Cylinder Fins

2. Remove the frame assembly and fan housing.

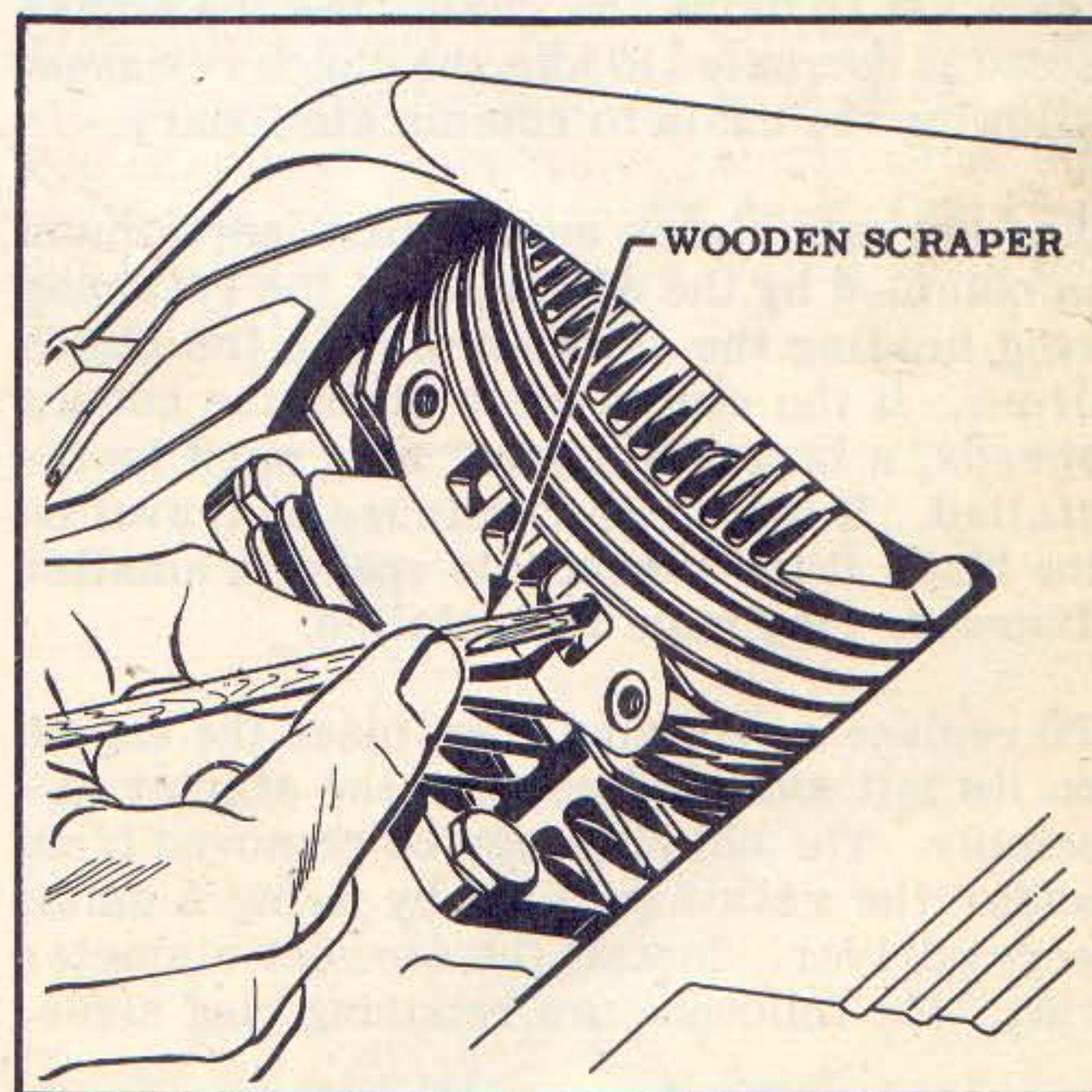
3. Bend up the tabs on the cylinder jacket to obtain access to the fins adjacent to the exhaust ports.

4. Clean out the cylinder fins with a small screwdriver or brush. Use compressed air if available. The fins may be cleaned without removing the cylinder shroud.

5. Reinstall the removed parts.

EXHAUST PORTS AND MUFFLERS

Clogged exhaust ports or muffler slots will cause loss of power. This condition will be found in engines which have been used over a long period of time or run with an improper fuel mix. If a noticeable lack of power and decrease of exhaust noise is evident, the exhaust ports or muffler outlet slots need cleaning.



Cleaning Exhaust Port

1. To clean the ports, remove the muffler and gasket, exposing the ports.

2. Rotate the flywheel until the piston covers the ports.

3. Dislodge and remove all carbon from ports

with a wooden scraper, using care not to scratch the piston or cylinder walls.

4. Blow out loose carbon with compressed air or turn the saw until the exhaust ports face downward and shake out the particles.

5. Start and run engine briefly before installing muffler.

6. Clean muffler outlet slots and inlet flange opening thoroughly with screwdriver or similar tool.

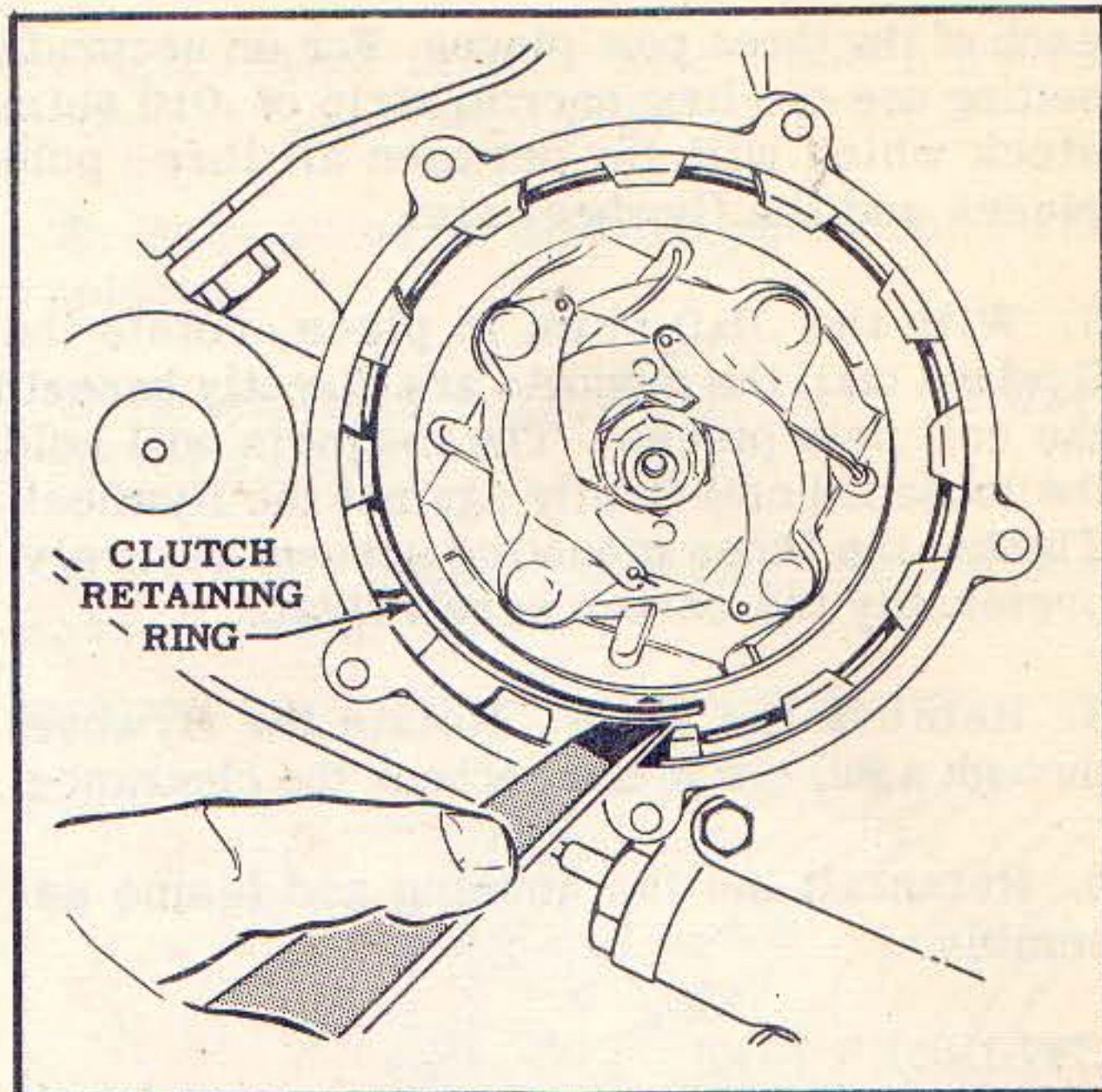
7. Reinstall muffler and gasket. (Install new gasket if torn or mutilated.)

CLUTCH ADJUSTMENT

The clutch assembly is of the centrifugal type. It is located directly beneath the starter assembly. As the engine speed increases, the clutch automatically engages, causing the sprocket to drive the chain. As the engine speed is decreased to idle, the clutch releases, allowing the chain to remain stationary.

The correct clutch engagement adjustment is obtained by the diameter of the retaining ring holding the friction disc to the clutch drum. If the clutch slips at engine cutting speeds, a larger diameter ring must be installed. If the chain continues to travel on the blade at the lowest idle speed, a smaller diameter ring must be installed.

To replace a retaining ring, place the engine on its left side and remove the starter assembly. The old ring may be removed from under the retaining lugs by using a small screwdriver. Install the correct diameter ring. The following are retaining ring sizes:



Replacing Clutch Retaining Ring

Part No.	Size	Part No.	Size
19114A	.041	19114D	.090
19114B	.051	19114E	.100
19114C	.063	19114F	.112
19114H	.071	19114G	.124
19114	.080		

DISASSEMBLY

If damage occurs, requiring major disassembly of the saw, the unit should be sent to an authorized McCulloch dealer for overhaul. The exploded views in the illustrated parts list indicate the general relationship of saw components and may be used as a guide for minor disassembly of parts.

CHAIN MAINTENANCE

It is important to you that your chain be sharp at all times. We want to help you obtain the best cutting speed and the longest life possible from your McCulloch chain. When your correctly sharpened chain is cutting smoothly, it is easier on the saw engine, the blade, and the chain itself. You are cutting faster and with less effort.

When your chain becomes dull or is poorly sharpened, its action is rough. It pounds, grabs, and binds in the cuts. This action loosens the teeth and rivets in the chain, wears out the blade at the groove and puts your saw in the repair shop. Careful sharpening can minimize all of these troubles. Here are some proven practical guides to help you sharpen your chain correctly.

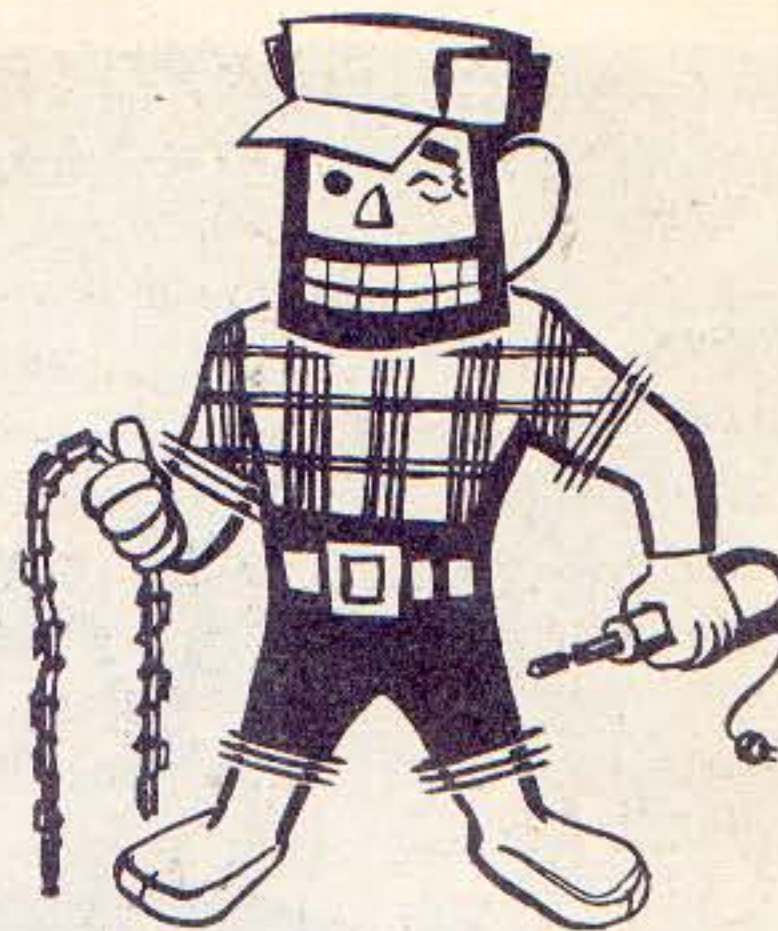
McCulloch saw chains, as shipped from the factory, are precision-sharpened and ready for general purpose cutting. When you sharpen your chain, try to keep the same shape of cutting edge.

TYPE "HH" AND "HJ" CHAINS

TO OBTAIN THE GREATEST EFFICIENCY FROM YOUR CHAIN YOU MUST:

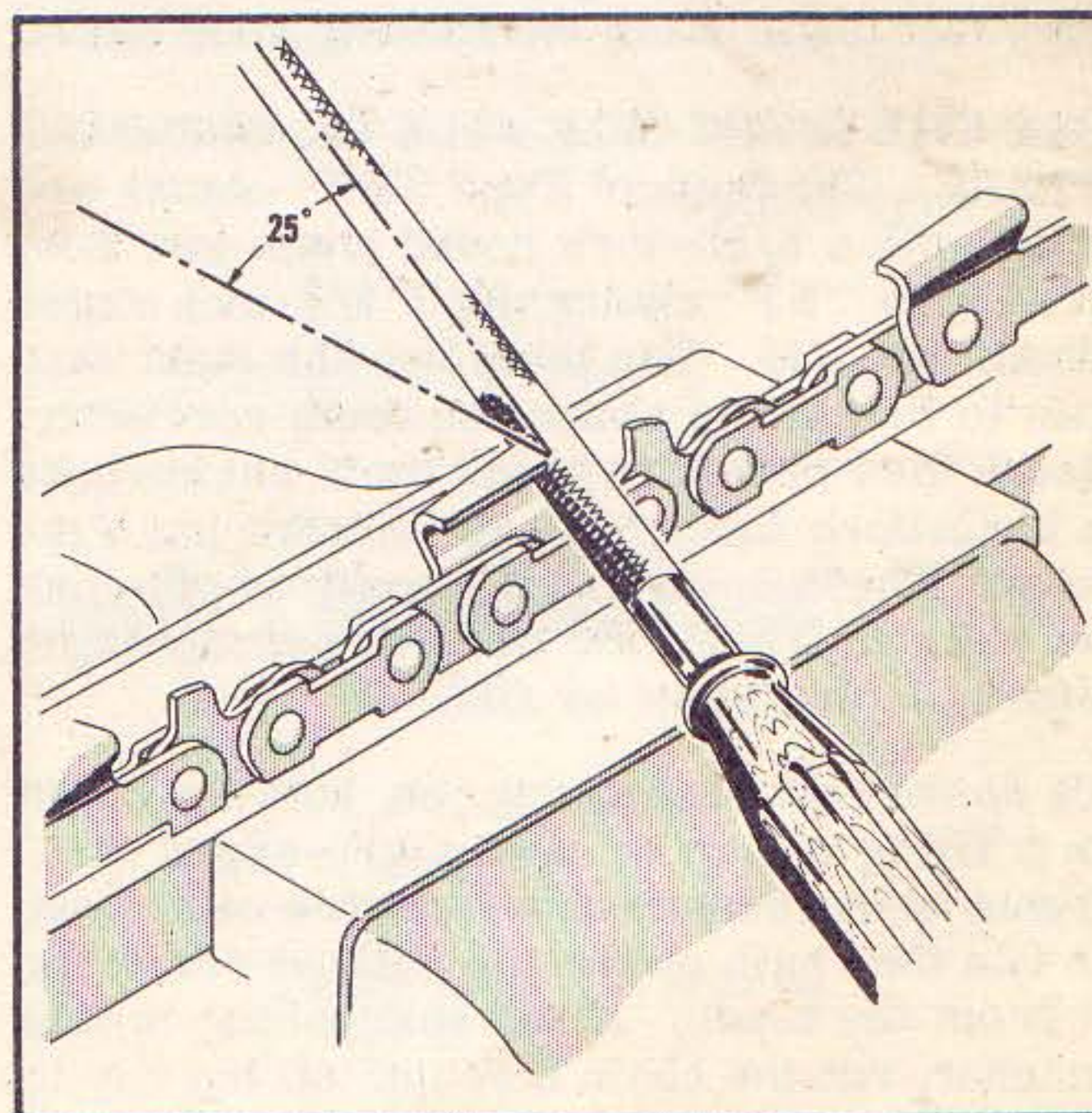
- Keep the same cutting angle on all teeth.
- Use the right size file or grinding stone.
- Keep the side cutting edge vertical.
- Shape the top cutting edge correctly.
- Keep all depth gage clearances the same.
- Maintain equal length of all cutter teeth.

KEEP THE SAME CUTTING ANGLE ON ALL TEETH. File the cutting angle exactly the same on all teeth. Some men find it easier to file from one side than the other; that the file

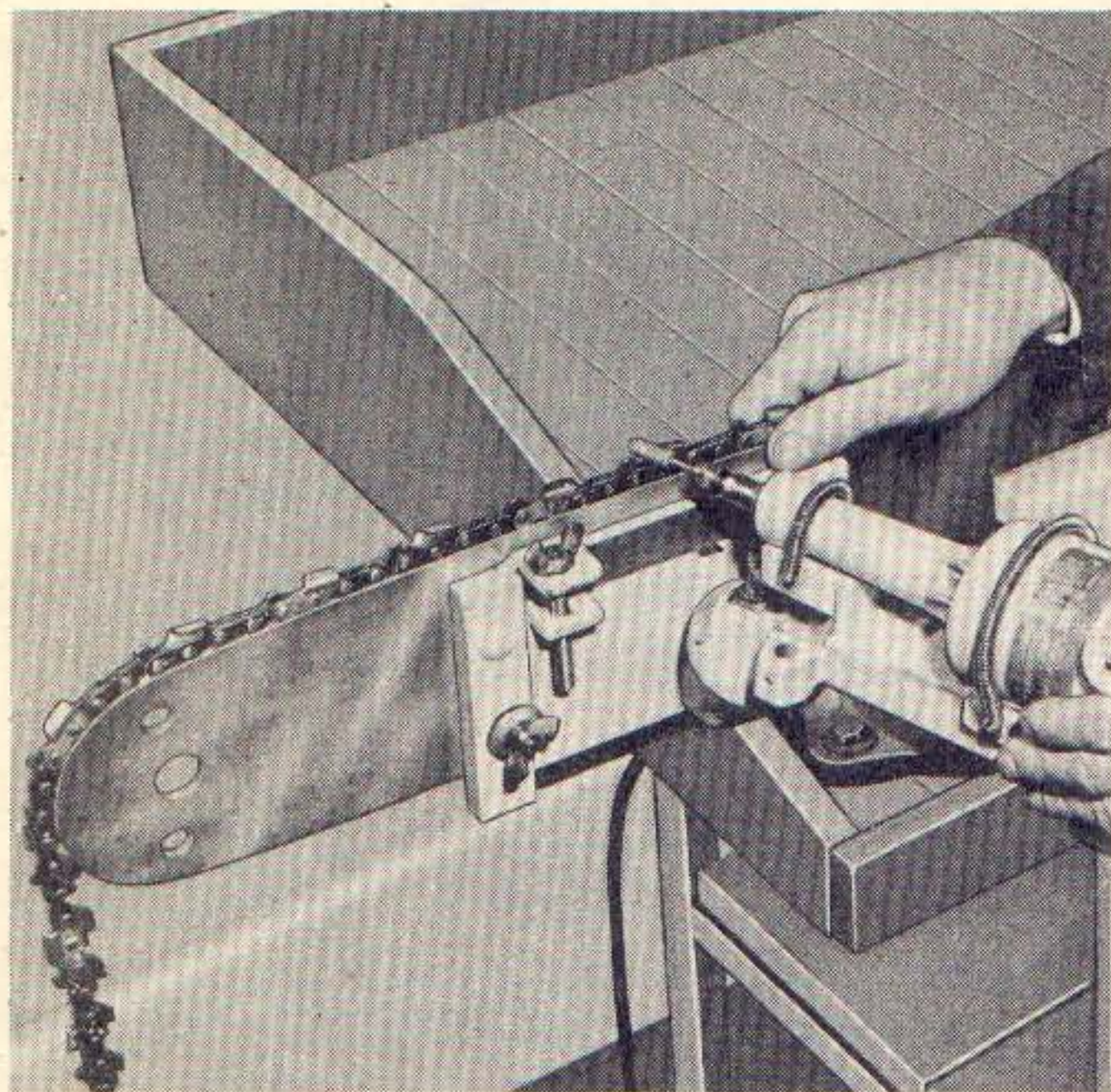


seems to feel just right against the teeth on one side, but they must hold the file in an unnatural position when filing from the other side. Make sure you are filing both left-hand and right-hand teeth to the same cutting angle.

If you develop a filing habit of varying the cutting angle of the teeth more on one side than the other, the chain will cut erratically. This will prevent making a straight cut and will cause excessive wear on the blade groove. You often hear an operator complain that his chain will not cut a straight kerf. Don't let this happen to you. Keep the cutting angle the same on all teeth.



Filing Chain Cutting Angle



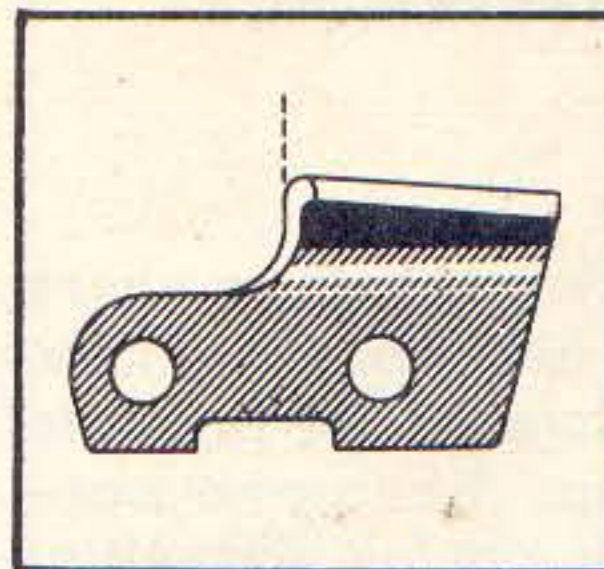
McCulloch Electric Chain Grinder

The cutting angle on the chain teeth is factory-ground at 25°. This angle has proven best for all-around cutting. Many loggers cutting in soft wood increase the cutting angle to approximately 45° for greater production. On the other hand, loggers cutting in extremely hard wood or frozen wood reduce the cutting angle to a minimum. If you want to change the cutting angle for a particular use, do so with care. To insure the best cutting life, maintain the factory-set angle when sharpening your chain.

USE THE RIGHT SIZE FILE OR GRINDING STONE. The teeth of Type "HH" chains are filed with a 5/16-inch round chain saw file. With type "HJ" chains use a 1/4-inch round chain saw file. You must use the right size file to be able to shape the teeth correctly. Some men prefer to grind their chains with a McCulloch Electric Chain Grinder and Fixture. These instructions apply to grinding as well as filing. Be sure to use the right size grinding stone or file.

To do the best sharpening job, hold the chain in a filing clamp or a straight-edged vise. It may be necessary under certain conditions to file the chain on the job without removing it from the blade. After sharpening in this manner, run the chain free and oil heavily to wash out any filings which might have dropped onto the chain or into the blade groove.

KEEP THE SIDE CUTTING EDGE VERTICAL. Filed correctly, the teeth will feed smoothly

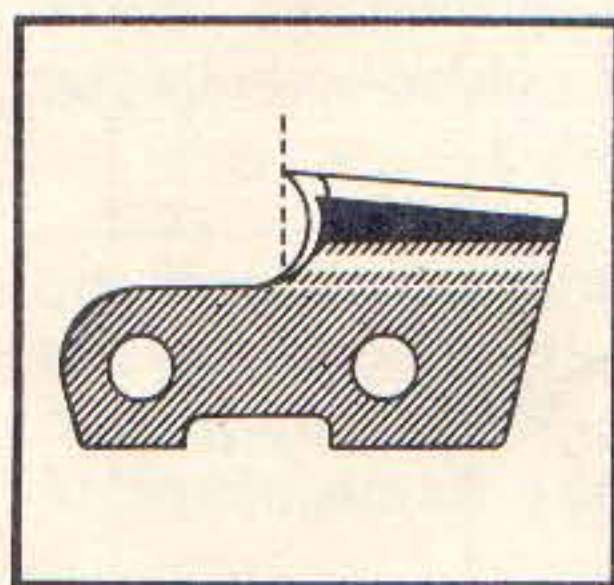


into the wood, cutting the cross grain cleanly before the top cutting edge routs out the chip. Each tooth will hold its edge longer without resharp-
ening, which will increase your production. To file the side edge

vertically, hold the file level with approximately one-fifth of the file above the top cutting edge (as shown). Be careful not to cut into the side links by pressing downward on the file.

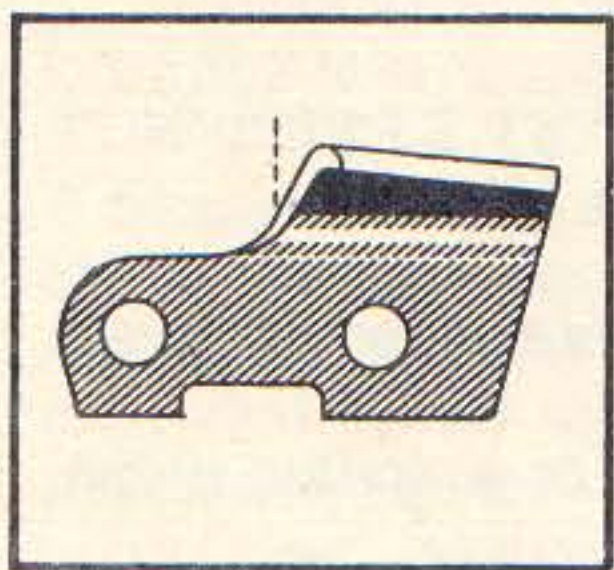
DON'T LET THIS HAPPEN TO YOUR CHAIN

A HOOK in the cutting edge causes your chain to jerk roughly, to grab and hang up in a cut.



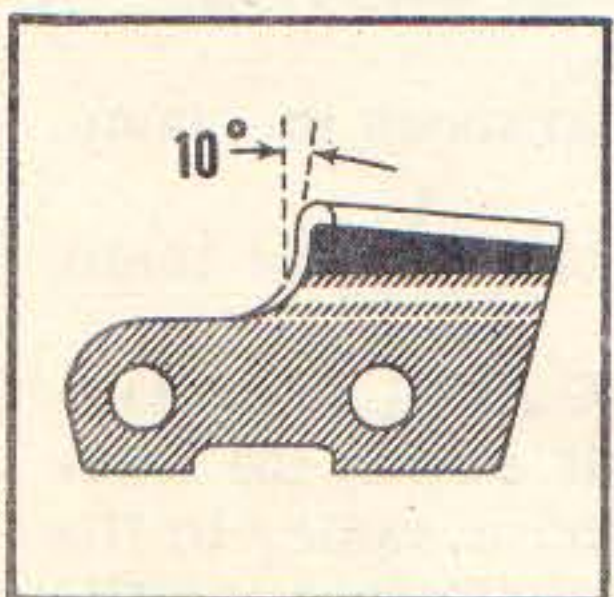
A HOOK in the cutting edge is made by holding your file too low and by pressing down on the file or by using a file of too small diameter. Press upward into the top cutting edge to eliminate the HOOK.

TOO MUCH SLOPE will create a tendency for

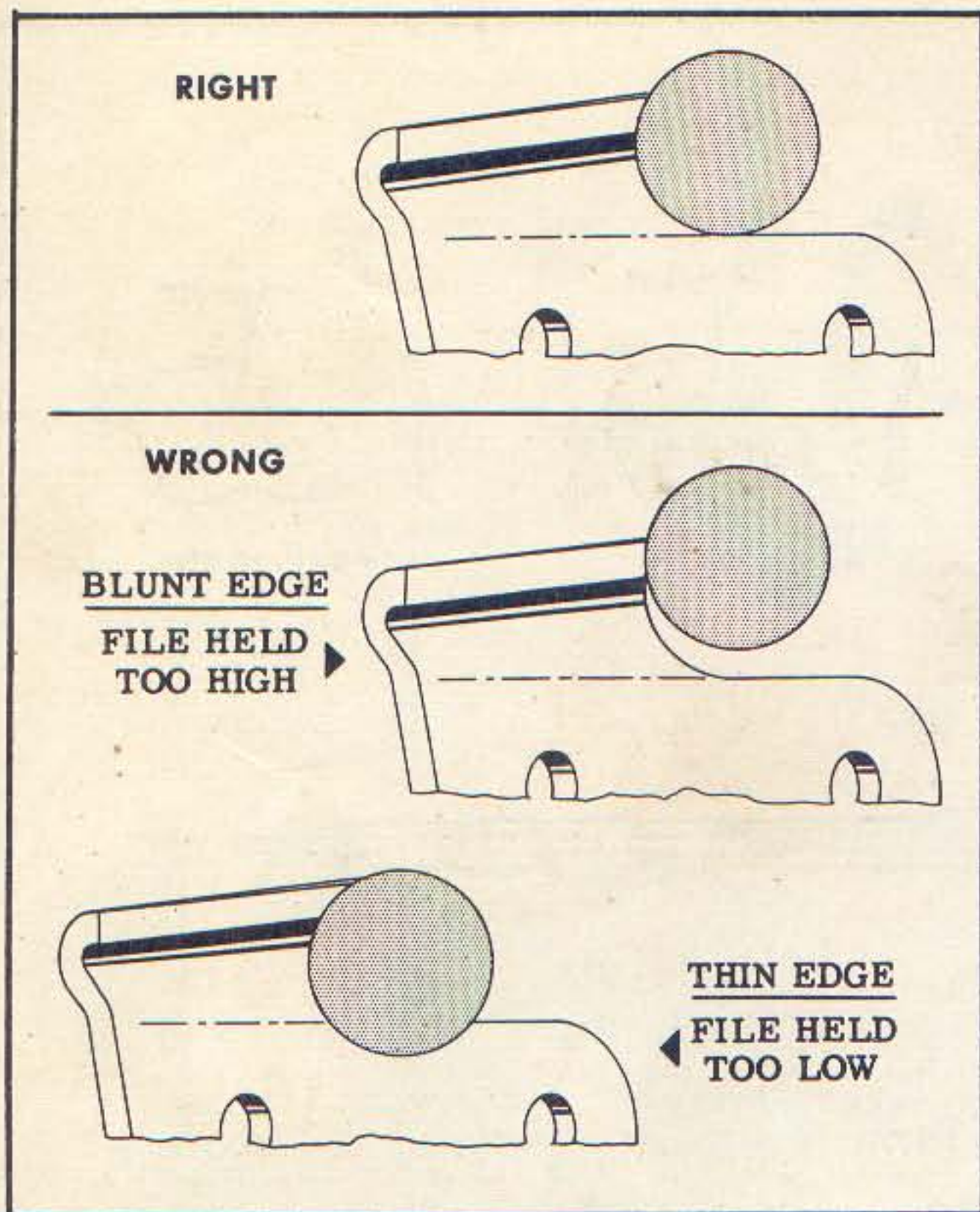


your chain to run out of the cut and not feed as it should. The engine will overspeed and you have to press harder to get any work done. TOO MUCH SLOPE is caused by holding the file too high on the tooth.

A SMALL AMOUNT OF SLOPE in the cutting



edge helps when cutting in extremely hard or frozen wood. A SMALL AMOUNT OF SLOPE gives a smoother cutting action, but it will dull faster and require more feed pressure. Hold the slope to a maximum of 10° from vertical at most.



SHAPE THE TOP CUTTING EDGE CORRECTLY. The best hollow ground cutting edge is obtained by keeping one-fifth of the file above the top cutting edge. This cutting edge provides two qualities; fast-cutting, slow-dulling. If the file is held too high on the tooth, the top cutting edge will be blunt and cut slowly. If the file is held too low, the cutting edge will be thin. The thin edge may cut slightly faster for a few cuts, but it will dull quickly. For very soft woods, a slightly thinner than normal cutting edge can be used with good results.

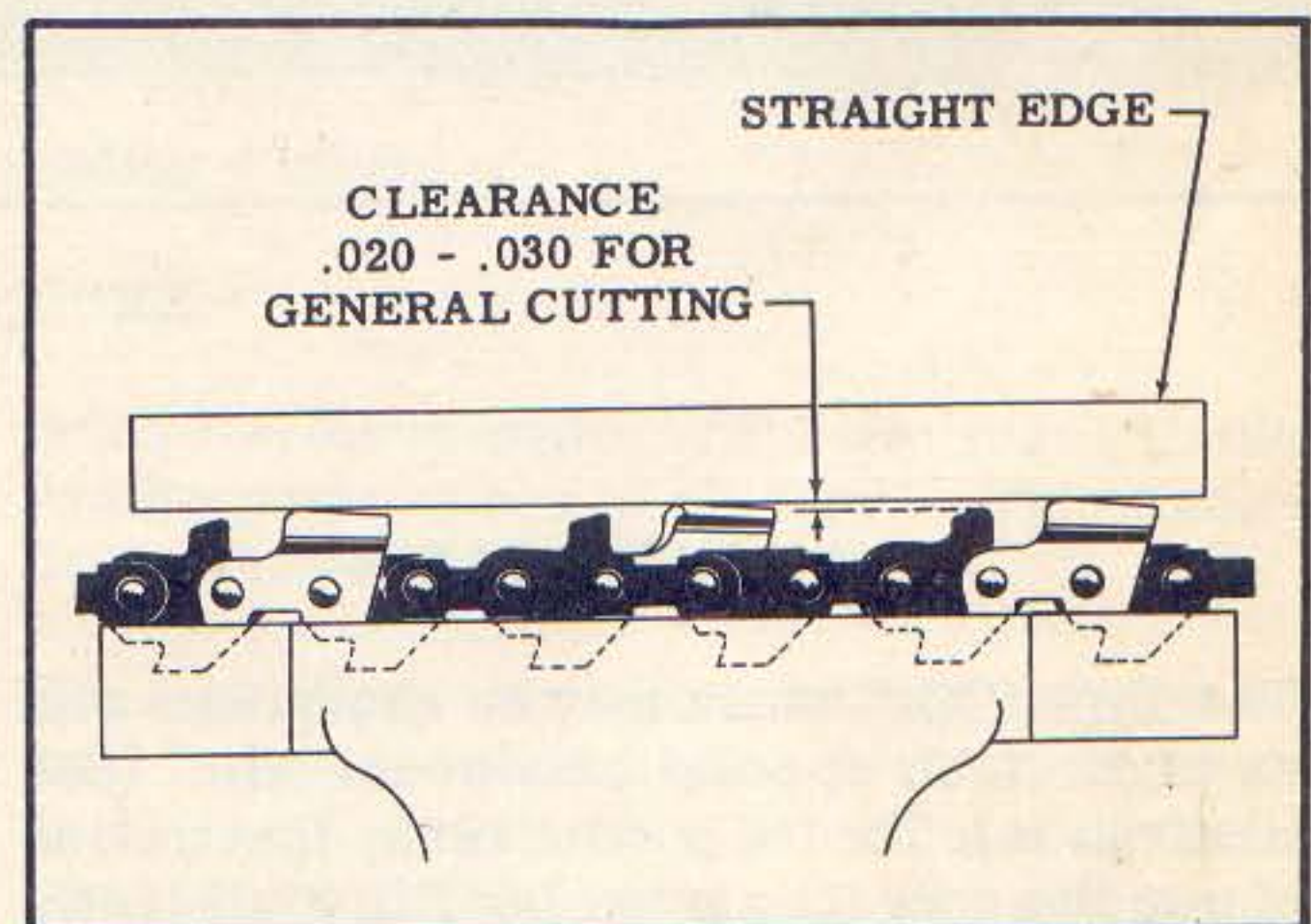
KEEP ALL DEPTH GAGE CLEARANCES THE SAME. It is very important to maintain the same clearance between the depth gage and the cutter teeth. If one depth gage is lower than the other, the following tooth will be forced deeper in the wood. If the depth gage is not filed enough, the tooth will not do its share of cutting. The result of misfiled gages will be a rough cutting chain. The amount of depth gage clearance may be as little as .015 for extremely hard wood and as much as .045

for soft wood. The clearance, as set at the factory and recommended for general cutting is between .020 and .030. Consult your dealer for the most suitable clearance in your locality. Whatever depth clearance you choose, remember one thing. Keep the depth gage clearance for all teeth the same.

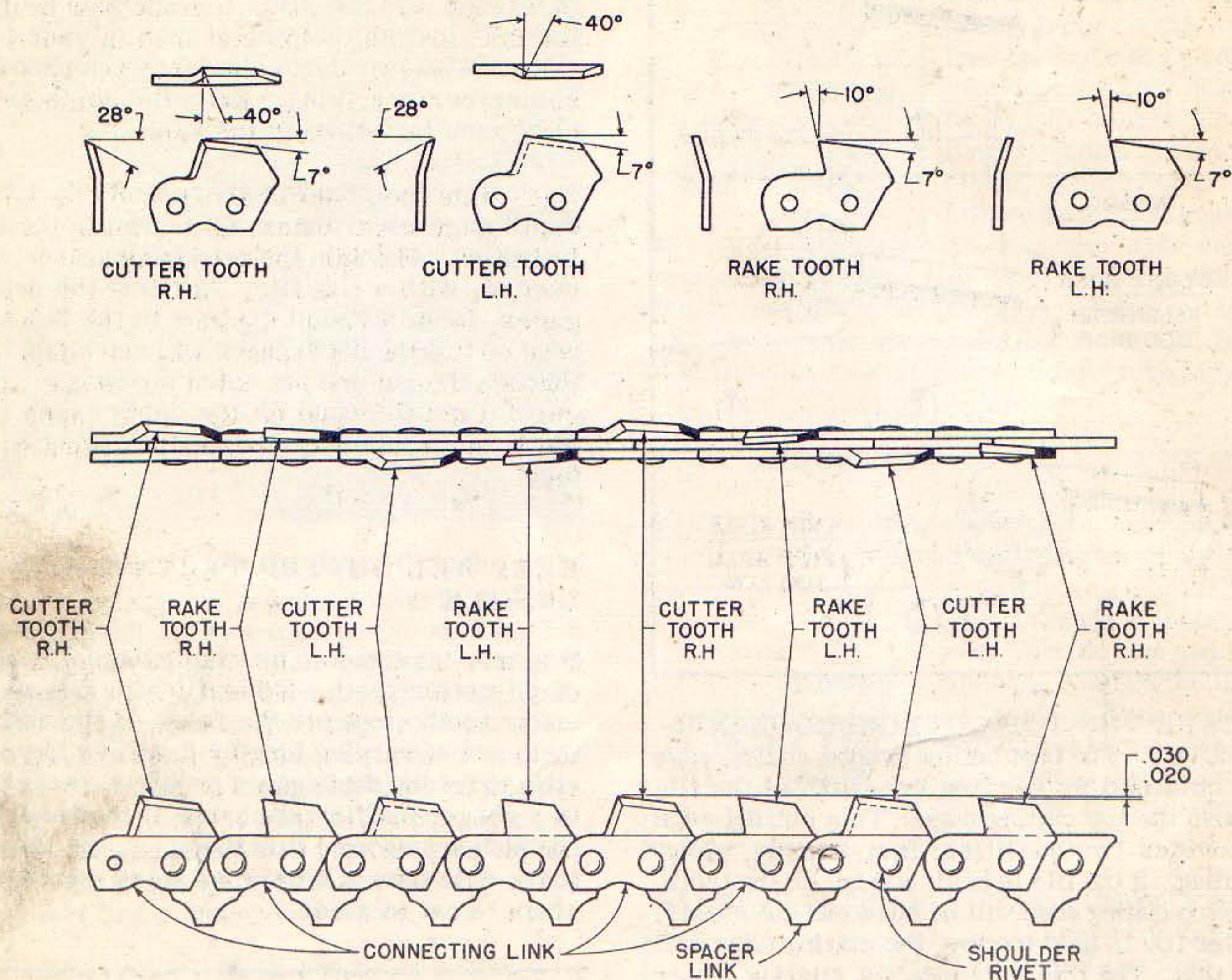
Each time the chain is sharpened check the depth gage clearances, as shown in the illustration. Maintain the proper clearance, as needed, with a flat file. In filing the depth gages, form a round contour to the leading edge so that the depth gages will run smoothly through the cut and not catch nor gouge. Be careful not to round off the depth gages too much, since this may destroy the gaging surface.

KEEP ALL CUTTER TEETH EQUAL IN LENGTH

It is very important to maintain an equal length of all cutter teeth. You will note that each cutter tooth slopes to the rear. If the cutter teeth are of varying lengths it will be impossible to set the depth gages properly, resulting in a rough, inefficient chain. If the teeth on one side are shorter than the other, the longer teeth will take a bigger bite and cause the chain to cut in an arc.



Depth Gage Clearance

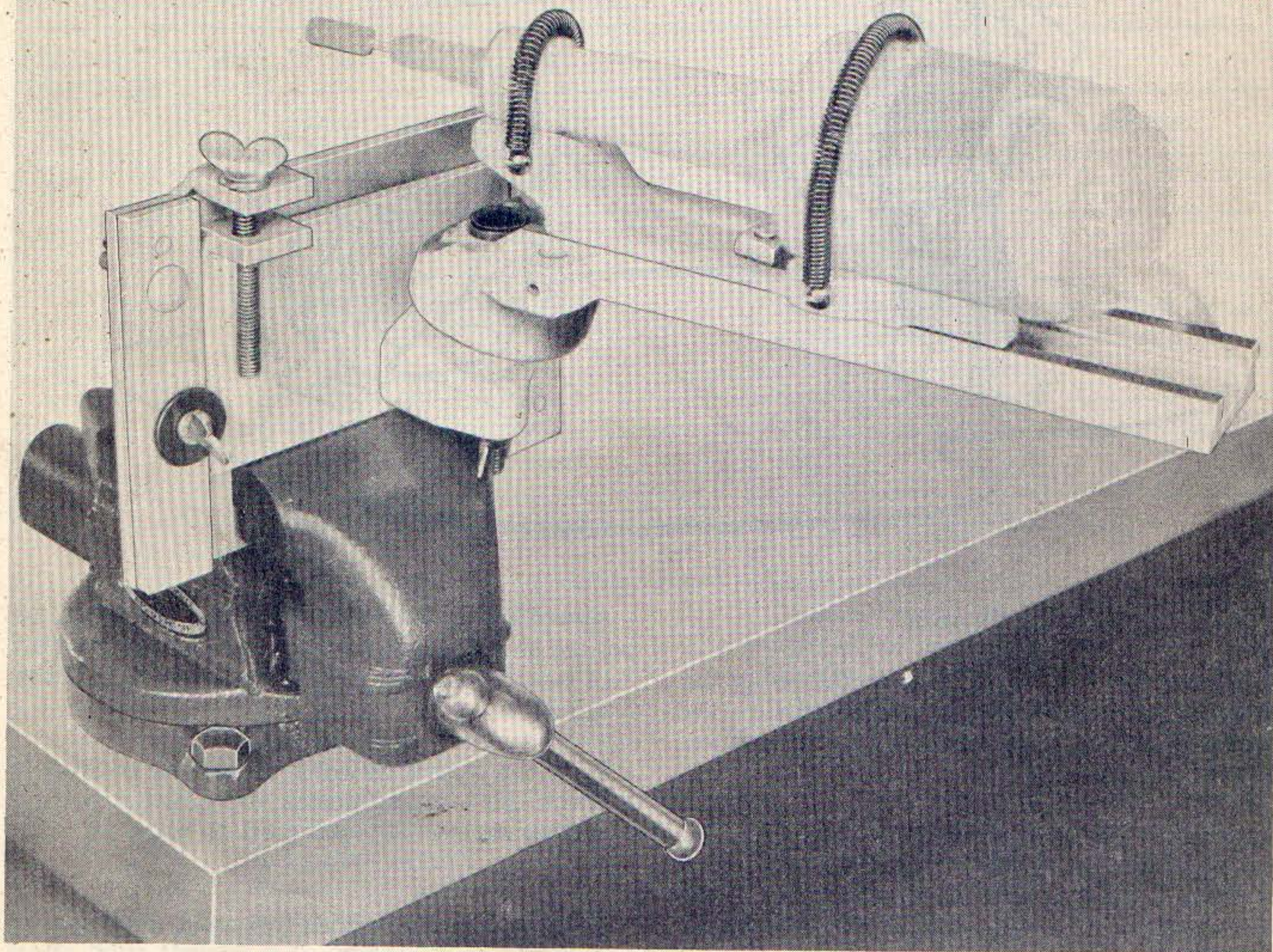


"XX" Chain Diagram

TYPE "XX" CHAIN

The Type "XX" chain may be sharpened with an eight-inch special cross-cut file. (See illustration.) The top portion of the illustration shows the correct angles for filing all teeth. The bottom portion shows how much lower

the rakers should be than the cutters. The center part of the illustration shows the position of the rakers and cutters in the chain. This chain may be ground in any standard chain grinding fixture for this type of chain and it is recommended that the chain be ground when major sharpening is necessary.



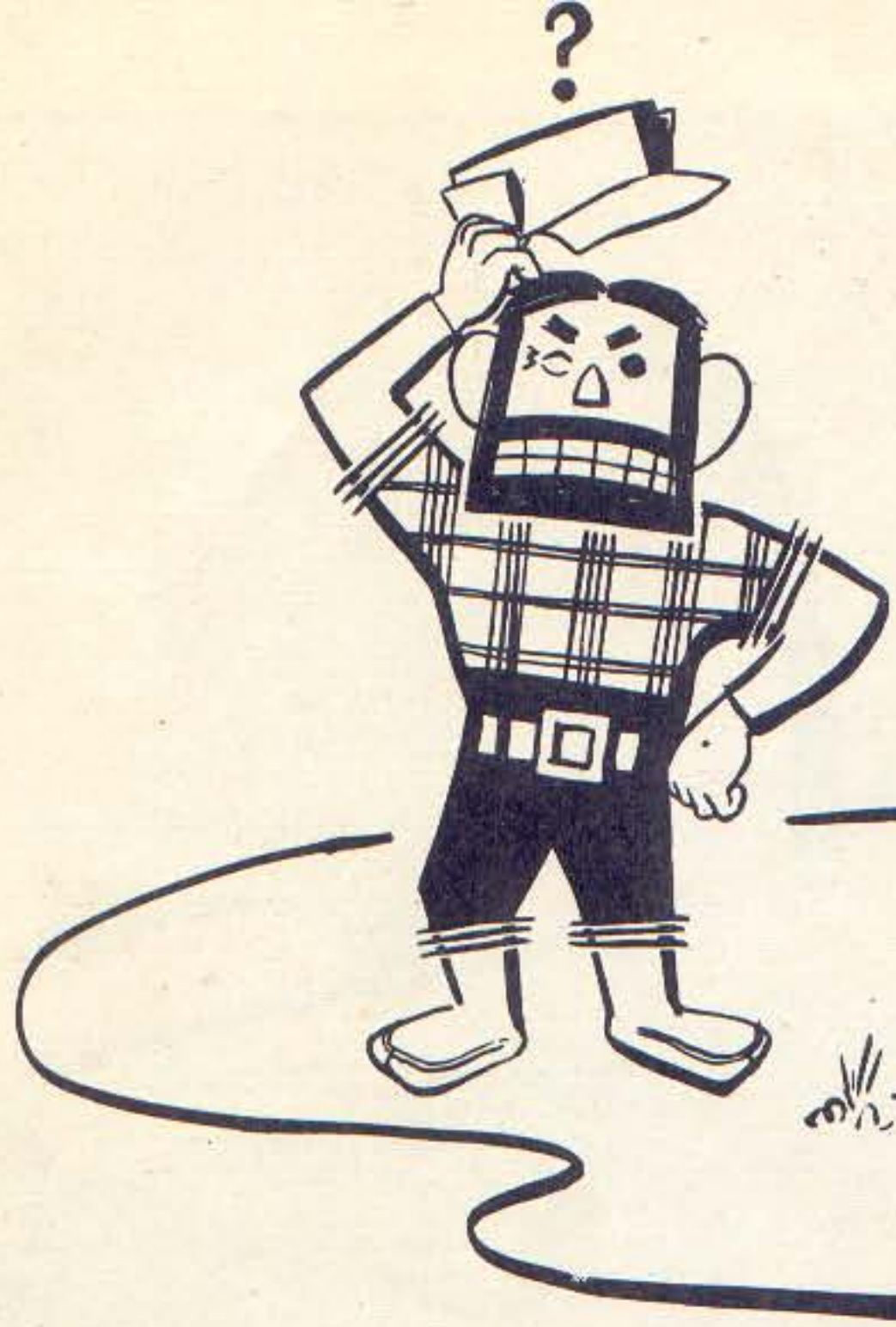
McCulloch Chain Grinding Fixture

CHAIN GRINDING FIXTURE

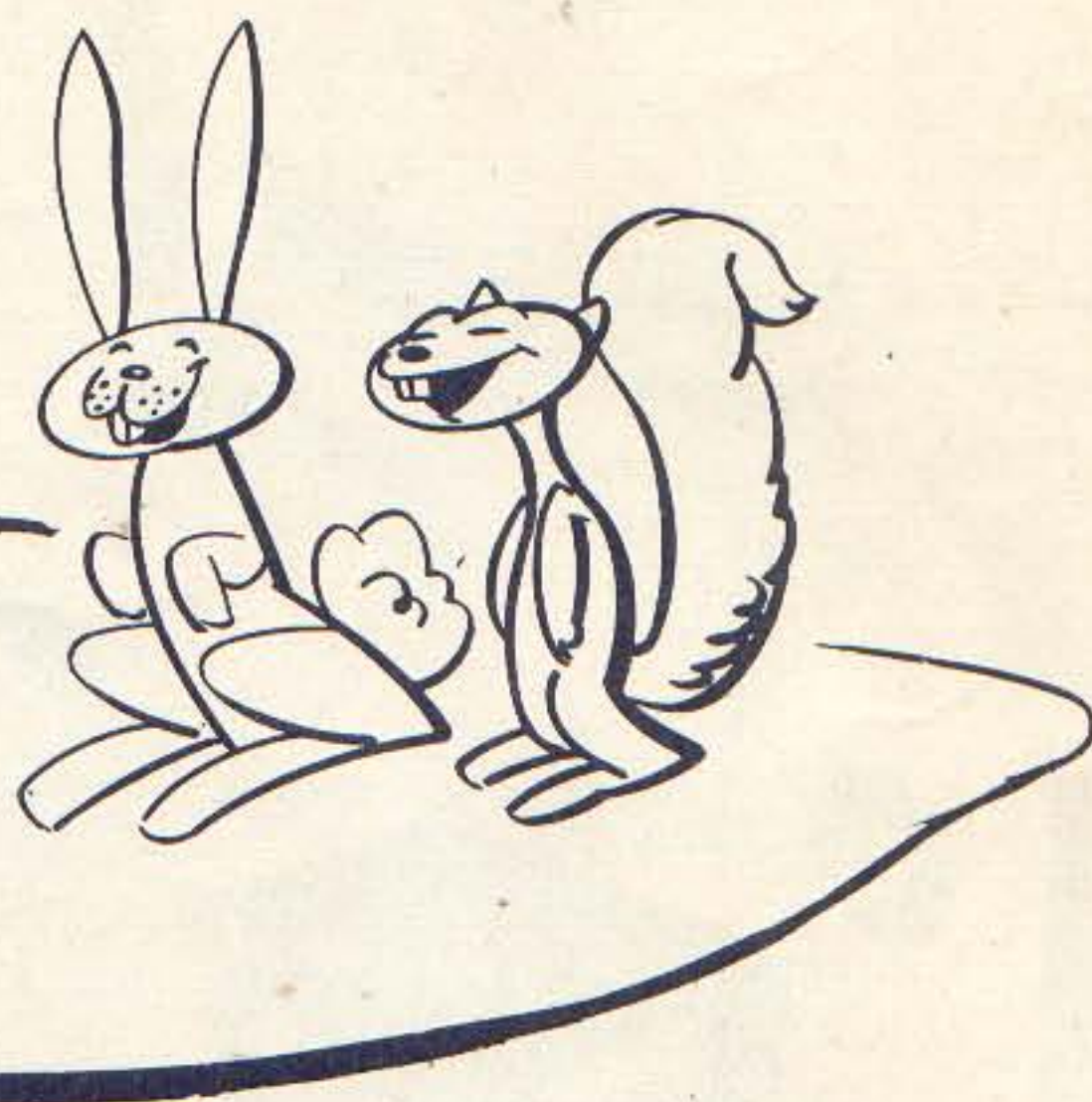
In answer to the many requests for a precision chain grinding fixture, we now have available Part No. 102094 Chain Grinding Fixture for use with the McCulloch Chain Grinder. This device permits the operator to sharpen the cutter teeth on both sides of the chain to ex-

actly the same angle. This insures optimum cutting performance at all times. This fixture is available from your dealer.

We hope these chain sharpening instructions will help you to keep your McCulloch chain in the best condition all the time. Careful sharpening on your part will assure this.



TROUBLES AND REMEDIES



ENGINE FAILS TO START

If the engine fails to start after following the starting procedure on page 16, make sure the engine is receiving fuel, then check the ignition spark as follows:

1. Remove the wire from the spark plug. To prevent shock, hold the wire by means of the insulating material so that the metal terminal is approximately 3/8-inch from a paint-free metal surface. Pull the starter rope sharply to rotate the flywheel as fast as possible. There should be a strong blue spark jumping the gap. If no spark, refer to Trouble Shooting Chart.

2. If a spark jumps the gap, remove the spark plug. Clean and dry the spark plug electrodes if they are wet. Connect the wire to the spark plug and ground the metal side of the spark plug against a paint-free metal surface. Crank the engine to see if a blue spark jumps the spark plug gap. If no spark is evident after this check, install a new

spark plug. After installing the plug, be sure that the spark plug wire from the coil is not close to or grounding against the metal.

3. If the spark is weak or yellow in Step 1, check the breaker points and coil for setting and condition as instructed on page 22.

If the engine is receiving fuel and a good spark, it should start readily. If it doesn't start after the second or third pull, don't keep pulling the starter over. Check out the ignition and fuel systems as instructed in the Trouble Shooting Chart. If you have both fuel and spark in the cylinder combustion chamber at the proper time, the engine should run. When you suspect ignition trouble, go through the ignition system from beginning to end before proceeding to the carburetor. Most engine troubles can be corrected readily if you trace them down in a thorough, systematic manner. The following Trouble Chart will be of assistance in helping you trace such troubles.

TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE FAILS TO START	(FUEL TROUBLES)	
	*Empty fuel tank.	Fill with correct fuel mixture.
	*Fuel shutoff valve closed.	Open valve.
	Flooded.	See Page 16.
	Water or dirt in fuel.	Drain fuel tank. Remove and clean carburetor sediment bowl and filters. See Page 20.
	High speed fuel needle valve closed or set too lean.	Correct setting described on Page 16.
	Primer fails to operate due to dirt.	Clean or replace as required.
	Primer not functioning.	Test by removing primer and operating in clear gasoline or cleaning solvent. If not functioning after this test, replace.
	(NO SPARK)	
	*Spark plug wire grounding against metal.	Carefully route the wire to provide maximum clearance.
	*Ignition button "IN".	Pull out button.
	Fouled or defective spark plug.	Clean or replace spark plug. Adjust to proper gap. See Page 21.
	Breaker point gap too wide, not opening, burned or pitted.	Adjust to proper gap. See Page 22. Replace if necessary.
	*Coil failure.	Replace. See Page 22 for installation adjustment.
	*Condenser failure.	Replace.
	Connections loose or wiring grounding.	Tighten the connector or insulate, as required.
ENGINE HARD TO START	All above conditions except those preceded by an asterisk (*) will prevent any possible start.	

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE FLOODING	Ball check valve in carburetor diaphragm chamber assembly not seating properly.	See Page 21 for carburetor maintenance.
	Improper diaphragm setting.	Adjust diaphragm. See Page 21.
	Primer bypassing fuel to crankcase.	Remove and operate primer in clear gasoline or cleaning solvent. Dirt may have been holding ball checks open, allowing fuel to bypass.
	Primer screws loose.	Be sure the gaskets and joining surfaces are smooth and free of any grit or dirt. Reinstall primer and securely tighten screws.
	Fuel pump diaphragm torn or cracked, causing leak.	Replace.
ENGINE CUTS OUT OR MISFIRES	Short circuit in ignition system.	Check all wiring and connections. Make all wiring secure and free from grounding.
	Fouled or defective spark plug.	Clean or replace. See Page 21.
	Breaker points sticking or burned.	Replace points <u>and check condenser.</u>
	Breaker points clearance incorrect.	Adjust to proper clearance. See Page 22.
	Excessive push rod or guide hole wear.	Replace parts, as required.
	Push rod sticking.	Clean guide holes and replace push rod, if necessary.
	Coil failure.	Replace coil.
ENGINE OVER-HEATS AND LACKS POWER CAUTION: Any of these conditions can cause piston and cylinder scoring.	Incorrect fuel mixture.	See FUEL MIXTURE, Page 8.
	High-speed fuel adjustment set too lean.	Correct high-speed adjustment. See Page 16.
	Cooling air restricted.	Clean cylinder fins. See Page 23. Check flywheel for broken fins.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE LACKS POWER	Incorrect fuel mixture.	See FUEL MIXTURE, Page 8.
	High speed fuel flow set too rich. (Excessively blue exhaust fumes.)	Correct high speed adjustment. See Page 16.
	Ball check assembly in carburetor diaphragm chamber not seating properly.	Clean and adjust as instructed on Page 21.
	Cylinder exhaust ports clogged.	Clean ports. See Page 23.
	Muffler outlet slots clogged.	Clean slots. See Page 23.
	Air cleaner plugged.	Remove and clean thoroughly. See Page 20.
	Poor compression, or piston and cylinder scored.	See your dealer. Replace rings; or rings, piston, and cylinder, as required.
ENGINE STARVES ON ACCELERATION OR IDLES TOO FAST	Idle mixture too lean.	Adjust idle mixture. See Page 17.
	Air leak in engine.	Check condition of all gaskets and seals.
	Muffler loose.	Inspect for damaged gasket; replace if necessary. Tighten muffler cap screws.
	Loose cylinder base bolts.	Tighten carefully.
	Loose venturi plate beneath flywheel.	See Page 21.
	Worn or damaged crankshaft seals.	See your dealer. Replace.
CHAIN STALLS IN CUT WITH ENGINE AT HIGH SPEED	Clutch retaining ring too small, causing clutch to slip.	See clutch adjustment on Page 24.
	Blade and chain pinched.	Free blade and chain by means of a wedge.
CHAIN MOVES AT ENGINE IDLING SPEED	Clutch retaining ring too large, causing clutch to drag.	See clutch adjustment on Page 24.
	Idle speed too fast.	See Idle Adjustment, Page 17.
CHAIN BINDING IN CUT	Improper filing.	See Filing Instructions, Page 25.

TROUBLE	PROBABLE CAUSE	REMEDY
CHAIN CUTS OUT OF LINE	Improper filing. Blade track worn down on one side. Caused by improper teeth angle on one side.	Replace blade and sharpen chain correctly.

SEE CHAIN MAINTENANCE INSTRUCTIONS

CHAIN OILER FAILS TO DELIVER OIL TO BLADE	Oil reservoir empty.	Fill with clean, good grade oil.
	Dirt in pump assembly.	Remove and thoroughly clean.
	Oil not entering pumping chamber - caused by cold oil.	Use lighter weight oil. For extreme winter freezing conditions, thin 50% with kerosene.
	Oil outlet nozzle plugged.	Remove nozzle and clean thoroughly.
	Oiler not pumping. Leaking seals or valve assembly.	See your dealer.

