

GENERAL SERVICE INFORMATION

Mini-Mac 6 & 6A Chain Saws

SPECIFICATIONS

Weight	
Mini-Mac 6	6-1/2 lbs.
Mini-Mac 6A	6-3/4 lbs.
Guide Bar	
Mini-Mac 6	12"
Mini-Mac 6A	14"
Overall Dimensions (outside frame)	8"H x 8-3/4"L x 7-1/2"W
Displacement	1.7 cu. in. (30 cc)
Bore and Stroke	1.375 x 1.201
Compression Ratio	7:1
Bearings	Main: Needle Con Rod: Needle Roller
Piston Rings	2 Cast Iron Compression Rings
Carburetor	Diaph. Type with Choke. Fully Enclosed, External Adj.
Filtering System	Felt Fuel Filter Felt Air Filter
Fuel Type	Regular Grade Automotive
Fuel - Oil Mixture	40:1 with McCulloch Oil
Fuel Tank Capacity	.73 U.S. Pints (345 cc)
Intake Valve	3rd Port, Piston Timed
Clutch	Automatic Centrifugal
Clutch Engaging Speed	2,600 R.P.M.
Chain Oiler Capacity	3.2 oz (102 cc)
Ignition	Waterproof Magneto
Breaker Point Gap	.018"
Coil Location	Outside Flywheel. Fan Cooled
Timing	26 B.T.D.C.
Spark Plug	AC-CS 45T Gap .025

For location of parts on the Mini-Mac 6 and 6A chain saw and their position relative to other parts refer to the Illustrated Parts List, Part No. 84718, covering these models.

CARBURETION

PRELIMINARY CARBURETOR ADJUSTMENTS

The carburetor and carburetor adjustments are similar to the PM 6 carburetor.

1. Preset the low and high speed fuel needles $3/4$ turn open from the gently seated position. Start the engine using the choke and allow it to warm up for several minutes.
2. Adjusting Low Speed Screw and Idle Speed Screw
Adjust the low speed fuel needle for clean acceleration and then adjust the idle speed screw to the fastest engine speed below clutch engagement. For safety purposes, the engine should idle without chain movement.
3. High Speed Adjustment
Although a preliminary high speed fuel needle adjustment is made in the shop, the final adjustment must be determined with the engine under load. Out-of-the-cut adjustment is similar to the Power Mac 6 engines in that too rich a setting will allow the engine to bog in the cut. Too lean a setting will cause a definite lack of power. Because of this, always make the final high speed fuel needle adjustment after testing the engine in the cut. Adjust the high speed fuel needle for best engine performance in the cut, not for best sound.
4. Check idle and acceleration operation again. It may be necessary to adjust the idle fuel and speed needles slightly after setting the high speed adjustments to obtain the best idle and acceleration performance.

OTHER ADJUSTMENTS

The only other adjustment that can be made on the carburetor is the position of the fuel inlet control lever. This lever should be level with the flat surface of the carburetor body to .015 above.

STARTING

Turn the choke lever to the fully closed position. A warm engine usually does not require the use of the choke. However, when restarting an extremely hot engine or one which has just been refueled, it may be necessary to use the choke to clear out the vapors in the carburetor.

CARBURETOR REPAIR

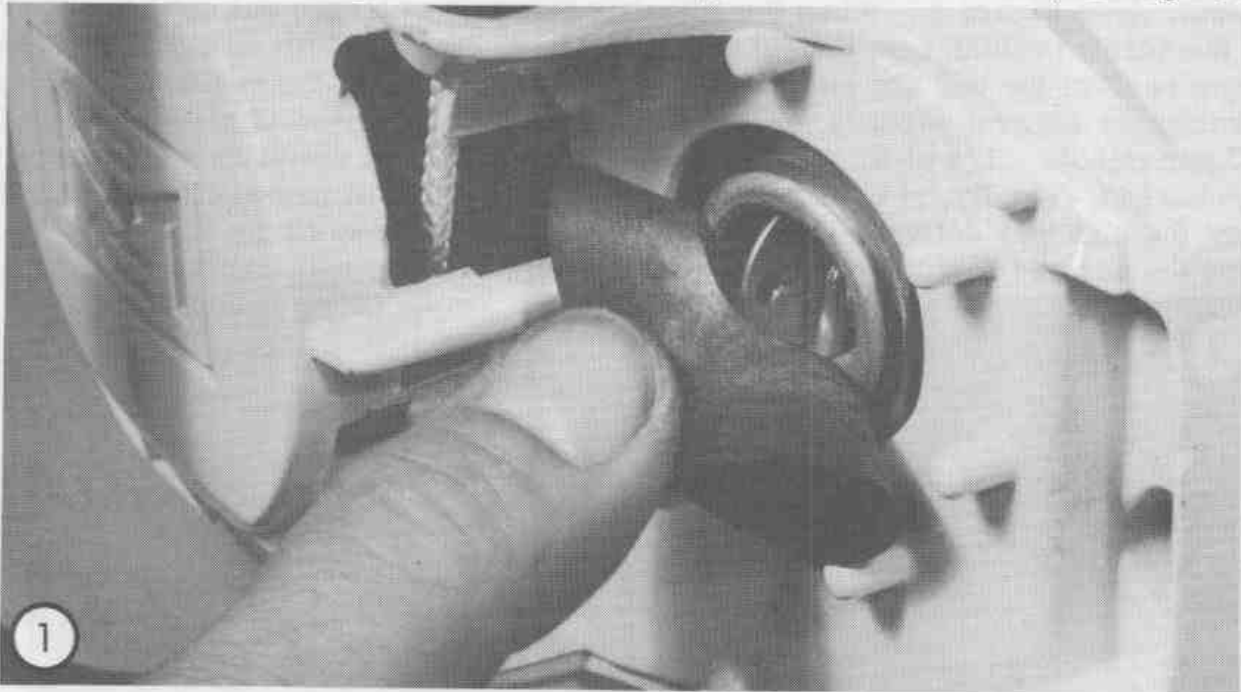
To remove the carburetor for repair, the fan housing must be removed.

NOTE: (See section on fan housing removal).

Carburetor repair and maintenance on the MM 6 chain saw is basically the same as that discussed in the Power Mac 6 & 6A chain saw Shop Manual, Part No. 83323. However, do not overtorque the screws which hold the plastic pump cover, separator and control diaphragm cover. These screws should not be over tightened, to avoid damage to gaskets, diaphragms and cover.

CARBURETOR AIR

Air for the carburetor enters through the three openings in the back of the plastic air filter cover and passes through a round rayon flocked filter which is held in place by the filter cover and six diecast locating posts on the fan housing. The filter is a three piece assembly with the circular top and bottom removable for easier filter cleaning. Below the filter is a circular rubber seal. The inner edge of the seal fits into a groove in the outer edge of the carburetor. (See Figure 1.)



FILTER CLEANING

The filter should be cleaned daily or every five hours of operation, by washing in clean solvent and blowing out with low pressure air (5 psi). Inspect the seal and be sure it is clean, in good condition, and is sealing around the carburetor.

If the air filter is not cleaned periodically, the air/fuel mixture ratio will be incorrect and result in erratic (rich) carburetion. When complaints of erratic carburetion are received, inspect the air filter first.

When installing the filter be sure that it fits snugly in place inside the six locating posts on the fan housing.

To remove the air filter and rubber seal, pry outward on the filter bail. Prying outward will snap the bail loose and the plastic filter cover can be removed.

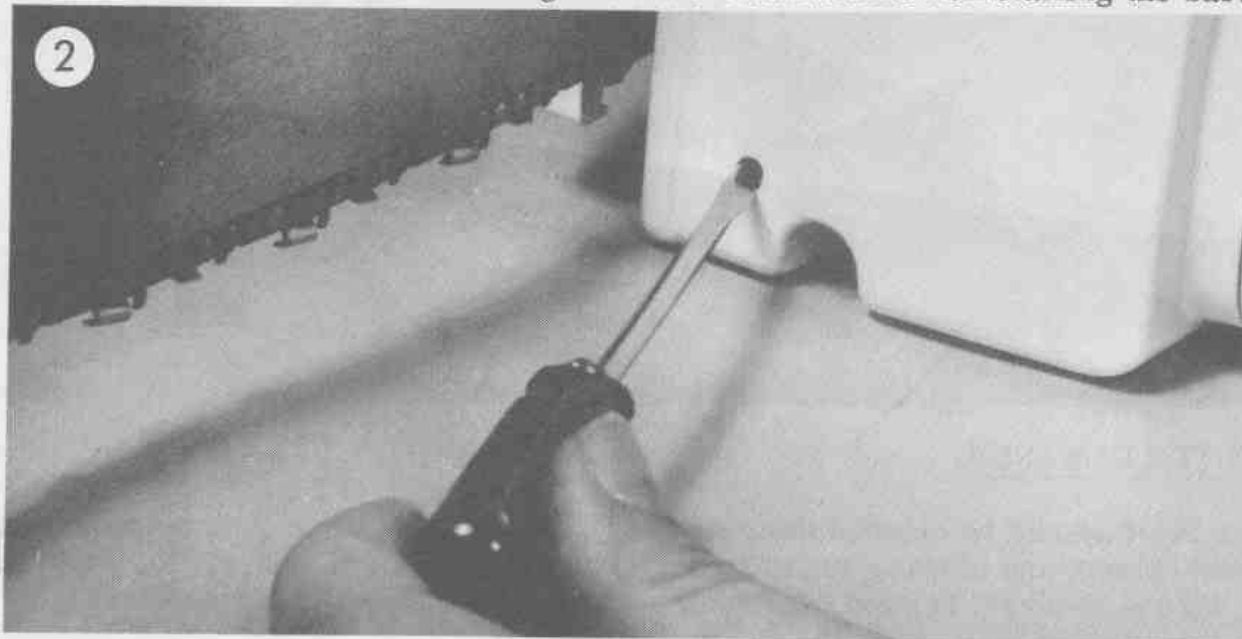
CHECKING CHAIN FOR PROPER AMOUNT OF OIL

To determine if oil flow is adequate for the chain and bar, lift the chain out of the bar groove after the engine has been operating for awhile. Be sure the engine is turned off when you do this. If you see oil clinging to the bottom of the center links and in between the side links, the oil flow is adequate.

AUTOMATIC OILER

ADJUSTING OILER SCREW

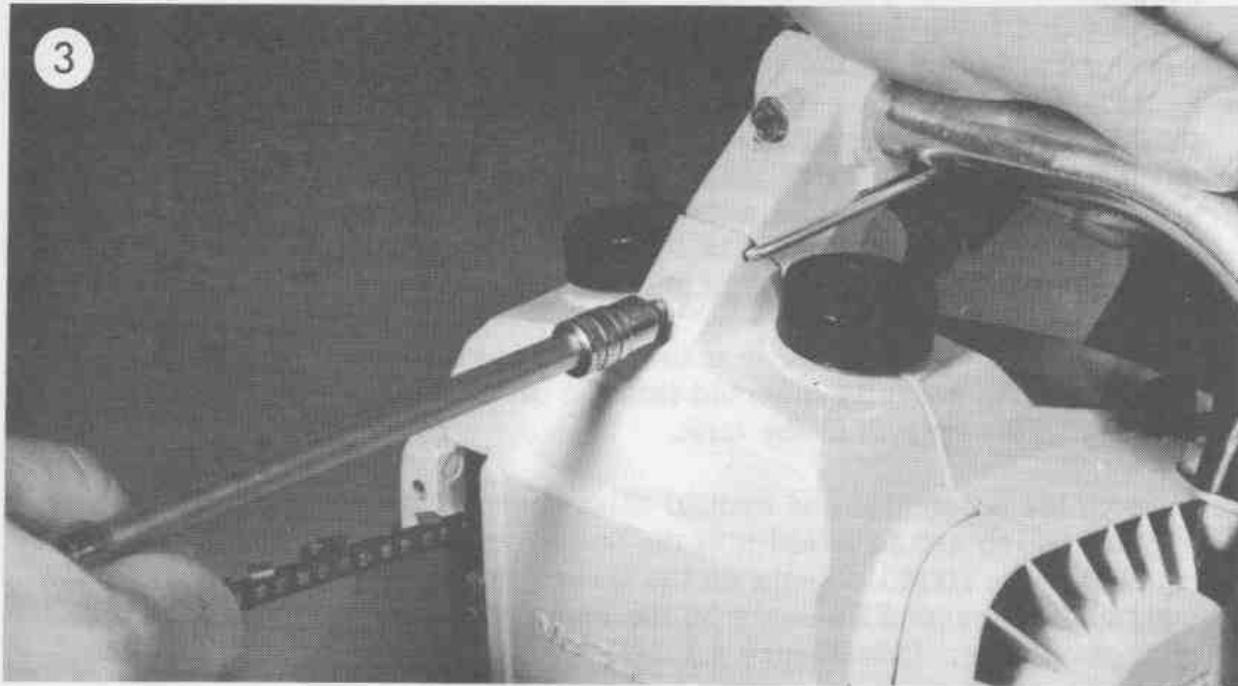
The engine should be turned off during this procedure. Turning in the adjustment screw decreases oil output and turning out the adjustment screw increases oil output. (See Figure 2.) When the adjustment screw is turned out until the head of the screw is flush with the outside of the front cover and oil output is not adequate remove the bar and chain and start the engine. Hold the engine at wide open throttle for several seconds, to determine if an adequate flow of oil (minimum 6 CC per minute - 1/5 of an ounce) is being discharged. If adequate oil is being discharged, visually, at the bar pad area, clean out the oil passage in the bar. Be sure the slot that delivers the oil to the bar groove is also clean and open. Be sure the bar and bar pad mounting area are clean before reinstalling the bar.



SERVICING THE AUTOMATIC OILER

To service the automatic oiler, empty the oil and fuel tanks. Unscrew the two front cover retaining screws and remove the front cover and plastic fuel/oil tank assembly. (See Figure 3.) Once the fuel/oil tank assembly is removed, lay the assembly down so that the oil and fuel discharge openings face up. This will prevent leakage onto the work area. Clean foreign material away from the two openings at once so that the discharge areas remain clean. If foreign material

does get into these openings, the fuel system and automatic oiler passages can become plugged and inoperative.



The automatic oiler is removed by prying forward on the bail retainer from the top of the oiler assembly. The entire oiler assembly can then be removed along with the inlet oil line ("T" shaped) and discharge line. (connectors)

The automatic oiler components should be disassembled and washed in clean solvent. If the oil output is low, the automatic oiler housing should be washed in solvent and low pressure air (5 psi) blown up through the center metal sleeve inside the oiler housing. Repeating this procedure several times should clean the oil discharge ball check and seat. Since the oil discharge ball check and spring are not removable, this is the only method for cleaning foreign material from the ball check seat and oil passage area.

OIL SEEPAGE AT BAR DISCHARGE AREA (ENGINE TURNED OFF OR IN STORAGE

AUTOMATIC OILER MODELS

Should oil seepage occur when the engine is not operating, several conditions can exist:

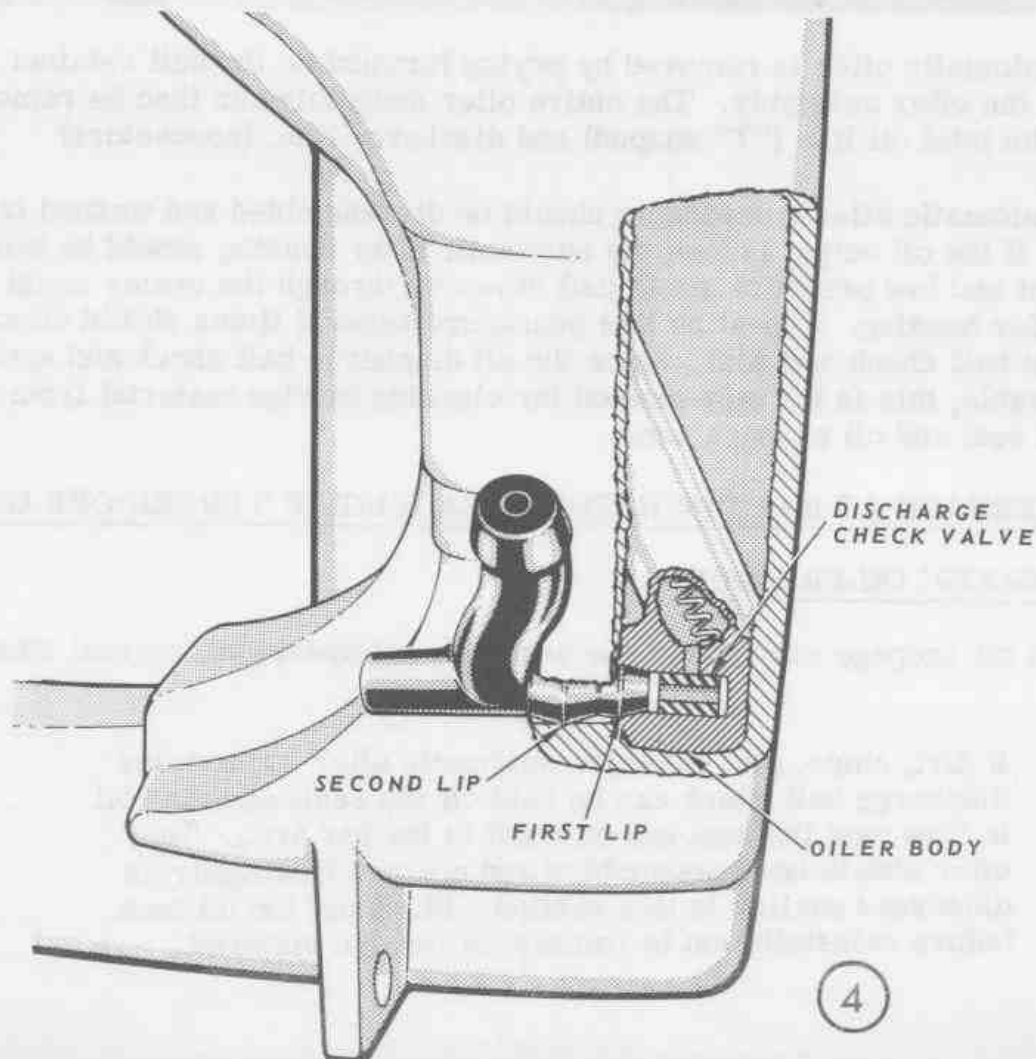
If dirt, chips, etc. enter the automatic oiler system, the discharge ball check can be held off the seat, allowing oil to flow past the seat and outward to the bar area. The oiler should be disassembled and cleaned thoroughly as discussed earlier in this section. Flush out the oil tank before reinstallation to remove all foreign material.

MANUAL OILER (WITHOUT AUTOMATIC OILER)

Seepage at the bar pad area can indicate that the rubber check valve in the bottom of the manual oiler body is not seating due to dirt or the valve is not fully seated in the back of the oiler body. Remove the oil tank and inspect the oil discharge opening at the bottom of the tank. Take out the oil discharge valve and inspect it for distortion, softening, foreign material and/or cracks. Install a new valve, if required, making sure that it is fully inserted to the rear of the oil discharge opening.

Oiler leakage can also occur if the discharge oil line (connector) is not fully inserted into the oil discharge opening in the bottom of the tank.

NOTE: On both the automatic and manual oiler models, the oil discharge connectors which are inserted into the bottom of the oil tank, have a double lip seal. The first lip seals on the inner diameter of the manual oiler body and the second lip seals on the inner diameter of the oil tank discharge opening. (See Figure 4.)



If the oil line connector is not fully inserted as shown in Figure 4, oil leakage at the bar pad area will occur on manual oiler only models.

On automatic and manual oiler models, oil may leak at the oil tank discharge area and run down onto the floor of the front cover and flow out where the front cover meets the fan housing. Before installing the fuel/oil tank assembly onto the engine, check to be sure that the manual oiler body is aligned with the discharge hole in the tank. If the manual oiler body is not aligned with the hole in the tank, the connector cannot be fully inserted and a leak will occur.

On manual oiler only models, with the check valve and oil connector properly installed, refill the oil tank with oil and place the tank in an upright position. No oil leakage should be observed at the oil discharge opening. Pump the manual oiler to be sure that oil flows under pump pressure.

AUTOMATIC AND MANUAL OILER MODELS

If the oil discharge line is not inserted into the oil discharge opening in the bottom of the oil tank, oil leakage will occur. When this happens clean oil will be seen on the bottom of the saw where the front cover and fan housing meet and, in some cases, at the automatic oiler adjustment screw hole in the front cover.

With the tank in place, but with the front cover removed, tilt the saw and look up under the bar pad and visually inspect the oil discharge line at its point of entry into the oil tank. The oil line can be prodded into proper location using a small blunt instrument without removing the oil tank.

AUTOMATIC OILER INSTALLATION

Make certain that the two rubber connectors are installed so they bottom out in the holes in the crankcase and in the bar pad.

Next, install the "O" ring in base in the crankcase. Place the oiler assembly in position guiding the rubber connector from the bar pad into the front hole in the oiler assembly and snap the bail into place.

SERVICING THE MANUAL OILER

The manual oiler body is located inside the oil tank. The plastic oiler pump piston and return spring rest inside the removable plastic oiler body. The oiler piston and spring are removed by holding the tank upside down and pulling the piston and spring out of the top of the oiler tank. The return spring rests inside the bottom end of the oiler piston. If the return spring stays in the oiler body, light tapping of the tank will dislodge it. The manual oil pump body is removed by placing a small screwdriver in the oil discharge hole in the bottom of the tank and prying upward on the body until it falls free inside the oil tank. On Mini-Mac 6 manual oiler only models a small rubber valve is located inside the bottom of

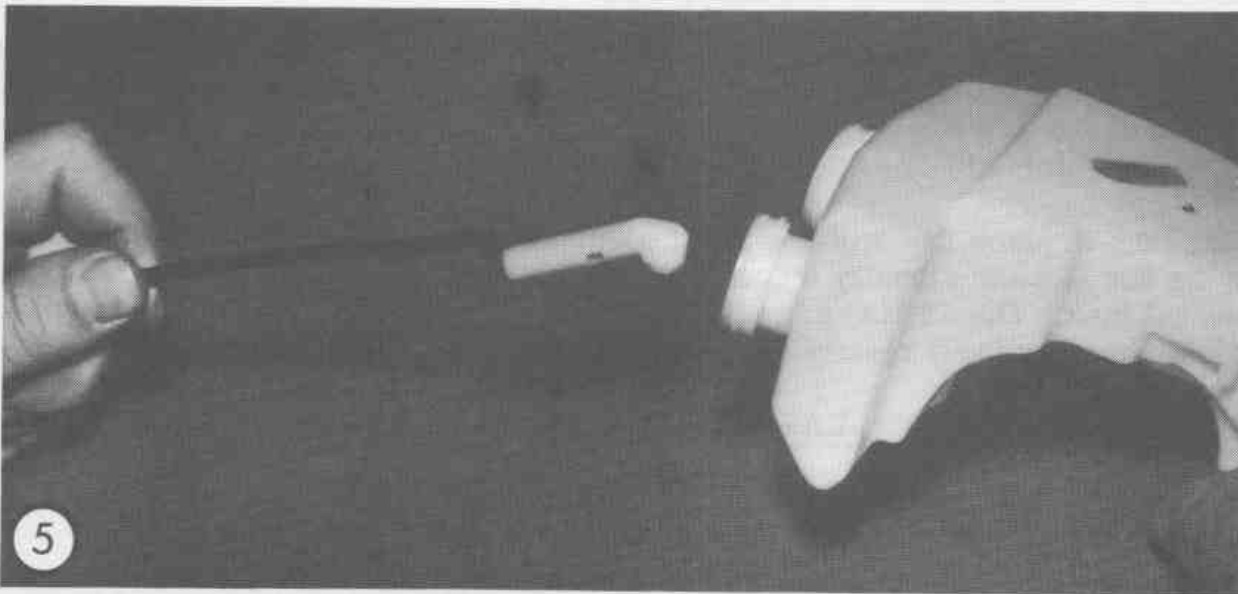
the body. This check valve should be removed before the body is removed to prevent damaging the check valve.

Automatic oiler models do not have the check valve in the bottom of the oiler body. The check valve in the manual oiler body is the only difference between the two models. The fuel/oil tanks are also the same for both models.

NOTE: Refer to the specifications section for model differences.

INSTALLING MANUAL OILER BODY (AUTOMATIC & MANUAL MODELS)

Use a manual oiler rod, Part No. 51857B, as shown in Figure 5. The angled end of the rod is the approximate angle at which the manual oiler body must be installed. Press the body down into the recessed area in the bottom of the oil tank until the discharge opening in the body aligns properly with the hole in the bottom of the oil tank.



Install the oiler piston return spring in the hole at the bottom of the oiler piston. Turn the tank upside down and insert the oiler piston and spring into the hole in the top of the tank until the oiler piston and spring are fully inserted into the oiler body. Push in on the oiler piston several times to be sure that it moves freely in both directions and does not bind.

In manual oiler only models reinstall the oiler discharge check valve into the bottom of the oiler discharge opening.

On automatic oiler models the spring and ball check in the automatic oiler assembly performs the same basic function as the rubber check valve. Do not install the manual oiler check valve in automatic oiler models.

IGNITION SERVICE

If an ignition problem is suspected, first remove the spark plug and ground it to one of the handle screws. Keep the electrode end away from the spark plug hole to prevent igniting fuel from the cylinder. Crank the engine to determine if good hot spark is generated.

If no spark is observed, check to see if the spark plug wire insulation has been damaged where it passes through the fan housing.

To repair, or replace ignition components or to time the engine, the fan housing assembly must be removed.

NOTE: (See section on fan housing removal).

Timing procedures for the MM 6 chain saw are the same as that for the PM 6 and 6A. The coil and terminal assembly, flywheel, condenser and primary terminal wire are also the same. The timing procedures and coil specifications as described in the ignition wall chart S.I. 17 under Group 3 should be followed. The PM 6 timing tool, Part No. 83687, should be used when adjusting the breaker assembly. Refer to the PM 6 shop manual for correct usage of the timing tool and timing procedures.

FLYWHEEL TO LAMINATION AIR GAP

The coil lamination to flywheel air gap (at the magnet) is .010" to .015" clearance. With the coil lamination retaining screws loose and shims installed between the flywheel and coil laminations, move the flywheel and crankshaft toward the top of the cylinder. While holding flywheel and shaft in this position with shims in place, tighten the two coil lamination retaining screws. This procedure prevents the possibility of the flywheel rubbing on the coil lamination while the engine is operated.

IMPORTANT NOTE:

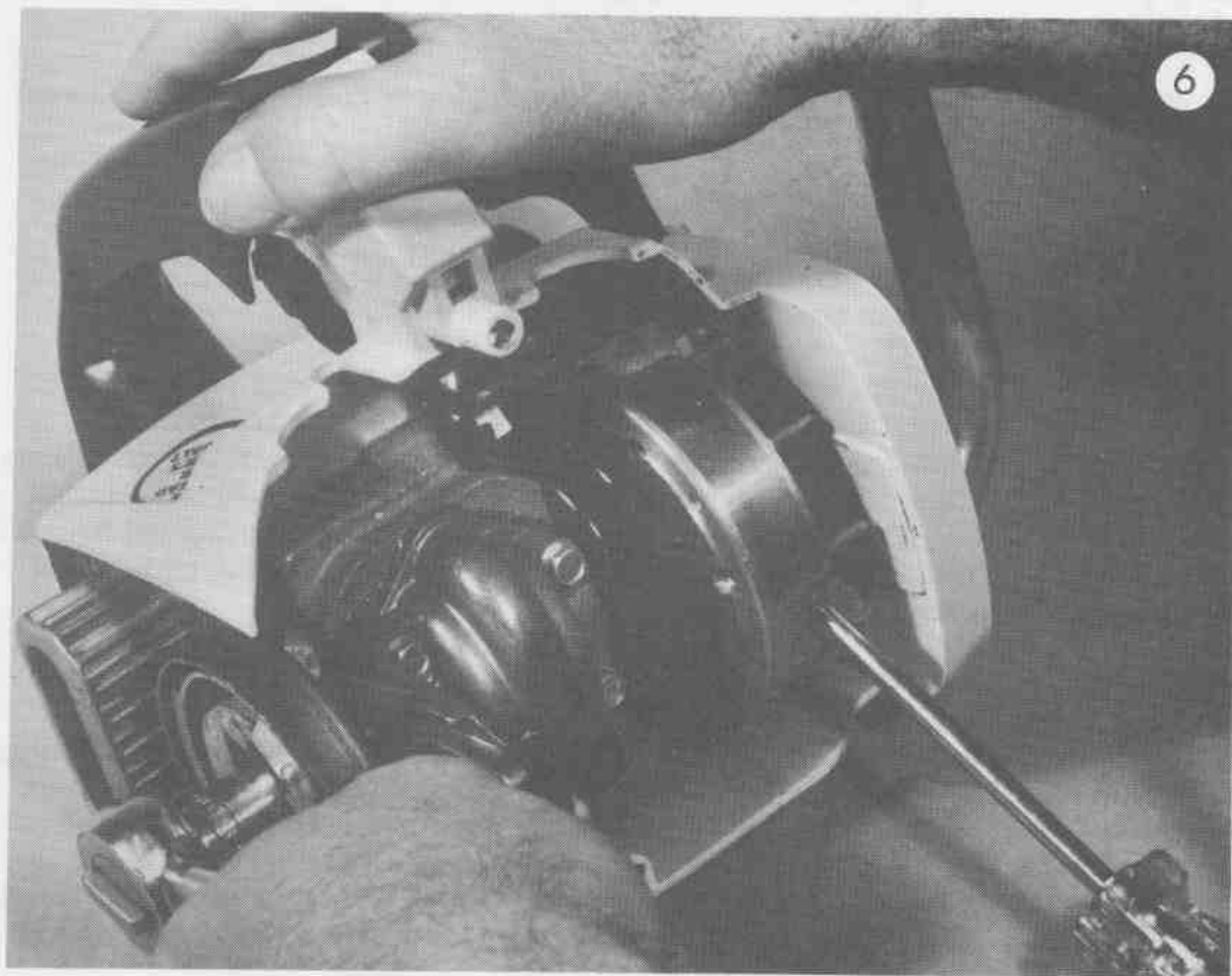
If the condenser lead and primary terminal wire are removed from the terminal screw on the breaker box they must be reinstalled in exactly the same position. Otherwise, they may interfere with the fuel tank and/or flywheel when the engine is reassembled. Also reinstall the primary wire onto the coil primary terminal post in exactly the same position as it was when removed.

CLUTCH AND CLUTCH DRUM

Removal of the clutch requires that the crankshaft be locked so that the clutch can be unscrewed.

To lock the crankshaft, remove the front cover and fuel/oil tank assembly.

Insert a screwdriver between one of the flywheel counterweight bosses with the tip resting firmly against the flywheel retaining nut. (See Figure 6.) Do not support the screwdriver against any of the flywheel fins or fin breakage or bending may occur. Do not use an impact wrench to install the clutch as damage to the crankshaft, flywheel and/or starter assembly may result.



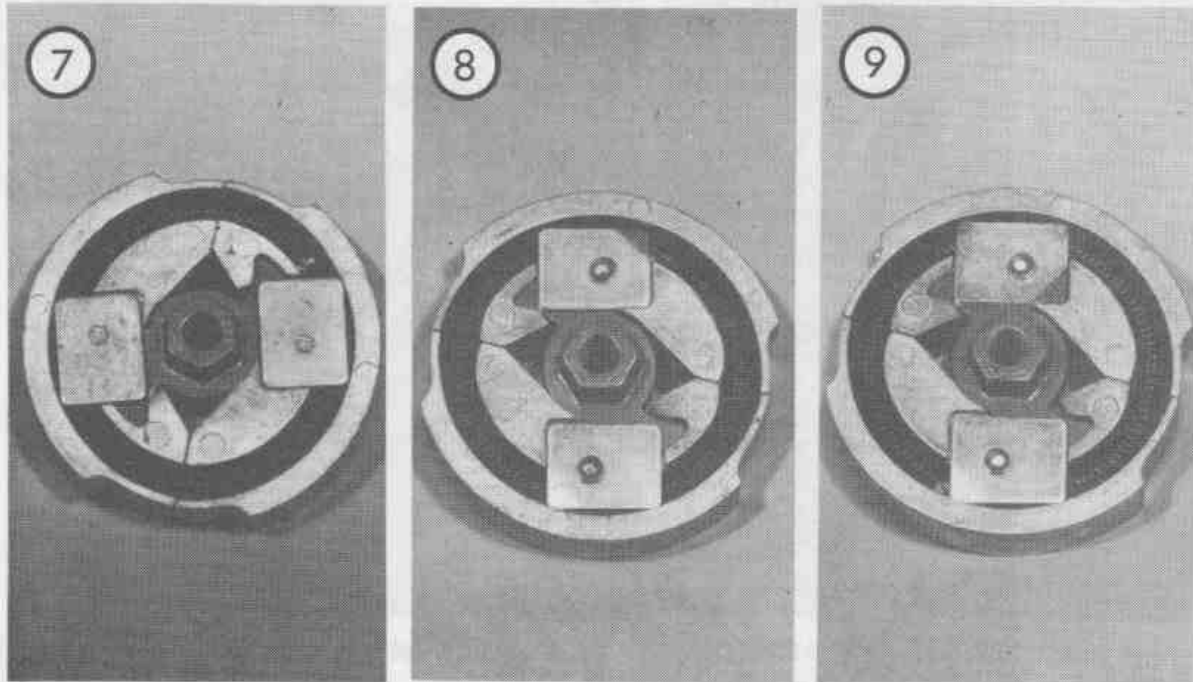
To remove the clutch use a 1/2 inch wrench. Facing the clutch side of the engine, turn the clutch clockwise to remove it and counterclockwise to install it. When installing the clutch tighten to 125 to 150 inch pounds.

CLUTCH REPAIR

The clutch spring retaining plates have been assembled on the clutch shoes in 3 different ways.

1. Both plates flat. (See Figure 7.)
2. Plates bent at one corner with the bent corner of both plates toward the spring. (See Figure 8.)

3. Plates bent at one corner with the bent corner of one plate towards the spring and the other plate with the bent corner facing up. (See Figure 9.)

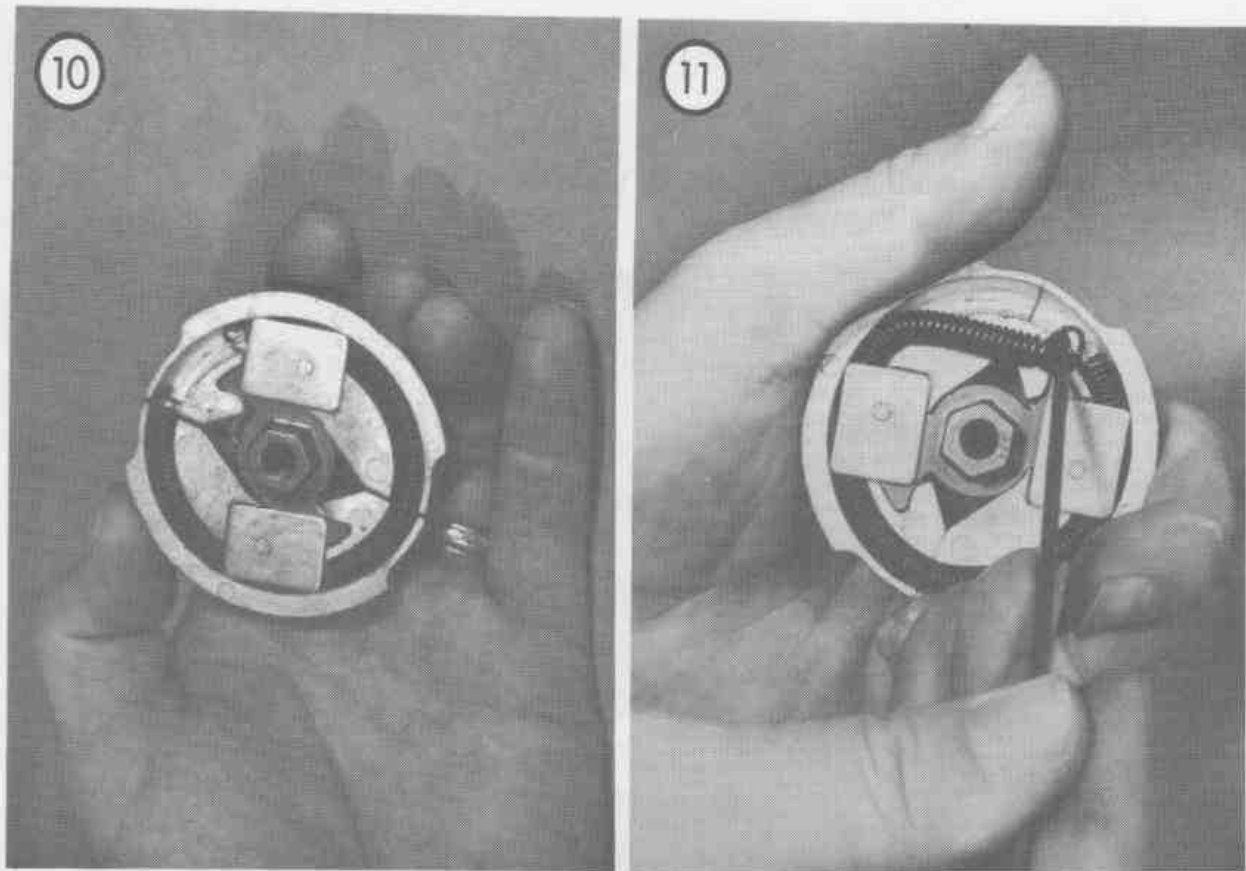


Clutch assemblies with the flat spring retaining plates are serviced as follows:

1. Use needle nose pliers or small blunt pick to lift spring out of clutch groove at spring "ends" location. If the hooked ends of the spring are under one of the retaining plates, rotate spring until hooked ends are accessible.
2. Use needle nose pliers to unhook spring ends.
3. Remove spring and replace or inspect clutch components. Replace broken or worn parts.

REASSEMBLY

1. Feed clutch spring into one shoe and place shoe onto clutch spider.
2. Feed spring into the other clutch shoe and install shoe on the spider.
3. Bring clutch shoes together and rotate spring so that spring ends are as near to one of the spring retaining plates as is possible. (See Figure 10).
4. Place the end of a small blunt pick through both spring ends. Move the pick in such a manner as to bring the two spring ends together. At this point a twisting motion of the pick will lock the spring ends together. (See Figure 11).



A good tool for this procedure is an ice pick which has had the tip blunted on a grinding stone.

CAUTION: Be extremely careful while using this type of tool.

5. Rotate the spring until the spring ends are as close as possible to one of the clutch retaining plates.

CAUTION: Do not locate the spring ends where the two shoes come together.

Clutch assemblies with spring retaining plates with bent corners are serviced as follows:

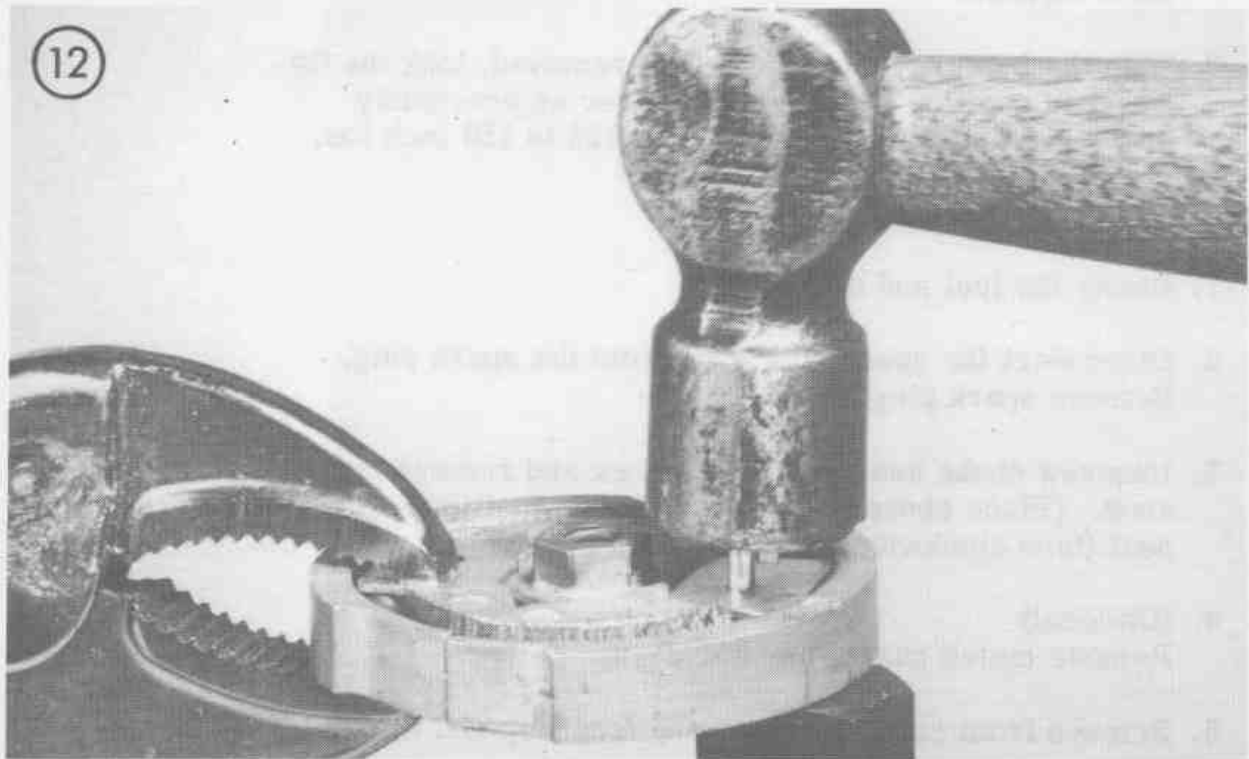
1. Remove both plates by grinding off the peened head of the rivets. Be careful not to hit the shoes with the grinding wheel. Retain the spring with vise grips until tension is relieved.
2. Punch out rivets with a $1/8$ inch drift pin.

ASSEMBLY

1. Place the shoes on clutch spider.
2. Install the clutch spring so that the attached ends of the spring are located underneath the bent corner plate when it is installed. Place a plate in position with the bent corner

up. Hold plate in position with vise grip pliers.

3. Insert a rivet through the other shoe and install the plate with the bent corner down resting between the attached spring ends. Peen the rivet until the plate is secured to the clutch shoe. (See Figure 12).



4. Remove the vise grip pliers, install the second rivet and peen until second plate is secure to second shoe.

CLUTCH DRUM AND SPROCKET ASSEMBLY

Whenever the clutch is removed, the clutch drum and bushing should be inspected for possible wear.

Rock the clutch drum on the crankshaft. Slight movement is normal. However, if, with the clutch assembly installed, the drum can be moved so that the inner diameter of the drum touches the clutch shoes, the clutch drum should be replaced.

Inspect the sprocket on the drum for wear. A badly worn sprocket will damage the chain and should be replaced. A new sprocket on a worn chain can extend the life of the chain.

Inspect the crankshaft at the clutch drum bearing area. If there are deposits from the bushing, they should be removed by polishing with a fine crocus cloth.

The bushing in the center of the clutch drum is not replaceable. Whenever installing a used or new clutch drum, always place a light coating of chassis lubricant on the bearing surface of the bushing just prior to installation.

INSTALLATION PROCEDURE

1. Install the sprocket washer and clutch drum assembly.
2. Place the clutch assembly on the end of the crankshaft and turn it counterclockwise until it bottoms on the crankshaft threads.
3. With the front cover and fuel tank removed, lock the flywheel in position with a screw driver as previously described and tighten the clutch to 125 to 150 inch lbs.

FAN HOUSING REMOVAL

1. Empty the fuel and oil tanks.
2. Disconnect the spark plug wire from the spark plug. Remove spark plug.
3. Unscrew choke knob retaining screw and remove choke knob. (Place choke butterfly in closed position) and gently seat (turn clockwise) the idle speed screw.
4. (Optional)
Remove clutch guard, bar and chain.
5. Remove front cover by removing front top and bottom screws.
6. Remove manual oiler push rod.
7. Remove the fuel/oil tank assembly by pulling it straight outward. Clean all foreign material away from the surface of the tank. Use needle nose pliers to pull the fuel filter out of the fuel passage opening and clean the filter carefully. The filter is held in place in the tank by a Pin, P/N 84057, approximately 1/2 inch long and running through the filter 0.180 inch from the exposed end. When reinstalling the filter, be sure it is placed all the way into the fuel discharge opening until the pin rests against an inner rib approximately 1/2 inch inside the opening.

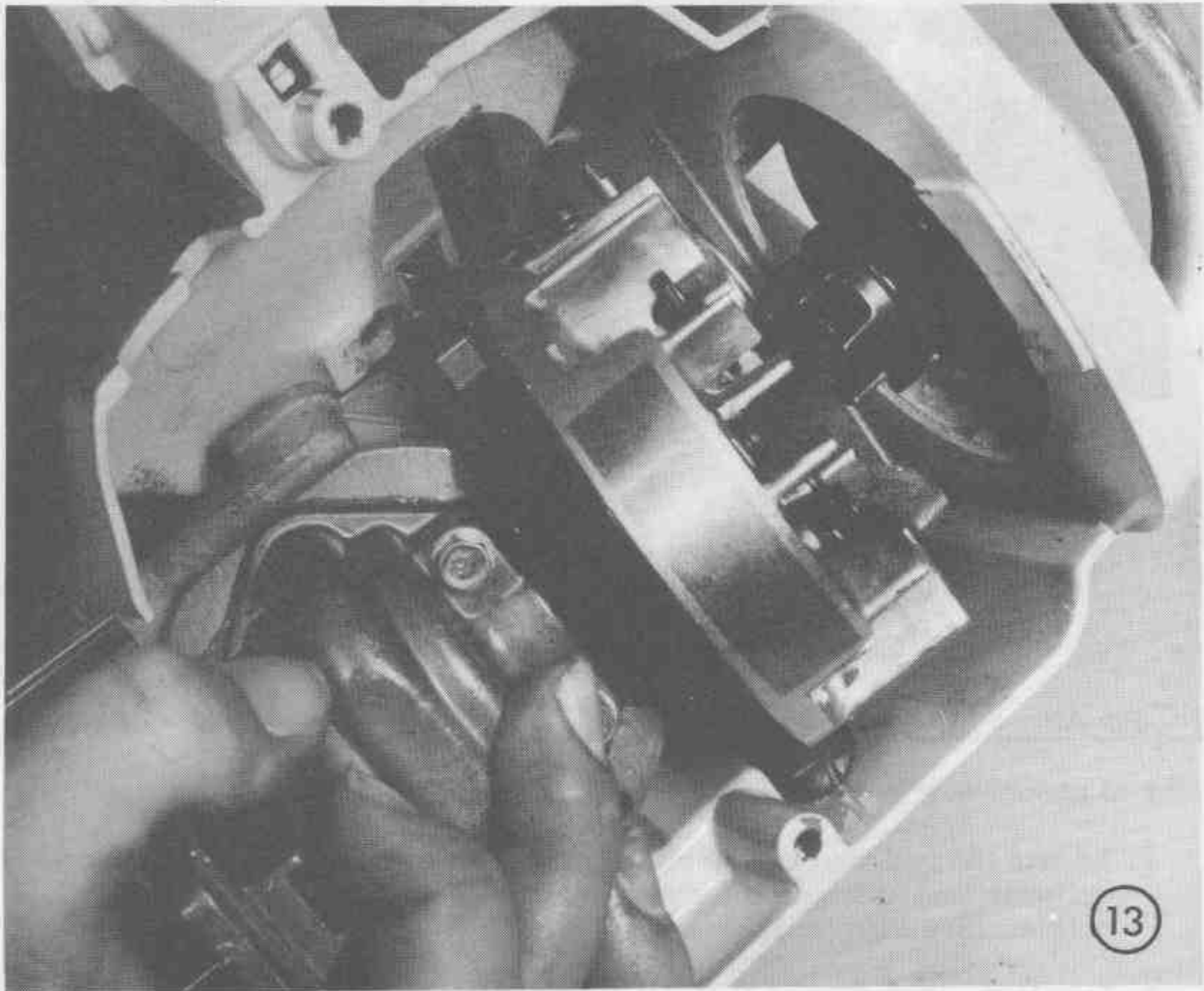
NOTE: (The discharge areas must be kept clean or foreign material will get into the two systems and cause a malfunction).

8. Disconnect the throttle rod from the throttle trigger with needle nose pliers. The throttle rod is a snap fit to the slot in the throttle trigger.
9. Remove air filter cover, air filter and round rubber seal which is attached to carburetor flange area.

10. Remove the three fan housing-to-engine retaining screws. One screw is located just behind the carburetor air inlet in a recessed area in the casting. The second screw is located just under the throttle trigger. The third screw is located on the bottom, front of the fan housing. Do not remove the frame and plastic handle screws.

The fan housing can now be removed.

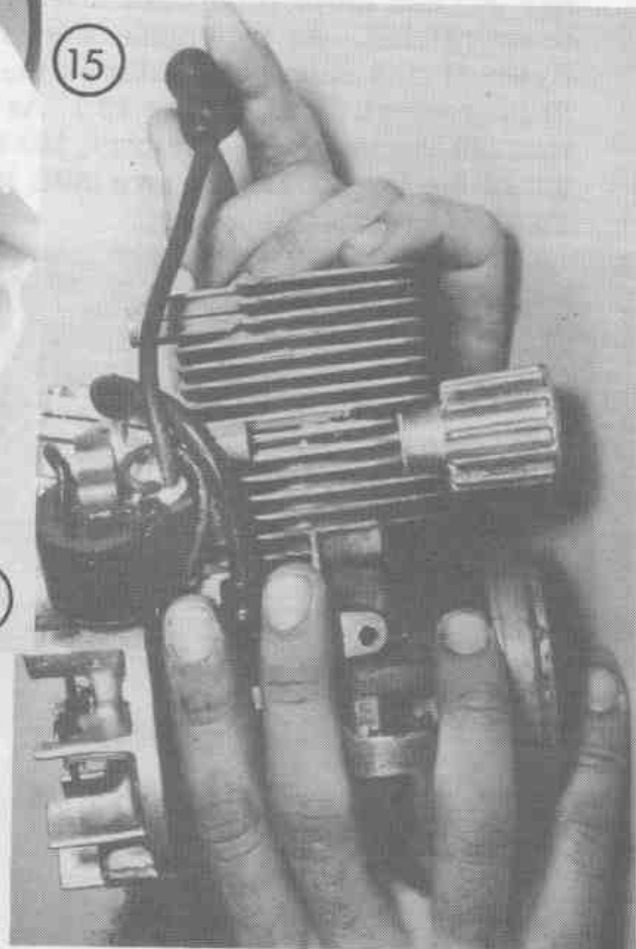
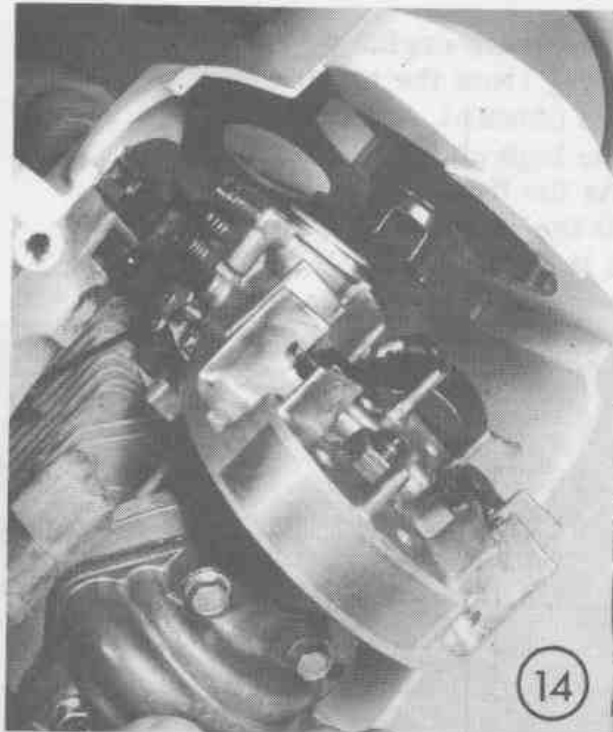
11. Put switch in the "On" position. Grasp the engine by the bar pad and move it outward and away from the starter drum ratchet. As the engine moves outward, one of the flywheel fins must pass between the legs on the starter drum ratchet. (See Figure 13) As the flywheel fin starts through the legs of the ratchet, lift the spark plug wire out of the fan housing groove until it is free in the large spark plug access opening.



Continue to pull the engine outward and away from the starter drum until the flywheel clears the starter drum ratchet.

12. When the flywheel has cleared the starter ratchet, the engine must be moved further away from the starter ratchet until the air inlet section of the carburetor is clear. (See Figure 14).

With the carburetor clear of the starter ratchet, pull the spark plug boot through the spark plug opening in the fan housing and move the engine out and away.



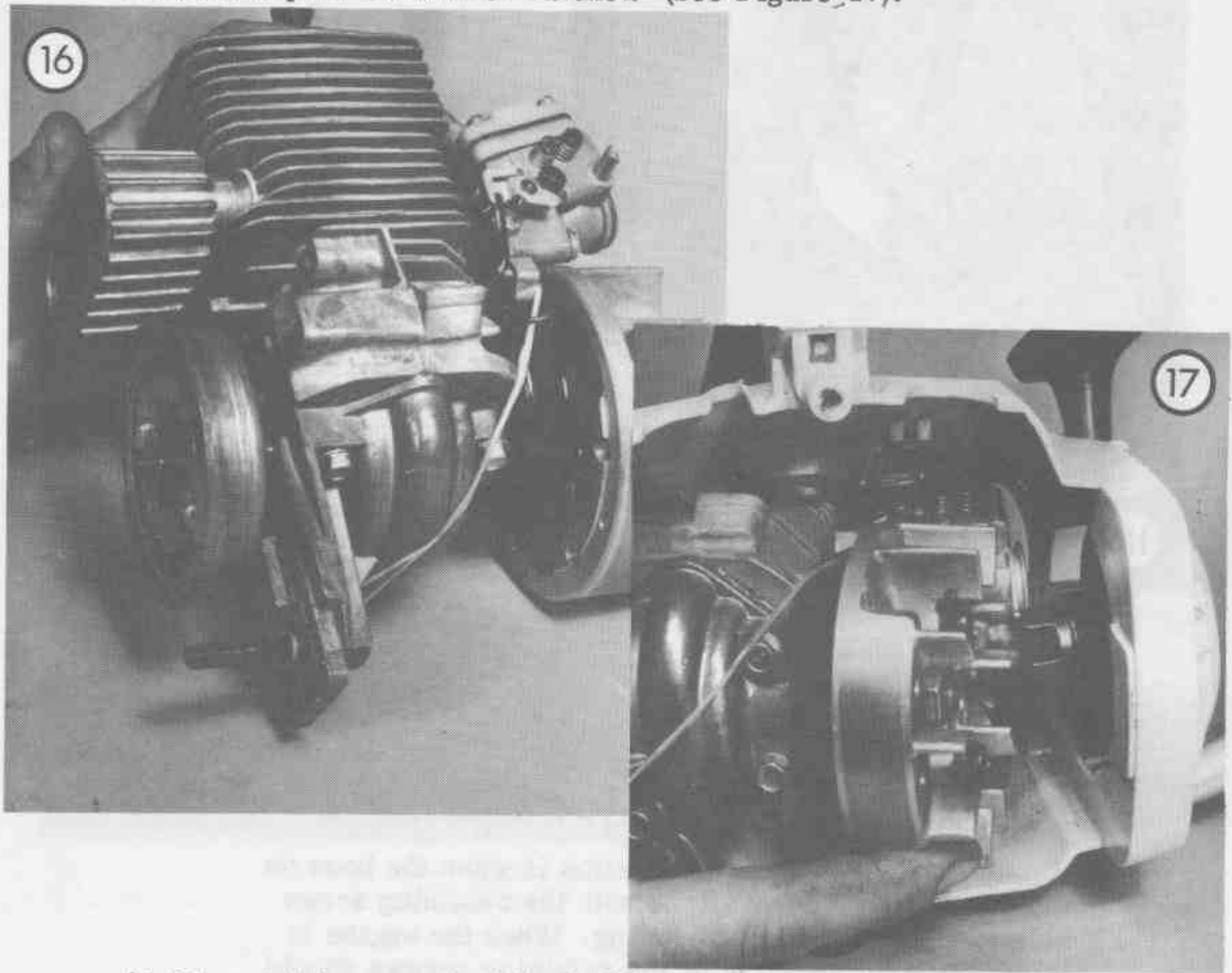
ENGINE AND FAN HOUSING ASSEMBLY PROCEDURE

Prior to assembling the fan housing onto the engine:

1. Locate the fuel line between the spark plug wire and cylinder fins and feed it forward towards the crankcase bottom. (See Figure 15).
2. Install the throttle rod to the throttle shaft plate on the carburetor and secure the opposite end to the ignition ground strap on the breaker box with a rubber band as shown in Figure 16. Should the throttle rod become disconnected during fan housing installation, the fan housing must be removed to reattach the throttle rod.

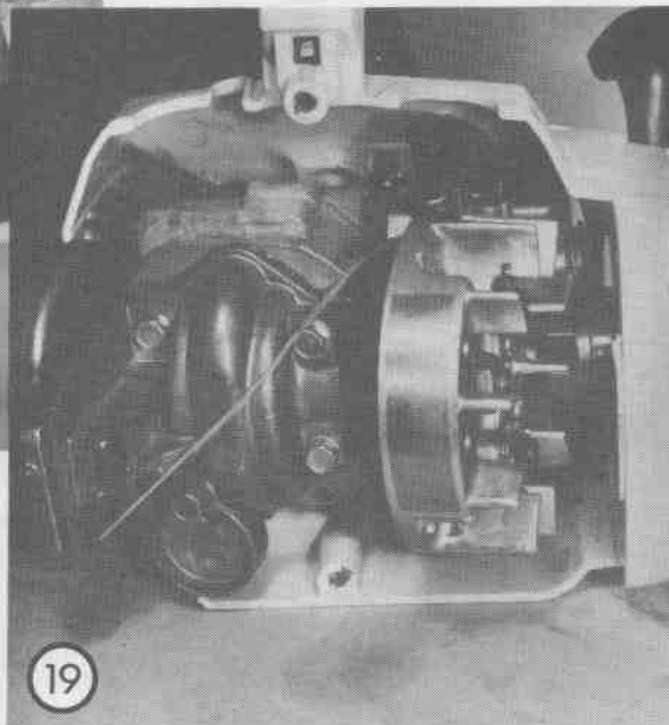
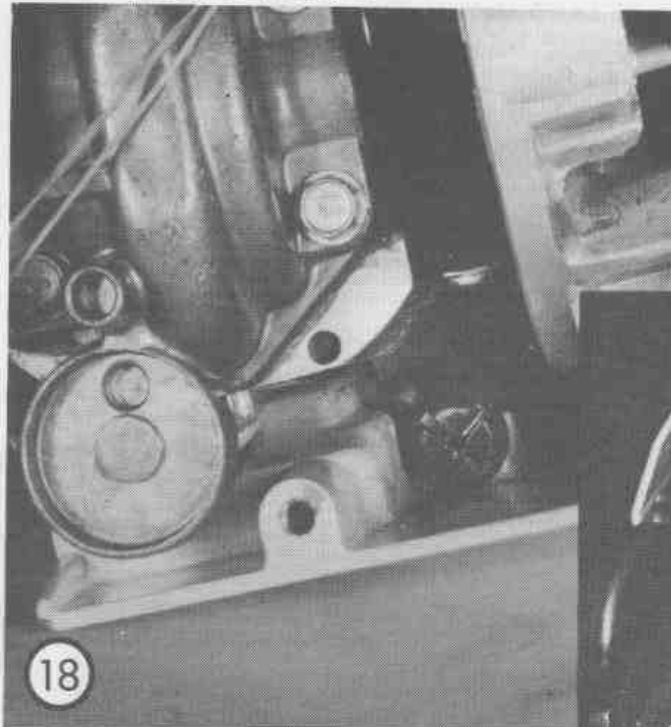
The rubber band procedure prevents the throttle rod from becoming disconnected during fan housing installation.

3. Installation of the fan housing is similar but in reverse steps to the fan housing removal procedure. Start the engine into the fan housing. Be sure the switch is in the "Run" position. The first step is to insert the cylinder assembly until the carburetor inlet opening is inside and past the starter ratchet. (See Figure 17).



At this point, be sure that the fuel line is between the two die cast ribs in the bottom of the fan housing. These ribs act as a guide for the fuel line during engine installation and also firmly support the fuel line. (As Shown in Figure 18) As the engine is inserted in the fan housing, feed the spark plug boot through the rear opening in the handle. Once you have the boot through the opening, use a smooth round tool to feed the plug wire down the slot to the bottom of the opening. As the engine installation continues, keep the slack out of the plug wire. Do not pull too hard or you may pull the lead wire out of the coil.

The flywheel should be rotated clockwise between the legs on the starter ratchet. A flywheel fin must pass between the starter ratchet legs to properly install the engine. (See Figure 19) Continued rotation of the flywheel is required to engage the pawls with the starter ratchet. When this engagement occurs the engine is fully and properly installed.



Another guide for final installation is when the boss on the top of the cylinder aligns with the retaining screw hole in the top of the fan housing. When the engine is fully installed, all three of the retaining screws should be installed to prevent the engine from shifting while assembling the rest of the unit. Once you have installed the three fan housing retaining screws, attach the throttle rod to the trigger using a pair of needle nose pliers. The throttle rod should snap into place quite easily. Use a needle nose pliers to remove the rubber band after the throttle rod has been installed in the trigger.

4. Install the choke knob and knob retaining screw. The choke plate should be in the closed position during the knob installation. After the choke knob is installed, turn the engine over several times with the spark plug removed to be sure all components function properly.

Install the fuel/oil tank and front cover along with the manual oiler rod and secure the two front cover retaining screws to a torque value of 55 to 60 inch lbs.

NOTE: Be sure the oiler rod is correctly positioned over the manual oiler piston which is located near the oil tank filter cap before tightening the two front cover screws.

STARTER ASSEMBLY

To service the starter assembly (rope, spring and drum), the fan housing must be removed from the engine.

To service the starter spring, remove the starter rope handle and allow the drum to unwind slowly.

Remove the starter drum retaining screw and washer from the drum. Feed the starter rope to the inside of the fan housing and carefully remove the drum so that the spring does not become dislodged. Use a pair of needle nose pliers to lift the coiled spring out of its seat. The spring is under tension, so use caution.

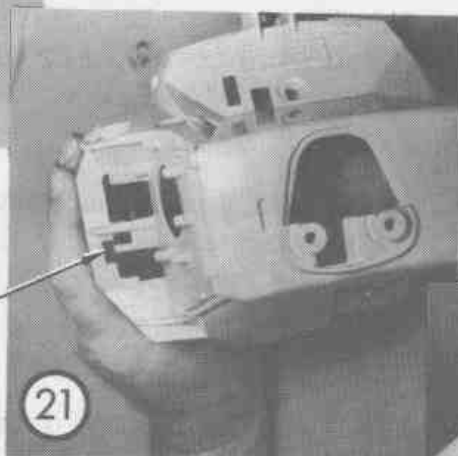
A nylon bushing on the starter post should be inspected and replaced if excessively worn or otherwise damaged. A light coating of chassis grease should be applied to the nylon bushing before the starter drum is reinstalled.

To reinstall the starter spring, feed the outer end of the spring outward through the spring retaining notch. See Figure 20 in the fan housing. Pull all but approximately two coils of the inner end of the spring out through the opening. Seat the inner coils within the recess.

Insert the starter drum on the starter post and rotate the drum clockwise until it fully engages the inner end of the starter spring. Continue to turn the drum clockwise until the starter spring is completely wound into the fan housing. (See Figure 21) Be sure the outer end of the spring is properly anchored in the relieved area in the fan housing. Carefully release the spring tension on the drum. The drum can now be removed to install the starter rope. When the starter rope and drum are reinstalled in the fan housing, replace the starter drum retaining screw and washer to prevent the drum from disengaging from the spring when the starter rope is wound onto the drum.



OUTER END OF SPRING
PROPERLY ANCHORED



WINDING ROPE

With the handle attached to the starter rope, draw a small amount of slack rope to the inside of the starter assembly and engage it into the notch in the O.D. of the drum. (See Figure 22) Rotate the starter drum two turns clockwise with the rope in the notch. Then allow the rope to retract on the drum.

Proper spring tension allows the rope to rewind so that the handle stands upright in the cradle.

With the starter rope pulled all the way out, turn the drum clockwise. It should turn one to two inches which indicates the spring is not wound too tight.

If the drum cannot be turned, the spring is bottomed out. Repeat the winding procedure except rotate the drum one less turn during the rope winding procedure.

THROTTLE TRIGGER

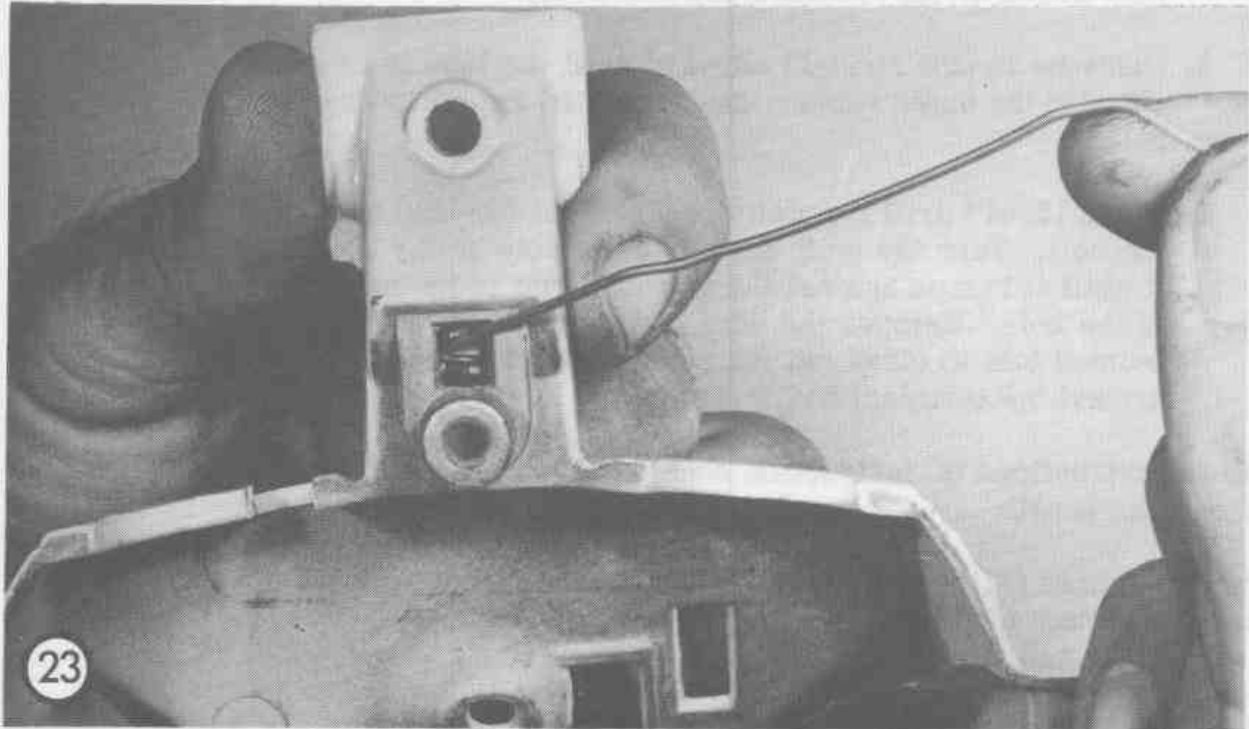
To remove or install the throttle trigger and return spring, remove the plastic handle and frame, the front cover and fuel/oil tank assemblies.

Remove the throttle rod from the throttle trigger at the inner end of the trigger.

Rotate the flywheel until the magnet lamination is opposite the ground strap end at the top of the breaker box.

As the throttle rod is disconnected from the trigger, move it over against the flywheel until the magnet in the flywheel holds it securely in place. This procedure prevents the throttle rod from accidentally becoming disconnected from the throttle shaft during service procedures.

To remove the throttle trigger and return spring from the spring retaining post, shape a paper clip as shown in Figure 23. Insert the small hooked end of the paper clip into the opening in the front part of the casting and hook onto the spring end. Pull outward until the spring can be moved downward and away from the post. Once the spring is removed from the post, the throttle trigger and spring can be disassembled.



To replace the trigger and spring, attach one end of the spring to the trigger and install the trigger, spring first, into the recessed opening in the fan housing. Insert the paper clip through the front opening, hook onto the spring and pull outward until the spring can be fed up onto the spring retaining post.

As soon as the spring is retained in position, reconnect the throttle rod to the trigger end. Reassemble the plastic handle, frame assembly, fuel/oil tank and front cover. When installing the fuel/oil tank, make sure all foreign material is removed from the fuel and oil lines and also from around the fuel and oil tank discharge openings; otherwise, foreign material can get into the two systems and cause a malfunction.

COIL HIGH TENSION LEAD REPLACEMENT

Use high tension Lead Kit, P/N 69966.

Should the coil high tension lead require replacement, an instruction sheet in the above kit should be read thoroughly before servicing the coil.

REMOVING DEFECTIVE LEAD FROM COIL

1. Remove coil from engine.
2. Grasping coil in one hand, pull straight outward on coil lead with other hand.

(Caution: Do not twist to remove coil lead as the lead may break at its entrance point to coil.)
3. Continue to pull straight outward until the lead is removed. Usually the outer rubber insulation will remain in the lead hole.
4. Use a 13/64" drill manually to clean out the lead hole in the coil. Turn the drill down into the hole gently rotating it until it bumps against the terminal rod in the bottom of the hole. Remove the drill and use a small pick or pointed tool to clean out the remaining lead material around the terminal rod.

Follow instructions on instruction sheet, P/N 69965 for cutting the new lead to the correct length.

Place a sealant (Plio-bond, RTV 737 or equivalent) approximately 1/4 inch up from the bottom of the new lead.

Insert the lead into the hole in the coil until it bottoms on the terminal rod. When the lead wire is fully inserted onto the terminal rod, place a small amount of sealant around the area where the lead wire enters the coil. This will give additional protection against moisture.

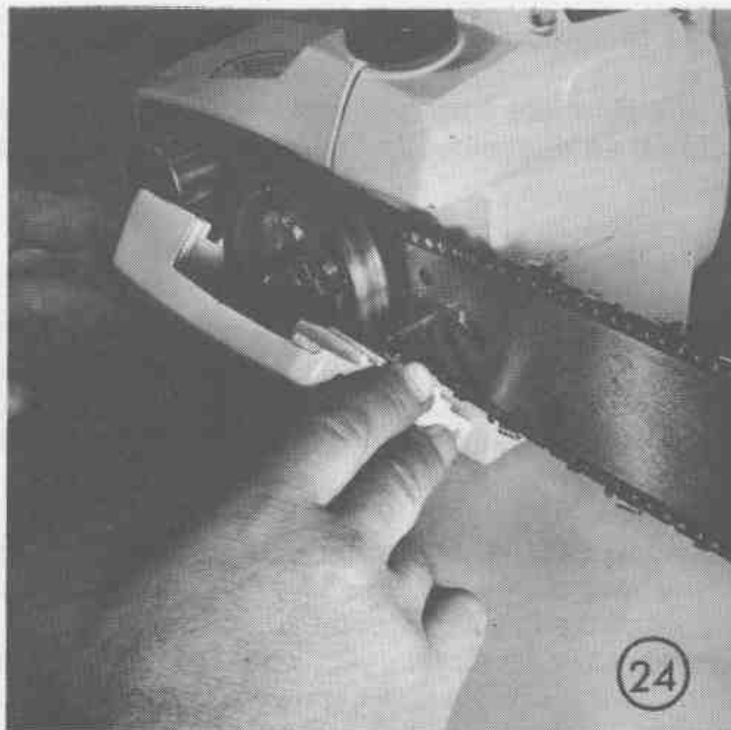
Replace the wire spring clip in the end of the boot. A light coating of oil on the spark plug boot will make it easier to install over the wire clip.

BAR AND CHAIN INSTALLATION

1. To install the chain, lay it sideways between the top of the fan housing and outer diameter of the clutch drum. As the

chain drops into position, feed the chain upright around the back of the sprocket in the muffler stack area.

2. Feed the chain onto the sprocket and place the bar on the bar bolt and bar pad mounting area.
3. Place the chain on the bar and then pull outward on the bar until the chain is tight.
4. Install the clutch guard assembly being sure that the bar adjustment tab, on the inside surface of the guard, fits into the round hole in the bar. Turn the bar adjusting screw to align the adjustment tab with the hole in the bar. (See Figure 24). Turning the screw clockwise moves the tab toward the front of the saw and also tightens the chain when being adjusted to correct a too loose condition.



Turning the screw counterclockwise moves the bar adjustment tab to the rear of the saw and also loosens the chain to correct a too tight condition when the clutch guard is installed.

5. With the clutch guard properly in place flush with the bar, install the clutch guard retaining nut and screw it in until it gently holds the clutch guard flush against the bar.
6. Screw in on the bar adjusting screw while holding up on the outer end of the bar. Turn the adjustment screw

until the chain is snug on the bar but moves freely around the bar when pulled by hand. Use gloves or other protection for your hands.

7. Tighten the clutch guard retaining nut--when proper chain tension is accomplished. Do not over tighten.

CYLINDER DISASSEMBLY PROCEDURE

Remove the cylinder from the fan housing.

NOTE: (See fan housing removal section).

When disassembling the cylinder assembly for replacement of any internal parts, it is not necessary to remove the exhaust stack and coil/carburetor assemblies.

Valuable time can be saved by utilizing the following procedures:

1. Remove the automatic oiler where applicable.
2. Lock the flywheel with a screwdriver and remove the clutch as described in "Clutch and Clutch Drum" section.
3. Remove the clutch drum and spacer washer.
4. Remove the flywheel by locking it with a screwdriver on one of the counterweight bosses and remove the flywheel retaining nut. Light tapping on the end of the crankshaft with a plastic mallet will loosen the flywheel from the taper on the crankshaft.
5. Unsnap and remove the breaker box cover, two breaker box retaining screws and condenser retaining screw. Disconnect the primary terminal wire at the coil. The Entire breaker box assembly, condenser and primary terminal wire can now be removed as a complete assembly. Do not remove the terminal screw on the side of the breaker box unless the breaker points and/or condenser are to be replaced.
6. Remove the four crankcase to cylinder retaining screws and remove the crankcase bottom.
7. The crankshaft, connecting rod and piston assembly can now be removed as one unit.

On each side of the crankshaft is a needle bearing and seal. The bearings are the same and when reinstalled should have

the lettering on the side of the bearing case facing out.

The crankshaft seals are also the same and should have the seal lip and spring facing in when reinstalled.

PISTON ASSEMBLY

The piston assembly on the Mini-Mac 6 uses two closed end bearings. You will observe that one bearing boss has a recessed "window" in the side of the piston while the other bearing boss bore runs out to flush with the outer face of the piston and is "windowless". It is this "windowless" side of the piston that must face the exhaust port in the cylinder when the piston and rod assemblies are installed onto the crankshaft.

To replace the piston assembly and/or connecting rod, unscrew the two rod cap retaining screws and remove the connecting rod and piston assembly from the crankshaft.

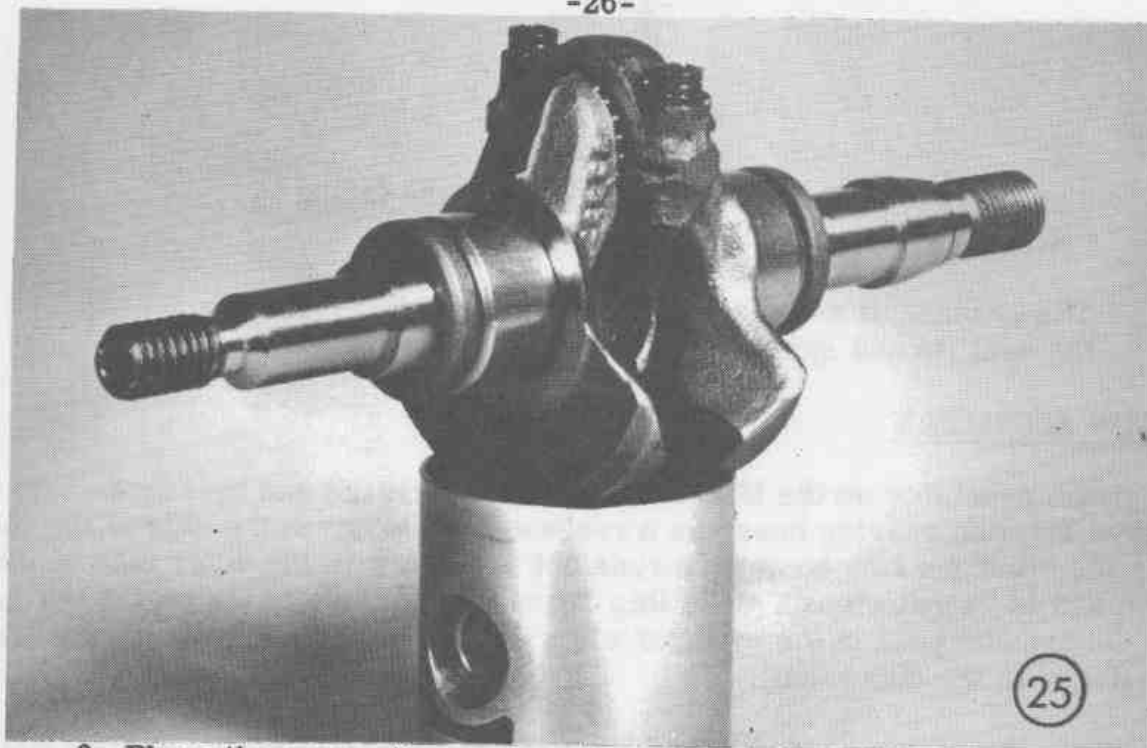
NOTE: Be sure that all twenty (20) of the connecting rod needle bearings are accounted for and placed in a clean container along with the rod cap and rod cap retaining screws.

A piston pin bearing and pin driver kit will be available in the near future. An instruction sheet will be included with the kit.

CYLINDER ASSEMBLY PROCEDURE

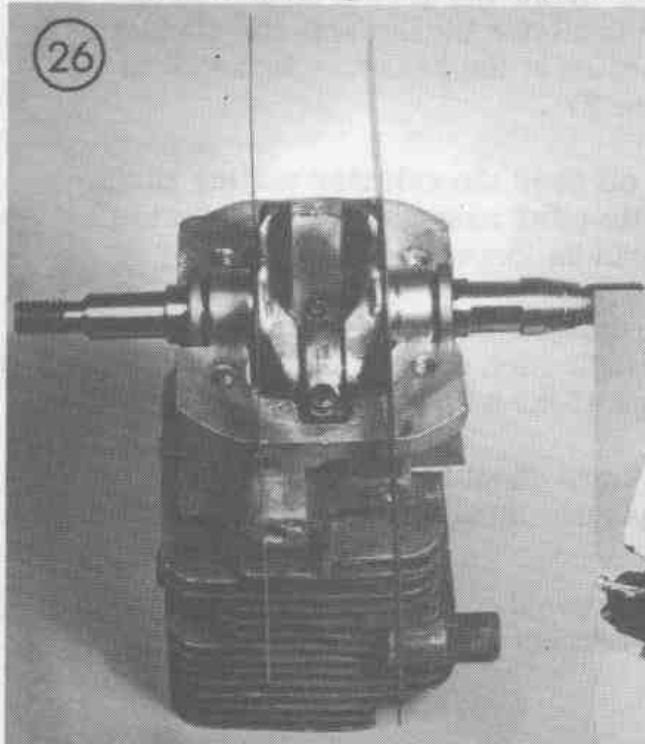
The connecting rod and piston are assembled onto the crankshaft so that the "windowless" side of the piston faces to the clutch side of the crankshaft. (See Figure

1. Install the two cast iron piston rings onto the piston.
2. Place a light coating of grease on the bearing surfaces of the rod and rod cap. Put 10 of the needle bearings in the connecting rod and 10 in the rod cap. Make sure you use all twenty rollers.



3. Place the connecting rod on the crankshaft with the "windowless" side of the piston on the same side as the clutch end of the crankshaft. When installing the rod cap, make sure to line the pip on the connecting rod with the pip on the rod cap. Install the rod screws and tighten them to a torque value of 35 to 40 inch pounds. Be sure the cap and rod are properly aligned together before tightening the screws. (See Figure 25).
4. Next add a light coat of clean 30 or 40 weight non-detergent oil to the crankshaft needle bearings, oil seals and bearing surfaces on the crankshaft. Install the crankshaft needle bearings with the lettering side of the bearing case facing out. Both crankshaft needle bearings and oil seals are the same. Install the two crankshaft seals onto the crankshaft with the seal lips facing in.
5. Light pressure on the piston during installation into the cylinder will be enough to safely compress the rings into the piston ring grooves. Always clean the cylinder and crankcase bottom before assembly of the piston and crankshaft and spread a light coat of sealant on the crankcase mating surfaces and crankshaft needle bearing bores.
6. After installing the crankshaft assembly into the cylinder, position the connecting rod in the center of the crankcase and position the crankshaft throw in the center of the connecting rod. Space both crankshaft needle bearings away from the crankshaft thrust surface, .015". (See Figure 26). Once the connecting rod is centered in the

crankcase and the crankshaft then adjusted to center the rod on the throw, the shaft must not be moved while the bearings are being shimmed away from the crankshaft thrust surface .015". Use two feeler gauges to position the bearings. This will keep the crankshaft throw and connecting rod aligned in the center of the cylinder. With the feeler gauges in place, push both oil seals up against the needle bearing cages.



7. After the crankshaft assembly is positioned in the cylinder, install the crankcase bottom. Always place the bar mounting bolt in the crankcase bottom on the same side as the clutch end of the crankshaft. Install the four crankcase bottom mounting screws and torque them to 70 to 75 inch pounds. At this point of cylinder assembly, follow the reverse procedure as is described for cylinder disassembly.

NOTE: Refer to S.I. 17 ignition wall chart and Power Mac 6 shop manual for timing procedures and coil test specifications.

PRESSURE TESTING THE CYLINDER

Install the automatic oiler assembly where applicable. Install the spark plug and tighten. The exhaust port adapter, Part No. 68917, and the intake adapter, Part No. 68918, are the same adapters used for pressure testing the Power Mac 6.

The exhaust port adapter can be installed by using the same mounting screws that are used to install the exhaust stack. Next, install the intake adapter and adapter screws on top of the carburetor insulator block using the standard carburetor insulator mounting gaskets and connect the pressure test tool to the fitting on the intake adapter. (See Figure 27).

By spreading a thin coat of light weight oil over the cylinder mating surfaces, crankshaft seals and around the automatic oiler assembly or by submerging the unit in clear solvent, the entire engine can be inspected for leakage.

If any leakage is observed coming from the automatic oiler discharge hole located in the blade pad, this will be an indication of wear to the automatic oiler piston bore and will also indicate leakage at the automatic oiler check valve.

With the pressure gauge reading 5 psi, there should be no sudden decrease in pressure, however, 1 pound pressure loss per minute is acceptable and normal.

If any of the pressure testing procedures reveal a leak, check the following items before replacing the necessary parts to correct the leakage:

- A. All screws tight?
- B. All gaskets in place?
- C. All gaskets sealing surfaces clean and flat?
- D. All component parts assembled in their correct sequence?

Should air leakage be observed at the crankcase halves, the crankcase cover should be removed, the mating surfaces cleaned and a new application of sealant applied. (Plio-Bond or equivalent)

Do not apply too heavy a coating of the sealant to the mating surfaces as excessive sealant may extrude internally and damage the bearing surfaces when the engine is first operated.

TOOLS FOR SERVICING THE MINI MAC 6 AND 6A

1. 1 ea. — 1/4" drive ratchet and 6" extension
2. 1 ea. — 1/4" drive 5/16" socket
3. 1 ea. — 1/4" drive 7/16" socket
4. 1 ea. — 1/4" drive 1/2" socket or 1/2" box wrench
5. 1 ea. — 1/4" drive 1/4" socket
6. 1 ea. — 3/8" drive ratchet
7. 1 ea. — 3/8" drive 5/8" socket
8. 1 ea. — 3/8" drive 9/16" socket
9. 1 ea. — 7/64" Allen Wrench
10. 1 ea. — 5/16" Box Wrench
11. 1 ea. — Narrow screwdriver for carburetor adjustment
12. 1 ea. — Feeler gauge set (1 ea., .018 — 2 ea., .015)
13. 1 ea. — Regular screwdriver
14. 1 ea. — Needle nose pliers
15. 1 ea. — 25 to 300 inch lb. torque wrench

SPECIAL TOOLS FOR PRESSURE TESTING & ELECTRICAL TESTING

1. Piston Pin & Bearing driver kit (Part Number will be announced).
2. 1 ea., Pressure Test Tool, P/N 62849, with PM-6 intake, P/N 68918 and exhaust, P/N 68917, adaptors.
3. 1 ea., PM-6 Timing Tool, P/N 83687.
4. 1 ea., Continuity light or meter.
5. Merc-O-Tronic Tester.

TORQUE SPECIFICATIONS

<u>Description</u>	<u>Screw Size</u>	<u>Torque Lbs/In.</u>
Conn Rod	6-40	35-40
Crankcase to Cylinder	12-24	70-75
Breaker Box	8-32	25-30
Breaker Bracket	8-32	25-30
Flywheel Nut	3/8-24	265-325
Fan Housing to Cylinder	12-24	55-60
Fuel Tank Cover	12-24	55-60
Main Handle Rear	12-24	55-60
Main Handle Front	Special (Hi-Low)	40-45
Frame Bottom	12-24	55-60
Carburetor & Coil to Cylinder	8-32	35-40
Clutch Assembly to Shaft	5/16-18	125-150
Spark Plug	14-MM	144-180
Muffler to Cylinder	10-24	55-60
Breaker Spring Retainer	6-32	20-25

GENERAL NOTES:

All torque values are assembly torque values with dry or Loctited threads prior to engine test unless otherwise specified.