McCULLOCH

# SERVICE BULLETIN #1065

SUBJECT Review of Factors Contributing to Marginal Engine Performance

MODEL ALL CHAIN SAW ENGINES

DATE 7/22/59

A chain saw engine that runs poorly and cannot deliver sufficient power when it is needed is of very little use to the chain saw user. In many cases the source of trouble can be found quickly. The engine may only need a minor adjustment or change (such as a spark plug replacement) to restore lost power. At other times a complete overhaul of the engine may be necessary.

One or many things may cause an engine to fail. For this reason, a systematic plan of checking the engine is the best and most dependable way to find the source of trouble. Some of the important points that should be checked when an engine is not producing enough power are covered in the list below.

1. FUEL SYSTEM

a. Fuel Venting - The fuel cap vent hole should be fully open and free of dirt and sawdust. If the vent hole is plugged, it may cause the engine to run lean and lose power since there will be no way to relieve the "suction" caused by the fuel flowing to the carburetor. A plugged vent can also cause flooding by not relieving pressure which builds up as the fuel temperature rises in hot weather.

Another type of venting, the fuel vent orifice assembly, used in fuel caps and also in the fuel tanks of the new model engines, contains a self-cleaning wire which jiggles freely from engine vibration. If the orifice should become plugged with sawdust, the complete assembly should be removed from the engine and cleaned with gasoline or solvent (see the applicable Service Bulletins).

Most fuel tank vents require from 1/2 to 2 pounds pressure to operate. During the summer months, the heat from the engine combined with higher temperatures, causes the tank pressure to increase and results in a condition known as "Fuel Boiling". Fuel boiling results when the fuel cap is removed and the pressure in the tank drops sharply. The drop in pressure allows the lighter elements of the fuel to bubble in exactly the same fashion as a bottle of soda bubbles when the cap is removed. In both cases the boiling can cause trouble; the soda can eventually become flat and the fuel can eventually loose the lighter fuel

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fractions so that the engine becomes harder to start. In actual practice, the fuel is used up before this has a chance to occur.

b. Felt Fuel Wick - Fuel passage will be stopped if dirt and water plug the felt fuel wick. If inspection shows that dirt and water are present, it will be practical to replace the wick with a new one (see Service Bulletin #237). If the wick is only water-soaked, remove and dry in open air. Do not use an oven or any type of flame to dry wicks since they are combustible. Engines which have been stored may pick up moisture in the fuel tank through condensation.

c. Carburetor - Many of the causes for poor engine performance can be blamed on the carburetor. Dirt and small metal "fines" are often responsible for stopping fuel flow in the carburetor passages. Other factors that may cause malfunction are improper adjustments of the idle and high speed adjustment needles and parts that may be damaged or worn.

When adjusting the carburetor, follow the directions in the Operation and Maintenance manuals to avoid an excessively lean setting of the high speed adjustment needle. The latest Service Bulletins covering carburetor adjustment and repair on various model engines are as follows: #1000, #1022, #1031, #1036, #1042, #1048 and #1056.

2. IGNITION

a. Spark Plug - A chain saw engine cannot function properly if a spark plug of the wrong heat range is used. A spark plug that is too "cold" will oil-foul excessively, while a plug that is too "hot" will result in pre-ignition.

A champion J8J spark plug, or the equivalent, should be used in McCulloch chain saw engines. However, under certain operating conditions (continuous operation under heavy load or operation of the engine in areas of high temperatures) the use of a spark plug of cooler design than the J8J may be advisable. Cooler plugs that we recommend are the J7J, J6J and H0-3 in descending order. The length of insulation between the firing end of the plug and the plug body determines the coolness of the plug. The shorter the insulation, the faster the heat is dissipated and the cooler the plug. The H0-3 has the coolest range and is designed for hot weather conditions where pre-ignition may occur. Its center electrode is platinum-tipped for long life under severe fouling conditions.

After removing the spark plug from the engine, an examination will reveal whether a change to a different heat range is necessary. If the spark plug (at the electrodes) appears to be white in color, with a powdery coating on shell and electrodes, with indications of "cooking" of the insulator, the spark plug is too hot and a cooler plug should be installed.

If the insulator is black in color, and the shell and electrodes appear coated with an oil-film, the plug is too cold and it should be replaced with a plug having a higher heat range.

If the insulator appears reddish-brown in color, and with no signs of "cooking", and the shell and electrodes appear normally clean, it can be assumed the spark plug is of the correct heat range.

b. Breaker Points - Another reason for poor engine performance may be incorrectly timed, misaligned, badly pitted, or oxidized breaker points. When replacing or adjusting breaker points, follow the instructions in the McCulloch maintenance manuals. Always replace breaker points as a complete assembly; never as individual parts!

c. Coil and Lamination Assembly - The coil and lamination assembly normally requires little cleaning or maintenance. However, to insure maximum efficiency, it should be adjusted so that the core legs and the flywheel have a maximum clearance of .012 inch.

3. INTERNAL ENGINE

If sawdust, dirt and other abrasive materials coat the cylinder fins and block the exhaust port, the engine will become overheated and lose power.

When the cylinder fins become coated with sawdust or other material, these act as a blanket and prevent the passage of the heat of combustion. In addition, the flow of cooling air is restricted. As a result, engine temperature increases rapidly. When this occurs, the overheated engine soon destroys the protective oil-film on the cylinder wall. The loss of lubricant increases friction and the piston rings and cylinder wall become scored (see Service Bulletin #1054).

Scoring will also result if the exhaust port is partly blocked. Carbon "flakes", sawdust, dirt, etc., may be drawn into the combustion chamber on the downward stroke of the piston as it approaches bottom dead center. These abrasives can quickly cause ring and cylinder wear.

Loss of engine power can also be caused by poor compression. If the engine pulls over too easily and the spark plug is tight, remove the spark plug and check with a compression gauge. Any reading below 100 lbs indicates a major overhaul is required.