charge reading is 1.260 + or − 0.015. Under 1.210 battery needs recharge.

Attempt to turn engine flywheel with a suitable flywheel turning tool to make sure the engine is free, the engine itself may be seized.

Starter Switch Defective — Replace switch.

Open Circuit in Wiring — Inspect and test all wiring.

Inoperative Starter — Inspect the starting motor for loose brush holders, worn or corroded brushes or corrosion on the commutator. To test the starting motor, disconnect the battery cable at the solenoid switch and touch it firmly to the solenoid starter terminal, now if the starting motor operates, the trouble is not in the starting motor. If the starting motor fails to operate and a heavy arc occurs when the cable touches the solenoid starter terminal, a mechanical lock-up of the motor or pinion, or a grounded condition in the motor may be the cause. Failure of the starting motor to operate and no arc in the preceding test indicates poor brush contact or an open circuit in the motor winding. Repair or replace the starting motor as required.

STARTER TURNS BUT DRIVE PINION DOES NOT ENGAGE

Starter Clutch Slipping — Replace drive.

Broken teeth on Flywheel Drive Gear — Replace flywheel ring gear (see your Chrysler Industrial Engine Dealer).

Armature Shaft Rusted, Dirty or Dry, Due to Lack of Lubrication— Clean, test and lubricate (See your Chrysler Industrial Engine Dealer).

SOLENOID PLUNGER VIBRATES BACK AND FOURTH WHEN STARTER SWITCH IS ENGAGED

Battery Low — Test specific gravity of battery. Recharge or replace battery.

Faulty Wiring — Test for loose connections at starter switch and solenoid; repair as necessary.

Lead or Connections Broken Inside of Solenoid Switch Cover — Test and if necessary replace solenoid.

STARTER OPERATES BUT WILL NOT DISENGAGE WHEN STARTER SWITCH IS RELEASED

Defective Starter Switch — Replace Switch.

Defective Solenoid — Replace solenoid.

STARTER PINION JAMS OR BINDS

Starter Mounting Loose or Misaligned — Check to see that the nuts that hold the starter on the housing studs or attaching screws are tight. Loose attaching parts will cause misalignment of the starter pinion with the flywheel.

Broken or Chipped Teeth on Flywheel Ring Gear — See your Chrysler Industrial Engine Dealer.

STARTER WILL TURN ENGINE BUT ENGINE WILL NOT START

Dirt and Moisture on Ignition Wires and Distributor Cap.

Be sure that the distributor cap and coil is clean especially around the towers. Dirt and grease there can soak up moisture like a sponge, and can easily cause a short. Check for a cracked cap, arcing at the distributor cap contacts, burned rotor. If any cable terminals are corroded be sure to clean or replace them. Clean distributor cap towers inserts. Be sure that the spark plug and coil cable terminals are fully seated and that the nipples fit tightly on the cap towers and around the cables. Replace any cracked or shorted cables.

Dirty or Corroded Distributor Contact Points — Clean points and check for excessive pitting and worn surfaces. If blue oxide is present on contacts, this is an indication that oil or grease has reached the contact surfaces and contacts should be replaced. Remove rotor and wipe all the old grease from surface of breaker cam. Apply a light film of new Mopar Cam Lubricant Number 1473595 on breaker cam only. Do not overlubricate, keep oil and grease away from the breaker points. Install contact points, the contact gap should be .014 to .019 inch, check breaker spring tension — 17 to 20 ounces. See "Adjustments".

Fouled Spark Plugs — Caused by an over-rich carburetor adjustment or excessive oil consumption — oil entering cylinders due to worn rings or worn valve guides. Improper gap adjustment. Clean and dry plugs and set gap at .035 inch. Adjust carburetor.

Ignition Coil Failure — Test and replace if necessary.

Condenser Failure — Test and replace if necessary.

Improper Timing — Refer to "Distributor Timing".

Dirt or Water in the Fuel Line or Carburetor —

Carburetor Flooded — See "Carburetor Adjustments".

Incorrect Float Level Setting — See "Carburetor Adjustments".

Faulty Fuel Pump — See "Fuel Section".

Ignition Coil Failure — Voltage regulator setting too high, refer to specifications and make necessary adjustments. Coil damaged by excessive heat from engine. Replace coil and inspect condition of distributor points. Coil case or tower cracked or leak at coil tower; replace coil. Coil tower may have a carbon track from tower to primary terminal; wipe tower clean and test coil.

FUEL SYSTEM DIFFICULTIES

Fuel Does not Reach Carburetor

Out of fuel: — Tank empty.

Vent pipe in fuel tank clogged.

Shut off valve may be closed.

Fuel Lines restricted.

Fuel Pump Not Operating

Inspect Filter Bowl Gasket — Replace if damaged. Tighten filter bowl retaining screw. (A quick and reliable check for air leaks is to submerge the end of the fuel discharge line in gasoline and check for air bubbles while cranking the engine.)

Inspect for Diaphragm Failure — With engine running, a leaking diaphragm will always result in gasoline leakage at the air vent.

Inspect valves — This requires disassembly of the pump. Failure of the valves is more common than failure at the diaphragm.

Test Fuel Delivery Rate — Disconnect fuel line at carburetor and while cranking the engine with ignition off, discharge the fuel into a suitable container. The amount of gasoline discharged for five pulsations of the pump should be 90 to 100 cubic centimeters (approximately 1/5 pint).

Fuel Reaches Carburetor But Does Not Reach Cylinders

Remove spark plugs and see if they are moist. If there is no trace of gasoline in the cylinders:

The carburetor may be out of adjustment.

The float level may be too low or float valve stuck on the seat.

Carburetor fuel jets or passages clogged with dirt or gum.

Carburetor Flooded

If the spark plugs are wet, this indicates the choke has been used too long or there is an overly rich carburetor mixture. Push the choke button in, open the throttle fully and press the starter button.

GENERAL LUBRICATION

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		DAILY		
Oil Level Indicator	.....	.....	.....	Check oil level daily.
Carburetor Air Cleaner	.....	.....	.....	Check oil daily if engine is operated under extremely dusty conditions. If the sump is found to contain a semi-solid mixture of oil and dirt up to the air cleaner shelf, the air cleaner should be serviced as outlined under every 50 hours of operation.
Power Take-off	.....	Front fitting on side of housing.	Multi Purpose Grease	Daily
		EVERY 25 HOURS		
Distributor	.....	Add 3 to 5 drops to the oiler on side of distributor.	SAE 10W Engine Oil	Every 25 hours.
Governor Linkage	Few Drops	Oil Can	Engine Oil	Every 25 hours.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 25 HOURS (Cont'd)		
Water Pump	.....	1 fitting on some units	Water Pump Grease Only	Every 25 hours. (some engines are equipped with permanent packed bearings and do not require lubrication.)
		EVERY 50 HOURS		
Engine (Oil Pan)	H-318, HB-318 HC-318, H-361, HB-361, HC-361, H-413, HB-413, HC-413, HCI-413, 5 qts. 6 qts if oil filter element is being replaced. HT-361, and HT-413 - 8 qts, 10 qts with single oil filter element, 11 qts with dual oil filter element and oil cooler.	Remove plug in bottom of oil pan to drain oil. Install plug. Add oil through filler pipe to bring to proper level.	Refer to engine oil recommendations.	Every 50 hours. Replace oil if engine is idle 30 days or longer.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 50 HOURS (Cont'd)		
Oil Bath Carburetor Air Cleaner	One quart	Remove cover and filter element, rinse element clean in kerosene and drain. Empty dirty oil from reservoir, clean out the sump and refill to indicated level with fresh oil.	Engine Oil SAE 40 above + 32°F. SAE 20-W below + 32°F.	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 40 Engine Oil is not available, SAE 30 may be used.
Carburetor Paper Air Cleaner	.....	Blow out dirt gently with an air hose. Do not tap or immerse element in liquid.	.....	Replace paper cleaner every 500 hours.
Oil Filler Pipe Air Cleaner	.....	Remove filler pipe cap, wash filter element in kerosene, dry throughly and dip in fresh oil.	Engine Oil SAE 40	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 40 Engine Oil is not available, SAE 30 may be used.
Crankcase Ventilator Outlet Pipe Air Cleaner	.....	Remove filter element and wash element in kerosene. Re-oil with fresh oil.	Engine Oil SAE 40	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 40 Engine Oil is not available, SAE 30 may be used.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 50 HOURS (Cont'd)		
Generator	5 or 10 drops	Oil cup at front and rear bearings.	Engine Oil SAE 10-W	Every 50 hours. After oil is applied, be sure the oil cup covers are closed.
Power Take-off	.....	Rear fitting on side housing and fitting on end of shaft.	Multi Purpose Grease	Every 50 hours.
Clutch Linkage	.....	Oil Can	Engine Oil	Every 50 hours.
Transmission (Manual)	.....	.....	Multi-Purpose Gear Lubricant	Check oil level every 50 hours. Replace oil every 500 hours or 6 months as in last item of this table.
Power Torque		With engine idling, operating temperature normal and transmission in neutral, remove dip stick and check oil level. If oil level is low, add Automatic Transmission Fluid Type "A" Suffix "A" until level reaches the "Full" mark on the dip stick.	Automatic Transmission Fluid Type "A" Suffix "A"	Every 50 hours.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 100 HOURS		
Oil Filter (Full-Flow Type) Replaceable Element	..... One quart	Remove cover, gasket and element. Wipe clean, inside of filter casing and install new MOPAR filter element and gasket. Install cover. Then, idle engine for about five minutes and correct oil level in engine oil pan to compensate for oil absorbed by the filter.	.....	Service filter more often if engine is operated under extremely dusty conditions.
Heavy Duty	Two quarts			
Remote Mounted	Two quarts			
Oil Filter (Screw on, Throw Away Type) Light Duty	..... One quart	Unscrew the filter from the base and discard. Wipe the base clean and screw on a new filter until the gasket on the filter contacts the base. Tighten at least ½ turn more. Run engine to check for leaks. Add oil to full mark on the dip stick.	.....	Operation in dusty areas will require more frequent filter changes.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 100 HOURS (Cont'd)		
Closed Crankcase Ventilator Valve	.....	Remove the valve and long tube, disassemble and wash with a solvent capable of removing gasoline, gums varnishes such as carburetor cleaner. Dry thoroughly and reassemble.	.....	Clean the valve more often if the engine is operated under extremely dusty conditions.
Full Flow Filter By-Pass Filter Dual Oil Filter (413 cu. in. Engine only)	.....	Remove cover, gasket and element on the Full Flow type. The by-pass filter has an orifice with a 1/32 inch hole that should be cleaned with a wire to make sure the orifice is open. Wipe the base in each filter clean and install a new Mopar filter element and gasket for each. Install both covers and idle engine for about five minutes to check for leaks. Add oil to the full mark on the dip stick.	.....	In dusty areas or under severe operating conditions, it is advisable to change the filters more frequently.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 250 HOURS		
Power Torque Drive Unit	*7.2 Quarts *Add one quart if filter element is changed.	Remove the drain plug at the bottom of the hydraulic clutch housing oil pan and drain the fluid. When changing the oil, the engine and the hydraulic clutch housing should be hot, as the oil will drain down into the oil pan more readily, and carry off foreign material and sediment more completely. Drain the Torque Converter by removing the cover from the bottom of the Torque Converter Housing and using a suitable tool turn the flywheel until the converter drain plug is accessible. Tighten both drain plugs after the oil has drained. To refill: remove the vent plug fitting on the opposite side of the hydraulic	Automatic Transmission Fluid Type "A" Suffix "A"	If oil must be added before this time, add Automatic Transmission Fluid Type "A" Suffix "A". Drain every 250 hours or 3 months, whichever comes first or every 150 hours or 2 months whichever comes first, for heavy loading or during warm weather.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 250 HOURS (Cont'd)		
		clutch housing from the dipstick and fill the oil pan with 5 quarts of Automatic Transmission Fluid Type "A", Suffix "A". Start the engine and run at idle speed. After a few minutes of running, add sufficient oil to bring the level up to the full mark on the dip stick. Replace the vent pipe fitting. The oil level should always be checked with the Power Torque drive unit running as part of the oil in the system from the Torque Converter drains back into the oil pan when the engine is stopped.		
Distributor Wick	2 or 3 drops	Remove distributor cap and rotor and oil wick in center of cam.	Engine Oil SAE 10-W	Every 250 hours.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 250 HOURS (Cont'd)		
Distributor Cam	.....	Wipe old grease from surface of the breaker cam and apply a light film of new distributor cam grease.	Mopar Cam Lubricant Part #1473595	Every 250 hours.
		EVERY 500 HOURS		
Loadflite Automatic (A727)	18½ Pints (Dry Fill)	Remove the drain plug from the oil pan. Remove the torque converter access plate, remove the converter drain plug.	Automatic Transmission Fluid Type "A" Suffix "A"	Every 500 hours or 6 months.
Transmission 3-Speed (745) 3-Speed (T87E) 4-Speed (420) 4-Speed (433D) 5-Speed (540)	 3¼ Pints 6 Pints 5½ Pints 9½ Pints 9½ Pints	Remove drain plug in bottom of case to drain lubricant. Install plug. Fill transmission to bottom of filler plug hole at side of case.	Multi-Purpose Gear Lubricant or Lubricant designed for API Service GL-4 (MIL-L-2105 A or B or the SAE viscosity number. Above + 90°F. Use SAE 140 As Low as − 10°F. Use SAE 90 Below − 10°F. Use SAE 80	Every 500 hours or 6 months. If SAE 80 is not available, SAE 90 blended with 20% SAE 10-W Engine Oil may be used.

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 500 HOURS (Cont'd)		
Fuel Filter	.....	Disassemble, clean cartridge holder and replace cartridge. In reassembly tighten securely and run the engine to check for leaks.	.....	.....

LUBRICATION

SELECTION OF LUBRICANT

The type of service for which an engine oil is intended is usually designated by the letters MS, MM, or ML on the container. These are service classifications established by the API (American Petroleum Institute). This system does not replace the SAE (Society of Automotive Engineers) grade number of the oil which indicates the viscosity or consistency of the oil recommended.

For best performance and engine protection, the Chrysler Corporation recommends that the operator select:

1. An oil which conforms to the requirements of API classification "For Service MS".
2. An oil of proper SAE grade number in accordance with the recommendations for the anticipated temperature shown in the following table:

Anticipated Temperature Range	Recommended Viscosity Grade No.	Recommended Multi-Viscosity Oils
Above + 32°F	SAE 30	SAE 20W - 40
As low as + 10°F	SAE 20-W	SAE 10W - 30
As low as — 10°F	SAE 10-W	SAE 10W - 30 SAE 10W - 20
Below — 10°F	SAE 5-W	SAE 5W - 20

Chrysler Corporation does not recommend the use of any lubricant which does not have both an SAE designation and an MS service classification on the container.

BREAK-IN-PERIOD

For industrial engine break-in, a good quality engine oil having API classification "MS" should be used.

Viscosity of the oil to be used should be based on ambient temperature of the engine operational area. Oil viscosity should be selected from the viscosity-temperature chart under "Selection of Lubricant". After 25 hours of operation, the crankcase oil should be drained, and the crankcase refilled with the correct oil type and SAE viscosity grade.

CHANGING OIL

Frequency of oil change is determined by the type of operation and by operating conditions. Under normal operating conditions, oil should be changed after each 50 hours of operation. High speed, heavy load and extremely dusty conditions necessitate more frequent changes. A comparison of the oil on the indicator with fresh oil will usually serve as a guide. Lack of body, the presence of dirt and grit in the oil indicates that fresh oil is needed. Drain the oil while the engine is hot, as the oil will flow freely and will carrymore dirt and other foreign matter with it. For engine crankcase capacities see "General Lubrication" section of this manual.

ADDING OIL

Between oil changes, check the oil level daily. The oil level indicator (Fig. 56) is of the bayonet type, with two markings, "FULL" and "ADD OIL". After the engine has been standing, the oil level should be at the "FULL" mark. After the engine has started, this level will drop somewhat, due to the filling of oil passages and the oil filter. A quart of oil should be added when the level is at or slightly below the "ADD OIL" mark. Do not run the engine with the oil level below the "ADD OIL" mark.

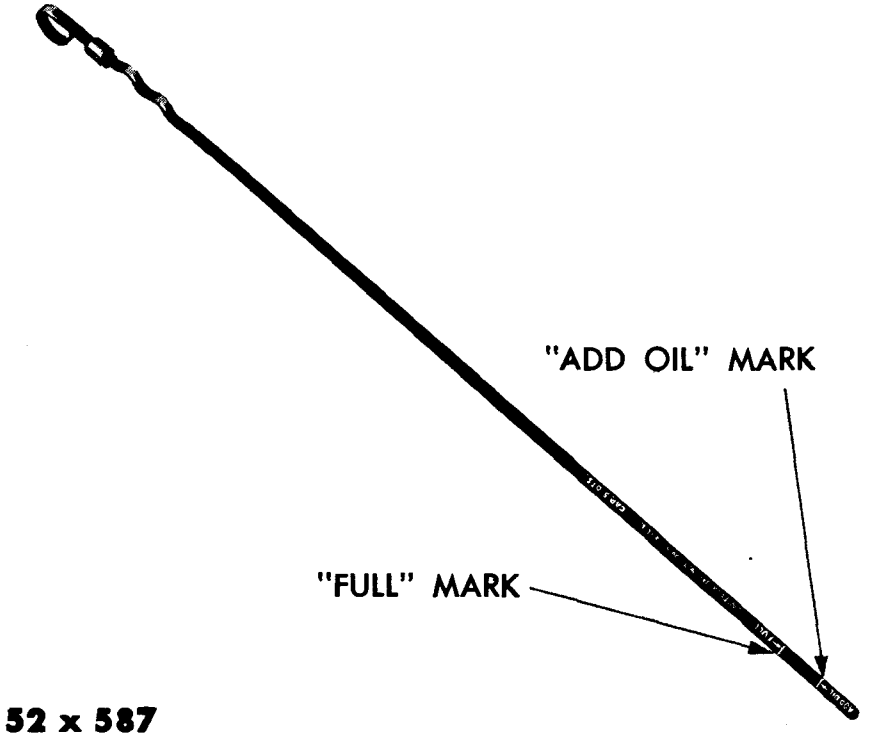

Figure 56 — Engine Oil Level Indicator

COLD WEATHER OPERATION

During cold weather, examine the oil daily for evidence of sludge or water resulting from condensation of moisture in the crankcase. Under extreme conditions, the engine may not reach normal operating temperature during a short run, with the result that fumes are not dissipated in the crankcase and sludge forms. This sludge may freeze or clog the oil inlet strainer, retarding lubrication of internal parts. If there is evidence of sludge, change the oil. If excessive sludge accumulation is evident, remove the oil pan and clean all accessible parts, including the oil inlet strainer, as thoroughly as possible. Use a new oil pan gasket when assembling the oil pan.

DUSTY CONDITIONS

Operation in dust laden air greatly increases the problem of keeping abrasive materials out of the engine. Under these conditions special attention should be given to the carburetor air cleaner, the filler pipe cap air cleaner, and the crankcase ventilator outlet pipe air cleaner, if so equipped, making sure that they are clean and in serviceable condition at all times. This will reduce the amount of abrasive material that may enter the engine. For operation under extremely dusty conditions the use of a closed or positive crankcase ventilation system making use of a crankcase ventilator flow control valve is recommended.

As a further precaution in preventing excessive wear and possible failure of parts under these dusty conditions, the engine oil and the oil filter cartridge should be changed more frequently. The frequency will depend upon the severity of the dust conditions; therefore, no definite recommendations can be made.

It is always adviseable to drain the crankcase while the engine is at operating temperature. Oil will drain more completely when hot, and will, therefore, carry more of the foreign matter and dirt away with it.

FULL-FLOW OIL FILTER

The full-flow filter cleans the oil as it comes from the oil pump. It is so constructed and installed that it is impossible for the supply of oil to be cut off to the engine even though the filter becomes clogged. If the filter becomes clogged, the oil will not be filtered but will be pumped to the working parts of the engine at reduced pressure through the safety bypass valve in the top of the filter body. When the filter is operating properly, oil pressure indicated on the oil pressure gauge should be 45 to 65 pounds at operating speeds. If this pressure drops to 35 pounds, the filter element may be plugged and should be changed.

The full flow oil filter cartridge should be replaced every 100 hours of operation.

In dusty areas or under severe operating conditions, it is advisable to change the filter cartridge more frequently.

TO REPLACE FULL-FLOW FILTER ELEMENT (FIG. 57)

While the engine is warm remove the filter cover, the cover gasket and the filter element. Wipe the housing clean and install the new filter element. Install a new cover gasket and the cover.

After replacing the filter cartridge, the engine should be operated for a period of five minutes and check made for leaks, the oil level should then be corrected to compensate for the oil absorbed by the new filter cartridge.

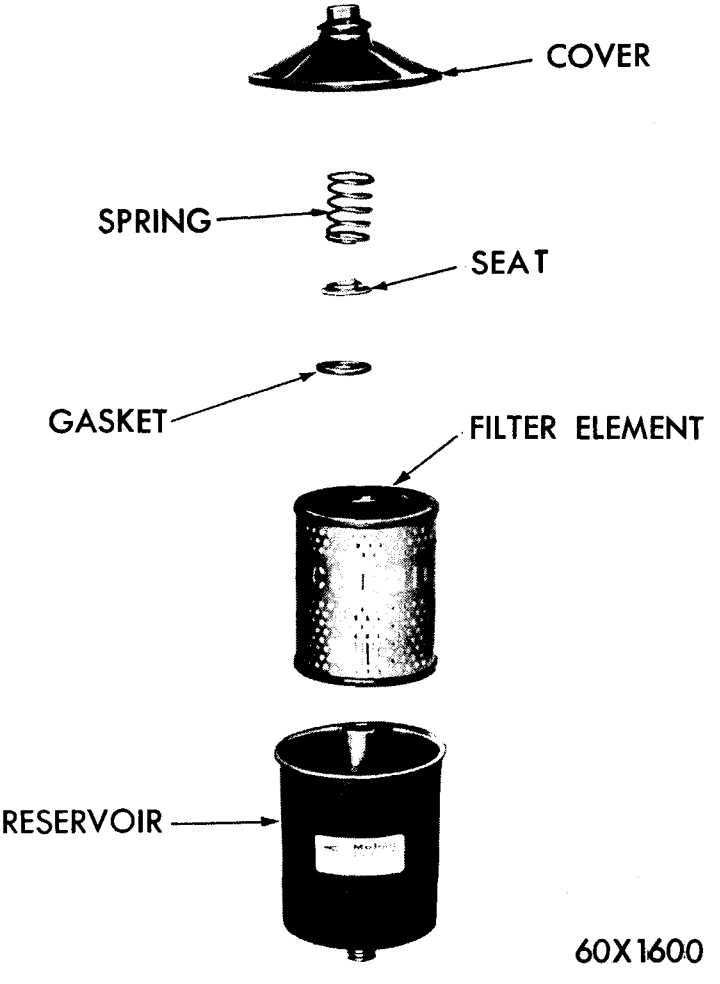

Figure 57 — Oil Filter (Disassembled)

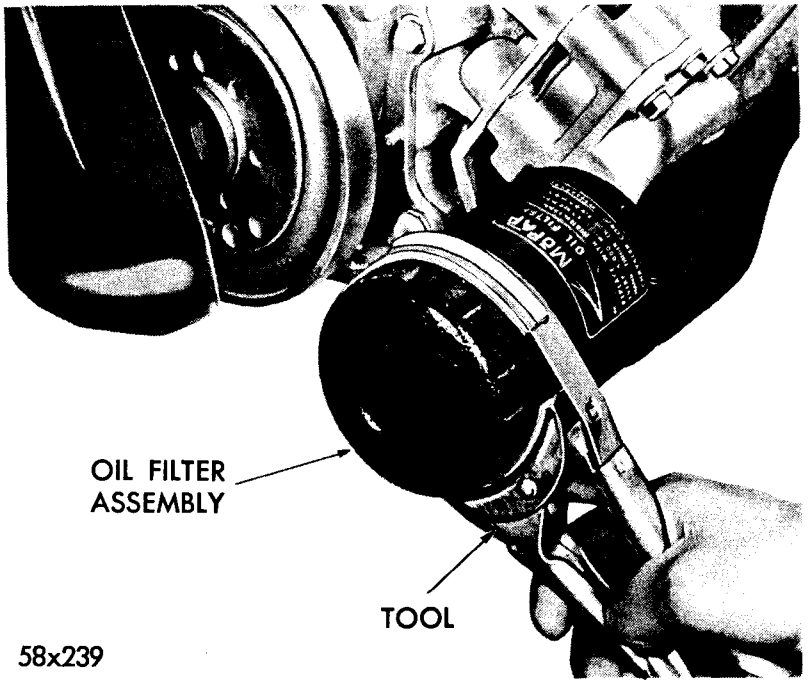

Figure 58 — Engine Oil Filter (Screw-on Type)

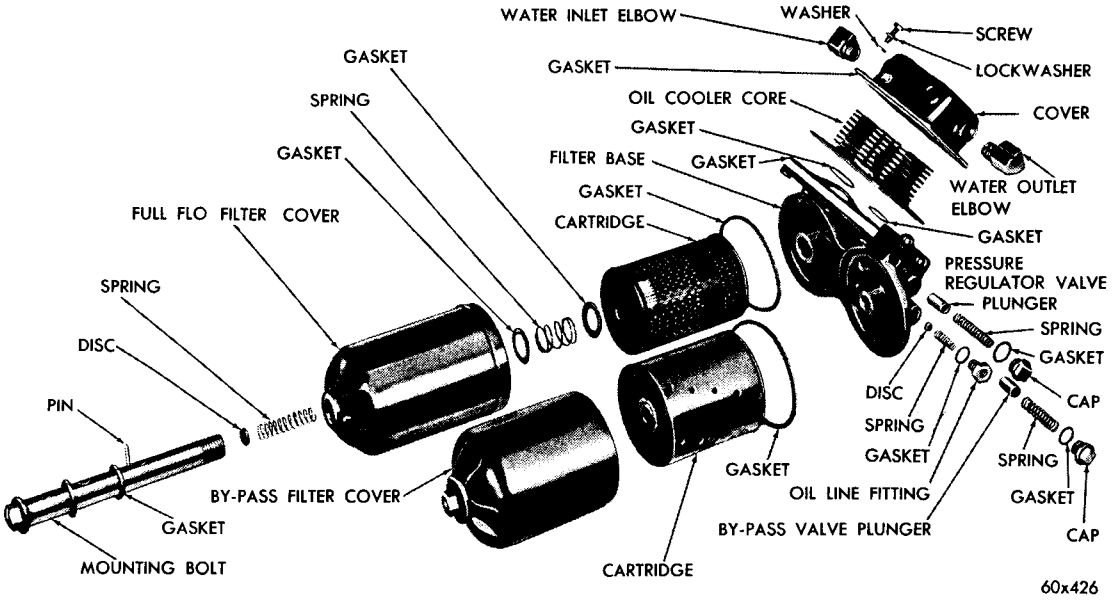

Figure 59 — Dual Oil Filters (Disassembled)

ENGINE OIL FILTER ("SCREW ON" TYPE) (FIG. 58)

On some engines the "Screw on, throw away" full flow sealed filter unit is used. The screw on type oil filter should be replaced every 100 hours of operation.

It is only necessary to unscrew the filter from the base by hand and discard. Wipe the base clean and screw on a new filter until the gasket on filter contacts the base. Tighten at least ½ turn more, as no tools are necessary. Run engine to check for leaks. Add oil to bring level to full mark on the dip stick.

DUAL OIL FILTERS (OPTIONAL EQUIPMENT) (FIG. 59)

Some engines are equipped with dual oil filters, one by-pass type and one full flow type. The by-pass oil filter has an orifice with 1/32 inch diameter hole that should be cleaned with a fine wire to make sure the orifice is open. If the orifice is clogged the filter is not operating.

After replacing the filter cartridge, the engine should be operated for a period of five minutes and a check made for leaks, the oil level should then be corrected to compensate for the oil absorbed by the new filter cartridge.

The dual oil filter cartridges should be replaced every 100 hours of operation.

In dusty areas or under severe operating conditions, it is advisable to change the filter cartridge more frequently.

OIL BATH CARBURETOR AIR CLEANERS

The oil bath carburetor air cleaner (Fig. 60) should be examined weekly or every 25 hours in normal operation. If the quantity of dirt in the sump is sufficient to reach the lower offset in the reservoir, the air cleaner should be removed and thoroughly cleaned.

Every 50 Hours

Remove cover and filter element assembly and rinse in kerosene and drain. Empty the dirty oil from reservoir, clean out the sump and refill to indicated level with the following engine oils.

Above + 32°F.	SAE 40
Below + 32°F.	SAE 20-W

NOTE: If SAE 40 is not available SAE 30 may be used.

Engines operated in dusty territories will require more frequent attention. Under extreme conditions daily service may be necessary.

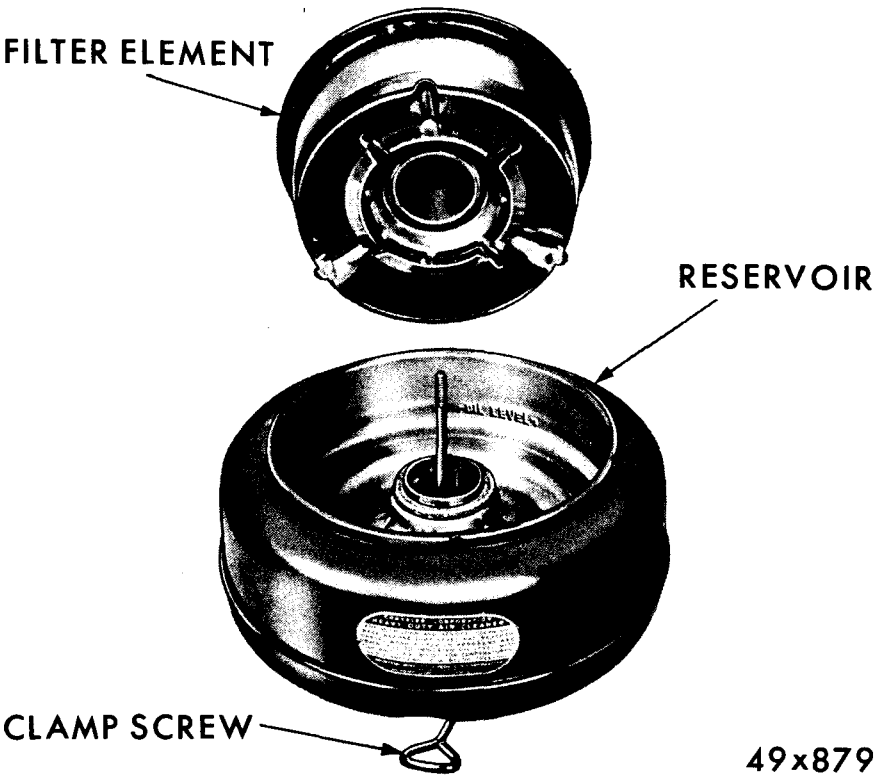

Figure 60 — Oil Bath Carburetor Air Cleaner

CARBURETOR PAPER AIR CLEANERS

Paper carburetor air cleaners should be cleaned every 50 hours or every month in normal use. In areas of extreme dust or dirt, cleaning should be performed more frequently, as often as once a day, if necessary.

To clean the paper element, the following procedure should be used:

Remove cleaner assembly, remove paper element, blow out dirt gently with an air hose. Direct air from inside out, and keep nozzle two (2) inches away from element to avoid damaging. Do not tap or immerse element in liquid. Wash the cleaner cover and body with cleaning solvent, such as kerosene and wipe dry (Fig. 61). Replace paper element, center and secure firmly. Replace cleaner assembly on engine. Replace paper element every 500 hours.

CRANKCASE VENTILATING AIR CLEANERS (OPTIONAL EQUIPMENT)

After each 50 hours of operation, or with each oil change, remove the air cleaner from the oil filler pipe (Fig. 62) and the ventilator outlet pipe (Fig. 63), wash in kerosene, dry and reoil with SAE 40 Engine Oil, or more frequently in dusty conditions.

NOTE: If SAE 40 is not available SAE 30 may be used.

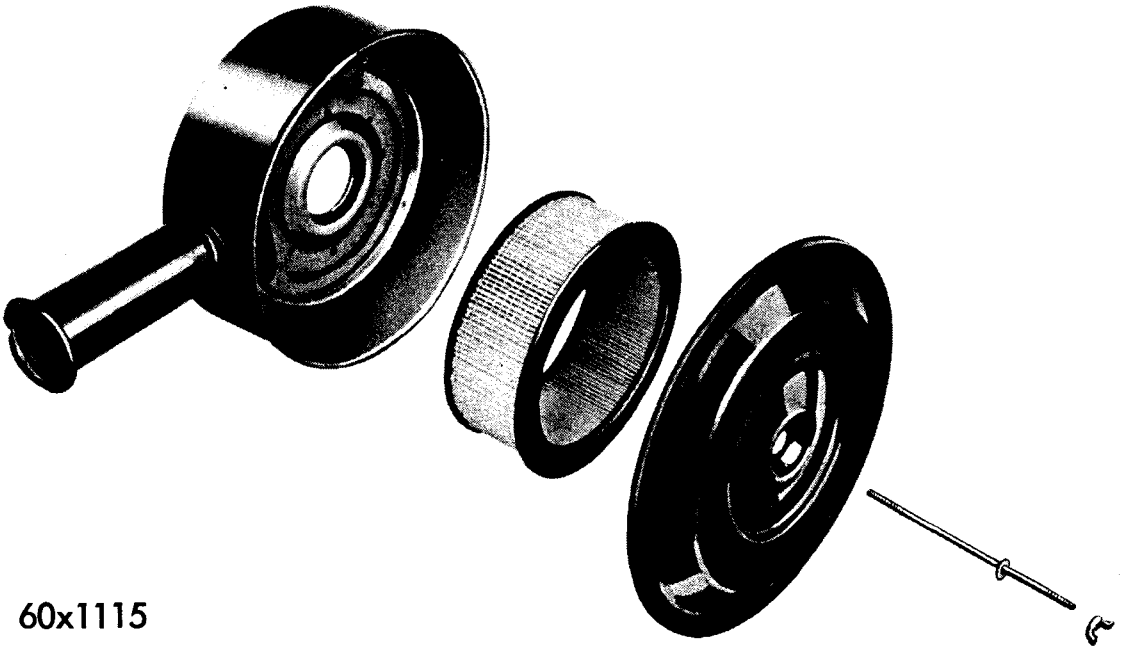

Figure 61 — Carburetor Air Cleaner (Paper Type)

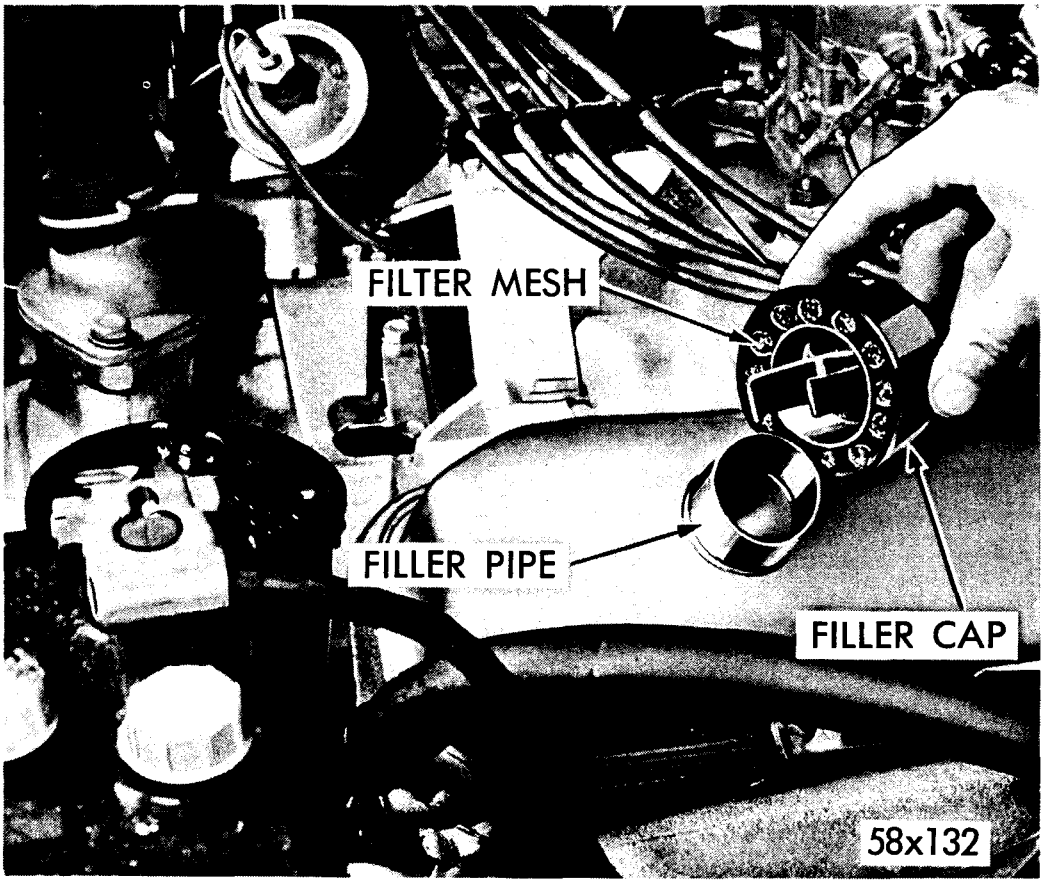

Figure 62 — Engine Ventilation Inlet Air Cleaner

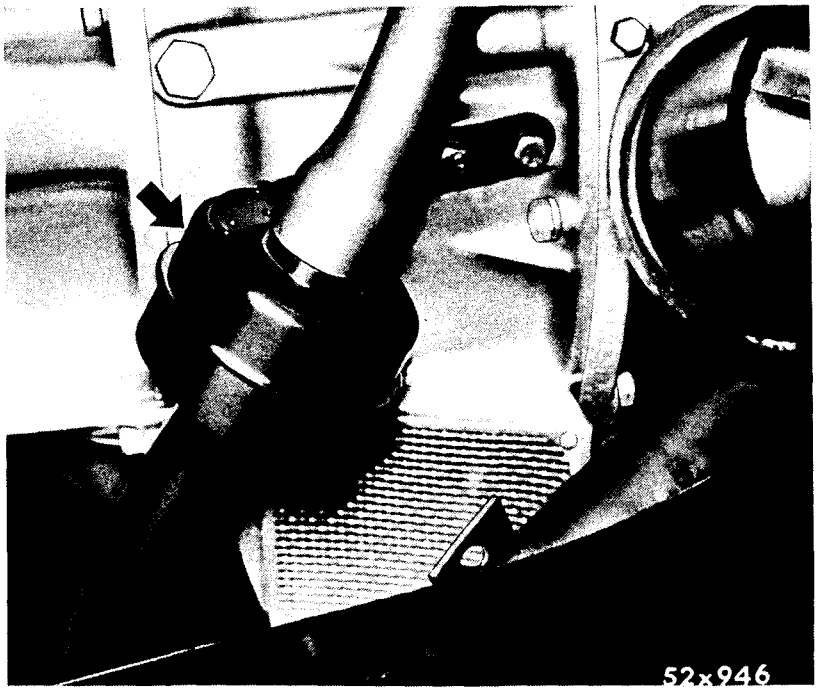

Figure 63 — Crankcase Ventilation Outlet Pipe Air Cleaner

WATER PUMP

Every 25 hours, relubricate using a good quality water pump grease.

The water pumps on Models HT-361 and HT-413 cu. in. engines have one grease fitting. The heavy-duty water pump available on the H-318 engines also has one grease fitting.

All other models have permanently sealed bearings which require no service lubrication.

ALTERNATOR

The alternator bearings are permanently lubricated and do not require lubrication.

DISTRIBUTOR

The distributor (Fig. 64) should be lubricated at three points: (1) Oil cup on the side of the distributor; and (2) Wick under the rotor in the center of the cam. Apply a few drops of SAE 10W Engine Oil to the oil cup after each 25 hours of operation. After 250 hours of operation, remove the distributor cap and rotor and apply two or three drops of SAE 10W Engine Oil to the cam wick; (3) Wipe old grease from surface of the breaker cam. Apply a tight film of new distributor cam grease MoPar Number 1473595.

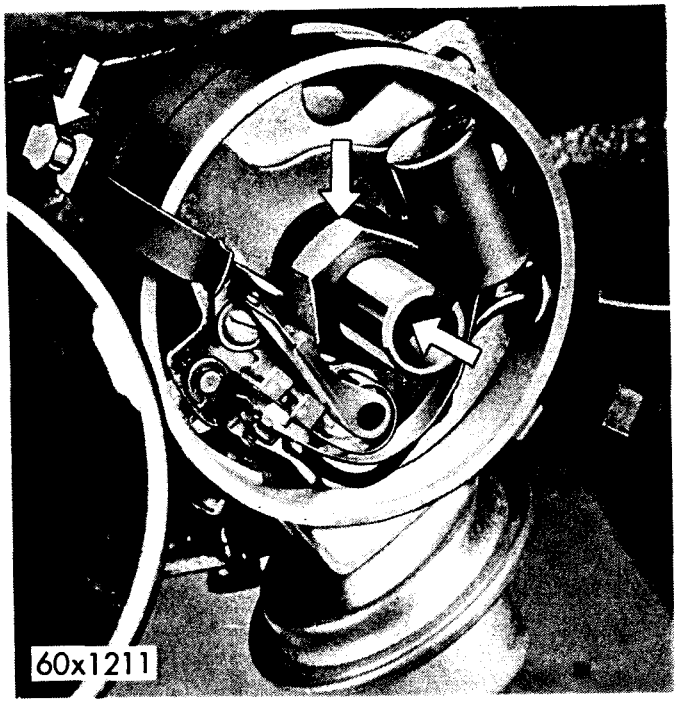

Figure 64 — Distributor Lubrication Points (Typical)

CAUTION: Keep oil and grease away from contact points.

PIERCE MECHANICAL GOVERNOR

This mechanical governor is mounted on the distributor support housing and is gear driven from the distributor. It is lubricated by engine oil through the restrictor elbow in the governor housing. The tachometer cable is driven by nylon gears at the upper end of the governor shaft. The tachometer gears are sealed away from engine oil. And if an overhaul is necessary it should be cleaned and lubricated.

PIERCE BELT DRIVEN MECHANICAL GOVERNOR

The Pierce belt driven mechanical governor is also used on the Models H-318, HB-318 and HC-318 Industrial Engines.

Check the oil level in the governor housing weekly by removing the inspection hole plug at the rear of the housing. The level should be even with the lower edge of the inspection hole. To replenish the oil, remove the filler hole plug at the top of the housing and fill with engine oil until oil reaches the correct level. Use oil of the same viscosity as that in the engine crankcase.

FUEL FILTER

The fuel filter located between the fuel pump and the carburetor on all models contains a paper element, replaceable type.

Every 500 hours disassemble, clean cartridge holder and replace cartridge. In reassembly tighten securely and run the engine to check for leaks.

3-SPEED, 4-SPEED, 5-SPEED TRANSMISSIONS

Remove the filler plug and inspect the level of the lubricant after each 50 hours of operation. (Fig. 65) Level should be at bottom of the filler plug opening. Replenish, if necessary, with Multi-Purpose Gear Lubricant or Lubricant designed for API Service GL-4 (MIL-L-2105) A or B or the SAE viscosity number.

Above + 90°F.	Use SAE 140
As Low as − 10°F.	Use SAE 90
Below − 10°F.	Use SAE 80

If SAE 80 is not available, SAE 90 blended with 20% SAE 10-W Engine Oil may be used. Drain and refill the transmission prior to anticipated temperature change or after each 500 hours of operation. See "General Lubrication" for all Transmission capacities.

POWER TAKE-OFF WITH HEAVY DUTY CLUTCH

Five lubrication fittings are provided for this assembly (Fig. 66), one or two on the side of the housing and one at the end of the shaft,

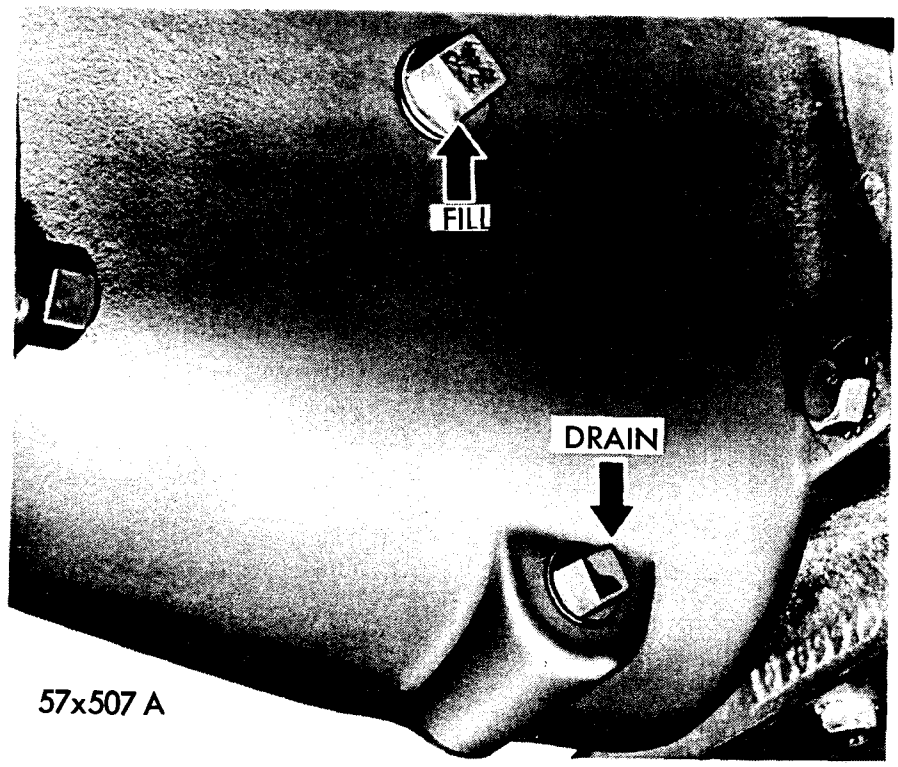

Figure 65 — Transmission Fill and Drain Points (Typical)

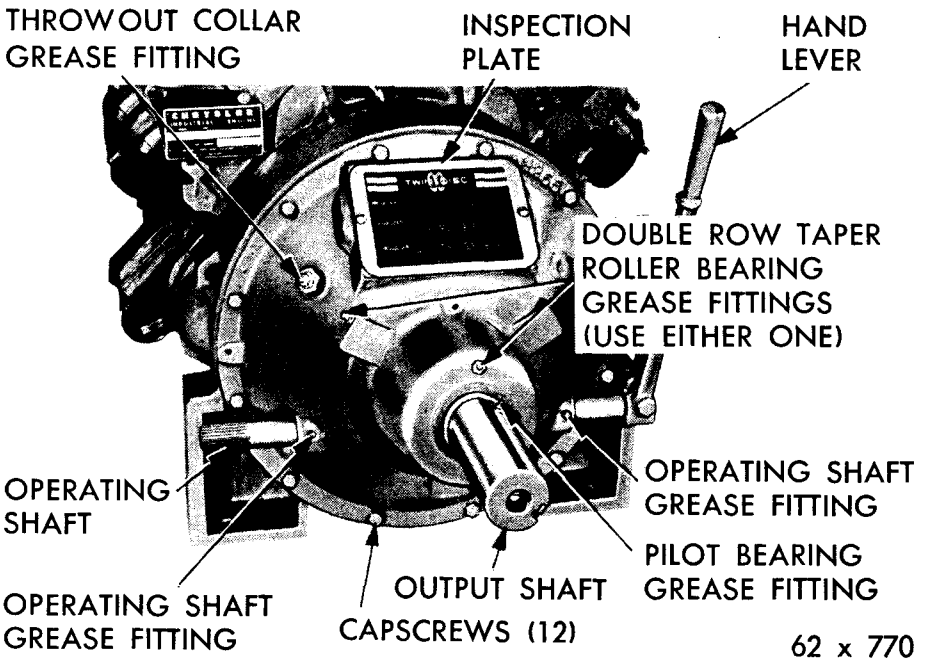

Figure 66 — Power Take-Off Lubrication

and one located on each yoke shaft boss. On some units, the fitting for the clutch release is inside the housing, accessible by removing a small plate at the left side of the housing.

The clutch release throwout bearing should be lubricated through the front grease fitting at the clutch housing, or through the fitting located inside of the housing with multi-purpose grease after every 8 hours of operation. Lubricate sparingly to avoid grease on the clutch facing.

For some types of installation, the pilot bearing must be lubricated from the side of the housing rather than the end. In such case, remove the small plug from the shaft, install a grease fitting in its place and use Multi-Purpose Grease. Remove the fitting from the end of the shaft after lubrication and replace with the plug.

The drive shaft main bearing and the pilot bearing should be lubricated through the grease fitting on the housing with Multi-Purpose Grease every 50 hours of operation.

CAUTION: Do not overgrease.

The clutch levers and linkage should be lubricated with engine oil every 500 hours of operation. Remove the inspection hole cover on the clutch housing and lubricate the toggle joints with engine oil to help keep the joints free.

Lubrication of the yoke shaft is as needed, with multi-purpose grease.

POWER TORQUE (Every 250 Hours) (FIG. 50)

Change the oil in the Power Torque unit every 250 hours or 3 months of operation, whichever occurs first for normal operation and every 150 hours or 2 months of operation, whichever occurs first, for prolonged heavy loading in hot weather.

The oil pan dip stick is located on the right side of the hydraulic clutch housing with the breather vent cap positioned on the left side.

The hydraulic clutch housing and torque converter have an oil capacity of 7.2 quarts "Full" and Automatic Transmission Fluid Type "A" Suffix "A" is used.

Remove the drain plug at the bottom of the hydraulic clutch housing oil pan and drain the fluid. When changing the oil, the engine and the hydraulic clutch housing should be hot, as the oil will drain down into the oil pan more readily, and carry off foreign material and sediment more completely. Drain the Torque Converter by removing the cover from the bottom of the Torque Converter Housing and using a suitable tool turn the flywheel until the converter drain plug is accessible. Tighten both drain plugs after the oil has drained.

To refill: remove the vent plug fitting on the opposite side of the hydraulic clutch housing from the dip stick and fill the oil pan with 5 quarts of Automatic Transmission Fluid Type "A", Suffix "A". Start the engine and run at idle speed. After a few minutes of running, add sufficient oil to bring the level up to the full mark on the dip stick. Replace the vent pipe fitting. The oil level should always be checked with the Power Torque drive unit running as part of the oil in the system from the Torque Converter drains back into the oil pan when the engine is stopped.

CAUTION: The allowable maximum oil temperature is not to exceed 250°F.

Lubrication is provided the two tapered roller bearings in the extension housing by means of a drilled passage in the output shaft depositing transmission fluid in the extension housing sump. An oil return hole in the back of the power unit hydraulic clutch housing maintains the required oil level in the extension housing so that the bottom of the two roller bearings are continuously rotating in oil.

No special attention on the part of the operator is required to lubricate the right angle power take-off as oil is pumped to the extension housing and the proper oil level is automatically maintained.

MAINTENANCE SCHEDULES

DAILY

(1) Check level of oil in crankcase and add oil if necessary to bring level to "FULL" mark on indicator. See Lubrication Section for oil recommendations.

(2) Check cooling system and add clean water or anti freeze as required.

(3) If the engine is operated under extremely dusty conditions, check the carburetor air cleaner and the two crankcase ventilation air cleaners, is so equipped, for accumulation of oil and dirt and service as required. See Lubrication Section.

(4) If the unit is equipped with a power take-off, lubricate the clutch release bearing.

EVERY 25 HOURS OF OPERATION

Lubricate and service as specified for "Daily" and perform the following additional operations:

(1) Lubricate the water pump (if equipped with grease fitting).

(2) Check the level of the fluid in the Industrial torque converter and power torque hydraulic clutch housing, if unit is so equipped.

(3) Adjust fan and alternator belt.

(4) Add 3 to 5 drops of SAE 10-W oil to the oil cup on the outside of distributor housing.

EVERY 50 HOURS OF OPERATION

In addition to the operations listed under "Daily" and "Every 25 Hours of Operation", perform the following operations:

(1) Drain the engine crankcase and refill with recommended grade of oil. See Lubrication Section.

(2) Clean and service the carburetor oil bath air cleaner and the crankcase ventilation air cleaners, if so equipped, as described in the Lubrication Section.

(3) Lubricate the generator. See Lubrication Section.

(4) Check the lubricant in the transmission.

(5) Lubricate the power take-off drive shaft bearings.

(6) Check the electrolyte level in the battery.

(7) Clean dry paper type air cleaners.

EVERY 100 HOURS OF OPERATION

(1) Replace filter element in oil filter.

(2) Clean crankcase ventilator valve.

EVERY 250 HOURS OF OPERATION

(1) Clean and check adjustment of the distributor contact points. (.014 to .019 inch).

(2) Lubricate distributor cam wick with 3 to 5 drops of SAE 10-W oil.

(3) Check spark plugs for fouling and for proper gap (.035 inch).

(4) Check ignition timing. See Adjustment Section.

(5) Check carburetor adjustment. See Adjustment Section.

(6) Inspect all wiring for loose connections and worn or broken insulation. Clean the battery terminals, and coat terminals and clamps with vaseline.

(7) Clean the engine thoroughly.

(8) Drain and refill power torque hydraulic clutch housing and torque converter.

EVERY 500 HOURS OF OPERATION

(1) Drain and refill transmissions (manual and remote shift).

(2) Drain and refill power torque converter unit.

ADJUSTMENTS

ELECTRICAL SYSTEM

Distributor Contact Points

In order to maintain efficient operation, the contact points in the distributor must be adjusted properly, as follows:

To adjust breaker points, remove the distributor cap and rotor, crank the engine until the rubbing block of the movable contact rests on the

highest point of a cam lobe. Loosen the contact support lock screw just enough to permit the stationary bracket to be moved. Turn the adjusting screw to open or close the point gap. The clearance between the points should be from .014 to .019 inch, as measured with a dial indicator (Fig. 67). Tighten the lock screw after each adjustment and measure the breaker point spring tension with an accurate scale. Hook a spring scale on the breaker arm as close to the breaker point as possible and pull scale gently in a straight line (Fig. 68). Take a reading as the points start to separate. The spring tension should be 17 to 21.5 ounces. If not, loosen the screw which holds the end of the point spring and slide the end of the spring in or out as necessary. Retighten screw and recheck spring tension.

Wipe old grease from the surface of the breaker cam and apply a light film of MOPAR distributor cam lubricant (Part No. 1473595) to the breaker cam. Do not over-lubricate, keep oil and grease away from the contact points.

Spark Plugs

Spark plugs should be kept clean to insure economical engine operation. Every 250 hours of operation; remove the spark plugs and examine the firing ends of the plugs for evidence of oil fouling, gas fouling, burned or over heating conditions. Clean or replace, and reset plug gaps to .035 inch. Always use new gaskets when installing the spark plugs. Tighten plugs to 30 foot-pounds torque.

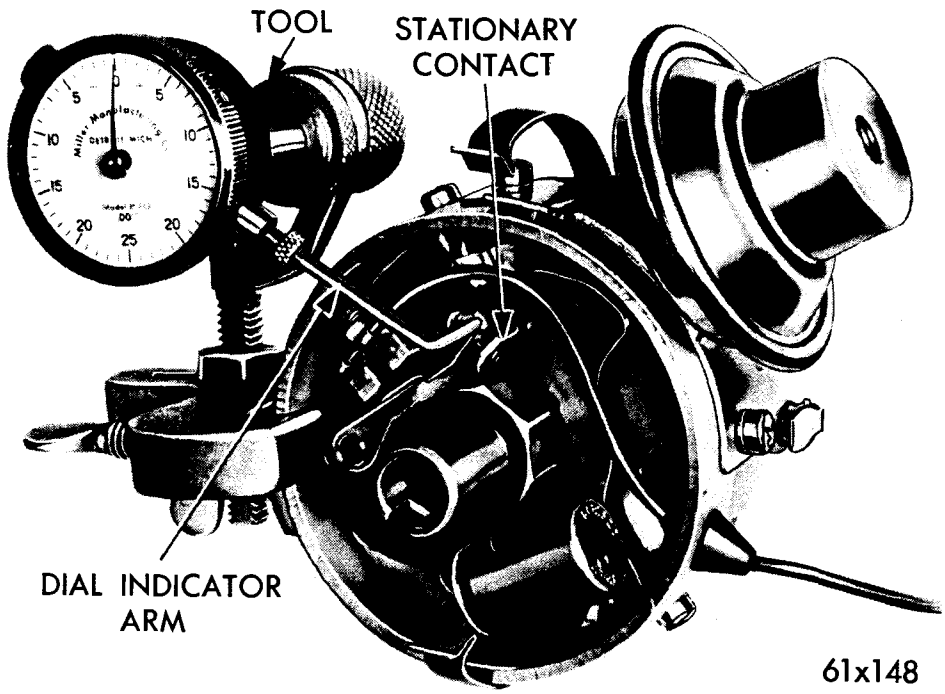

Figure 67 — Checking Point Clearance with Dial Indicator

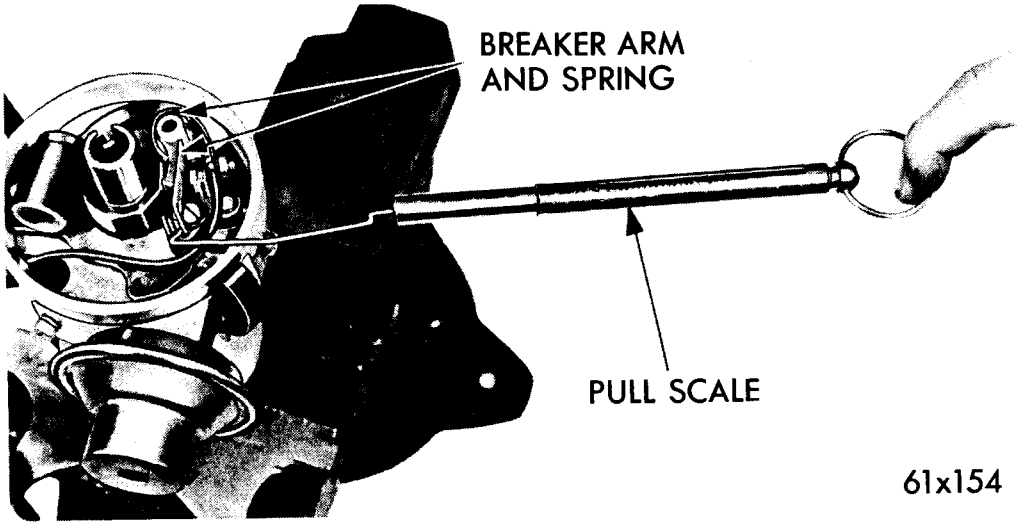

Figure 68 — Testing Breaker Arm Spring Tension

Ignition Timing

To obtain maximum engine performance, the distributor must be correctly positioned to give proper ignition timing as follows:

The ignition timing test will indicate the timing of the spark at the No. 1 piston at idle (only).

Disconnect the vacuum line at the distributor. This will eliminate any chance of vacuum advancing the breaker arm plate. The engine should operate on centrifugal advance only when checking the ignition timing.

Connect the secondary lead of the Power Timing Light to No. 1 spark plug, red primary lead to the positive terminal of the battery and the black lead to the negative battery terminal.

Start the engine and set the idle to 475-500 r.p.m., engine at normal operating temperature (transmission in neutral).

Using a timing light, observe the position of timing mark on the vibration dampener or pulley (units so equipped) end check against the specifications, 10°BTDC for all Models "H", "HB", "HC" and "HT" Series V-8 Engines.

Loosen the distributor clamp screw and rotate the distributor housing so that the specified timing mark and pointer are in alignment. (Moving distributor housing against shaft rotation advances timing and with shaft rotation retards timing).

Tighten the distributor clamp screw securely after the timing has been set and recheck timing adjustment with a Power Timing Light.

When the spark timing is correct, reconnect the vacuum line to the distributor and remove timing light.

NOTE: As the engine speed is increased, the timing mark should move down on the vibration dampener blow the pointer if advance units are functioning.

CARBURETOR ADJUSTMENT

Before attempting any adjustment of the carburetor, check the following items:

(1) **Spark Plugs.** See that plugs are correct type, clean, and have the correct gap. The point gap should be set at .035 inch.

(2) **Distributor Points.** See that points are clean, in good condition and properly set (.014 to .019 inch).

(3) **All High Tension Terminals.** See that terminals are making good contact at plugs and at distributor cap.

(4) **Compression.** See that compression is approximately even in all cylinders.

(5) **Carburetor.** See that carburetor is clean and in good condition and firmly attached to the manifold with no air leaks .

(6) **Manifold Heat Control Valve.** See that manifold heat control valve is free and functioning correctly.

IDLE SPEED ADJUSTMENT WW3-BBD SERIES CARBURETOR

(1) Turn the idle speed screw in or out to obtain 500 rpm. Be sure the choke valve is fully open and that the fast idle adjusting screw is not contacting the fast idle cam (if so equipped).

(2) Turn each idle mixture screw to obtain the highest rpm. While making the adjustment, carefully watch the tachometer and notice that the speed can be decreased by turning the screws in either direction from the setting that gave the highest rpm reading.

(3) Readjust to 500 rpm with the fast idle speed screw.

(4) Turn each idle mixture adjusting screw in the clockwise direction (leaner) until there is a slight drop in rpm. Now, turn each screw out, counterclockwise (richer) just enough to regain the lost rpm.

This procedure will assure that the idle has been set to the leanest mixture possible for smooth idle. **This setting is very important.**

Since the correct speed was originally set using the speed screw, the

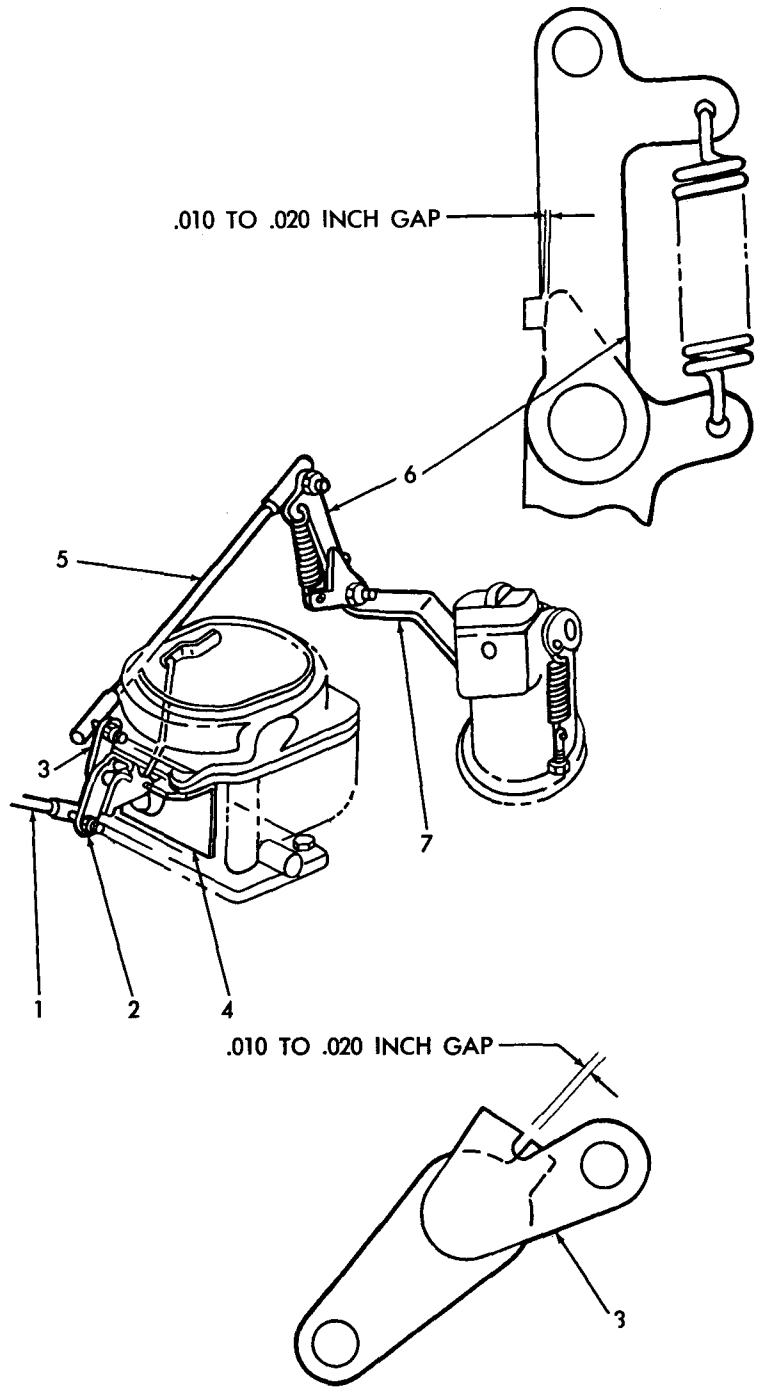

Figure 69 — Pierce Governor Throttle Linkage

1. CARBURETOR ACTUATING ROD
2. CARBURETOR LOWER FLOATING LEVER
3. CARBURETOR UPPER LEVER
4. CARBURETOR STOP (WIDE OPEN THOTTLE STOP)
5. CARBURETOR TO GOVERNOR ROD
6. GOVERNOR AUXILIARY LEVER
7. GOVERNOR LEVER

61 x 424

speed obtained after finding the leanest smooth idle setting will probably be too fast.

(5) Readjust the speed screw to obtain correct idle speed. Repeat steps 2 and 4 above if necessary.

After the proper idle speed has been obtained, move the sliding link to the rear against the stop and tighten the nut securely (if so equipped).

IDLE SPEED ADJUSTMENT AFB SERIES CARBURETOR

The idle speed adjustment is made after the carburetor has been installed on the engine.

With the throttle valves closed and the choke valve wide open (engine at normal operating temperature), adjust the idle screw at 500 rpm.

Adjust the idle mixture screws until the engine operates smoothly, then recheck the tachometer and again adjust the idle screw to give the correct engine rpm.

THROTTLE LINKAGE
ENGINES EQUIPPED WITH THE PIERCE GOVERNOR

The following procedure, based on actual field contact experience, is recommended for correcting so called low power and fuel economy complaints. There are other routine adjustments that should be considered before adjusting the throttle linkage, such as carburetor float setting, proper ignition, etc.

To correctly adjust the throttle linkage, refer to Fig. 69, then proceed as follows:

GOVERNOR/DISTRIBUTOR ADAPTER (PIERCE)

Make certain governor is securely fastened (tight) to block. In general, the best governor arm clearance condition is obtained when the governor and adapter assembly are moved in a clockwise direction (viewed from above the engine), as far as possible before tightening the governor hold-down clamp. This precaution should be observed anytime the governor is installed. This governor hold-down bolt must always be tightened to approximately 10 foot-pounds. (If difficulty is experienced tightening the adapter, replace with clamp, part #1852127, or lengthen leg ¼".)

ADJUSTING THE PIERCE GOVERNOR TO CARBURETOR ROD
(Refer to Figure 70)

(1) Hold the rod so that the carburetor throttle is wide open and

adjust the rod length by turning the ball end so there is .020" clearance between the stops on the governor "broken" lever. (Make sure the throttle is wide open by looking inside the carburetor. Hold the ball joint stud at right angle with the rod so that the proper clearance is maintained when the stud is installed and tightened.) (If on 4-barrel carburetor a bind is encountered, check carburetor to manifold gasket — it can be reversed.) Large holes (secondary) must be to rear.

(2) Attach the rod to the governor making sure that the ball joints at each end of the rod are in line to prevent binding. **Tighten lock nuts on rod.**

(3) Move entire governor arm assembly to the closed throttle position. There should be a minimum of 1/8 inch clearance between the governor arm and bracket. If the clearance is inadequate, remove enough material from the bracket until desired clearance is attained. Allow the governor to return to the wide open throttle position and make sure that there is 1/4 inch minimum clearance between the governor arm and air cleaner. (Temporarily install air cleaner.)

(4) Make a final check to insure that there is still .020" clearance between the stops on the governor "broken" lever.

(5) If throttle valves do not stay open, check governor broken arm lever (surge control) spring for distortion. This spring should be completely solid (coil to coil) in the relaxed position and require 9 pounds pull for an extension of 1/4 inch.

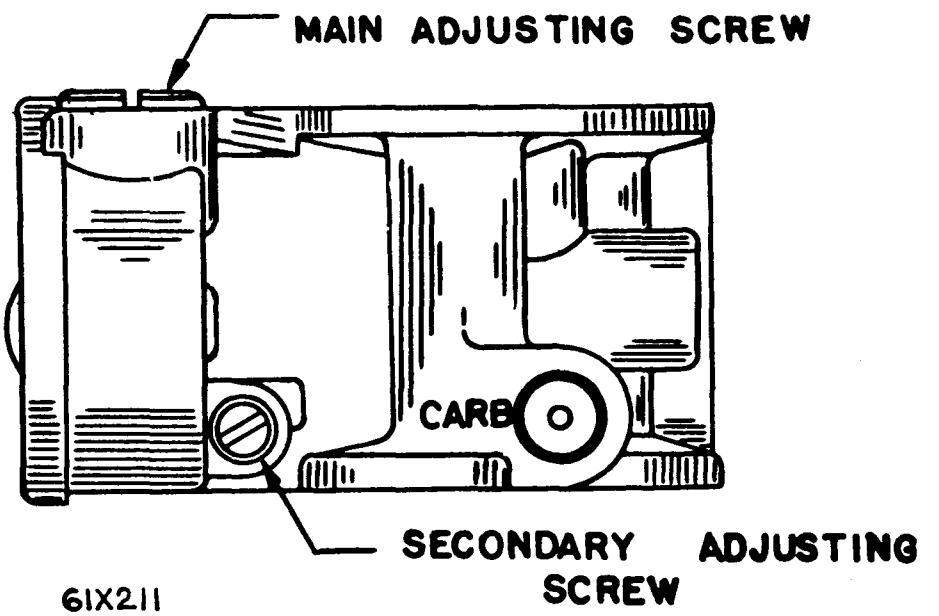

Figure 70 — Hoof Governor Adjustment

ADJUSTING THE HOOF GOVERNOR (Refer to Figure 70)

For higher speed, turn main adjusting screw clockwise; for lower speed, counterclockwise. Always turn governor up to desired speed setting. If setting is too fast, turn back to below desired setting — then up to it.

When desired speed is reached, install seal.

The secondary adjusting screw is factory set to cover a wide range of engine speeds. (This does not apply to governors furnished as original equipment where setting is pre-determined). In setting the governor to desired road or engine speed, use main adjusting screw only. If governor control is too sharp or not sharp enough, follow instructions below. Only in rare instances need the secondary adjustment be changed, as follows:

(1) Drill welch plug covering secondary adjusting screw with a 1/16" drill. Insert a 1/16" rod in drilled hole and pry off welch plug.

(2) IF GOVERNOR CONTROL IS TOO SHARP, WHICH CAUSES SURGING OR HUNTING: Turn secondary adjusting screw clockwise ¼ turn at a time. Turn main adjusting screw counterclockwise approximately one turn for every ¼ turn of secondary screw to bring speed adjustment back to normal.

(3) IF GOVERNOR CONTROL IS NOT SHARP ENOUGH, WHICH CAUSES TOO GREAT A VARIATION IN SPEED BETWEEN LOAD AND NO LOAD: Turn secondary adjusting screw counterclockwise ¼ turn at a time. Turn main adjusting screw clockwise approximately one turn for each ¼ turn of secondary screw to bring speed back to normal. Reinstall the welch plug.

ADJUSTING THE KING SEELEY VELOCITY GOVERNOR

Should the governor become inoperative, or require servicing, or if the correct settings cannot be obtained, the governor should be removed. Replace or take to the local King-Seeley Distributor where facilities are available for proper adjustment.

Leakage of manifold, carburetor, or interconnector gaskets must be corrected before carburetors or governors can be properly set.

It may be apparent after a long period of operation that the governor has become sluggish and is not as responsive as when it was originally installed. Such sluggishness is most generally caused by deposits of carbon and gum on the valve shaft and bearings, stabilizer piston rod or cylinder. The remedy for this condition is to remove the governor and soak it in a cleaning solvent that will remove the carbon and gum de-

posits. It is always recommended that a governor that is not functioning properly be soaked in cleaning solvent before any adjustments or repairs are attempted, because in many cases, satisfactory performance can be restored in this manner. Before attempting any adjustment or recalibration of the governor, run the engine until normal operating temperature is reached. Manifold vacuum at sea level should be at least 16 inches with engine running at full throttle (governor operating), and at least 17 inches at idling speed, with an allowable reduction for altitude.

To adjust governor, refer to Fig. 71, and proceed as follows: For a HIGHER speed, turn adjusting cap (13) counter-clockwise or to the left; for LOWER speeds, turn adjusting cap clockwise or to the right. One turn of the adjusting screw will change the engine speed apprixi-mately 300 rpm.

When a more sensitive regulation is desired, or if the governor is too sensitive and inclined to surge at full throttle, correct as follows by means of the calibrating nut (11).

KING-SEELEY SENSITIVITY ADJUSTMENT

If the governor is too sensitive or has a tendency to surge, place the hollow wrench (1) in position on the calibrating nut (11) and insert the

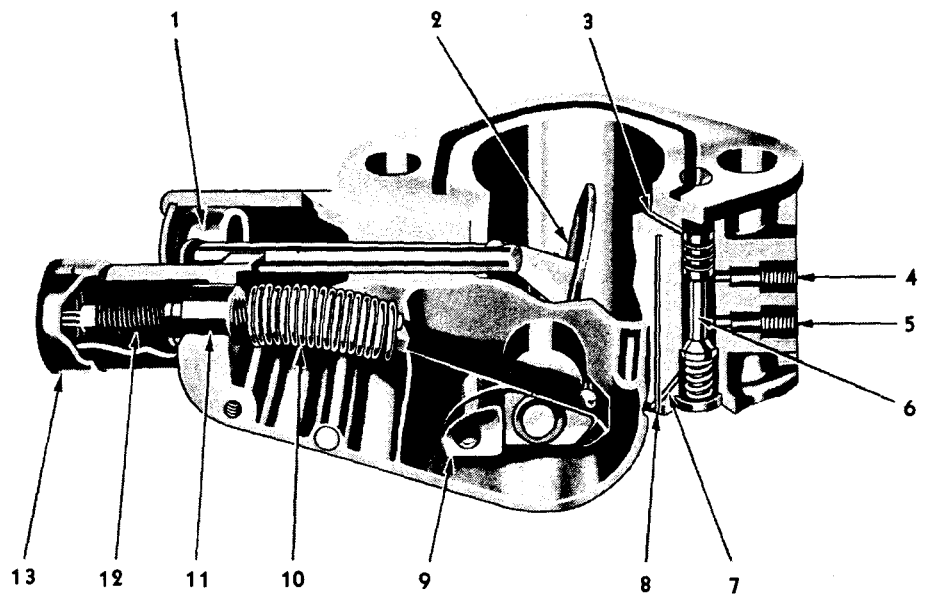

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Figure 71 — King Seeley (Handy) Governor (Sectional View)

1 — Non-cheating stabilizer piston
2 — Throttle Valve
3 — Passage to transfer valve chamber
4 — Carburetor vacuum connection (not used)
5 — Ignition distributor vacuum connection (not used
6 — Vacuum transfer valve plunger
7 — Vacuum passage
8 — Vacuum by-pass passage
9 — Cam and valve shaft assembly
10 — Control spring and ribbon assembly
11 — Calibrating nut
12 — Adjusting screw
13 — Adjusting screw cap assembly

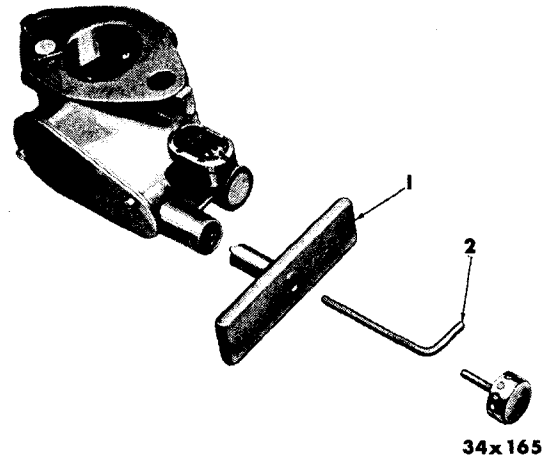


Figure 72 — King Seeley Adjusting Wrenches

1 — Hollow Wrench — A-24283 2 — Hex Wrench — A-25264

special adjusting wrench (2) through the hollow wrench into the adjusting screw and turn the screw clockwise one turn (Fig. 72).

With the hollow wrench in the slot of the calibrating nut, turn the nut clockwise about ¼ of a turn. When this adjustment is made the adjusting screw must be held from turning.

Continue this adjustment until the surge is eliminated. However, engines operate most efficiently when the governor is adjusted to the point which just barely eliminates the surge at full throttle.

KING-SEELEY REACTION ADJUSTMENT

If the governor is slow acting and does not open promptly when a load is applied at the governed speed or cut off promptly at maximum speed, turn the adjusting screw counter-clockwise one turn and while holding the screw in the new position, turn the calibrating nut counter-clockwise ¼ of a turn. Repeat this procedure until the desired regulation is obtained. However, when making this adjustment, it is best to continue until an actual surge is produced, and then, just eliminate the surge.

When the adjustment is completed, tap lightly on the end of the hollow wrench so that the calibrating nut will be properly seated and re-check speed.

The stock numbers of the special wrenches (Fig. 72) are as follows:

A-24283 (Item 1)

A-25264 (Item 2)

These wrenches can be obtained from the King-Seeley Corporation, Ann Arbor, Michigan.

KING-SEELEY CALIBRATION

If the control spring should for any reason be disengaged from the adjusting screw, or the relationship of the adjusting screw and calibrating nut changed by someone not familiar with the governor, it will be necessary to go over the complete calibration for the particular governor to insure efficient control.

Remove seal and adjust screw cap (13. Remove cover screw and force out the drive screw, as indicated on Fig. 73. Do not use a screw driver or similar tool, as it will result in damage to the housing or cover. When the drive screw is out far enough so that side cutting pliers can be applied under the screw head, turn the screw out counter-clockwise.

Position the adjusting screw in the spring until the open coils correspond to the number indicated on the "Calibration Specification" sheets for the particular governor, and it may in some cases be necessary to move the calibrating nut several turns to provide sufficient space between the end of the spring and governor housing to obtain the correct number of open coils.

Referring to Fig. 74, the active coils of the control spring end where the spring contacts the thread of the adjusting screw at point "A". Each

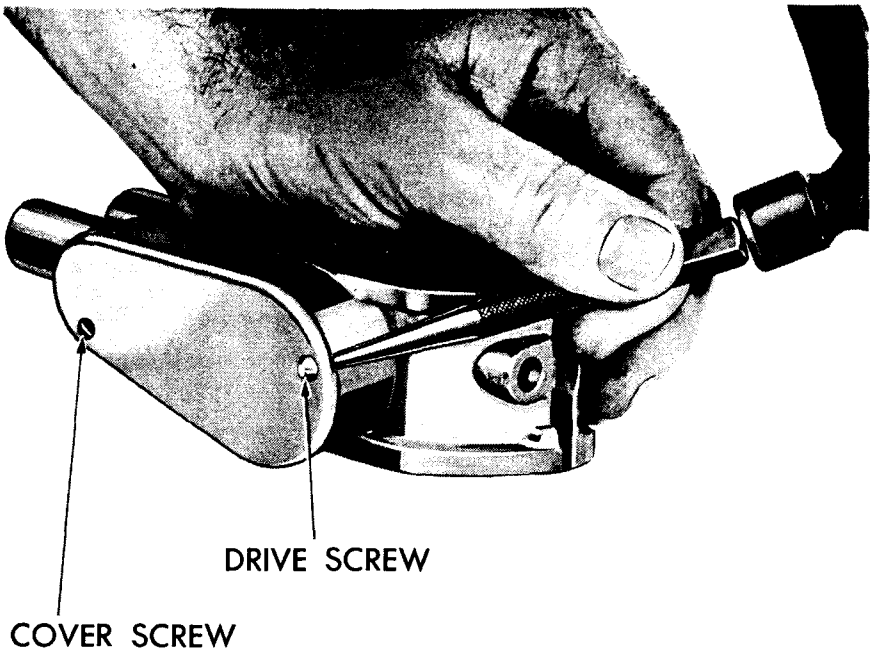


Figure 73 — Removing King Seeley Governor Housing Cover

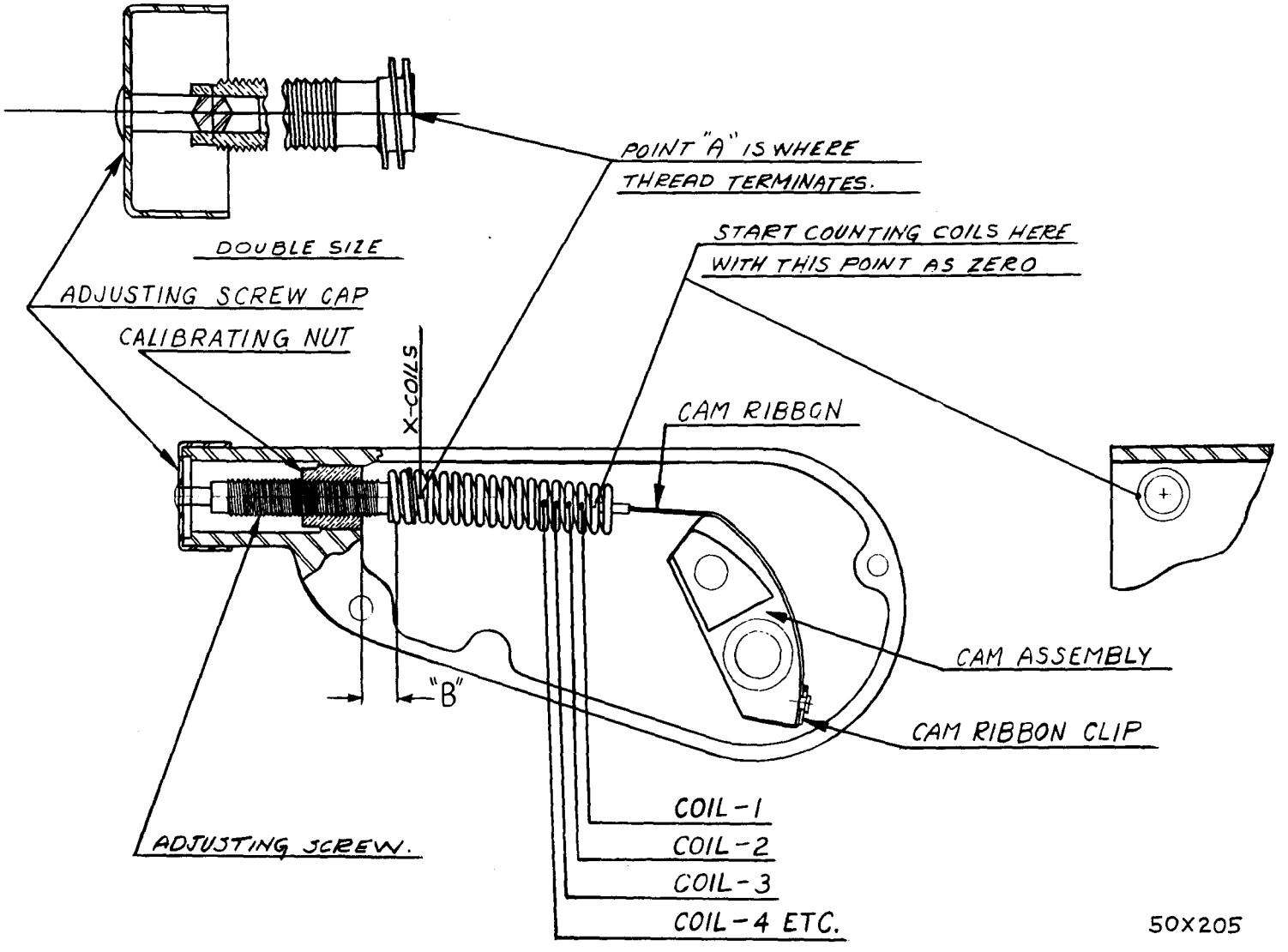


Figure 74 — Control Spring Calibration Detail (King Seeley)

turn of the adjusting screw adds or subtracts one coil. As an example: To obtain 10-¼ coils turn the adjusting screw until there are 10 active coils between zero point and point "A", and then add ¼ coil by turning adjusting screw counter-clockwise ¼ turn.

When the adjusting screw is positioned to provide the correct number of active coils, hold the adjusting screw and turn the calibrating nut in the direction required with the A-24283 wrench until dimension "B" (Fig. 74) indicated on the "Calibration Specification" sheets for the particular governor is provided. This measurement is from the center of the last spring coil to the inside of the governor housing, as indicated on Fig. 74.

This will usually provide a setting within a few hundred revolutions of the maximum governed engine speed recommended for a particular model. However, further adjustment may be required after the governor is installed on the engine to obtain correct control and governed maximum speed. Perform any changes necessary, according to the instructions outlined under the subject of "Adjustments".

Lead type seals are recommended for the governor adjustment, inasmuch as it is possible to lock the lead type seals with a particular symbol which prevents tampering, as any change in the seal would be readily noticeable. While the patented type seals are easier to use, they offer but little protection, inasmuch as they can be easily purchased, enabling the operator or mechanic to change the adjustment and reseal the governor to avoid detection.

Generally, it is not economical to attempt major governor repairs in the average shop, as mechanics are seldom familiar with this type of work. Moreover, it will usually prove less expensive to replace the governor if necessary, or have it reconditioned in an Authorized King-Seeley Governor Service Station.

STARTER PINION ADJUSTMENT

When the starter solenoid is energized to engage the starter pinion, there should be .015 to .030 inch clearance between the pinion and the pinion thrust washer, in order to prevent binding or jamming of the pinion. An accurate measurement of clearance can be made only when the solenoid is holding the pinion in the engaged position. For this reason, do not rely on a measurement made when holding the solenoid plunger in by hand.

PROCEDURE: Remove the starter from the engine. Detach the strap connecting the solenoid to the starting motor terminal. Connect a 12-volt battery to the frame of the starting motor (ground) and to the starter

solenoid battery terminal. Connect a jumper wire from the solenoid relay ground terminal to the starter frame. Connect another jumper wire from the starter switch terminal of the relay to the solenoid battery terminal (this wire energizes the solenoid). Push the solenoid plunger into the engages position; the energized solenoid will hold the plunger in position. Measure the clearance between the pinion and the pinion thrust washer. If the clearance is not within the specified limits (.015 to .030 inch), remove the cotter pin and link pin that attaches the pinion yoke to the solenoid plunger and turn the plunger stud in or out the required distance to provide proper clearance.

FAN AND ALTERNATOR BELT ADJUSTMENT

Fan belts that are adjusted too tightly will cause rapid wear of the alternator bearing and the water pump bearing. A loose fan belt will slip and wear excessively, causing overheating and unsteady alternator output.

(1) To obtain a satisfactory belt adjustment loosen the alternator mounting bolts and the adjusting strap bolt.

(2) Tighten the belt by pulling the alternator out and away from the engine. If properly adjusted, the belt can be depressed 3/8" from a straight line between the two pulleys.

(3) Tighten the alternator adjusting strap bolt and the mounting bolts.

POWER TAKE-OFF, WITH HEAVY DUTY CLUTCH

The clutch must be properly adjusted to prevent slippage, which causes rapid wear of the clutch facings and distortion of the plates. Frequency of adjustment is determined by the amount and nature of the load. Heavy or shock loads necessitate frequent clutch adjustment to compensate for wear.

ADJUSTING THE CLUTCH RELEASE LEVER

Place the shifting lever in released position and remove the adjustment cover from the housing. See Fig. 40. Release the adjustment nut lock and with a long screwdriver or rod inserted in a notch in the nut, turn the nut in a clockwise direction until firm pressure is required to engage the clutch. To keep the clutch from turning with the adjusting nut, apply pressure on the shifting lever while turning the nut. Make sure the lock engages to hold the adjustment.

ALIGNMENT OF CLUTCH HOUSING (IF SO EQUIPPED)

Replacement of clutch housing or reinstalling the original clutch housing (if removed for any reason), must be correctly aligned when

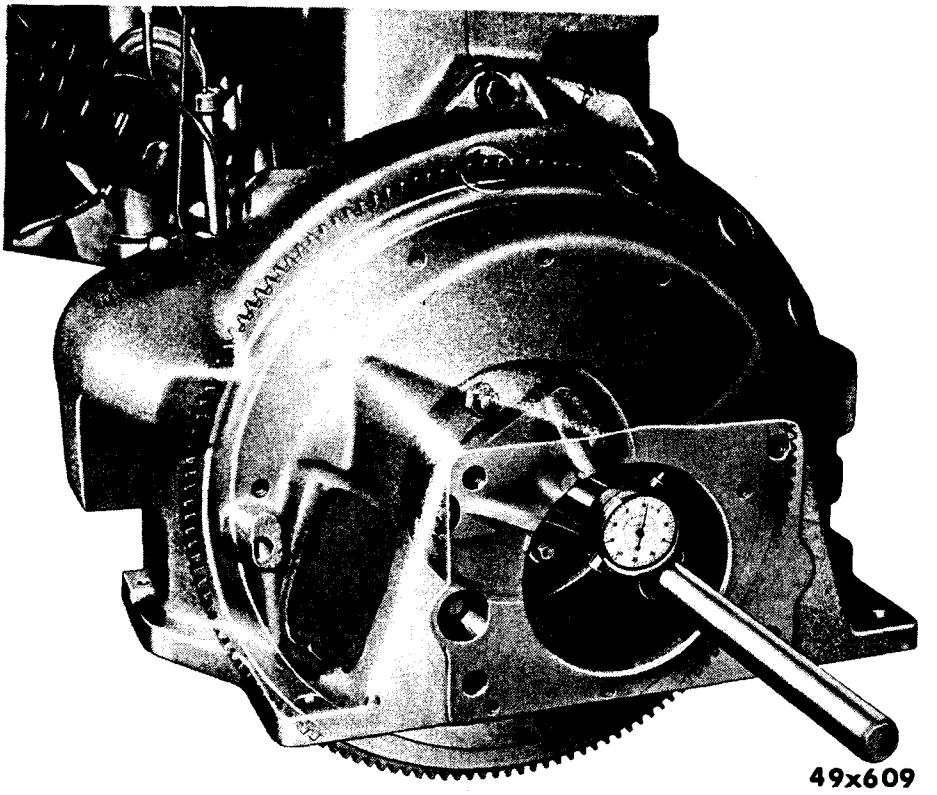


Figure 75 — Flywheel Housing with Tool C-870 Attached

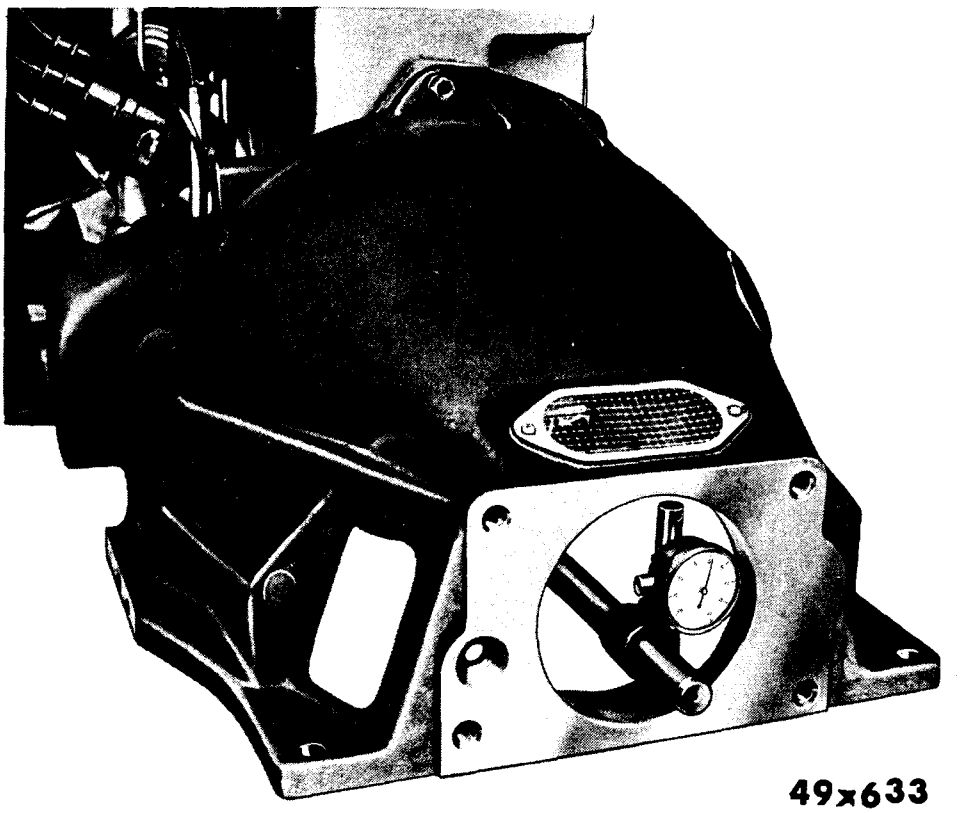


Figure 76 — Checking Clutch Housing Using Tool C-435 (Typical)

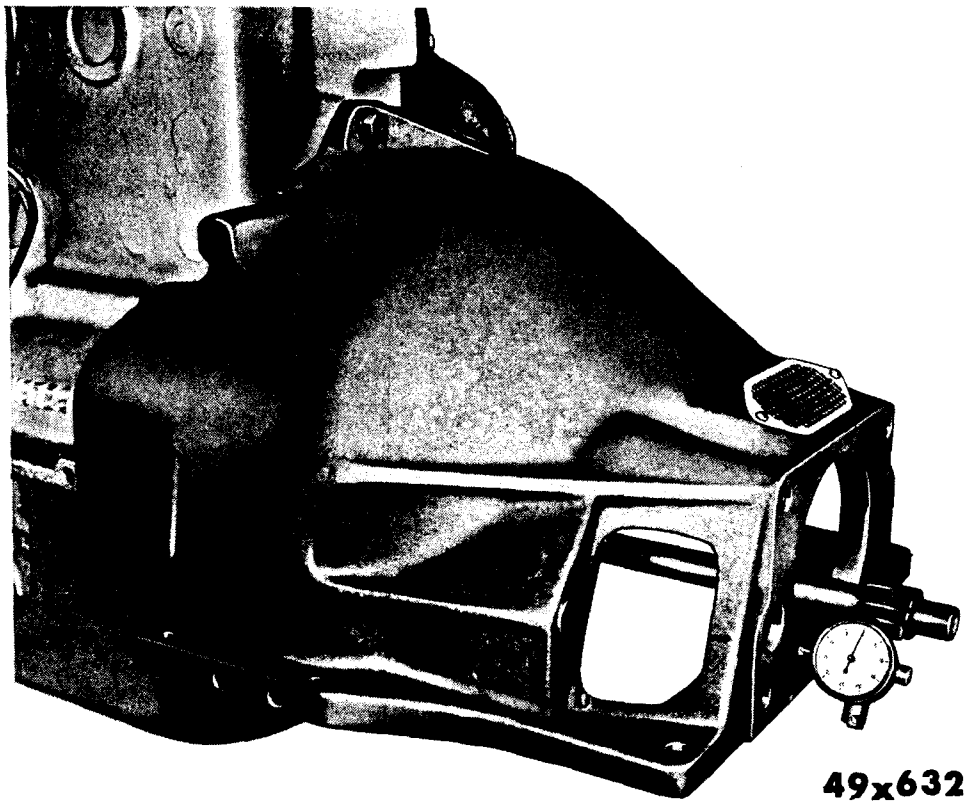


Figure 77 — Checking Rear Face Housing Using Tool C-435

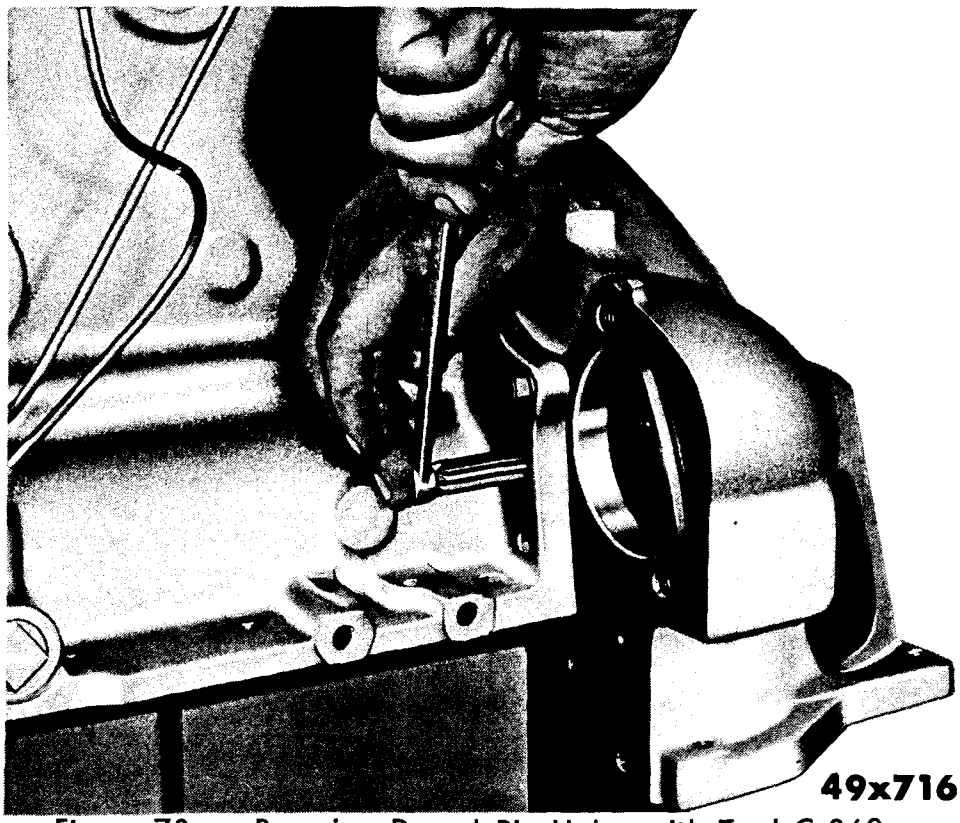


Figure 78 — Reaming Dowel Pin Holes with Tool C-860

installed. Out-of-round of the bore must not exceed .005 inch total indicator reading. To correctly align clutch housing with or without fluid drive, proceed as follows:

(1) Inspect the housing face where it contacts the rear of the engine block for particles of dirt and burrs; remove burrs with a file, then clean both surfaces.

(2) Start the two dowel pins in the block from the front end so they protrude beyond the machined face of the engine block and install the clutch housing. Install clutch housing to block cap screws, making them just snug enough so the housing can be shifted if necessary by tapping with a mallet.

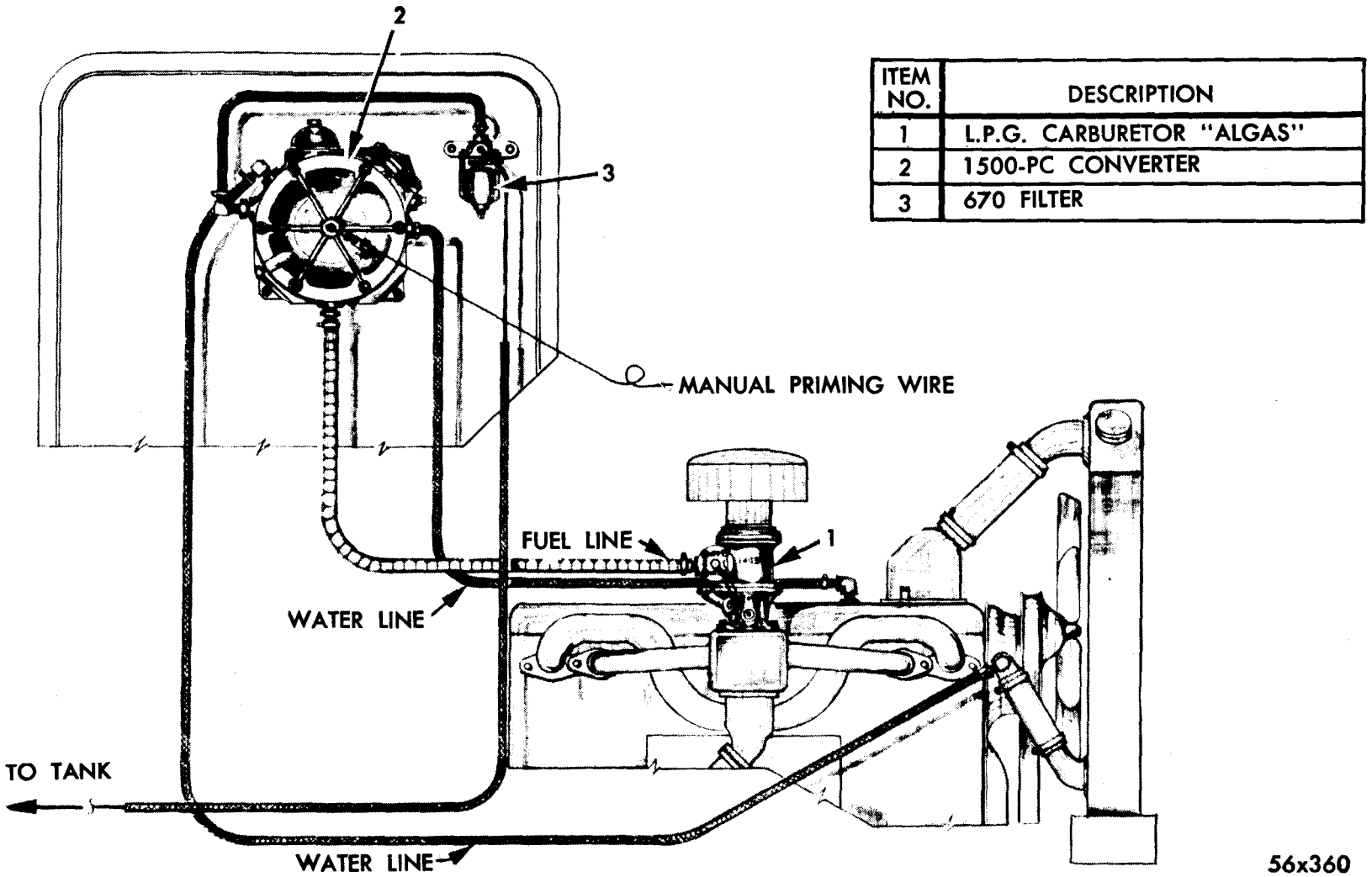
(3) Install the fixture C-870 to the flywheel attaching bolts, (Fig. 75) or, if fluid drive unit is to be installed, attach the fixture to the crankshaft flange bolts and install the indicator (C-435 or C-430) as shown in Fig. 76. Rotate the crankshaft and check the inside diameter of the housing bore; it should not vary more than .005 inch to one complete revolution of the crankshaft. If alignment is necessary, remove the dowel pins and tap the housing until it comes within the specified tolerance. After obtaining correct alignment, tighten the housing cap screws to 30 to 35 foot-pounds torque.

(4) Change the position of the dial indicator and check the rear face of the housing, as shown in Fig. 77. This tolerance must be within .002 inch. Assuming that all burrs and dirt has been removed as described in step 1, this tolerance will no doubt be within the specified limits.

If alignment of the housing was necessary as described in step 3, the dowel pin holes will have to be reamed. Ream with Tool C-860 as shown in Fig. 78 and install .512 inch oversize dowel pins. Continue to assemble the clutch assembly. **Failure to align clutch housing may result in hard shifting of transmission and the possibility of gear disengagement.**

Power Take-Off Heavy Duty Clutch

A hand-hole of ample size is provided to permit convenient adjustment of the clutch. Instructions for adjustments and lubrication are shown on the hand-hole cover plate.



ITEM NO.	DESCRIPTION
1	L.P.G. CARBURETOR "ALGAS"
2	1500-PC CONVERTER
3	670 FILTER

Figure 79 — Liquid Propane Gas System (Typical)

LIQUID PROPANE GAS

LIQUID PROPANE GAS OPERATION

Liquid Propane Gas is a high quality petroleum product which can be stored in liquid form under pressure, but will boil or become vapor at normal atmospheric temperatures. Although Liquid Propane gas is a liquid in the tank it can readily be converted to a vapor when entering the carburetor. The Liquid Propane gas system (Fig. 79), is composed of three main units, carburetor, converter and filter.

a. **The carburetor** is of venturi principle and so designed to mix Liquid Propane gas vapor fuel and air in the correct proportions for best engine operating efficiency at all engine speeds.

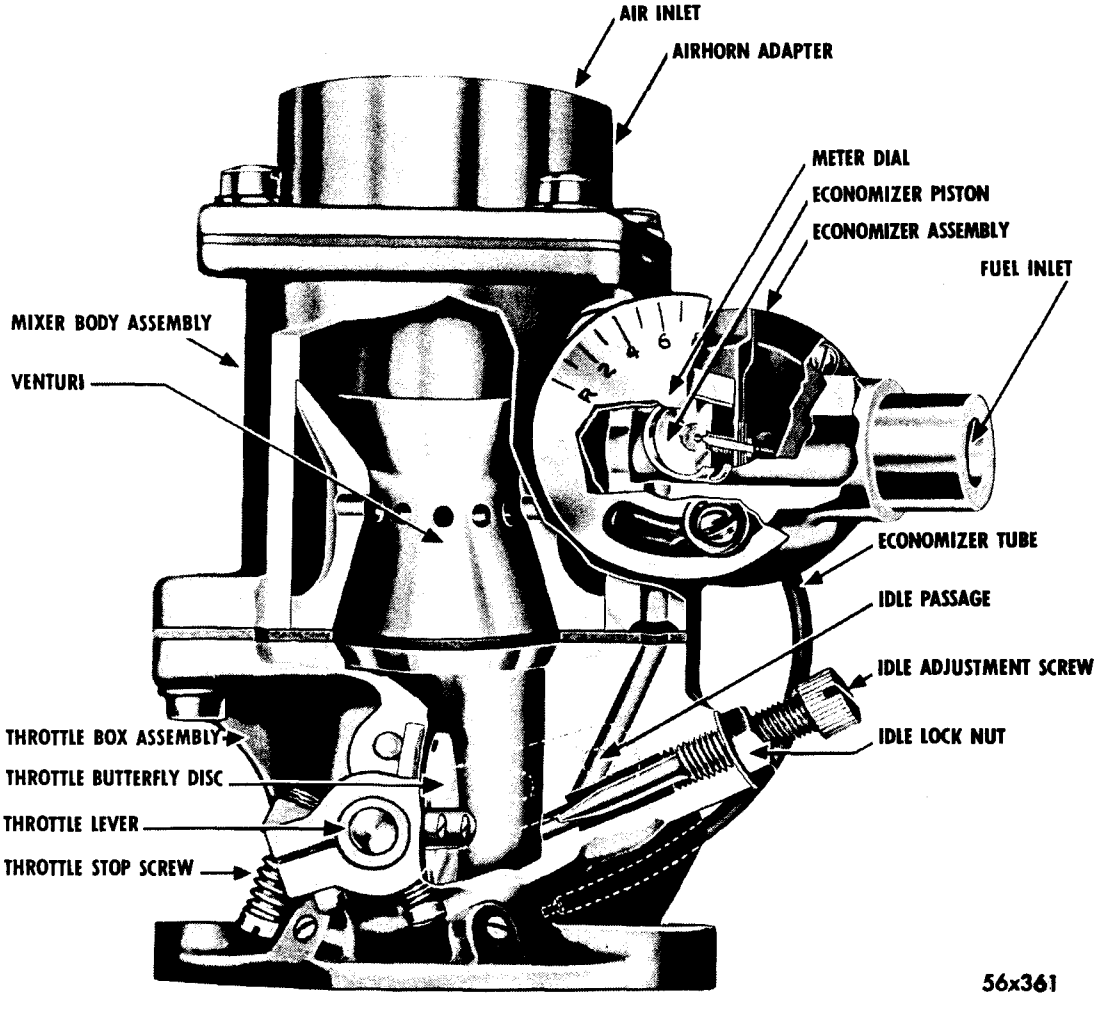


Figure 80 — Liquid Propane Gas Carburetor

b. **The converter** is a combination heat exchanger and pressure reducing unit. The converter receives the liquid fuel under tank pressure, converts it to vapor form, reduces pressure to slightly below atmospheric, and regulates the flow of vapor in volume to meet the engine's demand.

c. **The filter's** function is to catch foreign particles of dirt that may be in the tank and fuel line.

d. **To start engine,** open throttle **all the way.** Depress plunger on the propane vaporizer for a short period of time and close the throttle to one-fourth open position. Depress magnetic oil safety switch (if so equipped) and start the engine. Continue to depress safety switch button until oil pressure reaches 40 pounds. When weather is extremely cold, it may be necessary to "choke" the engine occasionally by depressing button on the vaporizer. Warm up the engine at approximately 1400 rpm before putting on the load.

OPERATING AND SERVICE INSTRUCTIONS

When removing or servicing converter or filter, be sure to shut off fuel at the tank and run engine until all fuel is out of the lines.

CARBURETOR

The Liquid Propane gas carburetor (Fig. 80) replaces and serves the same function as the gasoline carburetor in that it mixes the fuel and air in proper ratio for economical operation under all load conditions. The idle, or no load, adjustment consists of a needle valve at the base of the throttle box, the setting being held by a locknut, as shown in Fig. 80. The power adjustment is made by rotating the meter tube dial and is firmly set by a lockscrew. This provides the fuel setting for maximum power and rpm. The economizer varies the fuel input in proportion to engine requirements during part throttle or irregular operation of the engine, such as during cruising or deceleration periods. Adjustment is made by the economizer screw on the opposite side of the meter tube dial.

CONVERTER (Fig. 81)

The converter is composed of three parts, as follows:

a. The heat exchanger portion is connected to the cooling system of the engine. The converter furnishes the heat for vaporizing the fuel in the transformation from liquid to vapor.

b. The primary regulator reduces the liquid fuel from existing tank pressure to a lower controllable pressure of approximately 5½ to 7 pounds.

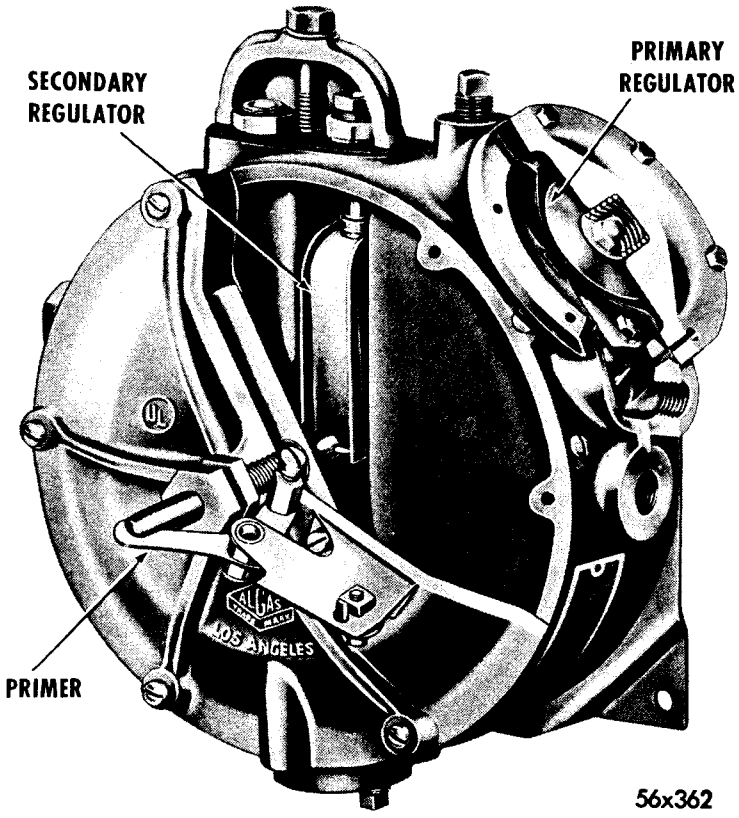


Figure 81 — Liquid Propane Gas Converter

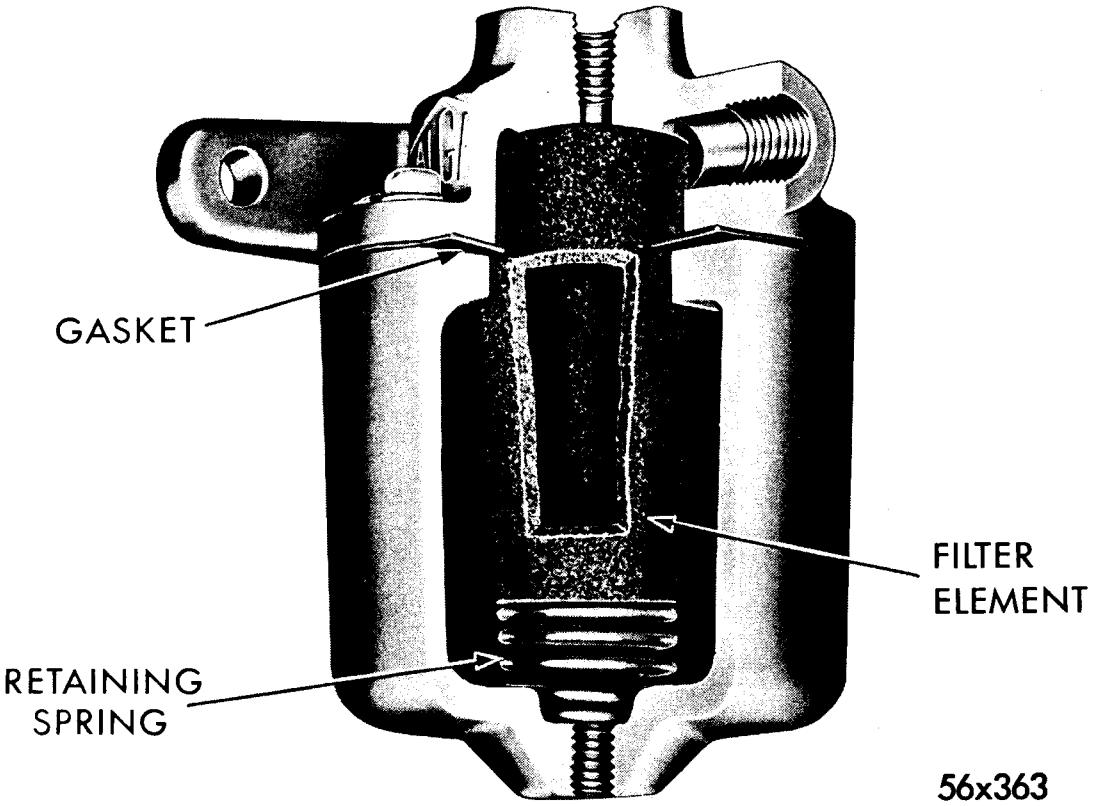


Figure 82 — Liquid Propane Gas Filter

c. The secondary regulator is a lockoff device as well as a fuel regulation unit and controls the flow of fuel to the carburetor. It operates by engine suction when the engine is running, and locks off the fuel flow when the engine is stopped. The converter is equipped with a priming device for starting. The primer when depressed causes the secondary regulator to leak thus filling the carburetor lines and manifold with fuel sufficient to start the engine, and suction takes over and operates the secondary regulator to continue the flow of fuel. Both primary and secondary regulators are controlled by spring pressure and do not require adjustment.

FILTER (Fig. 82)

Remove the drain plug from bottom of the Filter and drain any particles trapped in filter bowl. By removing the six screws in the cover the bowl and filtering element may be removed for cleaning or replacing

ADJUSTING PROCEDURES

The following adjustments are essential to obtain the best performance of the engine operating system. Run engine to reach operating temperature before adjusting. In making adjustments, it is best to use a Tachometer and Fuel Analyzer.

APPROXIMATE IDLE

Screw idler adjustment (Fig. 80) in (for lean) or out (for rich until a good smooth idle is obtained. This may be checked by means of manifold vacuum; the best idle is at the highest vacuum.

POWER ADJUSTMENT

Screw economizer adjustment all the way in. Set engine at 1400 rpm with throttle stop screw. After engine has stabilized at this speed set power adjustment to read 12.5 on fuel analyzer. Tighten screw on meter tube after adjustment. If a fuel analyzer is not available proceed as follows: Set engine at 1400 rpm with throttle stop screw.

After engine has stabilized at this speed, rotate meter tube dial to the lean side until engine rpm starts to fall off, mark this point. Rotate the dial to the rich side until engine rpm again falls off and mark this point. Go halfway between marks and set 2 to 3 serations to the rich side.

ECONOMIZER ADJUSTMENT

With engine running at 1400 rpm after making power adjustment turn out economizer screw gradually until engine has reached peak rpm at this throttle setting and begins to lose speed. Turn screw back in until peak rpm is reached, and tighten locknut. Fuel analyzer will read between 13.8 and 14.4 with this adjustment.

FINAL IDLE ADJUSTMENT

With main jet and economizer set as above, adjust idle screw for smoothest idle. The throttle stop screw is set for desired idle rpm. Making this final adjustment will not affect the correct power or economizer settings.

PRIMER ADJUSTMENT

Run engine at 700 rpm. Loosen locknut and turn primer out (counter-clockwise) a couple of turns. Press primer button and turn primer in (clockwise) until mixture richens to drop engine 350 to 400 rpms.

CAUTION: Under no circumstances should power settings be made too lean as this will result in poor economy and possible engine damage.

Most analyzers may reverse their reading if they have been subjected to an overly lean or rich condition. If satifactory reading cannot be attained, check analyzer.

SPARK PLUGS

The spark plug usage chart for L.P.G. engines should be as follows:

H, HB, HC-318	XJ-10-Y
H-361	XJ-12-Y
HB, HC, HT-361	XN-6
H-413	XJ-12-Y
HB, HC, HT-413	XN-6

PREPARATION FOR STORAGE

When the engine is to be stored or removed from operation for an extended period of time, the following precautions should be taken to prevent rust accumulation, corrosion of bearing and mating surfaces within the engine, and gum formation in the fuel system:

1. Drain the lubricating oil from the engine and add 2½ quarts of Rust Preventive Oil which may be obtained from a reliable oil company.

2. Drain the cooling system, add MOPAR RUST RESISTOR and fill with clean water.

3. Add one quart of special rust preventive oil to each five gallon of gasoline in the fuel tank.

4. Drain the fuel tank and operate the engine until the carburetor runs dry.

NOTE: The purpose of this operation is to aid in preventing the carburetor from being contaminated with gums that normally form in the gasoline as a result of its prolonged exposure to the oxygen in the air. Failure to take this precaution generally results in carburetor flat spots or other carburetor malfunctioning.

5. Remove the spark plugs and pour two ounces of rust preventive oil into each spark plug opening. Turn the engine over four or five revolutions with the starting motor to distribute the rust preventive oil on the cylinder walls and install the plugs.

6. Remove the cylinder head covers, and using a clean paint brush, coat the rocker arms, the rocker arm shafts, the valve springs, the push rods and the valve stems with special rust preventive oil.

7. Drain the cooling system.

8. Remove the carburetor air cleaner, the oil filler pipe air cleaner and the outlet ventilator pipe cleaner. Seal the openings with masking or adhesive tape. Also, seal the exhaust outlet opening in the exhaust manifold or exhaust pipe.

9. Replace the element in the oil filter after cleaning the filter housing.

10. Remove the storage battery and store in a cool, dry place. Replenish the water in the battery cells to cover the plates ⅜ inch. See

that the battery is fully charged and keep it fully charged during the idle period.

11. Protect the engine with a waterproof cover if it is exposed to the weather.

12. Make periodic inspections to see that the engine is properly stored and that all seals are intact.

13. The Rust Preventive Oil should be drained prior to putting the engine back into operation. The crankcase should then be filled with the recommended engine oil for the operating conditions being encountered.

ORDERING OF PARTS

The exploded views shown in this book are intended to enable the operator to better understand the general construction of Chrysler Industrial Engines, and to assist in ordering parts.

The views are helpful in determining the sequence of assembly and function of the various parts; therefore, they will be of considerable assistance when making adjustments or repairs.

IMPORTANT

Orders for parts should be placed with the nearest Authorized Dealer. Authorized Dealers are in possession of complete parts information and can, in most instances, promptly supply your parts requirements from their inventory. If you do not know the location of your nearest Chrysler Industrial Engine Dealer, a card addressed to the Industrial Engine Division, Chrysler Corporation, 12000 E. Jefferson, Detroit 15, Michigan, will bring you his name and address promptly.

Most important in ordering parts is the proper identification of the engine. Always mention the Model, Type and Serial Number. (Sample: Model Ind. H-318-102, Type 140, Serial Number 39540.) This information is stamped on the identification plate (Located on the rear side of the left cylinder head) and should be mentioned in all parts orders or communications. The number stamped on the front end of the cylinder block just back of the water pump is a manufacturing code and should not be used for the purpose of identification.

SPECIFICATIONS

Make	Chrysler V-8 Industrial Engines						
Model	H-318 HB-318	HC-318	H-361	HB-361 HC-361	HT-361	H-413 HB-413 HC-413 HCI-413	HT-413
Type	4 stroke cycle gasoline	4 stroke cycle gasoline	4 stroke cycle gasoline	4 stroke cycle gasoline	4 stroke cycle gasoline	4 stroke cycle gasoline	4 stroke cycle gasoline
Cylinders	90° V-8	90° V-8	90° V-8	90° V-8	90° V-8	90° V-8	90° V-8
Bore	3.910 In.	3.910 In.	4.125 In.	4.125 In.	4.125 In.	4.188 In.	4.188 In.
Stroke	3.31 In.	3.31 In.	3.375 In.	3.375 In.	3.375 In.	3.750 In.	3.750 In.
Piston Displacement	318 Cu. In.	318 Cu. In.	361 Cu. In.	361 Cu. In.	361 Cu. In.	413 Cu. In.	413 Cu. In.
Horsepower Rating	190 @ 4000	190 @ 4000	200 @ 4000	205 @ 4000	200 @ 4000	214 @ 4000	214 @ 4000
Compression Ratio	8.25:1	8.25:1	8.0:1	7.3:1	7.5:1	8.0:1	7.5:1
Compression Pressure at 150 rpm	120-150 psi	120-150 psi	120-150 psi	120-150 psi	120-150 psi	120-150 psi	120-150 psi
Maximum Variations Between Cylinders	20 psi	20 psi	20 psi	20 psi	20 psi	20 psi	20 psi
Cylinder Numbering as Viewed from Flywheel End of Engine							
(Left Bank)	1-3-5-7	1-3-5-7	1-3-5-7	1-3-5-7	1-3-5-7	1-3-5-7	1-3-5-7
(Right Bank)	2-4-6-8	2-4-6-8	2-4-6-8	2-4-6-8	2-4-6-8	2-4-6-8	2-4-6-8
(Firing Order)	1-8-4-3-6-5-7-2						

SPECIFICATIONS CONT'D

Oil Pressure (Operating at 2000 R. P. M.)	45-65 psi	45-65 psi	45-65 psi	45-65 psi	45-65 psi	45-65 psi	45-65 psi
Oil Pressure Idling at 500 rpm (Minimum)	15 psi	15 psi	15 psi	15 psi	15 psi	15 psi	15 psi
Cooling System Capacity Without Radiator	16½ qts.	16½ qts.	12½ qts.	12½ qts.	12½ qts.	12½ qts.	12½ qts.
With Radiator	20 qts.	20 qts.	16 qts.	21 qts.	21 qts.	16 qts.	21 qts.
Crankcase Capacity	5 qts.*	5 qts.*	5 qts.*	5 qts.*	8 qts.‡%	5 qts.*	8 qts.‡

*Add one additional quart of engine oil when single filter element is changed.

‡Add two additional quarts of engine oil when vertical mounted filter element is changed.

%Add three additional quarts of engine oil when dual oil filter elements are changed.