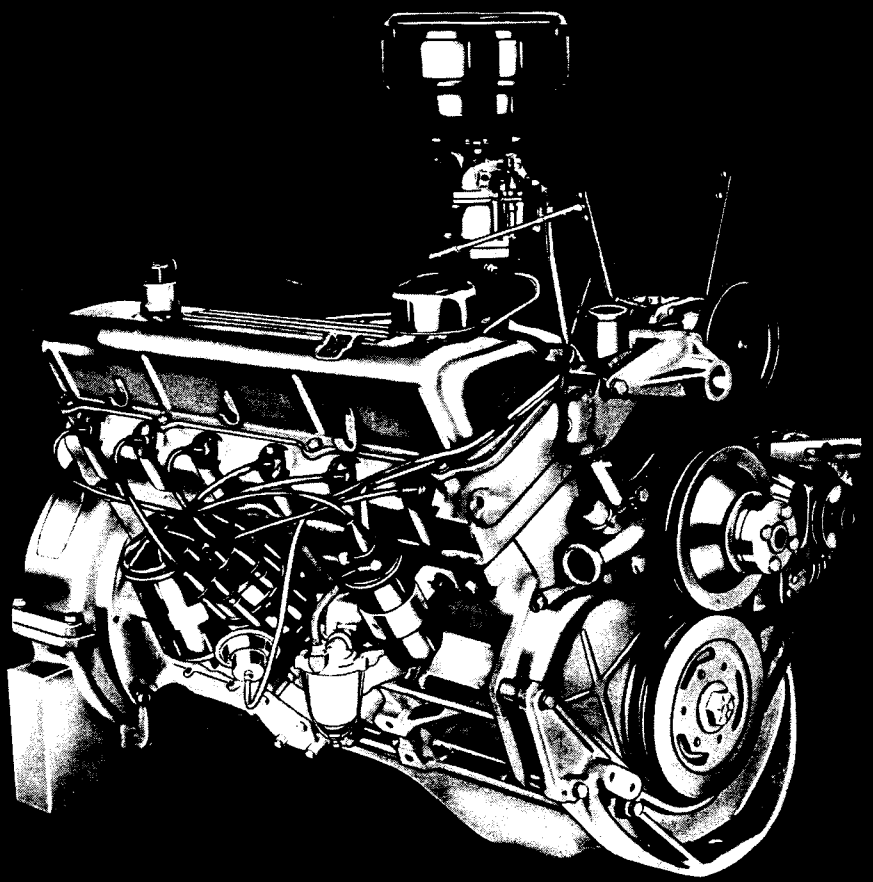
Chrysler



OPERATING MANUAL

CONTENTS

IMPORTANT

For the Owner's record and convenience, fill in the information below on engine. It will then be readily available when needed for identification purposes, should the replacement of any parts become necessary.

Model .....

Part Number or Engine Assembly .....

Serial Number .....

FOREWORD

The operator's manual is published as a guide and reference to assist the new owner of a Chrysler Industrial Engine in obtaining satisfactory operating performance. Refer to maintenance manual for repair and service procedures.

In order to obtain optimum performance, it is necessary that the unit be treated with reasonable care and that inspection, operation and maintenance procedures be closely followed.

Chrysler Corporation recommends that the owner discuss with his selling dealer the conditions and environment in which the Industrial engine will operate. The owner should request the selling dealer to make recommendations relative to optional equipment that will protect his Industrial engine and promote engine life.

The nationwide organization of Chrysler Industrial Distributors and Distributor Dealers are ready to aid you in maintaining your Chrysler Industrial Engine in top operating condition. Chrysler Corporation recommends that all service and maintenance be performed by authorized, qualified Chrysler Industrial service organizations wherever possible.

Chrysler Corporation reserves the right to make changes in design and specifications, and/or to make additions to or improvements in its product without imposing any obligations upon itself to install them on products previously manufactured.

MODIFICATIONS

There may be slight modifications in the design of the engine as dictated by the field experience or a desire by the Manufacturer to improve the engine; or changes of material may become necessary due to the inability to procure the parts originally specified. If such changes become obvious, then wherever possible, parts or assemblies will be made interchangeable with the original design.

ILLUSTRATIONS

The illustrations and the line drawings in this Operator's Manual are intended to show to Owner the various parts and constructions of the engine. In some instances the shapes or details of the parts illustrated may not exactly represent their actual appearance; however, they are being used to show the servicing methods or operation of the parts performing the same function.

IDENTIFICATION

A name plate is attached to the left rear side of the cylinder head (Fig. 1) showing the model, type and serial number of the engine.

Fig. 1—Engine Identification Name Plate

DESCRIPTION

The Chrysler Industrial Engines, H-225, HB-225, I-225 as shown in Figures 2 and 3 are supplied in various types for use in powering Fork Lift Trucks, Delivery Trucks, Irrigation pumps, Standby pumps, Auxiliary generators, Welding generators, Cement mixers, Wind machines, Tow-tractors, Hoisting equipment and many other industrial applications.

When an engine is modified for various adaptations with a particular combination of accessories, it is designated by a separate model and type number, such as Model H-225-108 or by engine assembly part number. This is done so it may be readily identified in determining the service parts requirements or where additional accessories are required for various adaptations.

CONSTRUCTION

The basic engine is a six-cylinder, four-cycle, gasoline type with liquid cooling and pressure lubrication. Many moving parts are superfinished to provide the maximum in wear-resisting, load carrying properties in the bearing surfaces. Figures 4 and 5 show the engine parts completely disassembled. Figures 6 and 7 are sectional views of the engine.

The 225 Chrysler Industrial Engine is inclined toward the right at an angle of 30 degrees from the vertical for various adaptations. The engine has inline overhead valves and wedge shaped combustion chambers with 8.4:1 nominal compression ratio.

An externally mounted rotor type oil pump is attached on the lower center right side of the cylinder block. A full flow replaceable type oil filter is mounted on the rear of the oil pump body. The oil is forced by the oil pump through a series of oil passages in the engine, as shown in Figure 8.

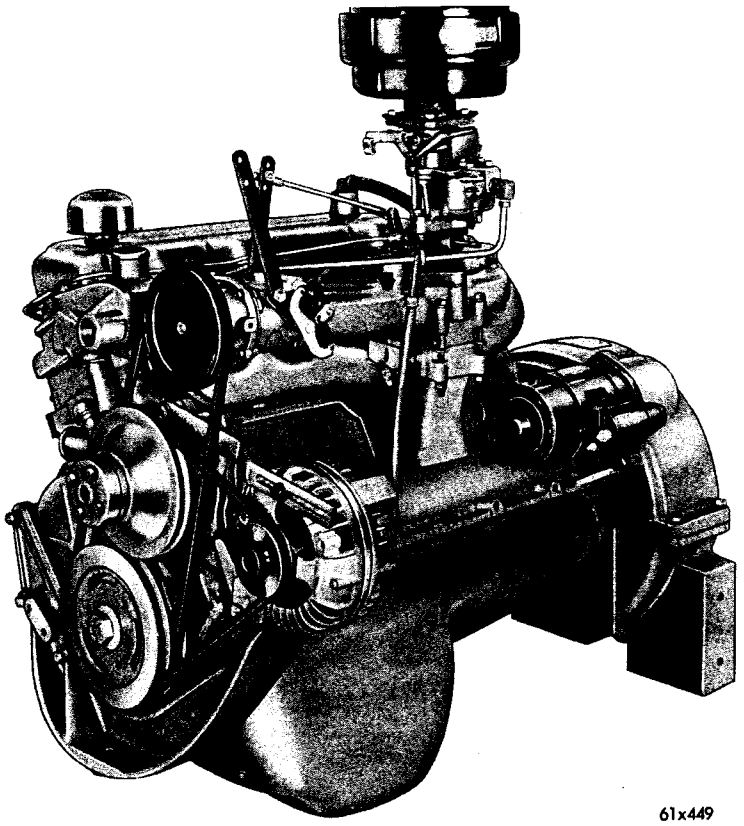
The cooling system contains an aluminum water pump body with a pressed-in, lubricated for life ball bearing and seal assembly and a plastic impeller. The water pump housing is integral with the cylinder block.

LIMITED WARRANTY

Refer to applicable warranty policy card or manual for warranty information.

IMPORTANT

THE WARRANTY CERTIFICATION CARD INCLUDED WITH EACH ENGINE MUST BE COMPLETED AND MAILED AT THE TIME OF SALE BY THE ORIGINAL RETAIL PURCHASER.



61x449

Fig. 2—Engine Assembly—Right Front View

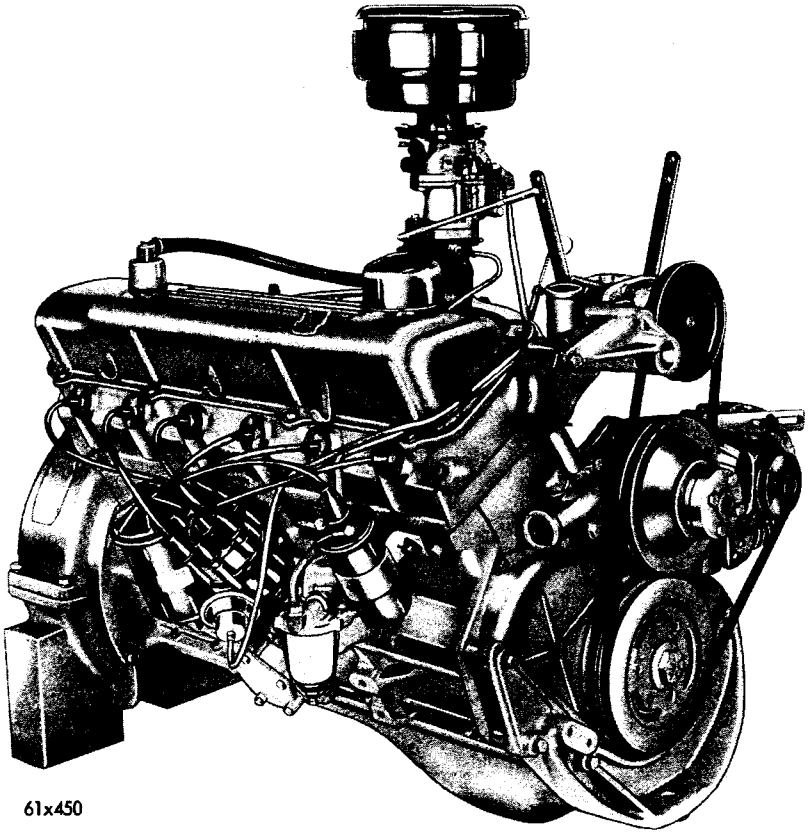


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Fig. 3—Engine Assembly—Left Front View

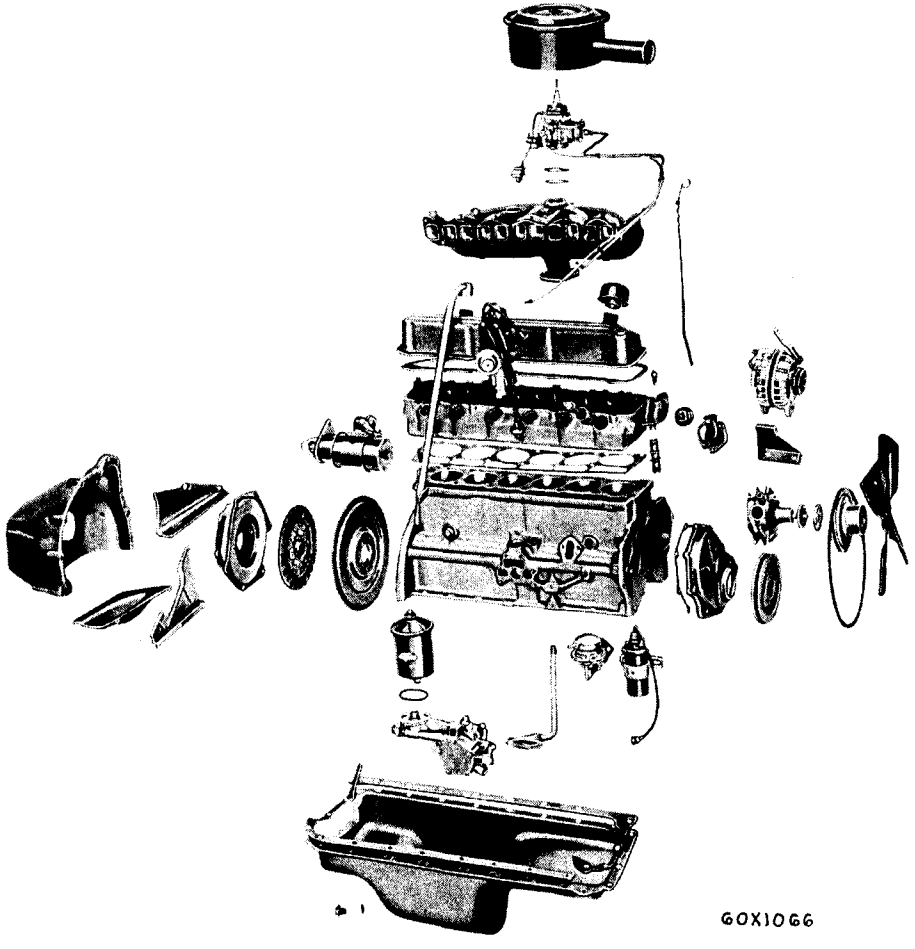


Fig. 4—Engine Assembly External View (Disassembled View)

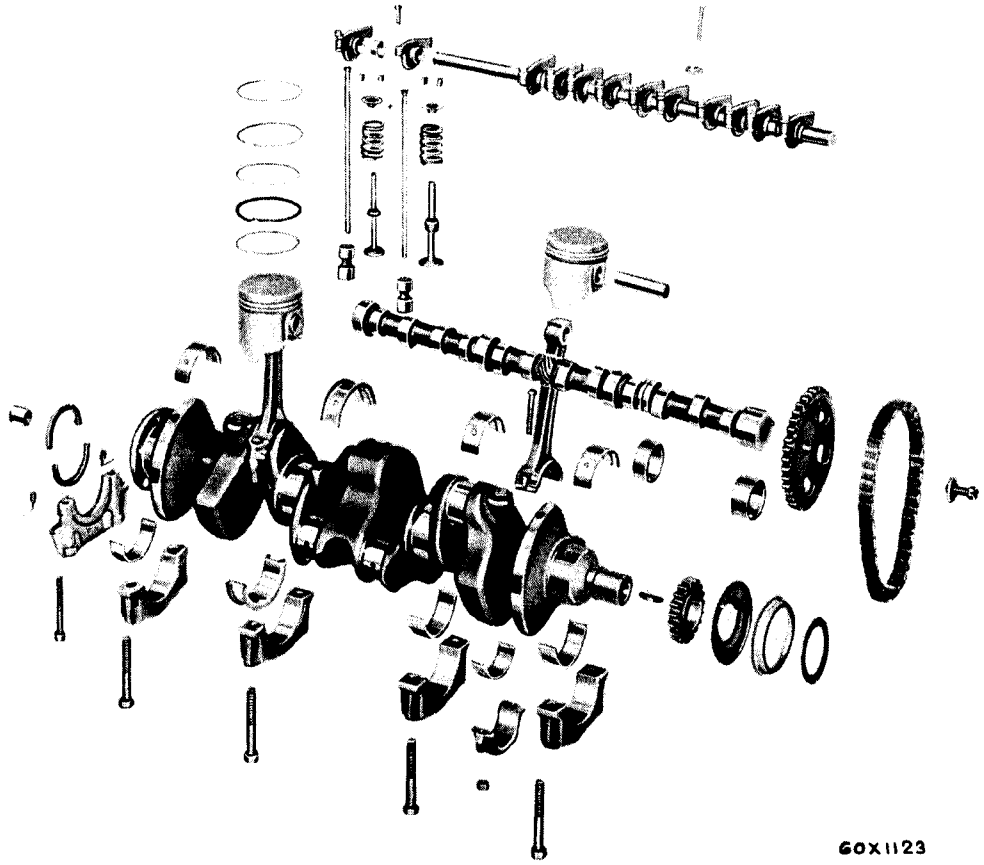


Fig. 5—Engine Assembly Internal Parts (Disassembled View)

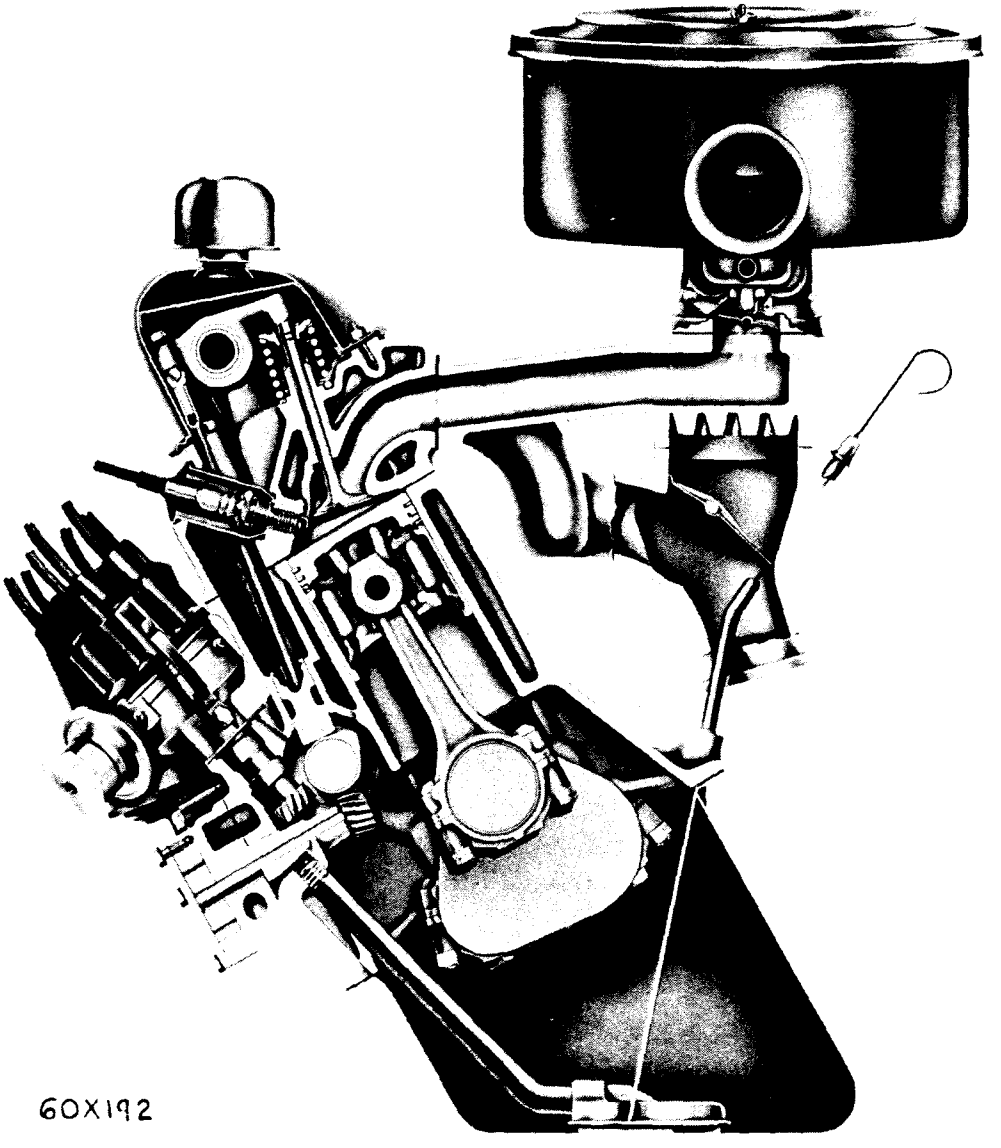


Fig. 6—6-Cyl. Engine—End Sectional View

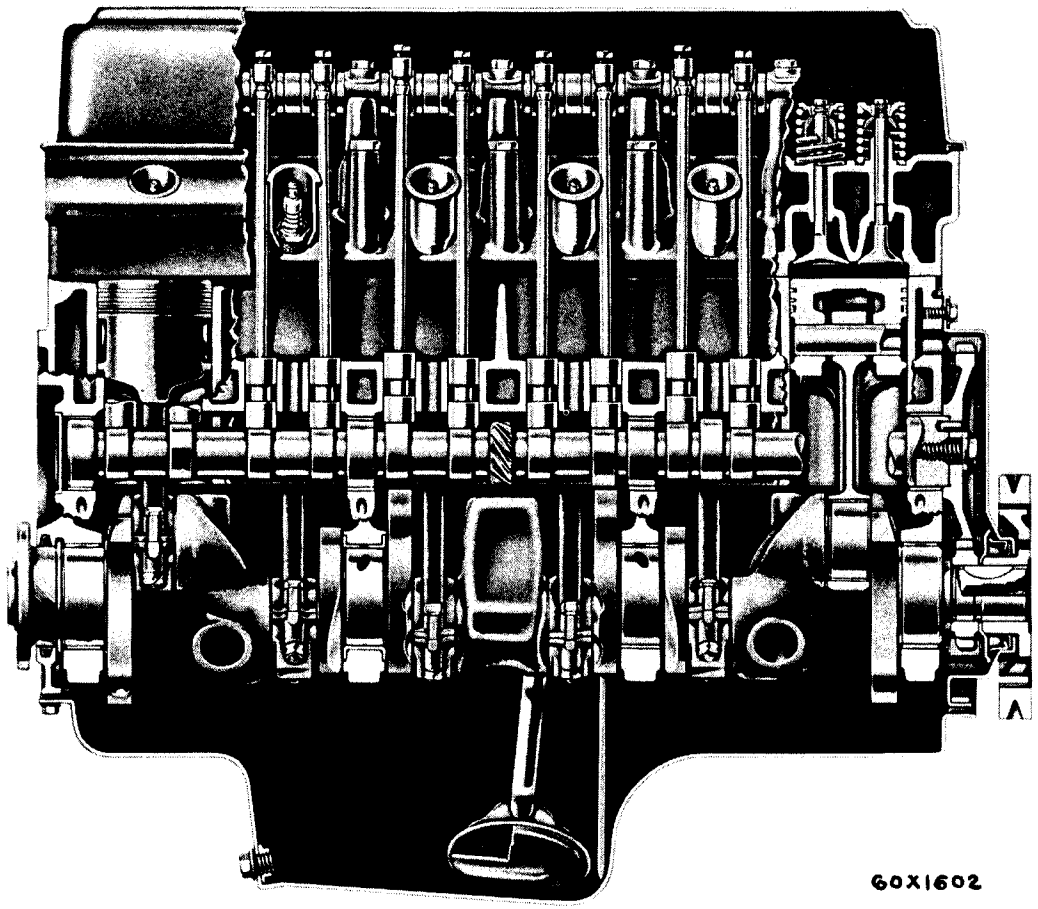


Fig. 7—Engine Assembly—Side Sectional View

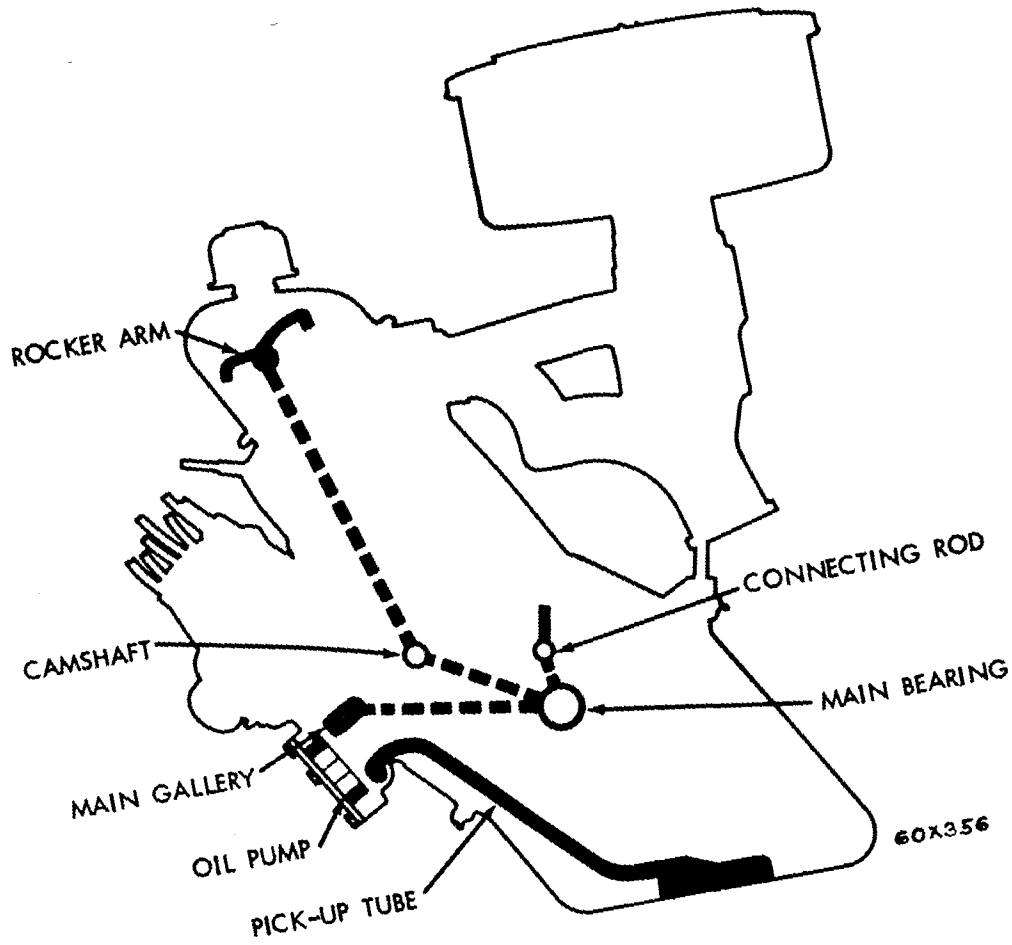


Fig. 8—Engine Oiling System

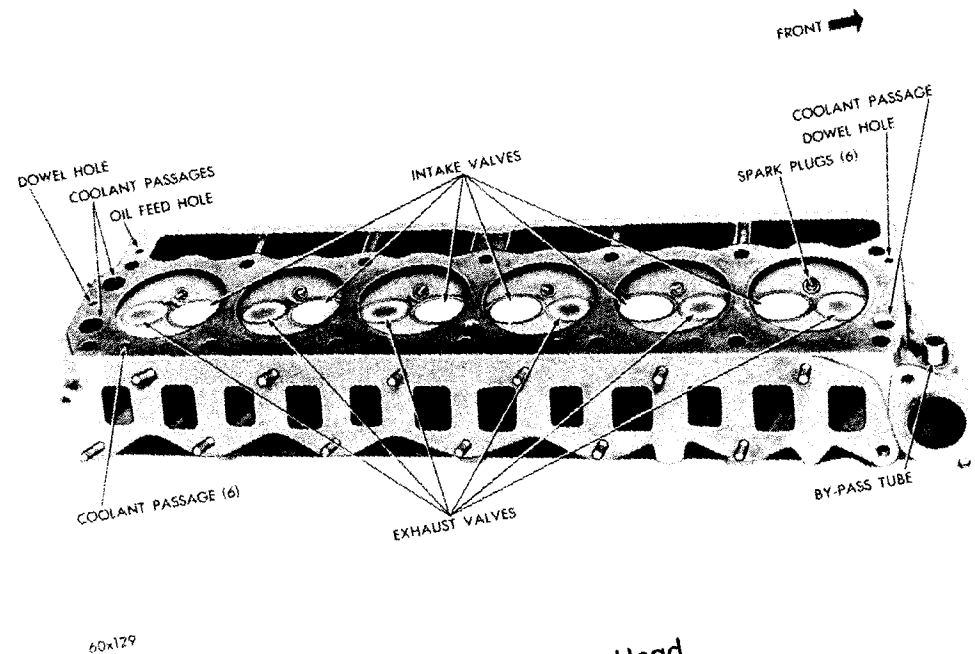


Fig. 9—Cylinder Head

Special bolt used on late models at rear location to properly index rocker shaft.

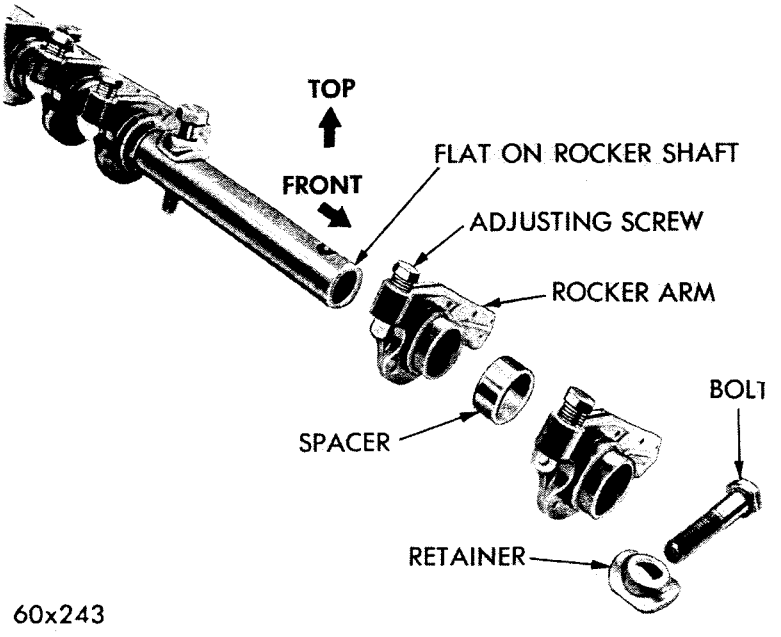


Fig. 10—Rocker Arm and Shaft Assembly

The chrome alloy cast iron cylinder head, as shown in Figure 9, is held in place by 14 bolts. The spark plugs are located at the wide edge of the combustion chambers. Aluminum spark plug tubes also serve as spark plug gaskets. 1975 and later models use cylinder heads without spark plug tubes and use tapered seat type spark plugs.

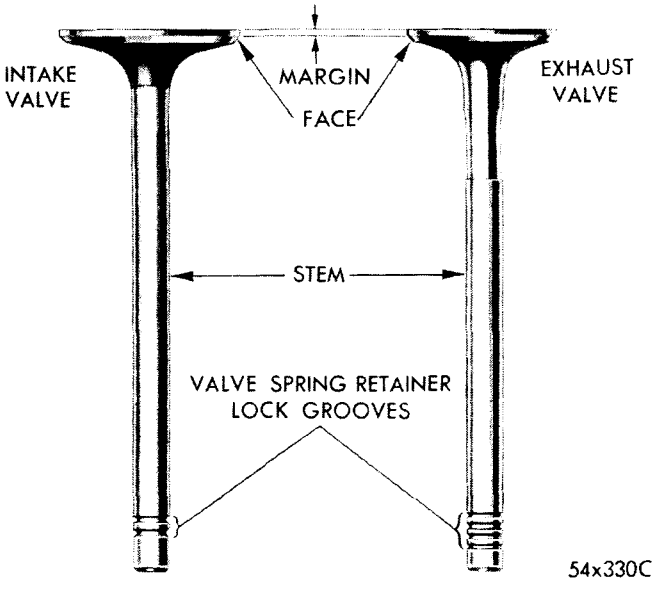


Fig. 11—Intake and Exhaust Valve

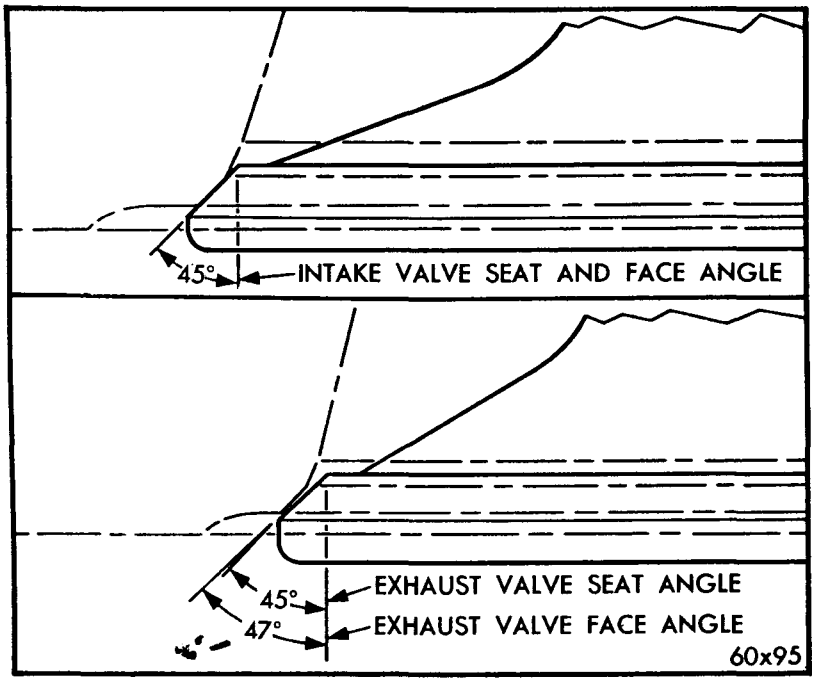


Fig. 12—Valve Face and Shaft Angles

The stamped steel rocker arms are arranged on a single rocker arm shaft (Fig. 10). Hardened steel spacers are used between the pairs of rocker arms. The rocker shaft is held in place by bolts and stamped

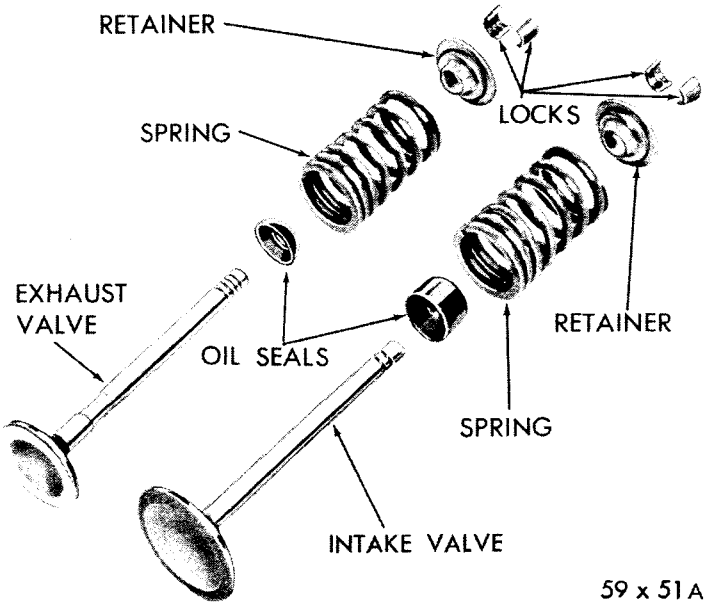


Fig. 13—Valve Assembly

steel retainers are attached to the seven integral brackets on the cylinder head. The valves are arranged-in-line in the cylinder head and operate in guides that are integral with the cylinder heads. The intake and exhaust valve seats and the intake valve faces have a 45-degree angle. The exhaust valve face has a 47-degree angle. The valve face and valve seat are shown in Figures 11, 12 and 13.

Model HB-225 has stellite faced exhaust valves with rotators and exhaust seal inserts. The rotators provide positive rotation of the exhaust valve each time the valve moves (Fig. 14). This rotation with each stroke of the engine prolongs the life of the stellite exhaust valves. Special valve springs are used on the exhaust valves which are not interchangeable with the intake valve springs.

The camshaft has an integral oil pump and distributor drive gear and a fuel pump eccentric, as shown in Figure 15. The rearward camshaft thrust is taken by the rear face of the cast iron camshaft sprocket hub, bearing directly on the front of the cylinder block, eliminating the need for a thrust plate. The helical oil pump and distributor drive gear and the camshaft lobe taper both tend to produce only a rearward thrust.

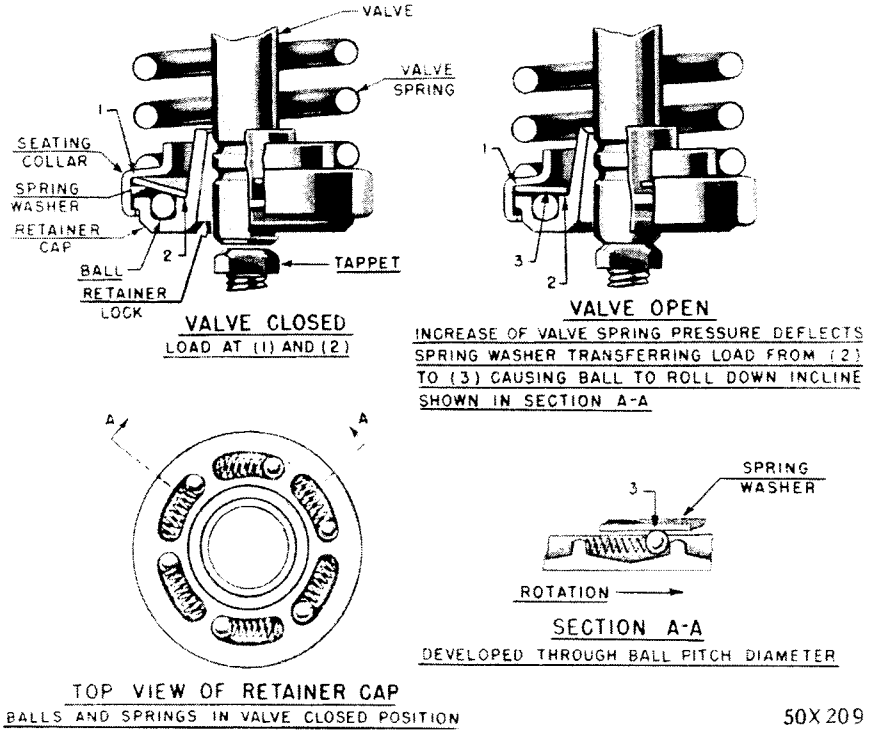


Fig. 14—Exhaust Valve Spring Retainer Assembly (Schematic)

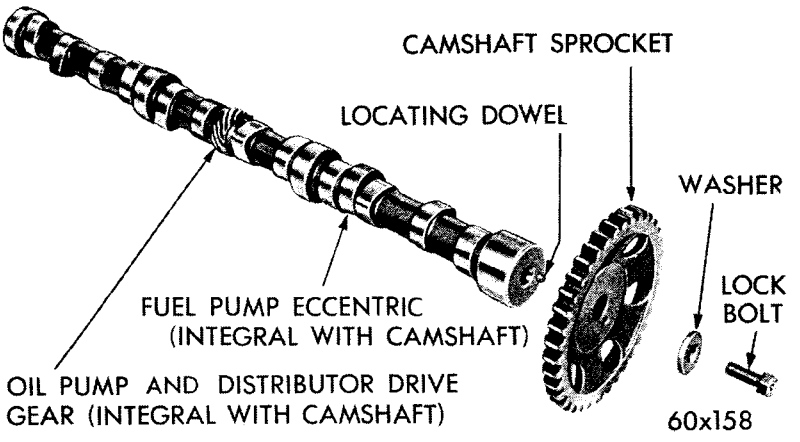


Fig. 15—Camshaft and Sprocket Assembly

The pistons are cam ground so that the diameter at the pin boss is less than the diameter across the thrust face. This allows for expansion under normal operating conditions. The expansion forces the pin bosses away from each other, and therefore, the piston assumes a more round shape. All of the pistons are machined to the same weight in grams regardless of oversize in order to maintain piston balance (Fig. 16).

The Number 1, 2 and 4 lower main bearings are interchangeable. The Number 2 and 4 upper main bearings are interchangeable. The Number 1 upper main bearing is not interchangeable and is chamfered

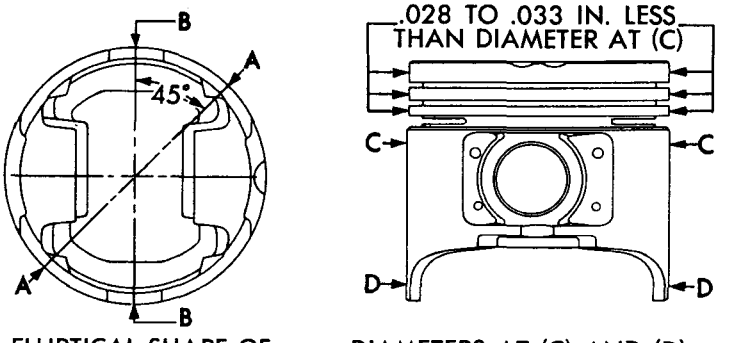


Fig. 16—Piston Measurements

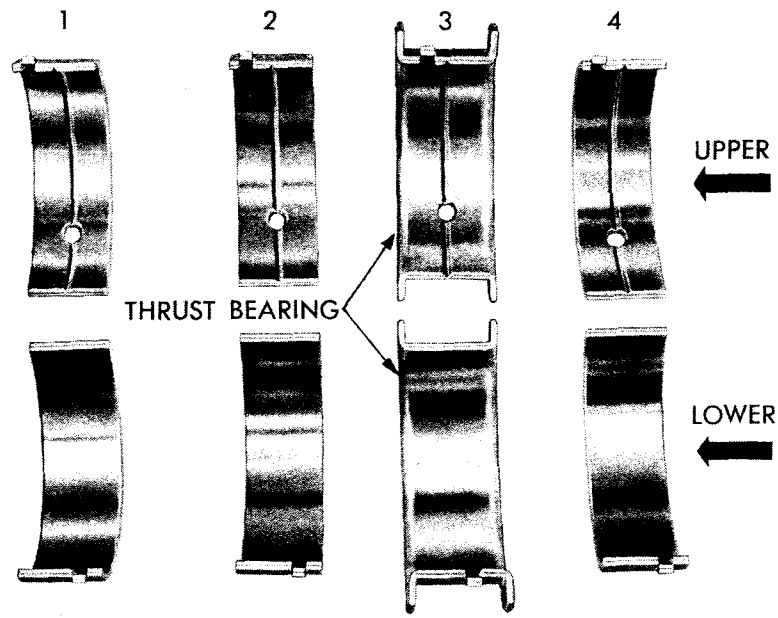


Fig. 17—Main Bearing Identification

on the tab side for the timing chain oiling and can be identified by a red mark on the edge of the bearing. The upper main bearings are grooved and the lower main bearings are plain and are not interchangeable. The Number 3 upper and lower main bearings are flanged to carry the crankshaft thrust loads and are not interchangeable with any

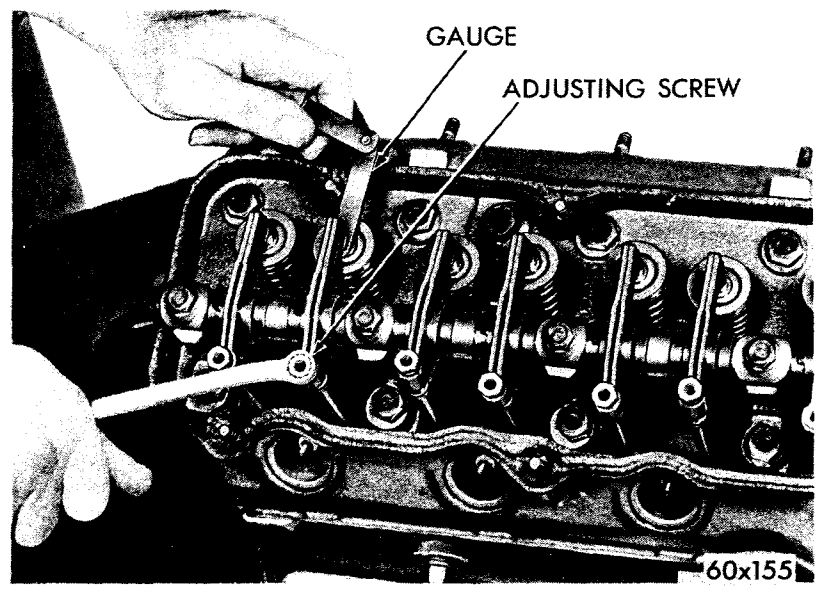


Fig. 18—Adjusting Tappets

other main bearings in the engine. The bearing caps are not interchangeable (Fig. 17).

ADJUSTING THE VALVE TAPPETS

The valve tappets should be adjusted with the engine running at normal operating temperature. The valve tappet screws are of the self locking type without lock nuts.

Adjust the valve tappets to: intake .012 (engine hot), exhaust .024 inch (engine hot). (Fig. 18.) It is important that the proper clearance be maintained to insure satisfactory engine performance.

The lubrication system consists of an externally mounted rotor type oil pump in the lower right side of the cylinder block (Fig. 19). A full flow type oil filter and the oil pressure sending unit are mounted on the rear of the oil pump body. All of the oil discharged by the oil pump passes through the full flow filter before it enters the engine. The filter has an integral relief valve, which permits oil to by-pass the filter if the element becomes clogged.

The oil from the filter flows into the main oil gallery which supplies oil to all camshaft and main bearings, through drilled passages in each main bearing web. Oil is supplied from the main bearings through drilled passages in the crankshaft to the connecting rod bearings, and through a drilled hole in the connecting rod for the cylinder walls and piston ring lubrication. Oil from the rear camshaft bearing is delivered

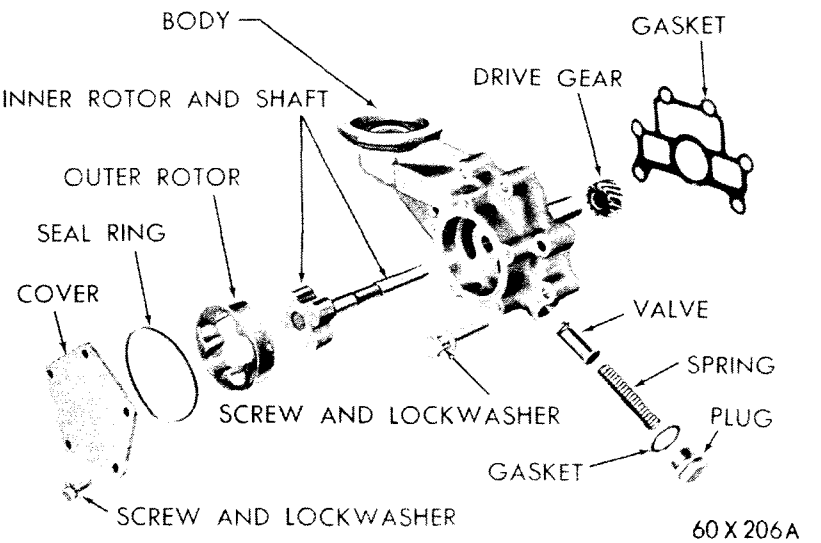


Fig. 19—Oil Pump and Filter Assembly (Disassembled)

through passages in the block and cylinder head, through the rocker shaft rear pedestal, into the rocker arm shaft which feeds each rocker arm through metered holes in the shaft. The No. 1 main bearing is chamfered slightly to direct a spray of oil to the timing chain and sprockets.

The selection of the proper lubricant and its correct application at regular intervals will do much to increase the operating life of the engine. See "Lubrication and Maintenance" in this Manual. When an engine is operating under abnormal conditions, such as extreme heat, heavy loads or dusty conditions, it will require lubricating attention more frequently. The type of lubricant may also have to be changed

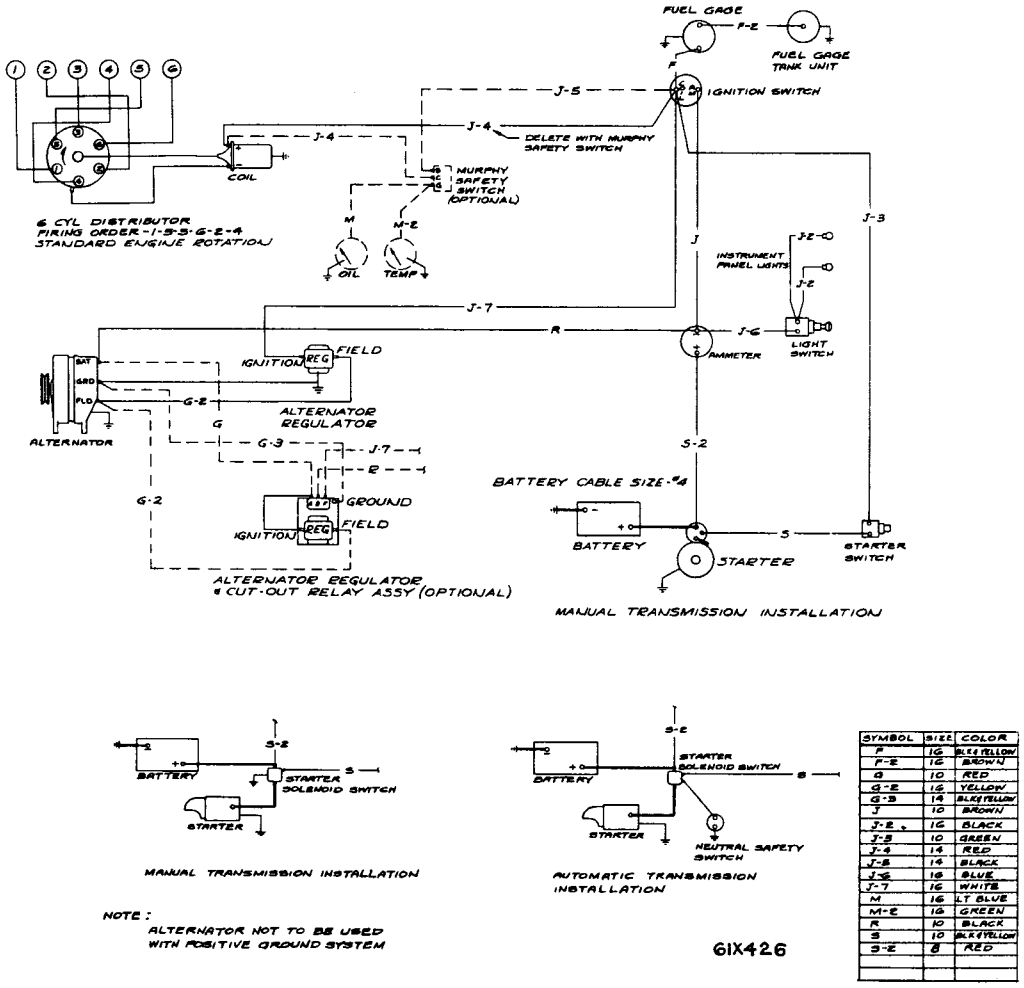
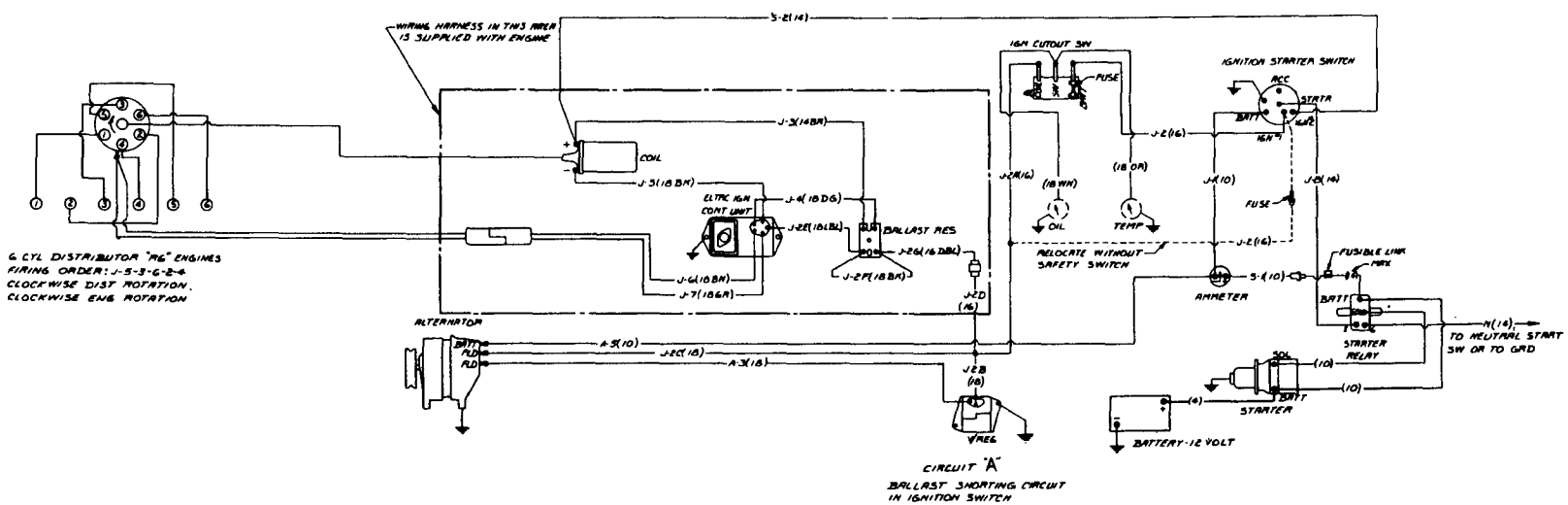
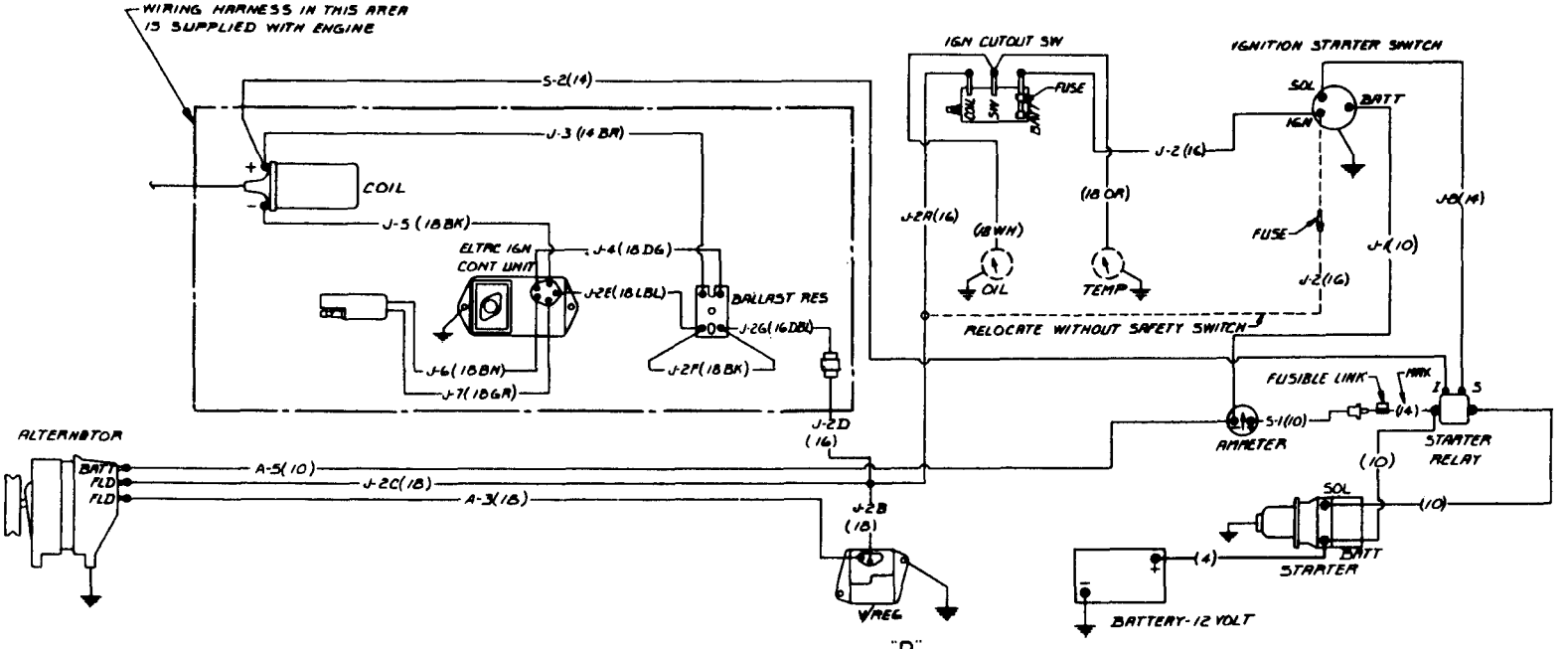


Fig. 20—Chrysler 6-Cylinder Industrial Engine Wiring Diagram
All Models


WIRING HARNESS IN THIS AREA IS SUPPLIED WITH ENGINE
S-2(14)
IGN CUTOUT SW
FUSE
IGNITION STARTER SWITCH
ACC
STRTR
BATT
IGN
IGN 2
J-3(14BR)
COIL
J-5(18BR)
ELTRC IGN CONT UNIT
J-4(18DG)
J-22(18LBL)
BALLAST RES.
J-26(18DBL)
J-2F(18BR)
J-6(18BR)
J-7(18GR)
J-2C(16)
(18 WH)
(18 OR)
OIL
TEMP
J-2(16)
J-A(10)
J-2(14)
FUSE
RELOCATE WITHOUT SAFETY SWITCH
J-2(16)
FUSIBLE LINK
AMMETER
S-1(10)
BATT
STARTER RELAY
N(14)
TO NEUTRAL START SW OR TO GRD
6 CYL DISTRIBUTOR "R6" ENGINES
FIRING ORDER: 1-5-3-6-2-4
CLOCKWISE DIST ROTATION.
CLOCKWISE ENG ROTATION
ALTERNATOR
BATT
FLD
RLD
A-3(10)
J-2C(18)
A-3(18)
J-2D
(16)
J-2B
(18)
VREG
SOL
(10)
BATT
STARTER
(4)
BATTERY-12 VOLT
CIRCUIT "A"
BALLAST SHORTING CIRCUIT IN IGNITION SWITCH



CIRCUIT "B"
BALLAST SHORTING CIRCUIT IN STARTING RELAY

in order to obtain the best service operation when the engine is continually operated under abnormal conditions. It is therefore recommended that a well planned lubrication and maintenance schedule be developed which will tend to promote peak engine operating conditions.

ELECTRICAL SYSTEM

The electrical system, as shown in Figure 20, consists of the following:

Starting motor, ignition coil, alternator, alternator regulator, distributor and spark plugs, spark plug cables together with the connecting wires, gauges and switches.

DISTRIBUTOR

The ignition system consists of two separate circuits: the battery, ammeter, ignition switch, primary winding of the ignition coil, distributor contacts and condenser, engine, and the primary wiring make up the low voltage primary circuit. The secondary high voltage circuit includes the coil secondary winding, the distributor cap and rotor, the spark plugs, the high tension wiring and the engine.

In operation, a primary current flows from the battery, through the ammeter and ignition switch to the coil primary winding, then to ground through the distributor contacts. When the contacts open, the current tends to continue flowing across the contact gap. The condenser, which is connected across the contacts, momentarily absorbs this current and in so doing hastens the collapse of the magnetic field produced by the current in the coil primary winding. This collapsing field induces a very high voltage in the secondary winding which is carried by the high tension wire to the center terminal of the distributor cap. The rotor connects this center terminal to one of the cap terminals which in turn is connected to the proper spark plug. The spark produced by this high tension current ignites the fuel in that cylinder. This process is repeated for every power stroke of the engine. This requires moving parts to operate at high speeds and electrical parts to perform their function with maximum efficiency.

The coil to distributor cap wire and the spark plug wires should make good, clean contact in the ignition coil and the distributor cap towers. Wires that are loose or are not inserted all the way into the towers will corrode and increase the resistance.

The ignition coil tower and the distributor cap should be wiped clean with a cloth moistened in a cleaning solvent. This serves to eliminate leaks and hard starting due to moisture that may collect in the dirt accumulation.

The insulation of the coil and spark plug wires will deteriorate with usage. Leakage to ground and between the wires will occur, resulting in hard starting and inefficient engine operation. Old, cracked, or damaged wires should be replaced. The secondary cables, cap and rotor should be tested, using Tool C-3296. This tester provides high voltage which is sufficient for testing secondary insulation.

On engines equipped with resistance type wire, check for open circuit, loose terminals or high resistance. Replace cable if resistance is more than 30,000 ohms. Replace cable if terminal has pulled off.

The rotor and distributor cap electrodes should be inspected for burning. Replace the rotor if the electrode is burned on the top or worn too short.

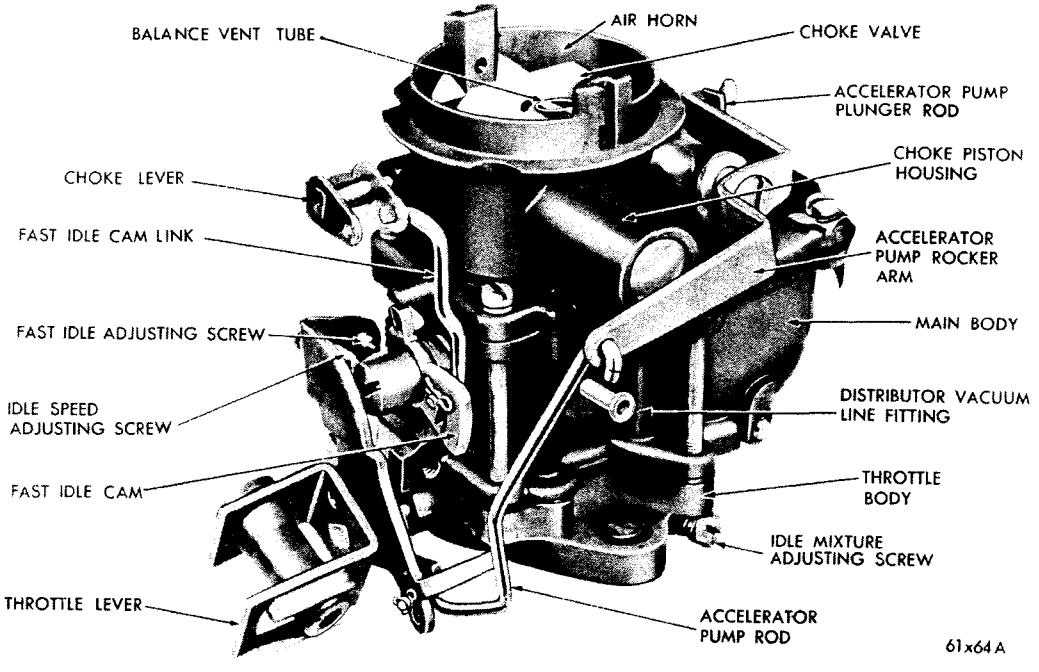


Fig. 21—Carburetor Assembly—BBS Series

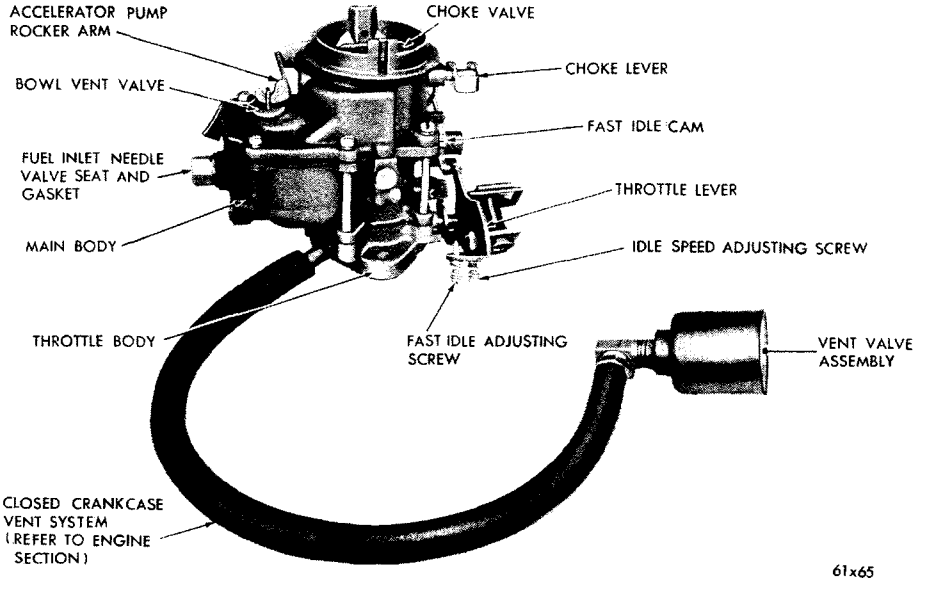


Fig. 22—Carburetor Assembly—BBS Series With Closed Crankcase Vent

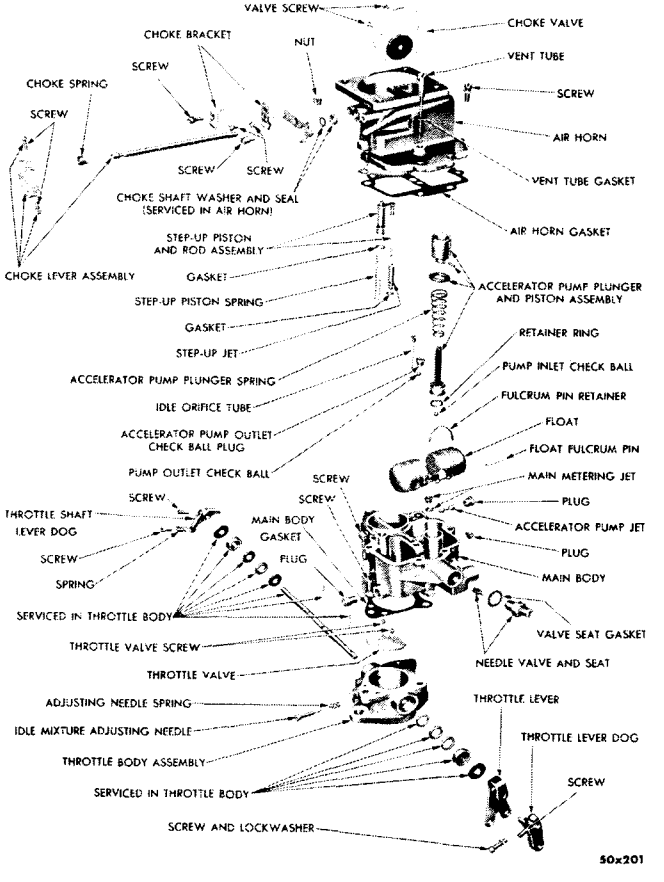


Fig. 23—Carburetor Model E7D (Disassembled View)

FUEL SYSTEM (Figs. 21, 22 and 23)

The fuel system consists of the fuel lines, fuel pump, fuel filter, vacuum lines, carburetor, fuel tank, intake manifold and throttle control. In operation, the fuel from the tank passes through the filter into the fuel pump, which is driven by an eccentric on the front end of the camshaft. The fuel pump forces fuel into the carburetor where it is metered into the air stream drawn into the engine in quantities suitable for all engine speed and load conditions through the manifold into the combustion chamber.

CARBURETORS

The 225 Chrysler 6-Cylinder Industrial Engines are equipped with downdraft carburetors. The carburetors are adapted to use different type governors. Fuel is supplied through separate circuits in the carburetor for varying requirements of idling, part throttle operation, acceleration and wide open throttle operation. The operation of the float, low speed, high speed, and accelerator pump systems are described as follows:

FLOAT SYSTEM

The float system maintains a fuel supply at the proper level for all operating conditions. The fuel level is kept at a minimum to limit fuel vaporization and to aid in warm engine starting. It is important that floats be properly adjusted, and needle valve assembly is in good condition. Equally important is a good seal between the air horn and main body. A poor gasket at this point causes leakage resulting in loss of fuel and might allow the entrance of dirt or other foreign material, which would result in poor performance.

LOW SPEED SYSTEM

During engine idle or part throttle operation, fuel is supplied to the engine through the low speed system. Fuel enters the main metering jet and is metered through the idle orifice tube where it mixes with air drawn through the idle air bleed. The idle restriction breaks up the fuel as it mixes with air drawn through the idle air bleed. This provides an air-fuel mixture at the idle port and idle adjustment screw port.

It is important that the idle air bleed, idle orifice tube, idle restriction, idle passage, idle port, and idle adjustment screw port are kept

clean. Any clogging will result in poor low speed operation. Air leakage through the gaskets will also cause poor engine idling or low speed operation.

HIGH SPEED SYSTEM

During part or full throttle operation, fuel is supplied to the engine through the high speed system.

When the engine is under a heavy load, suddenly accelerated, or operated at very high engine speeds, the step-up system supplies additional fuel through the diffuser bar discharge ports. Fuel flow through the fuel passage of the main metering jet is controlled by the movement of the step-up rod which in turn is moved by a spring and a vacuum-controlled piston. A vacuum passage to the intake manifold is provided for by a drilled passage in the carburetor body and throttle body, and a slotted flange gasket.

Under normal driving conditions, manifold vacuum exerts a strong pull on the vacuum piston. This holds the piston down keeping the step-up rod in the orifice of the main metering jet. Fuel then flows around the rod, through the jet, and through the diffuser bar discharge ports.

When manifold vacuum falls off, due to a heavy load, sudden acceleration or very high engine speed, the spring moves the piston up, moving the step-up rod out of the main metering jet orifice. Additional fuel is then supplied to the engine.

Air is drawn through the high speed air bleed and mixes with the fuel surrounding the main vent tube. The mixture is then drawn from the diffuser discharge ports. It is important that the vent tube is clean. A clogged tube may cause excessively rich mixtures. Leakage of air at the gaskets will decrease or destroy the vacuum and the step-up piston will remain up resulting in excessive fuel consumption.

ACCELERATOR PUMP SYSTEM

The accelerator pump system momentarily supplies an extra charge of fuel to the engine when the throttle is opened. The amount of fuel added is proportional to the amount the pedal is depressed. When the accelerator pedal is depressed, the pump plunger spring forces the plunger down and the fuel is discharged past the discharge check ball through the jet and into the air stream. The inlet passage is closed by the inlet check ball as this occurs.

When the accelerator pedal returns, the pump plunger is pulled up drawing a new charge of fuel past the inlet check ball. The discharge check ball is closed, preventing air bleeding into the passage when the pump plunger is pulled up.

When the engine is operated at high speeds, a vacuum exists at the accelerator pump jet. To prevent fuel being drawn out of the pump system, the pump jet air bleed is vented through a passage in the air horn to the float bowl.

A vent is also provided in the plunger to relieve vapor pressure developed by heat in the pump system.

KING SEELEY GOVERNOR

The velocity type King Seeley governor (Fig. 24) is used on some engines. Engine speed is governed by the throttle valve which is closed by the velocity of the fuel-air mixture as it passes through the governor. An accurately calibrated spring system attached to the throttle shaft

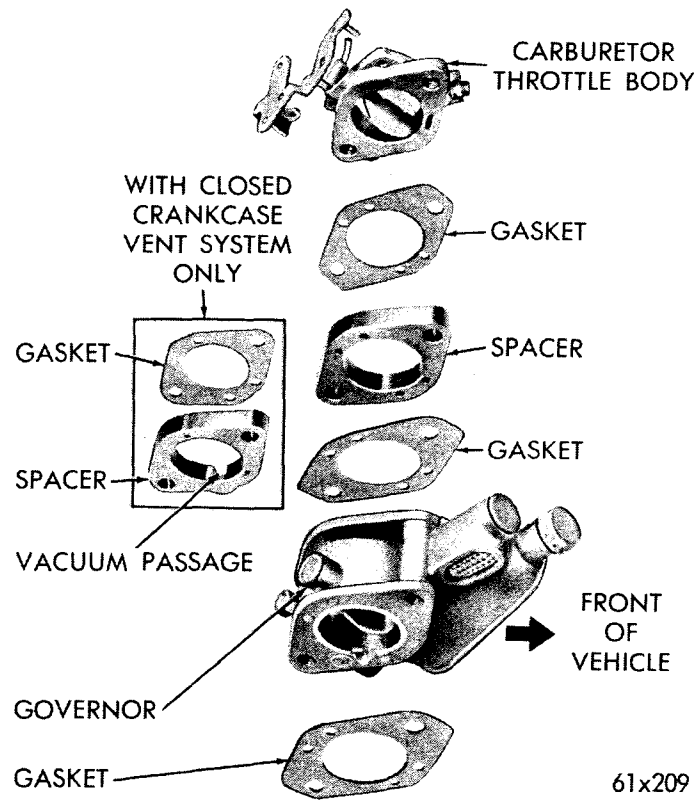


Fig. 24—King Seeley Governor (Disassembled View)

opposes the velocity and controls the position of the throttle valve and the maximum speed of the engine. When in proper operating condition, the governor does not affect engine performance below the speed at which it begins to control, and does not affect fuel consumption. (See "Adjustments" in this Manual.)

When installing the sandwich type King-Seeley velocity governor, install governor in the direction shown and using the correct gaskets and spacers. If the vehicle is equipped with the closed crankcase vent system, be sure the spacer and gasket for use with this system are installed correctly.

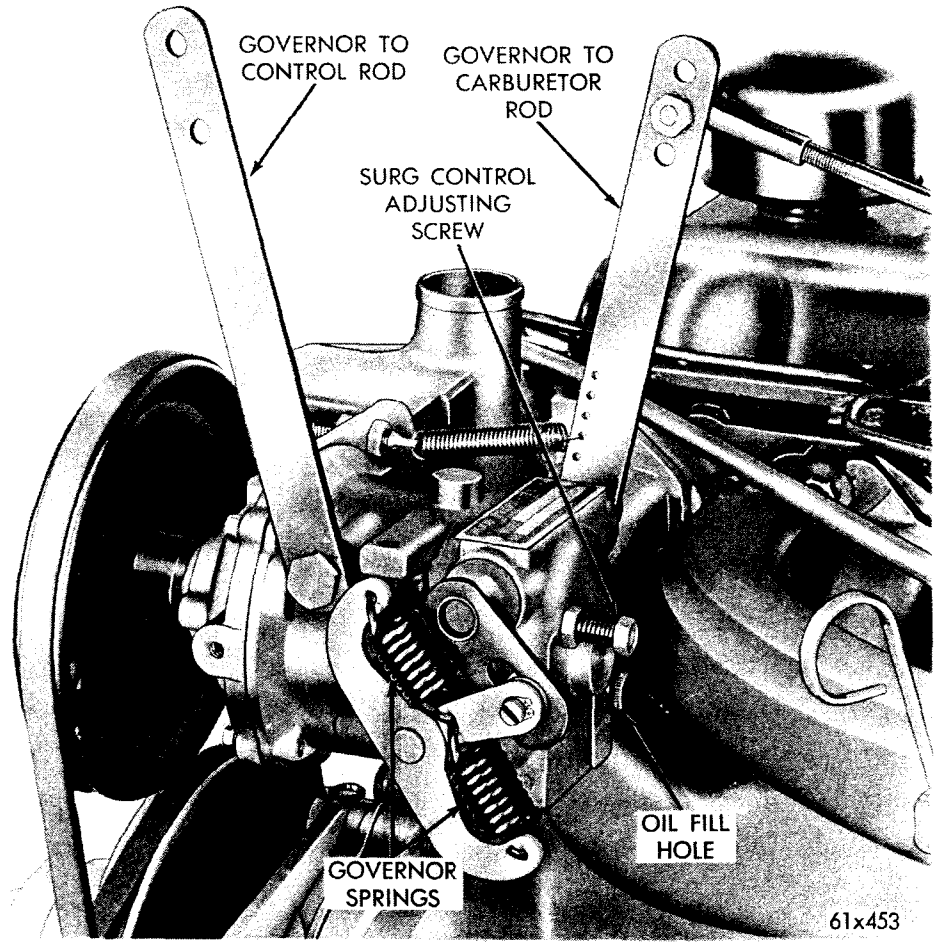


Fig. 25—Hoof Mechanical Governor

HOOF MECHANICAL GOVERNOR

The mechanical type governor Model BD 506 Constant, and Model BD 503 Variable speed is used to control the engine speed when the engine is being used to furnish power for auxiliary equipment such as saws, winches, post hole diggers, etc. The governor is belt driven from the governor drive pulley on the crankshaft.

The drive belt adjustment can be made by loosening the governor attaching bolts and positioning the governor for correct belt tension (Fig. 25). The level of SAE lubricant should be checked after every 250 hours of operation or 3 times a year.

CARBURETOR AIR CLEANER—DRY TYPE (Fig. 26)

The paper carburetor air cleaner should be cleaned every 50 hours or every month in normal use.

Remove the cleaner assembly and remove the paper element. Blow out the dirt gently with an air hose. Direct the air from the inside out and keep the nozzle 2 inches away from the element to avoid damaging the element.

Holes, loose end seals, dented sealing surfaces or other forms of damage will render the filter inoperative.

WARNING: Do not tap or immerse the element in any kind of liquid.

Wash the cleaner cover and body with a cleaning solvent and wipe

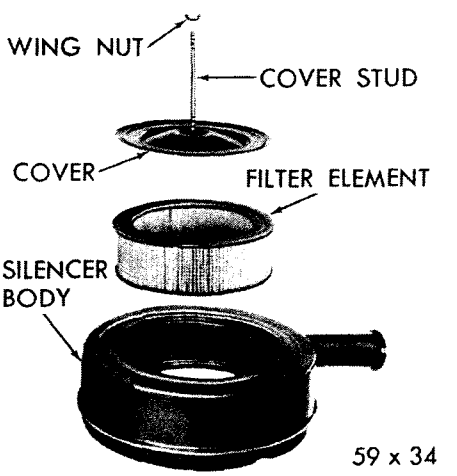


Fig. 26—Carburetor Air Cleaner (Dry Type)

dry. Replace the paper element center and secure firmly. **CAUTION:** Care must be used when installing the element to make sure it doesn't hang-up on the edge of the element support plate. The wing nut torque is 15 foot-pounds. Re-install the cleaner assembly on the engine. Engines operating in dusty areas will require more frequent attention. For this type of service it is recommended that an oil bath air cleaner be used.

CARBURETOR OIL BATH AIR CLEANER

An oil bath air cleaner, shown in Figure 27, is provided to afford maximum protection against dirt, dust and abrasives entering the engine. Under normal conditions, the air cleaner should be examined at each recommended crankcase oil change interval. If the sump is found to contain a semi-solid mixture of dirt and oil up to the lower offset in the reservoir, the air cleaner should be removed and thoroughly cleaned. Remove cover and filter element assembly, rinse clean in kerosene and drain. Empty the dirty oil from the reservoir, clean out the sump, and refill to indicated level with the following viscosity engine oil:

Above +32°F	SAE 30
Below +32°F	SAE 20W

If the engine is operated in dusty territories, the air cleaner will require more frequent attention. For extreme conditions servicing the cleaner as often as once a day may be necessary.

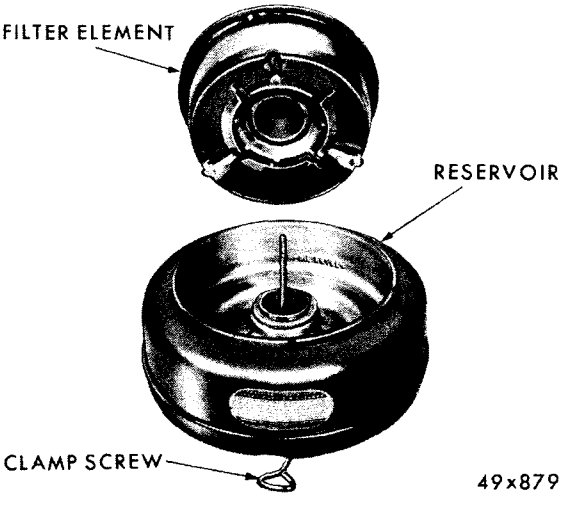


Fig. 27—Carburetor Oil Bath Air Cleaner

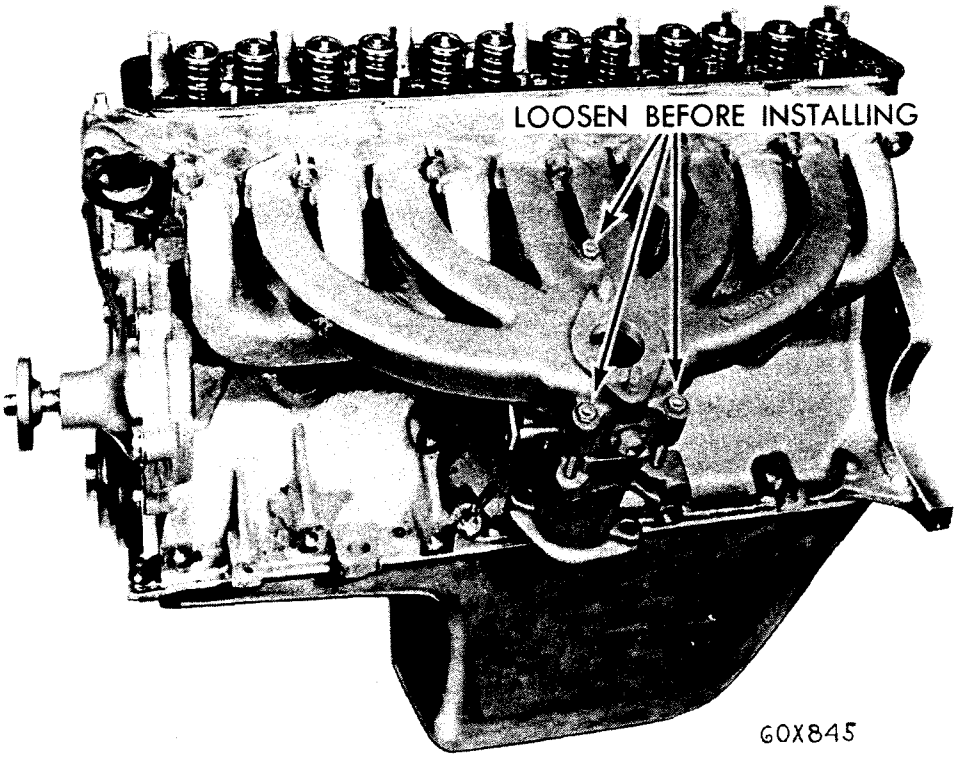


Fig. 28—Intake Manifold Assembly

EXHAUST SYSTEM

The intake manifold (Fig. 28) consists of six long, curved tubes which supply fuel and air to each individual cylinder from a single-throat downdraft carburetor.

The exhaust manifold (Fig. 29), located on the same side of the

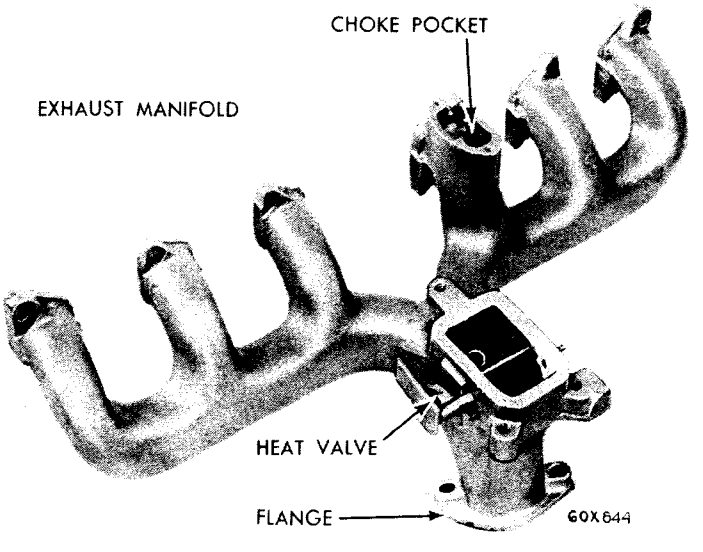


Fig. 29—Exhaust Manifold Assembly

cylinder head as the intake manifold, has large-radius curves which permit exhaust gases to leave the cylinders with a minimum of back pressure and power loss. A thermostatic heat control valve is incorporated to direct exhaust heat to a heat chamber beneath the carburetor to help vaporize the fuel for better warm-up performance. A well-type automatic choke of conventional design is available as optional equipment on some carburetors.

EXHAUST MANIFOLD HEAT CONTROL VALVE (Fig. 30)

The purpose of the manifold heat control valve is to direct hot exhaust gas to a heat chamber in the intake manifold and preheat the fuel-air mixture. Thus, the fuel is vaporized to a greater degree before entering the combustion chambers, providing quicker warm up.

When the engine is cold, the exhaust gases are deflected to the heat chamber of the intake manifold and then to the exhaust manifold. As the thermostatic coil heats, it loses tension and the valve closes the heat chamber permitting exhaust gas to flow directly through the exhaust manifold.

The heat control valve should be checked and lubricated with solvent Part No. 3419129 every 100 hours of operation. Apply solvent to both ends of the shaft when the manifold is cool. Move counterweight through its full travel until it is free to move by its own weight. Test the

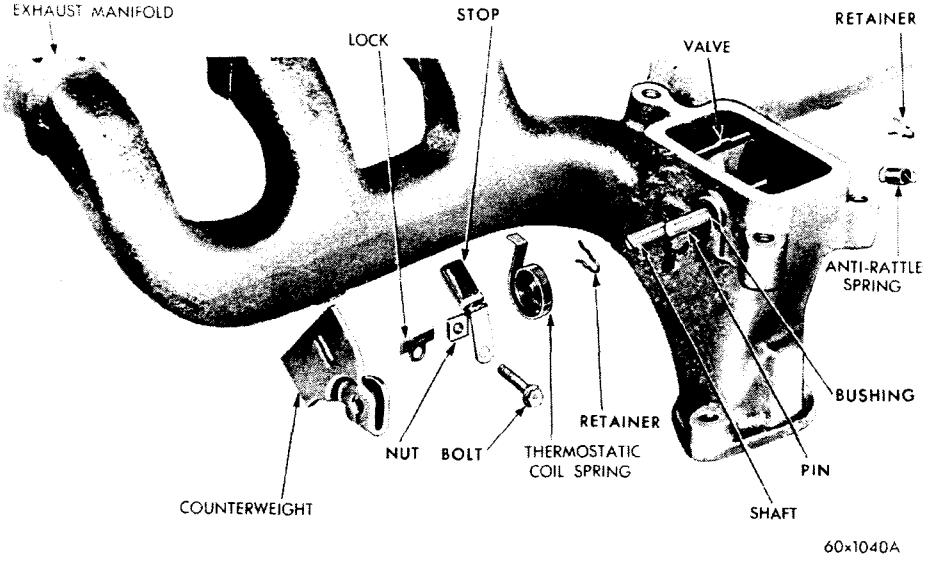


Fig. 30—Exhaust Manifold Heat Control Valve

action as follows: With the engine idling, accelerate momentarily to wide open throttle. The counterweight should respond by moving approximately 90 degrees or more (when cold) and return to its normal position. If no movement is observed, the shaft is frozen or the coil spring is weak or broken.

Apply solvent, Part No. 3419129, to both ends of the shaft and rotate shaft back and forth until it is free.

COOLING SYSTEM

The engine cooling system automatically maintains the most desirable engine operating temperatures under normal operating conditions. This is accomplished by means of thermostatic control of water circulation. Circulation is maintained by a centrifugal type water pump. When the engine is cold, a thermostat prevents the circulation of water to the radiator and a by-pass allows the water to circulate only in the water jackets of the engine until normal operating temperature has been reached. When operating temperature is reached the thermostat opens permitting unrestricted radiator circulation.

To drain the cooling system completely:

(1) Open the radiator drain cock.

(2) Remove the cylinder block drain plug (or open the drain cock) at the lower edge of the water jacket on the left side of the engine.

Flush the entire cooling system until soft water runs clean.

Refill the radiator with clean SOFT water.

Use Mopar Radiator Rust Inhibitor during the summer months.

COOLING SYSTEM MAINTENANCE

Use clean soft water in all cooling solutions; with approved rust resistor in summer and with approved anti-freeze in winter. Hard water, containing lime and minerals, will form a scale which can cause hot spots and will restrict the small passages in the cooling system.

The cooling system should be drained, flushed and filled with a fresh solution in the spring and in the fall. The level should be maintained 1¼ inches below the filler neck. Belt tension and hose connections should be checked at each lubrication period.

When the engine is at operating temperature, use care in removing the radiator cap. Always turn the cap only to the first stop to allow any pressure to escape through the overflow before removing the cap.

ACCESSORY BELT DRIVES

Satisfactory performance of the belt driven accessories depends on maintenance of proper belt tension. If the specified tensions are not maintained, belt slippage may cause engine overheating, reduced alternator charging rates and greatly reduced belt life.

Belt deflection measurements should be taken while applying a 10-pound load to the belt.

The crankshaft to water pump to alternator belt should have ¼ inch deflection at midpoint between the pump and the alternator.

OPERATING INSTRUCTIONS

PREPARATION OF A NEW ENGINE

Before placing a new or rebuilt engine in service, make a thorough inspection for evidence of damage or loose parts.

ENGINE OIL

See that the crankcase contains the correct amount of clean new SAE 10-W Engine Oil. After 25 hours of operation the crankcase may be drained and refilled with oil as recommended in the Lubrication Section.

COOLING SYSTEM

Fill the cooling system with water, using antifreeze solution, if temperature requires it. In warm weather, the use of MOPAR Rust Resistor is recommended.

ENGINE ACCESSORIES

See that all points requiring lubrication are properly supplied. Check storage battery terminals to see that they are tight and clean. Check the electrolyte in the battery.

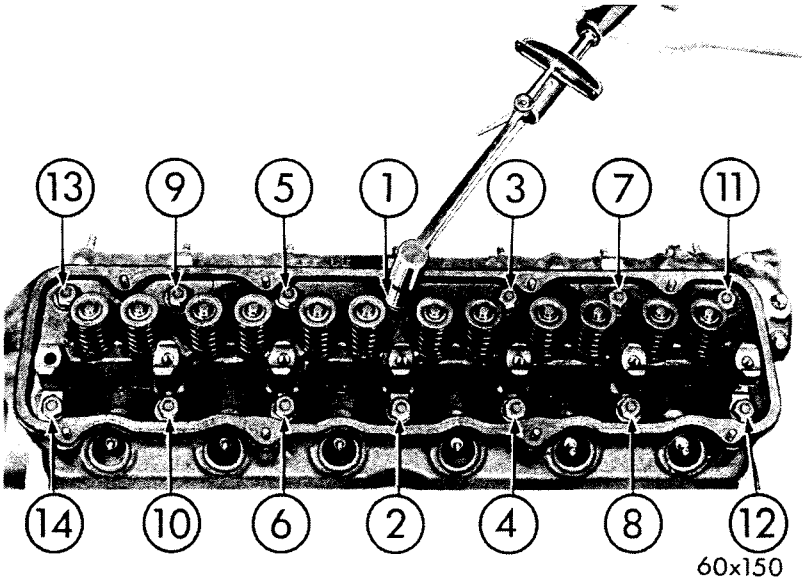


Fig. 37—Cylinder Head Tightening Sequence

ELECTRICAL CONNECTIONS

See that all electrical connections are tight and clean. Check each spark plug and tighten to 30 foot-pounds torque.

ATTACHING PARTS

See that all nuts, bolts and screws that attach parts are secure. Tighten cylinder head nuts with torque wrench to 70 foot-pounds, in sequence as shown in Figure 37.

PRESTARTING INSTRUCTIONS

When the engine is in daily use, inspect it daily and always before starting after a period of idleness.

ENGINE OIL LEVEL

Inspect the oil level and add oil if required.

FUEL

Check the fuel supply.

COOLING SYSTEM

Inspect the cooling system and add water or anti-freeze as required.

TIPS ON ENGINE CARE

NEW OR REBUILT ENGINES

It is good practice not to operate a new or rebuilt engine at more than ¾ throttle for the first 8 or 10 hours. This low speed will permit the bearings to seat properly, and will allow the operator to familiarize himself with the controls and performance of the engine.

SAE 10-W Engine Oil should be used in the engine during the break-in period because the clearance between moving parts is very small and the lighter oil provides assured lubrication. Keep the oil at the proper level. After 25 hours of operation the crankcase may be drained and refilled with oil as recommended in the Lubrication Section.

COLD ENGINES

When starting a cold engine (whether new or not), avoid unneces-

sary acceleration during the warm-up period. Keep the throttle at little more than idling speed until normal operating temperature is indicated on the temperature gauge. This simple precaution will assure long life of the engine and maximum efficiency of operation.

STARTING AND STOPPING THE ENGINE

STARTING (Fig. 38)

Open the throttle at ⅓ opening. See that the clutch, gear shift lever or power take-off lever is in neutral position. Turn on the ignition switch and press the starting motor switch until the engine starts. Do not hold the starting motor switch in for periods longer than 15 seconds if the engine does not start promptly. After the engine starts, watch the oil pressure gauge. If oil pressure does not register after about 10 seconds, stop the engine and investigate.

OIL PRESSURE SAFETY SWITCH

On engines equipped with oil pressure safety switch, the manual

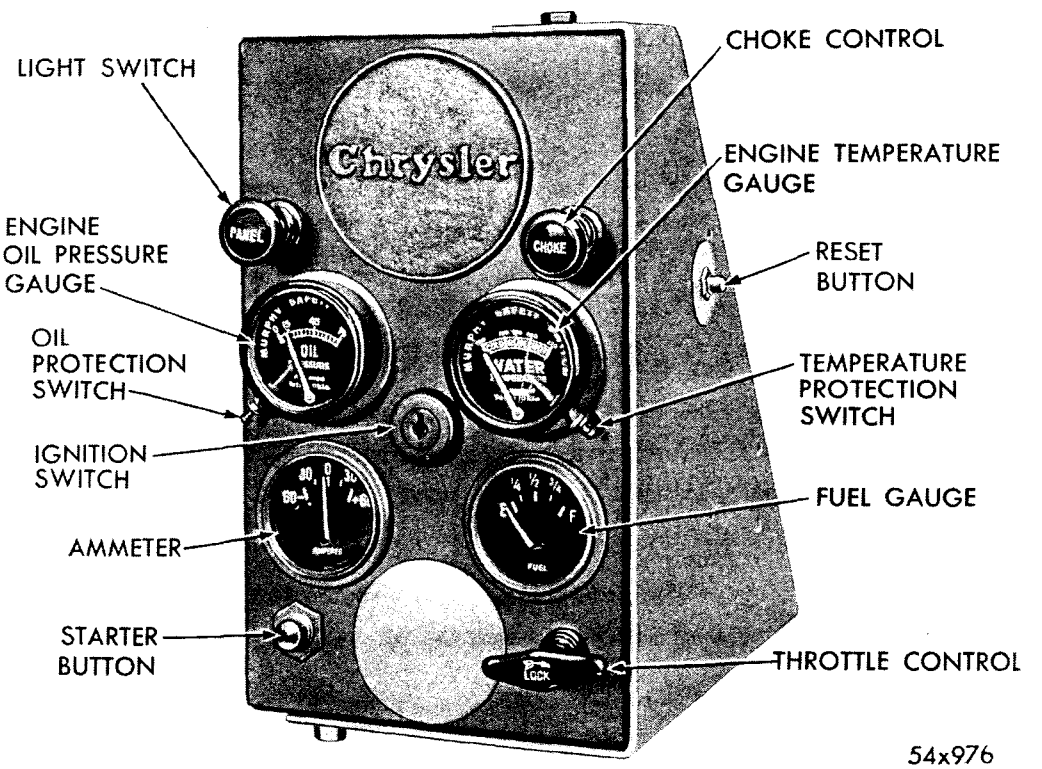


Fig. 38—Engine Mounted Instrument Panel

starting button on the safety relay must be held in until the engine has started and generated sufficient oil pressure to lock-in the safety relay.

STOPPING (Fig. 38)

To stop the engine, close the throttle and disengage the clutch. Allow the engine to run at idle speed for a few minutes; then, with the throttle closed, turn off the ignition.

PRECAUTIONS

WARM-UP PERIOD

After starting a cold engine, operate it at a speed only slightly faster than idle (approximately 700 rpm) for a few minutes to allow the engine to reach normal operating temperature before placing it under full load. This warm-up period will permit oil to reach all bearing surfaces, thus reducing the possibility of scoring and premature wear of internal engine parts.

OIL PRESSURE

With the engine turning at approximately 2000 rpm and the water temperature at 160° F., the oil pressure should be from 30 to 70 pounds, providing there is no abnormal escape of oil from some point. As bearings wear and the increased clearances permit more than the normal escape of oil, there will be a drop in pressure shown on the gauge, particularly at idling speed. A drop in oil pressure may also be the result of a plugged oil filter element. (Full-Flow type filter.) Minimum oil pressure at idle is 8 pounds.

WATER TEMPERATURE

A thermostat in the cylinder block retards the circulation of liquid in the cooling system until the liquid has reached a predetermined temperature, thereby permitting faster warm-up of the engine. Do not operate the engine with the thermostat removed, as this unit is essential to proper circulation and efficient engine performance. Without the thermostat, sludge will form in the crankcase because the low temperature of the engine permits condensation of fumes in the crankcase. The thermostat cannot be repaired; if it fails to operate properly, replace the unit. When installing a thermostat, position it so that the thin bridges which divide the openings, face to the front and rear of engine.

Remove and service the carburetor air cleaner every 50 hours. The crankcase inlet air cleaner should be cleaned and serviced every 100 hours of operation. If engine is operated in dusty conditions, or if engine is subject to frequent or prolonged periods of idle operation both the carburetor air cleaner and the crankcase inlet air cleaner should be serviced more frequently.

IGNITION SYSTEM

Keep the units of the ignition system clean and the distributor properly adjusted.

FUEL SYSTEM

Keep the fuel tank, lines and filters clean. Always use a good grade of fuel.

COOLING SYSTEM

Do not fill the cooling system when the engine is overheated. Allow the engine to cool before adding liquid, in order to prevent cracking the cylinder block and cylinder head. Use a good grade of anti-freeze during cold weather, and MOPAR Radiator Rust Inhibitor during warm weather.

POWER TAKE-OFF AND CLUTCH ASSEMBLY

On engines equipped with the Power Take-Off and Clutch Assembly, avoid unnecessary use of the shifting lever. Frequent engagement and disengagement of the clutch causes rapid wear of clutch facings, necessitating frequent adjustment and replacement of parts. Do not attempt to engage or disengage the clutch while the engine is accelerated. Do not operate the unit when the clutch is slipping. See Adjustment Section.

TROUBLE SHOOTING

A good rule to follow when trouble shooting is to make only one adjustment at a time. Locate the cause of failure or irregular operation by the process of elimination.

CAUTION: Before making any electrical tests, air out the engine compartment thoroughly to remove all inflammable fumes.

STARTER WILL NOT TURN ENGINE

Loose or Corroded Battery Terminals—Clean terminals and clamps, replace if necessary. Tighten clamps securely. Apply a light film of vaseline to the battery terminals, after the clamps are tightened.

Battery Not Fully Charged—Test the electrolyte in the battery. Check battery specific gravity. Full charge reading is 1.260 ± 0.015. Under 1.210 battery needs recharge.

Attempt to turn the engine flywheel with either a suitable flywheel turning tool or from the front end by cranking the hexagon crankshaft screw 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 Chrpsler Industrial Engine Dealer).

SOLENOID PLUNGER VIBRATES BACK AND FORTH 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 physically 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 tower 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 over-lubricate, 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 21.5 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", Page 69

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 filter plugged.

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 fuel pump air vent.

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 (if so equipped) on side of distributor.	SAE 10W Engine Oil	Every 25 hours.
Governor Linkage	Few Drops	Oil Can	Engine Oil	(Every 25 hours.)

GENERAL LUBRICATION (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 50 HOURS		
Engine (Oil Pan)	H-170, H220, 5 qts. 6 qts. if oil filter element is being replaced.	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 Reccommendations	Every 50 hours. Replace oil if engine is idle 30 days or longer.
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.

GENERAL LUBRICATION (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 50 HOURS (Continued)		
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.
		EVERY 100 HOURS		
Oil Filter (Full-Flow Type) Replaceable Element	. . . . . 1 qt.	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.

GENERAL LUBRICATION (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 100 HOURS (Continued)		
Oil Filter (Screw on, Throw Away Type) Light Duty	. . . . . 1 qt.	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.
Crankcase Ventilator Valve	. . . . .			Check operation of valve for proper function.
Crankcase inlet air cleaner	. . . . .	Remove from engine and wash thoroughly in kerosene or similar solvent. Allow filter element to dry and reoil. Allow excess oil to drain thoroughly through the vent nipple located on top of the air cleaner.	Engine oil SAE 30	Every 100 hours. If engine is used in service with frequent or prolonged periods of idling, the crankcase ventilation system should be serviced more frequently.

GENERAL LUBRICATION (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 250 HOURS		
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.
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		
Transmission		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-5 MIL-L-2105 A or B or the SAE viscosity number.	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.
3-Speed	3¼ pints			
3-Speed (Heavy Duty)	5½ pints			
4-Speed	9½ pints			
5-Speed				
			Above +90° F. Use SAE 140	
			As Low as −10° F. Use SAE 90	
			Below −10°F. Use SAE 80	

GENERAL LUBRICATION (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		EVERY 500 HOURS (Continued)		
Loadflite Automatic (A727)	18½ Pints (Dry Fill)	Remove the drain plug from the oil pan, or remove oil pan as required. Remove the torque converter access plate, remove the converter drain plug.	Dexron Automatic Transmission Fluid	Every 500 hours or 6 months. Severe Usage (such as prolonged operation with heavy loading). Every 300 hours.
Fuel Filter	. . . . .	Replaceable Paper Element Type. Disassemble, clean cartridge holder and replace cartridge. In reassembly tighten securely and run the engine to check for leaks. One Piece type Remove and replace with new filter.	. . . . .	. . . . .

CARBURETOR IDLE ADJUSTMENT (Fig. 39)

E7D Carburetor

With the engine running at normal operating temperature (160 degrees F.), turn the idle mixture adjusting screw counter-clockwise for richer mixture and clockwise for leaner mixture and maintain the engine idle speed of 500 rpm by turning the idle speed adjusting screw in direction required. The idle mixture adjusting screw should be set to the leanest position that will provide maximum steady engine speed. If a vacuum gauge is available, position the idle mixture adjusting screw for the maximum steady gauge reading.

ACCELERATING PUMP ADJUSTMENT

The accelerating pump is vacuum operated. It is fully automatic and requires no adjustment.

STEP-UP PISTON OR ECONOMIZER

No adjustments are provided for the economizer or step-up circuit of the carburetor.

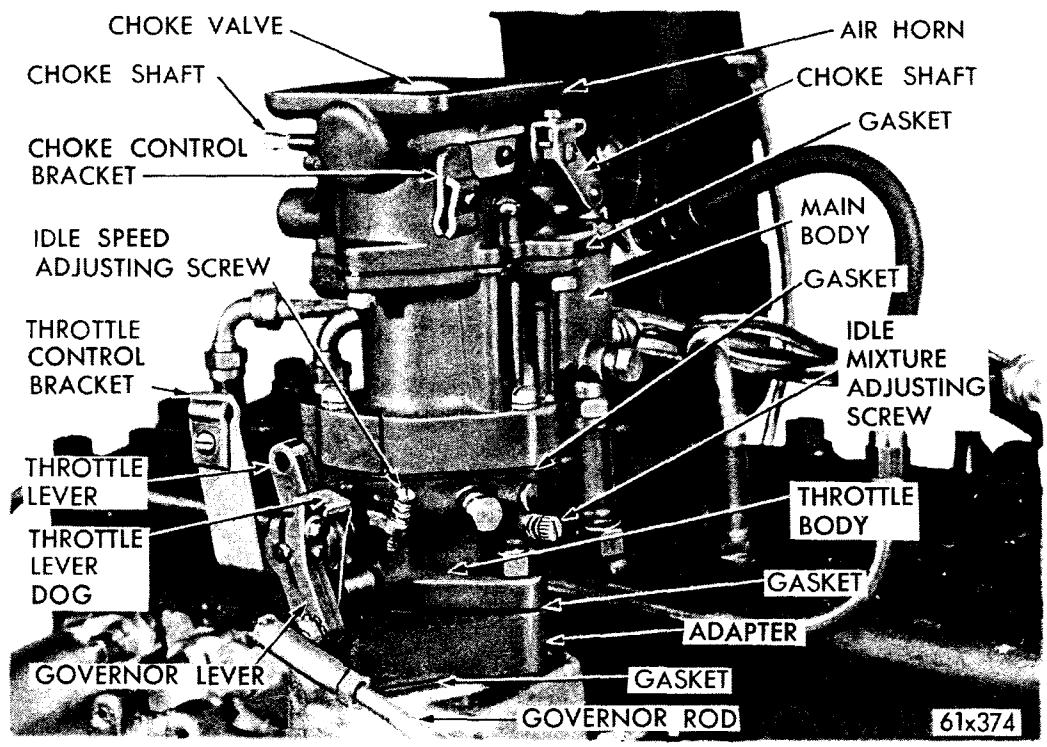


Fig. 39—Carburetor Assembly—Model E7D

ADJUSTING THE FLOAT LEVEL

Remove the float chamber cover and gasket. Hold the float needle valve in the closed position and measure the distance from the top of the float chamber (gasket removed) to the top of the float. The distance from the top of the float chamber (gasket removed) to the top of the float should be 5/64 inch, and can be reset if necessary by bending the lip of the float lever away from the needle to raise the float and toward the needle to lower the float. Bend the vertical lip of the float only.

SERVICING THE FUEL FILTER

If it becomes necessary to clean the fuel filter in the carburetor line, remove the bowl and filter element. Clean both by washing in a good solvent.

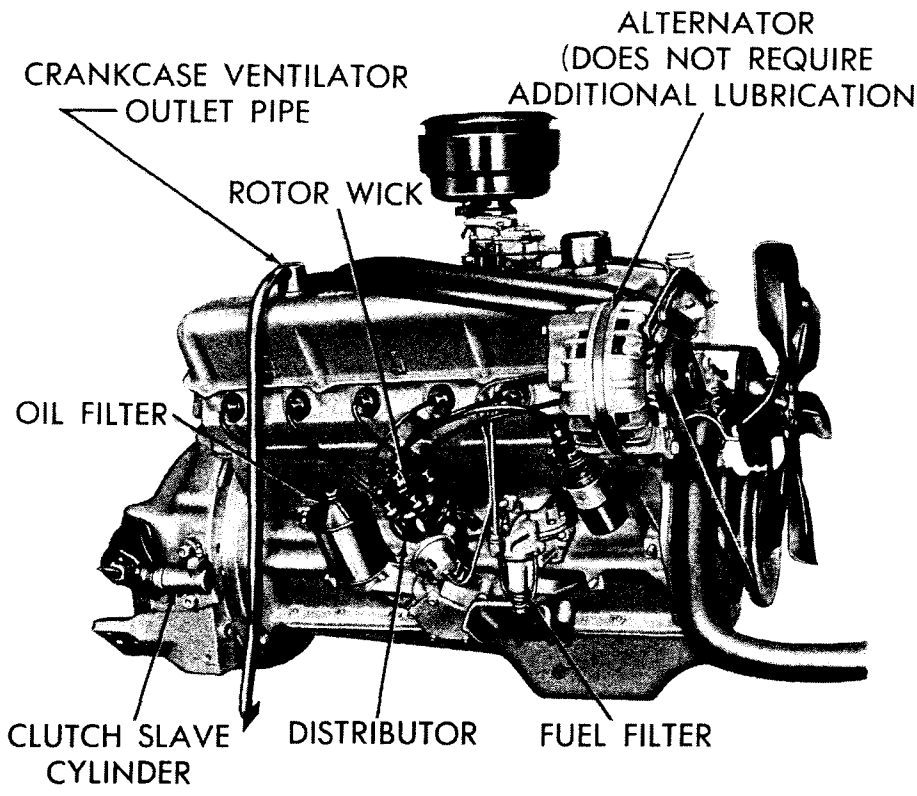


Fig. 40—Right Front View—6-Cylinder Lubrication Points

LUBRICATION

SELECTION OF LUBRICANT

The type of service for which an engine oil is intended is usually designated by the letters SE or CC 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. Refer to Figures 40 and 41 for left and right view engine lubrication points.

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 SE or CC."

2. An oil of proper SAE grade number in accordance with the recommendations for the anticipated temperature shown in the following table:

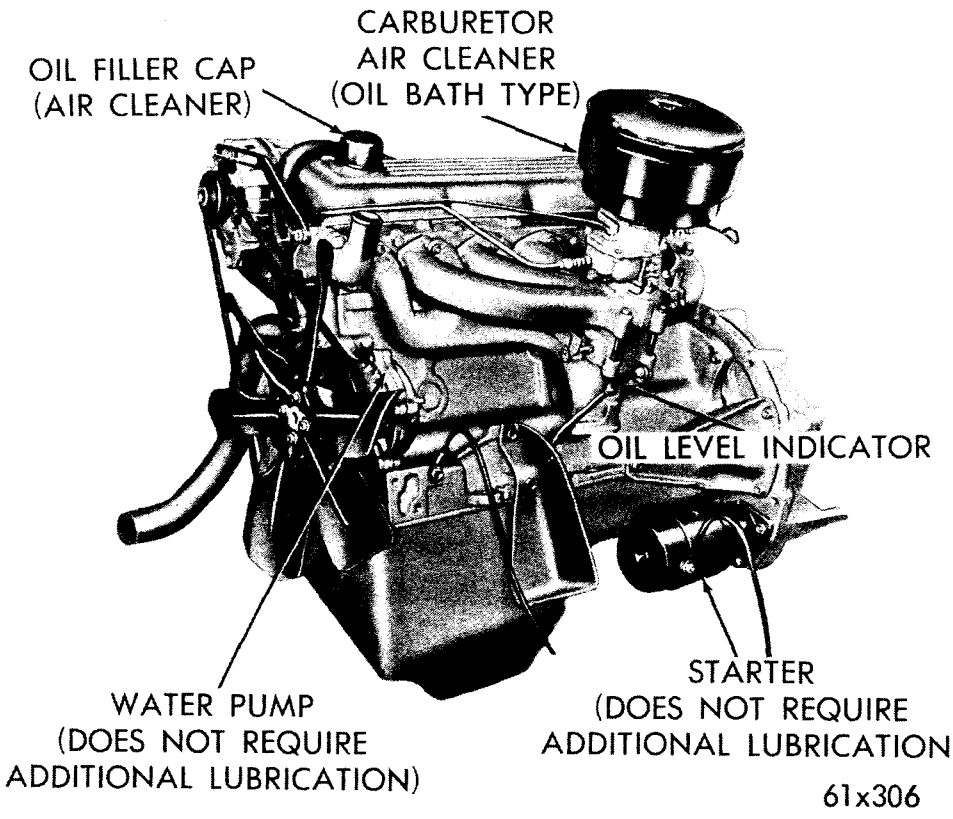


Fig. 41—Left Front View—6-Cylinder Lubrication Points

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 20W-40
		SAE 10W-30
		SAE 10W-20
As low as —10°F	SAE 10-W	SAE 10W-30
		SAE 10W-20
		SAE 5W-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 SE or CC service classification on the container.

BREAK-IN PERIOD

For industrial engine break-in, a good quality engine oil of an approved API classification 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

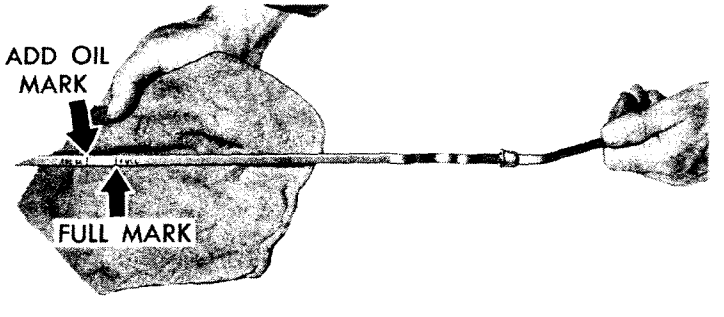


Fig. 42—Engine Oil Indicator—6-Cylinder

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 carry more 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. 42) 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.

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 crankcase inlet air cleaner, and the crankcase ventilator valve, 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.

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 advisable 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 by-pass valve in the top of the filter body. When the filter is operating

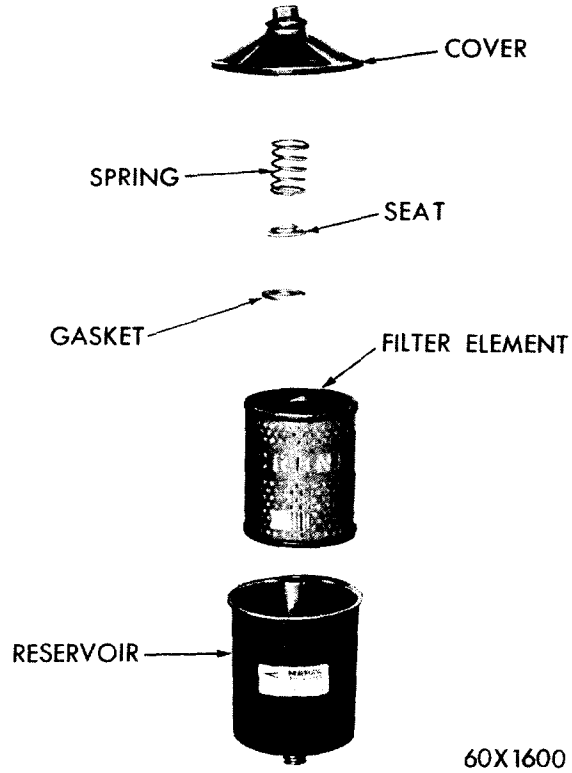


Fig. 43—Oil Filter (Disassembled View)

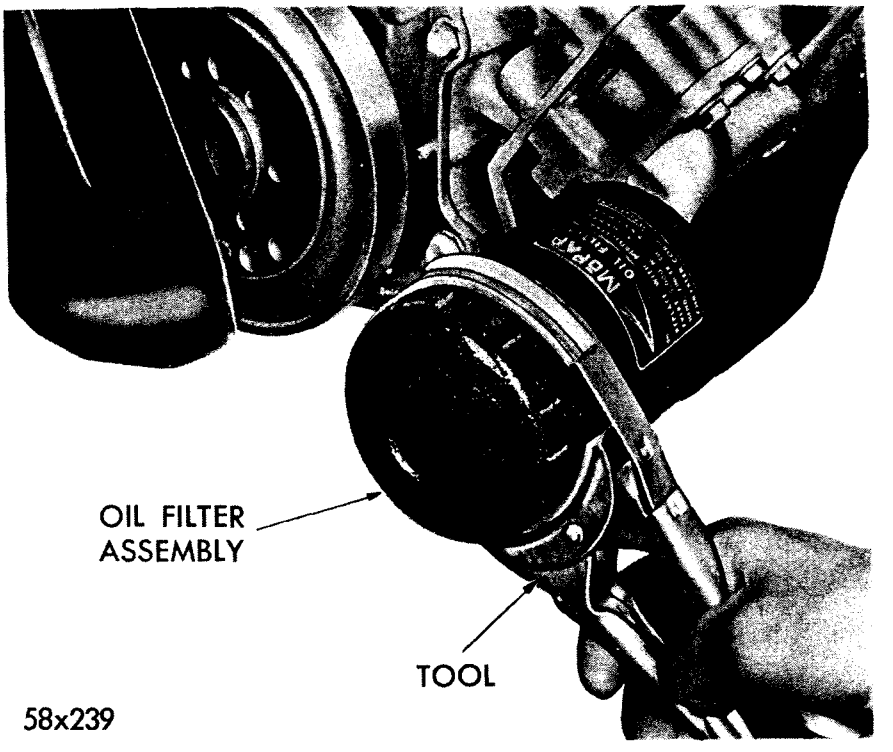


Fig. 44—Engine Oil Filter—Screw-on Type

properly, oil pressure indicated on the oil pressure gauge should be 30 to 70 pounds at operating speeds. If this pressure drops, 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. 43)

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.

ENGINE OIL FILTER ("SCREW ON" TYPE) (Optional Equipment) (Typical) (Fig. 44)

On some engines the "Screw on, throw away" full flow sealed filter

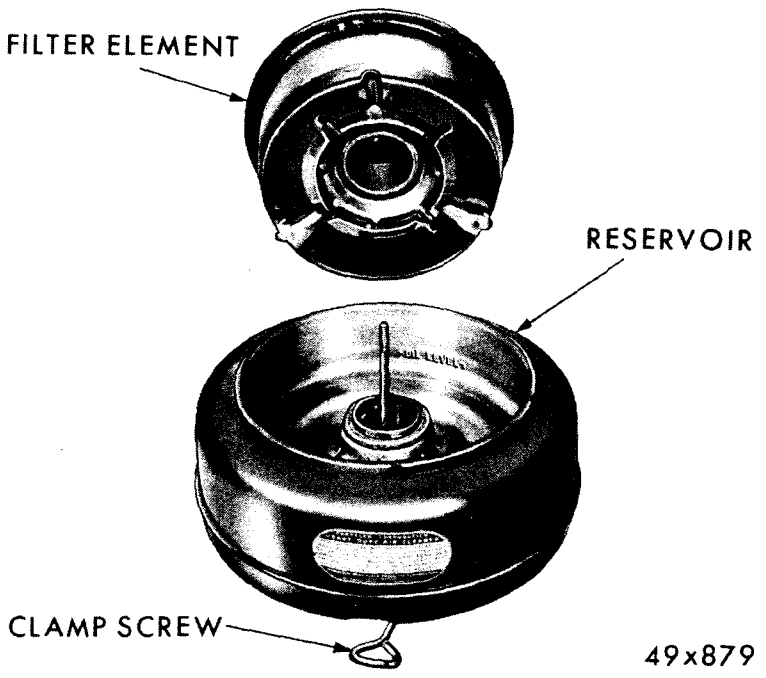


Fig. 45—Oil Bath Carburetor Air Cleaner

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. Run engine to check for leaks. Add oil to bring level to full mark on the dip stick.

OIL BATH CARBURETOR AIR CLEANERS

The oil bath carburetor air cleaner (Fig. 45) 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.

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. 46). Replace paper element, center and secure firmly. Replace cleaner assembly on engine. Replace paper element every 500 hours.

CRANKCASE VENTILATION SYSTEM

All industrial engines are equipped with a closed crankcase ventilation system, (Fig. 47) consisting of a crankcase ventilator valve mounted on the cylinder head cover with a hose extending from the valve to the base of the carburetor and a closed engine oil crankcase inlet air cleaner with a hose connecting it to the carburetor air cleaner housing to provide the source of air for the system.

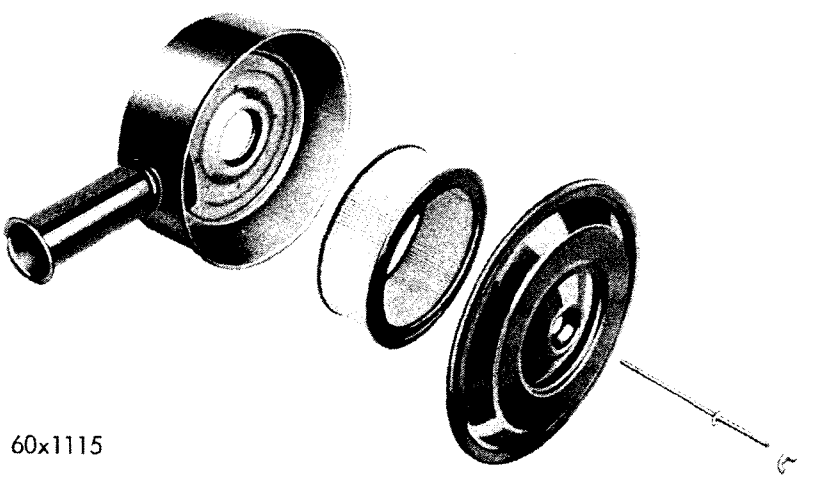


Fig. 46—Dry Type Carburetor Air Cleaner (Typical)

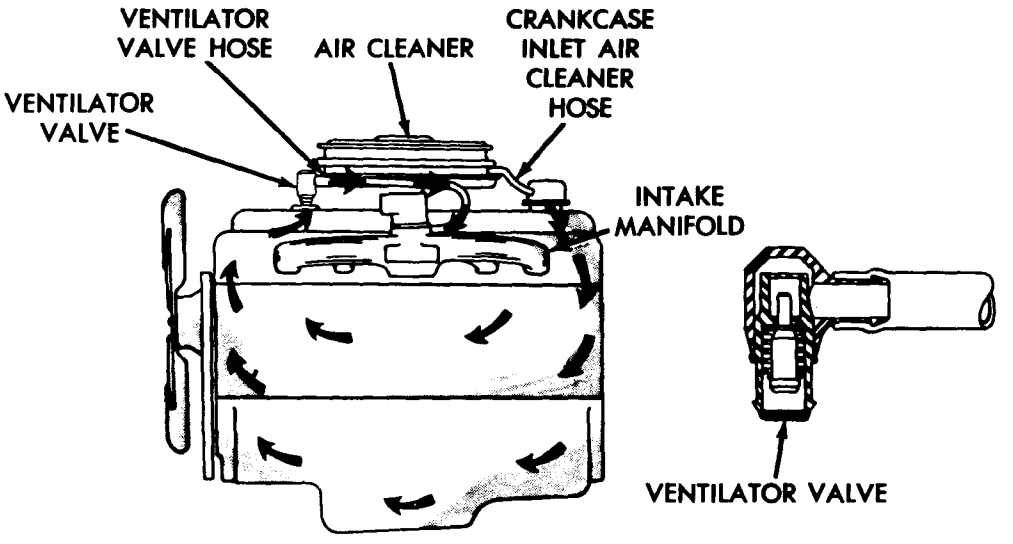


Figure 47—Fully Closed Crankcase Ventilation System

FREQUENCY OF SERVICE

All crankcase ventilation systems must be kept clean to maintain good engine performance and durability. Periodic service is required to remove combustion products from the valve, hoses, and carburetor passages. The ventilation system should be inspected and serviced as follows:

Every 100 hours:

Clean crankcase inlet air cleaner

Inspect and clean carburetor air cleaner

Every 250 hours:

Inspect crankcase ventilator valve

Every 500 hours:

Replace crankcase ventilator valve

Replace carburetor air cleaner element

If engine is used in service with frequent or prolonged periods of idling, the crankcase ventilation system may require servicing more often.

INSPECTION AND SERVICE PROCEDURE

a. With engine idling—

1. Remove ventilator valve from rocker cover.

   If the valve is not plugged, a hissing noise will be heard as the air passes through the valve, and a strong vacuum should be felt when a finger is placed over the valve inlet.

2. Reinstall the ventilator valve, then remove the crankcase inlet air cleaner. Loosely hold a piece of stiff paper, such as a parts tag, over the opening in the rocker cover.

   After allowing about a minute for the crankcase pressure to reduce, the paper should be sucked against the opening in the rocker cover with a noticeable force.

b. With engine stopped—

Remove ventilator valve from rocker cover and shake. A clicking noise should be heard to indicate that the valve mechanism is free.

c. If the ventilation system meets the tests in (a) and (b) above, no further service is required; if not, the ventilation valve should be replaced and the system rechecked. Install a new Chrysler Ventilator Valve. DO NOT ATTEMPT TO CLEAN THE OLD VENTILATOR VALVE!

d. With a new ventilator valve installed, if the paper is not sucked against the crankcase inlet air cleaner opening in the rocker cover with noticeable force, it will be necessary to clean the ventilator hose and the passages in the lower part of the carburetor.

1. Clean the carburetor hose with Combustion Chamber Conditioner, (Part No. 3419126) or similar solvent. Dry with compressed air. **NOTE: Hoses should not remain in cleaning solvent more than 1/2 hour.**

2. Remove carburetor. Turn a 1/4 inch drill by hand through the passages to dislodge the solid particles, then blow clean. If necessary, use a smaller drill so that no metal is removed. IT IS NOT NECESSARY TO DISASSEMBLE THE CARBURETOR FOR THIS SERVICE.

e. Clean the crankcase inlet air cleaner

f. Clean carburetor air cleaner

CRANKCASE INLET AIR CLEANER

Disconnect the hose from the crankcase inlet air cleaner. (Fig. 48) Inspect the hose from the crankcase inlet air cleaner to the carburetor air cleaner or flame arrestor and clean if necessary. Remove the crankcase inlet air cleaner and wash it thoroughly in kerosene or similar solvent. Lubricate or wet the filter, by inverting the crankcase inlet air cleaner and filling with SAE 30 engine oil. Position the air cleaner to allow excess oil to drain thoroughly through the vent nipple located on the top of the air cleaner. Reinstall crankcase inlet air cleaner and hoses.

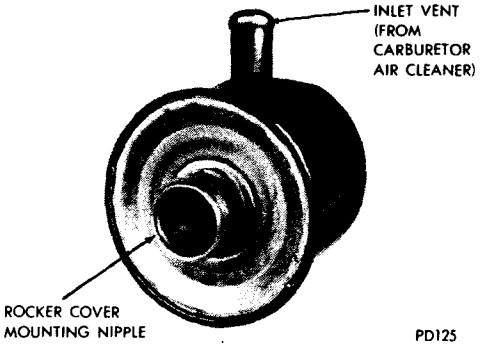


Figure 48—Crankcase Inlet Air Cleaner

DISTRIBUTOR

The distributor (Fig. 50) 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

Fig. 50—Distributor Lubrication Points

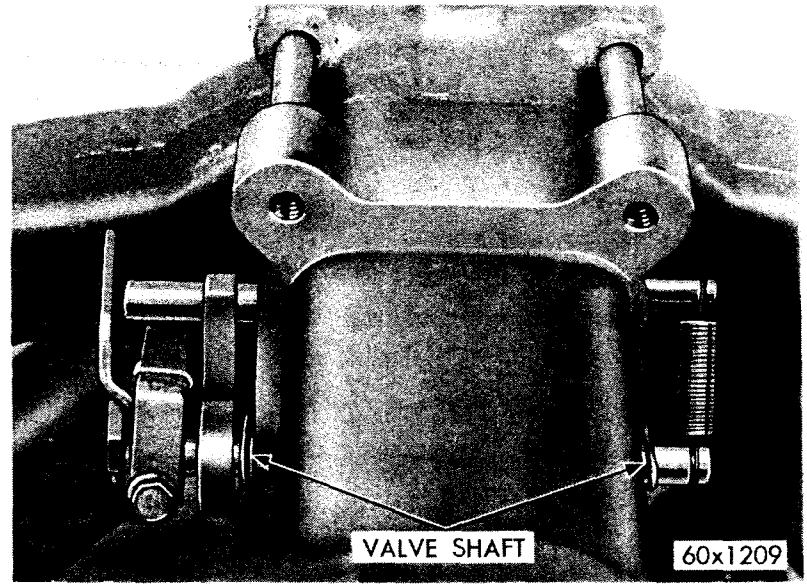


Fig. 51—Manifold Heat Control Valve

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 light film of new distributor cam grease MoPar Number 1473595.

CAUTION: Keep oil and grease away from contact points.

WATER PUMP

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

MANIFOLD HEAT CONTROL VALVE (Fig. 51)

Every 100 hours apply a few drops of exhaust manifold heat control valve solvent, Part Number 3419129, to each end of the shaft at the bearings. Work valve back and forth a few times. Apply only when exhaust manifold is cool.

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. 52). 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-5, 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. The capacities of the transmission are as follows: (1) 3-speed - 3¼ pints; (2) 4-speed - 5½ pints; (3) 5-speed - 9½ pints.

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, if 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) Adjust fan and alternator belt.

(2) 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) Check the lubricant in the transmission.

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

(5) Check the electrolyte level in the battery.

(6) Clean dry paper type air cleaners.

EVERY 100 HOURS OF OPERATION

(1) Replace filter element in oil filter.

(2) Check crankcase ventilator valve for proper operation.

(3) Clean and service crankcase inlet air cleaner.

EVERY 250 HOURS OF OPERATION

(1) Clean and check adjustment of the distributor contact points (.017 to .023 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.

EVERY 500 HOURS OF OPERATION

(1) Drain and refill transmissions (manual and automatic).

(2) Replace crankcase ventilator valve.

(3) Replace carburetor air cleaner element (dry type).

(4) Clean replaceable element type fuel filter. Remove and replace one piece type fuel filter.

ADJUSTMENTS

ELECTRICAL SYSTEM

DISTRIBUTOR CONTACT POINTS (Fig. 54)

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

To adjust breaker points, remove the distributor cap and rotor, crank the engine until rubbing block of movable contact rests on the highest point of a cam lobe. Loosen the contact support lock screw just enough to permit the stationary plate to be moved. Insert a screwdriver blade in the triangular space and rotate the blade against the stationary plate to open or close the point gap. Clearance between the points should be from .017 to .023 inch, as measured with a dial indicator (Fig. 55). Tighten the lock screw after each adjustment and measure the breaker point spring tension with an accurate scale (Fig. 56). Hook a spring scale on the breaker arm as close to the breaker point as possible and pull scale gently in a straight line. Take a reading as the points start to separate. Spring tension should be 17 to 21.5 ounces. If not,

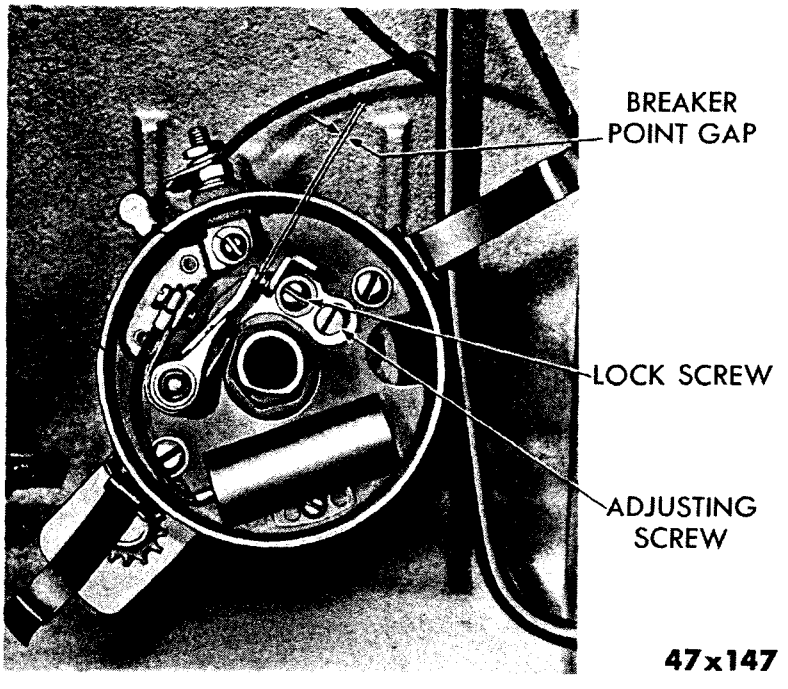


Fig. 54—Distributor Breaker Point Adjustment

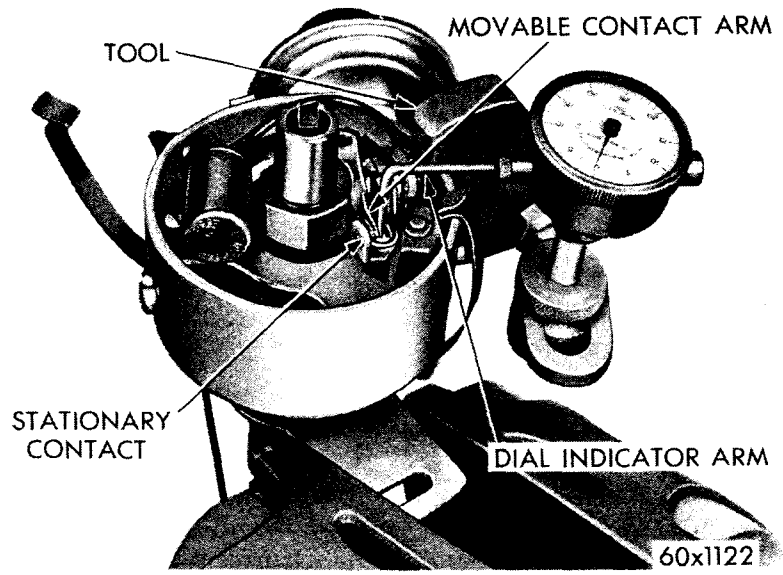


Fig. 55—Checking Point Clearance With Indicator

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 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.

IGNITION TIMING

To obtain maximum engine performance, the distributor must be correctly positioned to give proper ignition timing. The ignition timing test will indicate the timing of the spark at the No. 1 piston at idle (only).

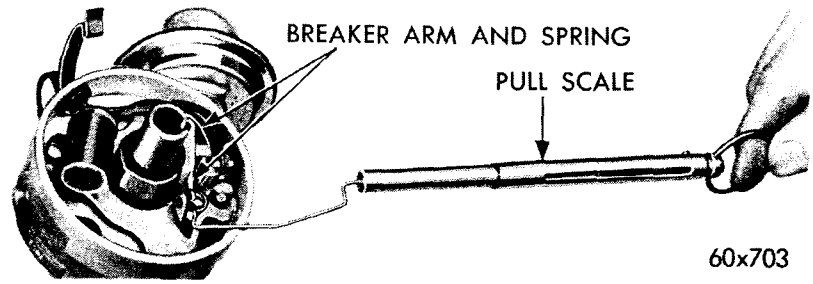


Fig. 56—Testing Breaker Arm Spring Tension

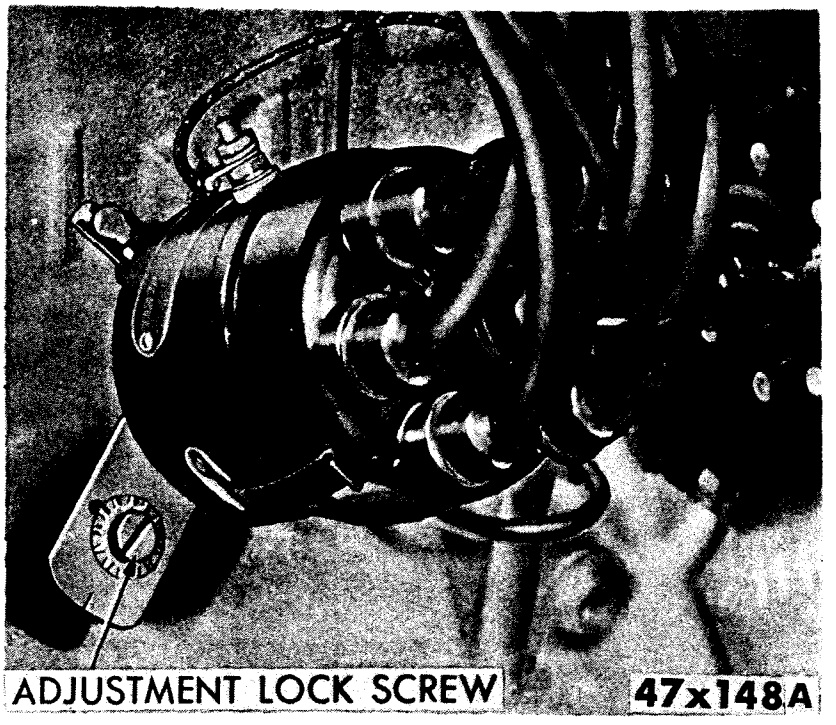


Fig. 57—Ignition Timing Adjustment (Typical)

Test procedure as follows:

(1) Disconnect the vacuum line at the distributor (on units so equipped).

(2) Connect the secondary lead of the Power Timing Light to the Number 1 spark plug, the red primary lead to the positive terminal of the battery and the black primary lead to the negative battery terminal.

(3) Use chalk to mark the desired degree line on the vibration damper to provide better visibility when the degree mark lines up with the timing pointer.

(4) Start engine and set idle to 475-500 rpm.

(5) Using the timing light to observe the position of the timing mark on the crankshaft pulley; as the timing mark and pointer are in alignment.

(6) Loosen distributor clamp screw (Fig. 57) and rotate distributor housing so that specified timing mark and pointer are in alignment. (Moving distributor housing against shaft rotation advances timing, and with shaft rotation retards timing.)

(7) Tighten distributor clamp screw after timing has been set and

recheck timing adjustment with power timing light.

If engine speed is increased, the timing mark should move down on vibration dampener below pointer if advance units are functioning.

(8) If spark timing is correct, connect vacuum line to distributor and remove timing light.

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 overheating conditions.

Cleaning and Inspection

Remove the spark plugs. Examine the firing ends of the plugs for evidence of oil fouling, gas fouling, burned or overheating conditions. Clean and/or replace the plugs. Reset the gaps to .035 inch.

Oil Fouling

Oil fouling is usually identified by wet, sludgy deposits caused by excessive oil consumption.

Gas Fouling

Gas fouling is usually identified by dry, black, fluffy deposits caused by incomplete combustion.

Burned or Overheating Conditions

Burned or overheated spark plugs are usually identified by a white burned or blistered insulator nose and badly burned electrodes. Improper fuel, inefficient cooling or improper ignition timing normally are the causes.

Normal Conditions

Normal conditions are usually identified by white powdery deposits or rusty-brown to grayish-tan powdery deposits.

NOTE: When reinstalling the spark plugs, tighten to 30 foot-pounds torque.

SPARK PLUG CABLES

Resistance type cables have the "Built-in" resistance in the spark plug cable instead of in the spark plug. The word "Radio" is printed on the cable.

The cables should never be pulled off the spark plugs; in doing so, can stretch the cable's inner core and cause a high resistance or open circuit. Pulling the cable sideways could jam the terminal on the spark plug and cause the cable to separate from the terminal. To remove the cable, grasp the boot at the end of the wire and rotate the boot to break the adhesion between the boot and the spark plug insulator.

Replace the cable if the terminal has pulled off or if the resistance exceeds 30,000 ohms. When installing the cable, make sure the cable is seated all the way in the distributor cap and that the terminals fit tightly on the spark plugs.

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 correct gap of .035 inch.

(2) *Distributor Points.* See that points are clean, in good condition and properly set (.017 to .023).

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

(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. Apply Manifold Heat Control Valve Solvent MoPar Part No. 3419129 to each end of the shaft when the manifold is cool. Work the valve back and forth a few times to distribute the solvent to be sure the valve is free.

ACCELERATOR PUMP AND BOWL VENT

(1) Back off the idle speed and fast idle adjusting screws. Open

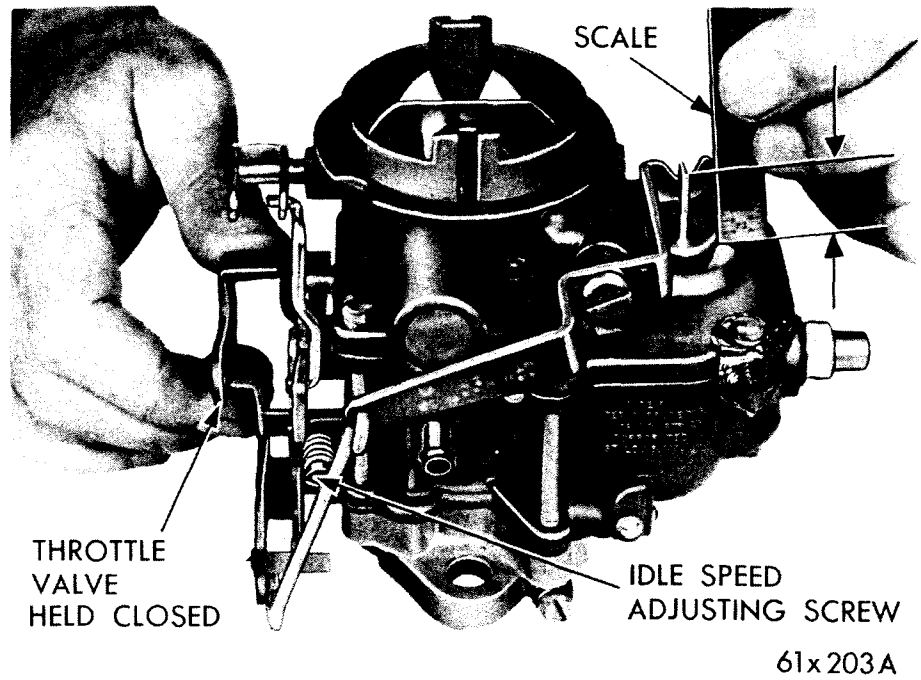


Fig. 58—Measuring Accelerator Pump Travel

the choke valve so that the throttle valve can be completely seated in the carburetor bore. Be sure the pump connector rod is in the center hole of the throttle lever.

(2) Close the throttle valve tightly. Now, measure the distance between the top of the air horn and the end of the plunger shaft, as

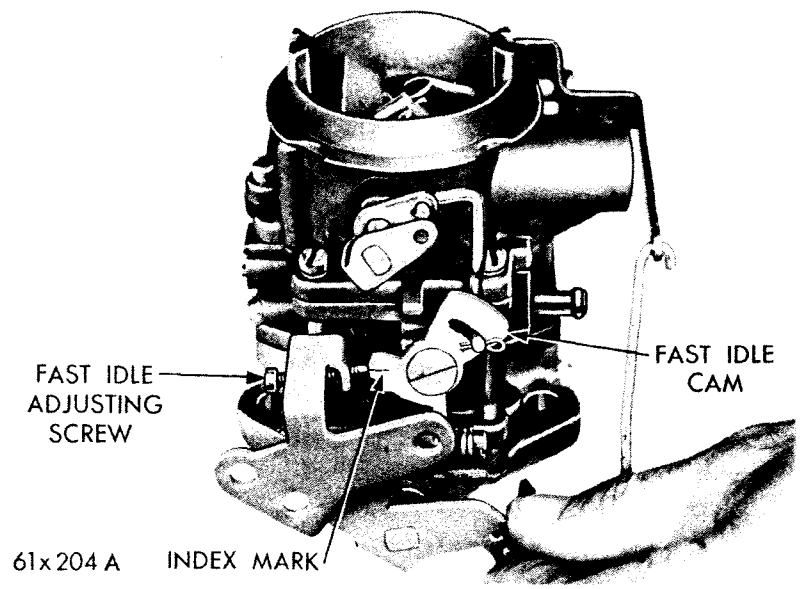


Fig. 59—Fast Idle Index Mark Aligned

shown in Figure 58. This measurement should be 27/32".

(3) To adjust the pump travel, bend the pump connector rod, using Tool T109-213, at the lower angle until correct travel has been obtained.

With the pump plunger shaft correctly adjusted, there should be 5/64 inch clearance between the top of the bowl cover and the bowl vent valve.

FAST IDLE CAM INDEX (WITH SEPARATE CURB AND FAST IDLE ADJUSTING SCREWS)

(Fast idle applies only to carburetors with automatic choke.) To index the fast idle cam (carburetor removed), refer to Figure 59, then proceed as follows:

(1) Open the throttle valve and hold the choke valve in the fully closed position. This will position the fast idle cam at the fast idle index position.

(2) Now close the throttle valve. The index mark on the cam should split the center of the fast idle adjusting screw, as shown in Figure 59.

If an adjustment is necessary, bend the fast idle connector rod at the angle, using Tool T109-213, until the index mark on the cam indexes with the fast idle adjusting screw.

The final fast idle speed adjustment must be made with the carburetor installed on the engine.

IDLE SPEED ADJUSTMENT (CURB IDLE)

To make the idle speed adjustment, the engine must be thoroughly warmed up. For the best results, it is recommended that a tachometer be used in this adjustment. (Before making the idle speed adjustment, observe the following precautions:)

On engines equipped with manual transmissions, unsnap the ball joint connection at the accelerator shaft bell crank. If this is not done, it is possible that the carburetor throttle will be held open against the stop in the transmission. The carburetor would therefore not respond to adjustment of the idle speed screw. After the proper idle speed has been obtained at the carburetor, screw the ball joint connector up or down until the ball on the bell crank will exactly mate with the socket. Snap into place.