MAINTENANCE

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 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.
5. Check oil level in governor housing, and replenish, if necessary (Pierce or Hoof governor).

EVERY 25 HOURS OF OPERATION

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

1. Lubricate the water pump (grease fitting) (if unit so equipped).
2. Check the level of the fluid in the power-torque drive, if engine is so equipped.
3. Check fan and generator belt adjustment.
4. Add 3 to 5 drops of SAE 10W engine oil to the oil cup on the outside of the 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 air cleaner and the crankcase ventilation air cleaners as described in the Lubrication Section.

EVERY 50 HOURS OF OPERATION (Continued)

3. Lubricate the generator. See Lubrication Section.
4. Lubricate the distributor (oil cup).
5. Check the lubricant in the transmission (if so equipped).
6. Lubricate the power take-off drive shaft bearings (if so equipped).
7. Check the electrolyte in battery.

EVERY 100 HOURS OF OPERATION

1. Replace filter element in oil filter.

EVERY 250 HOURS OF OPERATION

1. Clean the engine thoroughly.
2. Clean and check adjustments of distributor contact points (.018 to .020 inch).
3. Lubricate distributor cam wick with 3 to 5 drops of SAE 10W engine oil.
4. Check spark plugs for fouling and for proper gap (.035 inch-Resistor type Plugs and .025 to .028 inch-Standard Type Plugs).
5. Check ignition timing. See Adjustment Section.
6. Check carburetor adjustment. See Adjustment Section.
7. Inspect all wiring for loose connections and worn or broken insulation. Clean the battery terminals and coat terminals and clamps with vaseline after the clamps have been tightened.
8. Inspect fluid level in fluid-drive unit and Industrial Torque Converter unit.
9. Drain and refill power torque drive units.
10. Replace filter element in the oil filter of the Industrial torque converter.

EVERY 500 HOURS OF OPERATION

*1. Drain and refill the transmission.
2. Drain and Refill Industrial torque converter unit.

*Drain and refill at approximately 300 hours is recommended if service includes prolonged operation of unusually heavy loading, especially in hot weather.

ADJUSTMENTS

ELECTRICAL SYSTEM

DISTRIBUTOR CONTACT POINTS (Figs. 47 and 48.) 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. 49). Tighten the lock screw after each adjustment and measure the breaker point spring tension with an accurate scale (Fig. 50). Hook a spring scale on the breaker arm as close to the breaker point as pos-

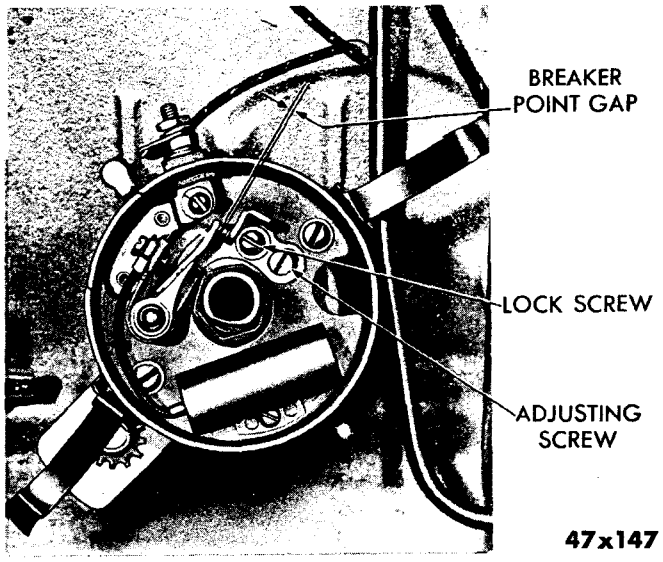


Figure 47 — Distributor Breaker Point Adjustment

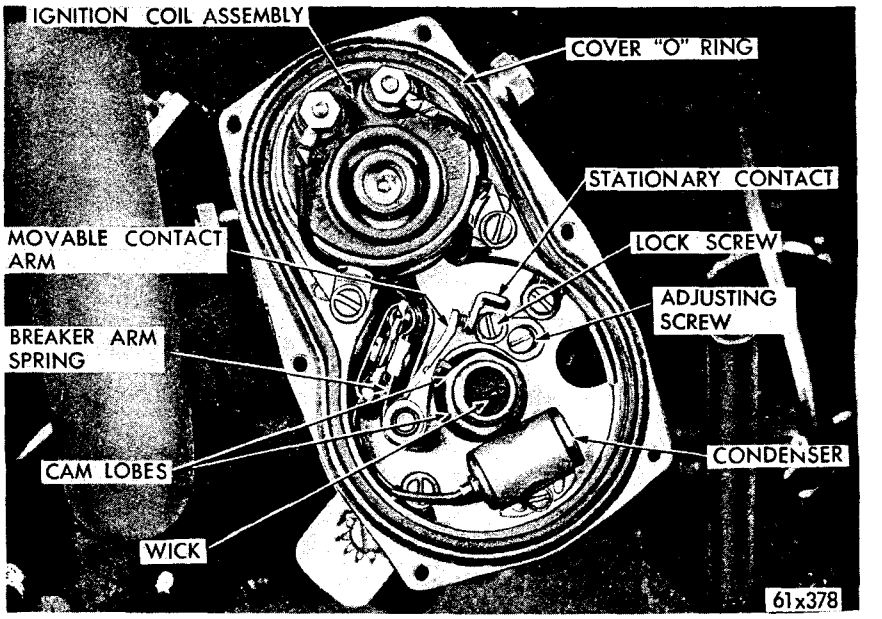


Figure 48 — Ignition Distributor with Cover Removed

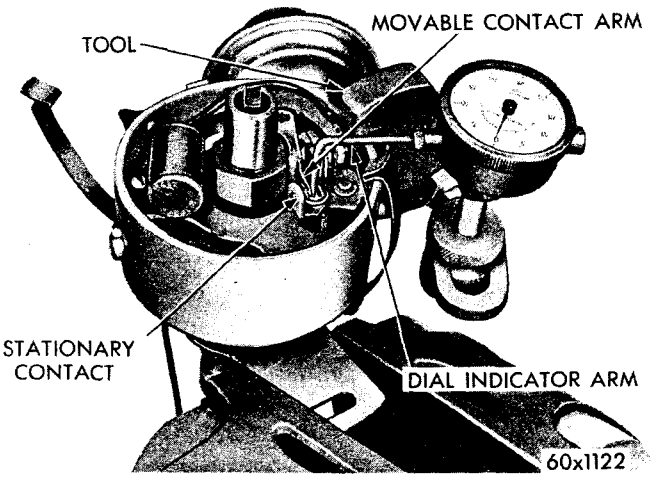


Figure 49 — Checking Point Clearance with Indicator

sible 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, 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).

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 (2½° BTC) 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 r.p.m. (Hydraulic clutch control in "off" position, if so equipped).

(5) Using the timing light (Fig. 51) to observe the position of the timing mark on the crankshaft pulley; as the timing mark and pointer are in alignment.

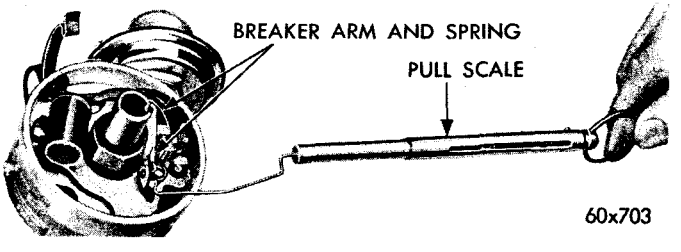


Figure 50 — Testing Breaker Arm Spring Tension

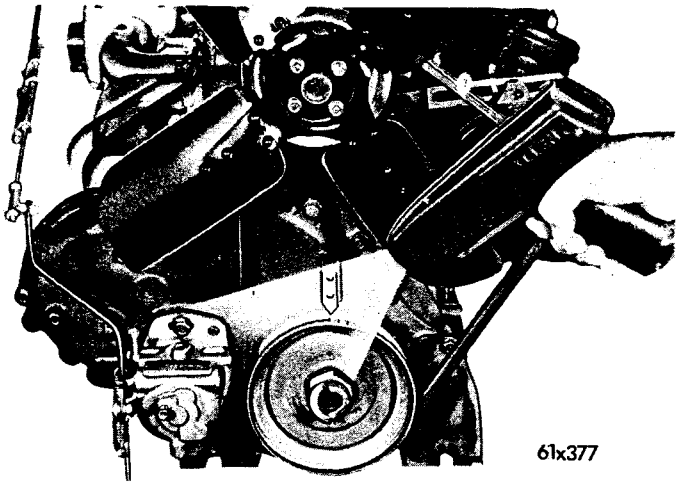


Figure 51 — Checking Timing With Timing Light on Model Ind. 908A

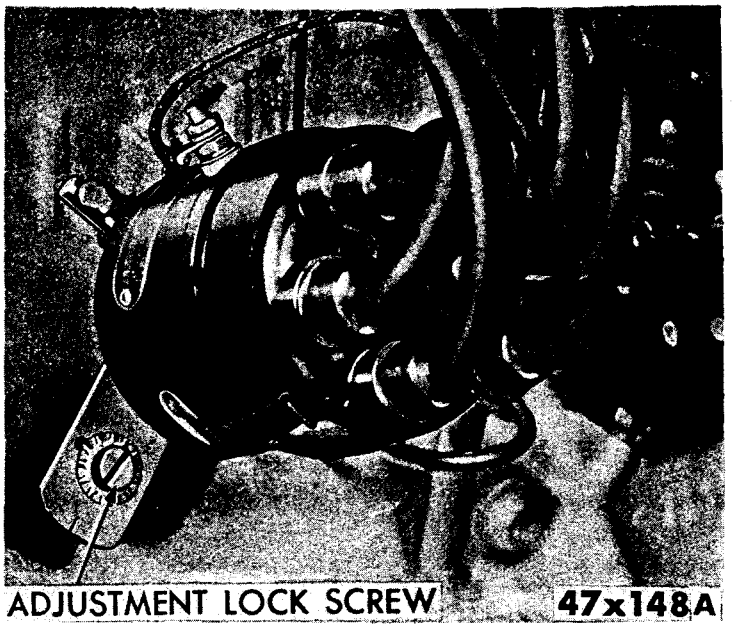


Figure 52 — Ignition Timing Adjustment (Typical)

(6) Loosen distributor clamp screw (Figs. 52 and 53) 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 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.

The AR-80 spark plug is standard. The AR-51 is a cold plug for high speed, Liquid Propane Gas, natural gas and/or continuous speed operation. The AR-10 is a hot plug for continuous slow speed light load operation. This plug should never be used for high speed heavy load operation. The AR-8S is a special application shielded plug.

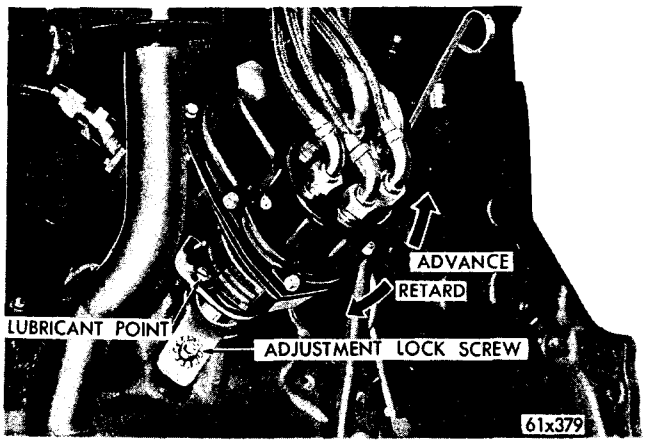


Figure 53 — Ignition Timing Adjustment

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 (.018 to .020).

(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. 1879318 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.

GOVERNOR ADJUSTMENT (Figure 54)

DRIVE BELT (Pierce). To tighten the governor drive belt, loosen the

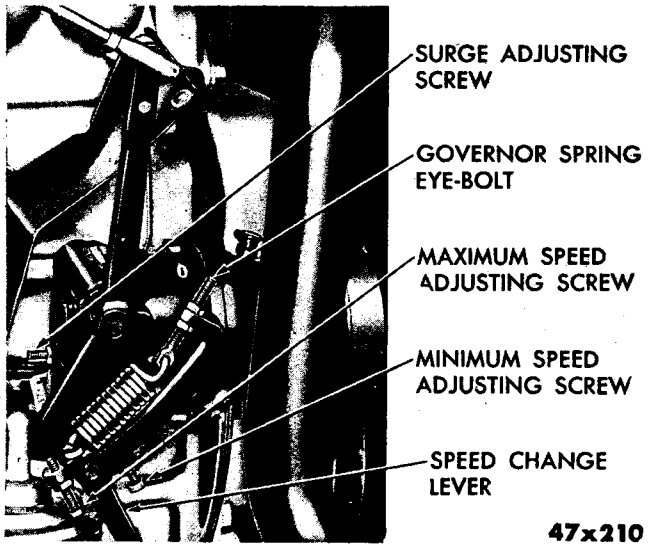


Figure 54 — Governor Adjustments (Pierce Type)

governor mounting bolts and move the governor away from the engine enough to establish tension on the belt, then tighten the mounting bolts.

THROTTLE TO GOVERNOR ROD (Pierce). Install the lower ball joint of the rod in the upper hole of the governor operating lever. Turn the low speed stop screw in to hold the governor lever in the open position, and hold the carburetor throttle lever open against the stop. Adjust the length of the rod so that the upper ball joint just fits into the tapped hole in the throttle lever. Test the operation of the rod for friction or excessive free play, and adjust, if necessary, at the ball joint.

THROTTLE TO GOVERNOR ROD (Hoof). (Fig. 55) Adjust the length of the rod so that the throttle lever on the carburetor contacts the stop just as the governor lever is at the wide open position. Test the operation of the rod for friction or excessive free play and adjust, if necessary, at the ball joint.

ADJUST TO ELIMINATE SURGE (Pierce). Select an engine speed at the low point of the range at which the governor is to operate and set the speed change lever to obtain this speed. If a no-load surge is encountered at this point, turn the surge adjusting screw in slowly until the surge disappears. **Under no circumstances should the surge screw be turned**

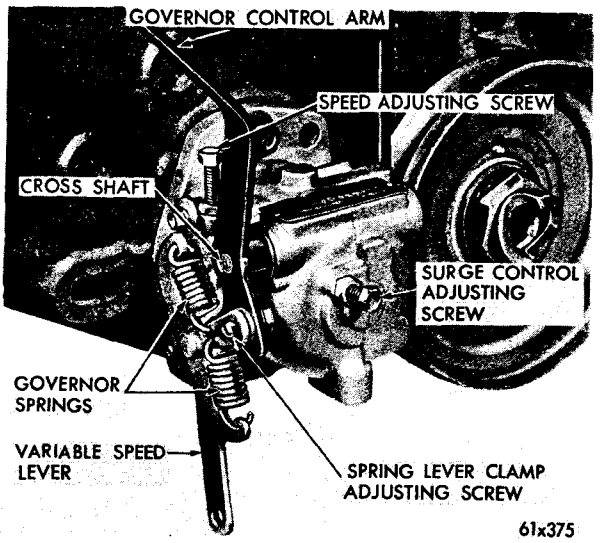


Figure 55 — Governor Adjustments Hoof Type

in far enough to increase the no-load speed of the engine more than 25 rpm.

To correct surge under load, loosen the spring eye-bolt lock nut and turn the eye-bolt to decrease spring tension. Then, tighten the lock nut.

ADJUST TO ELIMINATE SURGE (Hoof). To correct no-load surge, loosen the adjusting screw lock nut and turn the adjusting screw in until the surge disappears, but not far enough to increase no-load engine speed more than a few rpm.

To correct surge under engine load, loosen the spring lever clamp screw and move the spring lever forward until the eye of the lever is clear of the front of the governor lever. Tighten the spring lever clamp screw.

ADJUST GOVERNED SPEED OF ENGINE (Pierce). Move the speed change lever in clockwise direction until an engine speed midway in the desired range is obtained. Load and unload the engine and observe the variation in rpm between no-load and full-load speeds. If variation is excessive, adjust the spring eye-bolt to increase spring tension and move the speed change lever counter-clockwise until the previously selected speed is obtained. Check the results again and repeat the process until the desired regulation is obtained. Next, move the speed change level clockwise until the top load is reached and set the maximum speed adjusting screw to limit lever travel at this point. Then, move the speed change lever counter-clockwise until the lowest speed in the range is reached and set the minimum speed adjusting screw to limit lever travel at this point. Tighten all lock nuts after making the adjustments.

ADJUST VARIABLE SPEED LEVER TRAVEL (Some Hoof Models). Test the engine rpm's at high and low speeds in the desired range and set the adjusting screws to limit travel of the variable speed lever in that range. The maximum speed adjusting screw is located at the right of the lever and the minimum speed adjusting screw is at the left. Both screws are provided with lock nuts to hold the adjustment.

ADJUST CONTROL (Hoof). Sharpness of governor control may be increased by varying the tension of the governor spring. In general, increasing the spring tension sharpens the control. However, for very low speeds, it may be advisable to reduce spring tension. To increase spring tension, loosen the spring lever clamp screw and move the spring lever counter-clockwise. To decrease tension, move the lever clockwise. The position of the lever will be determined by the speed range at which

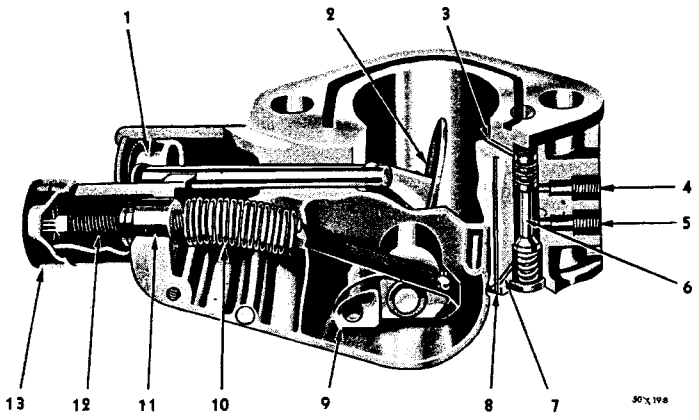


Figure 56 — King Seely (Handy) Governor (Sectional View)

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

greatest accuracy is desired. For middle speed ranges, the spring lever should be approximately vertical when the throttle valve is wide open. Tighten the spring lever clamp after adjusting the lever. Check the spring deflection; normal deflection for wide range of speed is 3/8 inch with the throttle wide open and the eye of the spring lever in alignment with the front edge of the operating lever. If spring deflection exceeds 3/4 inch when the spring level is vertical, or nearly so, hook the spring in the end hole in the spring clip, or move the spring clip to the next anchor pin hole on the right. (The spring clip is secured to the anchor pin with a cotter pin).

ADJUSTING THE KING SEELEY (HANDY) GOVERNOR (Fig. 56)

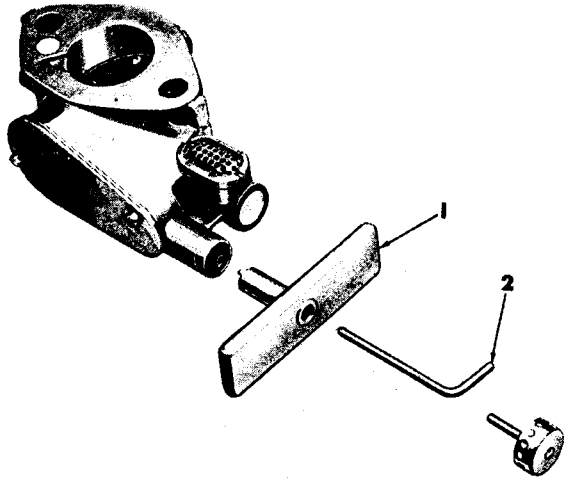
Should the governor become inoperative, or require servicing, or if the correct settings cannot be obtained, the governor should be removed. Replace or take them to the local King-Seeley (Handy) Distributor where facilities are available for proper adjustment.

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 deposits. 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 Figure 56, 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 approximately 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).



34x165

Figure 57 — Governor Adjusting Wrenches

1 — Hollow Wrench — A24283 2 — Hex Wrench — A25264

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 special adjusting wrench (2) through the hollow wrench into the adjusting screw and turn the screw clockwise one turn (Figure 57).

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.

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 (Figure 57) are as follows:

A-24283 (Item 1 Fig. 57).

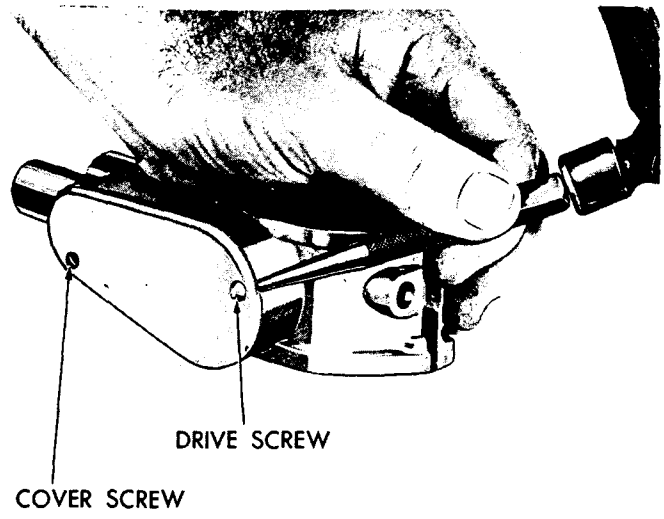
A-25264 (Item 2 Fig. 57).

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

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



50x204

Figure 58 — Removing Governor Housing Cover

force out the drive screw, as indicated on Figure 58. 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 Figure 59, the active coils of the control spring end where the spring contacts the thread of the adjusting screw at point "A." Each turn of the adjusting screw adds or subtracts one coil. As an example: To obtain 10¼ 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. 59) indicated on the "Calibration Specification" sheets for the

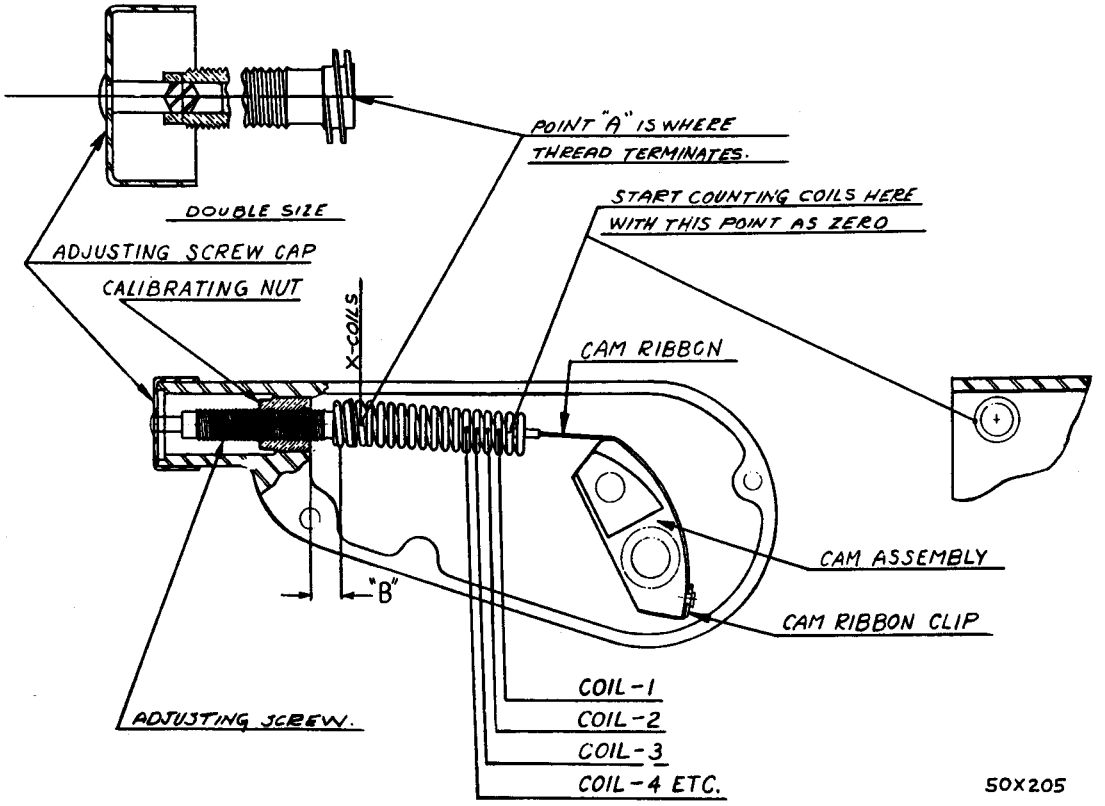


Figure 59 — Control Spring Calibration Detail

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 Figure 59.

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 Handy Governor Service Station.

STARTER PINION ADJUSTMENT

GENERAL. When the starter solenoid is energized to engage the starter pinion, there should be .078 to .125 inch clearance between the pinion and the pinion stop 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 6 or 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 in on the solenoid plunger link (not on the fork levers) until the plunger bottoms the

energized solenoid will hold the plunger in position. Measure the clearance between the pinion and the pinion stop ring, with the plunger seated and the starter pinion pushed toward the commutator end to take up all end play. If the clearance is not within the specified limits (.078 to .125 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 GENERATOR BELT ADJUSTMENT (Figure 60). To adjust the fan belt, loosen the generator pivot bracket bolts and the adjustment locking bolt. Pull the generator out until there is ¼ inch deflection in the belt midway between the fan pulley and the generator pulley. Hold the generator in this position and tighten locking bolt and pivot bolts.

POWER TAKE-OFF, WITH HEAVY DUTY CLUTCH

GENERAL. 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.

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 installed. Out-of-round

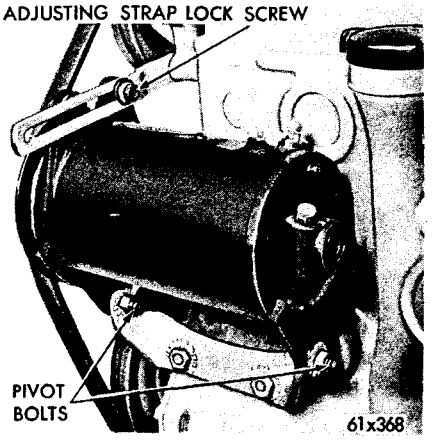


Figure 60 — Generator Belt Adjustment

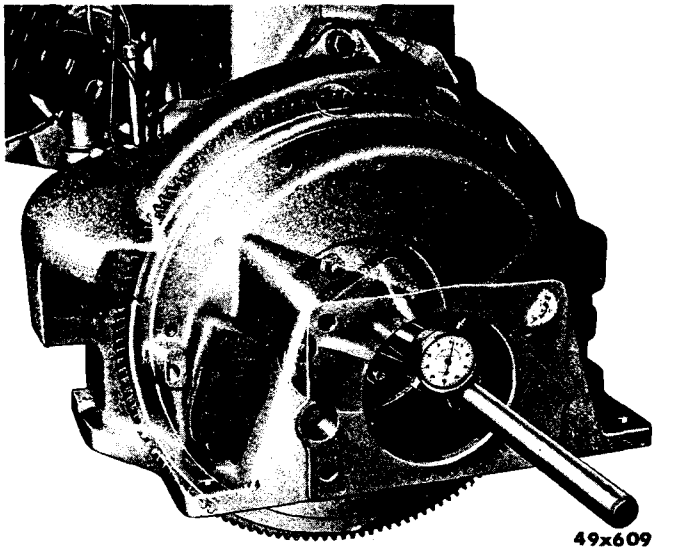


Figure 61 — Method of Attaching Fixture C-870 (Flywheel Type Housing Illustrated)

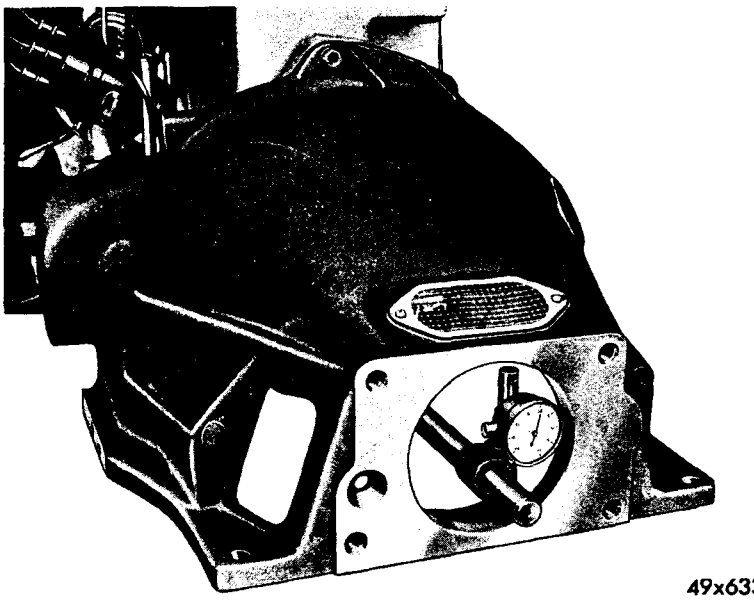


Figure 62 — Checking Clutch Housing Bore (Fluid Coupling Type Housing Illustrated)

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 that the housing can be shifted if necessary by tapping with a mallet.

3. Install the fixture C-870 to the flywheel attaching bolts (Figure 61) or, if fluid drive unit is to be installed, attach the fixture to the crankshaft flange bolts and install the indicator Tool (C-435 or C-430), as shown in Figure 62. 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

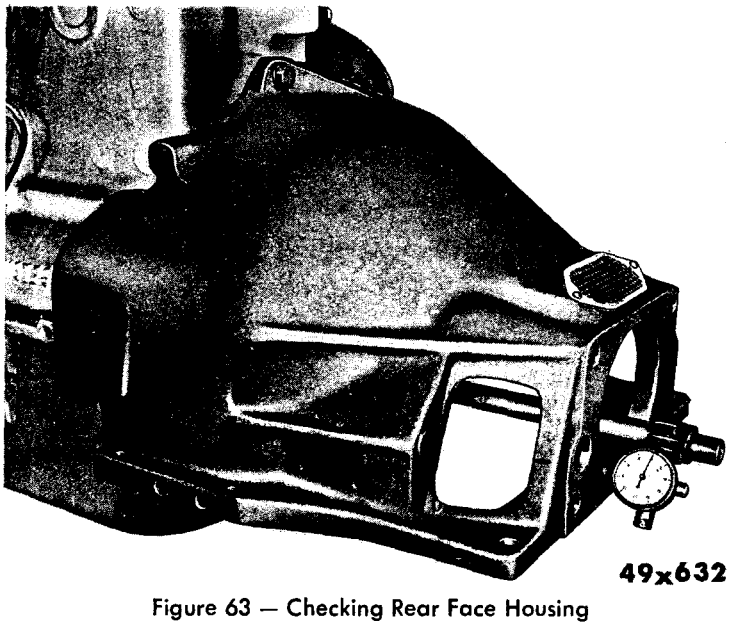


Figure 63 — Checking Rear Face Housing

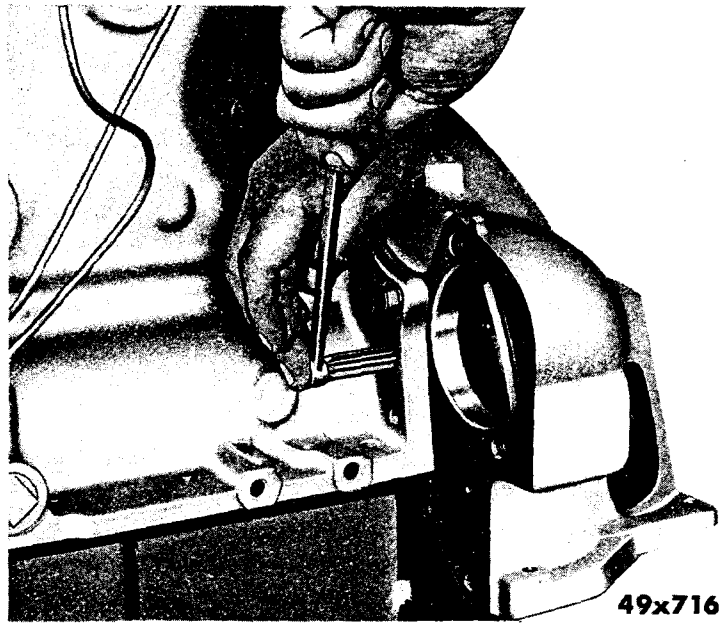


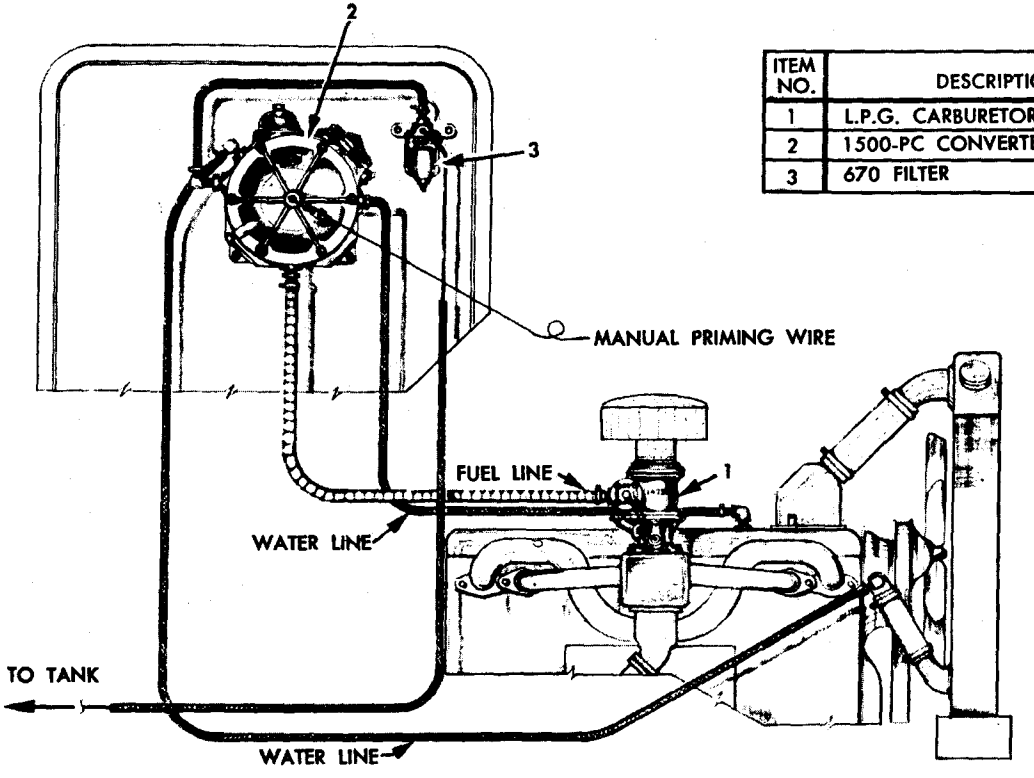
Figure 64 — Reaming Dowel Pin Holes

specified tolerance. After obtaining correct alignment, tighten the housing cap screws 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 Figure 63. 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 Figure 64 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.**

ROCKFORD. 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 65 — The Liquid Propane Gas System

LIQUID PROPANE GAS

LIQUID PROPANE GAS OPERATION (All Models) (OPTIONAL EQUIPMENT)

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 (Figure 65), 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.

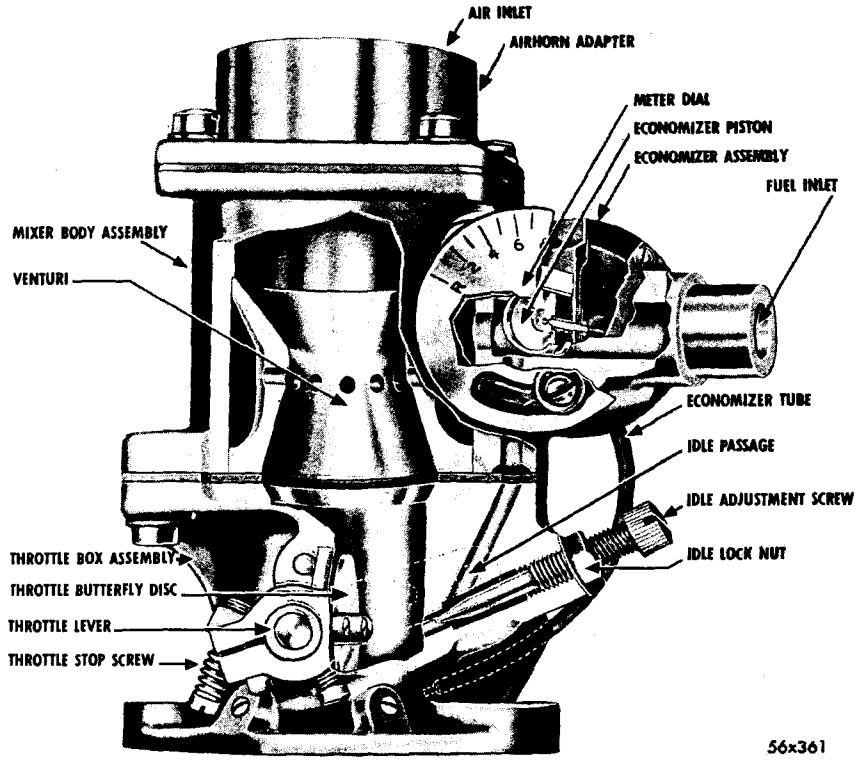


Figure 66 — The Liquid Propane Gas Carburetor

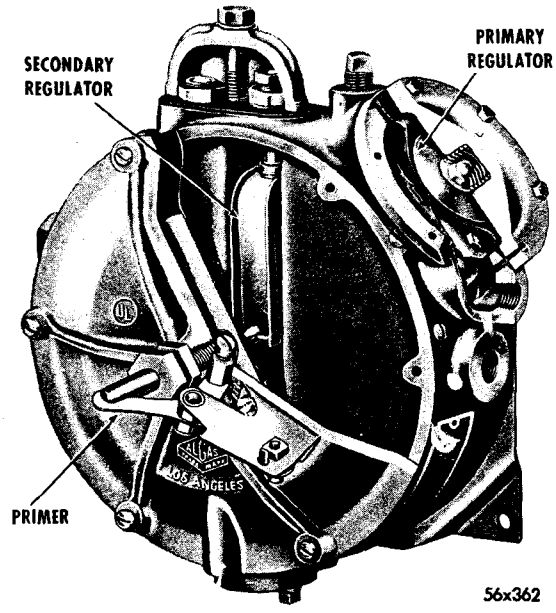


Figure 67 — The Liquid Propane Gas Converter

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 safety switch 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 the engine until all the fuel is out of the lines.

CARBURETOR

The Liquid Propane gas carburetor (Figure 66) 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 Figure 66. 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 at 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 (Figure 67)

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.

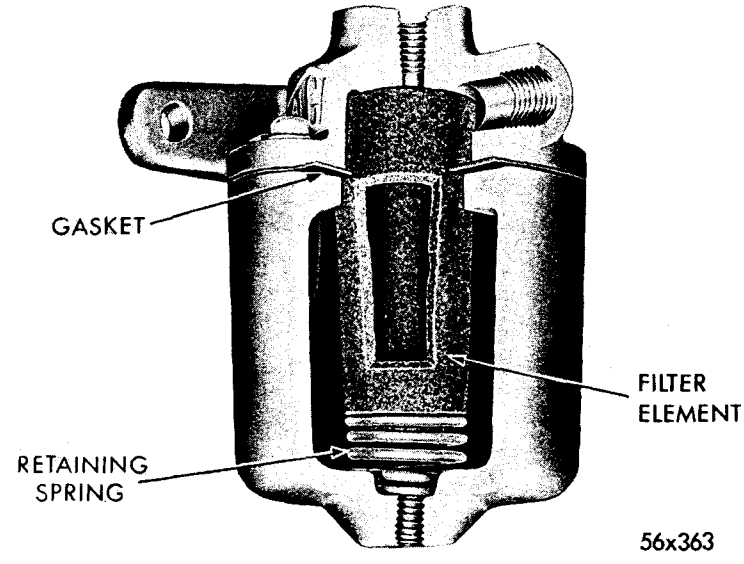


Figure 68 — The Liquid Propane Gas Filter

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

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 (Figure 68)

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 (Figure 66) 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 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 satisfactory reading cannot be attained, check analyzer.

ACCESSORY DRIVE GEAR

REMOVAL OF ACCESSORY DRIVE GEAR CASE COVER

Remove fan and governor (if so equipped), remove crank jaw screws from crankshaft pulley. Install puller (Tool C-3033) (Figure 69) on crankshaft pulley and remove pulley from crankshaft.

Remove hydraulic pump, disconnect oil lines, remove attaching bolts, and remove pump and drive gear assembly from gear case cover.

Disconnect governor linkage. Remove bolts from gear case cover and tap cover from dowel pin with a soft hammer. Remove hydraulic pump adapter from rear side of gear case cover plate.

REMOVING AND INSTALLING THE ACCESSORY DRIVE GEAR CASE COVER OIL SEAL

The accessory drive case cover oil seal prevents leakage of oil at the front of the engine. The seal is a press fit in the gear case cover. A composition gasket is used between the oil seal and the gear case cover to prevent oil leakage around the outer edge of the seal.

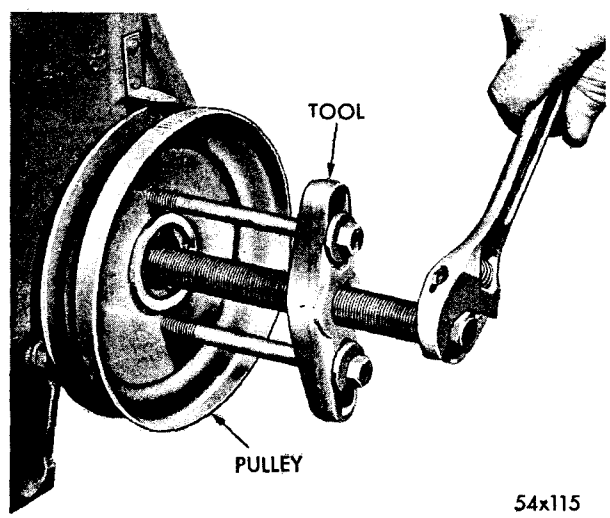


Figure 69 — Removing Crankshaft Pulley with Tool C-3033

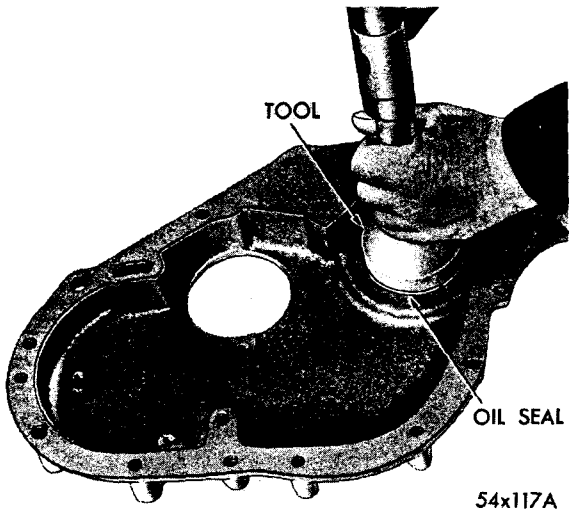


Figure 70 — Removing the Accessory Drive Gear Case Cover Oil Seal with Tool C-3050

To remove and install new oil seal proceed as follows:

Remove the snap ring from the cover seat. Drive out the oil seal from the rear of the gear case cover using Tool C-3050, as shown in Figure 71.

Place a new composition gasket in the gear case cover. Start the oil seal into the gear case cover with the projecting flange facing the inside of the cover.

Drive the oil seal into the cover with an arbor press, or use Tool C-3051. Hold the oil seal down with the press or Tool C-3051 and install a cone shaped snap ring into the cover seat.

INSTALLATION OF THE ACCESSORY DRIVE GEAR CASE COVER

Install a new gasket that has been coated with MoPar gasket seal. Be sure the mating surfaces of the gear case cover and the cylinder block are clean and free from burrs.

Rotate the crankshaft until line stamped on the camshaft gear matches the crankshaft gear timing marks. For hydraulic pump jobs, the crankshaft gear timing mark should be mated with the similar timing mark on the camshaft gear (See Fig. 71).

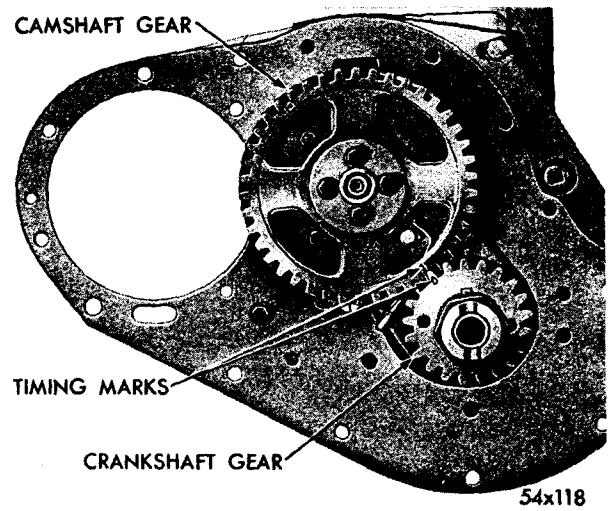


Figure 71 — Mating Timing Marks on Camshaft and Crankshaft Gears

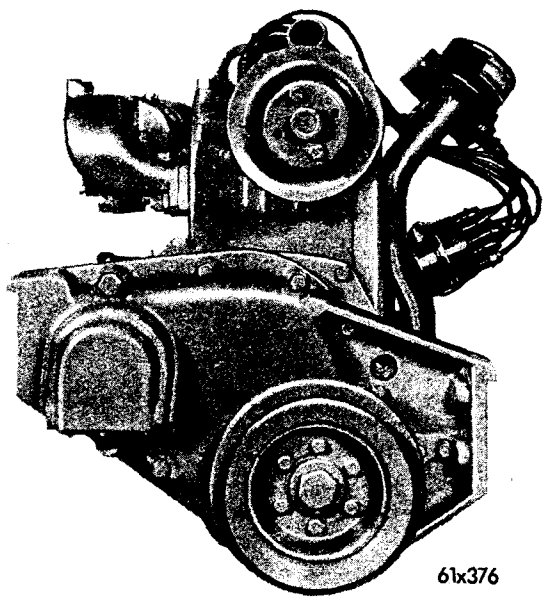


Figure 72 — Special Accessory Drive Gear Front End Case Cover Installed

Place the gear case cover in position and tap the cover on to the dowel pin.

Install copperseal washers on bolts and tighten with a torque wrench, the small screws from 15 to 20 foot-pounds, and the large screws from 30 to 35 foot-pounds torque.

NOTE

Be sure to install new copper washers under the "closed-end" nuts which are used to seal the two retainer cap screws that protrude through the gear case cover. The third screw which does not protrude, is sealed by the governor flange gasket (or governor opening cover plate and gasket where a gear driven governor is not used).

Install governor linkage. Install hydraulic pump, (engine so equipped) reconnect oil lines, and attach the bolts.

Install the crankshaft pulley using Tool C-3033. Attach the crank jaw. Install the fan blades and governor (if so equipped). Figure 72 shows the special accessory gear drive front end installed.

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. Run the engine at idle speed for three or four minutes (avoid overheating) to:

(a) Circulate the Rust Resistor to form a protective film in the water jackets and in the radiator or heat exchanger.

(b) Distribute the Rust Preventive Oil throughout the internal parts of the engine.

4. Remove the top of the carburetor air cleaner and with the engine running at approximately 1000 rpm, pour ½ pint of Rust Preventive Oil through the carburetor air intake. Turn off the ignition as soon as the ½ pint of oil has been drawn into the combustion chamber.

NOTE: If the engine will not run under its own power, turn it over several times with the starting motor to distribute the oil.

5. Drain the Rust Preventive Oil from the crankcase.

6. Remove the spark plugs and pour one ounce of rust preventive oil into each spark plug opening. Turn the engine over four or five revolutions with the starting motor and install the plugs.

7. Drain the cooling system.

8. Drain the fuel system tank, fuel pump and filter and carburetor. Operate the carburetor throttle lever several times to empty the accelerator pump system.

9. Remove the carburetor air cleaner, the oil filler pipe air cleaner and the outlet ventilator pipe air cleaner. Seal the openings with mask-

ing or adhesive tape. Also, seal the exhaust outlet opening in the exhaust manifold or exhaust pipe.

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

11. Remove the storage battery and store in a cool, dry place. Replenish the water in the battery cells to cover the plates 3/8 inch. See that the battery is fully charged and keep it fully charged during the idle period.

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

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

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, 12200 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. 30, Type 140, Serial Number 39540.) This information is stamped on the identification plate (located on the manifold side of engine) 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 INDUSTRIAL ENGINES
Type Engine	4 Cycle, Gasoline
No. of Cylinders	6 In-Line
Models	IND. 30, 31, 32, 33 and 908A, 931
Bore:	
IND. 30	3¼ in.
IND. 31	3¼ in.
IND. 931	3¼ in.
IND. 908A	3 7/16 in.
IND. 32	3 7/16 in.
IND. 33	3 7/16 in.
Stroke:	
IND. 30	4 5/8 in.
IND. 31	4 5/8 in.
IND. 931	4 5/8 in.
IND. 908A	4½ in.
IND. 32	4¾ in.
IND. 33	4¾ in.
Piston Displacement:	
IND. 30	230.2 cu. in.
IND. 31	230.2 cu. in.
IND. 931	230.2 cu. in.
IND. 908A	251 cu. in.
IND. 32	265.0 cu. in.
IND. 33	265.0 cu. in.

Compression Ratio:

IND. 30 ..... 7.0 to 1

IND. 31 ..... 7.0 to 1

IND. 931 ..... 7.0 to 1

IND. 908A ..... 6.6 to 1

IND. 32 ..... 6.8 to 1

IND. 33 ..... 6.8 to 1

Compression Pressure at 125 R.P.M. ..... 110 to 140 lbs.

H. P. Rating:

IND. 30 ..... 95 at 3400 R.P.M.

IND. 31 ..... 95 at 3400 R.P.M.

IND. 931 ..... 95 at 3400 R.P.M.

IND. 908A ..... 116 at 3600 R.P.M.

IND. 32 ..... 116 at 3600 R.P.M.

IND. 33 ..... 116 at 3600 R.P.M.

Firing Order (All Models) 1-5-3-6-2-4

Oil Pressure at 2000 R.P.M. ..... 45 to 55 lbs.

Cooling System Capacity ..... (Chrysler Power Units) approximately 6 gals.

Oil Crankcase Capacity ..... 5 qts.

(When oil filter element is replaced, add 1 additional qt.)

Warranty

Industrial Products Division warrants its new products to be free from defects in material and workmanship under normal use and service during the periods specified below for the type of products indicated:

INDUSTRIAL ENGINES — for ninety (90) days after delivery to the first user thereof or for fifteen (15) months after delivery to the original purchaser, whichever occurs first;

ENGINE ACCESSORIES (such as ignition system, starting devices, batteries, alternators, carburetors or other trade accessories) in finished form and installed on an Industrial Engine and purchased new from other manufacturers for that purpose — for the greater of either (1) fifteen (15) months after delivery to the original purchaser or ninety (90) days after delivery to the first user thereof, which occurs first, (2) the period specified by such other manufacturer.

ALL OTHER NEW PRODUCTS (not otherwise covered hereby) — for ninety (90) days after delivery to the original purchaser.

During the warranty periods specified above, Industrial Products Division will make good at its factory any part or parts of such products returned to it, (with transportation charges prepaid) which its examination shall disclose to its satisfaction to have been thus defective; provided it receives written notice of any such claimed defect within thirty (30) days from the date of discovery.

This warranty will not apply to any Industrial Engine which shall have been installed in a passenger vehicle, Industrial Products Division engine or product which has been subject to misuse, negligence or accident, or which shall have been equipped or repaired with any parts not supplied or approved by Industrial Products Division, or which shall have been altered or repaired outside of one of its authorized service stations in any way so as, in the judgment of Industrial Products Division, to affect the stability or reliability of such engine or product.

In the absence of any contrary written agreement signed by an authorized agent of the Industrial Products Division, this express warranty is the only warranty applicable to the Industrial Products Division products and parts described herein and is expressly in lieu of any warranties otherwise implied by law (including, but not limited to, implied warranties of merchantability or fitness for any particular purpose). The remedies available under this express warranty shall be the only remedies available to the purchaser with respect to defects in material or workmanship or otherwise. Industrial Products Division neither assumes, nor authorizes anyone to assume for it, any liability in connection with the sale of its products.

INDUSTRIAL PRODUCTS DIVISION

CHRYSLER CORPORATION