SECTION A

ENGINE FUEL SYSTEM—GENERAL

CONTENTS

DIVISION I SPECIFICATIONS AND ADJUSTMENTS

64-1 SPECIFICATIONS AND ADJUSTMENTS

Gasoline, Grade Required (With 2-Barrel Carb. Engines)	Regular
Gasoline, Grade Required (With 4-Barrel Carb. Engines)	Premium
Gasoline Tank Capacity (Approximately)	
Series 43-44000	20 Gal.
Series 45-46-48000	25 Gal.
Series 49000	21 Gal.
Gasoline Gauge, Make & Type	A.C., Electric
Fuel Pump, Make & Type	A.C., Mechanical
Drive	Eccentric at Camshaft Sprocket
Fuel Pump Pressure—At Carb. Level	
225-300-340 Engines	3 3/4 Lbs. Min.
400-430 Engines	5 Lbs. Min.
Fuel Filter, In Carb. Inlet	
225 Engine	Sintered Bronze
All Other Engines	Pleated Paper
Fuel Filter, in Gas Tank	Woven Plastic
Carburetor, Make & Type	Carter or Rochester, Downdraft
Carburetor, Barrels & Compression Ratio	
2 Barrel	9 to 1 Comp. Ratio
4 Barrel	10.25 to 1 Comp. Ratio
Air Cleaner, Make & Material	A.C., Plastic Foam Element
Air Cleaner Element, Type	
225 Engine	A132C
300-340 Engines	A96C
430 Engine	A202C
400-430 Engine Dual Intake Air Cleaner	A96C

64-1 SPECIFICATIONS AND ADJUSTMENTS (Cont.)

Positive Crankcase Ventilator Valve, Type	
All Engines Under 300 Cu. In.	CV-684
All Engines 300 Cu. In. & Over	CV-683
Intake Manifold Heat, Type	Exhaust Crossover Passage
Thermostat Wind-Up @ 70° F., Valve Closed	1/2 Turn
Idle Speed, Auto. Trans. in Drive or Man. Trans. in Neutral	
All Standard Engines	550 RPM
Air Injection Reactor and/or Air Cond. Engines (With Air Cond. Off)	Add 50 RPM

64-2 CARBURETOR IDLE AND AUTOMATIC CHOKE ADJUSTMENTS

Carburetor adjustment should not be attempted until it is known that engine ignition and compression are in good order. Any attempt to adjust or alter the carburetor to compensate for faulty conditions elsewhere in items affecting engine performance will result in reduced fuel economy and overall performance.

a. Idle Speed and Mixture Adjustments

The positive crankcase ventilator valve should be checked as described in paragraph 64-5 before making carburetor adjustments, as this valve noticeably affects the air-fuel ratio at idle.

1. Remove air cleaner. Connect a tachometer or vacuum gauge to engine.

2. Start engine and run it at fast idle until upper radiator inlet is hot and choke valve is wide open.

CAUTION: Idle speed and mixture adjustments cannot be made satisfactorily with an abnormally hot engine. On any carburetor with a hot idle compensating valve, it is particularly important that idle adjustments be made at normal temperature so that this valve will be closed.

3. On automatic transmission cars, place a block in front of a front wheel and apply parking brake firmly, then shift transmission into drive.

4. Adjust throttle stop screw to set idle speed at 550 RPM (all standard engines). Add 50 RPM for air conditioner and/or air injection reactor.

5. Make sure idle stator switch is closed by disconnecting switch connector. If idle speed does not decrease, switch was not closed; adjust idle stator switch, then readjust idle speed to specifications.

6. If carburetor is equipped with a hot idle compensating valve, press a finger on valve to make sure it was closed. If idle speed drops, valve was open; readjust idle speed and mixture, making sure valve remains closed.

7. Adjust idle mixture needles, one at a time. Turn needle to obtain highest tachometer or vacuum gage reading. Then slowly turn needle in (leaner) until tachometer reading drops 20 RPM or until vacuum gage reading drops 1/2 inch. Note direction of needle slot, then turn needle out (richer) exactly 1/4 turn and observe tachometer or vacuum gage. If reading has not returned to maximum, carefully turn needle out 1/8 turn at a time until maximum reading is just regained.

NOTE: This method of adjusting idle mixture will give the best and most economical performance at idle and at lower speeds for all cars; however, it is especially important that A.I.R. equipped cars be adjusted to the "lean side of best idle" using this procedure to keep hydrocarbon and carbon dioxide emissions to a minimum.

8. If either needle setting is changed much, always recheck other needle setting since they affect each other.

9. If idle speed is now too fast, reduce speed to specifications and recheck mixture adjustment.

CAUTION: Any car which is equipped with an Automatic Level Control should have the vacuum operated compressor disconnected during engine idle adjustment. To disconnect compressor, remove vacuum hose at compressor tank end and plug with a pencil.

b. Automatic Choke Adjustments

The choke thermostat is calibrated to give satisfactory performance with regular blends of fuel when it is placed at the standard factory setting, which is listed in the specifications for each carburetor.

When it is necessary to adjust the thermostat, loosen the housing or cover attaching screws and turn as required.

Thermostat settings other than standard should be used only when the car is habitually operated on special blends of fuel which do not give satisfactory warm-up performance with the standard setting. A "Lean" setting may be required with highly volatile fuel which produces excessive loading or rolling of engine on warm-up with the standard thermostat setting. A "Rich" setting should be used only when excessive spitting occurs on engine warm-up with

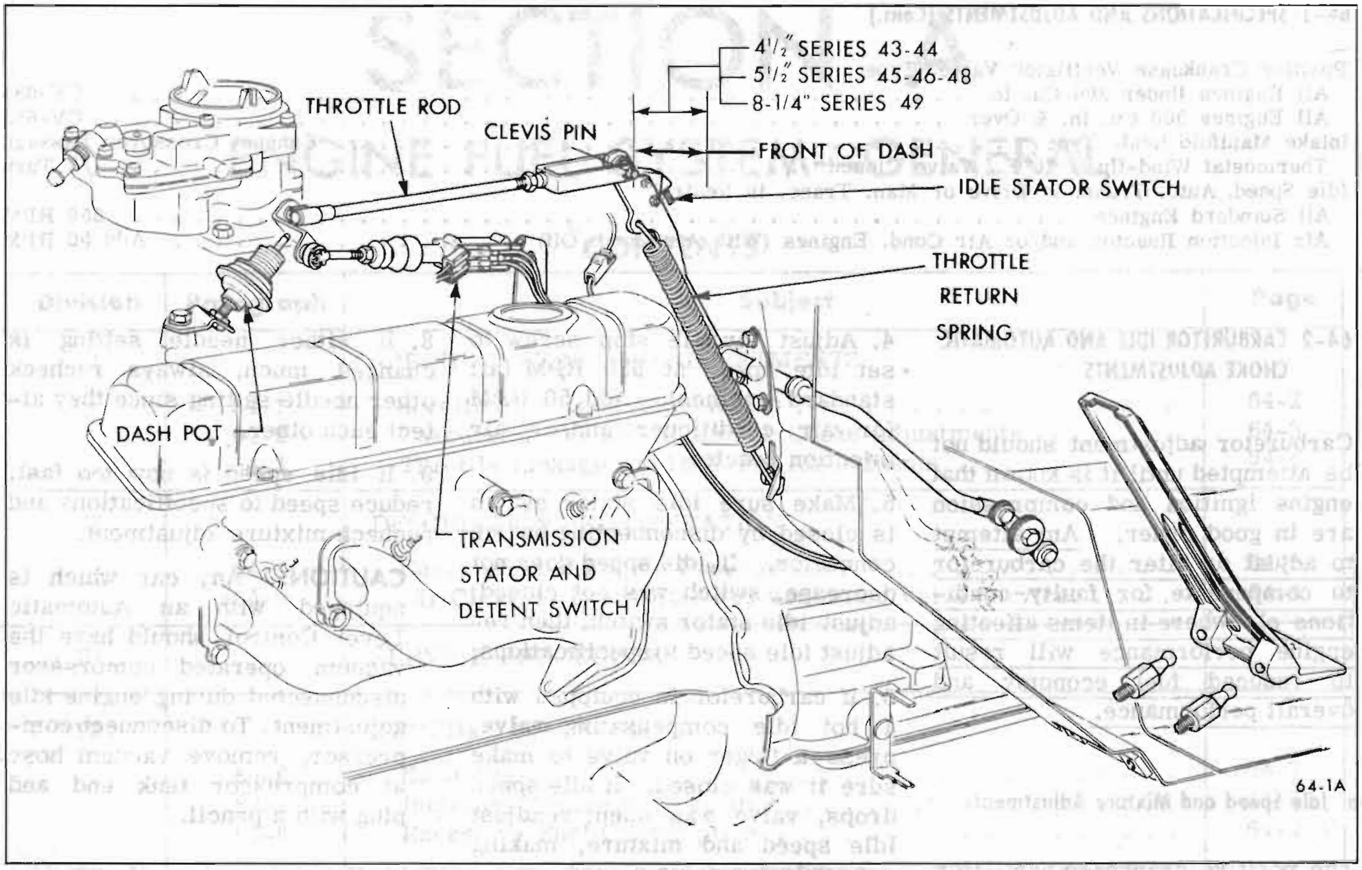

Figure 64-1—Throttle Linkage Adjustment

the standard thermostat setting. When making either a "Lean" or "Rich" setting, change one point at a time and test results with engine cold, until the desired performance is obtained.

If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, check the choke rod and choke unloader adjustments.

64-3 THROTTLE LINKAGE AND DASH POT ADJUSTMENTS

The procedure for adjusting throttle linkage is identical on manual and automatic transmission cars. Automatic transmission cars, however, have a dash pot which delays the closing action of the throttle to reduce any possibility of the engine stalling. California A.I.R. cars are not equipped with dash pots.

a. Throttle Linkage Adjustments

1. Remove air cleaner. Check throttle linkage for proper lubrication. Make sure that linkage is free in all positions and that nothing touches or interferes with the linkage. Hold choke open and make sure that return spring fully closes throttle, even though throttle is released very slowly.

2. Adjust engine idle speed and mixture. See paragraph 64-2. With throttle linkage in hot curb idle position, measurement from throttle rod clevis pin horizontally to dash must be 4-1/2 inches ± 1/4 inch (Series 43-44000), 5-1/2 inches ± 1/4 inch (Series 45-46-48000) or 8-1/4 inches ± 1/4 inch (Series 49000). If measurement is off, shorten or lengthen throttle operating rod as required to correct. See Figure 64-1.

3. Operate linkage to open carburetor and make sure carburetor wide open stop is contacting. If carburetor does not reach wide open position and nothing is interfering with throttle linkage, transmission stator and detent switch must be bottoming. To adjust transmission switch, remove fastener and link from carburetor lever pin. See Figure 64-1. With carburetor wide open and switch plunger bottomed, adjust link until it will slip over carburetor lever pin, then shorten link 1-1/2 turns. Reassemble link and fastener, and tighten lock nut.

4. As a final check, have a helper depress accelerator pedal and check to make sure wide open stop contacts at carburetor.

b. Dash Pot Adjustments

Before adjusting the dash pot, the engine idle speed and mixture should be correctly adjusted. With the engine idling at normal operating temperature, adjust the dash pot as follows:

1. While observing dash pot, open carburetor and allow throttle to snap closed. Time dash pot delaying action from the point where the throttle lever hits the dash pot to the point where the lever stops moving. The dash pot should delay or cushion closing action for two seconds; measure two seconds by saying, "One thousand and one, one thousand and two."

2. As a final check, hold car with brakes and put transmission in drive, then jab accelerator pedal. If engine stalls, adjust dash pot for slightly more interference and recheck as necessary.

3. Tighten lock nut securely.

DIVISION II DESCRIPTION AND OPERATION

64-4 DESCRIPTION OF ENGINE FUEL SYSTEM

a. Fuel Filter

V-8 engines have a pleated paper fuel filter located in the carburetor inlet. V-6 engines have a sintered bronze fuel filter in the same location.

All cars have a woven plastic fuel filter in the fuel tank on the lower end of the pick-up pipe.

b. Fuel Pump

The fuel pump is mounted at the lower left side of the timing chain cover. It is actuated by an eccentric mounted on the front end of the camshaft. The pump is inverted, thereby placing it in a lower, cooler location. It has a built-in air pocket to dampen out pulsations in fuel pressure. The construction and operation of the fuel pump are described in Section 64-B.

Most air conditioner equipped cars have a special fuel pump which has a metering outlet for a vapor return system. Any vapor which forms is returned to the fuel tank along with hot fuel through a separate line alongside the fuel supply line. This greatly reduces any possibility of vapor lock by keeping cool fuel from the tank constantly circulating through the fuel pump. All 400 and 430 engines have the vapor return system regardless of whether or not the car is equipped with an air conditioner.

c. Air Cleaner and Intake Silencer

All engines are equipped with oil wetted polyurethane foam element air cleaners combined with intake silencers. The air cleaner removes abrasive dust and dirt from the air before it enters the engine through the carburetor. The intake silencer reduces to a very low level the roaring noise made by the air as it is drawn through the intake system. The cleaner and silencer also functions as a flame arrester in event of "backfire" through the intake system.

There are five basic air cleaner and silencer assemblies: one for 225 engines, one for 300-340 two barrel carburetor engines, one for 340 four barrel carburetor engines, one for 430 engines, and one with dual air inlets for Gran Sport cars. A.I.R. cars require different air cleaners for each of the above engine groups.

Before installing an air cleaner, always make sure the air cleaner gasket is in good condition and is properly located on the carburetor flange. It is important to securely tighten the wing nut by hand to make sure the air cleaner remains stationary and to make sure the gasket seals properly. Proper location is with the word "FRONT" on the air cleaner forward.

All air cleaners have a washable plastic foam type element. It consists of a cylinder of polyurethane foam over a perforated sheet metal supporting screen. This screen also acts as a flame arrester in case of a backfire.

For normal operating conditions, the element should be cleaned every 12,000 miles (more often under dusty operating conditions).

d. Carburetor Throttle Control Linkage

The carburetor throttle control linkage is designed to provide positive control of the throttle valves through their entire range without being affected by movement of the engine on its rubber mountings. See Figure 64-1.

The accelerator pedal is mounted on two ball studs which are screwed into weld nuts in the floor pan. Depressing the accelerator pedal causes the pedal to make a rolling contact with rollers on the throttle operating lever, forcing the lower part of the lever to pivot forward and down. The lever pivots in a bearing mounted on the body cowl. See Figure 64-1.

As the lower part of the throttle operating lever is pushed forward by the accelerator pedal, the upper part of the lever is pulled rearward. This pulls the throttle rod rearward, causing the carburetor throttle lever to open the throttle valves.

The return spring returns the throttle linkage to idle position whenever pressure is released from the accelerator pedal. See Figure 64-1.

On all automatic transmission cars, (except A.I.R. cars), a dash pot is mounted in position to be contacted by an arm of the carburetor throttle lever as the throttle is closed. The dash pot cushions the closing of the throttle to prevent engine stalling when the accelerator pedal is suddenly released.

On all automatic transmission cars, a transmission control switch is fastened to a pin on the carburetor throttle lever. When the throttle linkage is moved to wide open throttle position, the switch contacts are closed to cause the transmission to "down shift". This switch also has a second set of contacts which close at about 3/4 throttle position to cause the stator blades in the transmission to "switch-the-pitch" to high performance angle. See Figure 64-1.

On all automatic transmission cars, an idle stator switch is installed in a joint of the throttle linkage between the throttle lever and the throttle rod. Whenever the throttle linkage returns to curb idle position, the switch contacts are closed to cause the stator blades to "switch-the-pitch" to high angle. This reduces the transmission load on the engine at idle, thereby reducing the tendency of the car to creep. See Figure 64-1.

64-5 AIR CLEANER, FUEL FILTER AND VENTILATOR VALVE SERVICE

a. Air Cleaner Service

An air cleaner with a dirty element will restrict the air flow to the carburetor and cause a rich mixture at all speeds. The device will not properly remove dirt from the air and the dirt entering the engine will cause abnormal formation of carbon, sticking valves, and wear of piston rings and cylinder bores.

Regular cleaning and inspection of the element at 12,000 mile intervals (or more frequently in dusty territory) is necessary to prevent excessive engine wear and abnormal fuel consumption. The procedure for cleaning the air cleaner is given in paragraph 1-1.

b. Fuel Filter—All Engines

All engine fuel filters are located in the carburetor fuel inlet. See Figure 64-2 or 3. The V-6 engine fuel filter element is of sintered bronze; all V-8 engine fuel filter elements are of pleated paper. Elements are placed in the inlet hole with the cupped end outward. A spring holds the element outward, sealing it by compressing a small gasket against the inlet fitting. If the element should ever become plugged, pump pressure is sufficient to depress the spring slightly so that some fuel by-passes the element. Thus, a plugged element, instead of causing a car stoppage on the road, allows the engine to continue running on unfiltered fuel. However, the spring pressure is designed to allow only enough fuel to by-pass to let the car run 50 to 60 MPH at a constant speed, or to cut-out at a much lower speed with heavy acceleration. If surging is encountered in the 50 to 60 MPH range, try several hard accelerations; if the engine also runs out of fuel during acceleration, the problem is insufficient fuel, and the most likely reason is a

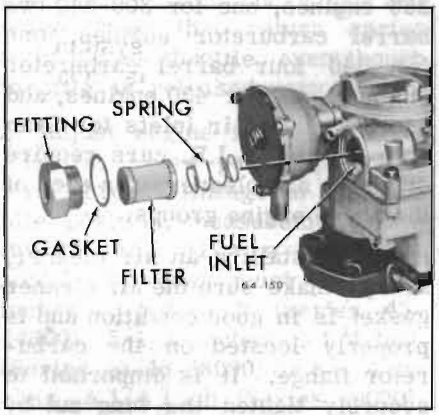

Figure 64-2—Fuel Filter Parts - V-8

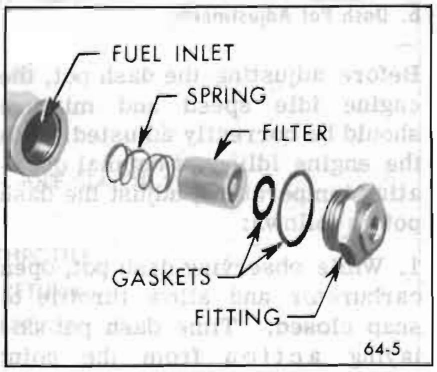

Figure 64-3—Fuel Filter Parts - V-6

plugged filter. If the owner has "put-up" with this trouble for some time, there is probably dirt in the carburetor due to usage of unfiltered fuel and also due to "dumping" of dirt from the plugged filter element.

Every 12,000 miles the V-6 engine filter element should be removed and washed thoroughly in a good cleaning solvent, then blown dry in a reverse direction. If the element does not clean up completely, a new element should be installed. The V-8 engine element must be replaced every 12,000 miles.

After assembling any filter element in the carburetor, always start the engine and check for leaks in the fuel line and fittings before installing the air cleaner.

c. Other Filters or Strainers

A woven plastic filter is located on the lower end of the fuel pickup pipe in the gas tank. This filter prevents dirt from entering the fuel line and also stops water unless the filter becomes completely submerged in water. This filter is self cleaning and normally requires no maintenance. Fuel stoppage at this point indicates that the gas tank contains an abnormal amount of sediment or water, the tank should therefore be removed and thoroughly cleaned.

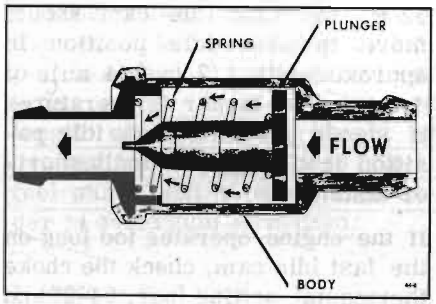

Figure 64-4—Positive Crankcase Ventilator Valve

d. Positive Crankcase Ventilator System Service

All cars have a positive crankcase ventilating system to help reduce air pollution and to provide more complete scavenging of crankcase impurities. Ventilation air is drawn in through the filter in the filler cap on the left rocker arm cover, down into the crankcase, across and up into the right rocker arm cover, up through the ventilator valve, through a hose, and into the intake manifold. Intake manifold vacuum draws any fumes from the crankcase to be burned in the engine. See Figure 64-4.

When air flow through the carburetor is high, added air from the positive crankcase ventilating system has no noticeable effect on engine operation; however, at idle speed, air flow through the carburetor is so low that any large amount added by the ventilating system would upset the air-fuel mixture, causing rough idle. For this reason, a flow control valve is used which restricts the ventilating system flow whenever intake manifold vacuum is high.

After a period of operation, the ventilator valve tends to become clogged, which reduces and finally stops all crankcase ventilation. An engine which is operated without any crankcase ventilation can be damaged seriously. Therefore, it is important to replace the ventilator valve periodically (each 12,000 miles).

CAUTION: If an engine is idling too slow or rough, this may be caused by a clogged ventilator valve; therefore, never adjust the carburetor idle without first checking the crankcase ventilator check valve.

With the crankcase ventilator system operating normally, about 1/4 of the air used in the idle mixture is supplied through the ventilator valve. Therefore, if the ventilator air is shut off, the idle speed will be noticeably slower. Check operation of the ventilator system as follows:

1. Connect a reliable tachometer and adjust idle as specified.

2. Squeeze-off crankcase ventilator hose to stop all air flow.

3. If idle speed drops 60 RPM or more, crankcase ventilator system is okay.

4. If idle speed drops less than 60 RPM, ventilator system is probably partially clogged; install a new ventilator valve and recheck operation of system as described above.

5. After installing a new ventilator valve, always readjust engine idle.

e. Closed Positive Crankcase Ventilator System

All cars manufactured for registration in California are required to have a closed positive crankcase ventilating system. The closed PCV system consists of the standard PCV system plus additional features as described below.

To review briefly, the standard PCV system draws air in through the mesh of the oil filler cap, down across the crankcase, up through the PCV valve and through a hose into the intake manifold.

The closed PCV system operates in the same manner except that the ventilating air is drawn in from the air cleaner, down through a rubber tube, through a mesh filled breather assembly and into the left rocker arm cover. The oil filler cap is sealed air tight in the closed PCV system.

With the standard PCV system any blow-by in excess of the system capacity (from a badly worn engine, sustained heavy load, etc.) is exhausted to the atmosphere through the oil filler cap. In the closed PCV system any such blow-by is exhausted into the air cleaner and is drawn into the engine.

Maintenance of the closed PCV system is essentially the same as the standard PCV system with one exception, instead of cleaning the oil filler cap at 12,000 mile intervals (more often under dusty operating conditions), it is the breather assembly that will be cleaned.

DIVISION IV

TROUBLE DIAGNOSIS

64-6 HARD STARTING

a. Improper Starting Technique

Hard starting may be due to improper starting technique. If possible, observe the owner's method of starting; if not correct, suggest that he use the following procedure.

1. Automatic Transmission. Place control lever in "P" or "N" position. Starter cannot be operated in any other position.

Manual transmission. Place control lever in neutral and depress clutch pedal to floor.

2. Engine Cold. Depress accelerator pedal to floor once and release. This presets the automatic choke and throttle.

Engine Warm. Hold accelerator pedal about 1/3 down.

3. Turn ignition switch to "START" and release when engine starts. As soon as the engine is running smoothly, "jab" the accelerator pedal to slow the engine down to warm up speed.

If the engine is warm, but fails to restart promptly, there may be an excess of fuel or "flooding". (This is more likely to occur at low temperatures.)

Flooding. Hold the accelerator pedal to the floor (fully depressed) while cranking the engine; this opens the choke to "unload" any excess fuel. When the engine fires, do not immediately release the accelerator pedal, but hold it down until the engine races a little.

If the engine has not been started for several days, most of the fuel will have evaporated from the carburetor. Pumping the accelerator pedal, while cranking, will pump fuel directly into the engine which will hasten the start.

b. Improper Ignition

Before attempting any correction in fuel system make certain that the battery and ignition system are in proper condition. See paragraph 120-4 and 68-28.

c. Improper Adjustment of Fast Idle Cam or Choke Unloader

An incorrectly adjusted fast idle cam may not provide sufficient throttle opening and stalling will result.

If the choke unloader goes into action too soon it may cause hard starting when engine is cold. If choke unloader goes into action too late or not at all, it may cause hard starting when engine is flooded.

d. No Fuel at Carburetor

No fuel may be delivered to carburetor due to empty gasoline tank or stoppages in filters, strainers or feed hoses, or inoperative fuel pump. Test fuel supply as described in paragraph 64-11.

e. Improper Carburetor Adjustment

Improper setting of carburetor idle needle valves may cause stalling after starting. A high fuel level in float bowl will cause flooding and consequent hard starting. Adjust carburetor (par. 64-2).

f. Low Grade Gasoline

Low grade gasoline is usually insufficiently volatile to provide easy starting in cold weather even though it may perform reasonably well after the engine is started and warmed up. A change to higher grade gasoline is the only remedy.

g. Volatile Gasoline

In some parts of the country, gasolines are marketed which are very volatile and generally advertised as "easy starting gasolines." Some of these fuels are so volatile they boil (commonly referred to as "percolation") in a carburetor bowl which is only normally warm, especially when the engine is shut off following a run. This overloads the manifold, resulting in an over rich mixture which may cause "delayed" starting.

Such gasolines are not necessary in a Buick since the automatic choke has been designed and calibrated to provide easy and positive starting with fuels of ordinary volatility, but if the owner wishes to use volatile gasolines the automatic choke thermostat should be adjusted for a "lean" setting (par. 64-2).

64-7 IMPROPER ENGINE PERFORMANCE

a. Engine Idles Too Fast

A cold engine should operate on fast idle for two to five minutes depending on air temperature. At 32°F. the fast idle cam should move to slow idle position in approximately 1/2 to 3/4 mile of driving. At higher temperatures it should move to slow idle position in a correspondingly shorter distance.

If the engine operates too long on the fast idle cam, check the choke thermostat setting (par. 64-2) and the fast idle cam adjustment.

If the engine idles faster than the specified idle speed when off the fast idle cam, check throttle linkage for binding or weak return spring and adjust throttle stop screw (par. 64-3). This trouble can also be caused by a sticking choke.

b. Improper Idle and Low Speed Performance

Rough idling and tendency to stall may be caused by idling speed set below the specified idle speed. Idle mixture may be wrong due to improper needle valve adjustment (par. 64-2).

Rough idling, poor performance, and back firing at low speeds frequently originates in improper ignition. Check ignition system.

High fuel pump pressure will cause rough idling and poor low speed performance (par. 64-11).

An intake manifold air leak will cause rough idling and poor low speed performance. A manifold air leak produces a low, erratic reading on a vacuum gauge connected to the intake manifold.

Check for leaks at all pipe connections and check manifold joints with gasoline.

When rough idling and poor low speed performance cannot be corrected by checks of carburetion and ignition mentioned above, check cylinder compression.

Improper performance which is most noticeable at low speeds may be caused by sticking valves.

Sticking valves may be caused by the use of low grade fuel or fuel that has been in storage too long. When a car is stored for any length of time, fuel should be drained from the tank, feed hoses, fuel pump, and carburetor in order to avoid gum formation.

c. Improper High Speed Operation

Roughness or poor performance above 22 MPH indicates faulty ignition (par. 10-33) or improper settings in the high speed circuit of carburetor. Surging at high speed may be caused by low fuel pump pressure (par. 64-11).

Surging at 75 to 80 MPH constant speed indicates that the power jet is stopped up or the vacuum piston is sticking.

If there is lack of power at top speed, check throttle linkage to insure full throttle valve opening (par. 64-3).

d. Excessive Detonation or Spark Knock

Light detonation may occur when operating a synchromesh car in high gear with full throttle between 14 and 22 MPH, or when operating an automatic transmission car in Drive with full throttle at low speed even when ignition timing is correct and proper fuel is used. This light detonation is normal and no attempt should be made to eliminate it by retarding the ignition timing, which would reduce economy and over-all performance.

Heavy detonation may be caused by improper ignition timing (par. 68-24), improper grade of fuel, or by an accumulation of carbon in combustion chambers.

Heavy detonation is injurious to any automotive engine. A car driven continuously under conditions and fuels which produce heavy detonation will overheat and lose power, with the possibility of damage to pistons and bearings.

64-8 EXCESSIVE FUEL CONSUMPTION

Complaints of excessive fuel consumption require a careful investigation of owner driving habits and operating conditions as well as the mechanical conditions of the engine and fuel system; otherwise, much useless work may be done in an attempt to increase fuel economy.

Driving habits which seriously affect fuel economy are: high speed driving, frequent and rapid acceleration, driving too long in a low speed range when getting under way, excessive idling while standing.

Operating conditions which adversely affect fuel economy are: excessive acceleration, frequent starts and stops, congested traffic, poor roads, hills and mountains, high winds, low tire pressures.

High speed is the greatest contributor to low gas mileage. Air resistance increases as the square of the speed. For instance, a car going sixty miles an hour must overcome air resistance four times as great as when going thirty miles an hour. At eighty miles an hour the resistance is over seven times as great as when going thirty miles an hour. Over seventy-five per cent of the power required to drive a car eighty miles an hour is used in overcoming air resistance, while at thirty miles an hour only thirty per cent of the power required is used to overcome air resistance.

Gas mileage records made by car owners never give a true picture of the efficiency of the engine fuel system since they include the effects of driving habits and operating conditions. Because of the wide variation in these conditions, it is impossible to give average mileage figures for cars in general use; therefore, any investigation of a mileage complaint must be based on an accurate measurement of gasoline consumption per mile under proper test conditions.

a. Gasoline Mileage Test

A gas mileage test should be made with a 1/10th gallon gauge on a reasonably level road, at fixed speeds, without acceleration or deceleration. Test runs should be made in both directions over the same stretch of road to average the effect of grades and wind resistance. Test runs made at 30, 50 and 70 MPH will indicate the approximate efficiency of the low speed, high speed, and power systems of the carburetor and show whether fuel consumption is actually abnormal. If a mileage test indicates that the fuel consumption is above normal, check the following items.

1. Fuel Leaks. Check all gasoline hose connections, fuel pump, gasoline filter, and carburetor bowl gasket.

2. Tires. Check for low tire pressures.

3. Brakes. Check for dragging brakes.

4. Ignition Timing--Spark Plugs. Late ignition timing causes loss of power and increases fuel consumption. Dirty or worn out spark plugs are wasteful of fuel.

5. Low Grade Gasoline. Use of gasoline of such low grade that ignition timing must be retarded to avoid excessive detonation will give very poor fuel economy.

6. Air Cleaner. Check for dirty or clogged cleaner element (par. 64-5).

7. Automatic Choke. Check for sticking choke valve and improper setting of thermostat (par. 64-1).

8. Valves. Check for sticking valves.

9. Fuel Pump. Check for excessive fuel pump pressure (par. 64-11).

10. Carburetor Adjustment. Check idle adjustment (par. 64-1).

For all other adjustments to high speed and power systems, the carburetors must be removed and disassembled.

b. Changing Carburetor Calibrations

Under no circumstances should the jet sizes, metering rods and other calibrations of a carburetor be changed from factory specifications. The calibrations given in the calibrations paragraph must be adhered to unless these are later changed by a bulletin issued from the Buick Service Department.