SERVICE REFERENCE BOOK

of the MASTER TECHNICIANS SERVICE CONFERENCE

session no. 139

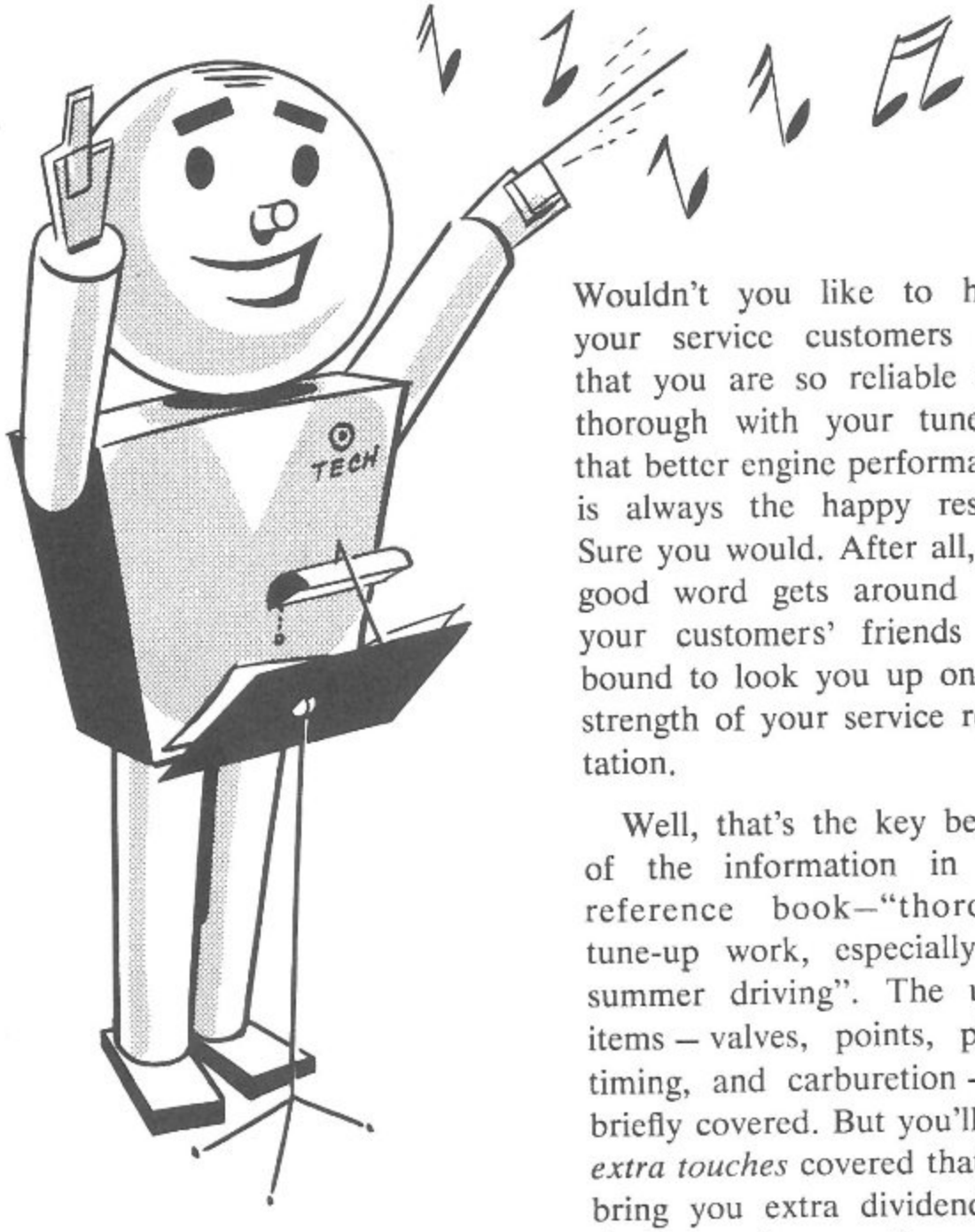
Summer Tune-up Tips

PREPARED BY CHRYSLER CORPORATION

Plymouth • Dodge • De Soto • Chrysler • Imperial

Tech Sez:

"MORE THOROUGH TUNE-UP KEEPS MORE CUSTOMERS HAPPY!"



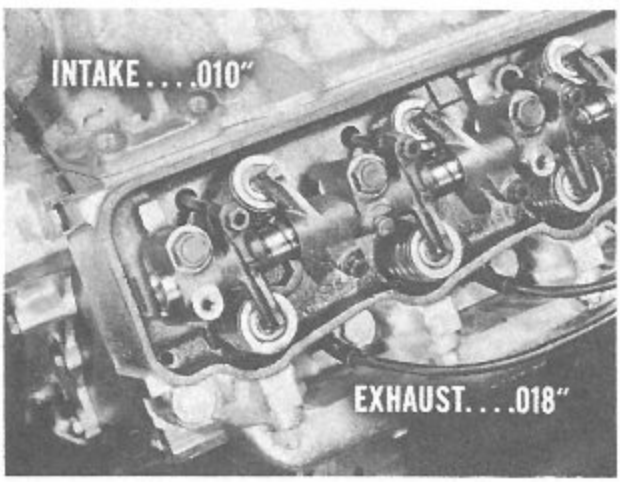
Wouldn't you like to have your service customers say that you are so reliable and thorough with your tune-up that better engine performance is always the happy result? Sure you would. After all, the good word gets around and your customers' friends are bound to look you up on the strength of your service reputation.

Well, that's the key benefit of the information in this reference book—"thorough tune-up work, especially for summer driving". The usual items – valves, points, plugs, timing, and carburetion – are briefly covered. But you'll find *extra touches* covered that will bring you extra dividends in the way of more thoroughly satisfied customers.

Here's your page guide to this useful service information:

EXTRA TUNE-UP OPERATIONS

Valve Tappet Clearance. One extra tune-up service to perform on the Plymouth Fury V-800 engine is a valve tappet clearance inspection, particularly on a car that has traveled 12,000 miles or more. So glance at the speedometer first to see if mileage is beyond the 12,000-mile range. If it is, then you'll know that intake valve clearances should be set at .010" and exhaust valve clearances should be set at .018". Make both settings with the engine running at normal operating temperature.



High-Tension Cables. On any engine, the high-tension cables should be examined closely. Engine heat, plus cold winter temperatures expand and contract the insulation so much, tiny cracks and pinholes may have developed.

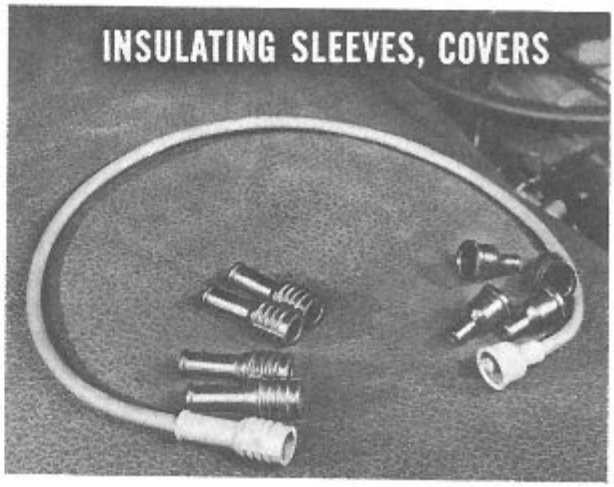
Besides that, the distributor cap and spark plug terminals can corrode and cause poor contact—just the same as any electrical connection that's dirty. Cracked cables and corroded terminals, of course, don't contribute to good ignition. So remove the cables for inspection—and be extremely careful how you remove them. Hold the cables at the insulating covers, and pull straight. Examine them for cracks and pinholes. In addition, make sure the terminals are clean and tight.

If you're not sure about the condition of the cable, test it for leakage. And if you don't have any way to test a cable for leakage, the best thing to do is replace it. But whenever you replace a cable, be sure to use the same type you removed. Don't ever end up with a combination of non-resistor spark plugs and non-resistance cable.

You can get spark plug cable sets you need from the parts department, as you know. And for non-resistor plugs only, there's a new resistance-type cable package (Part No. 2084023) available.

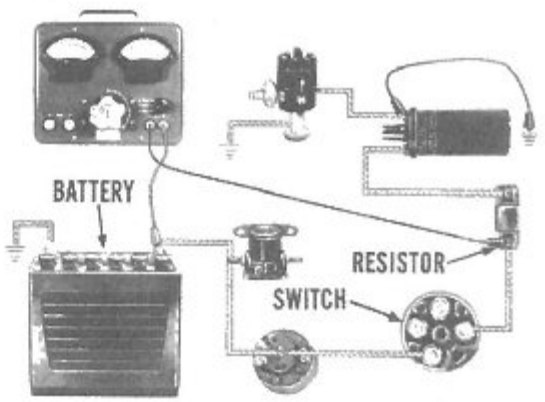
NOTE: Don't forget to make sure the distributor-to-coil wire is of the resistance-type marked "RADIO" on all Chrysler Corporation-manufactured distributors.

Here's another point to inspect. If the insulating sleeves and covers that fit over plugs and distributor cap towers get brittle—or are cracked—they should be replaced. Insulating sleeves are not removable from resistance-type cables. The complete cable must be replaced.

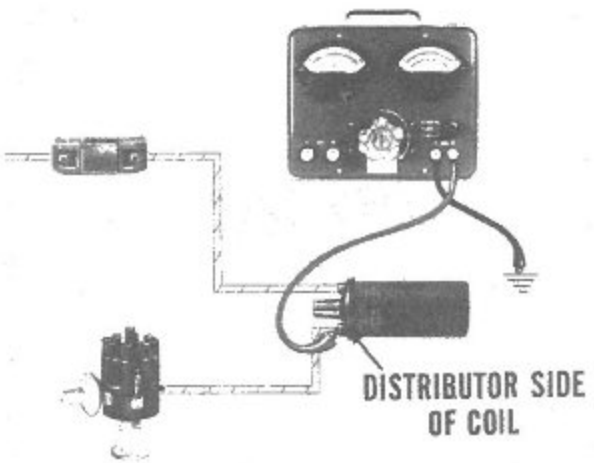


Loose, Corroded Terminals. Another easy thing to overlook is a loose or corroded terminal in the primary circuit. Looseness and corrosion in the primary add resistance to the flow of current. This can cause hard starting when the engine's cold.

A voltage drop test should be the first step in locating loose or corroded terminals. When you find the point of resistance, clean and tighten the connection. And, if you suspect an electrical condition being the cause of a "can't start" case, make the voltage

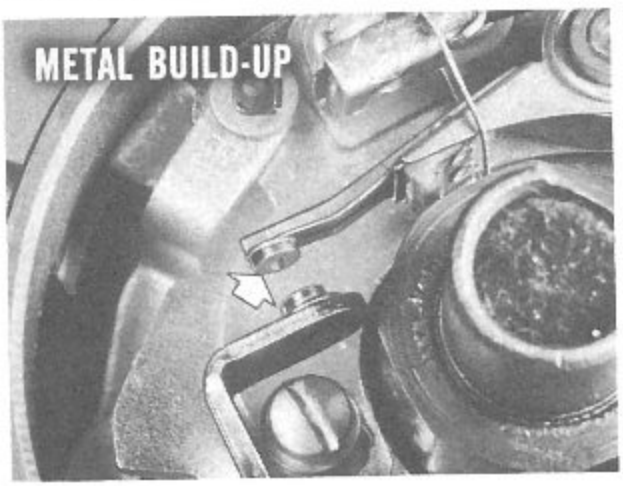


drop test between the switch side of the ballast resistor and the battery post. Voltage drop should be no more than .2 volt.



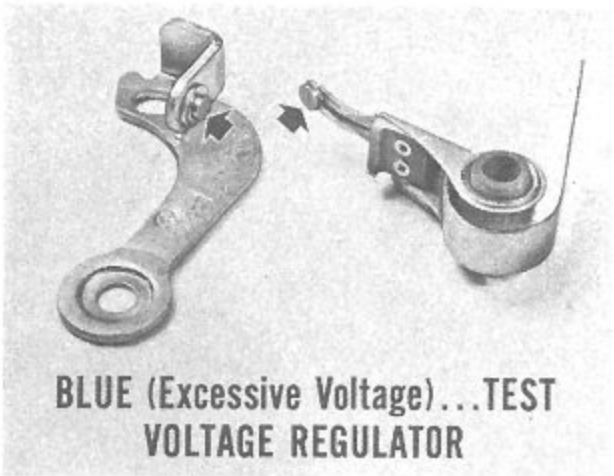
Then test voltage drop between the distributor side of the coil and ground. If you find more than .1 volt drop, look for a poor connection between the coil and the distributor contact points. Also inspect for burned points, or for a poor ground.

Distributor Points. When there's a slight build-up of metal on either contact point, it's usually a result of the type of driving being done. Constant slow-speed driving, for example, can cause a metal build-up. In a case like this, don't jump to the conclusion that the condenser is strictly at fault. On the other hand, don't fail to test the condenser. But replace it only if it fails the test. Replacing a condenser unnecessarily causes the owner unnecessary expense.

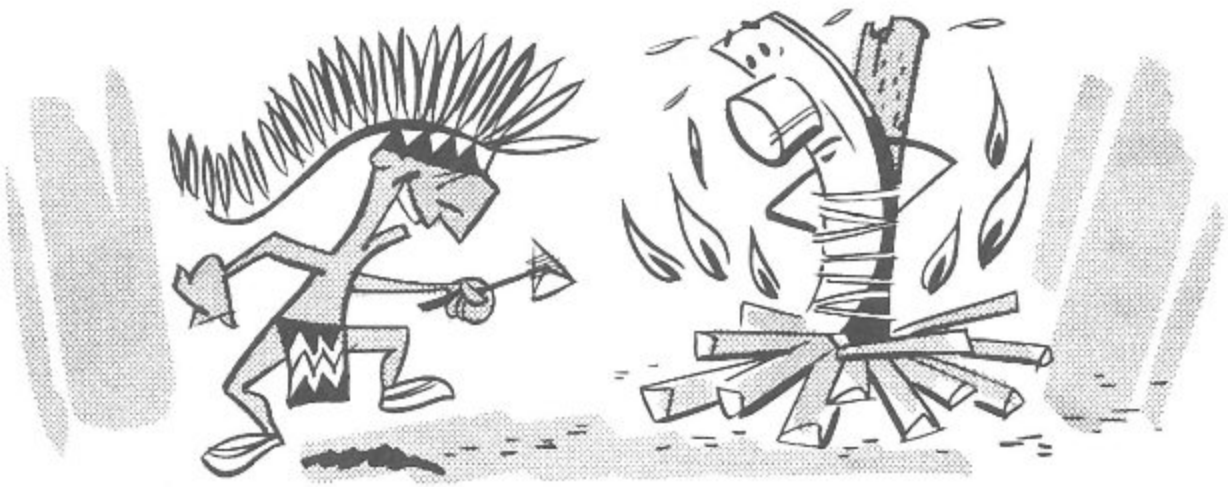


If the points are set too close, they will burn and pit. The different types of burning that take place can be clues to other corrections that should be made. Points burned *black*, for example, usually means lubricant got on the contact surfaces. This can happen if the cam surface or the felt in the center of the cam is excessively lubricated.

Points burned *blue* generally means excessive voltage. The voltage regulator is probably set too high, is damaged, or improperly adjusted. Naturally, the regulator should be tested and adjusted, or replaced if damaged.



BLUE (Excessive Voltage)...TEST VOLTAGE REGULATOR

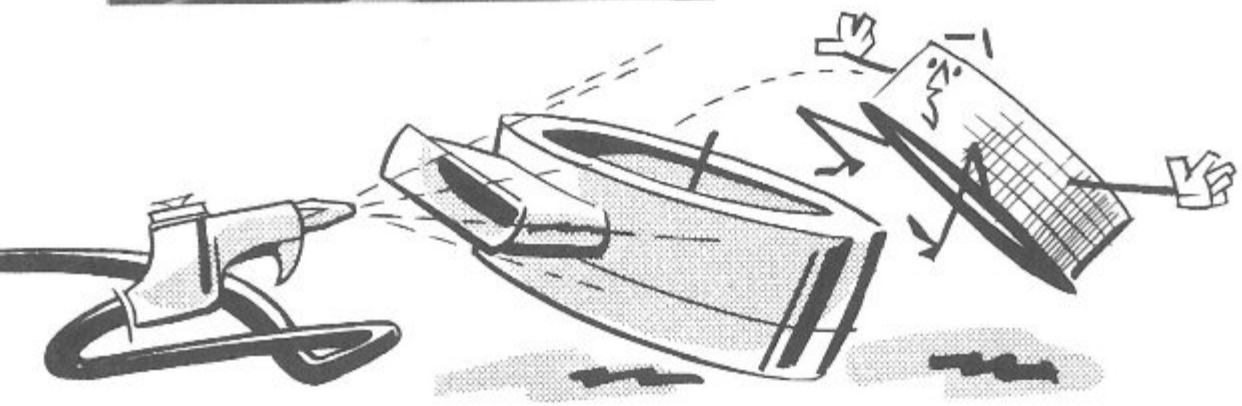


Remember to reset ignition timing after installing distributor points. Point gap, as you know, has a definite relation to ignition timing.

Air Cleaner. Another good extra tune-up step is thorough air cleaner service. It's one item often missed. The oil-bath cleaner should be serviced every 1000 miles. The filter element should be removed and swished around in kerosene. If there's a collection of dirt or sludge, the reservoir should be cleaned, also, and fresh oil added.

1000 MILES...CLEAN, ADD FRESH OIL

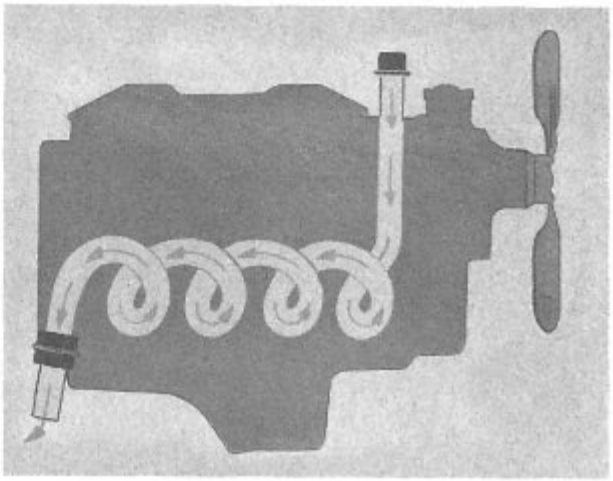
Inspect and clean the dry-type air cleaner every 5,000 miles and replace it every 15,000 miles. This goes for a car driven normally. Where driving conditions are more severe, the element should be cleaned and replaced more frequently.



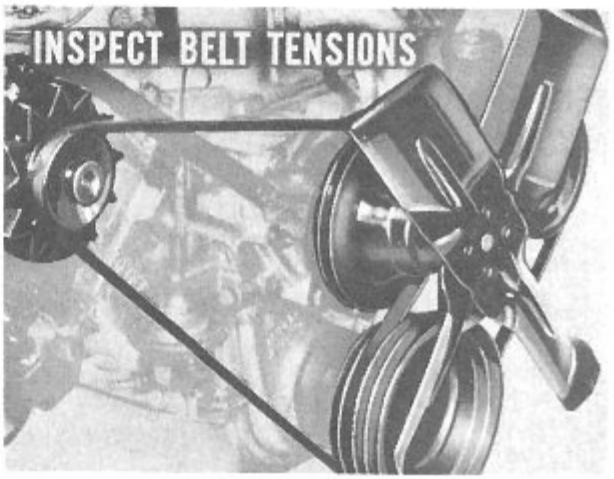
When you clean the dry-type cleaner element, blow the dirt out with compressed air. Hold the nozzle inside the element, but not too close to it or the filter element might be damaged. Tapping can damage the element before all the dirt is jarred out. Compressed air does a much better cleaning job and is easier on the element. Remember to wipe the dirt out of the filter chamber.

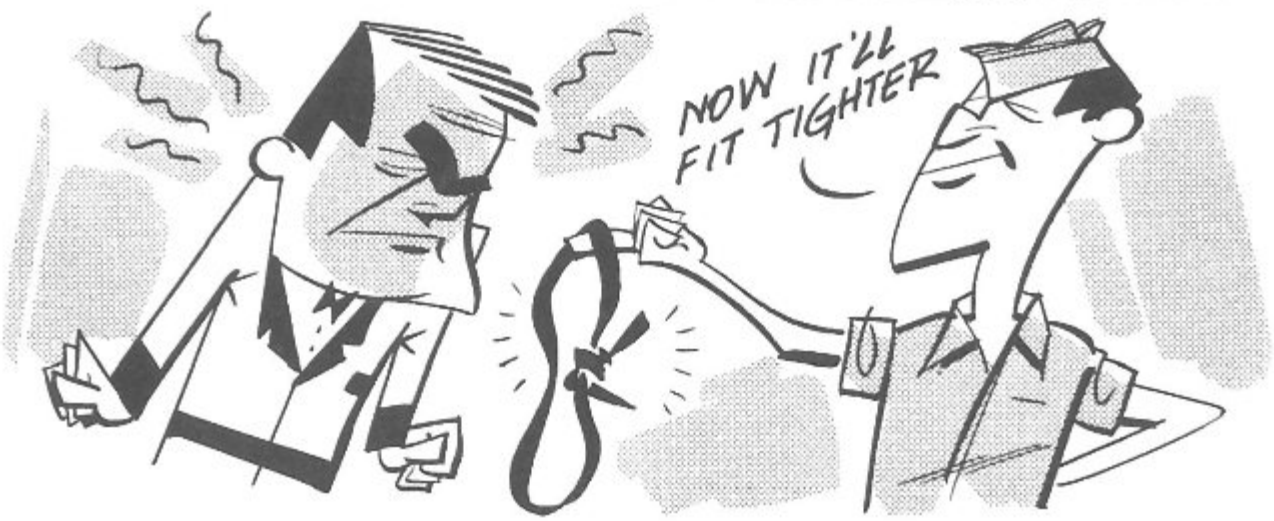
A partially clogged air cleaner will result in a carburetor mixture that's too rich. It will have the same effect as running with the choke valve partly closed. This not only wastes fuel, it also affects top-speed performance.

Crankcase Ventilation. The filter in the oil filler cap, and the filter in the crankcase ventilator pipe (if one is used) should also be cleaned. In addition, see that the ventilator pipe is free from any restricting dirt. Unless both ends of the ventilating system are open, the crankcase will sludge up and collect excessive acid.

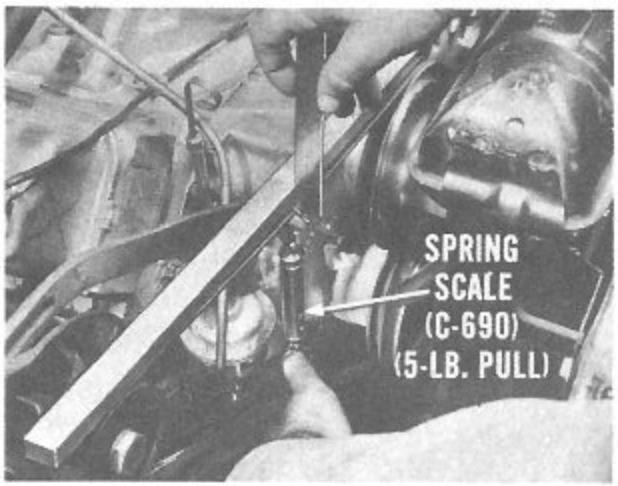


Drive Belts. Inspecting generator and power steering drive belt tensions also belongs on your "must do" list. On cars with power steering, a loose pump belt leads to erratic steering, noise, and even lack of assist on occasions. A belt that's frayed, or glazed due to slippage, should be replaced right away. Always tighten a drive belt to the tension specified for *used* belts. A belt is considered "used" once it has been operated for longer than 15 minutes.





Use a torque wrench or the deflection method to get proper belt tension adjustments. On 1955 and 1956 models, remember, you'll need the torque wrench adaptor (C-3379). Later models have a square hole in the pump mounting bracket that fits the torque wrench drive.



If you use the belt deflection method, be sure to use a spring scale and a five-pound pull. Leaning your thumb on the belt just won't work. For tension specifications that apply to the model you're working on, refer to the table below.

DRIVE BELT TENSIONS

	TORQUE (FT.-LBS.)	DEFLECTION (INCHES)
6-CYLINDER ENGINES		
Crankshaft-Water Pump-Generator Belt	20	5/32
Crankshaft-Water Pump-Power Steering	20	5/32
Water Pump-Generator	10	7/32
V-8 ENGINES		
Crankshaft-Water Pump-Generator	20 (15 on Dodge Coronet)	1/4
Crankshaft-Power Steering	55 (50 on Plymouth and Dodge Coronet)	3/16 (1/8 on Plymouth and Dodge Coronet)

NOTE: Refer to shop manuals for specifications on new belts, and for tension specifications that apply to the air-conditioning compressor and air suspension compressor drive belts.

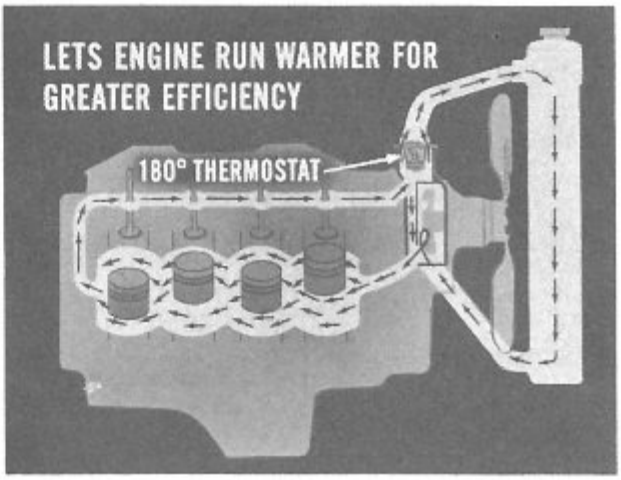
Cooling System. Antifreeze left over from winter must be drained. Discourage the practice of leaving it in the radiator and simply adding rust resistor. And when you drain antifreeze, be sure to push the temperature control lever to "HOT". That opens the water control valve and lets antifreeze drain from the heater core.

If the solution you drain from the cooling system is dirty or rust-colored, be sure to use Cooling System Cleaner (Part No. 1064580). Then, reverse-flush the cooling system.

Examine all of the rubber hoses to see if they've deteriorated and need to be replaced. If they are okay, add rust resistor (Part No. 680194) to the clean solution when you refill the cooling system.

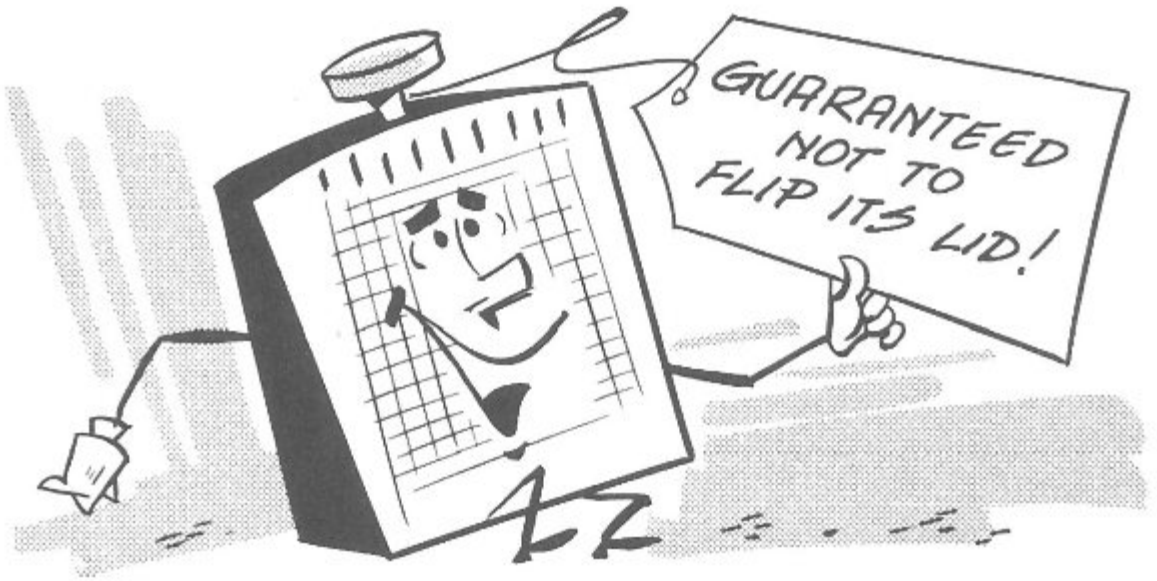
On air-conditioned cars, add one gallon of fresh, permanent-type antifreeze to the refill. That will protect the coolant in the heater core when the air conditioner is working.

All of our 1959 V-8 engines in the United States use a 180° thermostat. This thermostat should not be changed for summer operation. It's designed to let the engine run warmer for greater efficiency all the year around. Carburetion is better and fuel economy is at its peak.



But don't forget to inspect the pressure cap. If the cap loses its ability to maintain proper pressure, summer driving can cause a loss of water and the engine will overheat.

So test the pressure cap with a tester (C-3499) and cap adaptor. The cap should hold between 12 and 15 psi. If the car is equipped with air conditioning, the cap should hold at least 15 and not over 16 psi. If the cap fails this test, replace it.

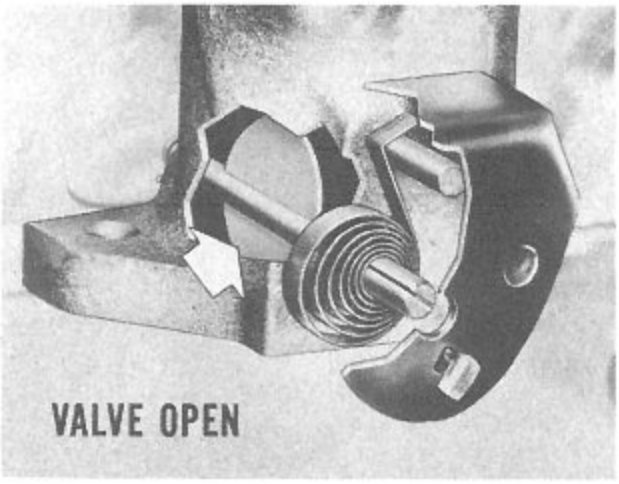


Use the same tester without the cap adaptor to pressure-test the cooling system. This will tell you whether the cylinder head gasket seals properly, and if there are any slow leaks at the connections, or in the heater core.

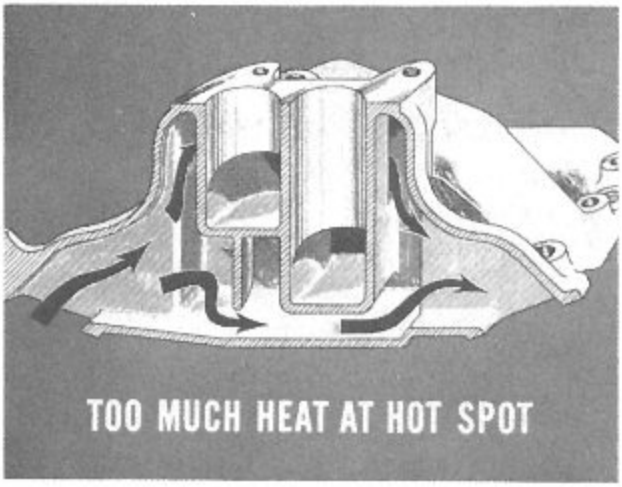
NOTE: Test the cooling system at a pressure 3 psi higher than cap pressure.

Manifold Heat Control Valve. Because the manifold heat control valve has such a direct bearing on engine performance as well as economy, it should be examined regularly as a part of every engine tune-up. The valve must work freely so it can help control temperature of the mixture that enters the cylinders. You can test this by hand in a couple of seconds.

If the valve sticks in its open position, hot gas will not be directed to the exhaust crossover passage and around the carburetor hot spot to pre-heat the mixture. If this happens, the engine will idle poorly, the choke will stay on too long and waste fuel.



If the valve sticks in its closed position, that upsets the air-fuel mixture in another way. The valve stuck closed sends too much heat to the carburetor hot spot. That overheats the mixture and interferes with proper combustion. It shows up in an owner report of no pick-up, poor acceleration, and the fact that high-speed performance is affected. There might be a stumble on acceleration, too. What happens is that the choke comes off too soon. Sometimes percolation takes place. In this case, the engine can stall and be hard to start again.

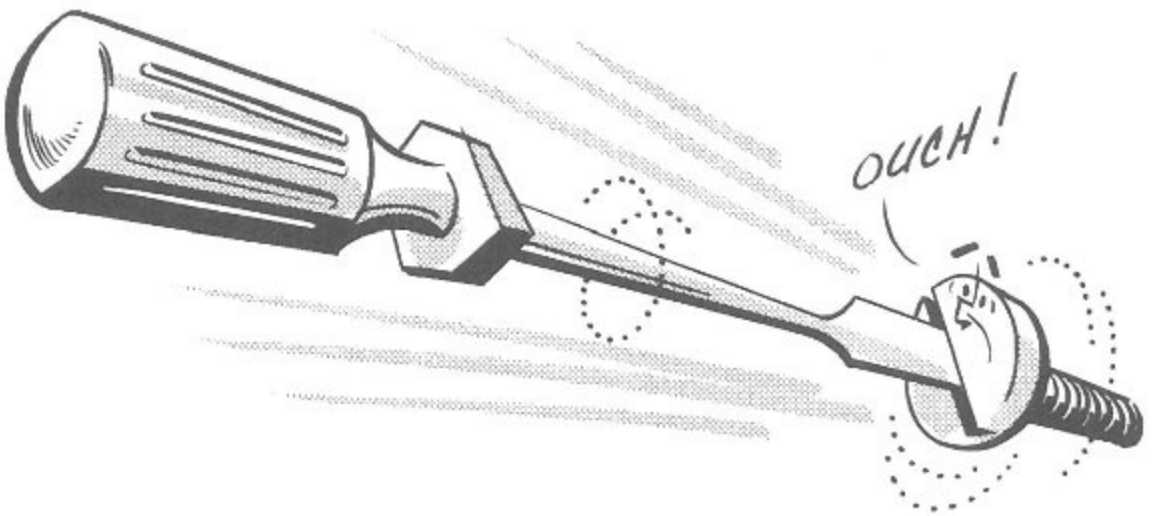


You can guard against the manifold heat control valve sticking by using solvent (Part No. 1879318) on the shaft every 1000 miles. Also, be sure that the thermostatic coil spring works properly.

Carburetor. One important thing to keep in mind is the tightness of carburetor air horn screws. Sometimes they work loose and air leaks develop. That, of course, leans out the mixture and spoils idle performance. If you didn't know those screws were loose, you'd tend to set the idle mixture screw on the rich side to compensate for the air leaks. As a result, economy would sure go out the window!

Air leaks can cause the throttle valve to open wider than necessary for a given speed during part and full throttle operation. It takes place automatically to try to make up for the over-lean mixture. A mixture too lean can also lead to burnt valves.

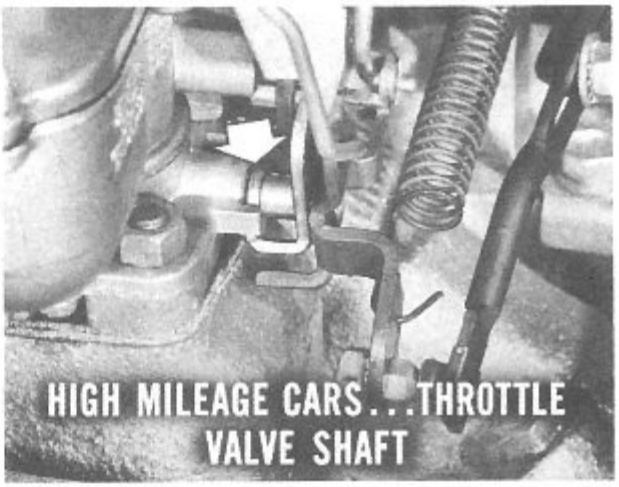
So whenever the air cleaner is removed for service, tighten the air horn screws as well as the mounting stud nuts. Don't overlook



tightening the intake manifold attaching bolts, either. Torque specifications for the manifold bolts are in the shop manuals.

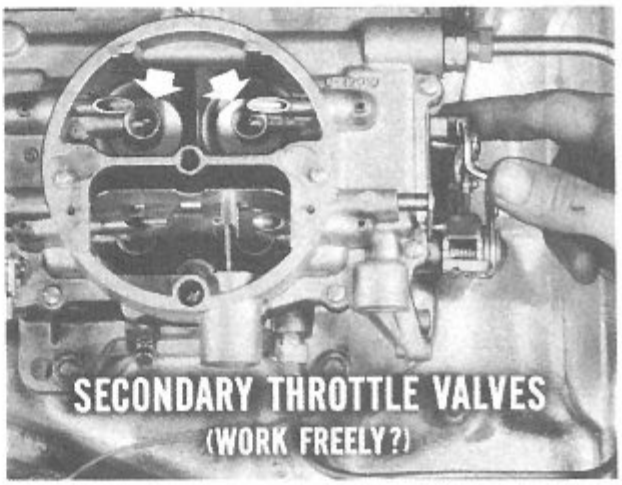
On high-mileage cars, watch for a possible air leak around the throttle valve shaft. Wear on the shaft, or in the throttle body—or

both—can cause an erratic idle condition. If you have a case where idle adjustment varies every time you open and close the throttle valve, inspect for excessive clearance at the shaft. You may have to replace the shaft, or throttle body and shaft assembly, to correct this condition.

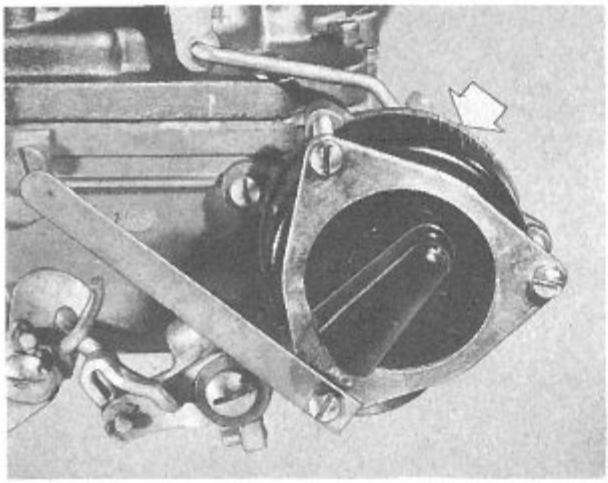


Leaks that interfere with vacuum-operated accessories, such as power brakes and the car heater can also affect engine operation. If the vacuum leak permits the engine to draw in air, it will lean out the carburetor mixture before it reaches the cylinder. That may mislead the technician into setting the carburetor too rich, which would increase fuel consumption.

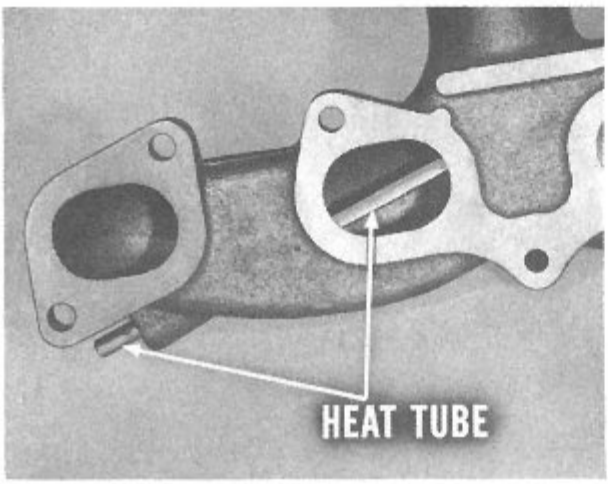
Secondary Throttle Valve Operation. On 4-barrel carburetors, inspect the secondary throttle valves to see that they work freely. These valves get more of a workout in summer. Unless they're free to move, both top-speed operation and fuel economy will be affected. If the secondary valves stick, look for gummy deposits on the valves and throttle body. Use solvent to get the carburetor thoroughly free of gum.



Fuel Economy and Hard Starting. If you get a report of excessive fuel consumption, along with hard starting, there are a number of things to inspect. Choke setting, float level, condition of the float needle valve and seat—all affect economy and starting. See that the float level is right, and that the floats don't leak or rub on the sides of the float chamber. Make sure the needle valve seats tightly.

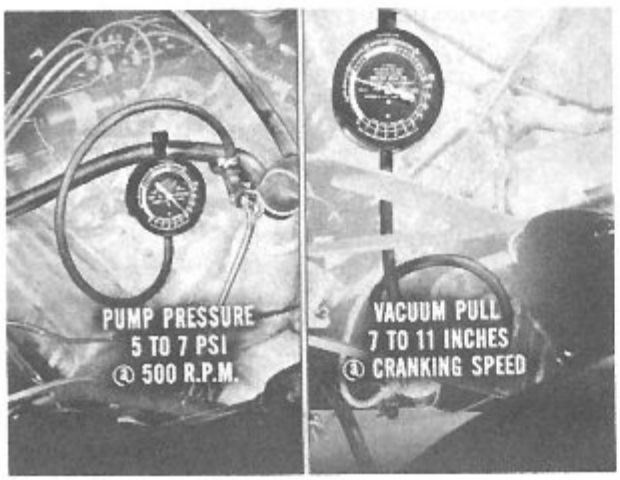


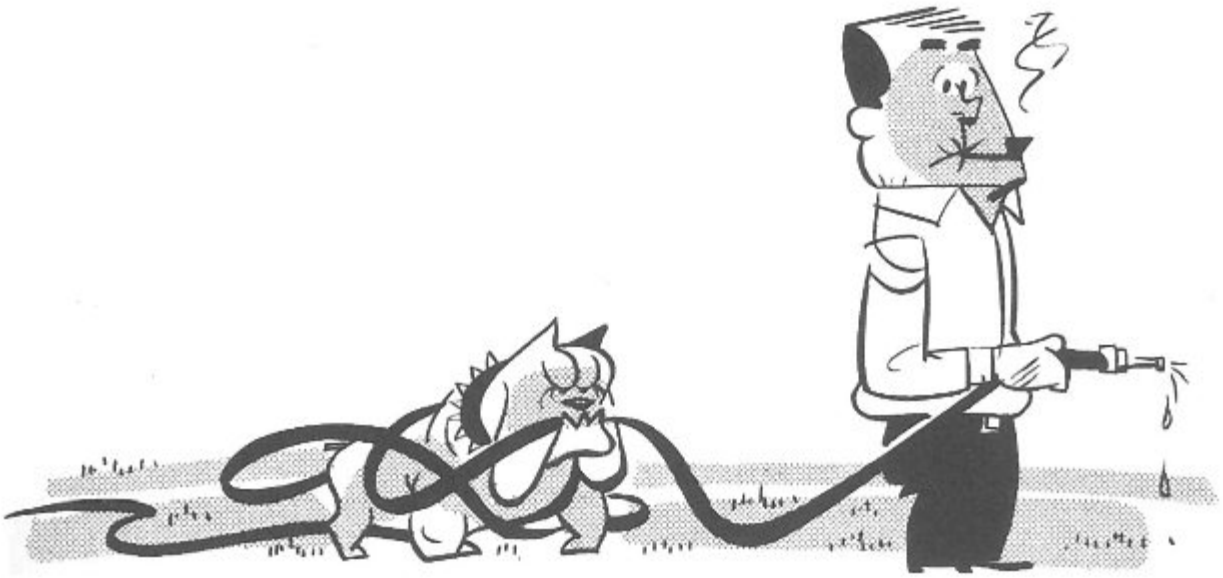
On cars with the integral-type choke, check the index mark on the housing to see that the thermostatic coil spring is properly adjusted.



If you find carbon or corrosion in the choke mechanism, the heat tube might be drawing exhaust gases from the manifold. That means the heat tube is cracked, burned through, or has a loose fit in the manifold. This calls for replacing the tube, or the manifold and tube as an assembly.

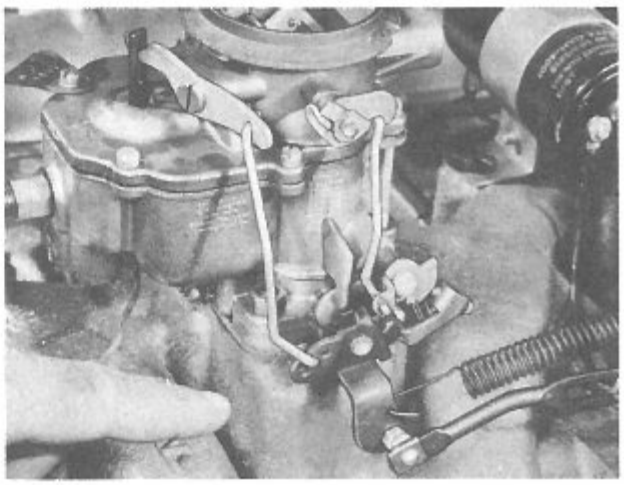
Poor Top-Speed Performance. Poor top-speed performance will also be affected by a float level that's too low, or by poor fuel pump performance. Best way to find out is to test the pump, once you're sure the float level is okay. Pump pressure should be 5 to 7 lbs. at 500 r.p.m. Vacuum pull should be 7 to 11 inches of mercury at cranking speed. Fuel pump vacuum that's too low tends to starve the engine at higher speeds. Sometimes this condition isn't due to the fuel pump at all. The fuel line or hose might be kinked, which restricts the flow of fuel, especially at high speeds.





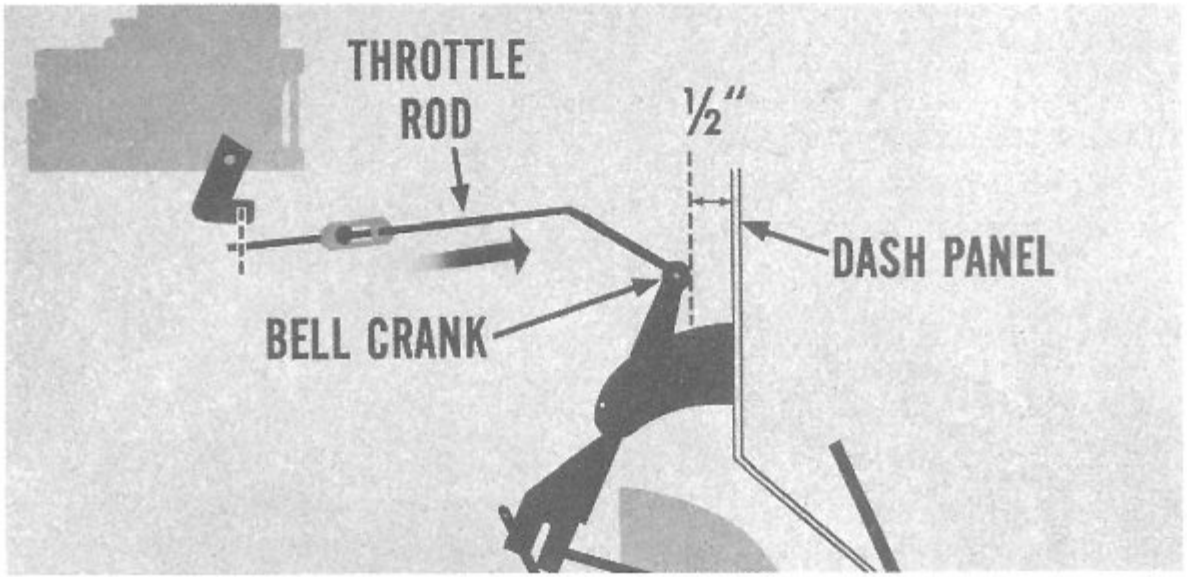
So, always examine the fuel line, the fuel hose, and hose connections. At the same time, be sure to service the fuel filter.

Accelerator Pump Position. Another thing to poke your nose into is accelerator pump position. The stroke is adjustable, as you know, but the middle position is the standard setting for all normal driving conditions. The long stroke should be used only when the car is driven at temperatures that are extremely cold—0° F. or colder. The short-stroke setting is for cars that drive under extremely hot conditions—90°F. or above—desert operation, for instance.



If the pump is left in the long-stroke position on a car that is driven normally, the engine's likely to stumble on acceleration. An overly-rich mixture is being shot into the cylinders. That surely isn't needed for summer driving. The extra charge, furthermore, adds up to a lot of wasted gas during a day's operation.

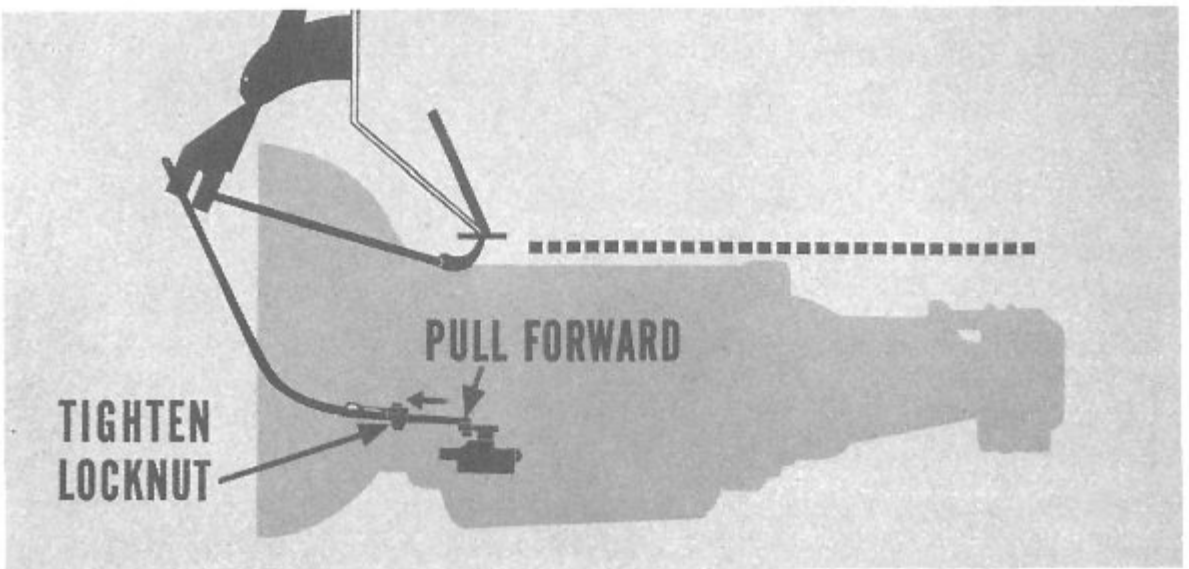
Transmission Throttle Linkage Adjustment. On cars equipped with automatic transmissions, it will pay to examine the throttle linkage adjustment.



To make this adjustment, the carburetor throttle lever must be in slow-idle position—off the fast-idle cam. Disconnect the throttle rod from the throttle lever at the carburetor.

Next, move the throttle rod rearward to the limit of its travel. There should be ½" clearance between the rear edge of the bell crank and the dash panel. With the bell crank in that position, adjust the length of the rod so the carburetor end will line up with the carburetor throttle lever without moving the lever from idle position.

If you don't have ½" clearance between the bell crank and the dash panel, leave the throttle rod disconnected at the carburetor. Make sure the engine is warmed up, and the carburetor adjusted to



give recommended idle speed. Loosen the throttle lever locknut at the transmission. Have a helper hold the bell crank lever so that the ½" dimension is correct. With the bell crank lever held, pull the transmission end of the bell-crank-to-throttle-lever linkage as far forward as you can, and tighten the locknut to secure the adjustment.

Then, with the bell-crank-lever-to-dash-panel clearance correct, adjust the length of the throttle rod so it can be connected to the carburetor throttle lever without moving the lever.

Don't forget to check the accelerator pedal position. You must be able to get a kickdown without compressing the floor mat. If necessary, you can adjust the length of the pedal-to-bell-crank rod to increase or decrease pedal travel.

A CLOSING WORD . . .

Service customers who enjoy better engine performance because of the more *thorough* tune-up work you do are naturally satisfied with your work. Since they'd like to stay that way, they're more inclined to bring their cars to you again when something else might need attention. What's more, they're bound to tell their friends and neighbors about the good work you do.

That keeps your current customers happy and helps you win new ones—the best ways to increase labor sales and keep your cash register humming. The summer tune-up tips in this reference book will help you reach both business-building goals. All you have to do is read the information over and apply it during every tune-up opportunity.

RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 139

When a Fury V-800 engine logs 12,000 miles or more, valve clearances should be inspected and reset if necessary—intake .010", exhaust .018". RIGHT 1 WRONG

The distributor-to-coil wire on all Chrysler Corporation-manufactured distributors should be the resistance-type marked "RADIO". RIGHT 2 WRONG

Make a voltage drop test to locate loose or corroded connections in the primary circuit. RIGHT 3 WRONG

When there's a voltage drop of more than .1 volt between the distributor side of the coil and ground, look for a poor connection, burned points, or poor ground. RIGHT 4 WRONG

If points are burned blue, the cause is usually excessive voltage due to a regulator that is set too high, or damaged or improperly adjusted. RIGHT 5 WRONG

Push the temperature control lever to "HOT" when you drain antifreeze to get the coolant out of the heater core. RIGHT 6 WRONG

Add one gallon of fresh, permanent-type antifreeze on air-conditioned cars to protect the heater core during summer operation. RIGHT 7 WRONG

The radiator pressure cap on non-air-conditioned cars should hold between 12 and 15 psi; it should hold at least 15 psi and not over 16 psi on air-conditioned cars. RIGHT 8 WRONG

Pressure-test the cooling system at 3 psi higher than cap pressure. RIGHT 9 WRONG

Hard starting and excessive fuel consumption can be caused by a faulty choke setting, improper float level, or faulty needle valve and seat. RIGHT 10 WRONG

Litho in U.S.A.