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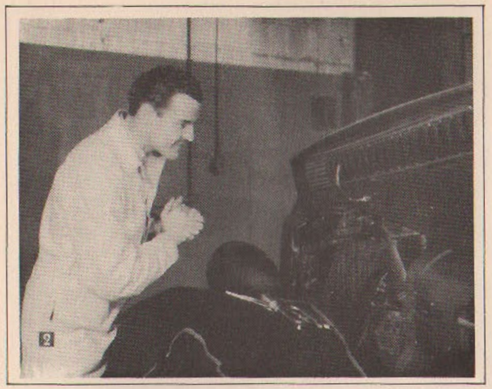
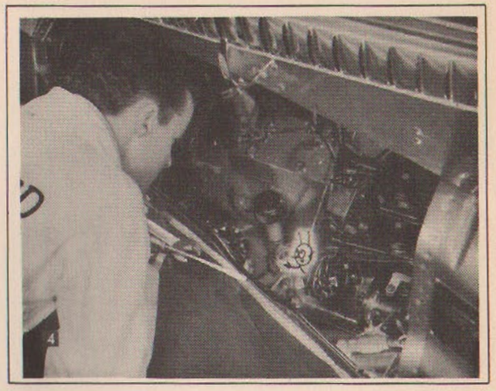
PACKARD MOTOR CAR COMPANY - DETROIT



ROY: Well, I guess it must be in the carburetor. I'll just take the old pot off and give her the works.

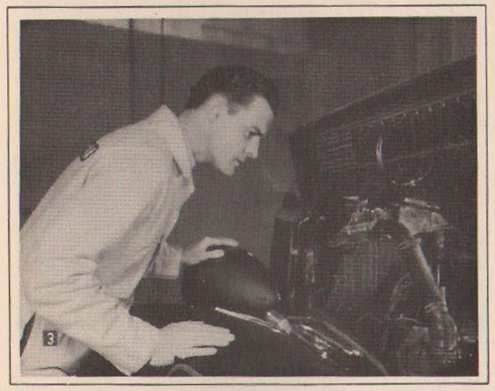
BUG: A lot of good it'll do you.

ROY: What's that?



BUG: Bugs to you. I'm that little devil performance complaint and I drive you "bugs" trying to find me.

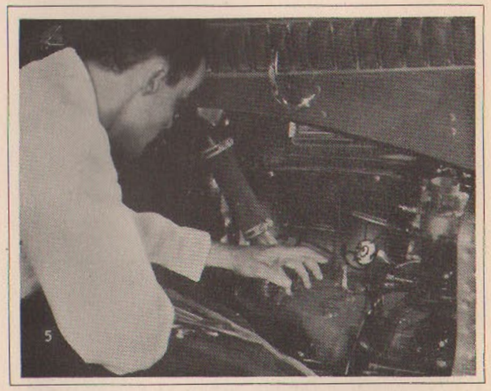
ROY: Ah ha! So that's it? Ignition, eh? Let me at you!



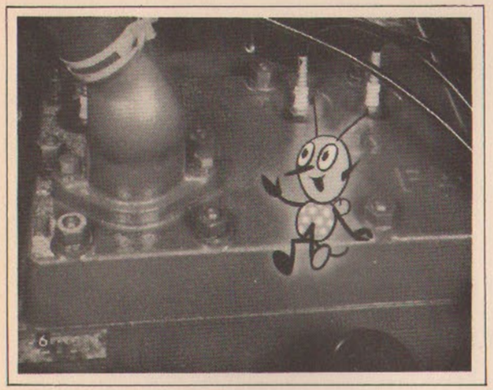
ROY: Who are you? Where are you?

BUG: I'm not in the carburetor this time, anyway. So you might as well save your time.

ROY: Say, where are you hiding--and who are you, anyway?



BUG: Foxed you that time, didn't I? Listen, Roy. You'll never get anywhere hopping from one place to another, looking for performance bugs. Use your head.

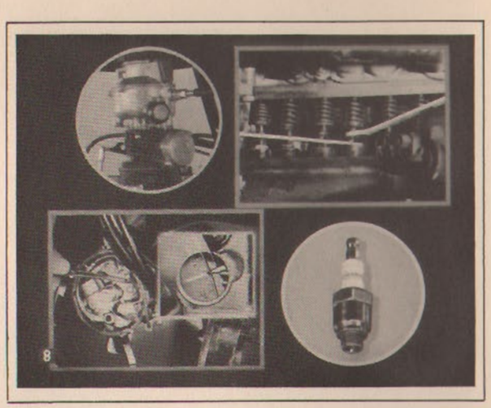


BUG: Reason out what is most likely to be causing a performance complaint. You'll never get rid of performance bugs by just trying to guess 'em out.

ROY: All right, I give up. How do I reason out the bug?

BUG: By just using common sense and your knowledge of how the various units of the car work to figure out what is most likely causing the trouble. Now, if I was looking for a hard-to-find bug--

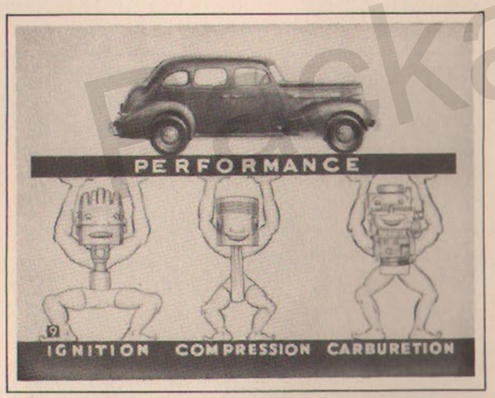
BUG: --first, I'd ride with the owner to see for myself just what kind of trouble the owner was having and under what conditions it happened.



BUG: Second, I'd check everything that might be causing it in logical order--and make accurate adjustments before going on to the next thing. That way a bug just doesn't have a chance.

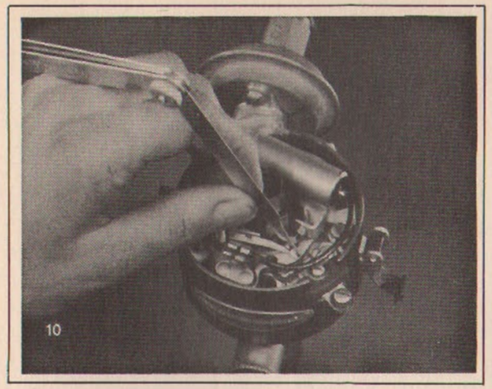
ROY: You've got me, Mr. Bug. How are you going to know where to start? Bugs are never in the same place twice.

BUG: Right. That's what makes it fun.



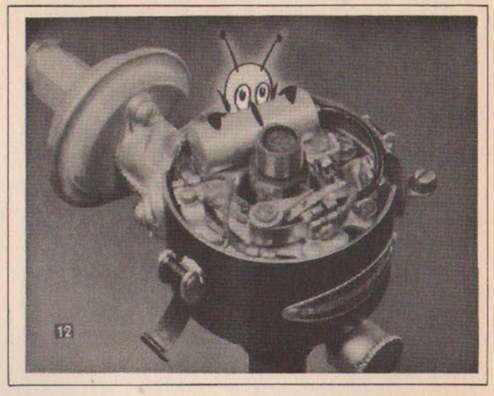
BUG: The way ignition, compression and carburetion are tied up together, a slight deviation from standard as a result of normal wear and dirt or carbon accumulation will upset performance. It may show up first in a number of ways; poor economy, poor idle, lack of acceleration and speed, or hard starting.

ROY: You're no help. Of course I give it an engine tune.

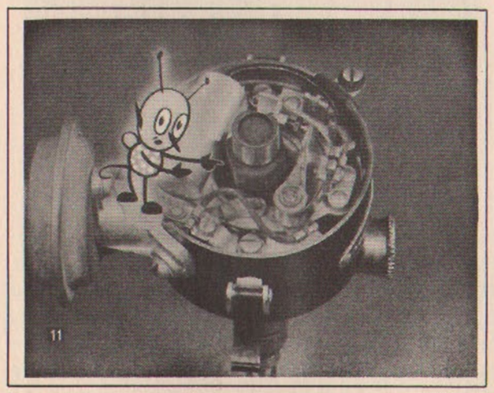


ROY: First, I check the distributor points. Clean and regap 'em, and, if they're pitted or burned, replace 'em with new ones. Anybody knows that.

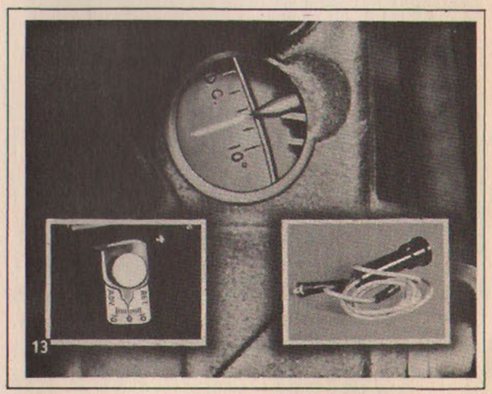
BUG: That's where I get a chance to fool you--



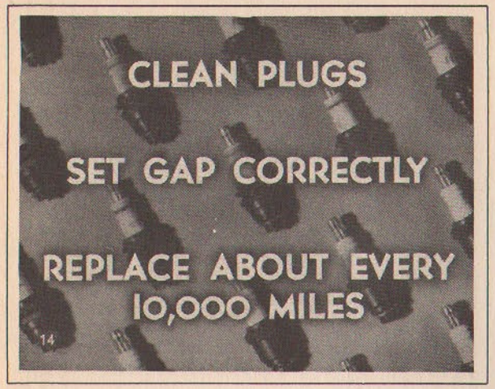
BUG: The condenser or the coil is a good place for me to hide. They'll give you plenty of trouble unless you check 'em everytime.



BUG: A whip in the distributor cam from worn bearings 'll give you a high speed miss you'd have a hard time finding. And be sure the points are parallel and seat squarely.



ROY: Yes, and the timing's gotta be right--I set it to standard or hand tailored--you know, a little faster or slower according to the engine.



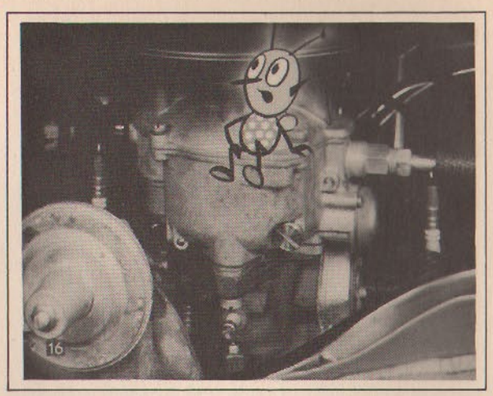
ROY: And, of course, the spark plugs have to be cleaned and the gap set.

BUG: That's right, but don't stop there. Inspect them carefully for broken or cracked porcelains that might short out. You know old plugs waste gasoline. Recommend new plugs every ten thousand miles.

BUG: Keep the outside of the porcelains clean. Dirt collects even on new plugs. and causes them to short in damp weather. Spark plug covers keep the porcelains clean and dry.

ROY: But we're going through an engine tune. Usually the owner has some specific complaint.

BUG: All right.



BUG: Suppose it's low mileage. What would you do?

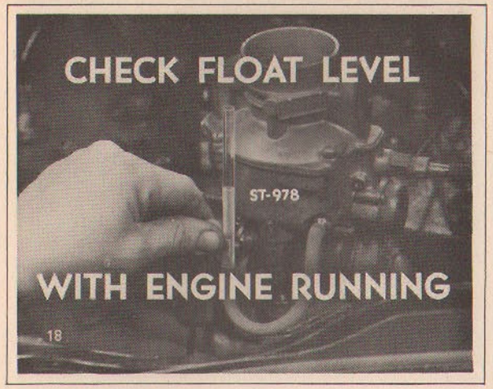
ROY: Change to leaner jets.

BUG: Bugs to you on that one! Too many things affect gasoline economy for you to start working on the carburetor without making some definite checks.

BUG: Your first job is to find out the actual mileage the car is giving by testing it with a mileage tester. And take the owner along. Maybe the owner is kidding himself about the mileage he's getting. You've got to have the facts.

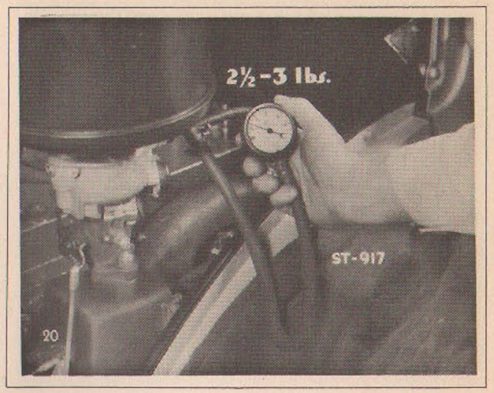
ROY: And then what do you do?

BUG: You start with the complete tune-up.

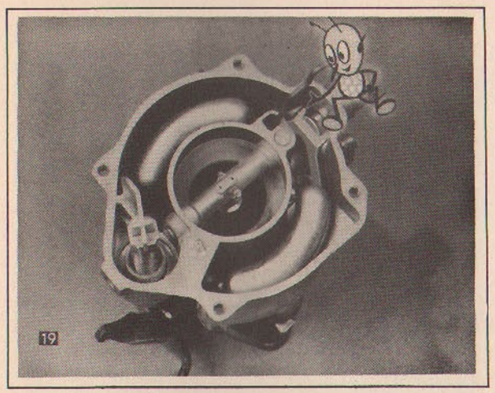


BUG: When you get to the carburetor, check the float level and be sure to do it with the engine running. That's the only way you get an accurate setting.

ROY: I know. Another thing--

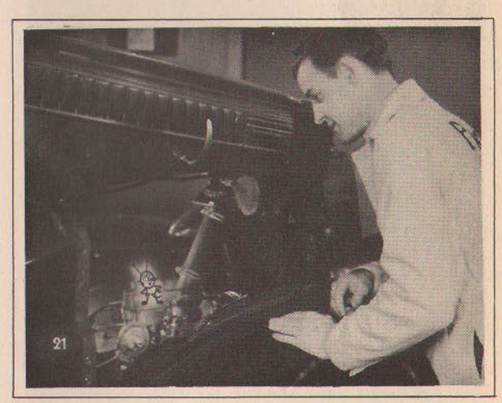


BUG: The pressure should be two and a half to three pounds at idle. If it's high, the excessive pressure may force the needle off its seat. That makes a rich mixture that upsets the idle and economy. If the pressure's extremely high, it will cause flooding of the carburetor.



ROY: --see that the float moves freely and doesn't bind on the hinge or strike the edge of the bowl to prevent its closing the needle valve.

BUG: And, if a moderate amount of adjusting doesn't correct the level, check the fuel pump pressure.



BUG: Now if it's a case of rich idle that acts like over-choking--

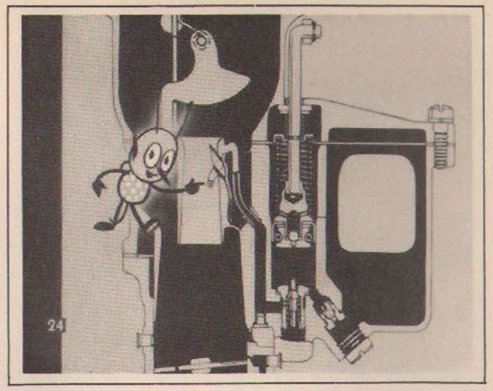
ROY: I know--it isn't the choke at all.

BUG: Well, it might be. But that isn't the only place to look. Watch me--

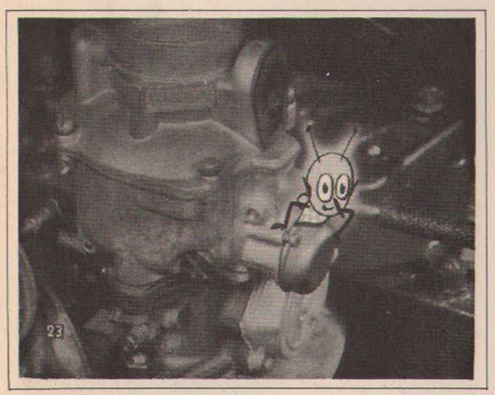
ROY: Hey, Bug! Where did you go? Don't run away so fast.

BUG: Here I am.

ROY: Where? You must think I'm a magician, the way you vanish.



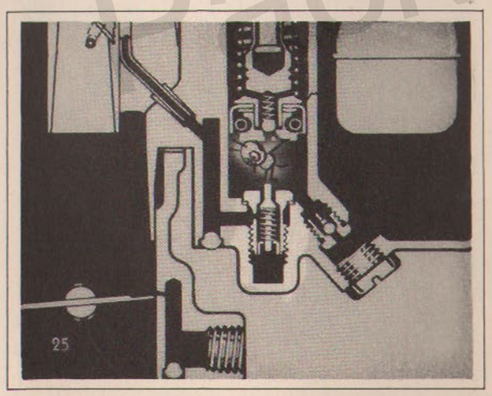
BUG: On the Stromberg, look down in the throat of the carburetor. If any gas comes from the downward turned discharge nozzle at less than seventy miles per hour, it's a sign the economizer valve is leaking.



BUG: I'm right here in the economizer valve--snug as a bug in a rug.

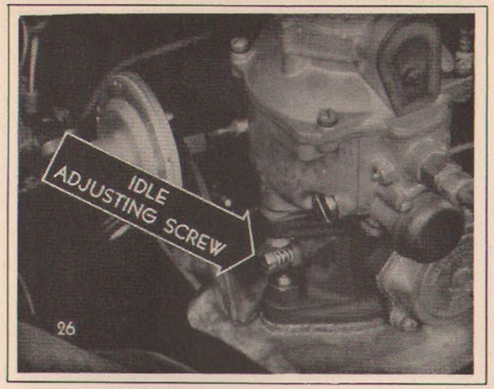
ROY: How you do get around. That's a funny place to find you.

BUG: Not so bad, as long as you've decided you're getting too rich a mixture at idle speed. It's a good place to look.

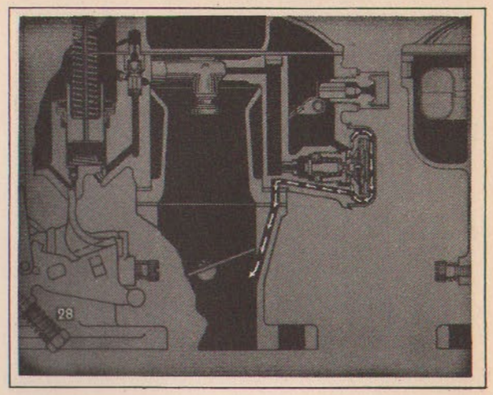


BUG: A little dirt or gum under the valve will stick it and cause a leak that will increase gasoline consumption.

ROY: Yeah, I know--

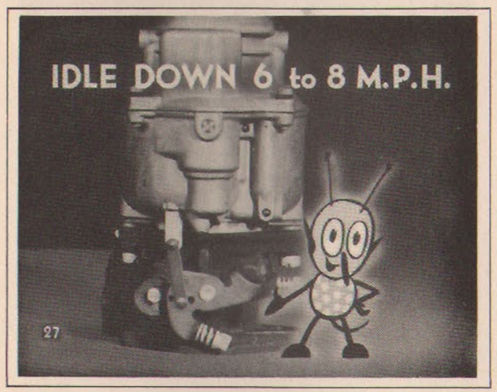


ROY: And there's an easier check on the Chandler-Groves. With the engine warmed up and idling, turn the idle adjusting screw all the way in. The engine will continue to idle if the economizer valve is leaking.

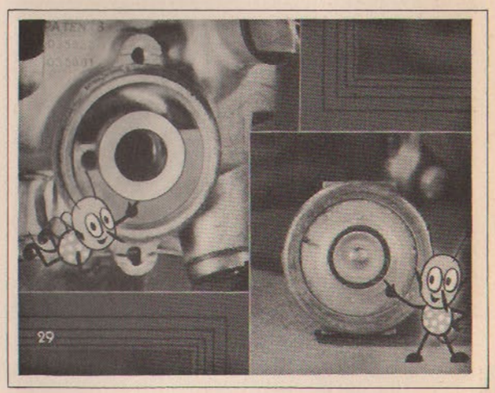


BUG: If gas leaks into the cap, the vacuum draws it into the carburetor throat and the engine will run even though the idle needle is closed tight.

ROY: Yeah, sometimes the lead washer on the earlier models takes a "set" letting the valve loosen up.

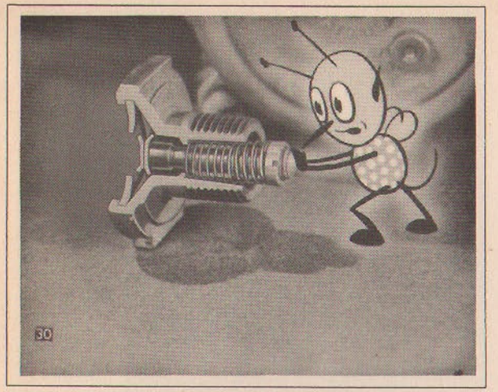


BUG: That's right, Roy. But that test won't work if the engine is idling too fast--say, ten miles or more--so, be sure the idle speed is six to eight miles an hour.

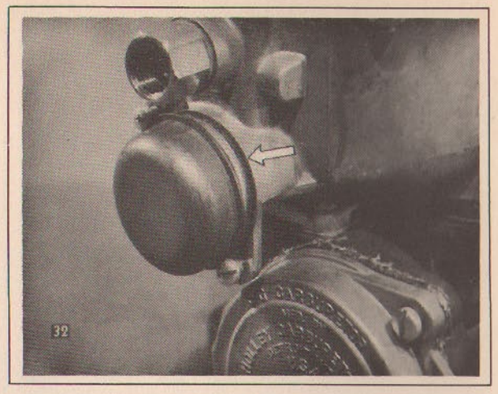


ROY: I always take out the economizer valve and inspect the washer. And, I look at the fabric head for cracks that might let gasoline through.

BUG: You're right. But that's not the only place gas can leak.

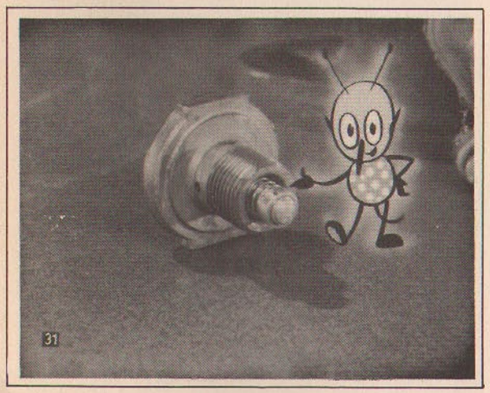


BUG: If gas leaks past the needle valve seat, the idle adjustment test won't show it up, but you'll still get a rich mixture that wastes gasoline. So, check the action of the valve by pushing on the brass pin to see that the needle is not stuck.



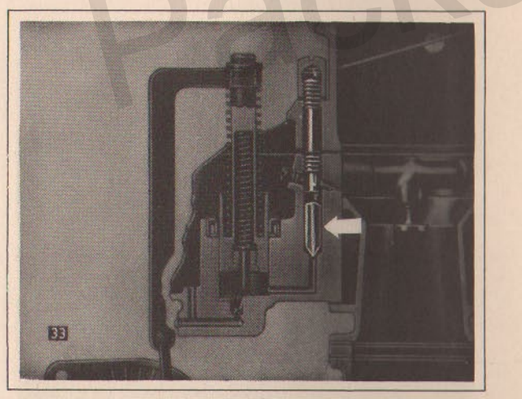
ROY: --if this little economizer valve cap gasket isn't tight, air leaks in and reduces the vacuum pull on the diaphragm. It causes the valve to open sooner and so increases gasoline consumption. If the leak is bad it will upset the idle.

BUG: Right--you'd better put on a new gasket and be sure the cap is tight.

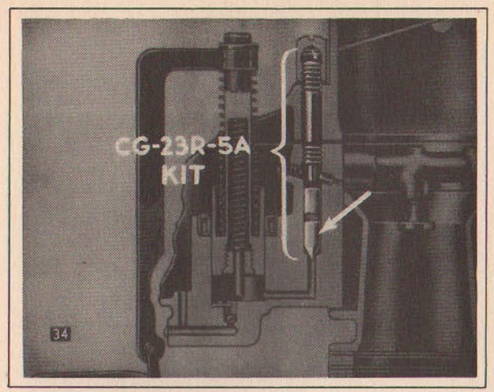


BUG: Inspect the spring to see if it is corroded or bent out of shape. Then put on a new lead washer and screw the valve in tight.

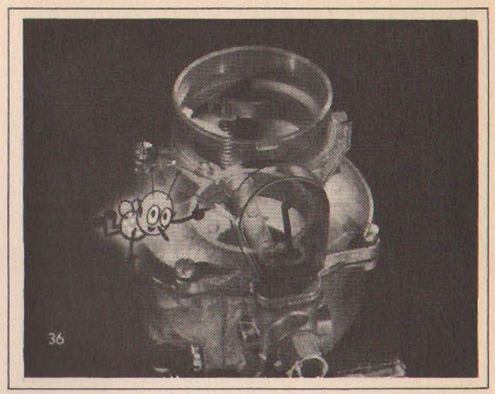
ROY: I always do. Another thing, too--



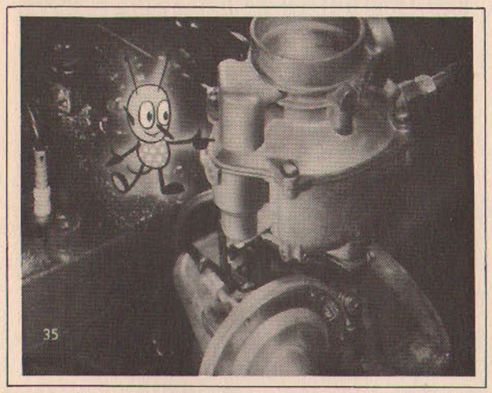
BUG: Cases of high speed gas consumption with Code One AA and One AB, Chandler-Groves carburetor may be caused by the accelerator pump discharge valve bouncing off its seat and letting fuel leak out.



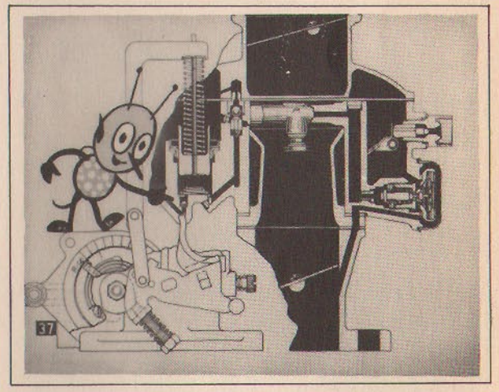
BUG: Later, One AC type carburetors have a two-piece, spring loaded valve that does not bounce. You can install them in earlier carburetors. When you make the change, use the kit, which includes the two-piece valve, a spring that goes between them and a new stud.



BUG: When you check the accelerator pump, make sure you've got fuel in the float chamber right up to level. Then look down the throat of the carburetor while you work the pump with the throttle lever. On the down stroke a solid stream of gas should be ejected through the discharge hole. If it sprays out, you'll know there's dirt in the hole.



BUG: Now, if you've got poor acceleration, your trouble is probably in the accelerator pump. Just a little dirt down there will plug the discharge and ruin acceleration.



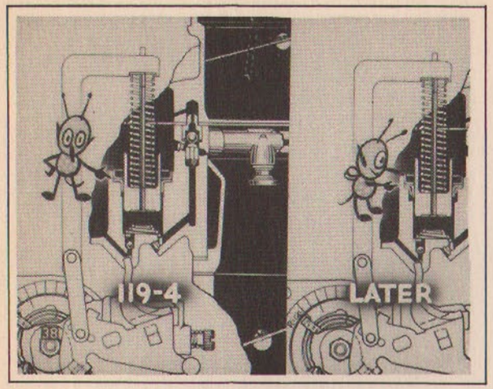
BUG: Now suppose the stream starts and then stops suddenly?

ROY: That means the ball checks are not seating on the compression stroke of the pump.

BUG: Correct. Now, Roy, I'll tip you off on something that gave some of the boys a headache--

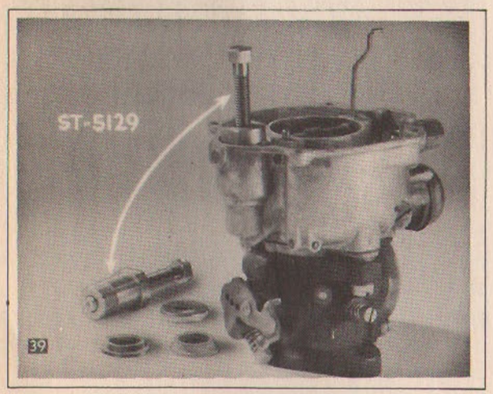
ROY: Hey! Don't hide 'til you've told me.

BUG: All right, this time.

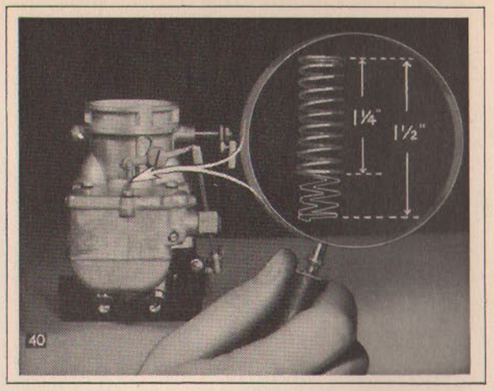


BUG: If the engine "stumbles" on acceleration, with the one nineteen dash four carburetor, it's probably because the leather on the accelerator pump is not seating.

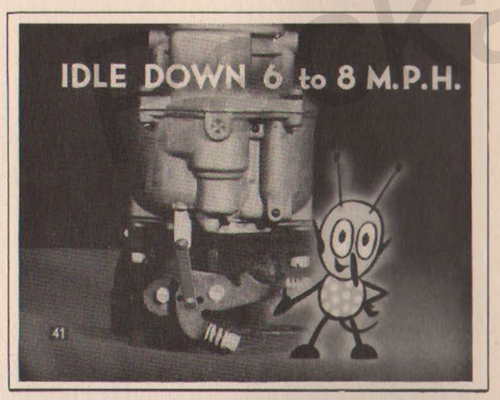
ROY: Yes. The later carburetors had a spring washer under the leather to hold it out against the plunger.



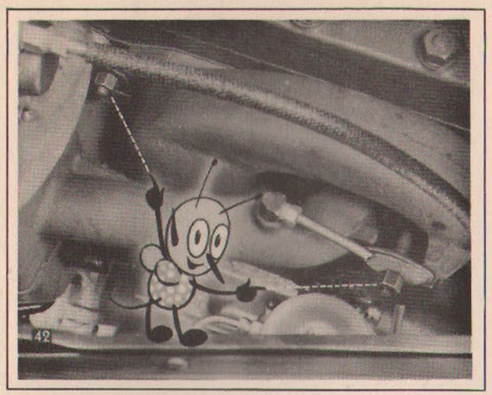
BUG: That's right, Roy, and you should use the special puller to pull the old leather out. Then put in the spring washer, a new leather and tap the metal cap washer in place.



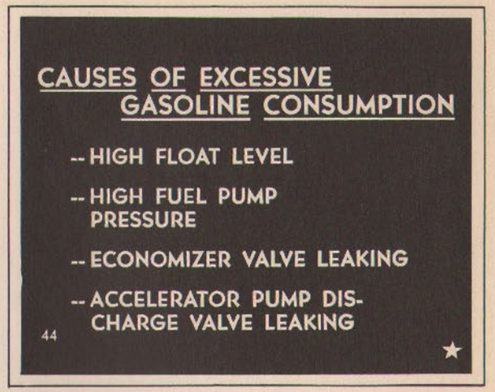
BUG: On the sixteen-o-one, with Stromberg carburetors, a low speed miss or "stumble" on acceleration may be due to a weak accelerator spring. That can be helped by stretching the pump spring, increasing the free length from one and one-quarter to one and one-half inches.



BUG: Don't idle the engine too slow. It won't be smooth. Set the idle between six and eight miles per hour. A rough idle isn't always caused by a mixture that's too rich, and is not always a sign of an economy complaint. You may have a rough idle without a drop in economy caused by too lean a mixture.

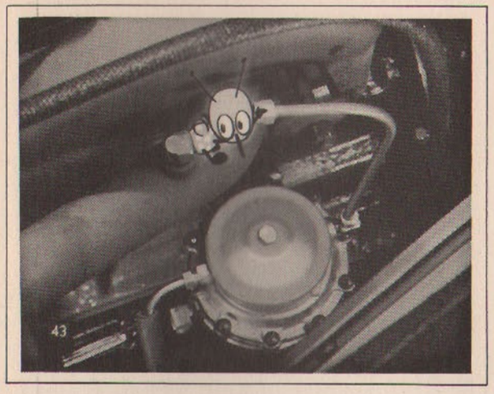


ROY: Sure, an air leak in the manifold gasket will give you a rough idle. A fella should always tighten the manifold nuts before he does any work on the carburetor. And then make sure that the carburetor bolts are tight and none of the body gaskets leak.

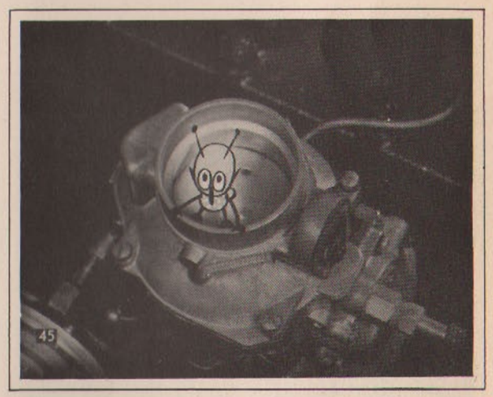


BUG: Speaking of idle, I'm getting tired. Let's take time out to add up the score.

BUG: Well, that's done. We've been talking about an excess flow of gasoline causing an over-rich mixture. Now, let's see what might restrict the flow of air to do the same thing.



BUG: Here's one that'll fool the best of 'em--a punctured vacuum pump diaphragm. It sure can upset your idle. That's easy to test though. Just disconnect the vacuum booster pump line from the manifold and hold your finger over the manifold connection. If the diaphragm is punctured the engine will smooth out.

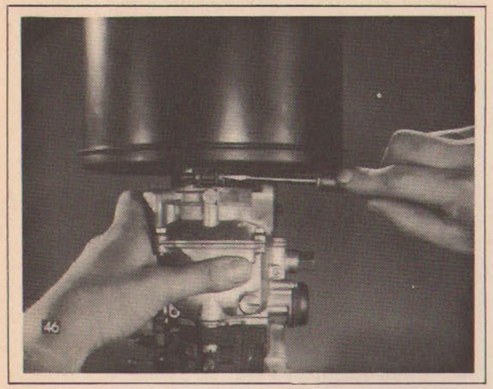


ROY: What! Again?

BUG: My favorite hiding place, Roy. Right in the choke valve. I'm stuck on it.

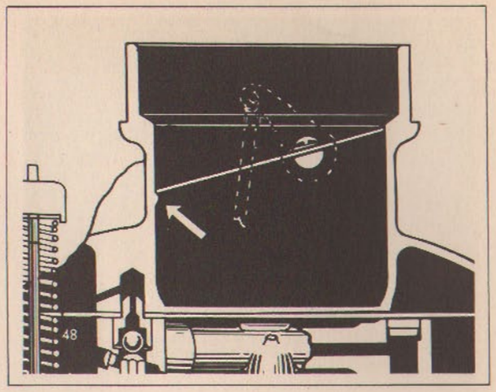
ROY: And I'm stuck with it.

BUG: Well, this is one time where a symptom of choking traces back to the choke.

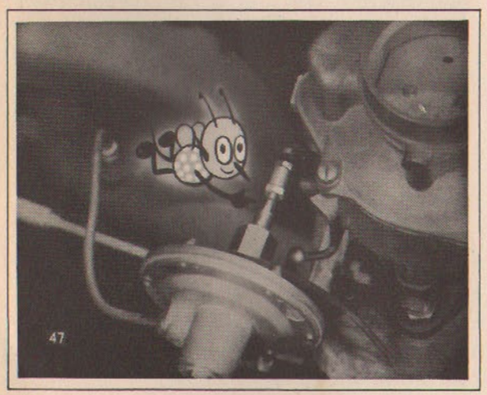


ROY: I know tightening the air cleaner clamp too much may cause the carburetor throat to contract--and stick the choke valve.

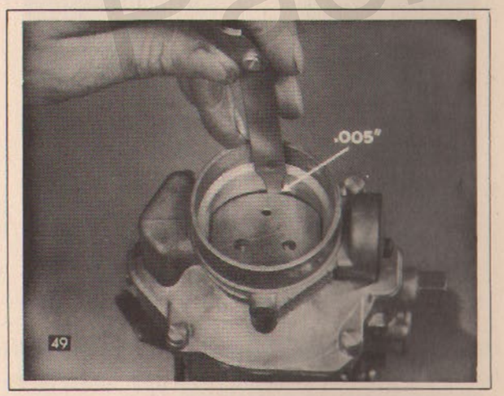
BUG: You're right. And that's not the only one that will trip you up--



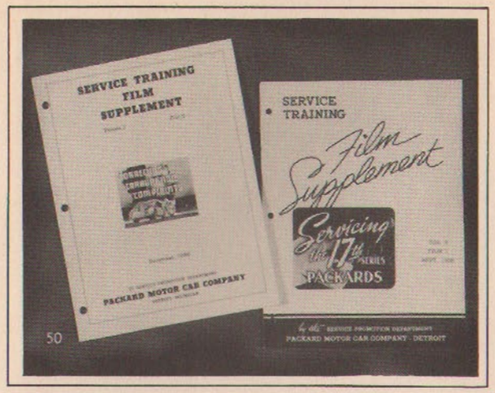
BUG: In real cold weather, the throat of the carburetor contracts against the choke valve which cuts in and forms a "lip" that'll hold the choke closed.



BUG: On the thirty-nine sixes, equipped with Econo-Drive, the throttle guard opens the throttle when the engine is turned off. That lets the thermostat close the choke as the engine cools.



BUG: Clean up the throat and file the choke valve. Make sure there's five thousandth clearance between the long side of the choke valve and the throat of the carburetor.



BUG: Make sure that all the choke linkage is free. You know how they work, don't you?

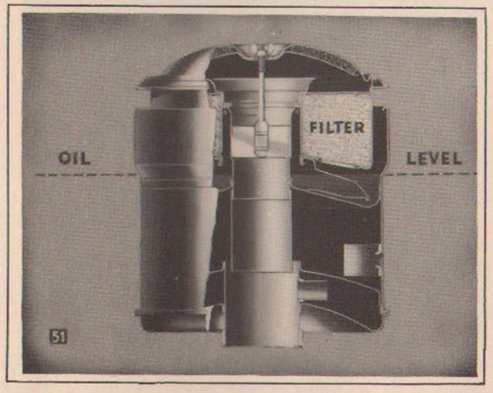
ROY: Sure. We got all the dope from "Correcting Carburetor Complaints" and "Servicing the Seventeenth Series Packards."

BUG: Yes, and don't forget to clean and oil the ball joints on the connecting linkage of the earlier Strombergs. If they're stiff and dirty, the choke can't work freely.

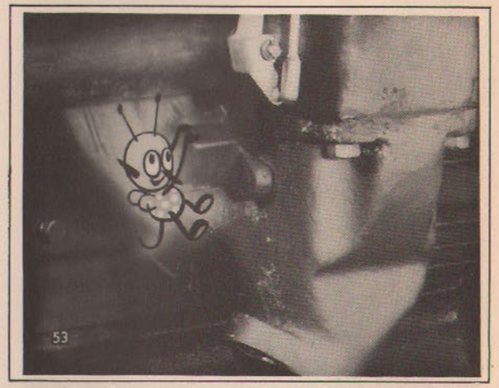
BUG: Hey! Roy--I've been hiding here for years and it's one of the best places I've found yet.

ROY: Huh? Well, I don't know where that is. I've looked about everyplace.

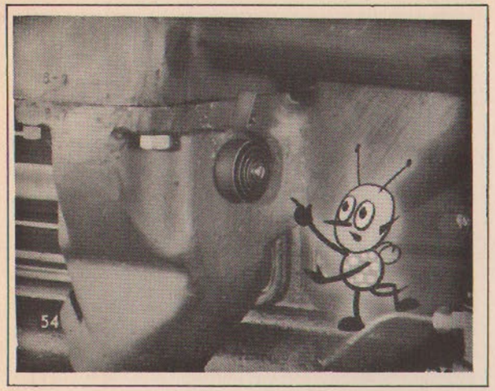
BUG: Ha, ha, ha--



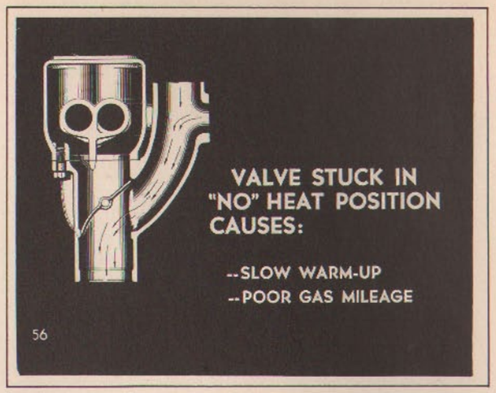
BUG: Check the air cleaner. If the filter is dirty or the oil level too high, it will restrict the flow of air and act like a choke. That causes lack of power and speed, a rich mixture and poor economy. It's a thing well worth checking early but a lot of fellows check everything else first.



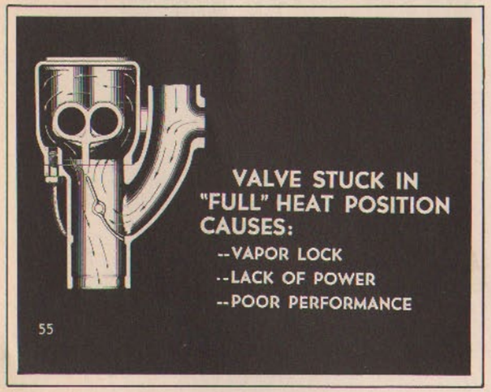
BUG: --ha, ha--down here in the manifold heat control valve. If I were you, I'd check the heat control valve on every car that comes in the shop. I've seen you fellows checking ignition, carburetion--and about everything else--for hours and all the time I was down here holding onto the old heat control valve. Ha, ha, ha.



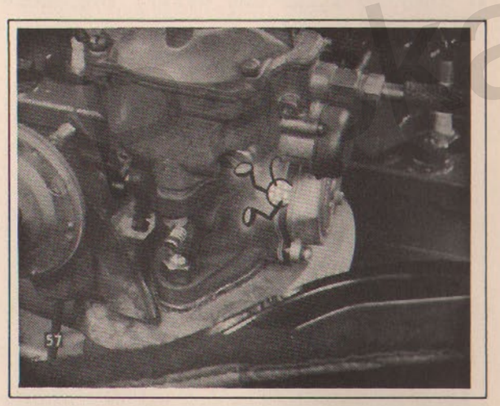
BUG: Make sure the heat control is working. I mean, see that the spring is wound up correctly and hooked. Be sure the valve isn't stuck in any position.



BUG: If the valve is stuck in the "no" heat position, the manifold does not get hot enough. So you get all around poor performance and especially a slow warm-up and poor gas mileage because the choke is slow in coming off.



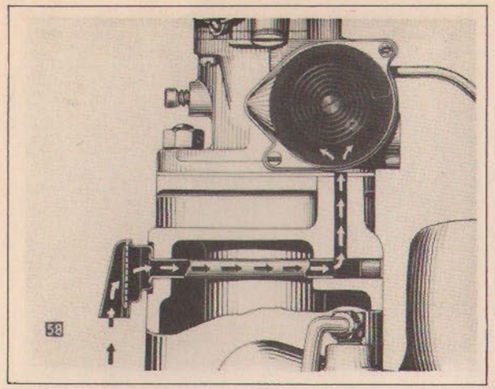
BUG: If the valve is stuck in the "full" heat position, the manifold gets so hot that it boils the gas right out of the carburetor. And, so you get vapor lock, lack of power, and poor performance.



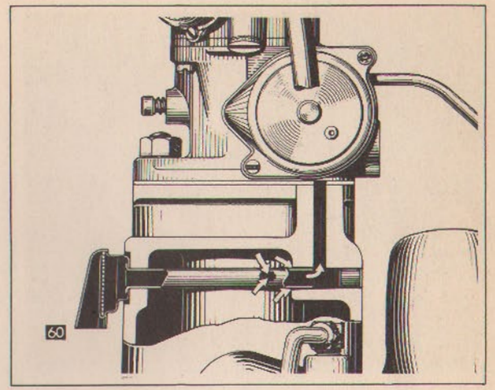
ROY: Come on outta there, bug! That's once you didn't fool me. I know that sometimes the thermostat keeps the choke from coming off.

BUG: Curses! Foiled again. Thought I had you tricked that time.

ROY: Nope. I've had experience on that.



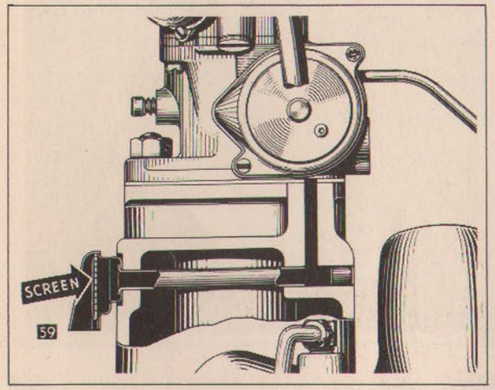
ROY: The thermostat is heated by air, drawn from a hot-spot in the manifold through a tube and circulated around the thermostat spring. If anything restricts the flow of air, the thermostat will be slow in warming up and releasing the choke.



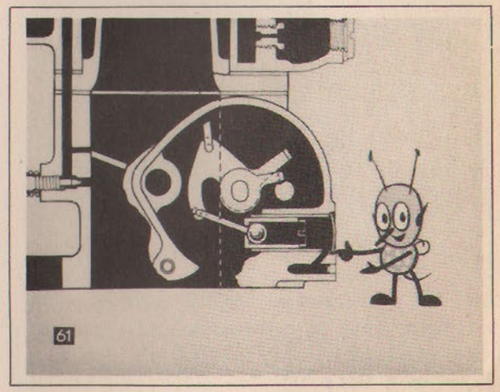
BUG: Don't forget that if the tube is loose or burned through, exhaust gases will get into the thermostat chamber.

ROY: Yeah, I know. It rusts up, and you've got to free up the vacuum piston and clean out the passages.

BUG: Exactly. All of 'em.



ROY: On nineteen thirty-seven six models, the screen over the mouth of the tube, in the hot-spot, may get clogged with dirt. It restricts the flow of air and causes a rich mixture and poor economy. In such a case, I merely discard the screen. The thirty-eight models didn't have the screen.

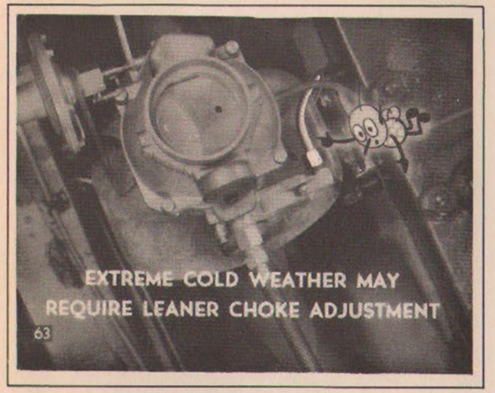


BUG: Remember to take out the Welch plug and clean out the passages behind the piston leading to the manifold. Too many times that one is overlooked.

ROY: Say, Bug! Here's a tuffy--

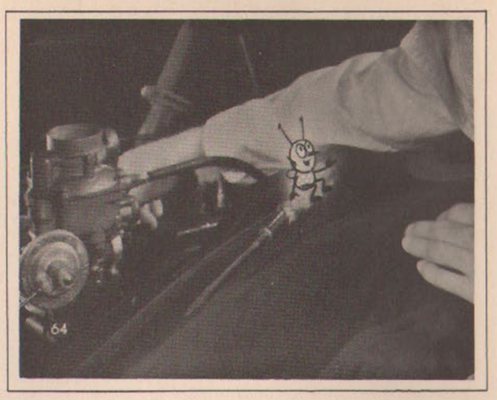
ROY: Why does the engine roll because of a rich mixture during the warm-up period? I mean, right in extremely cold weather when it's all right in moderate weather.

BUG: That is a "sticker," isn't it?



BUG: The reason is that the thermostat is connected by a tube to the hot-spot in the exhaust. In extreme cold weather, the air under the hood does not warm up as quickly as the engine and cools off the air in the tube. So, the thermostat is slow in coming off. If it's extreme cold weather, you may have to lean up the choke adjustment one and one-half to two graduations.

ROY: That's not so tough—

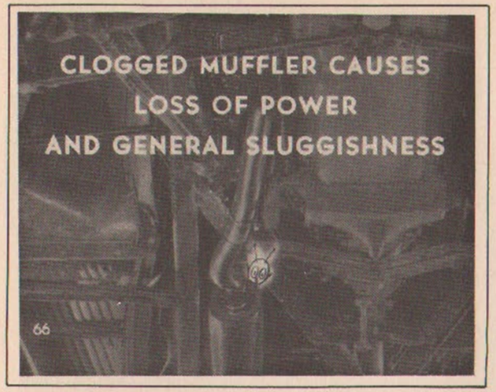


BUG: Oh, is that so? 'Bout time you think you've got me licked, I'm going to pop up missing and give you a whale of a surprise.

ROY: What're you doing down there? Trying to change the subject?

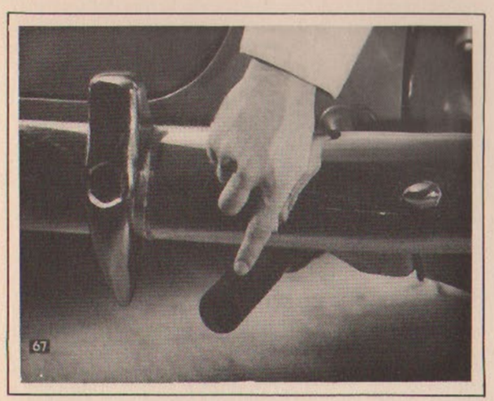
BUG: No, I'm just upsetting all your calculations. While you're chasing all around the carburetor and fuel pump looking for bugs, I'm taking it easy down here.

ROY: But--



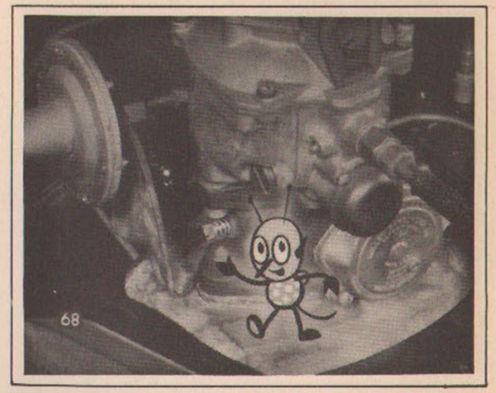
ROY: --you're on the muffler.

BUG: That's right. If it gets cluttered up with carbon and rust, the exhaust can't get through and it will cause back pressure. You'll notice it in lack of power and general sluggishness.



ROY: Include the tail pipe, too, Bug. Why, I know an owner who backed his car into a high curb and bent the tail pipe of his car almost shut. And did he come tearing into the service station with trouble popping out all over him.

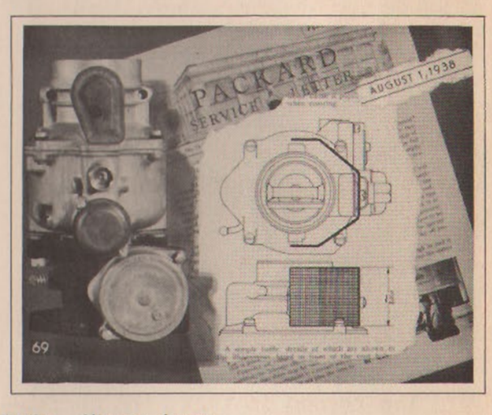
BUG: Well, Roy, here's another one that fools the boys--



BUG: Y'know, gasoline gets blamed for vapor lock a lot of times when the trouble's right in the carburetor or fuel pump.

ROY: Bragging again, huh? Don't tell me gasoline doesn't cause vapor lock.

BUG: No, but bugs in the carburetor may cause "cutting" out that seems like vapor lock.



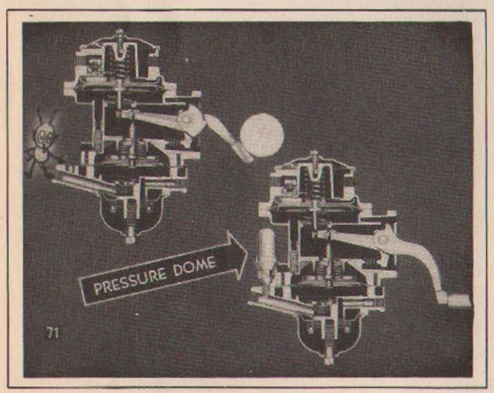
BUG: These bugs—

ROY: --and you do mean you.

BUG: No, Roy. I mean little green and yeller bugs--the kind that get plastered on your windshield. They get into your carburetor too and get caught in the jets, restricting the flow of gas causing the engine to cut out. So, clean 'em out and put on a screen.

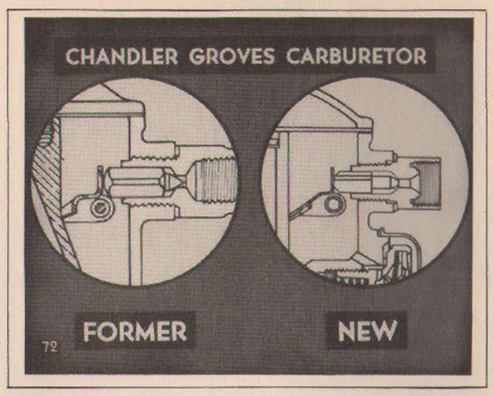
ROY: Yeah, that was in a Service Letter.

ROY: High speed miss, "starving" or running out of gas at high speed also acts like vapor lock. With the early Chandler-Groves, you might get a high speed miss or cut out at speeds over sixty miles an hour, especially in warm weather. It's due to fuel being drawn from the float bowl faster than it is supplied.



BUG: To overcome running out of fuel at high speed, on Junior cars, you can put on a "pressure dome" like the one on the super-eight fuel pump. The installation is simple. The pump body is already cored, so just drill through and tap it out, then screw in a super-eight pressure dome.

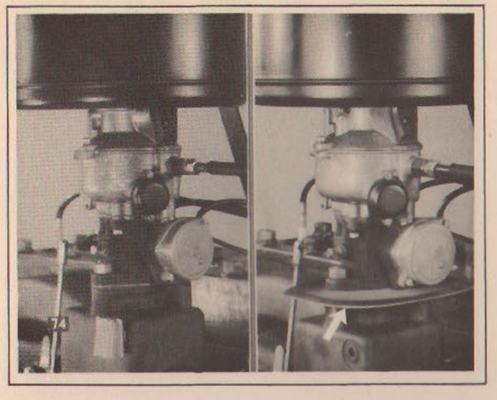
ROY: That's a good idea. I know about the early CG carburetors.



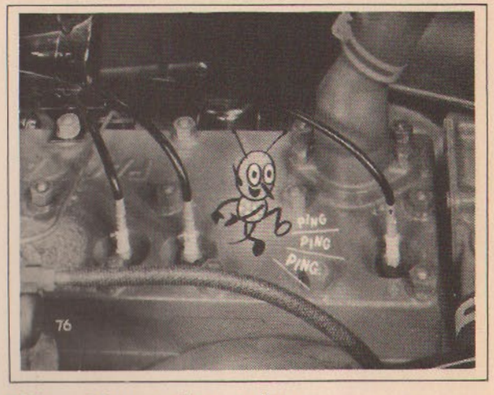
ROY: Starting with code one-nineteen dash three, an undercut needle-valve and larger seat was used. They can be installed on the earlier type carburetors to give more fuel at high speeds.

BUG: That's right. So you see, Roy, why I say use your head and figure things out first. Now let's see about vapor lock.

ROY: When the weather warms up suddenly, gas stations are usually caught with the more volatile winter grade gasoline. So, the first thing I check on a vapor lock job is the gasoline.



ROY: On the earlier sixes, when the car is standing, the heat from the manifold often heats the carburetor causing the gas to boil out of the bowl. Installing a sixteenth or seventeenth series heat shield under the carburetor--and by using insulating gaskets--it may be corrected.

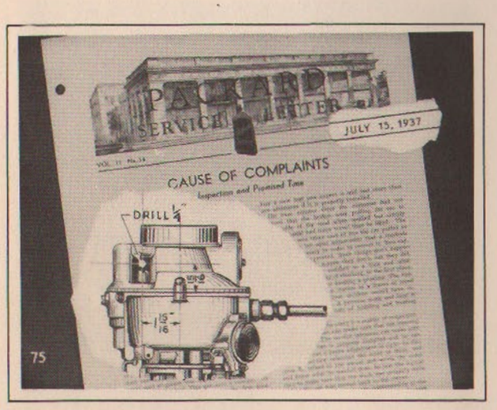


BUG: Ping, ping, ping--

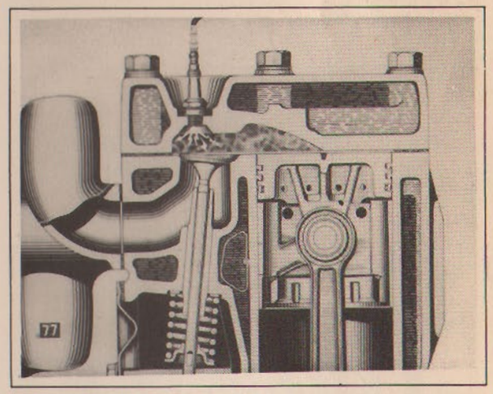
ROY: Stop that noise! What's it for, anyway?

BUG: I'm imitating detonation just to see if you'd know what to do.

ROY: I sure do know what to do. First, I'd wring your neck and then all I've got to do is to retard the spark and the detonation is gone.

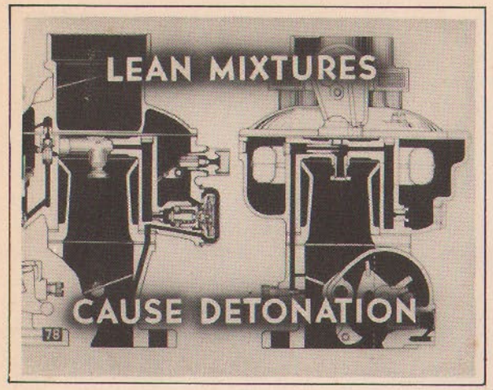


BUG: Yes, and sometimes you have to drill extra vents over the float bowl of the early One AA series Chandler-Groves carburetors. That lets the vapor out so it won't build up a pressure that forces the gasoline out of the bowl through the jets. Your Service Letter gives you details of where and how to drill.

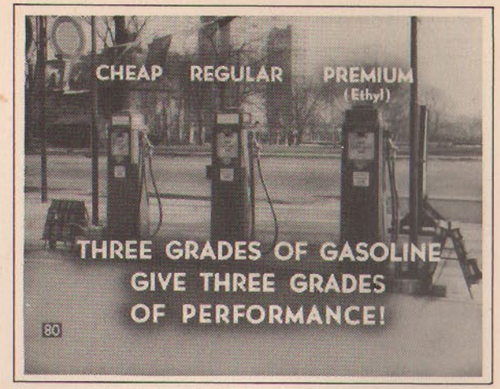


ROY: Nothing to it.

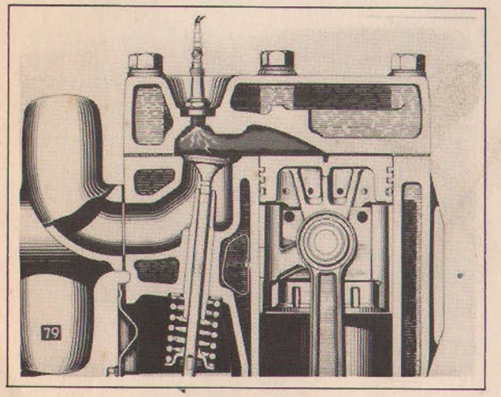
BUG: It's not gone. It's just covered up. And you're losing out on performance. Retarding the spark merely absorbs the force of detonation by letting the piston start its down stroke before the explosion occurs. That permits more space for the expansion of the gases, but the detonation still occurs.



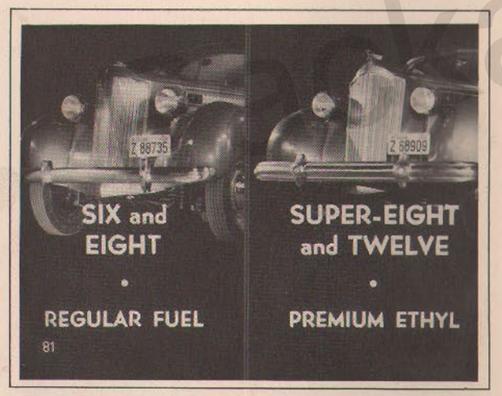
BUG: Now, a car should "ping" slightly on full acceleration if it's set right. Anything that causes too lean a mixture at any speed may cause detonation--a plugged economizer or any plugged passage, or if the main jets are too lean. If the carburetor idle adjustment is set too lean, it will ping up to around twenty-five or thirty miles an hour.



BUG: And on top of that, the octane rating of the gasoline will affect detonation. There are three grades of gasoline and they give three grades of performance. If the owner insists on using cheap fuel, you'll have to retard the spark and he'll have to be satisfied with third-grade performance.

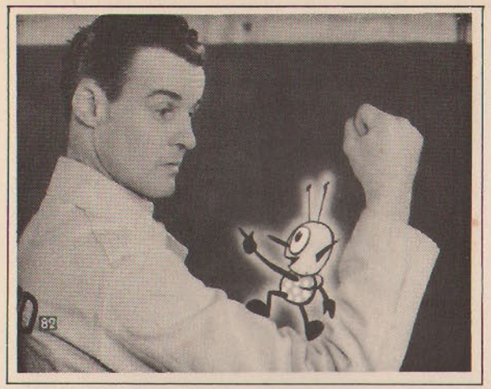


BUG: Of course, the likelihood of ping increases with increases in compression ratio. But don't forget that an accumulation of carbon increases compression. The higher the compression, the less carbon accumulation it takes to cause detonation.



BUG: The Six and Eight are intended to run on "regular" fuel and the Super-Eight and Twelve are intended to run on premium Ethyl. If the Six and Eight owner will use premium fuel, you can give him a little more spark advance and a little more performance.

BUG: Okay, Roy. That's about all I can tell you.

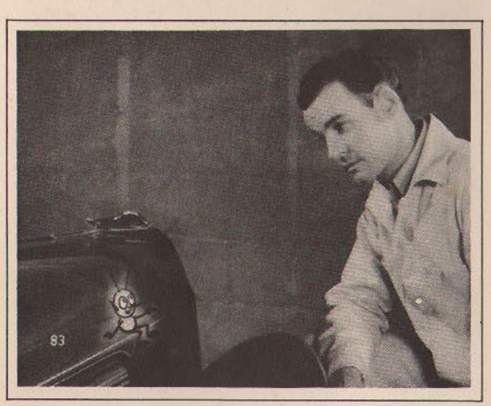


BUG: Of course, I'll be finding new and different places to hide, but as long as you're using your head instead of your knuckles, you'll give me a run for my money--maybe.

ROY: It's a pipe.

BUG: Oh, yeah?

ROY: I'll get you. After I ride with the owner to see for myself what's happening and after I make a thorough diagnosis, and then check one thing at a time, in logical order, I'll get you--and no two ways about it.



BUG: About time you get to looking for some new or different complaint, you'll forget what I've told you and start jumping at conclusions again. And I'll still be as snug as a bug in a rug.

ROY: Not a chance, Buggy-wuggy.

LITHO IN U. S. A.