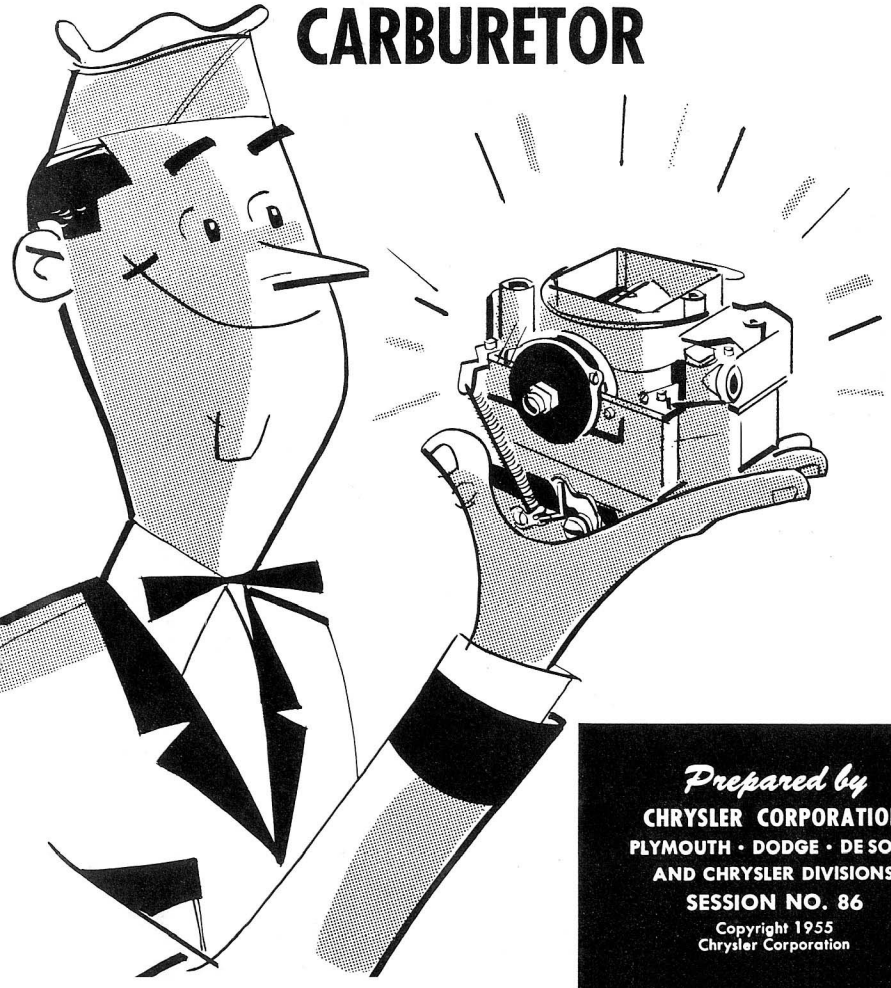
SERVICE REFERENCE BOOK

THE FOUR-BARREL CARBURETOR



Prepared by

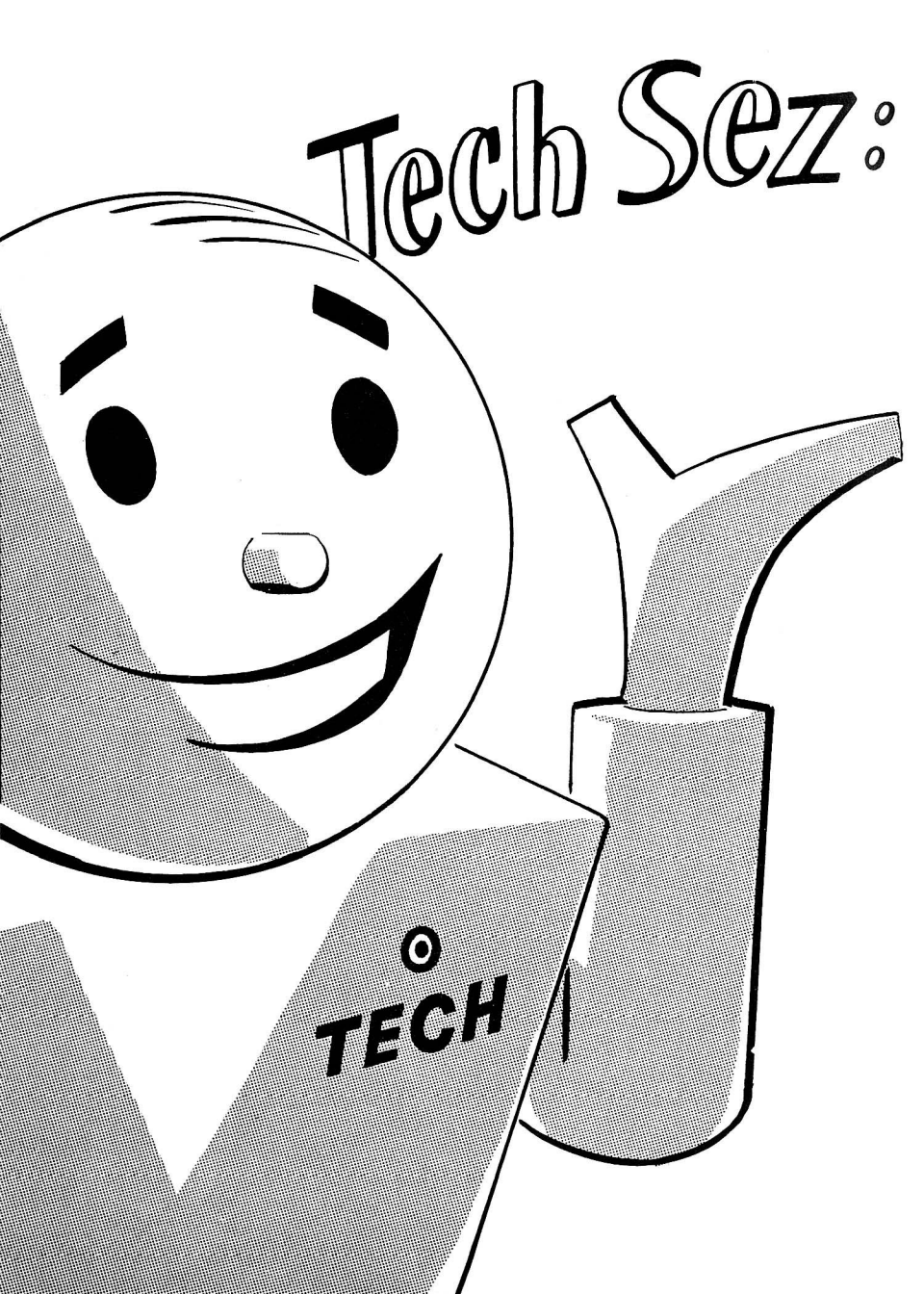
CHRYSLER CORPORATION

PLYMOUTH · DODGE · DE SOTO

AND CHRYSLER DIVISIONS

SESSION NO. 86

Tech Sez:



This Reference Book covers a mighty important subject—the four-barrel carburetor. Most of us have had a good deal of experience working on the single- and double-barrel carburetors, so we shouldn't have much difficulty learning how to service this new four-barrel carburetor. Actually—as you will see—the basic design features are the same for the four-barrel carburetor as for the single- and double-barrel ones.

This index will help you put your finger on the information you'll need to do a bang-up job of servicing this new carburetor:

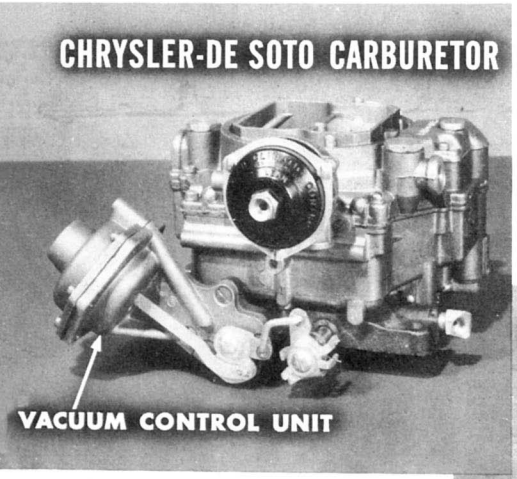
	Page No.
GENERAL DESCRIPTION	4
FLOAT SYSTEM	6
LOW-SPEED SYSTEM	9
HIGH-SPEED SYSTEM	14
SECONDARY VALVES, CHRYSLER-DE SOTO	15
SECONDARY VALVES, PLYMOUTH-DODGE	16
ACCELERATOR PUMP SYSTEM	17
AUTOMATIC CHOKE	17
CARBURETOR ADJUSTMENTS	17
FLOAT ADJUSTMENTS	18
ACCELERATOR PUMP TRAVEL ADJUSTMENT	22
METERING ROD ADJUSTMENT	24
FLOAT BOWL VAPOR VENT ADJUSTMENT	26
CHOKE UNLOADER ADJUSTMENT	27
CHECKING THROTTLE VALVE OPERATION	28
ENGINE IDLE SETTING	31

GENERAL DESCRIPTION

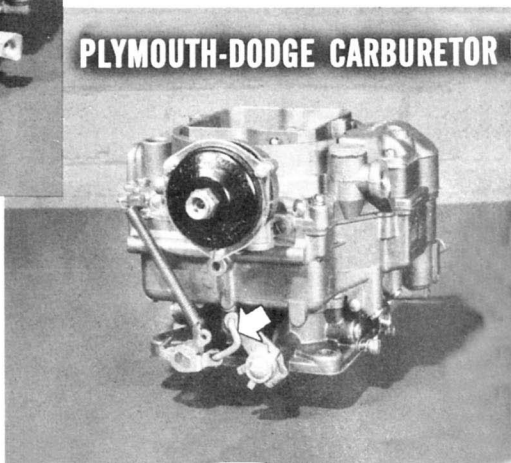
The four-barrel carburetor used on Chrysler and De Soto is very similar to the type used on Plymouth and Dodge. The main difference is in the method of operating the throttle valves in the secondary barrels.

A good many mechanics have had years of experience with the single- and two-barrel carburetors. But few have had much experience on this new "four-barrel" type. This Reference Book is written to acquaint you with this new carburetor.

But there isn't too much difference between the two models of four-barrel carburetors used on Chrysler Corporation cars.

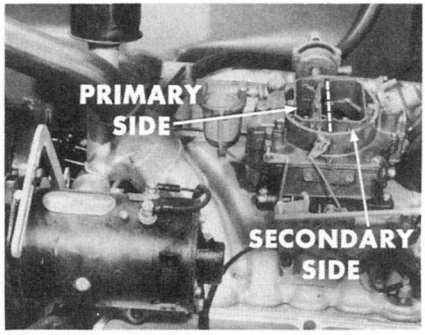


The Chrysler and De Soto model has a vacuum unit for operating the throttle valves in the secondary barrels.



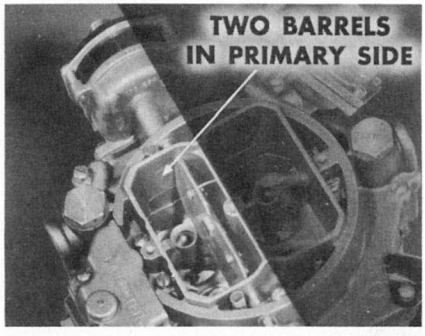
The Plymouth and Dodge model uses a mechanical link between the primary and secondary throttle valves plus a pair of velocity valves.

The four-barrel carburetor is, in effect, two two-barrel carburetors combined in a single assembly. Actually, you might consider the four-barrel carburetor as practically two carburetors, by "splitting" it down the middle. The half toward the *front* of the engine would be the *primary* side, and the half toward the *rear,* the *secondary* side. Each side does its share of the job.

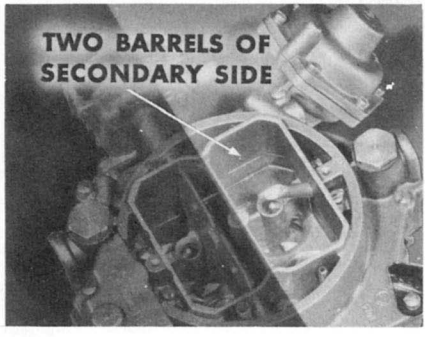


Many owners—and not a few mechanics—have assumed that they would get lower gas mileage on cars equipped with the new four-barrel carburetor. There are several reasons why this is not the case.

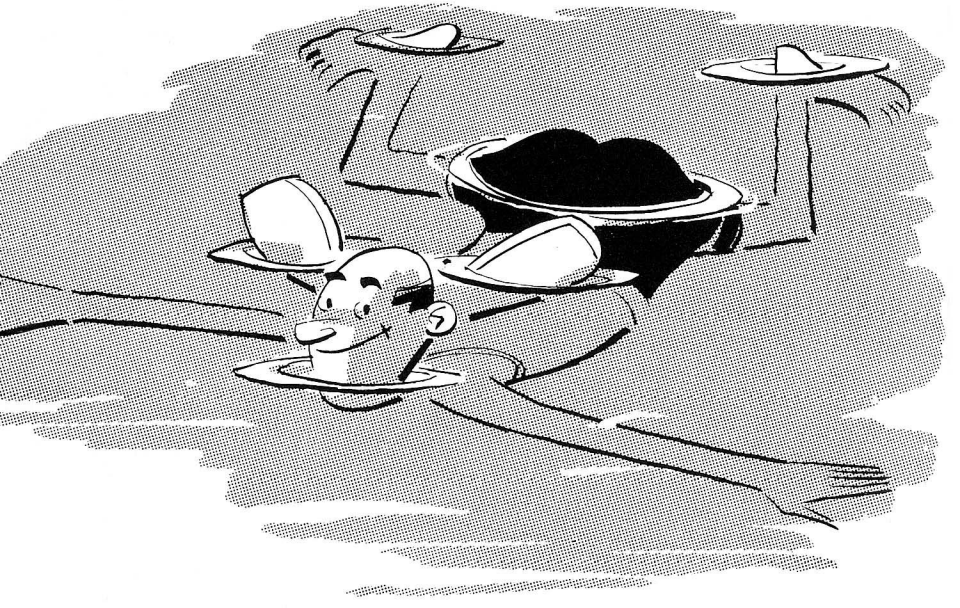
Only the two barrels in the *primary* side work all the time, just like a two-barrel carburetor. They're capable of taking care of *most* driving conditions.



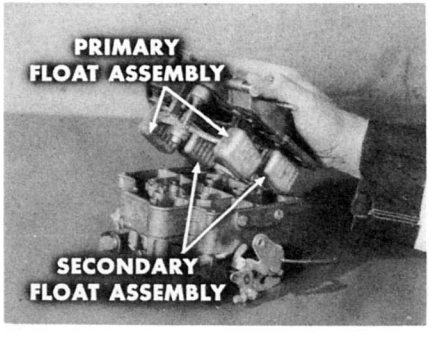
The two barrels of the *secondary* side work at *wide-open throttle* for hard acceleration or for top speed.



The operation of the throttle valves for secondary barrels is controlled automatically, so that they work when they are needed, depending upon speed and load requirements.

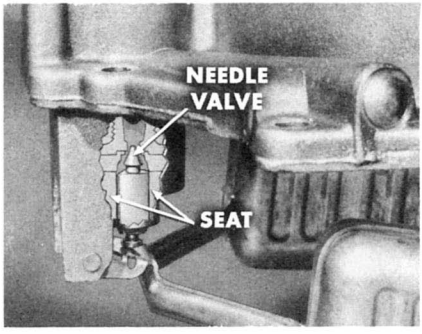


FLOAT SYSTEM

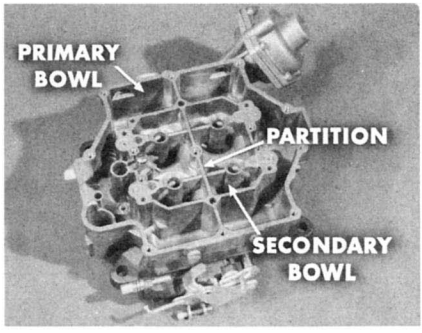


The four-barrel carburetor uses two float assemblies—one for the primary side and one for the secondary side.

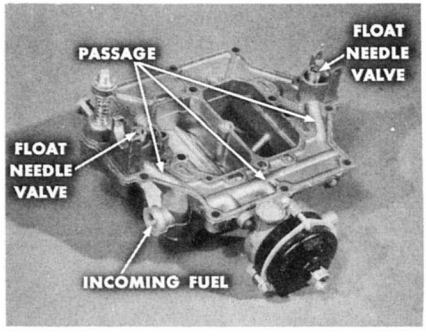
Each float assembly has its own needle valve and seat.

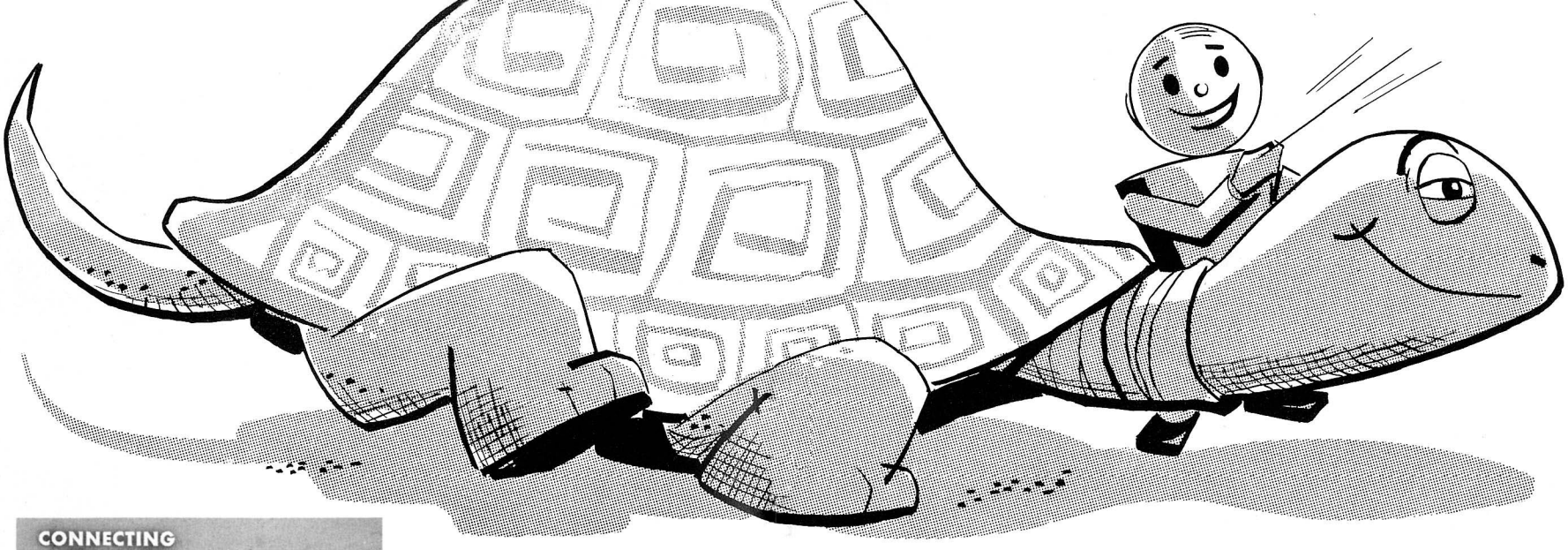


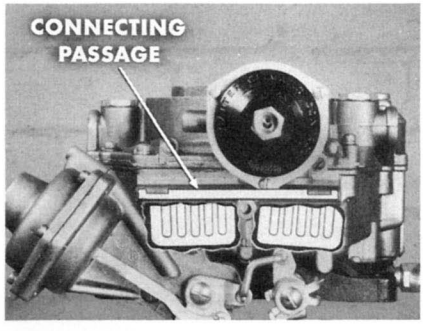
A partition in the body divides the area into separate bowls—one for the primary and one for the secondary side.



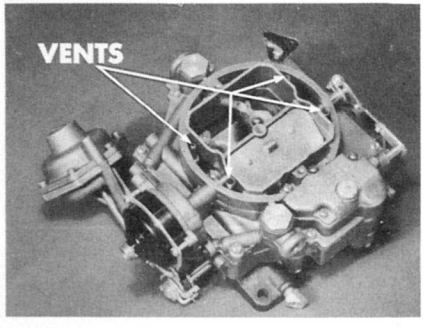
Incoming fuel travels through a passage in the air horn leading to each float needle valve.







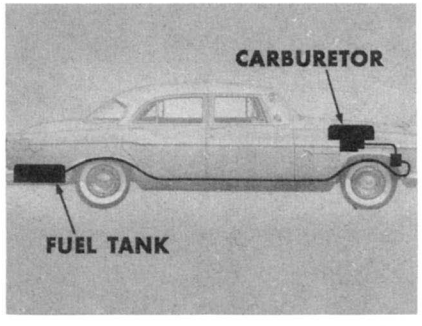
In addition, a connecting passage between the two float bowls, above the fuel level, balances the air pressure between both bowls.



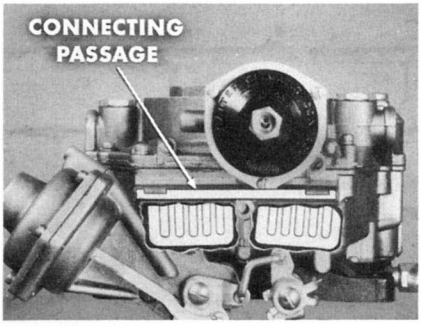
Both float bowls are vented through the air horn to the air cleaner and to the atmosphere.

LOW-SPEED SYSTEM

Fuel for the engine is drawn from the fuel tank and delivered to the carburetor under pressure by the fuel pump.



Fuel enters both float bowls through the separate float valves in the usual manner. Then the fuel is metered through the low-speed system for idle and early part-throttle operation. But only through the *primary* side.



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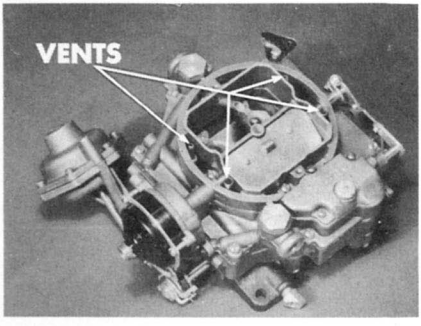

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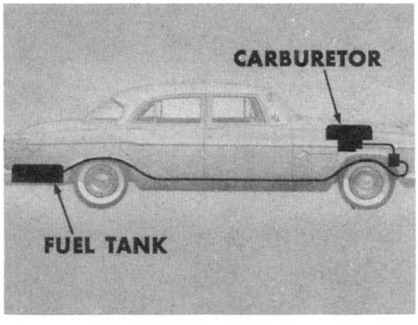

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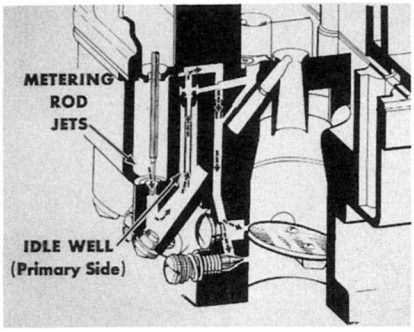
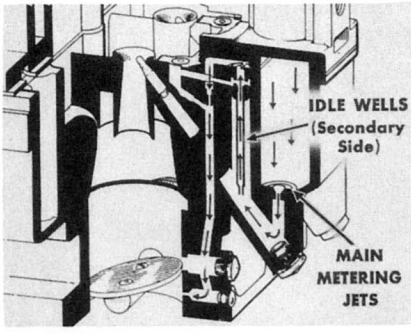
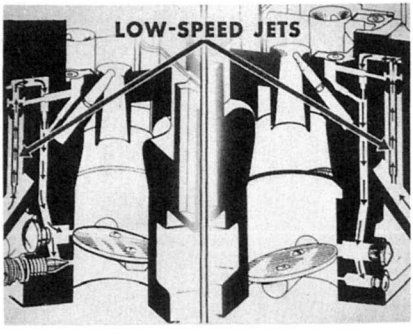


Fuel flows down through the metering rod jets into the idle wells in the primary side.

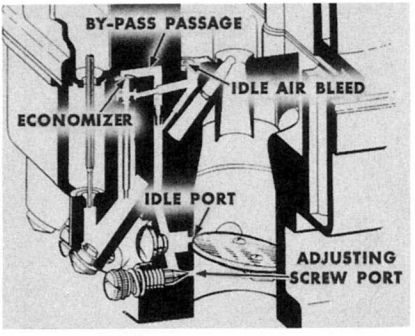


Fuel from the secondary float chamber flows into the idle wells through the secondary main metering jets. You want to keep in mind that there are *no* metering rods in the *secondary* float bowl, but there *are* two jets.

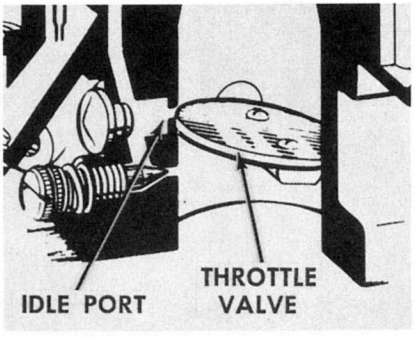


The fuel is then passed into the low-speed jets on both the primary and secondary sides.

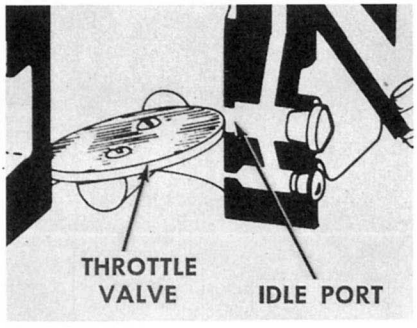
Here the air by-pass passages, economizer and idle air bleeds break up the liquid fuel and mix it with air as it moves through the passages to the idle ports and idle mixture adjusting screw ports.

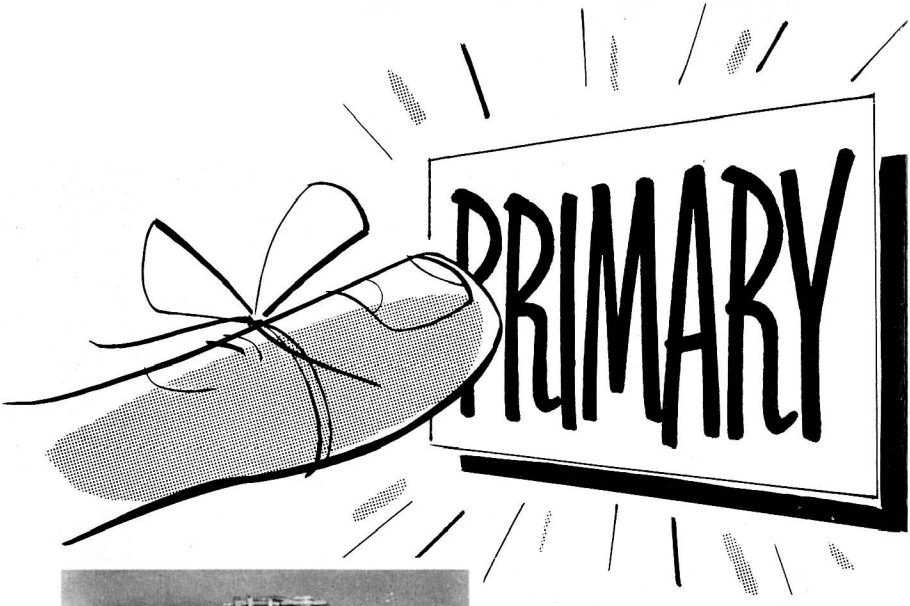


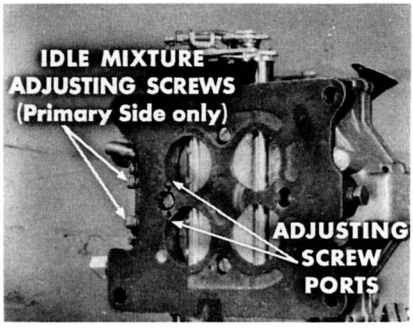
Actually, the idle ports in the primary barrels are slots. Part of each slot is below the throttle valve, and part is above the valve, when the valve is closed.



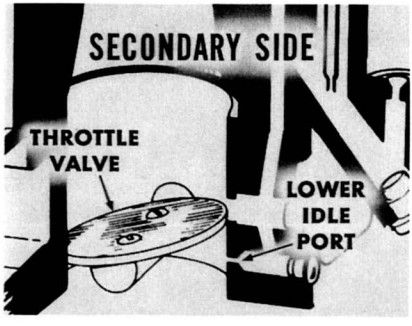
In the secondary side, the ports are also slots, but all of each slot is above the throttle valve when it is closed.





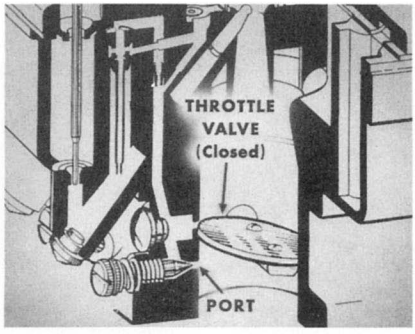


You want to remember that it's the *primary* side that has the idle mixture adjusting screws and, of course, a port for each screw.

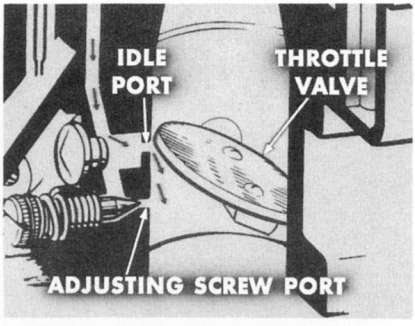


But, although the secondary side does *not* have the idle adjusting screws, there are lower idle ports in the barrels, below the throttle valves. The lower idle ports in the secondary side are for the purpose of controlling the fuel level in the secondary bowl when the secondary throttle valves are closed.

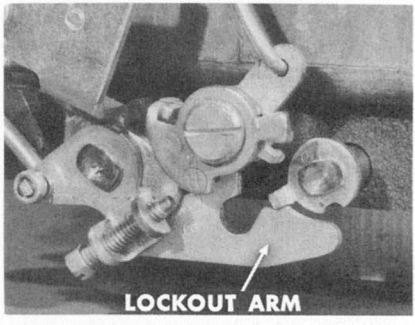
The idle adjusting screw ports on the *primary* side supply fuel for idle speed only —that is, when the throttle valves are *closed.*



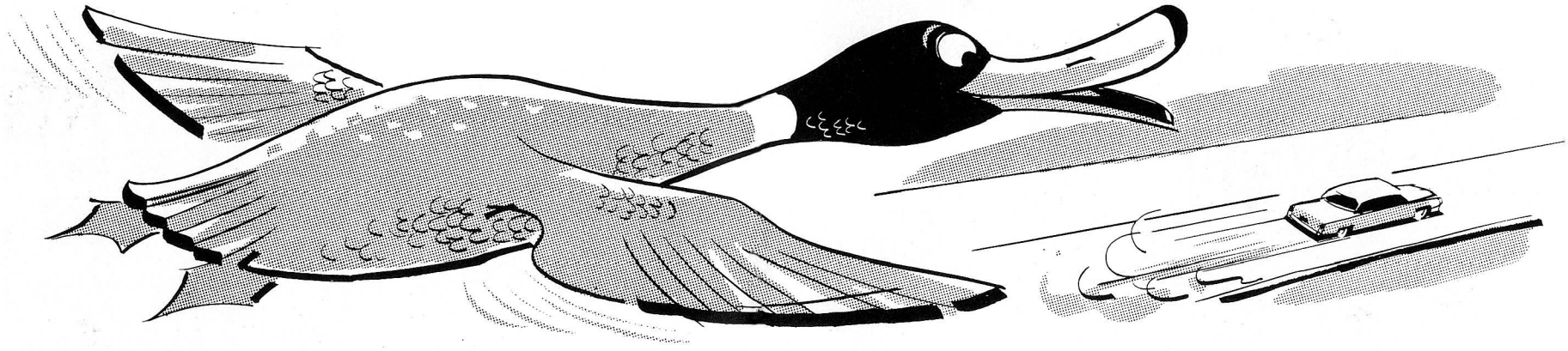
As the throttle valves on the primary side are opened, more of each idle port is uncovered, and a greater amount of the fuel mixture is allowed to enter.



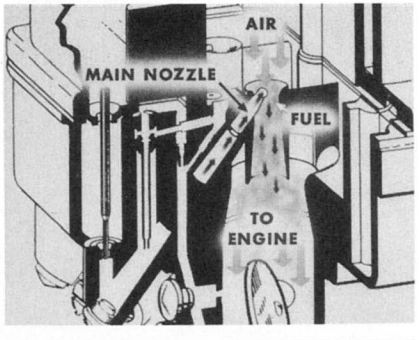
But remember—that's for the primary side *only*—the secondary valves are not open. They *can't* open yet—particularly if the engine is cold. The choke linkage is connected to the lockout arm which *keeps* the secondary side throttle valves from opening until the *choke* is fully open.



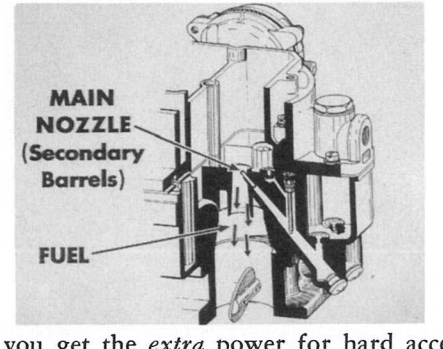
Actually, you can't possibly operate on all *four* barrels with a cold engine. And, even *after* the choke is fully open, you won't operate on all four barrels until the engine needs the additional power for hard acceleration or for high-speed operation.



HIGH-SPEED SYSTEM



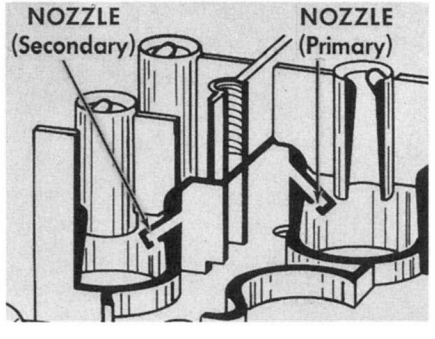
As the primary throttle valves open wider, more air rushes through the primary barrels. Fuel is then drawn out of the main nozzles, mixed with air and drawn into the engine.



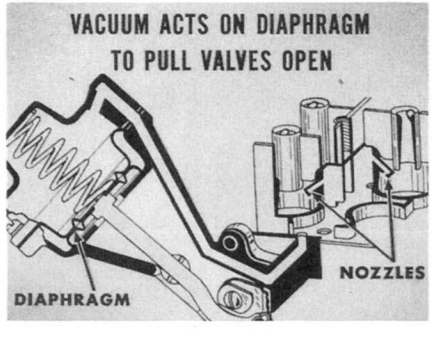
When the primary throttle valves reach approximately wide-open position for hard acceleration or high-speed operation, the secondary throttle valves are opened. Additional fuel is then drawn from the main nozzles in the secondary barrels. That's how you get the *extra* power for hard acceleration or high-speed driving.

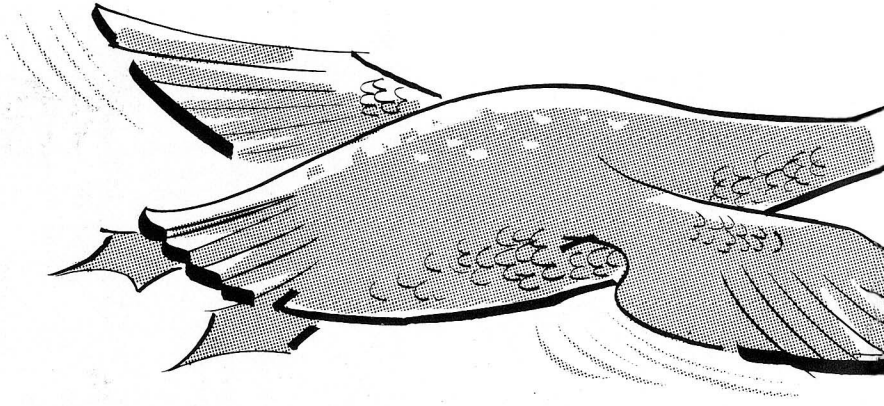
SECONDARY VALVES (Chrysler-De Soto Carburetor)

On the Chrysler-De Soto carburetor the opening of the secondary valves is controlled by vacuum. A nozzle in one barrel of the primary side, and another in one barrel of the secondary side helps control this movement.



As vacuum builds up in the venturi, it acts on the vacuum unit diaphragm through those nozzles. Movement of the diaphragm arm is what pulls the secondary throttle valves open. So, from the time you leave the idle and low-speed range, you operate on the two primary barrels *only,* until you reach wide-open throttle position, or until additional power is called for.





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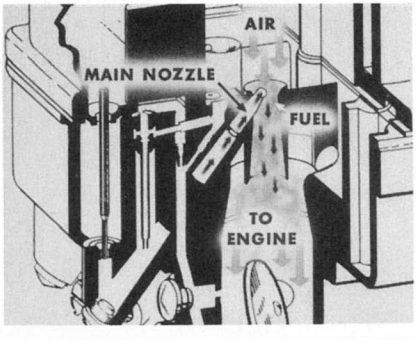

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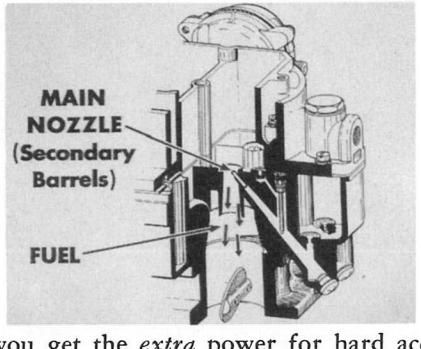

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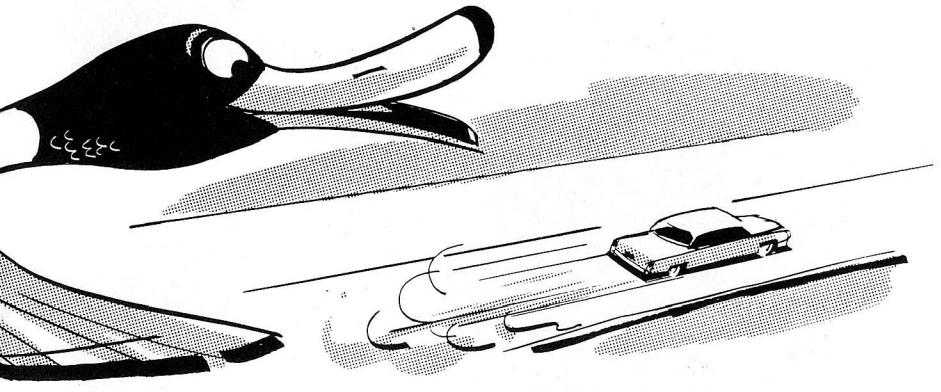

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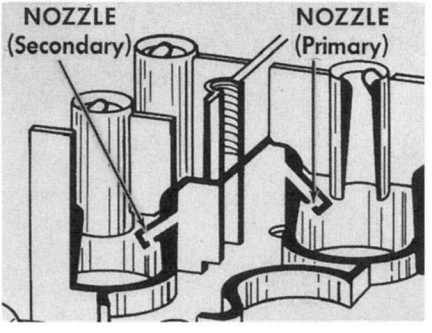

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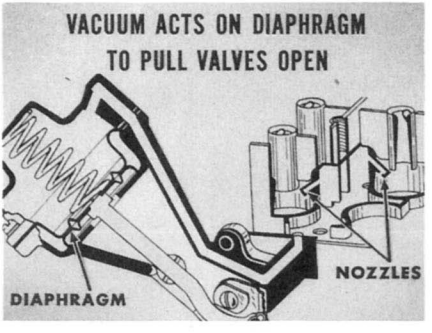
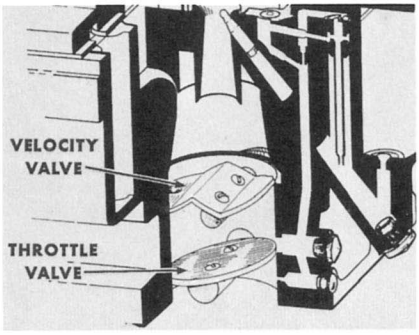
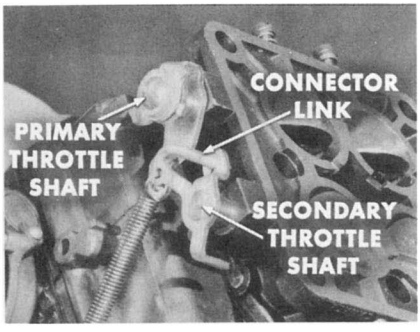


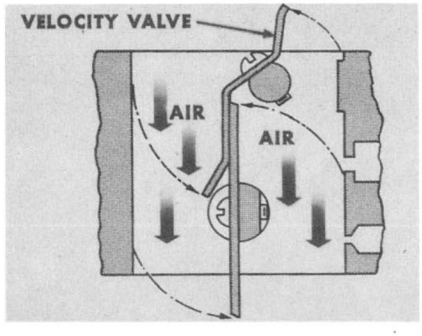
SECONDARY VALVES (Plymouth-Dodge)



You'll notice that, on the Plymouth-Dodge carburetor, there are two sets of what look like throttle valves in the secondary barrels. The valves higher up in the barrels are called "velocity" valves. They are held closed by a counterweight.



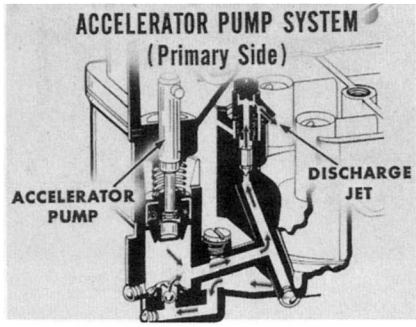
As the primary throttle valves approach wide-open throttle position, the connector link between the primary and secondary throttle shafts causes the secondary throttle valves to open.



When the secondary valves open, air flow acts directly on the velocity valves, forcing them open.

ACCELERATOR PUMP SYSTEM

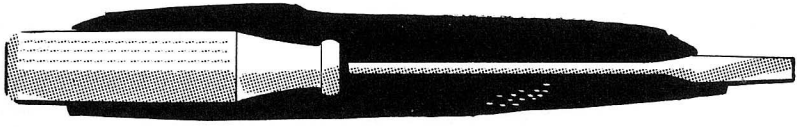
The accelerator pump system is in the primary side only, and supplies an extra discharge of fuel through the pump discharge jets for smooth acceleration.



NOTE: The accelerator pump system, on both the Chrysler-De Soto and the Plymouth-Dodge carburetor, is about the same as the one used on the single- and two-barrel carburetors.

AUTOMATIC CHOKE

The automatic choke used on both types of four-barrel carburetors is the same integral-type used on past carburetors. It operates only on the primary barrels. The choke linkage is different because of its connection with the operation of the secondary throttle valves, as already mentioned.

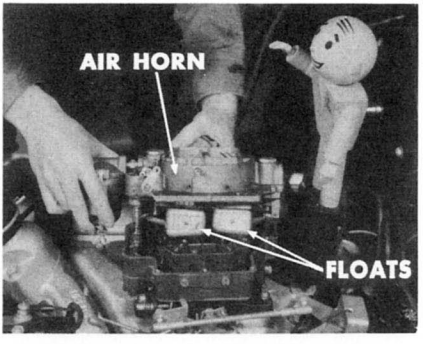


CARBURETOR ADJUSTMENTS

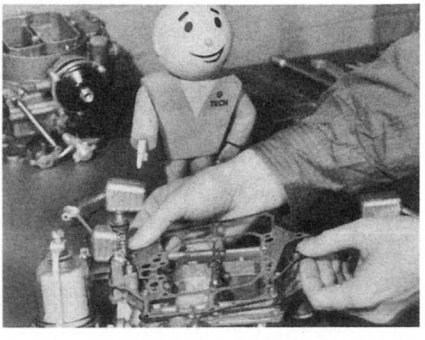
The following carburetor adjustments are those that can be made without removing the carburetor from the engine. These are the adjustments that the mechanic will most often make.

FLOAT ADJUSTMENTS

There are two separate float assemblies, one for the primary and one for the secondary side of the carburetor. There are also two separate adjustments for each float—lateral and vertical. These adjustments are important and care should be taken to see that they are made correctly. If the float level is too low, poor top-speed performance will result; if the level is too high, it will cause excessive fuel consumption. If the lateral adjustment is incorrect, the floats may rub on the sides of the bowl, which will interfere with their free travel.

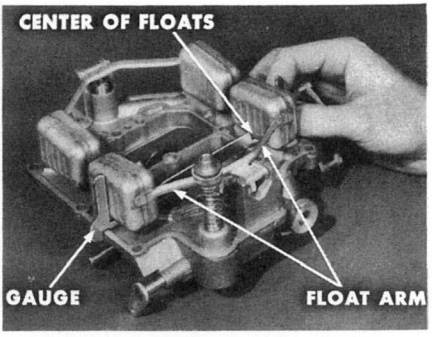


The floats are attached to the air horn. So, the adjustment for float setting is made in relation to the air horn. The floats come out of the carburetor when the air horn is lifted off.

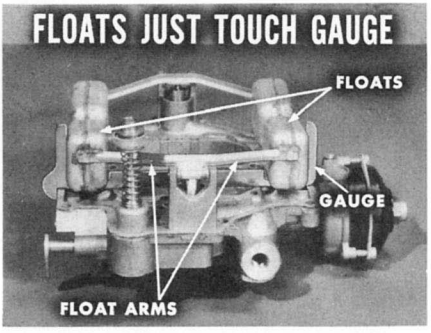


So, to make these adjustments, remove the air horn and turn it upside down. Remove the floats, take off the gasket, then replace the floats before attempting to make the checks for lateral and vertical adjustment.

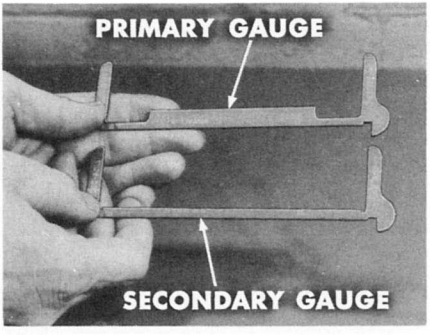
With the float arm resting on the seated needle, place the float level gauge (T-109-232) directly under the *center* of the primary floats. The notched portion of the gauge fits over the edge of the casting.

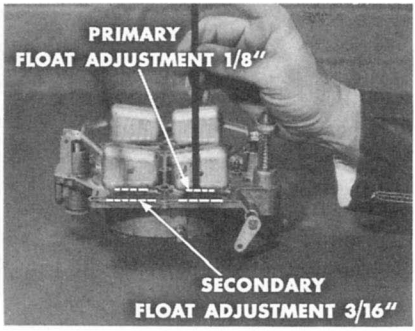


If the adjustment is right, the floats will just touch the gauge. Bend the float arms if you have to change the position of the float.

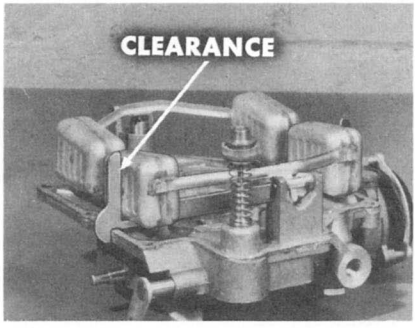


And remember—the adjustments are made the same on both primary and secondary floats. The only difference is that two gauges are required. (For the primary floats use Gauge T-109-232; for the secondary floats use Gauge T-109-222).



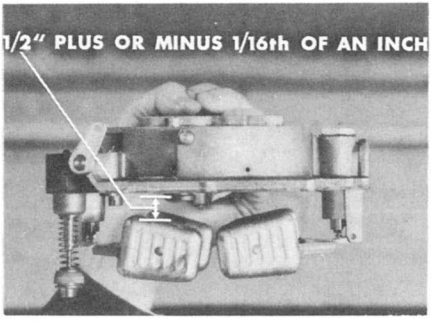


If gauges are not available, the following dimensions may be used: the primary float height is 1/8"; the secondary float height is 3/16". Both measurements are from the center of the float to the air horn.

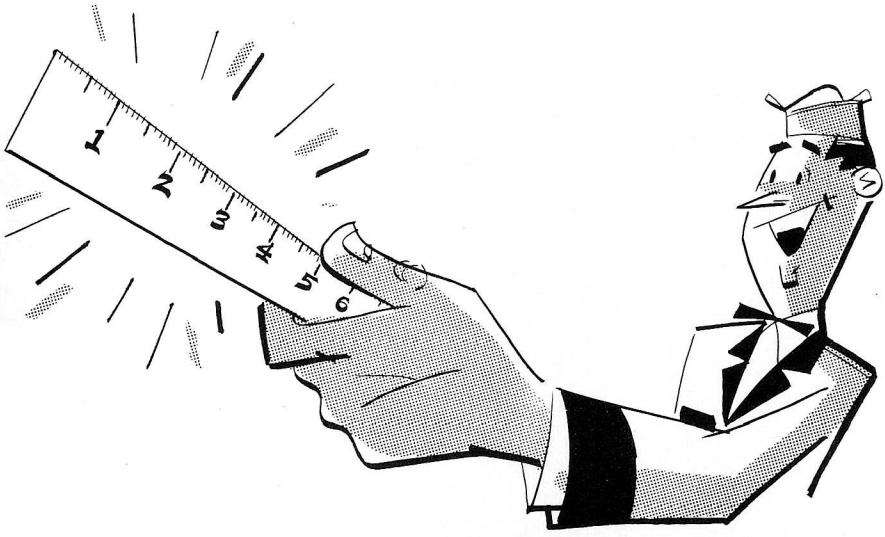


The lateral adjustment is just as important as the vertical adjustment. The sides of the floats must just clear the vertical uprights of the gauge. Bend the float arms, if necessary, to obtain proper clearance.

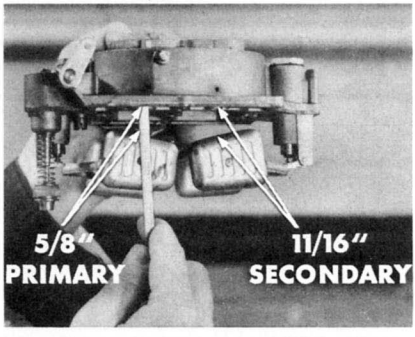
Float travel—vertical movement of the floats from raised to lowered position—is important, too. If it is incorrect, the floats may rest on the floor of the bowl and prevent the needle valve from opening fully.



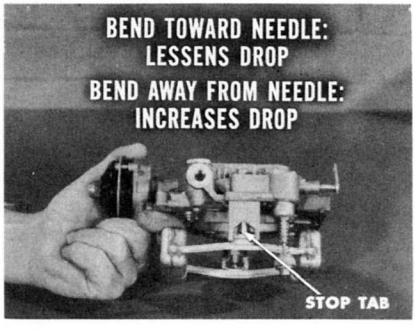
Float travel is checked from raised to lowered position. With the air horn held in the upright position, and the floats hanging down, measure the amount of up-and-down movement of the floats--from the closed to the fully opened positions. The total movement should be one-half inch, plus or minus one-sixteenth of an inch.



You could also get this measurement by measuring the distance from the air horn to the float, in its open position. In that case, the measurement should be one-half inch *plus* the closed position setting. In other words, five-eighths of an inch for the primary floats, and eleven-sixteenths for the secondary floats.

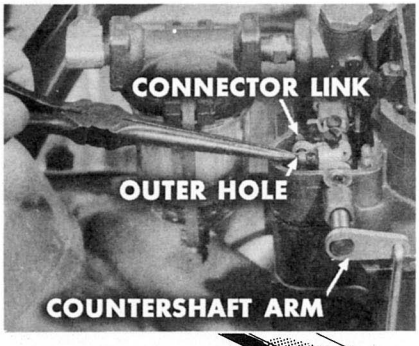


To adjust, bend the stop tab on the float bracket at the needle. Bending the tab *toward* the needle *lessens* the drop. Bending it *away* from the needle *increases* the drop.

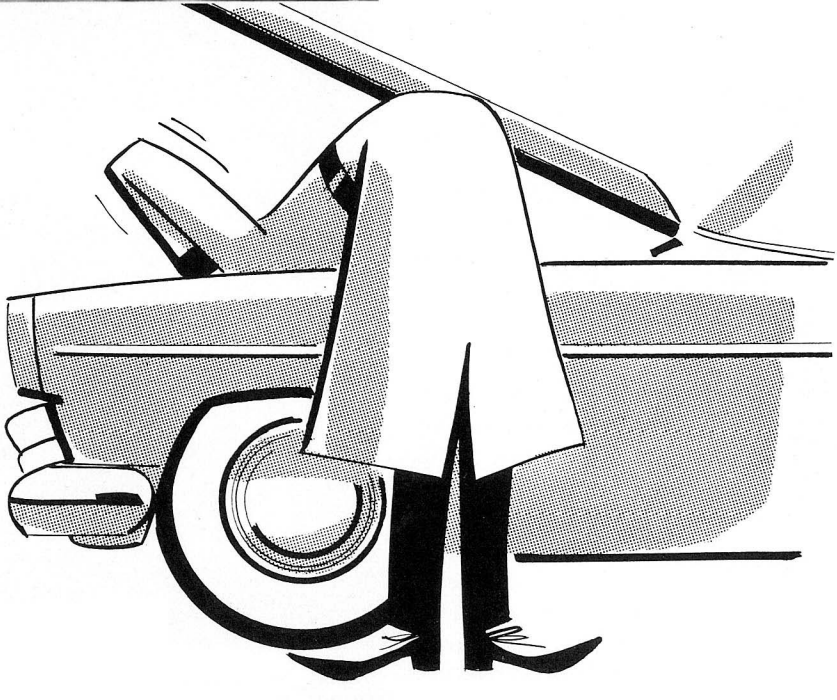


ACCELERATOR PUMP TRAVEL ADJUSTMENT

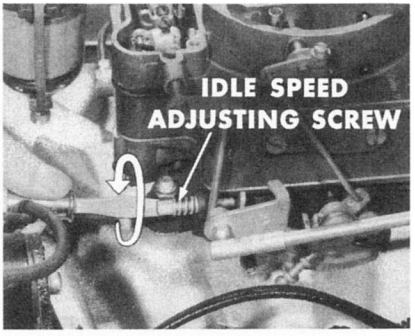
The travel of the accelerator pump has to be right to assure smooth acceleration at all speed ranges. This can be checked and adjusted with the carburetor on the car.



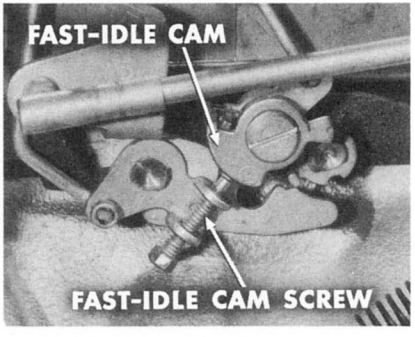
First, install the connector link in the outer hole of the pump arm, with the ends extending toward the countershaft arm. This is a cold weather position which gives the maximum stroke.



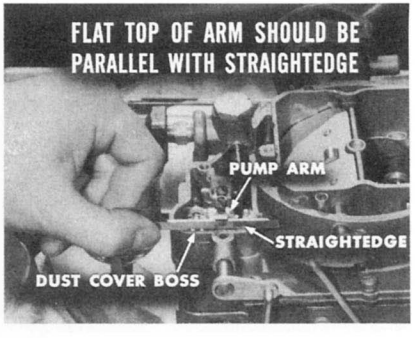
Next, turn the idle speed adjusting screw out until the primary throttle valves are completely closed.

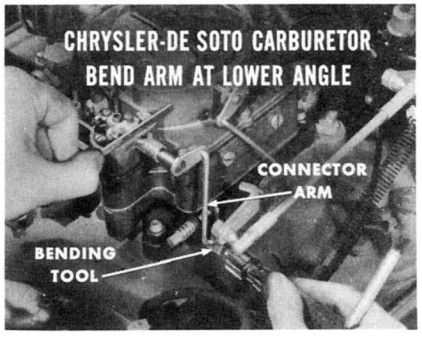


Make sure that the fast-idle adjusting screw is off the fast-idle cam. If it isn't, you may be fooled into thinking that the throttle valves are closed, when they're not.



Now place the straightedge across the top of the dust cover boss at the pump arm. The flat top of the pump arm should be parallel to the straightedge.



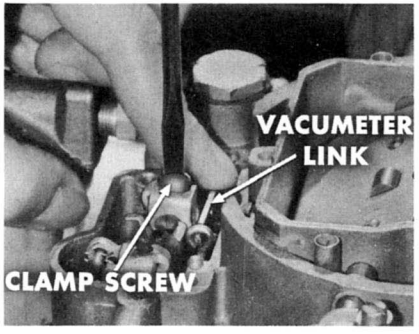


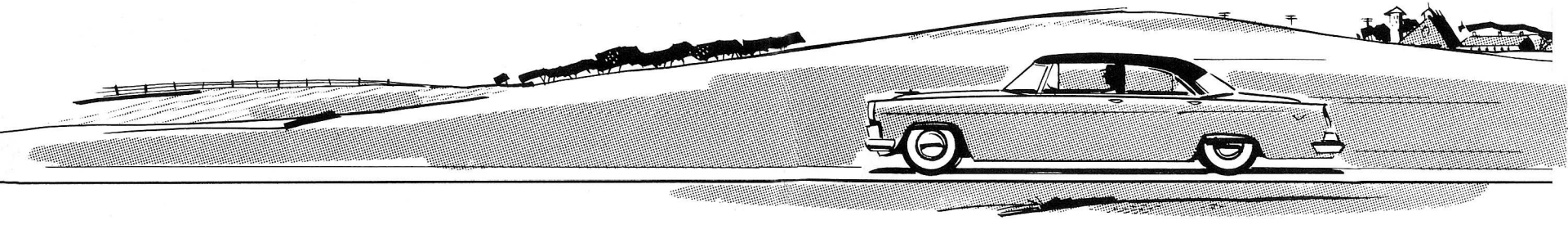
If it isn't, bend the throttle connector arm at the *lower* angle, using bending tool (T-109-213) or a pair of pliers.

NOTE: On the Plymouth and Dodge carburetor, make the bend in the connector arm at the *upper* angle.

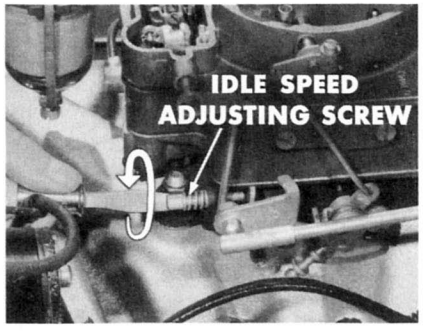
NOTE: If you adjust the accelerator pump stroke you *always* have to go over the metering rod adjustment, because they are directly related to one another.

Then loosen the metering rod arm clamp screw so that the arm is free on the shaft. With the metering rods in place, press down on the vacumeter link until the rods bottom in the carburetor body casting. The arm should be free on the shaft and the links and rods pressed down completely.



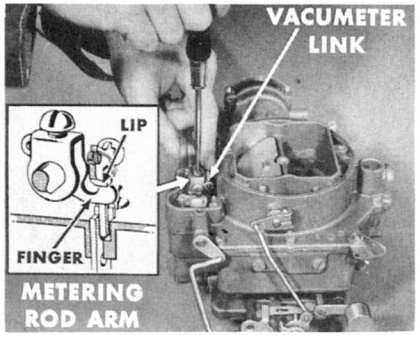


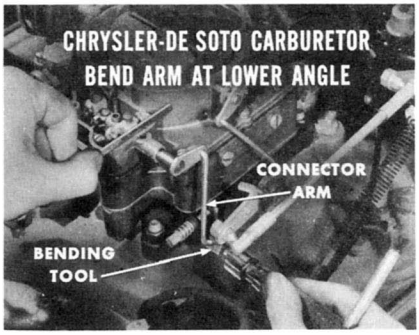
METERING ROD ADJUSTMENT



To make the metering rod adjustments, turn out the idle speed adjusting screw to allow the primary throttle valves to close completely.

Hold the metering rod link down. Then, keeping the lever on the arm in contact with the link, tighten the clamp screw.



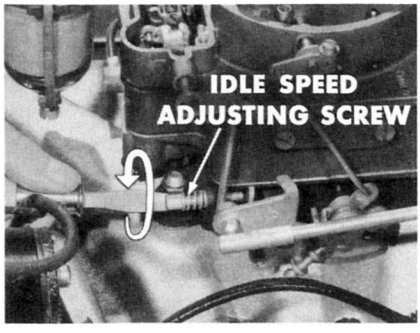


If it isn't, bend the throttle connector arm at the *lower* angle, using bending tool (T-109-213) or a pair of pliers.

NOTE: On the Plymouth and Dodge carburetor, make the bend in the connector arm at the *upper* angle.

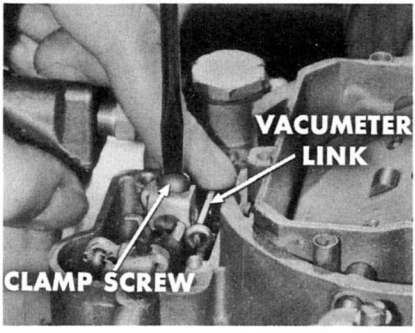
NOTE: If you adjust the accelerator pump stroke you *always* have to go over the metering rod adjustment, because they are directly related to one another.

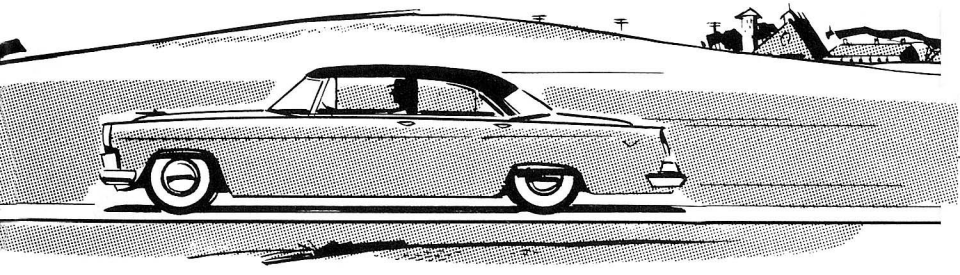
METERING ROD ADJUSTMENT



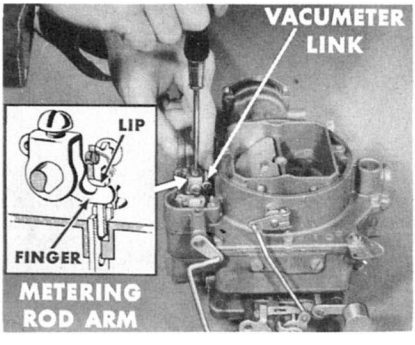
To make the metering rod adjustments, turn out the idle speed adjusting screw to allow the primary throttle valves to close completely.

Then loosen the metering rod arm clamp screw so that the arm is free on the shaft. With the metering rods in place, press down on the vacumeter link until the rods bottom in the carburetor body casting. The arm should be free on the shaft and the links and rods pressed down completely.





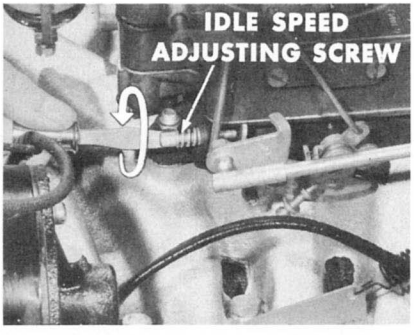
Hold the metering rod link down. Then, keeping the lever on the arm in contact with the link, tighten the clamp screw.



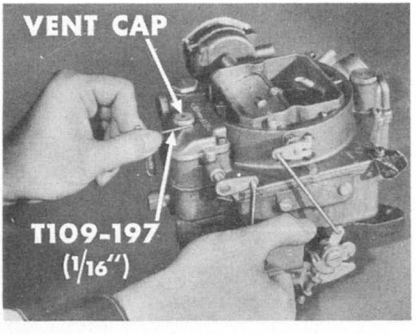
FLOAT BOWL VAPOR VENT ADJUSTMENT

(Chrysler and De Soto)

This adjustment should be made after completing the pump and metering rod adjustments. The dust cover and gasket should be in place and properly secured.

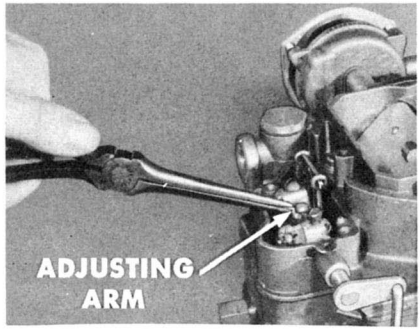


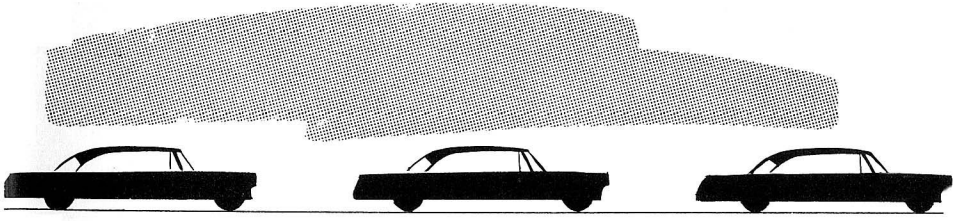
Then turn out the idle speed adjusting screw to allow the primary throttle valves to seat in their barrels.



With this setting there should be 1/16" clearance between the lower edge of the vent cap and the ledge of the dust cover. This can be measured with Tool T-109-197 or a scale.

If it is necessary to increase the clearance, remove the dust cover and bend the adjusting arm on the countershaft *up*. To decrease the lift or clearance, press down on the cap until the correct lift has been obtained.





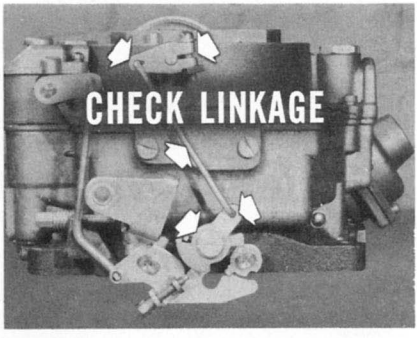
CHOKE UNLOADER ADJUSTMENT

With the primary throttle valves in fully opened position, insert 3/16-inch gauge (T-109-28) between choke valve and dividing wall of main body.

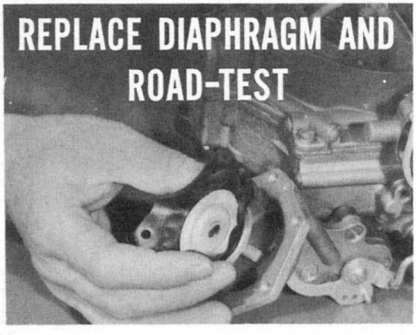
With light finger pressure applied against upper part of choke valve, a slight drag should be felt as the gauge is withdrawn. If no drag is felt, or if there is too much drag, bend the unloader tang on the throttle lever, using bending tool (T-109-41).

CHECKING SECONDARY THROTTLE VALVE OPERATION

If the high-speed performance isn't up to standard, it might indicate that the secondary throttle valves were not opening.

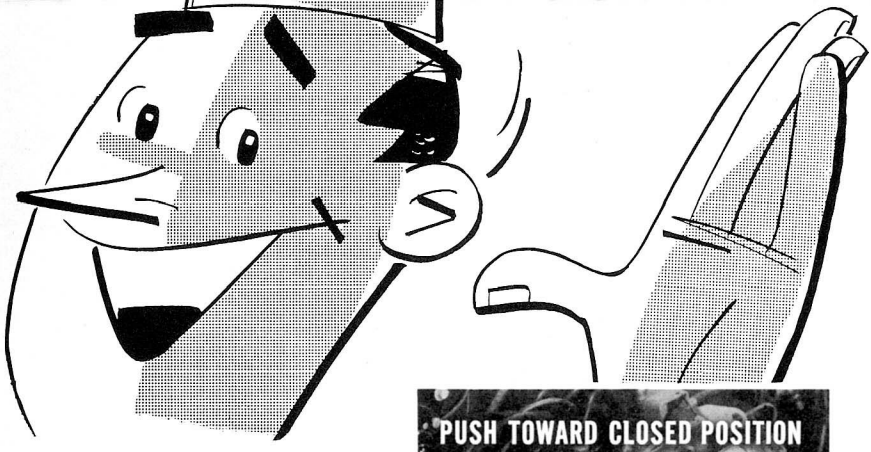


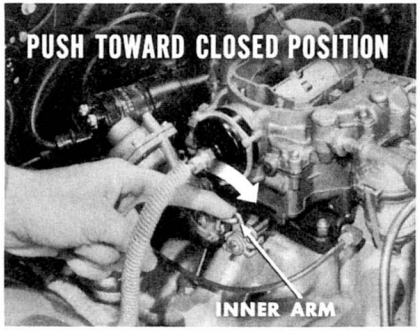
On the Chrysler and De Soto carburetor, these valves not opening might mean that either the vacuum diaphragm is ruptured, or the choke linkage is bent or improperly adjusted. So check the linkage first.



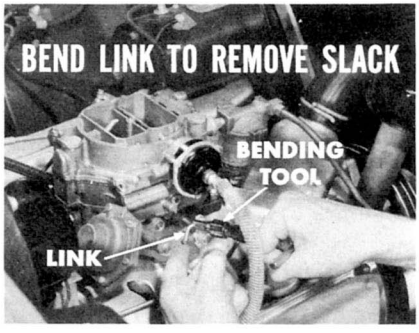
If the linkage is correct, you'll have to replace the diaphragm in the vacuum unit. Then road-test the car. Drive it at speeds high enough to feel the surge of power when the secondary throttle valves open.

NOTE: On the Chrysler and De Soto model, with the vacuum control of the secondary throttle valves, there may be a case in which you have some difficulty in trying to get a smooth idle with the mixture adjusting screws. The reason may be that the secondary throttle valves are not closing tightly.





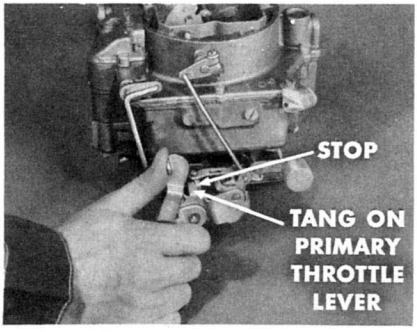
If you suspect that this is the case, check the secondary throttle valve position by pushing the primary shaft inner arm toward the closed position—that is, toward the front of the car. If there is any movement of the secondary shaft it means that the secondary throttle valves are not completely closed. So cut off the engine. Then back off the idle speed adjusting screw exactly one-half turn.

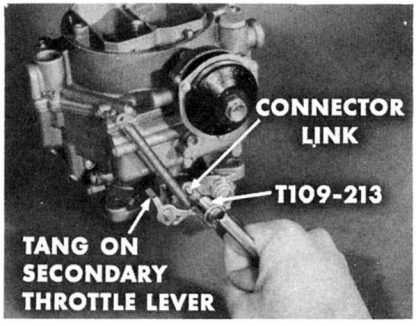


Now hold the secondary throttle valves closed and use the bending tool (T-109-213) to bend the link slightly at the angle, to remove all slack between the secondary throttle shaft and the inner arm on the primary shaft.

Finish the job by turning the idle speed adjusting screw *in* the half turn you just backed it off. Then start the engine and recheck the idle speed setting and the mixture setting.

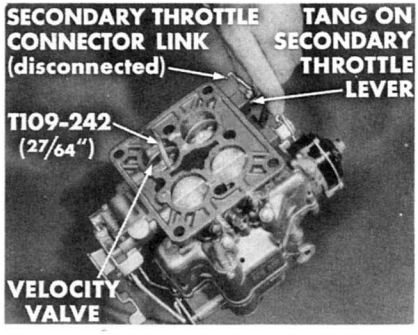
The secondary throttle valve adjustment for the Plymouth and Dodge carburetor is determined by the positioning of the tangs on the primary and secondary throttle levers. When the primary throttle lever is wide open, the tang should contact the stop boss on the throttle body at the same time the tang on the secondary throttle lever strikes its stop boss.

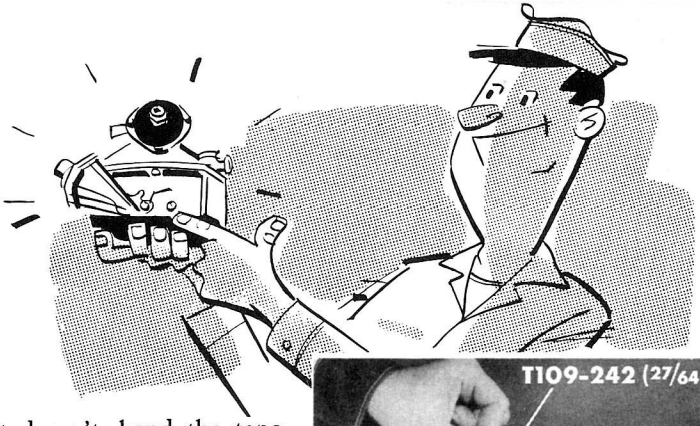




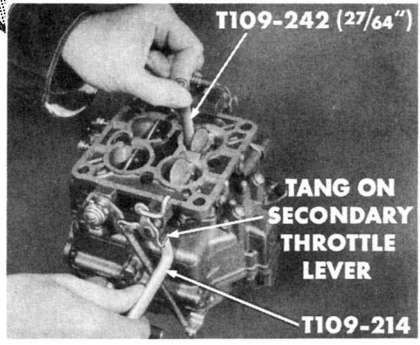
If it is necessary to make an adjustment, bend the secondary throttle connector link at the angle, using tool (T-109-213). Note that the secondary throttle valves will not be exactly wide open, but will lack a few degrees of wide-open position.

Velocity Throttle Valve Adjustment. The adjustment of the velocity throttle valves of the Plymouth and Dodge carburetor is made as follows: disconnect the secondary throttle connector link from the primary throttle operating lever. Insert gauge (T-109-242) between the lower edge of the velocity valve and the barrel. In this position, the tang on the secondary throttle lever should rest against its stop.





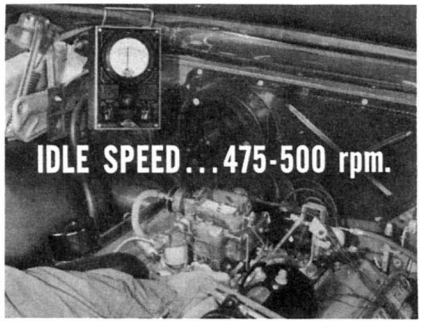
If it doesn't, bend the tang on the secondary throttle lever, using tool (T-109-214), until the correct positioning has been reached—the tang resting against its stop. Then reconnect the secondary throttle connector link.



ENGINE IDLE SETTING

Because engine performance has such a direct bearing on automatic transmission performance and over-all car performance, setting the engine idle speed and idle mixture becomes very important.

First, use a tachometer to check and set the idle speed. It should be between 475 and 500 rpm. After the idle speed has been set, turn the idle mixture adjusting screws *in* or *out* until the engine idles smoothly. When smooth idle has been obtained, it may be necessary to go back and reset the idle speed.



USE THE NEW TECH QUESTIONNAIRE FOR SESSION NO. 86 WHEN RECORDING YOUR ANSWERS TO THESE TEN QUESTIONS

The two barrels in the primary side of the four-barrel carburetor are capable of taking care of *most* driving conditions. RIGHT **1** WRONG

Fuel mixture flows through the two barrels of the secondary side when the primary throttle valves are wide open for hard acceleration or for high speed. RIGHT **2** WRONG

Both float assemblies of the four-barrel carburetor work in the same bowl. RIGHT **3** WRONG

There are no metering rods in the secondary side of the four-barrel carburetor. RIGHT **4** WRONG

The idle mixture adjusting screws are located in the secondary side of the four-barrel carburetor. RIGHT **5** WRONG

The secondary throttle valves can not be opened unless the choke valve is wide open. RIGHT **6** WRONG

The "velocity" valves in the Plymouth and Dodge carburetor are held closed by a counterweight. RIGHT **7** WRONG

The accelerator pump system is in the *secondary* side only. RIGHT **8** WRONG

If you adjust the accelerator pump stroke you have to go over the metering rod adjustment, because they are related to each other. RIGHT **9** WRONG

Poor high-speed performance might indicate that the secondary throttle valves of the four-barrel carburetor were not opening. RIGHT **10** WRONG

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