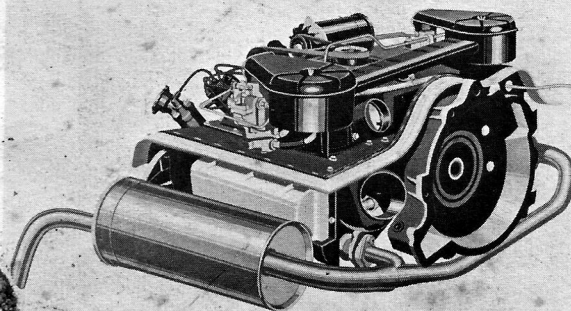




COMMUNICATION



TUNING THE CORVAIR ENGINE



FOREWORD

This booklet contains a complete reprint of the sound slidefilm, *Tuning the Corvair Engine*. Each man should have one of these booklets for on-the-job reference and at least one copy should be placed in the Service Department file of Technical Information.

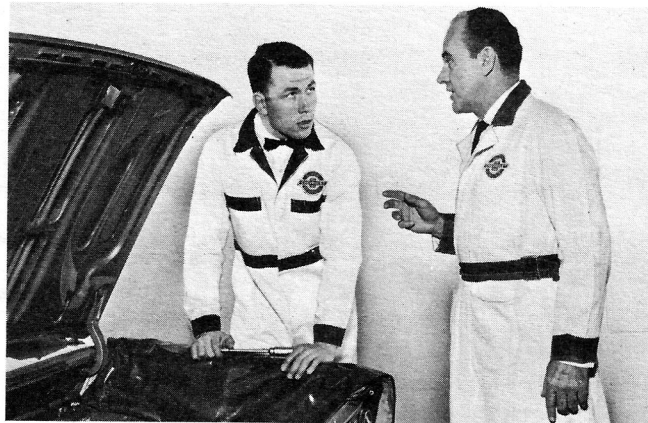
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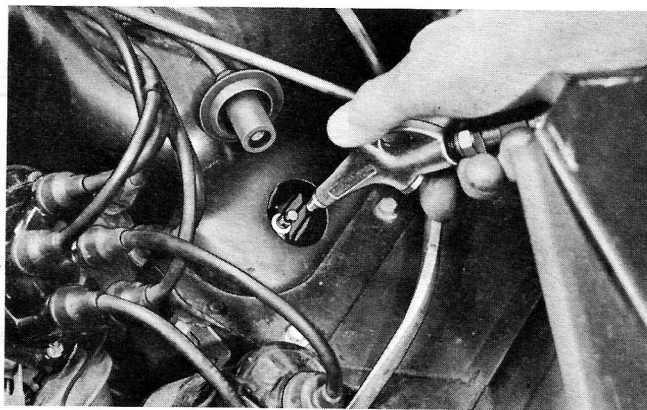


Dave: . . . I've got the O.K. on that tune-up, Joe, so run it back in the stall. Pull the spare and air cleaners; then call me. I've got some good service information, and I want you to pass it on to the other fellows on the line.

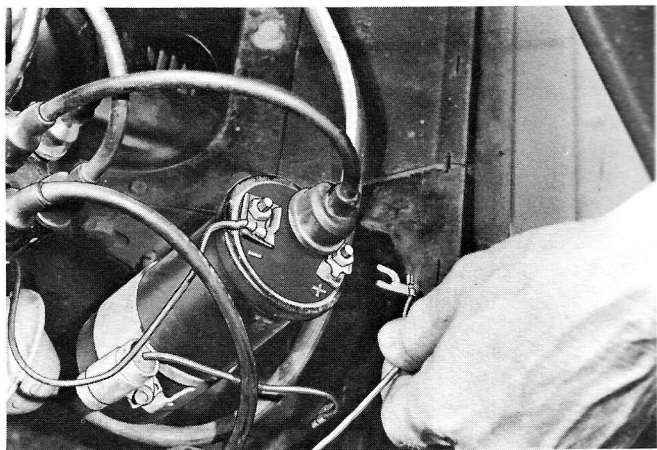
Joe: . . . Fine with me, Dave—I'll get all set up.



Dave: . . . Look, you and I know there are just as many different ways to tune up a Corvair engine as there are holes in a head gasket. So—let's establish a set way to turn out the best Corvair tune-up and still make it simple. I'll show you what I have in mind.

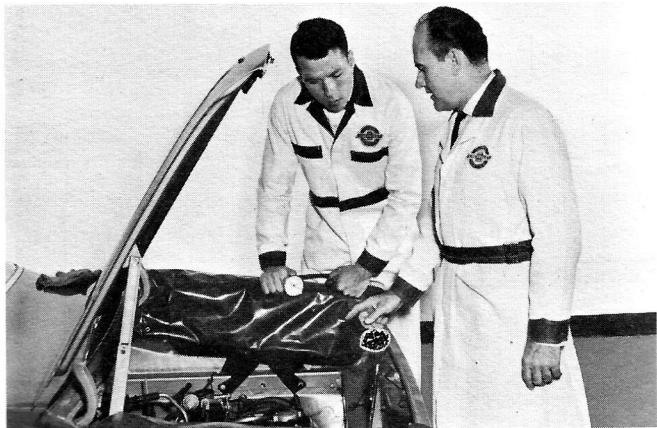


First, let's find out if we've got good compression. Disconnect the spark-plug wires; then loosen the plugs. Before you remove them, blow out all plug cavities with compressed air.



Disconnect the positive primary wire from the coil and—
Joe: . . . Why not just pull the high-tension coil wire?

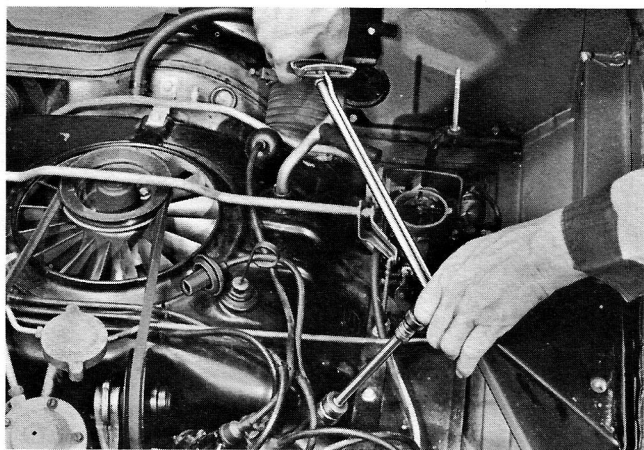
Dave: . . . Well, when the engine is cranked over with the high-tension wire removed, a spark jump leaves carbon tracks on the coil tower. That means trouble later on.



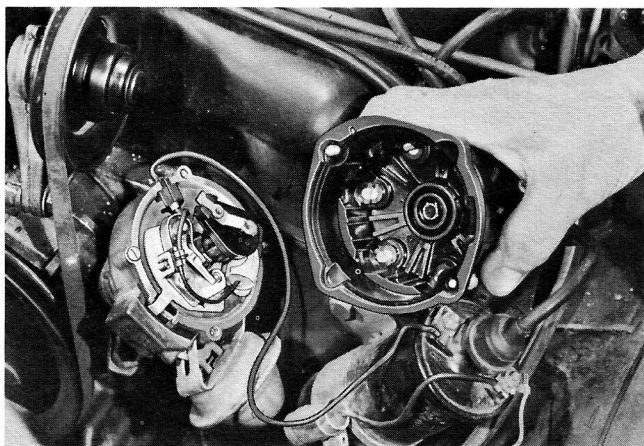
Block the choke and throttle valves wide open; then I'll crank the engine over for you. If you find compression weak in any cylinder, there's no point in going any further with the tune-up. O.K.?



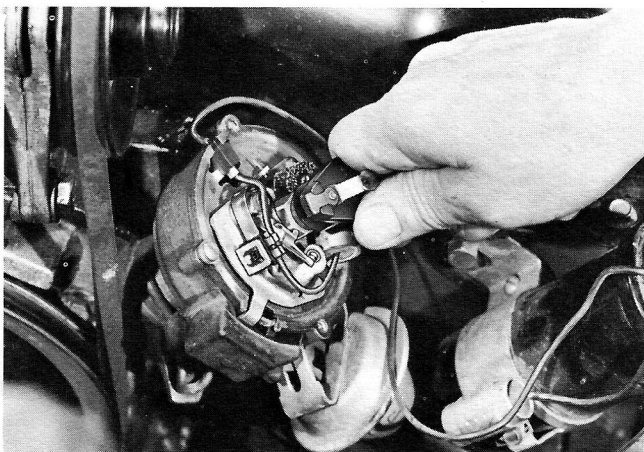
Since compression is good, let's check those plugs. If cleaning will only give a few hundred miles of additional service, it's far better to install new ones.



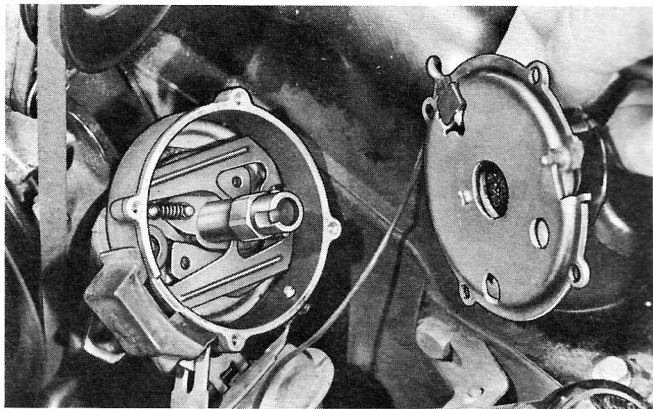
Now that you've got the new plugs installed, I'm glad to see you're using a torque wrench. It's a good habit to get into, especially on Corvairs. We don't want to stretch or pull those aluminum threads in the heads.



O.K., let's roll along. Pull the distributor cap. Some models also have a dust shield. Check that cap and rotor carefully. Look for burned terminals, carbon tracks, or cracks, both on the inside and out.



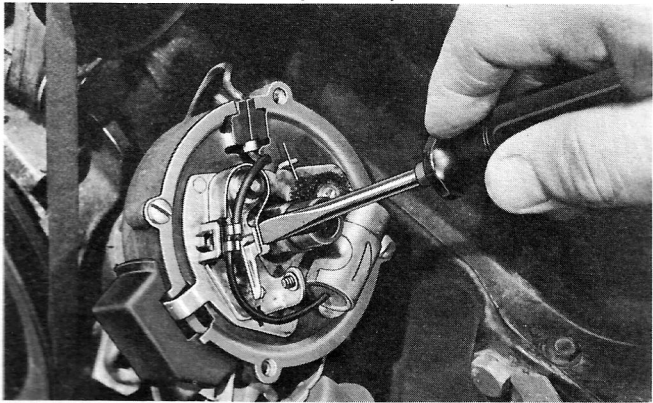
While we're at it, Joe, turn the rotor clockwise as far as possible without forcing the parts; then release it. The centrifugal advance springs should return the cam to full retard without binding.



If the advance assembly binds, pull the breaker plate. Make sure the advance unit is free of rust or dirt. Clean the cam lobes, too.

Joe: . . . What about oiling the advance mechanism?

Dave: . . . I wouldn't, Joe. Lubrication builds up a film of dirt. It's better to keep *those* parts dry.

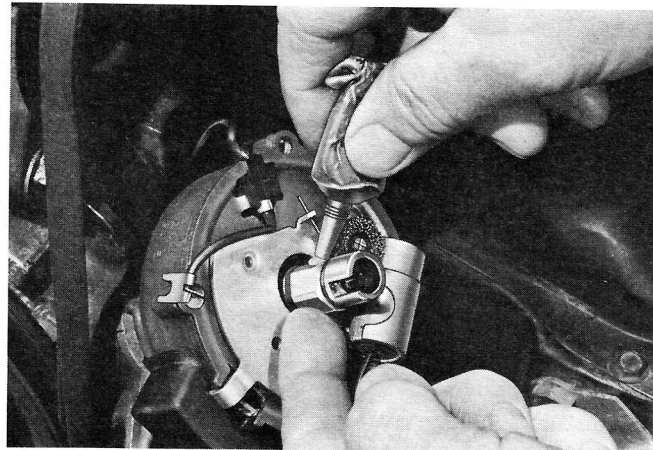


Now look at the distributor point contacts for signs of pitting, roughness and color condition. If the points are only dirty or gray-looking, clean with a point file. Never try to dress the points until they are smooth.

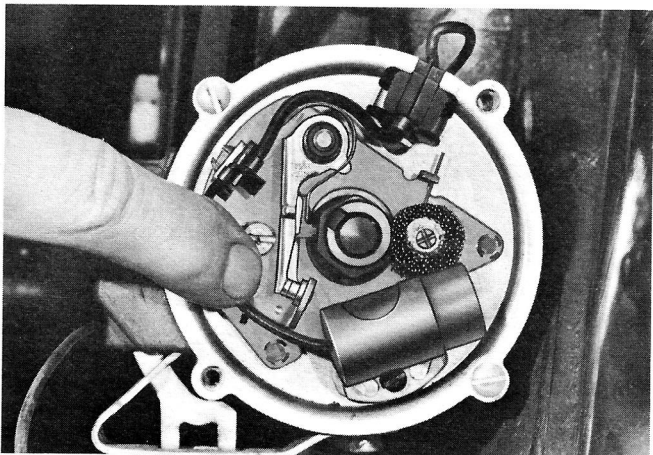


Joe: . . . Dave, those points are too far gone to try to save. I'd better pull them, they're badly burned.

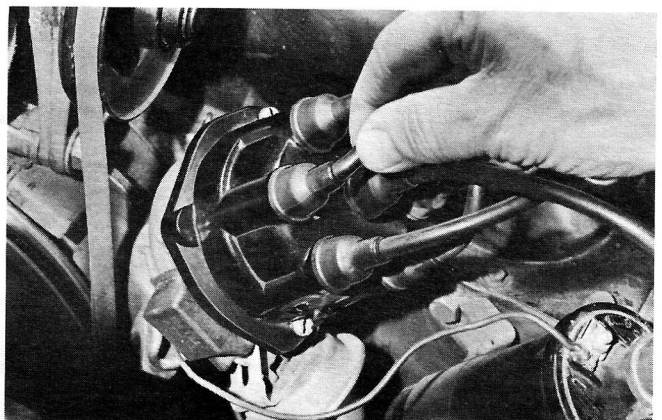
Dave: . . . They sure are. And, before I forget, points with only minor pitting, and also misaligned, should never be realigned. Better to replace so the job stands up.



Lubricate the cam surfaces with "Delco Remy Cam and Ball Bearing" lube or its equivalent. Then, if the distributor has a cam wick, rotate it $\frac{1}{2}$ turn. O.K.? Now install the new points.

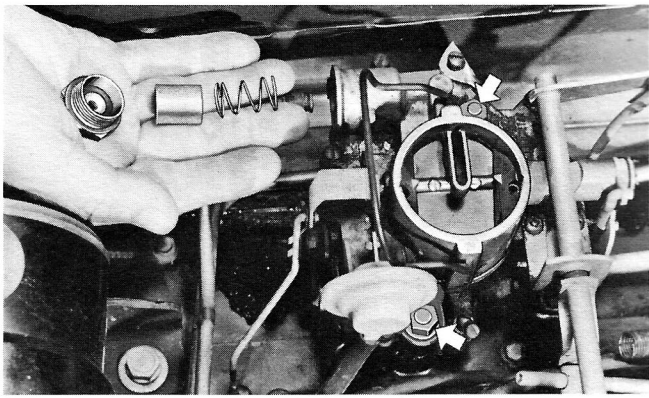


After you set the point gap to specs, Joe—kick the engine over a few times to close the points and check their alignment. If necessary, bend only the fixed contact support. Those look good, Joe.



Now that you've got all distributor parts installed, press all plug wires tightly into the cap towers. If you find any loose, check the socket. If badly burned, replace the cap.

Joe: . . . All wires tight, Dave—what's next?



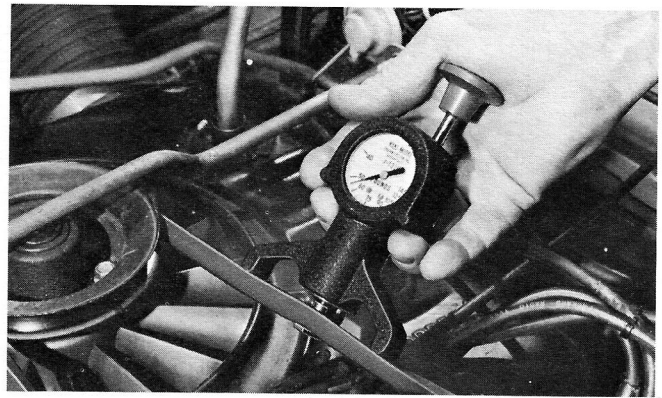
Dave: . . . Well, now that we've worked the ignition system over, remove the sintered bronze fuel strainers at each carburetor. Clean by blowing compressed air through the filter opposite to the flow of fuel; then reinstall. Also, tighten both carburetor hold-down nuts. And one other thing—



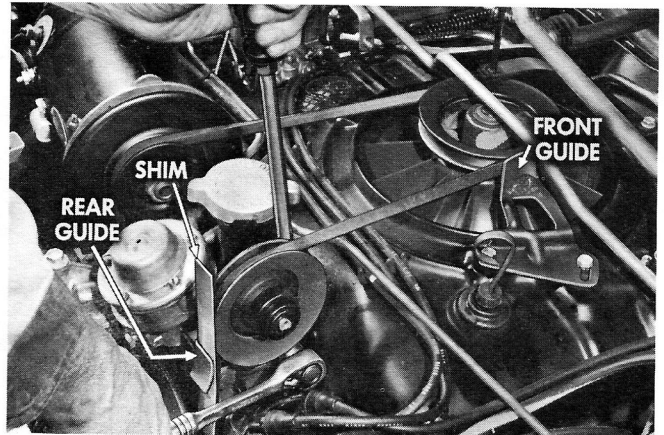
—if you ever get an owner complaint of poor high-speed performance, check both fuel pump volume and pressure. We won't go into that now, but when you have a few minutes, review page 7-11, in the 1961 Corvair Shop Manual. Now, let's service the battery.



Notice that dirt and acid film on top of the cells and on the cables. Better clean it off with a solution of soda or a dilute of ammonia. Check tightness of hold-down hooks and all battery connections. And, before I forget, oil that felt washer, and check water level in the cells. Now for the blower belt.

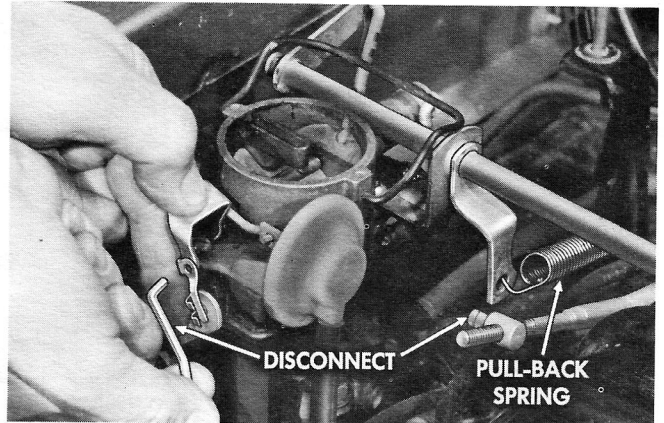


That belt's O.K., but if you find one that is cracked or frayed, don't fool with it, Joe—install a new one. Use our strand tension gauge and adjust old belts to 55 pounds, new belts to 75 pounds. Plus or minus 5 pounds is allowable. And, Joe, let's look at a 1964 model with blower belt guides.

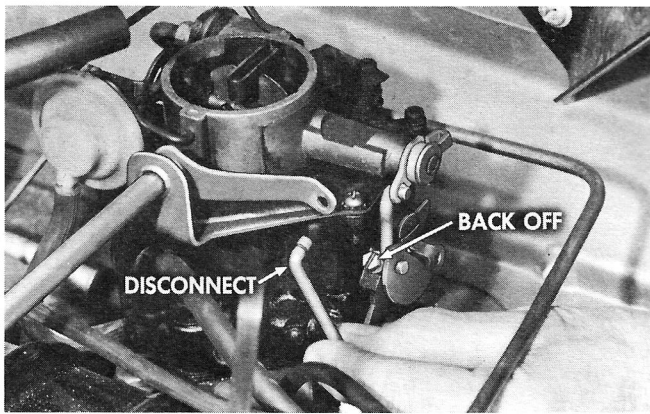


Use a 1/16" shim while adjusting the belt to maintain clearance at the rear guide, and also use the same shim to check and adjust clearance at the front guide.

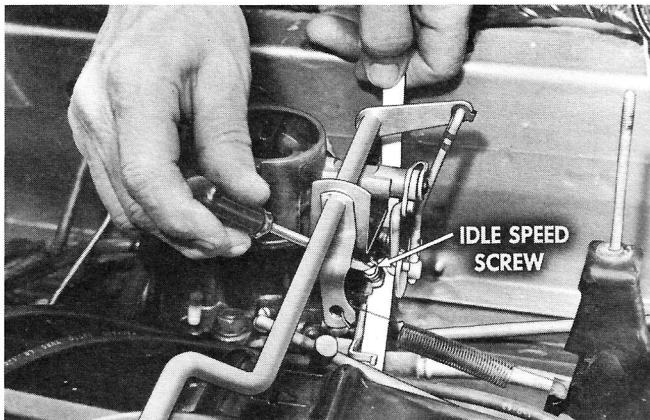
Joe: . . . O.K., Dave, where do we go from here?



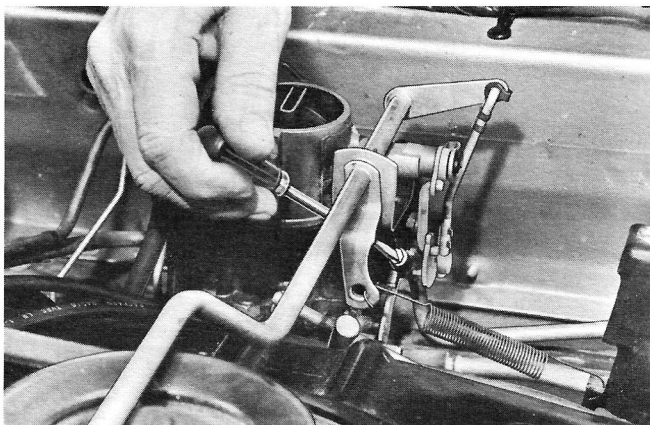
Dave: . . . Well, now let's check the mechanical adjustments of both carburetors. First, disconnect the accelerator rod swivel at the cross shaft lever and reconnect the pull-back spring to the swivel hole. Also, disconnect both choke rods at the choke shaft levers.



Disconnect the throttle rod from the cross shaft lever on the right carburetor and back off both carburetor idle speed screws at least 2½ turns.



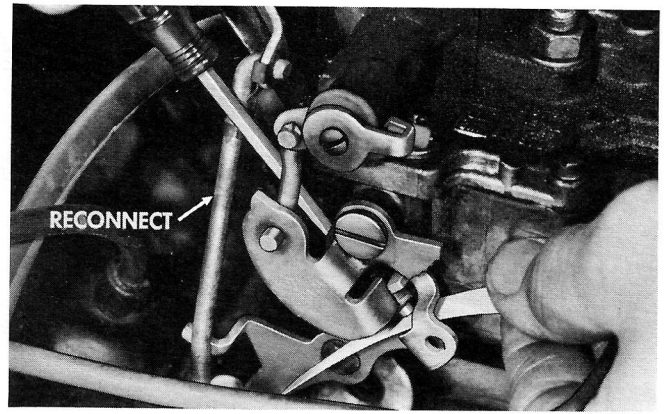
Now, take this strip of paper—it's about ¼" wide and 8" long—and insert it between the idle speed screw and the throttle shaft lever on the *left* carburetor. Both carburetors must be off the fast idle cam. Turn the screw down until you feel a firm drag on the paper, then . . .



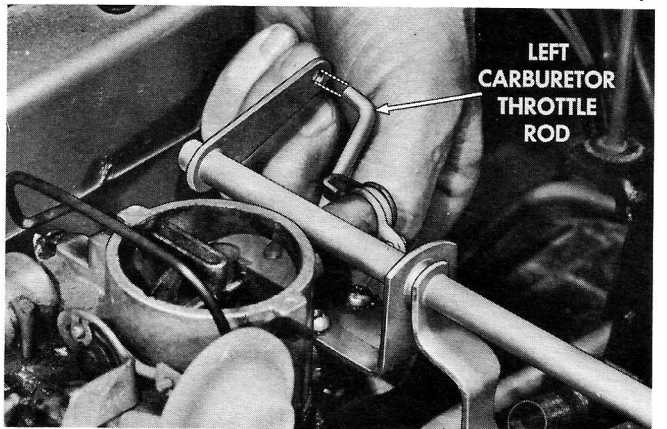
. . . turn the idle speed screw clockwise exactly 1½ turns more. This will give an initial idle speed of 500 to 600 rpm.

Joe: . . . Why not use feeler stock, Dave?

Dave: . . . Well, all other carburetor settings are based on this important adjustment. So, it's got to be right on the nose. Paper gives you a more sensitive feel.

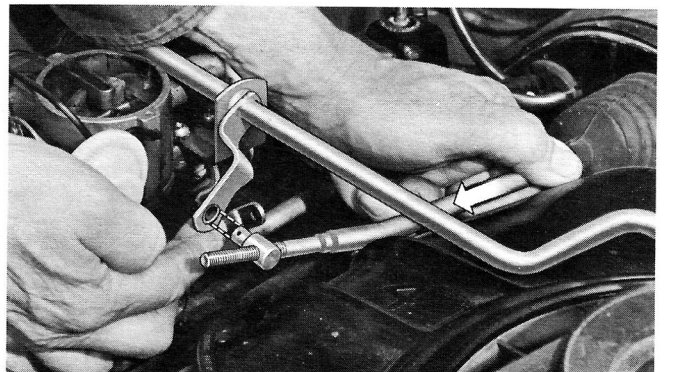


Reconnect the throttle rod on the right carburetor and disconnect the throttle rod from the left carburetor. Now, using the paper strip, repeat the idle speed screw adjustment on the right carburetor in exactly the same way.

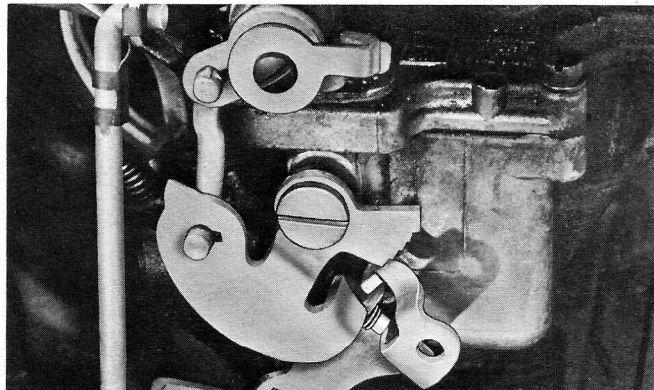


Joe: . . . O.K., Dave, what now?

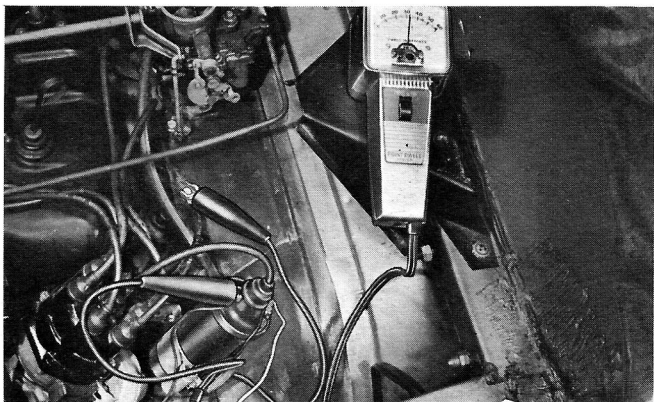
Dave: . . . Hold the throttle rod on the left carburetor in the "Up" position so that the throttle shaft lever is tight against the idle speed screw. Got it? Now thread the rod up or down, as necessary, in the lower swivel until it freely enters into the hole in the cross shaft lever and reconnect the rod.



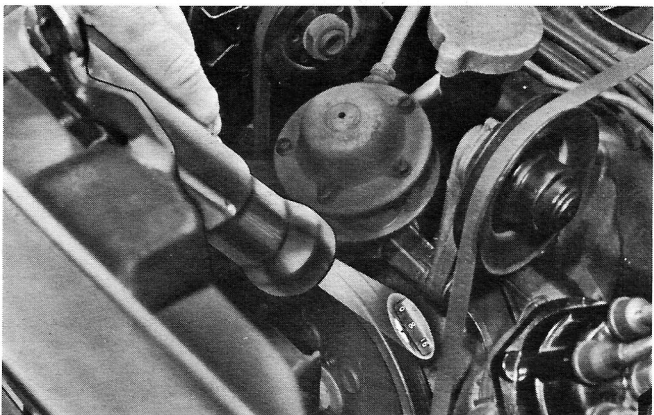
Remove the pull-back spring and hold the cross shaft lever in the wide open position. Pull the accelerator rod rearward as far as possible. On Powerglide models pull the rod "through detent." Now, adjust swivel so that it freely enters into the hole in the cross shaft lever and reconnect with the spring.



Now check carburetors for full return to idle position. If the throttle levers do not contact the throttle screws, never try to readjust the accelerator rod length—make the adjustment at the transmission bell crank. Then, recheck. That's it, Joe. Let's check out the engine with test equipment.



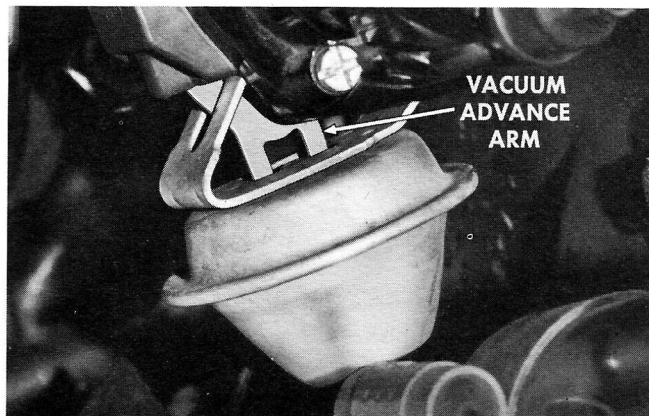
Hook up a dwell meter and a tachometer; then run the engine at 500 to 600 rpm, and note dwell reading. If necessary, readjust point gap and recheck dwell. The reading at all speeds should remain constant or within the allowable variation. If not, it means pulling the distributor for major service.



Now that dwell is O.K., hook up a timing light and disconnect the vacuum advance hose.

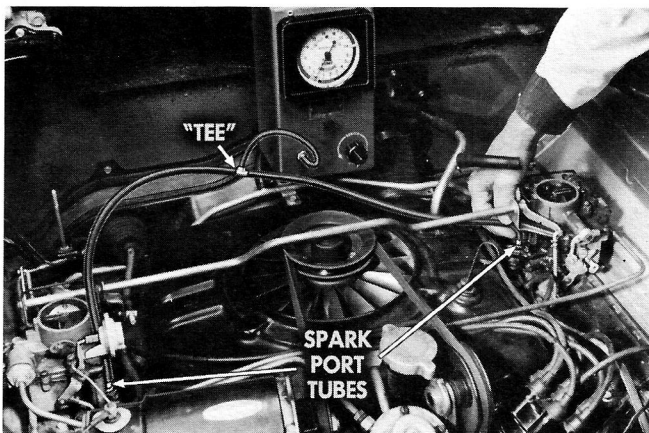
Joe: . . . Want it set on the high side?

Dave: . . . You bet. But remember, only advance the timing within specs, without causing detonation or spark knock.



VACUUM
ADVANCE
ARM

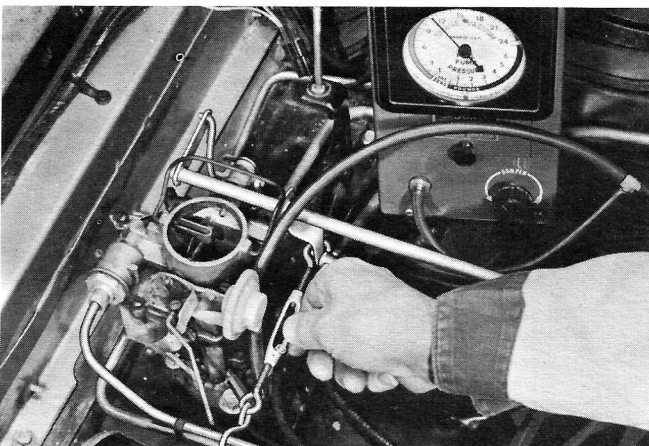
Now, reconnect the vacuum advance hose and while accelerating the engine to approximately 1500 rpm, observe the movement of the vacuum advance arm. If it does not move, it indicates a defective advance unit or hose.



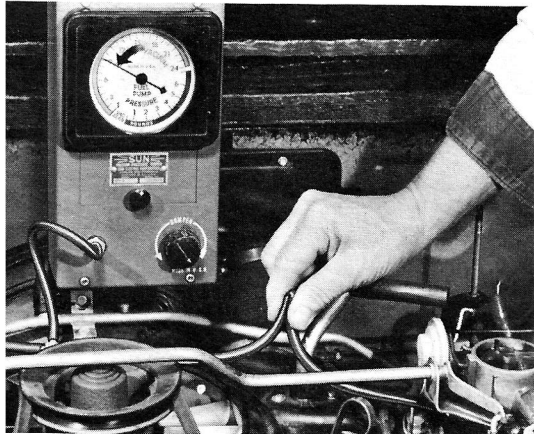
"TEE"

SPARK
PORT
TUBES

Now for the carburetor vacuum balance check. Take this hose assembly and connect it to the left and right carburetor spark port tubes. Connect the vacuum gauge to the "tee."



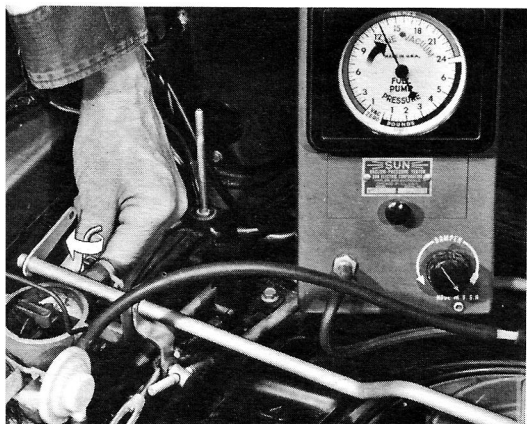
Now, connect this small turnbuckle and hooks to the cross shaft lever and to the fuel lines. Start engine. Rotate turnbuckle to maintain a steady rpm, between 1100 to 1200, and note vacuum reading, usually somewhere between 10" to 14" of vacuum. O.K.? Now—



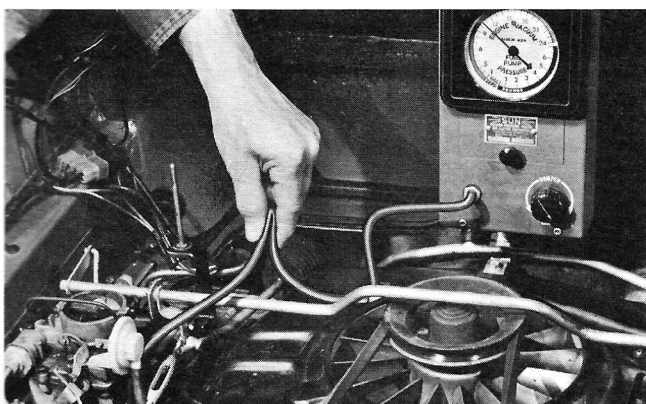
the right-hand hose to shut off vacuum from the buretor and note the gauge reading. If it shows *INCREASE* of *more than ONE* inch of vacuum, return to idle speed and . . .



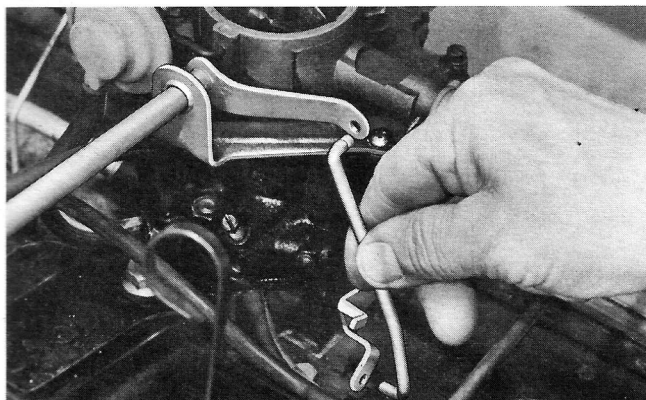
INCREASE the length of the throttle rod on the left carburetor by turning it counterclockwise *ONE* complete revolution. Reconnect rod and recheck. Repeat if necessary until the vacuum reading is steady, plus or minus *ONE* inch.



Now if there is an *INCREASE* of *more than ONE* inch of vacuum when the hose to the right carburetor is shut. In this case, *DECREASE* the length of the right carburetor throttle rod by turning it clockwise *ONE* complete revolution; then reconnect rod and recheck until the vacuum reading is steady, plus or minus *ONE* inch.



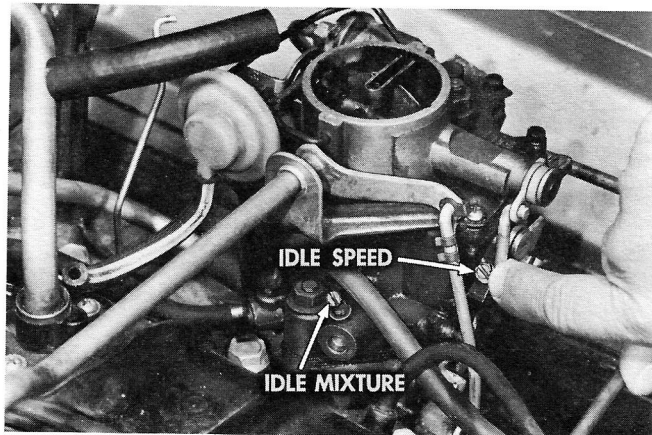
Joe, just for example, let's say that we get a change of *LESS* than *ONE* inch of vacuum on the gauge with the right carburetor hose pinched shut. O.K.? Now, release the right hose and pinch shut the left hose. The carburetion system is considered "in balance" when this test of the vacuum balance between carburetors changes *LESS* than *ONE* inch.



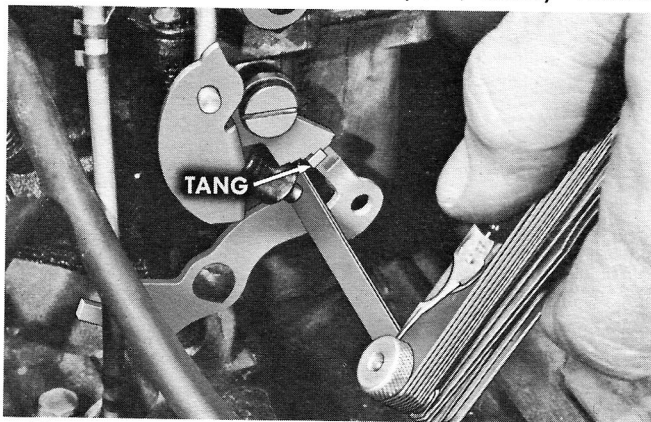
There are some carburetor linkage systems, Joe, where you must remove and bend the nonadjustable right carburetor throttle rod and readjust the left carburetor throttle rod before you can get the carburetors "in balance."



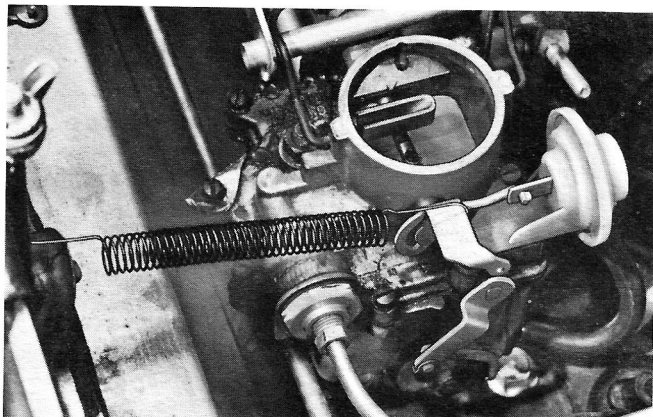
Now let's set idle speed and mixture. Disconnect the choke vacuum hoses from the base of both carburetors, and reconnect the vacuum gauge to these two locations. Slip the spark port hose and plastic cap back on the carburetor tubes. Then—



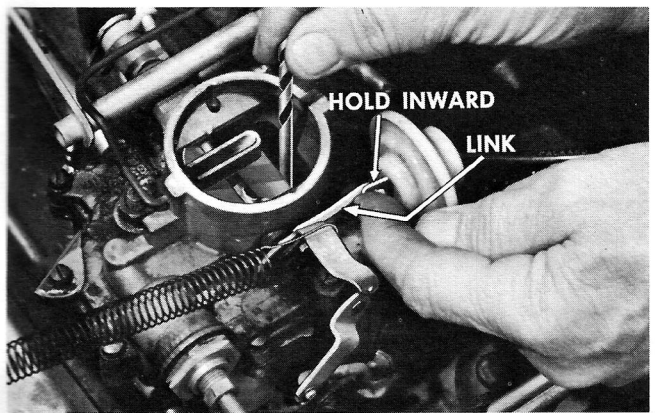
—with the engine running, adjust curb idle with chokes open. When one idle speed screw is turned in one direction, the opposite carburetor idle speed screw must also be turned an *equal amount in the same direction*. Then, adjust idle mixture screws for peak, steady vacuum.



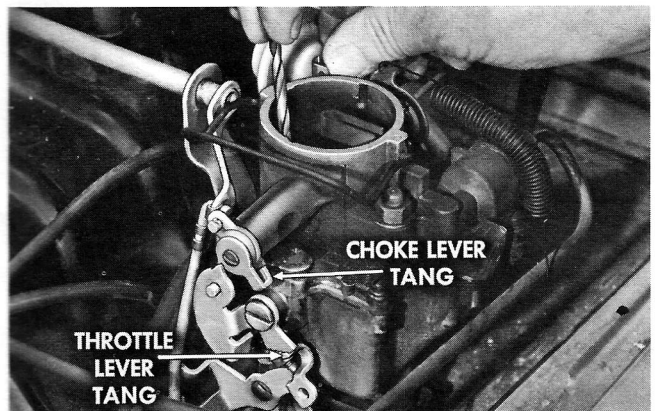
Now, let's check fast idle cam clearance on both carburetors. Shut the engine off and place the tang of the throttle lever on the step of the cam next to the highest step. Clearance between the idle speed screw and the lever should be $.078''$. Bend the tang up or down as necessary and recheck.



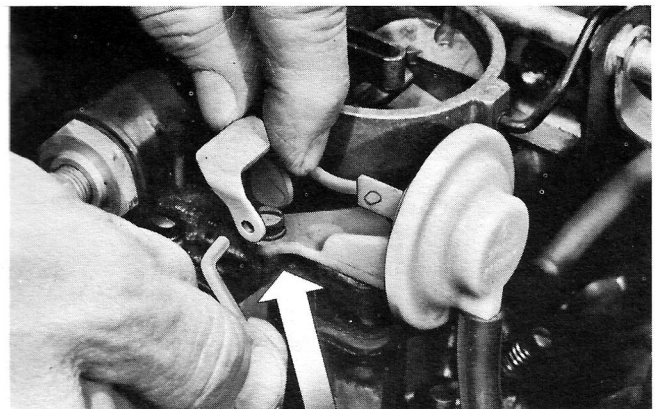
Now, let's check the choke vacuum linkage setting. Use the accelerator pull-back spring to pull the choke valve closed. Hook one end to the choke linkage and hook the opposite end to a convenient location.



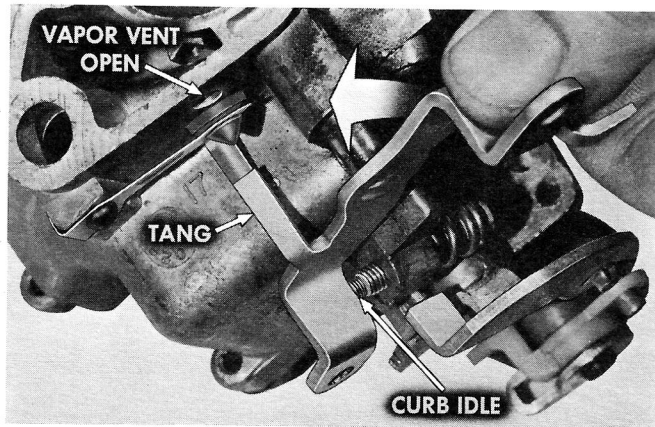
Now, push and hold the vacuum diaphragm arm squarely inward against the diaphragm and use a $3/16''$ drill to measure between the lower edge of the choke valve and the inner wall of the bowl cover. If not within limits, ($.180''$ to $.195''$) remove drill, bend connecting link and recheck. Remove pull-back spring.



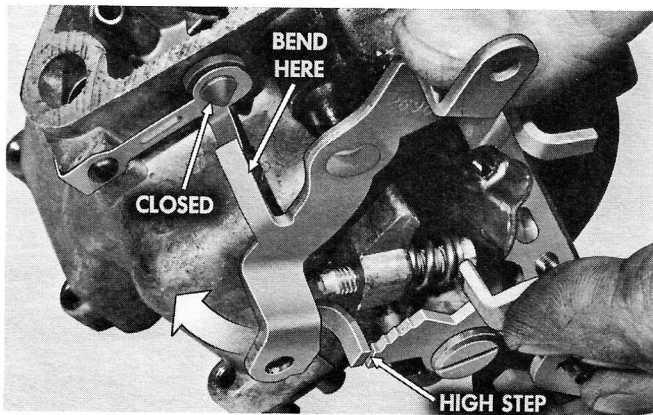
When choke vacuum linkage clearance is correct, the throttle lever tang should rest on the step of the fast idle cam, next to the highest step. If not, adjust by bending the outer choke shaft lever tang with pliers.



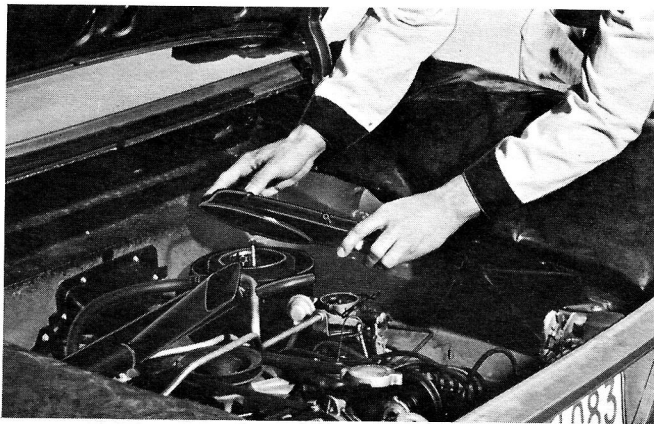
Now, hold the left choke valve closed; then pull the choke rod up until it stops. Turn rod until it freely enters the hole in the choke shaft lever. Then lengthen rod TWO turns. Repeat the operation on the right carburetor, and reconnect choke rods, accelerator rod and pull-back spring. Now, come over to the bench and . . .



... take a look at this 1964 Corvair carburetor. I want to run through the vapor vent check. It's important. The throttle lever tang should hold the vent open at curb idle speed, as you see here. Then—



—when the fast idle tang just begins to move away from the high step of the fast idle cam, the vent should just finish closing. If necessary, bend the throttle lever tang and recheck. O.K.? Let's get back to our own job and wind it up.



Remove all test equipment; then reconnect choke vacuum hoses at the base of the carburetors. Clean air cleaner filter elements and install, or if a paper element is used, check and replace as necessary. Install the spare tire. Start engine, and readjust the carburetor mixture screws if necessary. That's it, Joe.



Joe: ... How does this method of synchronizing the carburetor linkage system work on earlier models, the '60's and '61's?

Dave: ... O.K., except for some choke adjustments.

Joe: ... It sure is a thorough way to tune up *all* Corvairs, and easy too.

NOTES

NOTES