3·2=6

CORVETTE'S NEW 3-CARBURETOR INDUCTION SYSTEM OFFERS 6-BARREL PERFORMANCE ON TURBO-JET 427 V8s

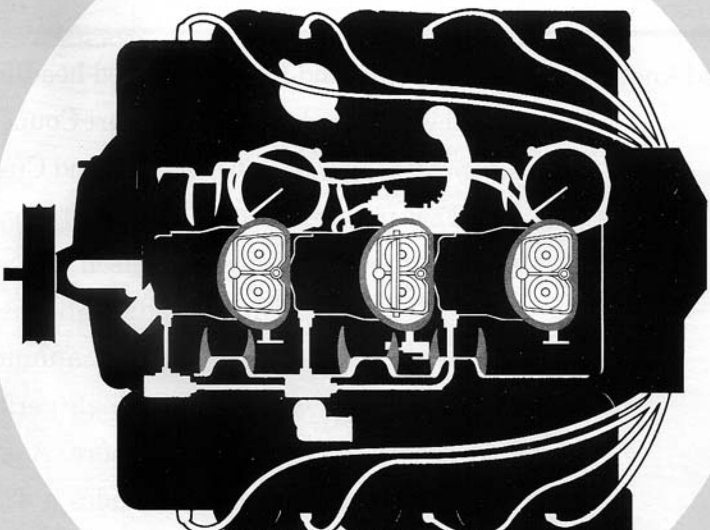

Fig. 1—3 x 2 CARBURETION ON TURBO-JET 427 V8

When you walk into your friendly Corvette-selling Chevrolet dealer's and spy a Corvette with that unique hood—a dead give-away for what rests beneath—chances are you'll be greeted by a new carburetion system when you pop the hood. Under that giant triangular air cleaner are three Holley 2-barrel carburetors (*Figure 1*) and a combination mechanical-venturi vacuum linkage setup designed to urge the maximum response from either the 400- or 435-hp Turbo-Jet 427 V8 engines.

CARBURETORS OPEN TO SATISFY ENGINE SPEED, LOAD DEMANDS—Normal driving generally utilizes only the center, or primary, carburetor. The 2-barrel design and venturi area provide excellent high air velocities necessary for responsive low-end and part-throttle engine operation. Fuel economy is also improved in all normal driving ranges. A unique constant idle system in the two outboard carburetors provides good emission control and engine idle.

When engine speed or load conditions demand, the outboard carburetors open to supply the engine with a fuel-air flow rate of up to 1000 cfm (cubic feet per minute). Positioning of the three carburetors also gives better fuel-air mixture distribution than single carburetor systems. *Figure 2A* shows the mixture flow pattern during normal engine operation using only the center, or primary, carburetor. *Figure 2B* shows how all three carburetors supply fuel-air mixture to the engine under wide-open throttle conditions. Note that during part-throttle operation, the two outboard carburetor throttle plates are fully closed. During full-throttle operation above 4000 rpm, the same throttle plates are fully open.

SECONDARY CARBURETORS USE VENTURI VACUUM FOR PRECISE FUEL METERING—A constant problem confronting engine designers and carburetor engineers is over-carbureting an engine with compound carburetor installations. Corvette's carburetor actuating system is unique. The driver controls the center carburetor directly through the accelerator pedal and linkage. However, the two outboard carburetors are actuated by venturi vacuum of the center carburetor. The outboard carburetors won't open until the mass (air) flow through the center carburetor dictates their opening.

Thus the system combines direct driver control with venturi vacuum control for superior mixture formation throughout speed and load ranges based on driver and engine demand.

The only mechanical connection between the three carburetors is a one-way linkage to insure positive closing of both end carburetors when the accelerator pedal is released. Corvette's 3 x 2 installation differs from previous designs in that vacuum is sensed in the carburetor venturi rather than elsewhere in the engine.

Most enthusiasts know the result of over-carburetion—poor engine response, slower acceleration and poorer elapsed times. Holley and Chevrolet engineers point out that trying to supplant the vacuum system with mechanical linkage will probably lead to the problem of over-carburetion. *Figure 3* shows the vacuum passages (A) and connections to all three carburetors for sensing venturi vacuum. Throttle plates in both outboard carburetors are controlled by the throttle control diaphragms (B).

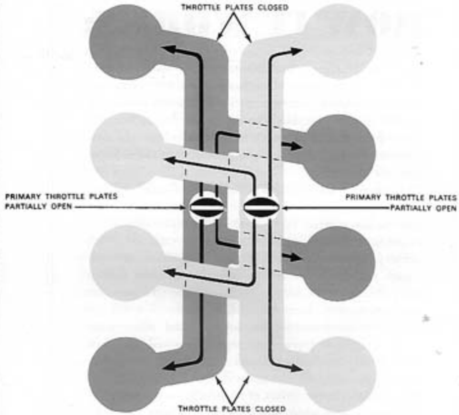

Fig. 2A—FUEL-AIR FLOW THROUGH PRIMARY CARBURETOR ONLY

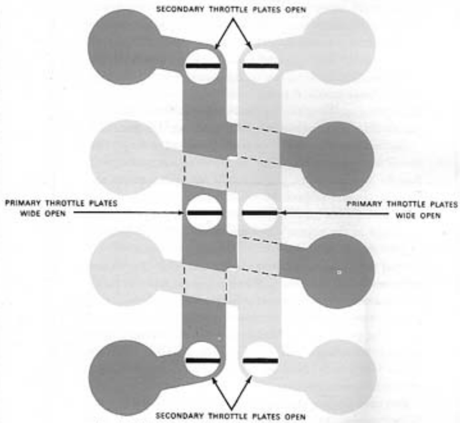

Fig. 2B—FUEL AIR FLOW THROUGH ALL THREE CARBURETORS

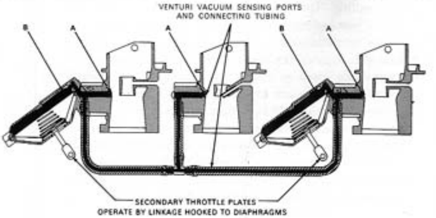

Fig. 3—VACUUM CONNECTIONS TO SECONDARY CARBURETORS

HOW IT WORKS:

1. FUEL INLET—A fuel line from the fuel pump connects to a distribution block beside the front carburetor and lines from it connect to the front carburetor and another distribution block beside the center carburetor. Lines from this block connect to both center and rear carburetors. Fuel filters are incorporated at the inlet of each carburetor.

2. IDLE AND METERING SYSTEMS—*Figures 4A* and *4B* show the center and one outboard carburetor idle system. The primary idle system in the center carburetor is an inverted "U" system shown by callouts. With primary throttle plates (A) in the idle position, idle discharge passages below the throttle plates permit fuel to enter the airstream. Idle adjusting needles (B—only one is shown) control the amount of fuel.

The outboard carburetors have a fixed idle system mentioned on the previous page. The fixed idle flow through very small idle passages in each outboard carburetor (*Figure 4B*—C) maintains good idle characteristics. This reduces the possibility of flooding from the outboard carburetors, and maintains a fresh fuel supply in both outboard carburetor fuel bowls.

The main metering system in the primary carburetor (*Figure 5*) operates at cruising speed when the accelerator is further depressed. Fuel flows from the bowl through main jets (A) which meter fuel into the bottom of the main well (B). Fuel moves up the main well and through the discharge nozzle, into the booster venturi (C). Throttle plate position (D—shown in wide-open position) controls the air flow and fuel-air mixture entering the manifold.

Outboard carburetors, operated by vacuum diaphragm assemblies, include fixed fuel restrictions controlling fuel flow to transfer slots (*Figure 4B*—D) and then to the booster venturi (*Figure 4B*—E).

3. ENRICHMENT SYSTEMS—Manifold vacuum through a passage in the primary carburetor main body (*Figure 6*—A) controls power enrichment. High vacuum at idle or normal cruising conditions holds the diaphragm and valve assembly (B) closed. When manifold vacuum drops during acceleration or power requirement conditions, the power valve spring (C) overcomes reduced vacuum and opens the power valve. Fuel flows through the valve (D), upward through channel (E) bypassing the main metering jets and then to the discharge nozzle (called out) enriching the fuel-air mixture.

For cold engine starting, an automatic choke on the center carburetor provides correct enrichment and increased idle speeds during warmup to prevent hesitation and stalling. The automatic choke (*Figure 7*) includes both a heat-sensing element (A) mounted in a well in the intake manifold and a vacuum-operated diaphragm (B). Fast-idle steps on the fast-idle cam (not shown) reduce engine idle speed as the engine warms up. At normal operating temperature, the choke is fully off and the choke valve (C) then should be fully open (as illustrated). An unloader tang (D) may be manually operated to open the automatic choke fully should the engine flood. If the engine floods, hold the accelerator to the floor and run the starter with the ignition key. Do *not* pump the accelerator—this will only increase flooding.

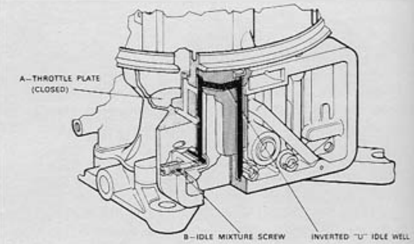

Fig. 4A

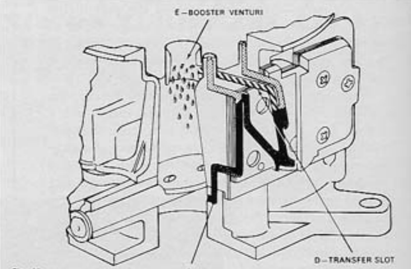

Fig. 4B

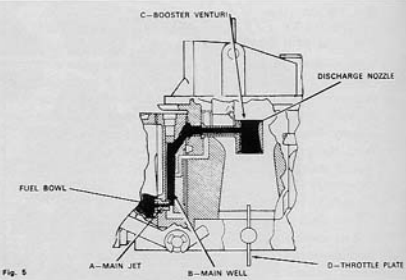

Fig. 5

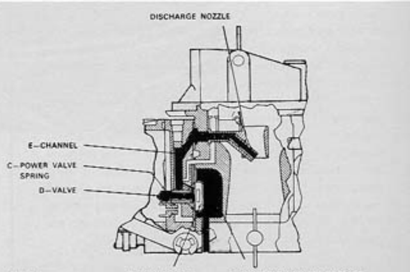

Fig. 6

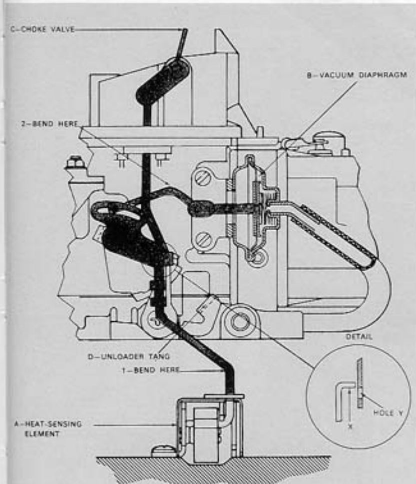

Fig. 7

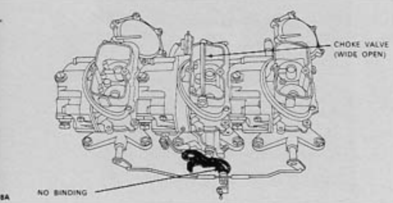

Fig. 8A

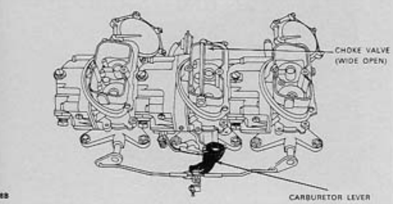

Fig. 8B

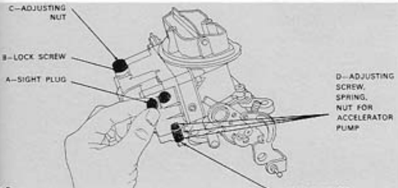

Fig. 9

ADJUSTMENTS ARE SIMPLE AND PRECISE—Level ground insures accuracy. Set parking brake, transmission in neutral, remove air cleaner and warm engine.

1. FAST IDLE—A contoured fast idle cam contacts a fast idle adjustment lever on the choke side of the center carburetor. Open throttle at carburetor and close choke valve by hand to bring fast idle cam into position (fast step). Close throttle and let choke valve return to open position. Restart engine *without touching accelerator* and note rpm. 2000 is correct for 400- and 435-hp V8s. Be sure fast idle cam is on fast step and adjust speed by bending tang on fast idle lever.

2. IDLE MIXTURE—With engine cold, turn idle *mixture* screws (clockwise) on the side of the center carburetor metering block *lightly* to fully closed position. DO NOT FORCE. Then turn counterclockwise one full turn. Start and warm engine. Move throttle lever several times to be sure fast idle cam is released. Then adjust each mixture screw slowly until engine idle increases or stabilizes smoothly. Correct setting occurs when engine runs smoothly at specified idle speed.

3. AUTOMATIC CHOKE—Make preliminary adjustment with engine cold. Hold choke valve closed with rubber band. Remove clips from deep well choke lever (*Figure 7*). Correct setting of cold choke to operating lever occurs when bottom edge of the top end of the rod (X) is even with top of the hole (Y) in the choke operating lever (see detail). Adjust, if necessary, by bending choke rod at point 1. Remove rubber band from choke plate and insert choke rod into operating lever. Choke valve will open correct distance. Now adjust vacuum unit. Hold choke valve closed with rubber band. Measure distance between choke valve lower edge and throttle body. If necessary, bend vacuum rod at point 2 to achieve desired distance.

Set choke unloader (D) by first blocking throttle in wide open position. Move choke valve toward closed position until linkage contacts unloader tang (D). Bend unloader tang (D) to give least amount of choke valve movement toward closed position.

4. LINKAGE ADJUSTMENT—With engine off, move dash lever fully rearward (*Figure 8B*) against dash panel. Adjust throttle rod by turning rod in swivel to line throttle rod up with carburetor lever hole. No binding should occur between accelerator rod and carburetor lever (*Figure 8A*).

5. FLOAT LEVEL ADJUSTMENT—Remove three sight plugs (*Figure 9—A*). Start engine. Observe fuel level through sight plug openings. *Correct fuel level is even with bottom threads in the sight plug ports—plus or minus 1/32".* If fuel level is incorrect, loosen lock screw (B) on affected carburetor. To raise fuel level, turn adjusting nut (C) below lock screw counterclockwise. Note: 1/6 turn will raise fuel level about 1/16". Turn the nut clockwise a like amount to lower fuel level. Allow the engine to idle a minute for the fuel level to stabilize. Tighten lock screw when fuel level is correct, replace sight plugs and air cleaner.

6. ACCELERATOR PUMP—With the engine off, block throttle lever in the wide-open position and hold pump lever screw *down*. Adjust clearance between adjusting nut and pump arm to .015" (*Figure 9—D*). Turn nut or screw as required. After adjustment, return throttle lever to normal closed position. Then move the throttle rod slightly. Rod should move accelerator pump lever without slack.