71. The Zenith Carburetor

Bron: http://www.jaimekop.com/CarbManual/Page01/toc.html

The Zenith Carburetor

service

This handbook is designed as a guide for adjusting the Zenith Carburetor. The adjustments are listed in their proper performance sequence.

Included with each adjustment procedure are problems which may be experienced if that particular system is not performing properly.

Adjustment values for all models can e found on page 31

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A. INTRODUCTION

The Zenith Carburetor is a two-stage carburetor with throttle valve diameters of 35 mm. for stage I and 40 mm. for stage II.

It consists of four main parts which are bolted together:

1. Carburetor Cover (choke plate, idling speed air hole and transition air hole);
2. Plate block (with all jets, accelerating pump, float and float chamber venting valve);
3. Float Housing (with mixing chamber and venturi for stage I and stage II);
4. Throttle Valve Section (with throttle valves, idling speed mixture regulating screw and bypass bores).

The Zenith was used by Mercedes in type 220Sb from 1964 and up until 1972 in the 250/8.

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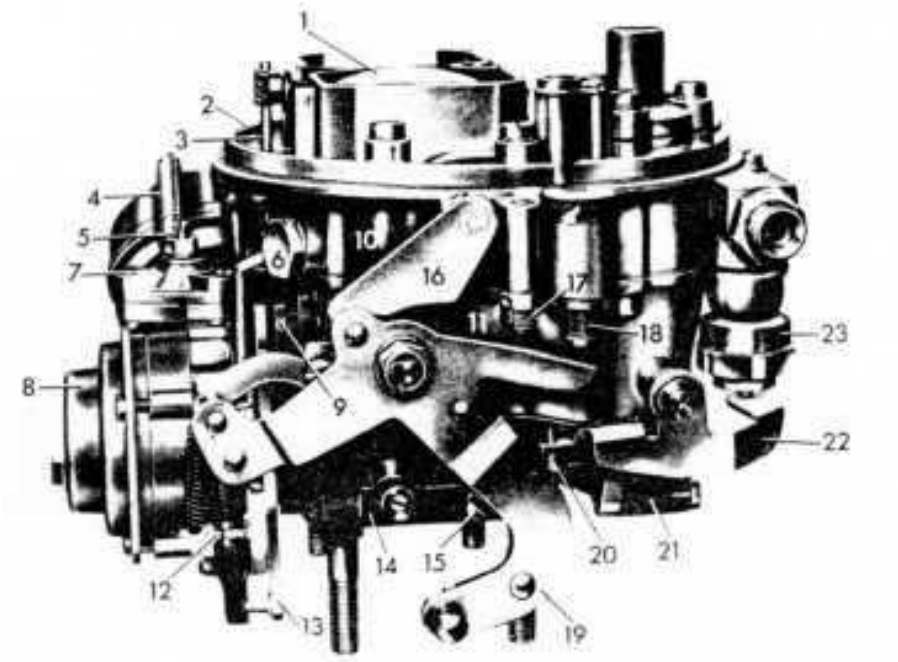
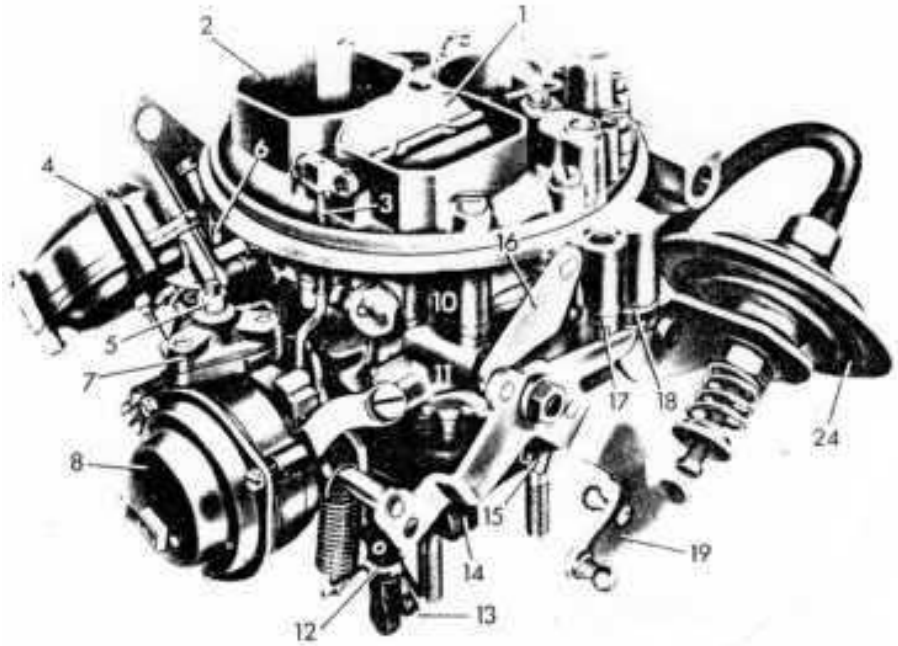
PARTS INDENTIFICATION





1. Choke Flap
2. Carburetor Cover
3. Choke Rod
4. Vacuum Chamber, 2nd Barrel
5. Choke Gap Adjusting Screw
6. Fastening Bolt for Pre-Atomizer
7. Choke Gap Control Assembly
8. Choke Cover
9. Throttle Lever, 2nd Barrel
10. Plate Block
11. Float Bowl
12. Idle Speed Adjustment
13. Throttle Relay Lever; 1st Barrel
14. Throttle Plate
15. Idle Mixture Screw
16. Pump Lever
17. Stop Screw
18. Float Bowl Vent Valve
19. Actuating Lever
20. Fuel Return Valve Adjustment Screw
21. Idle Lifting Switch
22. Activating Lever
23. Fuel Return Valve
24. Vacuum Throttle Control

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B. ADJUSTMENTS

1. VENTING VALVES. (Pre-1972)

Function

Bowl venting gives a reliable hot start.

Ventilation is achieved through the venting valve controlled by the carburetor linkage. When driving, bowl ventilation is in the air cleaner. At idle and when engine is stopped, ventilation is outside the air cleaner. This eliminates starting difficulties caused by fuel vapors entering intake manifold when engine is hot.

The venting valves were eliminated on 1972 models in order to conform to federal requirements. Only internal venting is provided on these models.

Problems

1. High fuel consumption can occur if the valve is stuck in the open position.

2. Hot starting problems can occur if the valve is stuck closed.

Adjustment

1. Remove carburetor connecting linkage. (See Fig. 1)

2. Remove vacuum throttle control. (See Fig. 2)

3. Open chokes. (See Fig 3)

4. On late carburetors the vent valve has a stop screw. This has been set at the factory and should not be changed. If it has been tampered with, readjust it to provide 2.5-2.8 mm. vent pin lift. (If changed other carburetor adjustments are affected.) (See Fig 4)

5. On early carburetors, without stop screw, this adjustment must be performed last. This adjustment is made by bending the arm at the notch to provide 2.5‹ 3.0 mm. vent pin lift. (See Fig. 5)

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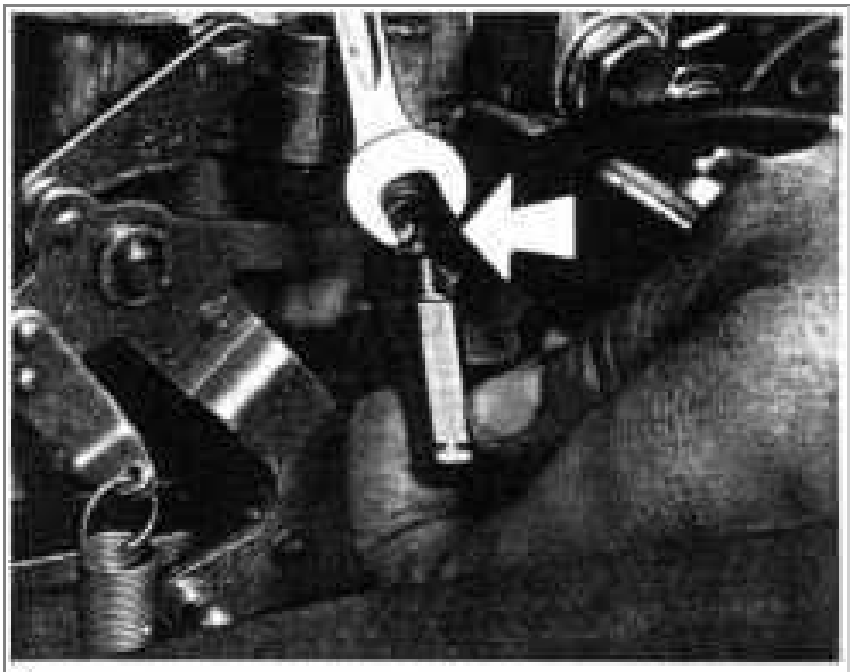

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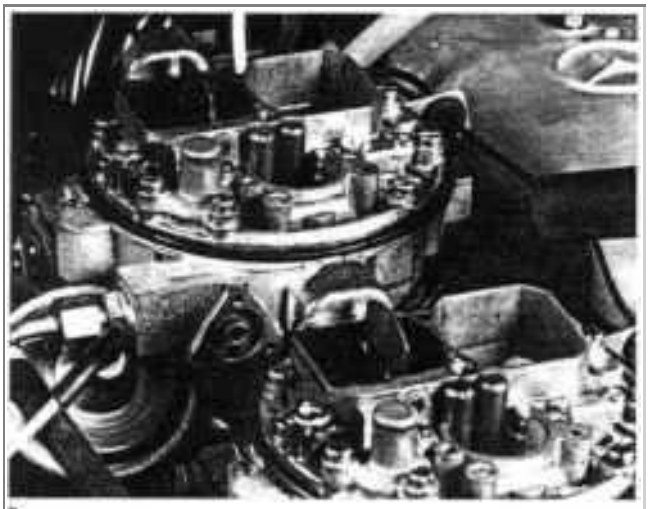

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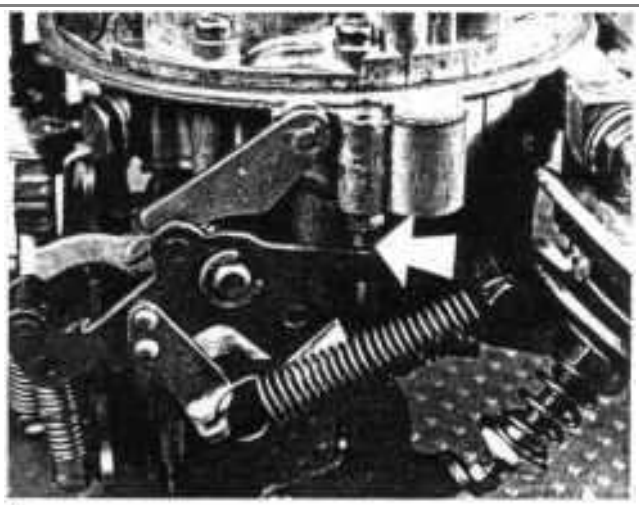

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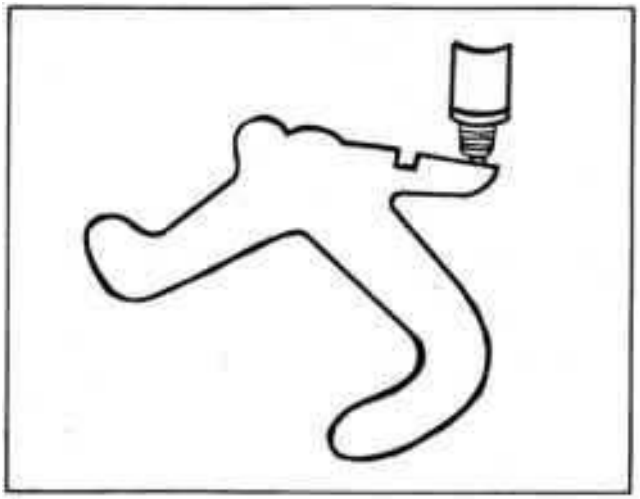

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2. ACCELERATOR PUMP

Function

The function of the accelerator pump is to momentarily provide the additional quantity of fuel needed during acceleration, until the flow delivered from the main metering system increases. This is required whenever the throttle is suddenly opened.

The pump is a piston type pump, operated through the throttle linkage. It is used in stage I only. Located inside the float chamber, it is constantly surrounded by gasoline.

When the pump lever is actuated, the pump piston forces fuel through channels and out through the calibrated injection pipe into the carburetor throat.

Problem

Examine pump plunger for damage and sticking. A faulty accelerator pump will cause:

1. Hesitation on acceleration

2. Stalling

3. Fuel consumption

Test: Pump lever should have tension‹if not, pump is binding in bore

Adjustment

To check the accelerator pump for proper function the top cover and pre-atomizer in the primary stage must be removed.

1. Start of Injection Immediately on opening the throttle, a powerful jet of fu' should emerge. (See Fig. 1)

2. Injection Amount Using a graduated container‹part no. 111-589-17-21-00, pump for one full stroke. The amount should be 0.7-1.0 cc. (See Fig. 2, 2A.)

Inspect accelerator pump checkballs, inlet and outlet. (See Fig. 2B)

3. Adjust the injection amount by bending the internal lever. (See Fig. 3)

4. Direction of injection. Pre-1972 and 1972 (See Fig 4)

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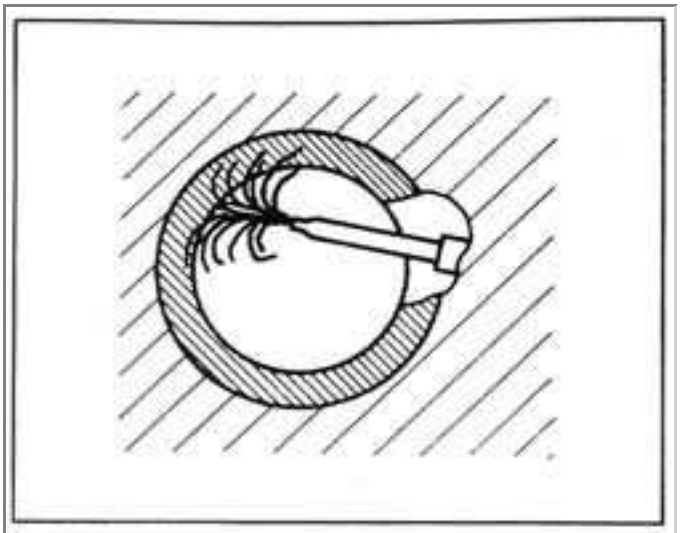

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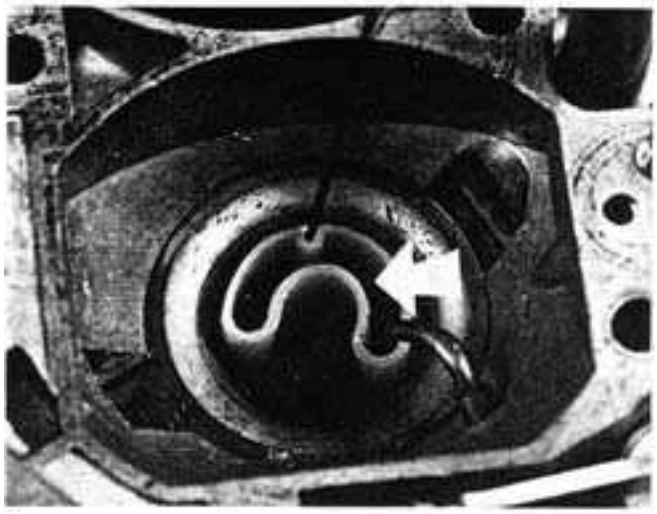

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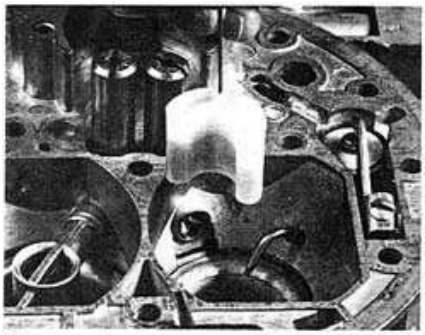

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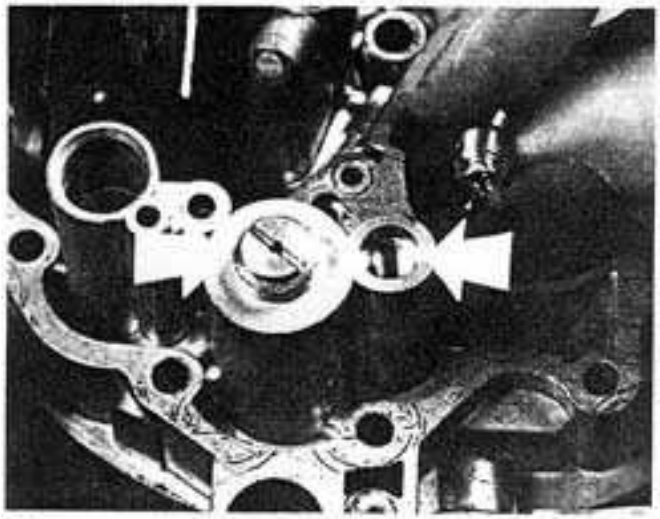

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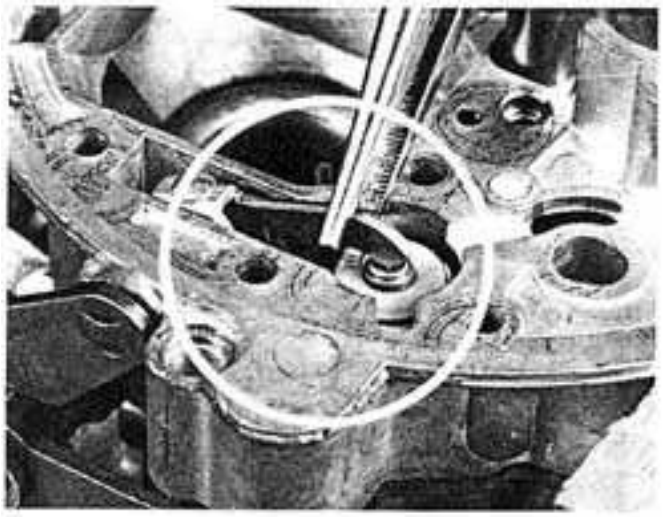

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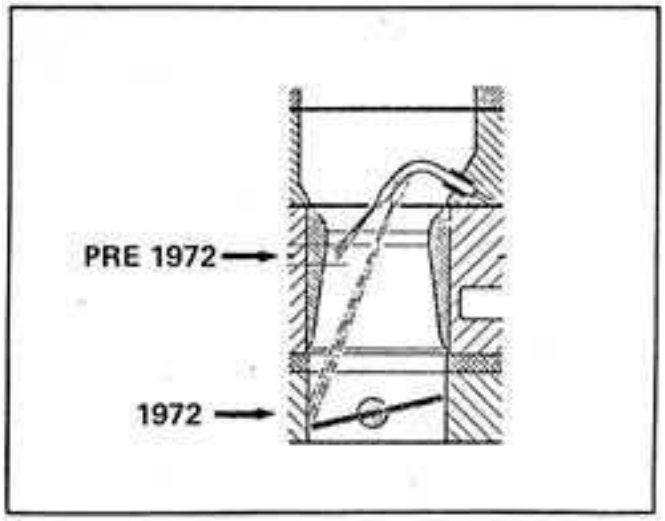

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3. FLOAT LEVEL

Function

To establish the fuel level in the carburetor. The Zenith carburetor is highly sensitive to the float level.

Problems

1. Incorrect float {fuel) level will cause:

    a. Fuel consumption

    b. Lean or rich fuel mixture

    c. Stalling and hesitation

    d. Hard hot starts

2. Float filling with fuel and sinking‹will cause flooding.
3. Fuel needle valve sticking‹will cause flooding.
4. 1972 Models with spring-loaded ball needle valves‹ball can fall out.

Adjustment

1. Remove plate block section. (See Fig. 1)

2. With gasket in place, measure from plate block to bottom of float. (See Fig. 2)

3. Adjust float level by changing thickness of seal ring under the needle valve assembly. (See Fig. 3)

4. Check data and adjustment guide on page 34.

5. Seal ring changes

Seal Ring	Part No.
0.5 mm	000-997-81-40
1.0 mm	000-997-28-40
1.5 mm	000-997-82-40
2.0 mm	000-997-83-40

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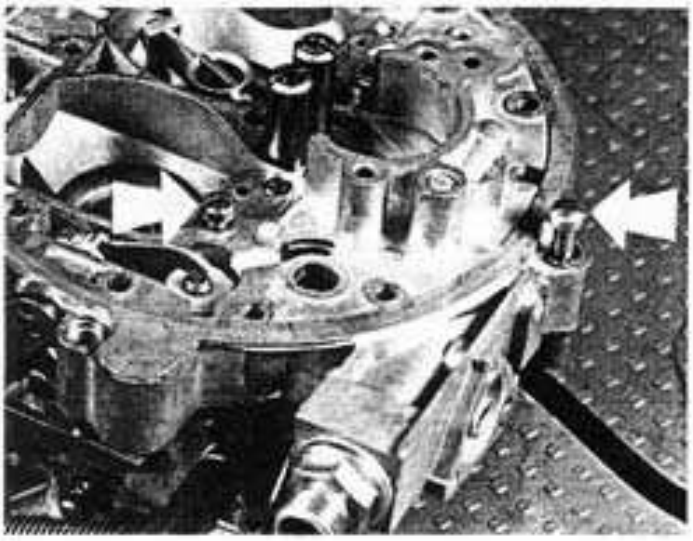

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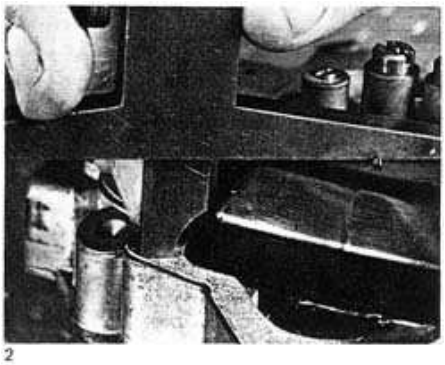

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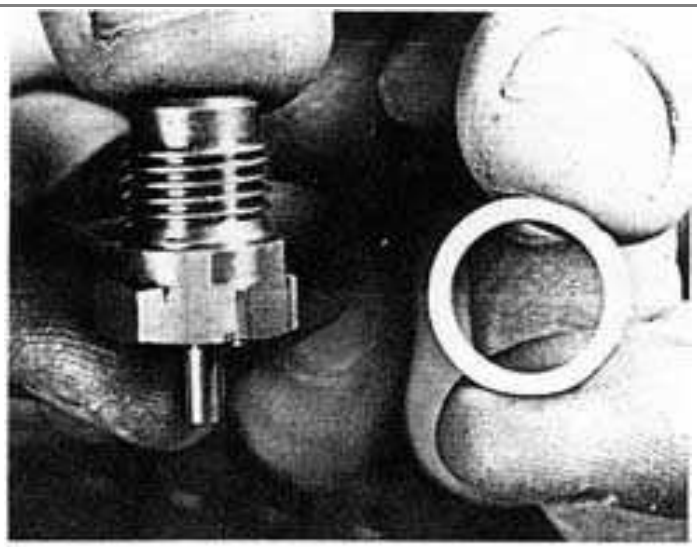

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4. SECOND STAGE DIAPHRAGM

Function

The second stage diaphragm operates the second stage throttle depending upon throttle position and engine load.

Problems

If the second stage diaphragm is not operating properly the following may be experienced:

1. Poor acceleration.

2. Inability to reach full speed.

Inspection

1. Locate the two vacuum supply holes for the second stage diaphragm housing. (See Fig. 1)

2. While the plate block section is removed, lift the second stage diaphragm and place fingers over the vacuum holes in the venturi. (See Fig. 2.)

3. Release the diaphragm. Vacuum will hold the diaphragm if there are no leaks.

4. If the diaphragm is bad, only it needs replacing. (See Fig. 3)

5. Reassemble carburetor using all new gaskets. (See Fig. 4)

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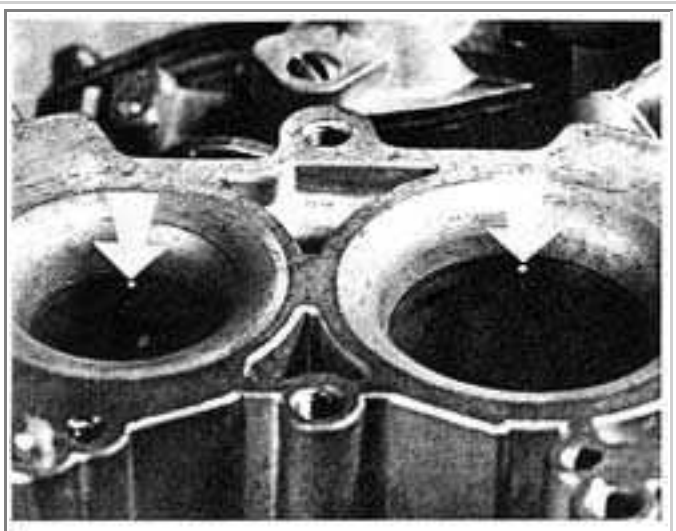

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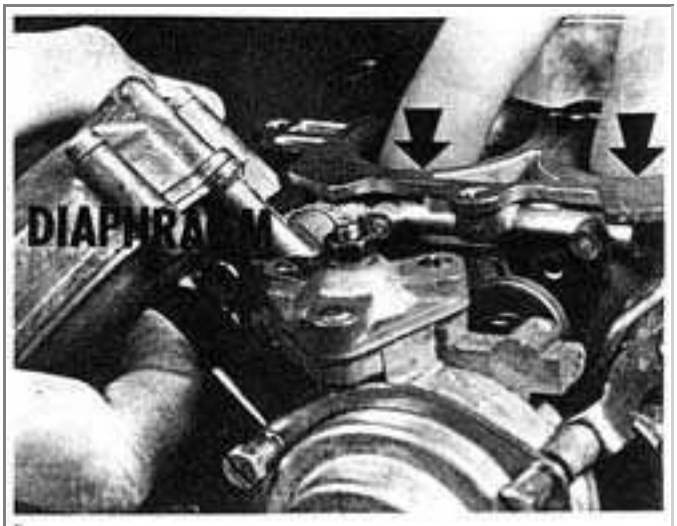

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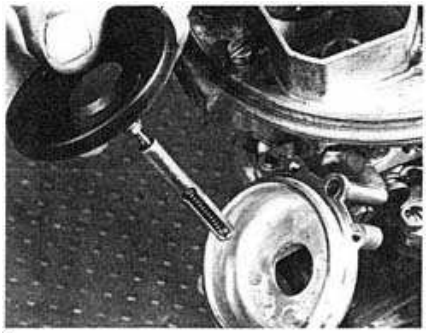

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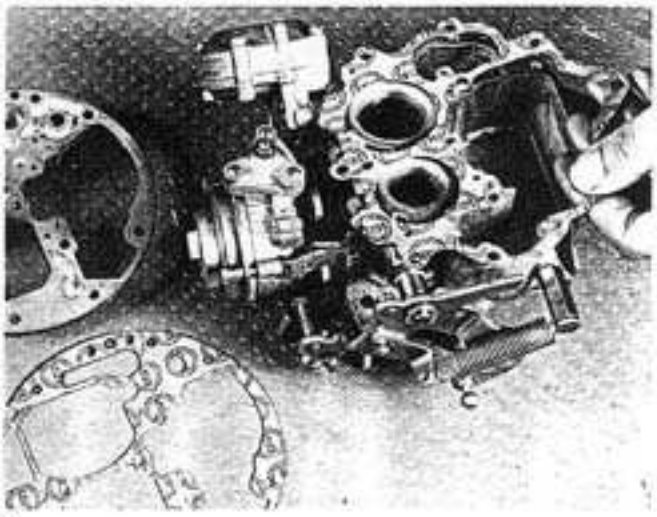

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5. IDLE FUEL SHUT-OFF SOLENOIDS (used in 1971-72 models)

Function

Idle fuel shut-off solenoids act as check valves. When the ignition switch is turned OFF, the solenoids shut off the fuel at the idle port to prevent "dieseling" or "after-run."

Problem

If idle fuel shut-off solenoids are not functioning properly, the driver may experience

1. Dieseling or after-run.

2. Shut-off valve malfunction produces the same characteristics as a "plugged" carburetor idle jet (rough idle).

Testing

1. To test the idle shut-off valves, disconnect and reconnect the single pin connectors individually with the ignition switched on. The noise caused by the valve opening must be audible. (See Fig. 1)

1

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6. IDLE SPEED AND MIXTURE

Function

The idle circuit is contained in the first stage of the carburetor. Fuel is drawn up into a cavity within the carburetor cover through the idle fuel jet. Here it is mixed into an emulsion with the air entering through the idle air bore. By way of a channel, this emulsion flows to the fuel mixture outlet at the idle mixture screw and to the by-pass bores. The by-pass bores serve to improve transition from idle jet to main jet system when opening the throttle.

IMPORTANT

The carburetors must be synchronized in order to prevent the possibility of performance problems.

Adjustment

1. With car at full operating temperature, synchronize the throttle plates of each carburetor using "Syncro-Test" device and adapter piece. Adjust to specified idle RPM. (See Fig. 1)

2. Adjust idle mixture screws to the same position by blocking off the idle air bore in the top cover, one at a time, and matching the RPM drop. This procedure prevents damaging the idle mixture screws. (See Fig. 2 and 2A)

3. Observing tachometer and exhaust analyzer, adjust throttle valves, and mixture as necessary to arrive at specified idle RPM and specified carbon monoxide. (See Fig. 3)

NOTE: Continually check balance of throttle valves (using "Synchro-Test") and mixture (using idle air bores) as the adjustments are made.

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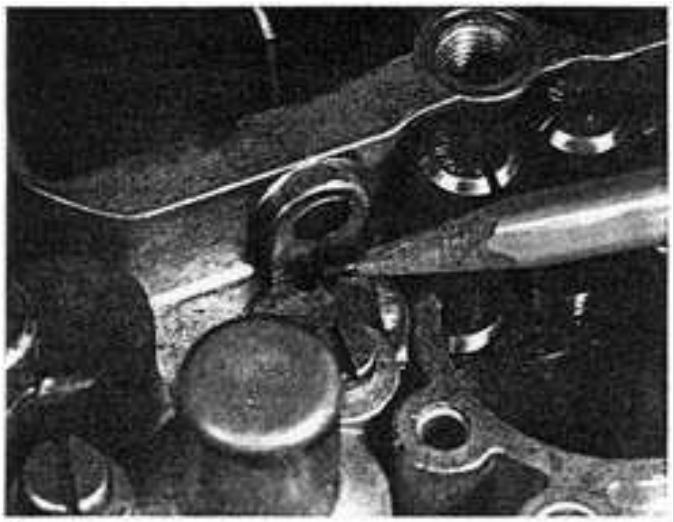

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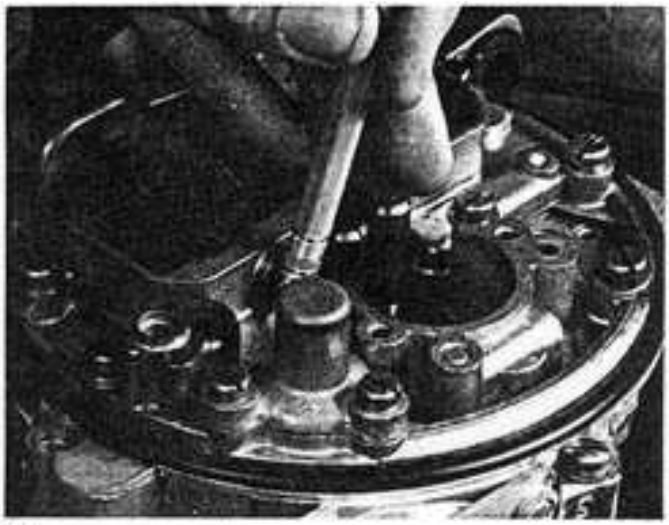

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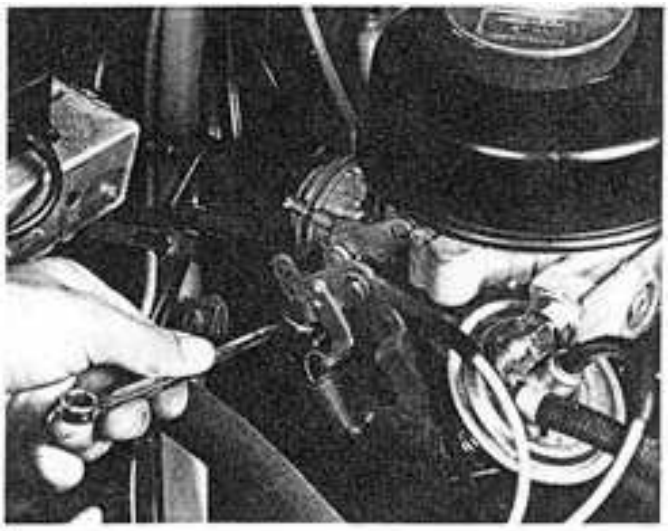

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7. LINKAGE

Function

To control synchronization while opening the throttle and transmission shifting.

Problems

If the linkage is not properly adjusted:

1. The carburetors will not be synchronized.

2. Shift pattern problems (too early or too late) may be experienced.

Adjustment

1. Long Rod Adjust the long center connecting rod to fit tension free and install. (It must be tension free so as not to change synchronization.) (See Fig. 1,1A)

2. Short Rod with Free Travel With the free travel fully extended the rod should fit neutral from ball joint to ball joint. (See Fig. 2, 2A)

3. Short Rod‹Solid Adjust the rod slightly short from ball joint to ball joint, so that the bell crank is lifted from its rest position by approximately 2 mm. (See Fig. 3)

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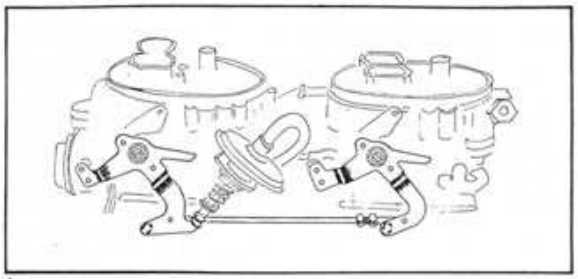

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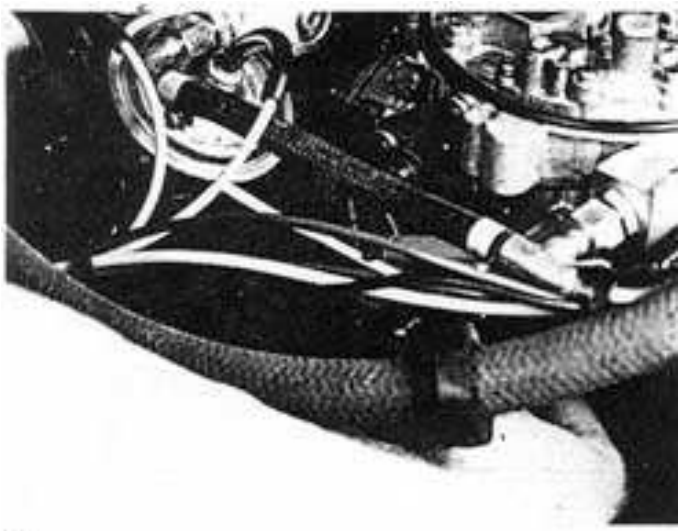

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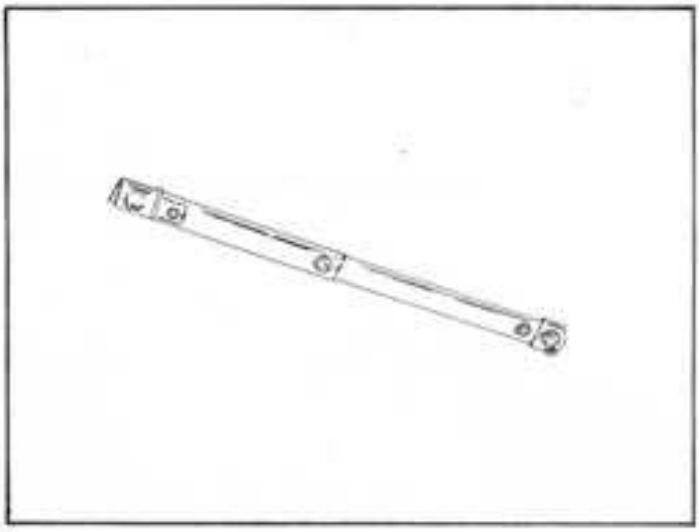

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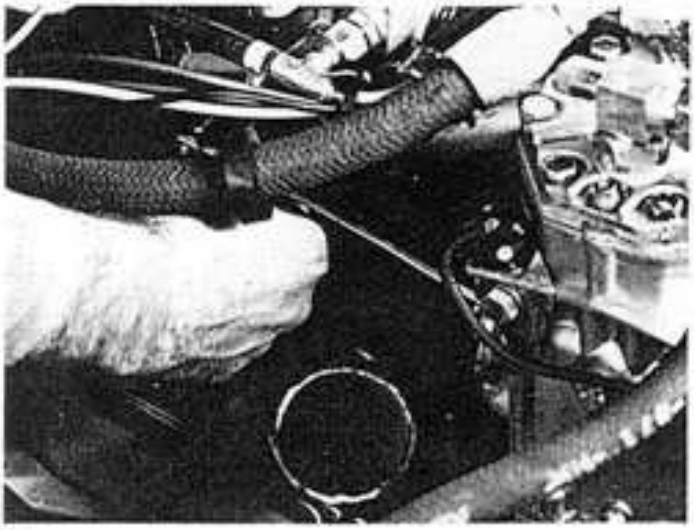

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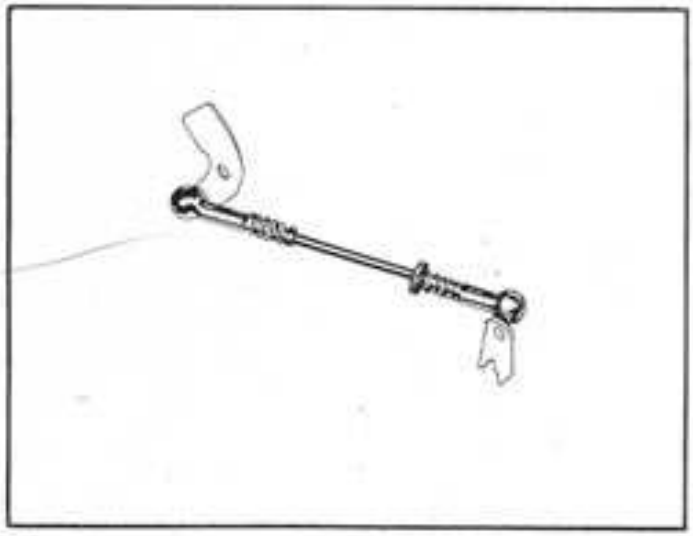

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8. CHOKE COVER TENSION

Function

The Zenith Carburetor is equipped with an automatic choke which is controlled by an electrically heated bi-metal spring. A connecting rod keeps the choke under the tension of the spring which responds to any change in temperature. When the engine is cold, the spring holds the choke closed. When the engine starts, the gap control unit opens the choke to prevent over enrichment.

Problems

If the choke cover tension is not properly adjusted the following could occur:

1. Warm up problems.

2. Stumbling, stalling, hesitation.

Adjustment

1. From the factory, both choke covers are adjusted 5 mm. in the rich direction. (See Fig. 1)

2. Re-adjustment is required at the second vehicle service. (See Fig. 2)

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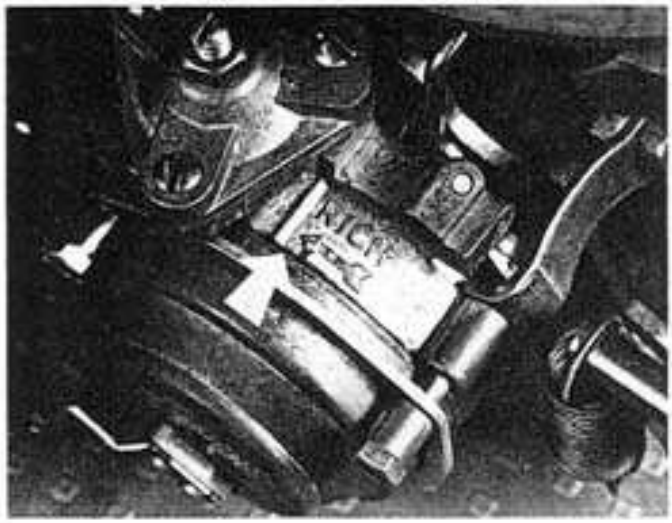

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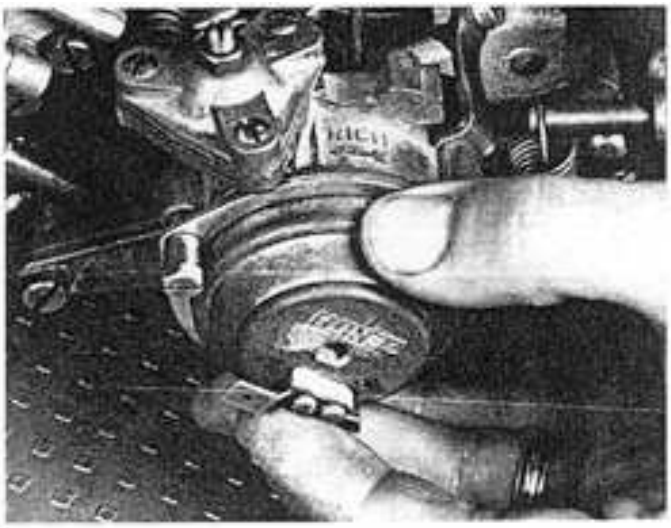

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9. CHOKE TIE ROD

Function

The function of the choke tie rod is to tie together the operation of the choke plate, bi-metal spring, high idle cam and choke gap.

IMPORTANT

Prior to making any adjustments related to the choke, the tie rod must be adjusted to its proper basic length. This insures that when the choke flap shuts the high idle cam is turned fully to the high step.

Adjustment

1. Block throttle linkage partially open to free choke cam. (See Fig. 1)

2. Loosen set screw at top of choke rod. (See Fig. 2)

3. Lift relay lever at bottom of choke rod to its full up position. (See Fig. 3)

4. Close choke flap fully, allowing connecting lever to center itself, and tighten set screw.(See Fig. 4)

Note: Late types have 1.5 mm. allen set screw.

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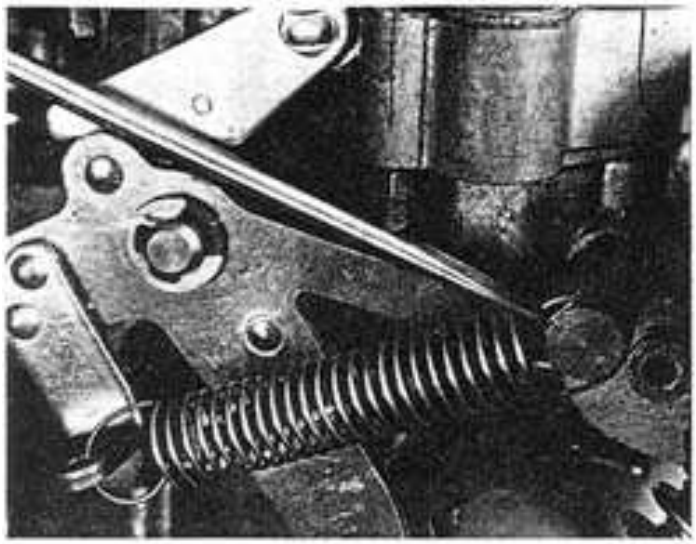

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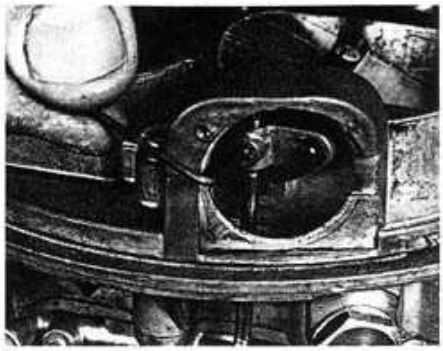

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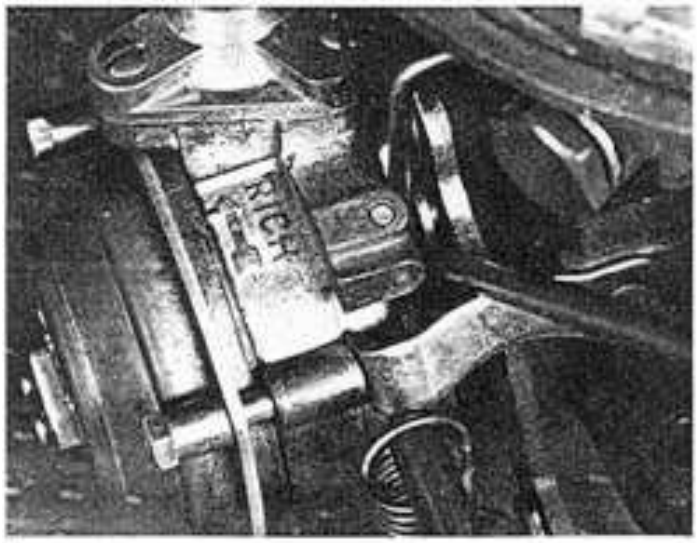

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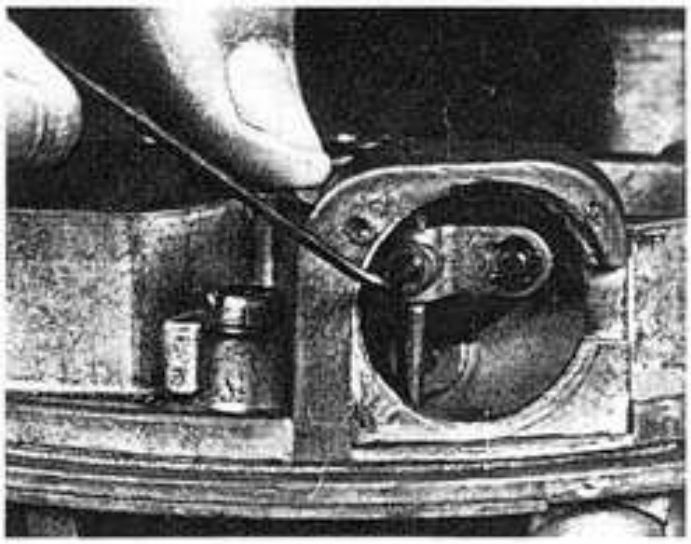

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10. CHOKE FAST IDLE SPEED

Function

The fast idle speed is critical in keeping the engine running at sufficient speed to overcome the increased resistance of the engine when cold.

Problems

If the choke fast idle speed is not correct, the result will be insufficient chokespeed (stalling) in a cold engine, or excessive speed causing rough engagement of the transmission.

Note: Before proceeding with adjustment, remove and discard fast idle speed adjusting screw and screw tensioning spring in the rear carburetor, if one is installed.

Adjustment

1. If a 100°C. temperature switch is installed in ther mostat housing, ground cable end so necessary advanced ignition timing is provided. (See Fig. 1)

2. Crack open throttle.

3. Close choke flap by lifting choke relay lever. Release throttle. (See Fig. 3)

4. Start engine without touching throttle. Observe RPM. (See Fig. 4)

5. Adjust to specified RPM at front carburetor fast idle adjusting screw. See page 34. (See Fig. 5)

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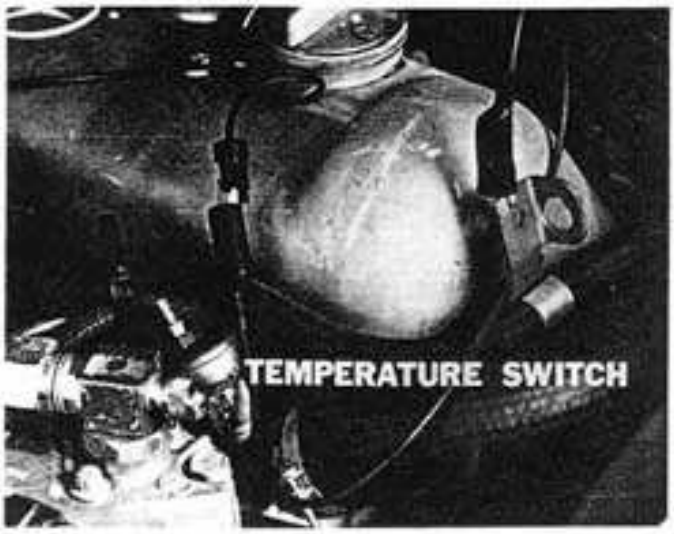

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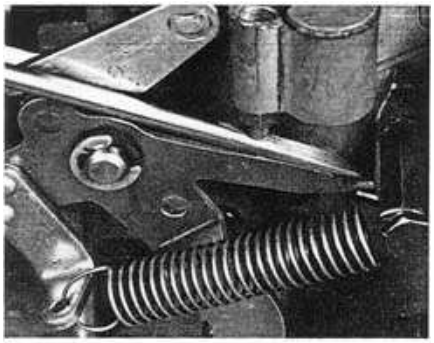
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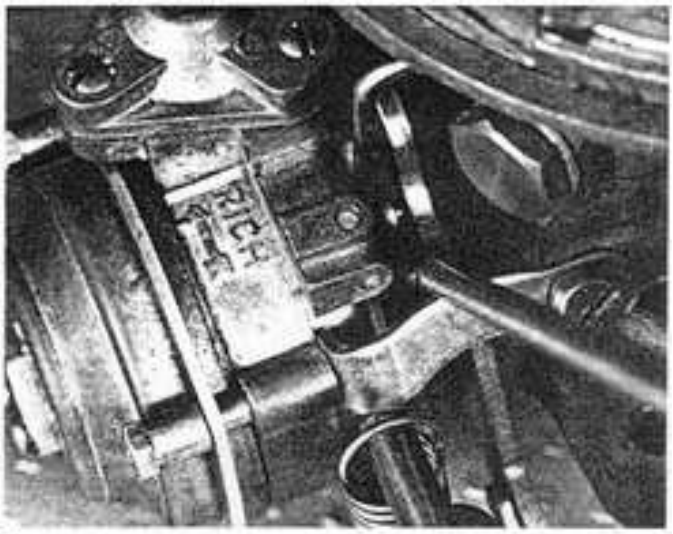

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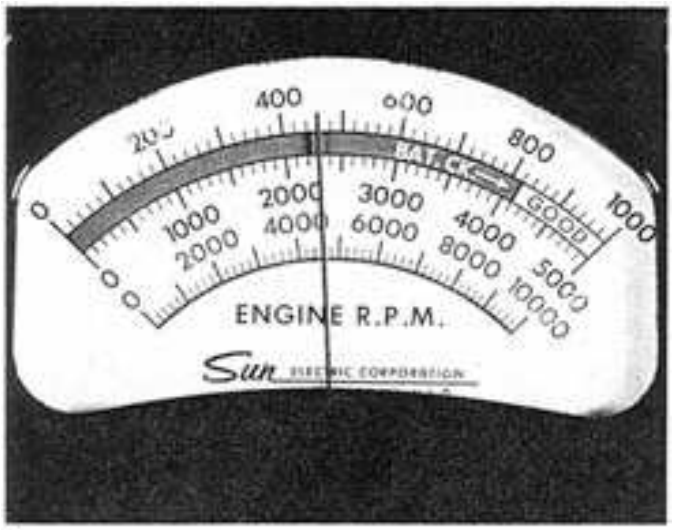

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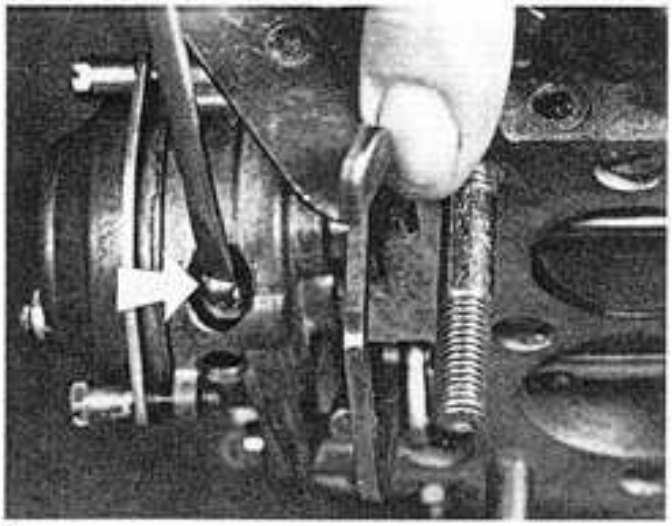
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11. CHOKE GAPS

Function

The choke gap control opens the choke flap slightly to allow the engine to breathe after starting.

Problems

1. Choke flap or linkage binds. (Flap won't close or binds and won't open.) Causes rough running and possible stalling when engine is cold.

Adjustment

1. Set carburetor at fast idle by actuating choke step cam. To do this, crack open throttle (See Fig. 1)

2. Close the choke flap by lifting choke relay lever. (See Fig. 2)

3. Release throttle.

4. Start engine without touching throttle.

5. Lift relay lever at bottom of choke rod to its full up position. (See Fig. 2)

6. Using a rod of proper diameter, measure the gap present between the lower flap of the choke and the carburetor housing. (See Fig. 3)

7. Adjust at the adjusting screw on diaphragm housing. (See Fig. 4)

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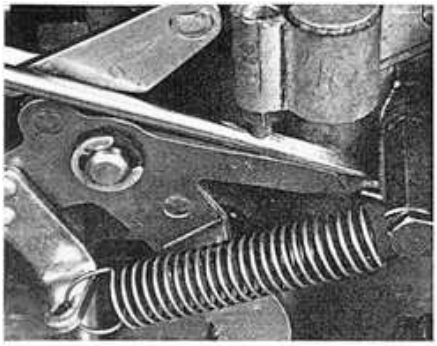

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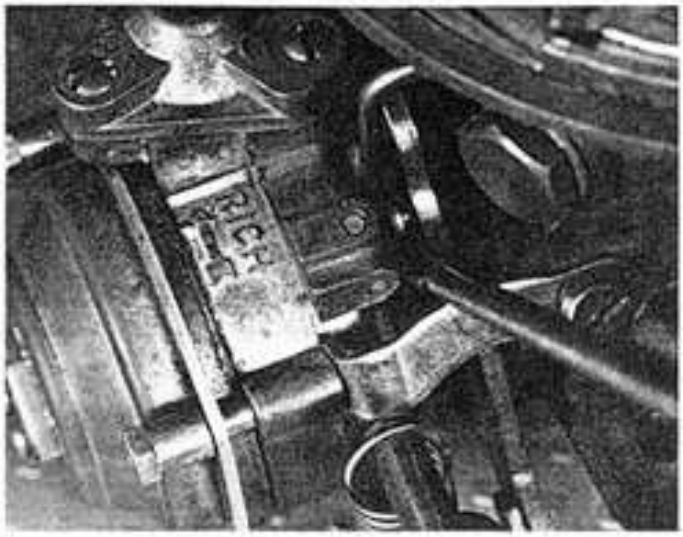

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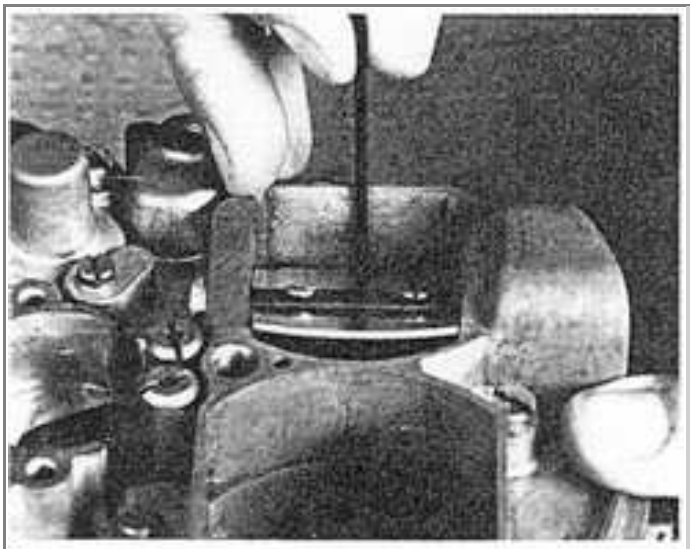

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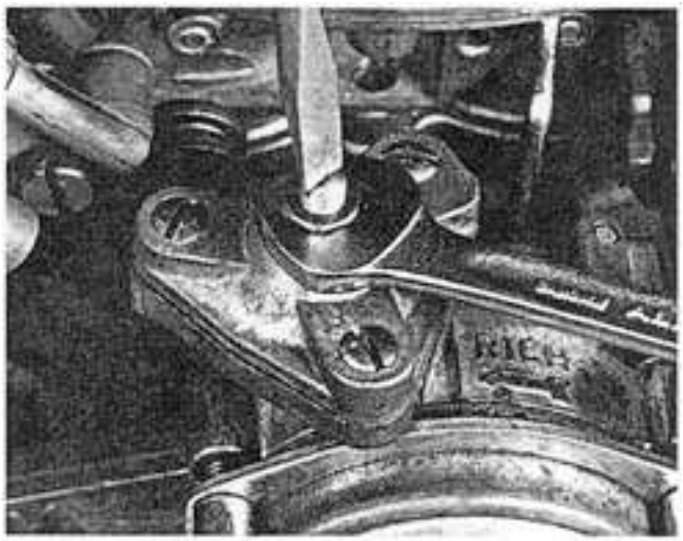

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12. VACUUM THROTTLE CONTROL OR VACUUM DASHPOT

The function of the vacuum throttle control or vacuum dashpot is:

1. To prevent stalling, when the throttle is suddenly closed. It insures a gradual or slow closing which permits the continuing air supply to lean out the rich mixture of fuel that occurs on sudden throttle closing.

2. It works with emission control. During coasting it holds the throttle plate open slightly.

3. It acts as an idle speed stabilizer when the engine is under load at idle. The plunger extends as the vacuum falls due to the load. This causes the throttles to be opened slightly.

Problems

If the dashpot or vacuum control is incorrectly adjusted the driver will experience:

1. Braking problems, if the throttle is held open too long.

2. Stalling.

Adjustment

VACUUM THROTTLE CONTROL

1. With engine idling, remove vacuum hose from throttle control. (See Fig. 1)

2. Set adjusting screw to provide an engine speed of 1100 to 1200 RPM. **Caution**: Late units have jam nut on screw which must be loosened first. (See Fig. 2)

3. Reconnect vacuum hose. (See Fig. 3)

4. Adjust compression spring with adjusting plate, so that play between actuating lever and adjustment screw is sufficient to slide a piece of paper through (0.1 mm). While adjusting nut do not allow screw to turn. (See Fig. 4)

VACUUM DASHPOT

(Early models only)

1. With engine off, hold actuating lever to the point where it just contacts the venting valve. (See Fig. 5)

2. Adjust dashpot plunger so that there is 2-3 mm. clearance between the carburetor lever and dashpot plunger. (See Fig. 6)

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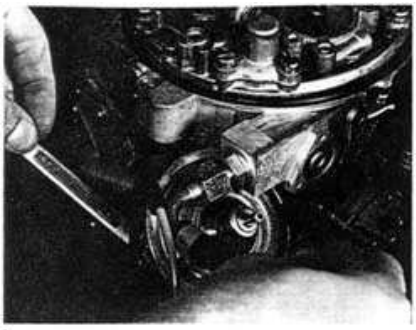

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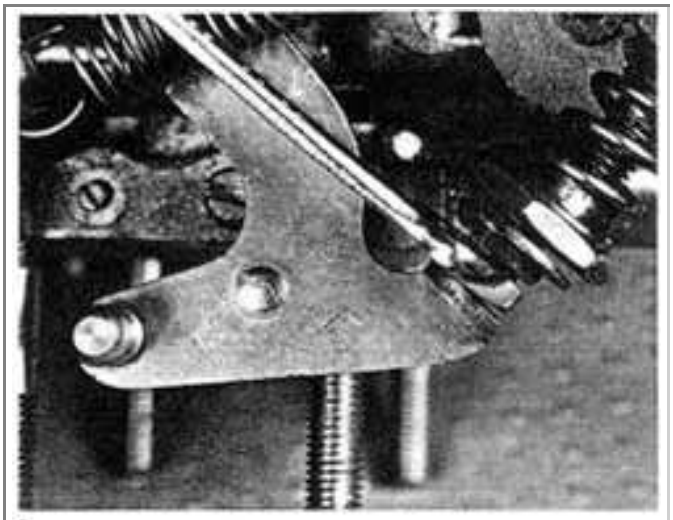

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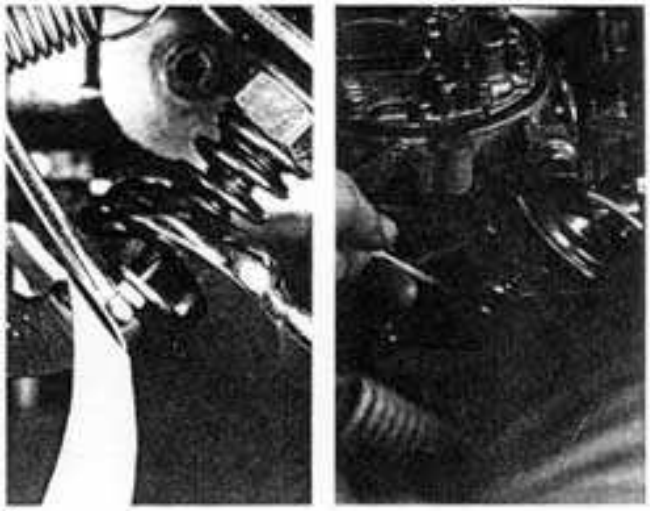

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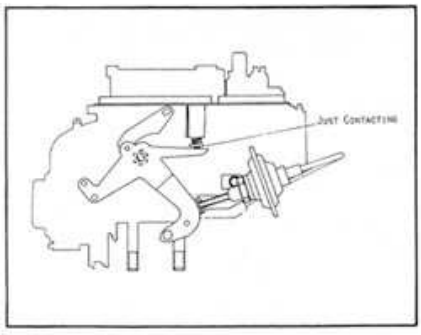

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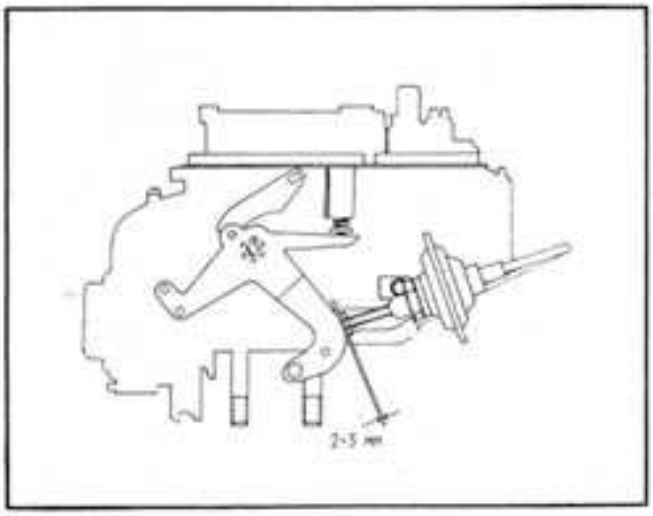

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13. FUEL RETURN VALVE (Pre-1972 only)

Function

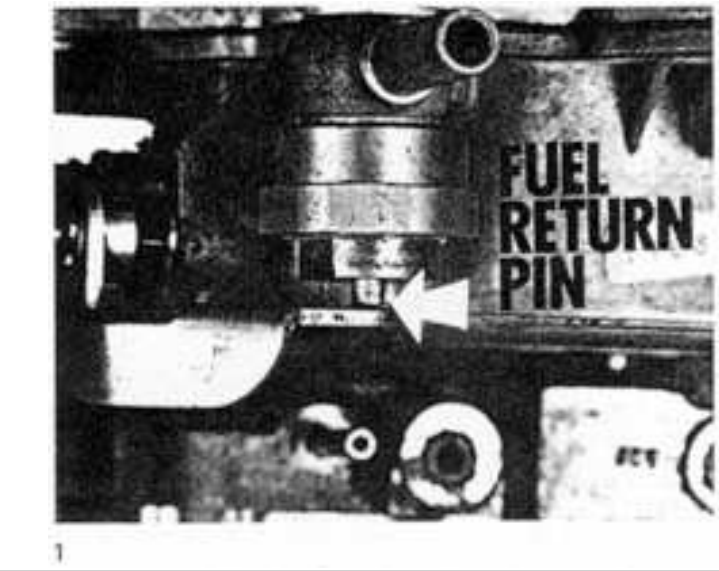
The function of the fuel return valve is to eliminate gasoline vapor locks. It does this by allowing unused fuel to return to the tank.

1972 models have an orifice hole for constant return which is automatic and requires no adjustments.

Adjustment (Pre-1972)

1. Slowly accelerate while watching return valve pin. At 2,000 RPM the pin should be fully lifted. (See Fig. 1)

2. Adjust at spring tension adjusting screw. (See Fig 2)



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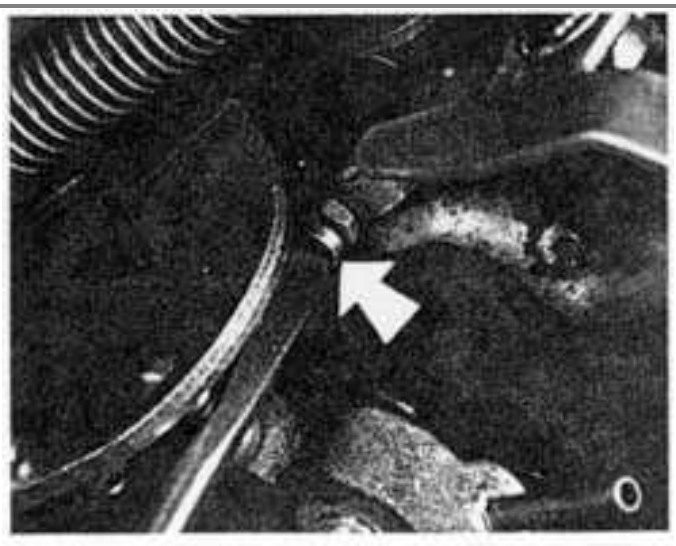
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14. IDLE LIFTING SWITCH

(applies only to K4A Automatic Transmission)

Function

The idle lifting switch controls the two-way solenoid on top of the automatic transmission.

Problems

If the idle lifting switch is not operating or adjusted properly, the results can be:

1. Slipping of the transmission on acceleration.

2. Very rough downshift of the transmission.

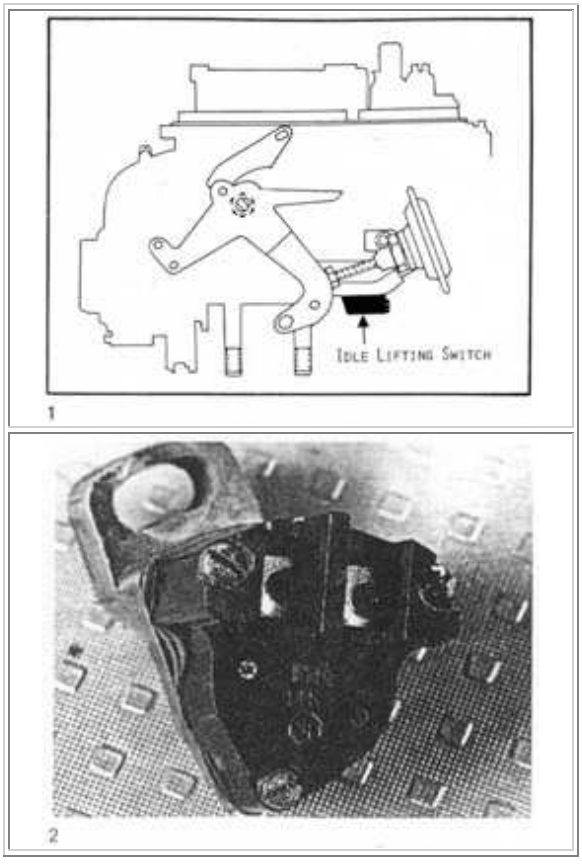
3. Damage to the transmission.

Adjustment

1. Attach a test light from outlet terminal of switch to ground. (See Fig. 1)

2. Accelerate slowly while observing light. (See Fig. 2)

3. Adjust switch as necessary by loosening the mounting screws and pivoting switch until light goes out (switch opens) at between 1400 to 1600 RPM.



C. Troubleshooting Guide

Symptoms	Where	Page
1. High fuel consumption	1. Venting Valve	5
	2. Accelerator pump	7
	3. Float Level	9
2. Hard Hot Starts	1. Venting Valve	5
	3. Float Level	9
3. Stalling and Hesitation	2. Accelerator pump	7
	3. Float Level	9
	8. Choke Cover Tension (cold)	18
	10. Choke fast idle speed (cold)	22
	12. Vacuum Throttle Control	26
4. Flooding	3. Float Level	9
5. Lean or Rich Fuel Mixture	3. Float Level	9
6. Poor Acceleration at full throttle	4. Second Stage Diaphragm	11
7. Inability to Reach full speed	4. Second Stage Diaphragm	11
8. Rough Idle	5. Idle fuel shut-off	13
9. Dieseling (after run)	5. Idle fuel shut-off	13
10. Early or Late shift pattern	7. Linkage	16
11. Rough downshift	14. Idle Lifting Switch	29
12. Transmission Damage	14. Idle Lifiting Switch	29
13. Vapor Lock	13. Fuel Return Valve	29

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D. Data and Adjusting Values

Type	220Sb		230 230S 230/8		250S 250/8 Sedan (2.5 ltr)		250/8 Cp (2.8) 250/8 Sd (2.8) 280S/8 Through 1971		250 Cp 250 Sd 1972	
Carburetor Barrel	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Venturi "K"	23	27	24	28	24	28	24	28	20	28
Main Nozzle "GG"	X112.5	X120	X115	X120	X115	X125	X115	X125	X100	X130
Air Correction Nozzle "A"	100	150	100	130	100	120	90	110	180	110
Emulsion Tube "s"	4S	4N	4S	4N	4S	4N	4S	4N	K30584	4N
Idle Fuel Nozzle "G"	45	-	45	-	45	-	45	-	45	-
Progression Fuel Nozzle	-	50	-	60	-	60	-	80	-	70
Idle Air Bore (mm)	1.5	-	1.3	-	1.3	-	1.3	-	1.4	-
Progression Air Bore (mm)	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0
Quantity Injected (c/c)	0.8-1.2		0.7-1.0							
Start of Injection	5 deg off idle		Immediately							
Float (mm)	18-20		21-23 with Solid Needle pin / 18-21 with spring-ball needle pin							
Fuel Return Valve	Valve Pin Fully in at 2000rpm								No Adjustment	
Vent Valve (mm)	2.8 (2.5 mm Minimum)								No Vent Valve	
Choke Gap (mm)	2.6		2.4		2.0-2.2					
Choke Fast Idle Speed	220-2400 rpm with Vacuum Advance (Ground cable of switch in thermostat housing)									
Choke Cover to 1970	Index Marks aligned on both carburetors									
1970/1971	Align index marks on front Carburetor --- Rear remains 5 mm towards Rich									
1972	Align index marks of both carburetors at second service									
Vacuum Throttle Control	Adjust at idle: Hose off 1100 to 1200 with screw - hose on 0.1 mm clearance with spring									
Idle Lifting Switch	Test Light at Outlet of switch: Out at 1400 to 1600 rpm									