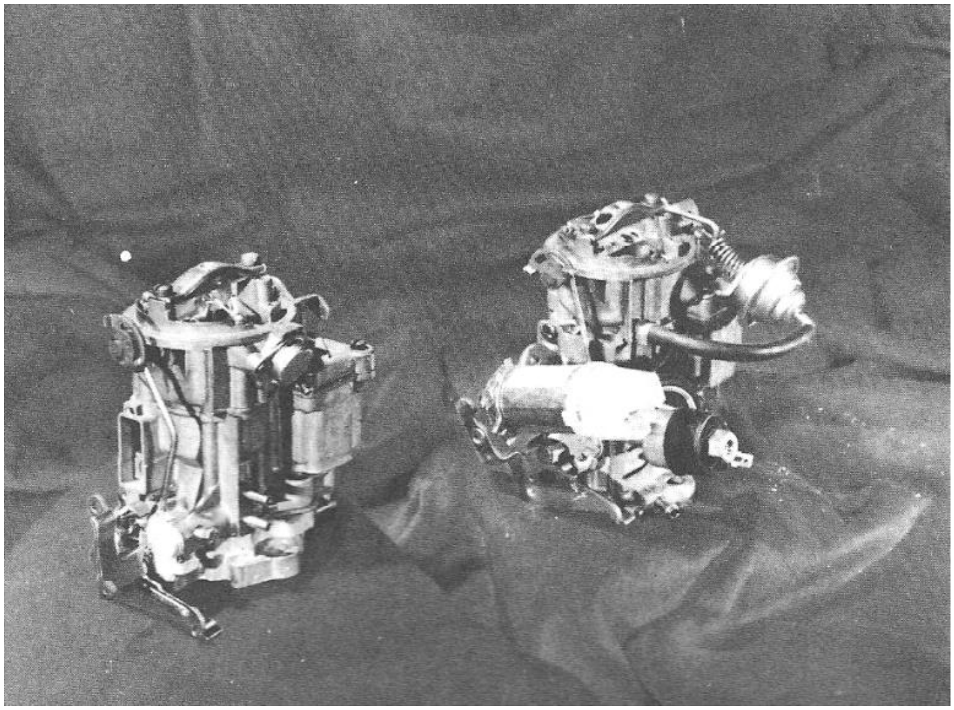
TYPICAL MODELS M-MV



GENERAL DESCRIPTION

The Monojet carburetor is a single bore downdraft carburetor that has a triple venturi coupled with a refined metering system resulting in a unit with superior fuel mixture control and performance.

A plain tube nozzle is used in conjunction with the triple venturi. Fuel flow through the main metering system is controlled by a mechanically and vacuum operated variable orifice jet. This consists of a specially tapered metering rod, which operates in the fixed orifice main metering jet, connected directly by linkage to the main throttle shaft. A vacuum operated enrichment system is used in conjunction with the main metering system to provide good performance during moderate to heavy accelerations.

The Monojet carburetor for the Chevrolet Vega four-cylinder engine uses a fixed orifice main metering jet but does not use a metering rod. Instead, a venturi vacuum controlled power enrichment valve is used with the main metering system to provide good performance during moderate to heavy accelerations.

A separate and adjustable idle system is used on all models in conjunction with the main metering system to meet fuel mixture requirements during engine idle and low speed operation. The off-idle discharge port is of a vertical slot design to give good transition between curb idle and main metering system operation.

The main metering system has a factory adjusted flow feature to enable production to control the fuel mixture more accurately than ever before attainable. This is especially important in assisting the engine to meet exhaust emission standards.

On some models, the idle system incorporates a hot idle compensator to maintain smooth engine idle during periods of extreme hot engine operation.

The Monojet carburetor is designed with either a manual or automatic choke system. The conventional choke valve is located in the air horn bore. A vacuum diaphragm unit is an integral part of the air horn on some automatic choke MV models, and on other automatic choke models the unit is mounted externally to the air horn of the carburetor. The automatic choke coil is manifold mounted and connects to the choke valve shaft by a rod.

On some 1968 models, a cranking enrichment valve is used for added enrichment during cold start. This feature is not used on later Monojet carburetors where use of low torque thermostatic coils renders the valve ineffective during cold start.

An integral fuel filter is mounted in the fuel bowl behind the fuel inlet nut. The paper filter has increased capacity to give maximum filtration of incoming fuel entering the carburetor bowl.

Other features of the Monojet include an aluminum throttle body for decreased weight and improved heat distribution and a thick throttle body to bowl insulator gasket to keep excessive engine heat from the float bowl The carburetor has internally balanced venting through a vent hole in the air horn. An external idle vent valve is used on some models, where necessary, for improved hot engine idle and starting. Other models are internally vented only, but use an internal pressure relief valve to vent (externally) should extreme vapor pressure buildup in the float bowl occur during hot engine operation.

SERVICE FEATURES

The simplicity in design of the Monojet carburetor lends itself to ease in servicing. Its three-piece construction aids in complete disassembly for cleaning and overhaul.

OPERATING SYSTEMS

There are six basic systems of operation used. They are float, idle, main metering, power enrichment, pump, and choke. The following text describes the purpose and operation of each system for ease in servicing and trouble shooting.

FLOAT SYSTEM

FLOAT SYSTEM (Fig. 1)

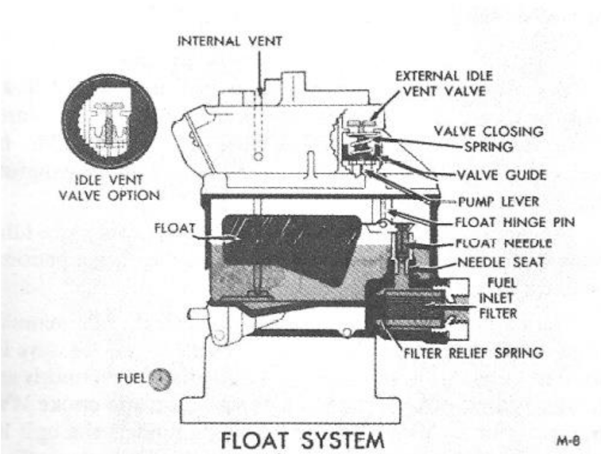


FIGURE 1

The float system on the Monojet carburetor is located adjacent to the main venturi. It is designed so that by keeping an adequate supply of fuel in the float bowl at times, angular maneuvers such as steep hills and sharp turns will not affect proper operation. A solid single pontoon float assembly, made of special light-weight cellular plastic is held in place by a float hinge pin that fits in dual slots cast in the float bowl. The hinge pin is held in place by compression of the air horn gasket against the upper loop of the hinge pin.

The float system controls the amount and level of the fuel in the float bowl. Higher than specified fuel levels can cause flooding rich mixtures causing poor economy and increased exhaust emissions, nozzle drip at idle, hard hot starting, turn cut-out, rough idle and stalling.

Too low fuel levels can cause lean mixtures, resulting in increased exhaust emissions, hesitation and flatness on acceleration, surge, hard cold starting, rough idle, and stalling.

It is important, as on all carburetors, that the float be set to the recommended specifications.

The float system (Figure 1) consist of a fuel chamber (float bowl), a single pontoon float assembly, float hinge pin and retainer combination, float needle valve and seat, isle vent valve (some applications), pressure relief valve (some applications), internal vent and fuel inlet, filter, and pressure relief spring.

The float system operates as follows:

Fuel from the engine fuel pump is forced through the paper fuel inlet filter located behind the fuel inlet nut. It passes from the filter chamber up through the float needle seat and spills into the float bowl. As the float bowl fills with fuel, it lifts the float pontoon upward until the correct fuel level is reached in the float bowl. At this point, the float arm forces the float needle against the float needle seat shutting off fuel flow. As fuel is used from the float bowl, the float drops downward allowing the float needle to move off its seat and more fuel to enter the float bowl. This cycle continues throughout engine operation keeping a nearly constant fuel level in the float bowl.

The fuel inlet filter has a pressure relief spring located at the rear of the filter. It seats between the rear of the filter and the inlet casing. Should the filter become clogged from improper servicing or excessive amounts of dirt in the system, the relief spring lets the filter move off its seat. This prevents complete stoppage of fuel flow to the carburetor until the filter can be replaced.

It is very important that the filter be serviced periodically to prevent dirt from entering the carburetor metering orifices.

The carburetor float chamber is both internally and externally vented. The internal vent channel is located in the air horn above the float chamber adjacent to the air cleaner hold down bracket. The purpose of the internal vent is to balance air pressure on the fuel in the float bowl with carburetor inlet air. With this feature, a balanced air/fuel mixture ratio can be maintained during part throttle and power operation because the air pressure acting on the fuel in the float bowl will be balanced with the air flowing through the carburetor bore.

The internal vent tube also allows the escape of fuel vapors from the float chamber during very hot engine operation. This prevents fuel vapor pressurization in the float bowl from causing excessive pressure build-up resulting in overly rich mixtures and fuel spillage from the main discharge nozzle.

1969 and earlier Monojet carburetors have an external idle vent valve located at the top of the carburetor air horn. It is actuated by a tang located on the accelerator pump plunger shaft.

When the throttle valve is returned to idle position, the tang on the pump plunger shaft pushes upward on the vent valve stem and opens the idle vent valve. This allows fuel vapors, which may form in the float bowl during hot engine idle and hot "soak," to be vented outside, so they will not be drawn into the engine manifold. This feature helps maintain a smooth engine idle and prevents hard hot starting.

When the throttle valve is opened to the off-idle and part throttle position, the idle vent valve closes returning the carburetor to internal balanced venting.

IDLE VENT VALVE OPTION (See Inset-Figure 1)

On some models (1969 and earlier), there is an optional construction used for the idle vent valve. The valve is aluminum and the closing spring is removed.

During the idle operation, this type valve operates the same as the standard valve explained previously. However, during extreme hot engine operation, lf excessive vapor pressures build up in the float chamber when the vent valve is closed it will act as a pressure relief valve. The pressure will lift the vent valve off it seat allowing it to be vented externally. This prevents excessive fuel from being forced by pressure from the float bowl into the carburetor bores to prevent engine stalling.

FLOAT SYSTEM (Fig. 2)

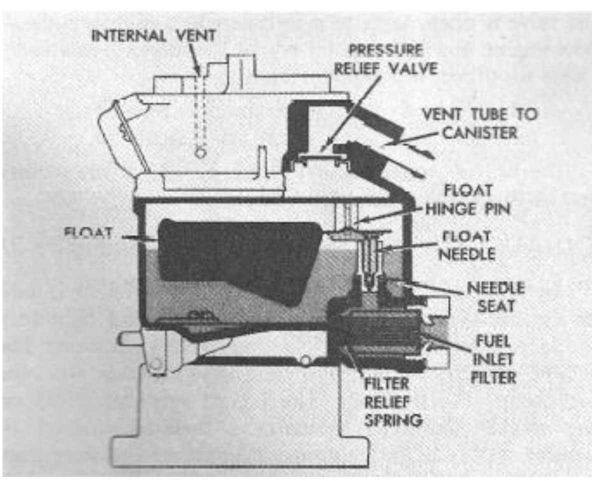


FIGURE 2

1970 and later Monojet carburetors (Figure 2) do not use an idle vent valve but use a "wafer type" pressure relief valve in the air horn to vent vapors outside that may form in the float bowl chamber during periods of hot engine operation. The valve seats on a hole that leads to the float chamber from a cavity in the air horn as shown. The float bowl is completely internally balanced throughout all ranges of engine operation.

Should extreme pressures build up in the float chamber during hot engine operation, the pressure relief valve will be pushed off its seat, releasing excessive vapor pressure , thereby preventing fuel from being forced from the bowl through the discharge nozzle into the engine to cause rough idle and hard hot start.

MV carburetors for the Chevrolet Vega four-cylinder engine have a pressure relief bowl vent tube added to the air horn. On Vert-Pak shipments only (vehicle shipped verti-cally), the tube is connected b y a line to the vapor canister to vent bowl vapors and transfer raw fuel spillage from the bowl, (caused by vehicle angularity) to the canister where it is stored.

IDLE SYSTEM

IDLE SYSTEM (Fig.3)

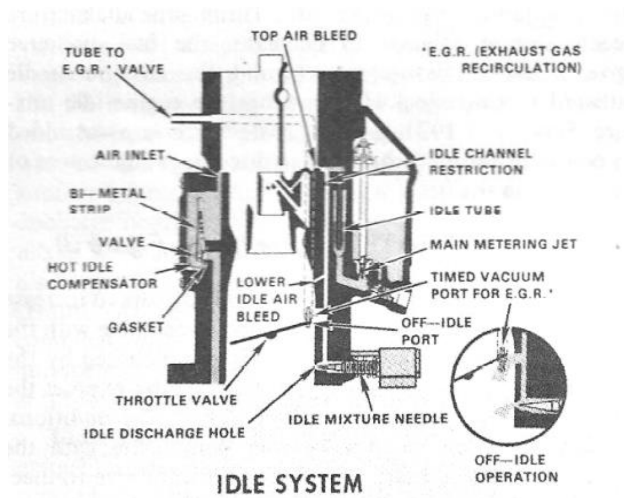


FIGURE 3

The purpose of the idle system in the Monojet carburetor is to control fuel mixtures to the engine during idle and low speed operation. The idle system is needed during this period because air requirements of the engine are not great enough to obtain efficient metering from the main discharge nozzle.

OPERATION

During curb idle, the throttle valve is held slightly open by the idle speed adjusting screw or idle stop solenoid plunger screw. The small amount of air passing between the throttle valve and bore is regulated by this screw to provide the correct engine idle speed. Since the engine requires very little air and fuel for idle and low speed operation, fuel is mixed with the air to produce a combustible mixture by direct application of engine manifold vacuum (low pressure) to idle discharge hole just below the throttle valve. With the idle discharge hole in a very low pressure area and the fuel in the float bowl vented to atmosphere (higher pressure) fuel flows through the idle system as follows:

Atmospheric pressure forces fuel from the float bowl down through the main metering jet into the main fuel well where it is picked up and metered at the lower tip of the idle tube. It passes up the idle tube and is mixed with air by the top idle air bleed hole at the idle cross channel. The air/fuel mixture passes downward through the calibrated idle channel restriction where it is further metered. The mixture continues down the idle passage past the lower idle air bleed hole and off- idle discharge port just above the throttle valve where it is again mixed with air. The air/fuel mixture then moves downward past the idle mixture needle and out through the idle discharge hole into the carburetor bore. It mixes with air passing around the slightly open throttle valve and then continues through the intake manifold into the engine cylinders as a combustible mixture.

The idle mixture needle is adjustable to blend the correct amount of fuel mixture from the idle system with the air entering the engine at idle. Turning the idle mixture needle inward (clockwise) decreases the fuel discharge (gives a leaner mixture) and turning the mixture needle outward (counterclockwise) enriches the engine idle mixture. Starting in 1971, an idle needle limiter cap was added to emission control carburetors to discourage adjustment of the needle in the field.

OFF-IDLE OPERATION (See Inset- Figure 3)

As the throttle valve is opened from curb idle to increase engine speed, additional fuel is needed to combine with the extra air entering the engine. This is accomplished by the slotted off- idle port. Opening the throttle valve exposes the off- idle port to manifold vacuum. Then, the additional air/ fuel mixture from the off-idle port mixes with the increased air flow past the opening throttle valve to meet increased engine air and fuel demands.

Further opening of the throttle valve increases air flow through the carburetor bore, causing sufficient pressure drop in the multiple venturi to start fuel delivery from the main discharge nozzle. The off-idle port air/fuel discharge does not cease at this transfer point but, rather, diminishes as fuel flow from the main discharge nozzle increases. In this way, the systems are so designed that they interact to produce a smooth fuel f1ow at all engine speeds.

The lower idle air bleed is used strictly as an air bleed during idle operation. It supplies additional air to idle circuit for improved atomization and fuel control at low engine speeds. The same air bleed is used as an additional fuel feed at higher engine speeds, to supplement main discharge nozzle delivery during operation or the main metering system.

HOT IDLE COMPENSATOR (See Figure 3)

The hot idle compensator, when used on the M and MV Monojet carburetor is located in a chamber on the float bowl casting on the throttle lever side of the carburetor. Its purpose is to offset the enriching effects, caused by changes in air density and fuel vapors generated during hot engine operation by by-passing additional air around the throttle valve to the intake manifold.

The compensator consists of a thermostatically con-trolled valve, a bi-metal strip which is heat sensitive, a valve holder and bracket. Under normal cooler under-hood engine temperatures, the valve closes off an air channel which leads from a hole inside the air horn to a point below the throttle valve where it exits into the intake manifold through the throttle body bore. However, during periods of extreme hot engine operation, excessive fuel vapors in the carburetor can enter the intake manifold causing richer mixtures than normally required. This can result in rough engine idle and stalling. At a predetermined temperature the bi-metal strip bends and unseats the compensator valve. This allows additional air to be drawn into the intake manifold to offset the richer idle mixtures and maintain engine idle speed to provide a smooth engine idle. When the engine cools and the added air is not needed, the bi-metal strip relaxes to close the valve and idle operation returns to normal.

The compensator valve assembly is held in place by the dust cover over the valve chamber. A seal is used between the compensator valve and float bowl casting. To obtain proper idle and adjustment speed and mixture when the engine is hot, the compensator valve must be closed. To check this plug the compensator inlet hole inside the air horn bore (a wooden pencil can be used). If no drop in engine RPM is noted on a tachometer, the valve is closed. If the valve is open, leave plug in hole when adjusting idle or cool engine down to a point where the valve automatically closes for proper idle adjustment.

CAUTION: Be sure to remove the plug in the inlet hole on completing the idle adjustment.

The hot idle compensator is pre-adjusted at the factory and no further adjustment is required.

EXHAUST GAS RECIRCULATION (See Figure 3)

An Exhaust Gas Recirculation (E.G.R.) system is used on late M-MV models for passenger cars and light-duty trucks to control oxides of Nitrogen (NOx) emissions. The E.G.R. valve is operated by a vacuum signal taken from the carburetor throttle body. The E.G.R. valve, mounted on the intake manifold, circulates a metered amount of exhaust gases to the combustion mixtures to lower peak combustion temperatures thereby reducing oxides of Nitrogen during these ranges of engine operation.

On 6-cylinder M-MV models (Figure 3, page 5), the vacuum supply tube for the E.G.R. valve is installed in the carburetor air horn and connects by a passage through the float bowl to a single-timed vertical port in the throttle body bore. The timed vertical port provides a vacuum signal to the E.G.R. valve in the off-idle and part throttle operation of the carburetor. On 4-cylinder Vega MV models (Figure 4), a vacuum supply tube is installed in the carburetor throttle body and connects by a passage to two timed vacuum ports, one located in the bore of the throttle body and one in the lower venturi area. The ports provide a vacuum signal to the E.G.R. valve in the off-idle and part throttle operation of the carburetor.

IDLE SYSTEM (Fig. 4)

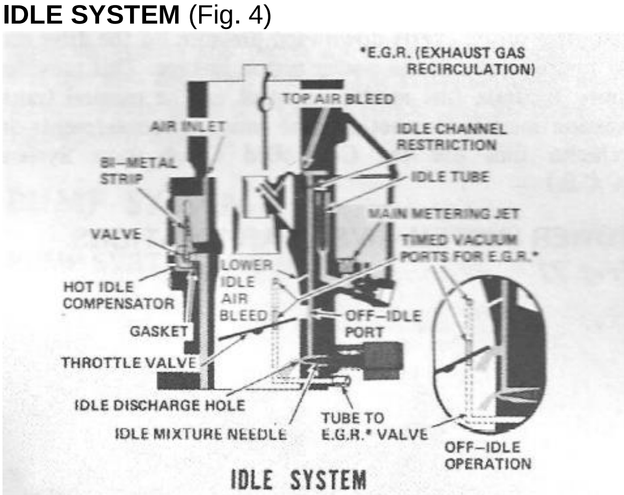


FIGURE 4

MAIN METERING SYSTEM

MAIN METERING SYSTEM (Fig. 5)

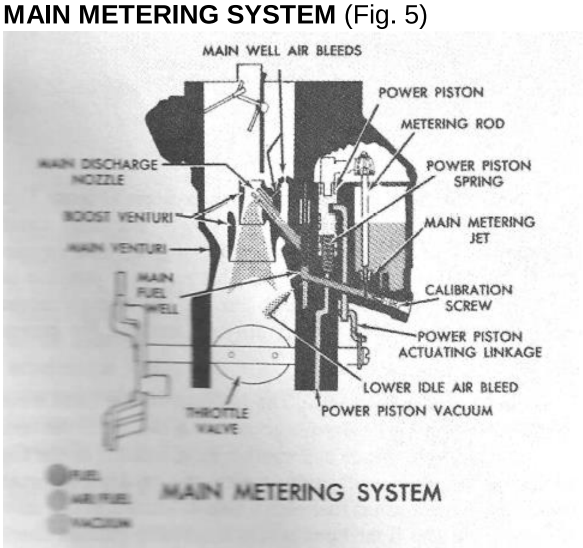


FIGURE 5

The main metering system (Figure 5) supplies fuel to the engine from off-idle to wide open throttle operation. It feeds fuel at all times when air flow through the venturi is great enough to maintain efficient fuel flow from the main discharge nozzle. The triple venturi in the Monojet carburetor is very sensitive to air flow resulting in a finer, more stable, metering control from light to heavy engine loads.

The main metering system consists of a main metering jet, a mechanical and vacuum operated metering rod (most applications), a main fuel well, main well air bleeds, fuel discharge nozzle and triple venturi.

OPERATION

The main metering system operates in the following manner:

As the throttle valve is opened beyond the off-idle range, air velocity increases in the carburetor venturi. This causes a drop in pressure at the discharge end of the nozzle in the double boost venturi. Since the low pressure (vacuum) is now in the smallest venturi, fuel flows from the main discharge nozzle as follows:

Fuel in the float bowl passes between the tapered metering rod (except Monojet carburetor for the Chevrolet Vega 4-cylinder engine that does not use a metering rod) and the main metering jet where it is metered and flows on into the main fuel well. In the main well the fuel is mixed with air from the air bleed at the top of the well and another air bleed which leads into the main well from the discharge nozzle cavity. After the fuel in the main well is mixed with air from the air bleeds, it then passes up the discharge nozzle where it sprays into the small boost venturi. At the boost venturi, the fuel mixture then combines with air entering the engine through the carburetor bore to provide the correct air/fuel mixtures to the engine cylinders for efficient combustion.

Those Monojet carburetors that use a metering rod are unique in that fuel flow to the main discharge nozzle is controlled by the tapered metering rod actuated by linkage connected directly to the throttle shaft. As the throttle valve is opened from idle position, the tapered metering rod is gradually raised out of the main metering jet orifice. Fuel flow from the main discharge nozzle is controlled by throttle opening and the depth of the metering rod in the main metering jet orifice. With the fuel metering mechanically controlled by the throttle valve angle, it is possible to maintain very accurate mixture ratios throughout part throttle to wide open throttle operation. An initial metering rod adjustment is required to set the depth of the rod in the main metering jet.

CAUTION: It should be noted here that there is a supplementary fuel feed passage in the bottom of the float bowl adjacent to the main metering jet on

all Monojet carburetors. Fuel is picked up from the float bowl and passes through a calibrated hole past a calibration screw and on into the same fuel passage which leads from the main metering jet to the main fuel well The purpose of the adjustable fuel feed is to allow production to refine part throttle calibration to meet very accurate air/ fuel mixture ratios to assist the engine in meeting exhaust emission control standards. The factory adjustment is made using very sensitive computer operated instrumentation and the screw should not be readjusted in the field. If the adjustment is tampered with, it will require complete float bowl or unit replacement.

POWER SYSTEM

POWER SYTEM-
EXCEPT VEGA APPLICATIONS (FIG. 6)

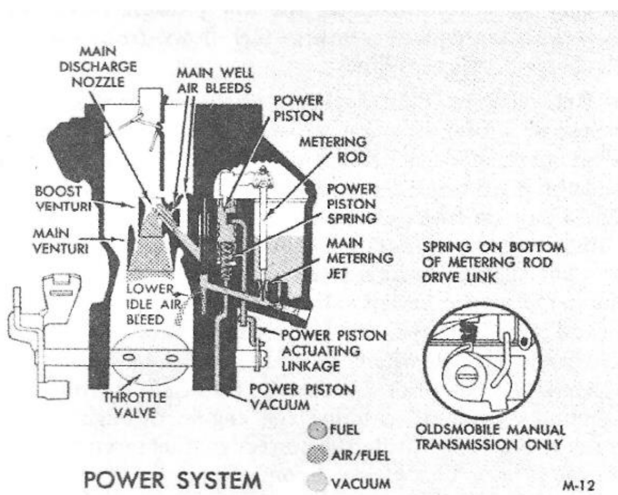


FIGURE 6

The vacuum operated enrichment system is used to slightly enrich mixture ratios during moderate to heavy acceleration loads. The necessary enrichment is obtained by movement of a spring-loaded vacuum piston which senses changes in manifold vacuum to lift the metering rod out of the main metering jet for added fuel enrichment.

OPERATION

During part throttle and cruising ranges, manifold vacuums are sufficient to hold the power piston down against spring tension. The upper part of the groove in the power piston is held down against the top side of the drive rod. This places the main metering rod lower in the jet for maximum· economy. On moderate to heavy acceleration, manifold vacuum drops and the power piston spring pushes the power piston up so that the lower edge of the slot in the power piston strikes the bottom side of the drive rod.

This moves the tapered metering rod slightly upward and out of the main metering jet. This allows more fuel to flow through the jet enriching the fuel mixture slightly.

The amount of enrichment is controlled by the amount of clearance between the groove in the side of the power piston and the diameter of the power piston drive rod. The clearance is a factory calibrated feature so that it can be varied to match the fuel enrichment requirements of a given engine. On 1969 Oldsmobile manual transmission carburetor models (see inset), a compression spring is externally mounted on the power piston drive rod. The spring extends from a recess in the bottom of the float bowl casting to a retaining groove in the lower e d o= the drive rod. The spring exerts downward pressure on the drive rod to remove play in the power piston linkage. This provides more accurate fuel mixture control on the manual transmission models to meet exhaust emission requirements on vehicles that use the Controlled Combustion System (C.C.S.).

POWER SYTEM-VEGA APPLICATIONS (FIG. 7)

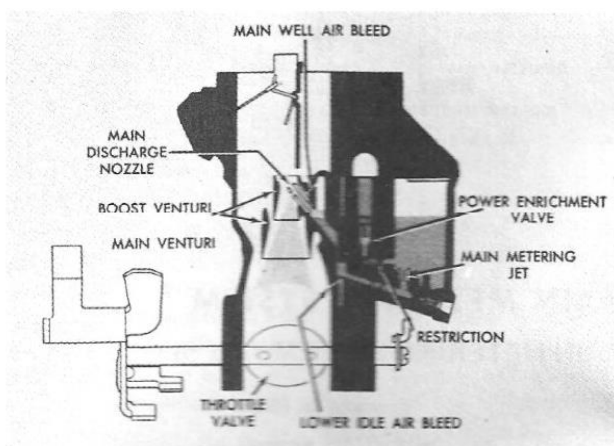


FIGURE 7

A different type power enrichment system (Figure 7) is used to supply additional fuel for more power and high speed requirements of the Vega 4-Cylinder engine, and supplements the main metering system. This makes it possible to use leaner mixtures in the part throttle (economy) ranges and still maintain the correct air/fuel mixture for power requirements.

A fuel passage leads from the bottom of the float bowl chamber into a vertical passage next to the main venturi. The vertical fuel passage has another hole located at the top which feeds into the idle tube cavity and on into the main well area. A calibrated fuel restriction is located in the inlet passage from the float bowl and a removable piloted check valve seats at the bottom of the vertical fuel passage.

OPERATION

Vacuum (low pressure) from the carburetor venturi is transmitted through the main discharge nozzle to the main fuel well. The power system passage, open to the main well area also receives this vacuum signal at a predetermined point when extra fuel enrichment is needed for power and high speed, the power enrichment check valve in the vertical passage is lifted off its seat. Fuel then flows from the float bowl through the calibrated power restriction which leads into the vertical fuel well. The fuel then passes the open power enrichment check valve and up the vertical well passage and on into the main fuel well At this point, fuel from the power system mixes with fuel from the main metering system and passes up the main discharge nozzle and out into the boost venturi. The extra fuel added by the power system gives the desired enrichment for power and high-speed operation.

PUMP SYSTEM

PUMP SYSTEM (Fig. 8)

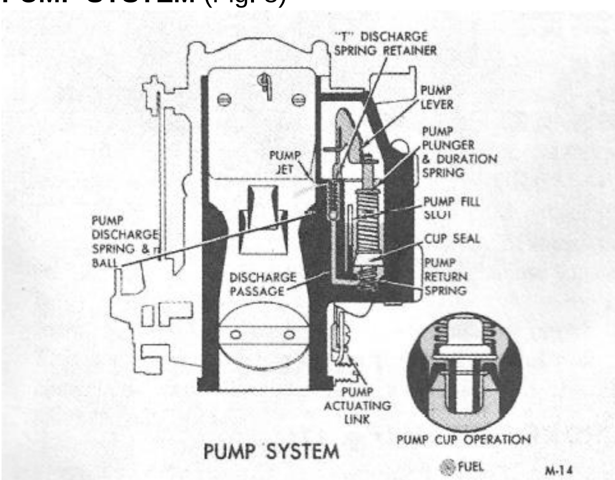


FIGURE 8

Extra fuel for smooth, quick acceleration is supplied by a spring loaded pump plunger. Rapid opening of the throttle valve causes an immediate increase in air flow through the carburetor bore. Since fuel is heavier than air, it requires a short period of time for fuel flow through the main discharge nozzle to "catch up" with the air flow. To avoid leanness during this momentary lag in fuel flow, the accelerator pump furnishes a metered quantity of fuel sprayed into the venturi air stream. This mixes with the increased air flow to supply the extra fuel needed until the main discharge nozzles can feed the fuel required.

OPERATION

When the pump plunger moves upward in the pump well during throttle closing, fuel from the float bowl enters the pump well through a slot in the side of the pump well. It flows past the synthetic pump cup seal into the bottom of the pump well. The pump cup is a floating type (see inset). The cup moves up and down on the pump plunger head.

When the pump plunger is moved upward, the flat on the top of the cup unseats from the flat on the plunger head and allows free movement of fuel through the inside of the cup into the bottom of the pump well. This also vents any vapors which may be in the bottom of the pump well so that a solid charge of fuel can be maintained in the fuel well beneath the plunger head.

When the throttle valve is opened during acceleration, the connecting pump linkage forces the pump plunger downward. The pump cup seats instantly and fuel is forced through the pump discharge passage, where it unseats the pump discharge check ball and passes on through the passage to the pump jet located at the top of the float bowl, where it sprays into the boost venturi area.

It should be noted the pump plunger is spring loaded.

The upper duration spring is balanced with the bottom pump return spring so that a smooth sustained charge of fuel is delivered during acceleration.

The pump discharge check ball prevents any "pull-over" or discharge of fuel from the pump jet when the accelerator pump is not in operation. It also keeps the pump discharge passage filled with fuel to prevent pump discharge lag.

The accelerating pump system does not require adjustment in the field. It is preset during manufacture. Normal service is all that is required.

CHOKE SYSTEMS

CHOKE SYSTEM (Fig. 9)

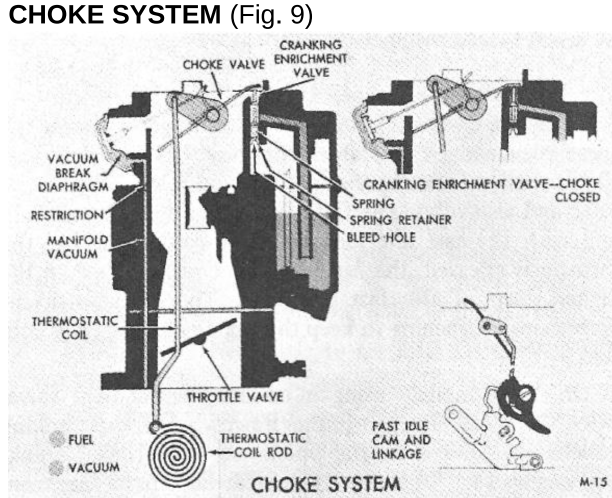


FIGURE 9

The "M" Monojet carburetors use a manual choke system and the "MV" carburetors use an automatic choke system. The purpose of the choke system is to provide a richer mixture for cold engine starting and operating. Richer than normal mixtures are required because vaporized fuel has a tendency to condense on cold engine parts. This occurs on the inside area of the intake manifold and cylinder heads, thereby decreasing the amount of combustible mixture available in the engine cylinders.

OPERATION (MODEL “M”)

The manual choke Model M has a choke valve located in the air horn and is controlled by a "push-pull" cable from the vehicle instrument panel. The fast idle cam is connected by linkage to the lever on the choke valve shaft. When the dash control is pulled to close the choke valve for engine starting, linkage from the choke shaft which is connected to the fast idle cam rotates the cam to a higher radius. The radius on the cam contacting the throttle lever tang forces the throttle valve open to increase engine idle speed and prevent stalling. As the engine begins to warm up and the choke dash control is pushed inward opening the choke valve, the fast idle cam rotates to a lower radius and gradually reduces fast idle speed. When the choke valve is fully open, the fast idle tang no longer contacts the fast idle cam and the engine returns to normal idle.

The Model MV carburetor is equipped with a fully automatic choke control. A thermostatic coil is mounted on the engine exhaust manifold and is connected by a rod to the lever on the choke valve shaft. The vacuum break unit is diaphragm operated and on some models, it is an integral part of the air horn casting; on other models, the vacuum break unit is mounted externally by a bracket attached to the air horn. In addition, the choke system on some 1968 Monojet carburetors includes a cranking enrichment valve to reduce engine cranking time during cold starts.

OPERATION (MODEL “MV”)

The Model MV choke system operates as follows:

When the engine is cold, prior to starting, depressing the accelerator pedal opens the carburetor throttle valve. This allows tension from the thermostatic coil to close the choke valve and also rotate the fast idle cam so the high step is in line with the fast idle tang on the throttle lever. As the throttle is released, the fast idle tang comes to rest on the highest step of the fast idle cam. This gives sufficient throttle valve opening to keep the engine running after cold start.

On 1968 models using a cranking enrichment valve, when the choke closes, it pushes downward on the cranking enrichment valve stem and opens the valve. During cranking, engine vacuum below the choke valve pulls fuel from the idle circuit and main discharge nozzle. It is supplemented with fuel from the cranking enrichment channel which leads directly from the bottom of the float bowl. This provides adequate enrichment from the fuel circuits for good cold starts.

When the engine starts, manifold vacuum is transmitted through a vacuum channel to the vacuum break diaphragm unit. This moves the diaphragm plunger until it strikes the diaphragm cover which in turn opens the choke valve to a point where the engine runs without loading or stalling. This is called the vacuum break position. The choke valve has opened far enough at this point to allow the cranking enrichment valve (if used) to close, shutting off fuel flow from the enrichment channel.

On those Monojet carburetors that have the vacuum break unit mounted as an integral pan of the air horn, a small restriction is located in the choke vacuum channel to retard the diaphragm travel slightly so that the choke valve moves slowly to the vacuum break position. This prevents the possibility of a lean stall immediately after cold start.

CHOKE SYSTEM (Fig. 10)

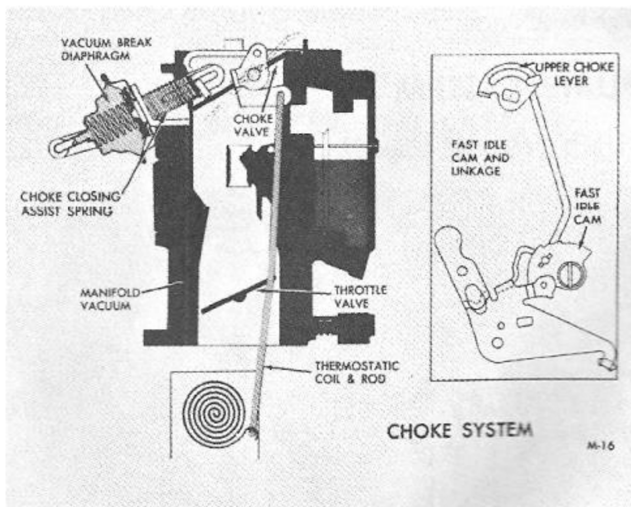


FIGURE 10

CHOKE SYSTEM (Fig. 11)

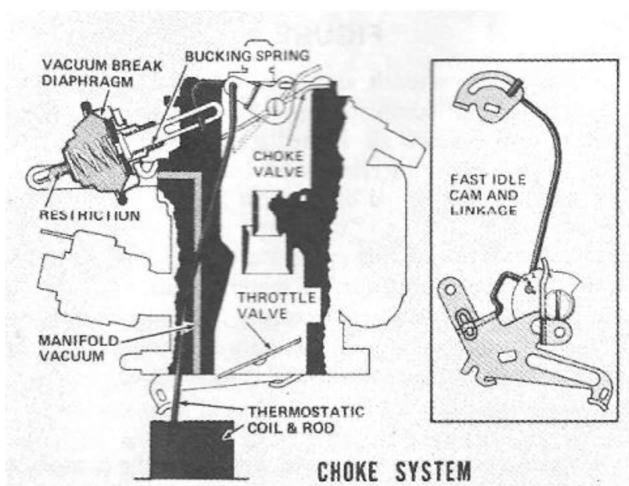


FIGURE 11

A choke closing assist spring is located on the vacuum break diaphragm plunger stem on some 6-cylinder models using an externally mounted vacuum break diaphragm unit (Figure 10). The spring assists in closing the choke valve, along with tension from the thermostatic coil, for improved cold starting. The choke closing assist spring only exerts pressure on the vacuum break link to assist in closing the choke valve during engine starting. When the engine starts and the choke vacuum break diaphragm seats, the closing spring hits a stop on the plunger stem and no longer exerts pressure on the vacuum break link.

On some Vega MV models, the vacuum break diaphragm assembly, externally mounted on the air horn casting, incorporates an integral plunger bucking spring for good cold engine operation.

After the engine starts, manifold vacuum acts on the vacuum break diaphragm to move the plunger inward, compressing the plunger bucking spring, until the diaphragm plunger strikes the cover. This opens the choke valve to a point where the engine will run without loading or stalling and is called the vacuum break position.

With the addition of the plunger bucking spring in the diaphragm assembly, the choke valve position can be modulated through the thermostatic coil so that leaner mixtures are maintained during warmer temperature and richer mixtures for colder temperature operation. On all automatic choke models, the thermostatic coil is heated during engine warm-up to gradually cause the coil to relax spring tension so that air velocity through the carburetor air horn can continue to open the choke valve. This continues until the engine is warm. At this point, the choke coil tension is completely relaxed and the choke valve is wide open.

The fast idle cam has graduated steps so that fast idle engine speed is lowered gradually during the engine warm-up period. The fast idle cam follows rotation of the choke valve. When the choke valve is completely open and the engine is warm, the fast idle tang on the throttle lever will be off the steps of the fast idle cam. At this point, the idle stop screw or solenoid plunger, if used, controls normal engine idle speed.

An unloader feature is provided should the engine become flooded during the starting period. The unloader partially opens the closed choke valve to allow increased air flow through the carburetor to lean out overly rich mixtures. This is accomplished by depressing and holding the accelerator pedal to the floor so that wide open throttle is obtained. When this is done, a tang on the throttle lever contacts an arm on the fast id le cam and forces the choke valve partially open. The additional air leans out the fuel mixture enough so that the engine will start.

COMBINATION EMISSION CONTROL (C.E.C.) **VALVE** (Fig. 12)

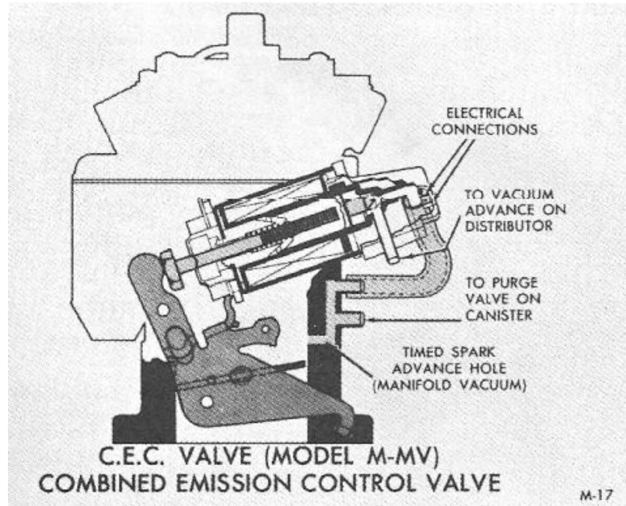


FIGURE 12

On some Monojet applications, a carburetor mounted

Combination Emission Control (C.E.C.) valve (Figure 12) is added to help reduce exhaust emissions. The C.E.C. valve, when energized through the transmission, controls distributor vacuum spark advance by providing spark vacuum advance during transmission high gear operation and, when de-energized, retarded spark timing during operation of the transmission in lower gears and at idle.

The C.E.C. valve, when energized through the transmission, also acts as a throttle stop by increasing engine idle speed during high gear operation to add more air as an aid in controlling over-run hydrocarbons during deceleration. Normal idle speed setting is made with the idle stop screw or idle stop solenoid. Idle speed settings should be made following vehicle manufacturer's specifications (noted on the decal located in the engine compartment).

The C.E.C. valve may be identified from the idle stop solenoid by two vacuum tubes for distributor vacuum advance, located at the end of the valve, and by the following precautionary label affixed to the valve:

> ***CAUTION: Never use to set idle. See Service Manual for adjustments.***

The timed spark port on C.E.C. valve equipped M and MV carburetors has two tubes that supply vacuum during the off-idle and part throttle operation. One tube is connected by a rubber hose to the C.E.C. valve to supply spark vacuum advance during high gear operation of the vehicle. The other tube leads to the vapor canister to activate the purge valve in the vapor canister. This provides a means of pulling extra fuel vapors from the canister during periods of higher air flow through the carburetor bore. A limited amount of canister purge also is provided during idle by a separate bleed orifice in the canister. Both bleed orifices are connected by a common tube from the canister to the P.C.V. valve.

IDLE STOP SOLENOID (Fig. 13)

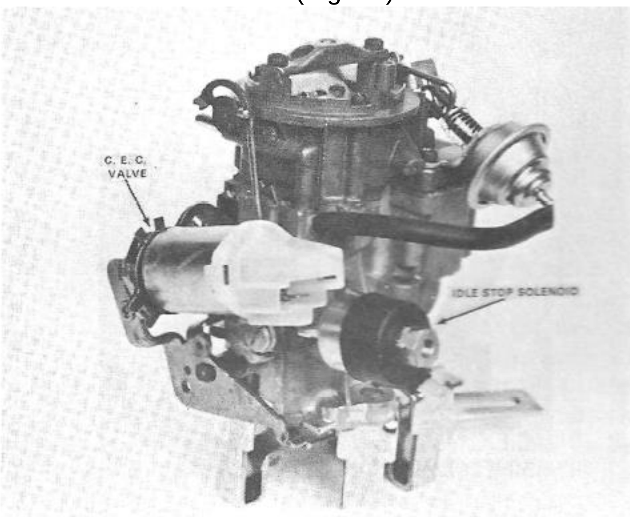


FIGURE 13

An electrically operated idle stop solenoid (Figure 13) is added to the float bowl on some Monojet carburetors to replace the normal carburetor idle stop screw. The idle stop solenoid may be used in conjunction with the Combination Emission Control (C.E.C.) valve. The idle stop solenoid controls the engine curb idle speed. The curb idle speed setting is made by adjusting the idle stop solenoid (electrically energized). Curb idle and low idle speed settings should be made using information located on the decal in the engine compartment (1968 and later vehicles).

MAJOR SERVICE OPERATIONS

DISASSEMBLY, CLEANING, INSPECTION AND ASSEMBLY PROCEDURES

DISASSEMBLY

The following disassembly and assembly procedures may vary somewhat between applications due to specific design features. However, the following will basically pertain to all Rochester M-MV carburetors:

Disassembly of Carburetor

C.E.C. Valve Assembly and Idle Stop Solenoid (if used)

REMOVAL - (See Figure 13)

1. Remove vacuum hose from the C.E.C. valve and from ported spark tube on float bowl.
2. Bend back retaining tabs on lock-washer; then remove large C.E.C. valve nut and remove valve from bracket.

   NOTE: Do not remove C.E.C. valve bracket from the float bowl assembly unless replacement is necessary.

3. If used, the electrically operated idle stop solenoid is removed by disconnecting the wire connector, and unscrewing the solenoid from the float bowl casting by turning the solenoid body counterclockwise.

   CAUTION: Do not immerse the CE.C valve assembly or idle stop solenoid in any type of carburetor cleaner.

AIR HORN REMOVAL (Fig. 14)

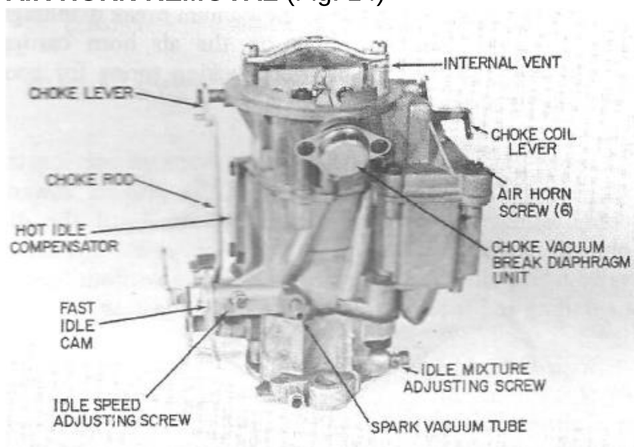


FIGURE 14

AIR HORN REMOVAL-1968 MODELS (Figure 14)

1. Remove upper choke lever retaining screw at end of choke shaft. Then remove choke lever from shaft.
2. Remove choke rod from slot in fast idle cam by rotating rod. Remove upper lever from other end of choke rod. Note position of rod in relation to levers for ease in reassembly.

AIR HORN REMOVAL (Fig. 15)

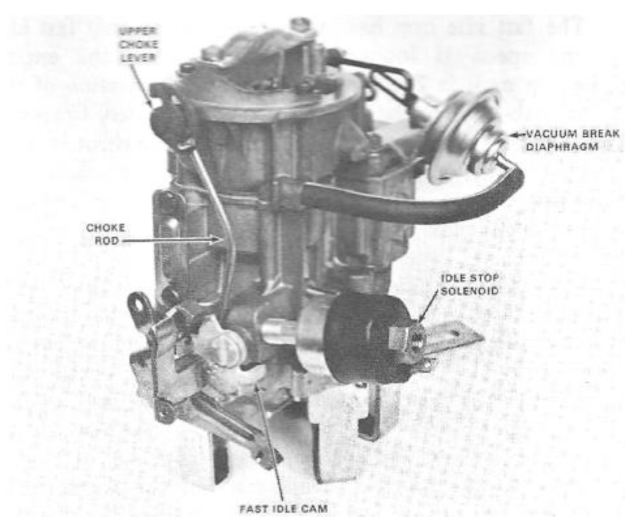


FIGURE 15

AIR HORN REMOVAL-1969 AND LATER MODELS (Figure 15)

1. The upper choke lever is "spun" on, in place of a screw attachment. Therefore, remove fast idle cam attaching screw and remove cam from float bowl, rotating the upper end of choke rod to remove rod out of slot in choke lever. Remove lower end of choke rod from fast idle cam. Note position of rod in relation to lever and cam for ease in reassembly.

AIR HORN REMOVAL-ALL MODELS

1. Remove hose from externally mounted vacuum break unit, if used, and from vacuum tube on carburetor.
2. Remove (6) air horn to float bowl attaching screws. There are (3) long and (3) short screws.
3. Remove externally mounted vacuum break unit, if used.
4. Remove air horn by lifting straight up. Invert air horn and place on a clean bench. Air horn to bowl gasket can remain on bowl for removal later.

AIR HORN DISASSEMBLY (Fig. 16)

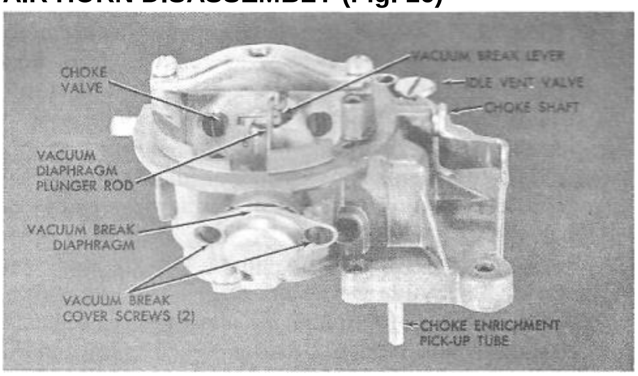


FIGURE 16

AIR HORN DISASSEMBLY

1. On models using an integral vacuum break unit on the air horn assembly (Figure 16), remove (2) vacuum break diaphragm cover screws. Then carefully remove diaphragm cover retainer. To remove vacuum break diaphragm and plunger rod, hold choke valve open. Then push upward on diaphragm rod until the looped end of rod slides out off of vacuum break lever attached to choke valve. Remove diaphragm plunger rod through hole in air horn. To remove diaphragm, carefully slide off plunger stem.
2. If desired, the choke valve and choke shaft can be removed from the air horn by removing the choke lever (Figure 14) or thermostatic coil lever (Figure 15) from the end of choke shaft by removing the attaching screw. Remove the two choke valve attaching screws. Staking on choke valve screws should be filed off before removal so as not to ruin threads and distort the choke shaft.

   NOTE: On some models, the choke valve screws are held in place by Loctite so it will be necessary to restake or use thread lock adhesive kit No.X10 or equivalent during assembly.
3. No further disassembly of the air horn is necessary. The pressure relief valve disc need not be removed from the top of the air horn for normal cleaning purposes. The idle vent valve, if used, can be removed by turning the screw head out of the plastic guide. A repair kit is available if replacement parts are needed.

   NOTE: The cranking enrichment valve, if used, is not removable. Make sure all cleaning solution is removed completely from valve cavity and bleed hole in valve retainer is open.

FLOAT BOWL DISASSEMBLY (Fig. 17)

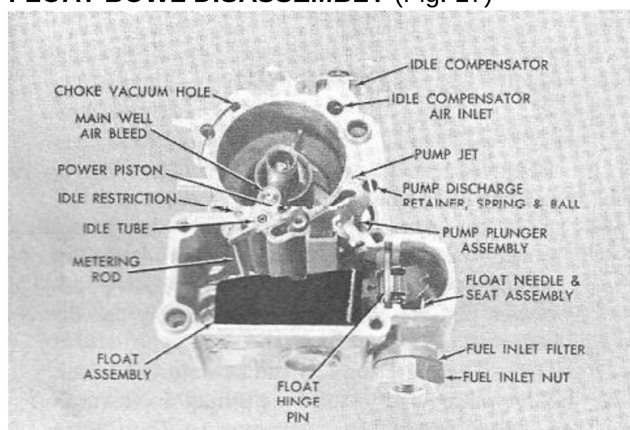


FIGURE 17

FLOAT BOWL DISASSEMBLY

1. Remove air horn to float bowl gasket. Gasket is slit next to metering rod lever so that it can be slid over lever for ease in removal.
2. Remove float assembly from float bowl by lifting upward on float hinge pin. Remove hinge pin from float arm.
3. Remove float needle, then remove float needle seat and gasket. To prevent damage to needle seat, use seat removal tool BT-3006.
4. Remove fuel inlet nut and gasket, then remove filter element and pressure relief spring.
5. Using long-nosed pliers, remove "T" pump discharge spring retainer. Pump discharge spring and ball may be removed by inverting bowl.
6. The idle tube (and power enrichment check valve on Vega applications) can be removed at the same time by inverting bowl.
7. To remove accelerating pump plunger and, if used, metering rod-power piston drive assemblies, perform the following operations (Figure 18):

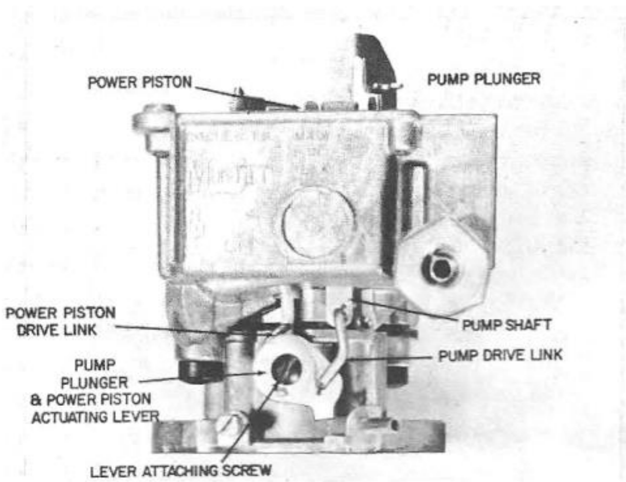


FIGURE 18

a. Remove actuating lever on throttle shaft by removing attaching screw at end of shaft.
b. Hold the power piston assembly down in float bowl, then remove power piston drive link by sliding out of hole in power piston drive rod. The power piston-metering rod assembly can now be removed from float bowl.

   NOTE: The metering rod can be removed from holder on power piston by pushing downward on end of rod against spring tension. Then slide narrow neck of rod out of slot in rod holder.

c. Remove power piston spring from power piston cavity.
d. Remove power piston drive link from throttle actuating lever by aligning squirt on rod and notch in lever.
e. Remove actuating lever from accelerator pump drive link in same manner. Note position of actuating lever for ease in reassembly (Figure 18).
f. Hold the pump plunger down in bowl cavity and remove drive link from pump plunger shah by rotating link until squirt on link aligns with not h in plunger shaft.

8. Remove pump plunger assembly from float bowl.
9. Remove pump return spring from pump well.
10. Remove main metering jet from bottom of float bowl.
11. If an idle compensator is used, remove (2) screws from idle compensator cover. Then remove cover, hot idle compensator and gasket from recess in bowl beneath compensator.
12. Idle adjustment screw, if used, and fast idle cam (Early Models) can be removed at this time if desired. No further disassembly of the float bowl is required.

THROTTLE BODY REMOVAL AND DISASSEMBLY (Fig. 19)

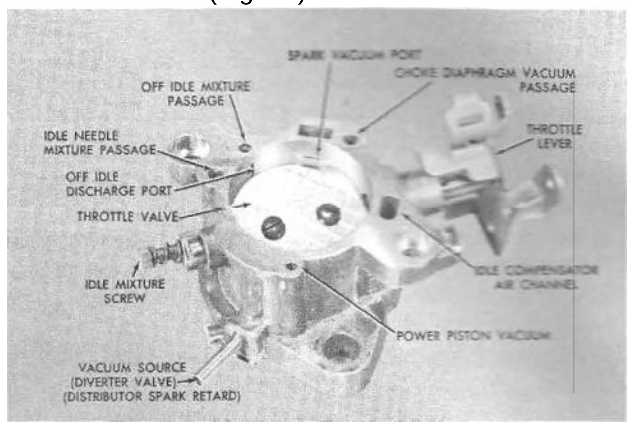


FIGURE 19

THROTTLE BODY REMOVAL AND DISASSEMBLY

1. Invert carburetor bowl on bench and remove (2) throttle body to bowl attaching screws. Throttle body and insulator gasket may now be removed from float bowl.

   NOTE: Do not tamper with the idle mixture needle with a limiter cap unless performing a carburetor overhaul or due to needle damage. The idle mixture is preset at the factory and should not be disturbed.

2. If necessary, destroy plastic limiter cap (if used) and remove idle mixture needle and spring. IMPORTANT: Before removing idle mixture needle, be certain to count number of turns to lightly bottom the mixture needle. This is required so that when it is necessary to reinstall the needle. You may lightly bottom he needle and then back off the same number of turns it took to bottom the needle originally.

   No Further disassembly of throttle body required.

   Note: due to the close tolerance fit of the throttle valve in the bore of the throttle body, do not remove the valve or shaft.

CLEANING OF PARTS

The carburetor should be cleaned in cold immersion type cleaner.

1. Thoroughly clean carburetor castings and metal parts in an approved carburetor cleaner such as Carbon-X X-55 or its equivalent.

   Caution: Any rubber parts, plastic parts, diaphragms, pump plunger, electric parts and solenoids should, NOT be immersed in carburetor cleaner. However, air horns that have the pressure relief valve, plastic vent valve guide. Or cranking enrichment valve, will withstand normal cleaning in carburetor cleaner. Make sure pressure relief valve area or cranking

enrichment valve cavity. Clean plastic parts only in washing fluid such as Stoddard solvent or kerosene - never gasoline.

2. Blow out all passages in castings with compressed air. Do not pass drills through jets or passages.

INSPECTION OF PARTS

1. If removed, inspect idle mixture needle for damage.
2. Examine float needle and seat assembly for wear. Install a new factory matched set if worn.
3. Inspect upper and lower casting sealing surfaces for damage.
4. Inspect holes in levers for excessive wear or out-of round condition. If levers or rods are worn they should be replaced.
5. Inspect metering rod, power enrichment valve (Vega applications), and metering jet. If damaged or worn excessively, replace.
6. Examine fast idle cam for wear or damage.
7. Check throttle and choke levers and valves for binds and damage.
8. Check throttle valve screws for tightness. If loose, tighten and stake securely.
9. Inspect throttle body assembly. Make sure all passages and vacuum channels are clean.
10. Inspect the pump plunger assembly. If pump plunger cup is worn excessively or damaged, the plunger should be replaced.
11. Check float for excessive wear at hinge pin holes and point of needle contact. Replace float if necessary.
12. Check all springs for distortion or loss in tension. Replace as necessary.
13. Inspect hot idle compensator for distortion or damage. Replace as necessary.
14. Replace fuel filter element.
15. Inspect vacuum break diaphragm for damage or leaks. On the externally mounted type, use a vacuum pump to apply at least 10" of vacuum to the diaphragm unit and check for leak-down. If a leak occurs, replace vacuum break unit.

ASSEMBLY AND ADJUSTMENT PROCEDURES

As mentioned during throttle body disassembly, there is a very close tolerance fit between the throttle valve and bore. Also, the E.G.R., timed spark, and idle discharge orifices are drilled or punched in relation to a proper fitting valve. Therefore, if the throttle valve, lever, or shaft is worn excessively or damaged, a complete throttle body assembly is required.

NOTE: Refer to the carburetor part number stamped on the bowl; then consult the Delco 9C Parts Bulletin for a listing of parts used.

1. If removed, install the idle mixture adjusting needle and spring in the throttle body until finger tight. Then, back out needle specified number of turns as a preliminary adjustment. (See step 2 page 14, Throttle Body Disassembly) After completing assembly of the carburetor, and when installed on the vehicle, adjust the mixture needle to a high the idle speed and idle mixture settings as specified in the Car Division Shop Manual.

THROTTLE BODY ASSEMBLY AND INSTALLATION (Fig. 20)

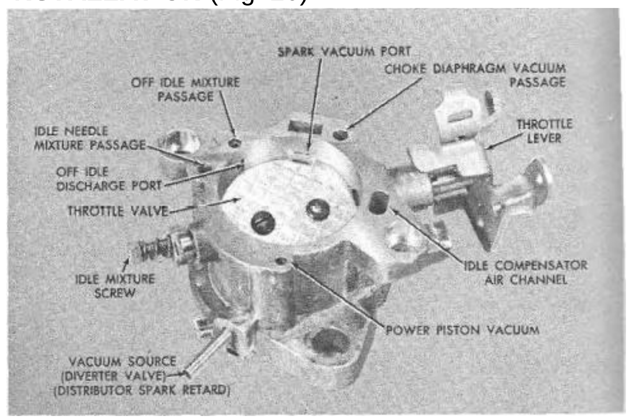


FIGURE 10

CAUTION: Do not force the idle mixture needle against the seat or damage will result.

2. Invert float bowl and install new throttle body to bowl insulator gasket, making sure all holes in gasket align with holes in float bowl.
3. Install throttle body on bowl gasket so that all holes in throttle body are aligned with holes in gasket. *NOTE: Where excessive vibration or rough road operation to cause loose carburetor screws is anticipated, it is suggested self-locking throttle body to bowl screws, included in Screw Kit 7041830, be installed (See Bulletin 9D-20L)*
4. Install (2) throttle body to bowl attaching screws. Tighten evenly and securely (12-15 ft. lbs. of torque).

FLOAT BOWL ASSEMBLY (Figure 21)

1. Install round seal into recess in idle compensator cavity in float bowl, then install idle compensator assembly.
2. Install idle compensator cover, retaining with (2) attaching screws. Tighten securely.
3. Install main metering jet into bottom of float bowl. Tighten securely.
4. Install pump return spring into pump well. Make sure spring is properly seated in bottom of well.
5. Install pump plunger assembly into pump well with actuating shaft protruding through bottom of bowl casting. Push downward on pump plunger and install pump drive link into hole in lower end of plunger shaft (Figure 22). Ends of drive link point towards carburetor bore. Bend in link faces toward fuel inlet. Squirt on end of link retains link to pump shaft.

FLOAT BOWL ASSEMBLY (Fig. 21)

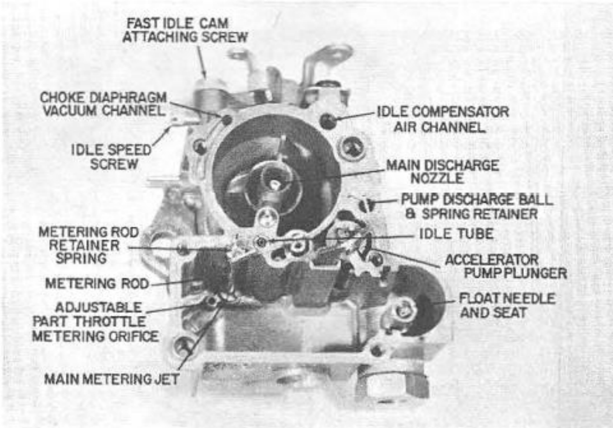


FIGURE 21

6. Install pump actuating lever to lower end of pump drive link by aligning squirt on rod with notch in lever. Projection on actuating lever points downward. Install power piston actuating link into opposite end of actuating lever. Lower end of link has retaining squirt and faces outward (away from throttle bore).
7. Install power piston spring into power piston cavity.

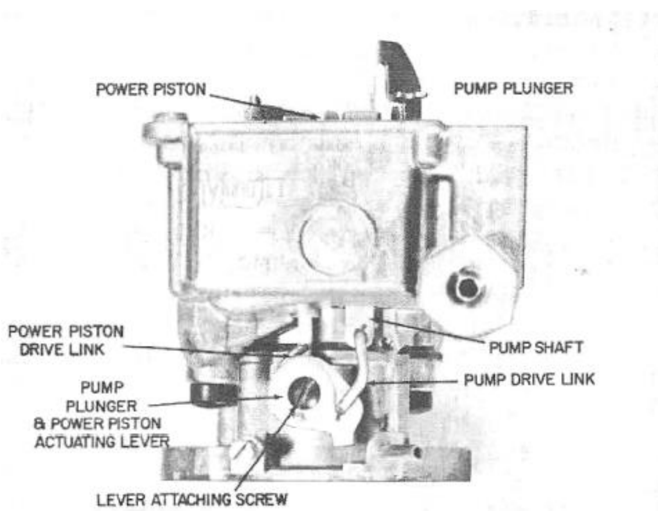


FIGURE 22

8. Install end of power piston drive rod into groove on side of power piston. Then install power piston and drive rod in to float bowl (metering rod, if used, is to be installed later - See Metering Rod Adjustment -Step 19).
9. Hold complete assembly downward in bowl, then install power piston drive link into hole in lower end of power piston drive rod (beneath bowl).

   NOTE: On 1969 Oldsmobile manual transmission models, install compression spring into recess in bottom of float bowl casting and in retaining groove in the lower end of the power piston drive rod. (See Power System, Page 8)
10. Align "D" hole in actuating lever with flats on throttle shaft and install lever on end of throttle shaft. Install retaining screw in end of throttle shaft and tighten securely (Figure 22).

    NOTE: Before installing air horn, check operation of entire drive mechanism, metering rod (if used), and accelerator pump to ensure free operation from closed to wide open throttle.
11. Install idle tube into cavity in float bowl.
12. On Vega models, install power enrichment valve into cavity in float bowl.
13. Install pump discharge ball, spring and spring retainer. Make sure spring retainer is in flush with top of bowl casting.
14. Install fuel filter relief spring, fuel inlet filter, filter nut and gasket. Tighten securely.

    NOTE: Open end of filter should face hole in fuel inlet nut.
15. Install float needle seat and gasket. Tighten securely using needle seat installation tool BT-3006 or, if unavailable, a wide blade screwdriver. Use care when tightening to prevent damage to the seat.
16. Install float needle valve into needle seat.
17. Insert straight portion of float hinge pin into float arm. Install float and hinge pin into float bowl. Check for free movement of float assembly.
18. Carefully adjust float level following procedures and specification listed in the ··D" Section of the Delco Carburetor Parts and Service Manual (9X).
19. Carefully perform metering rod adjustment (on models so equipped) by referring to procedures and specifications contained in the "D" Section of the Delco Carburetor Parts and Service Manual (9X).
20. After adjustment, install metering rod.
21. Install air horn gasket on float bowl by carefully sliding slit portion of gasket over metering rod holder. Then align gasket with dowels provided on top of bowl casting and press gasket firmly in place.

AIR HORN ASSEMBLY (Fig. 23)

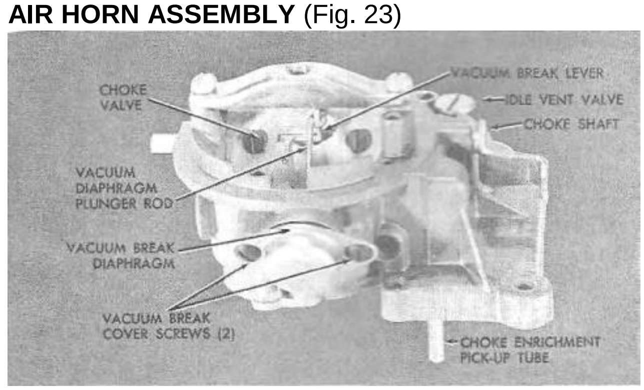


FIGURE 23

AIR HORN ASSEMBLY AND INSTALLATION (Fig. 23)

1. Install idle vent valve assembly, if removed.
2. If removed, install choke shaft, choke valve, and vacuum break lever. If choke shaft and/ or lever replacement is necessary, see Bulletin 90-205. Align choke valve, tighten (2) retaining screws. Open and close choke valve several times to check for free operation, then stake choke valve screws or use Thread Lock Adhesive Kit No. XIO or equivalent.

MODELS USING AN INTEGRAL VACUUM BREAK UNIT

3. Install vacuum break rubber diaphragm on plunger stem (convolute of diaphragm fits around head of plunger). Then install plunger assembly into cavity at side of air horn. With choke valve in the open position, slide eyelet of diaphragm plunger rod over end of vacuum break lever on choke valve.
4. Seat vacuum break diaphragm over sealing bead on air horn casting. With diaphragm held in place, carefully in stall diaphragm cover and (2) retaining screws. Tighten screws securely.

ALL MODELS

5. Install air horn to float bowl by lowering gently on to float bowl until seated. Install (3) long and (3) short air horn to float bowl attaching screws using tightening sequence shown in Figure 24. If desired, self-locking air horn screws (contained in Screw Kit 7041830) may be installed where excessive vibration or rough road operation to cause loose carburetor screws is anticipated (See Bulletin 9D-20 1).

NOTE: On units using an externally mounted vacuum break, install the choke vacuum break assembly under the (2) short air horn screws next to the thermostatic coil lever. Connect the choke vacuum break link to the thermostatic coil lever and install lever to the end of the choke shaft using retaining screw. Tighten all screws securely. Install the choke vacuum break hose to the nipple on vacuum break unit and tube on carburetor.

AIR HORN TIGHTENING SEQUENCE (Fig. 24)

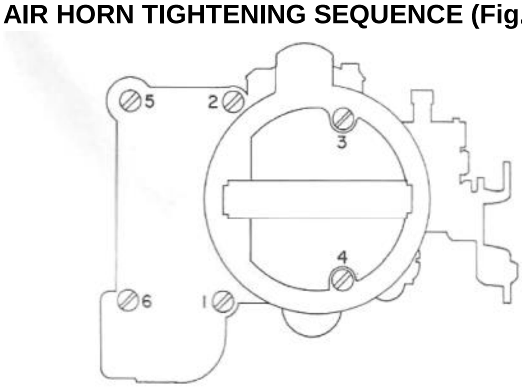


FIGURE 24

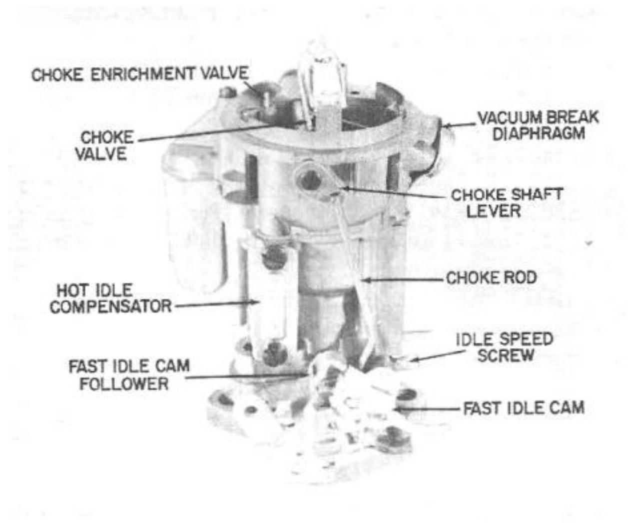


FIGURE 25

CHOKE SHAFT AND LEVER REPLACEMENT-1968 MODELS

6. Assemble choke rod to the choke shaft lever. End of rod points away from air horn casting when installed properly. (Lower end of rod has 45 degree bend.) Part number on lever faces outward.
7. Install lower end of choke rod into curved slot in fast idle cam. Steps on fast idle cam should face idle tang on throttle lever.
8. Install upper choke lever to choke shaft. End of lever faces towards vacuum break diaphragm (See Figure 25). Install choke lever screw. Tighten securely.

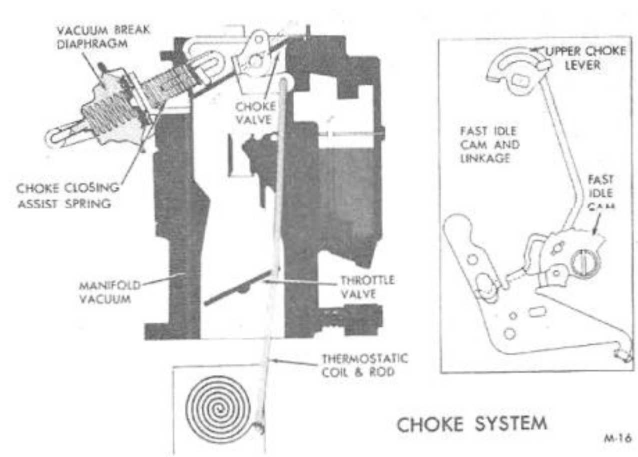


FIGURE 26

CHOKE SHAFT AND LEVER REPLACEMENT-1969 AND LATER MODELS

9. Assemble choke rod into the slot in the upper choke lever. End of rod points away from air horn casting when installed properly (Figure 26).
10. Install lower end of choke rod into fast idle cam.
11. Install fast idle cam to boss on float bowl with attaching screw. Tighten securely. Part number on cam faces outward and steps on cam should face fast idle tang on throttle lever.

    NOTE: Where excessive vibration or rough road operation to cause loose carburetor screws is anticipated, it is suggested a self-locking fast idle cam screw, included in Screw Kit 7041830, be installed (See Bulletin 9D-20I).

FINAL CARBURETOR ASSEMBLY-ALL MODELS

If choke shaft and/or lever replacement is necessary, see Bulletin 9D-205.

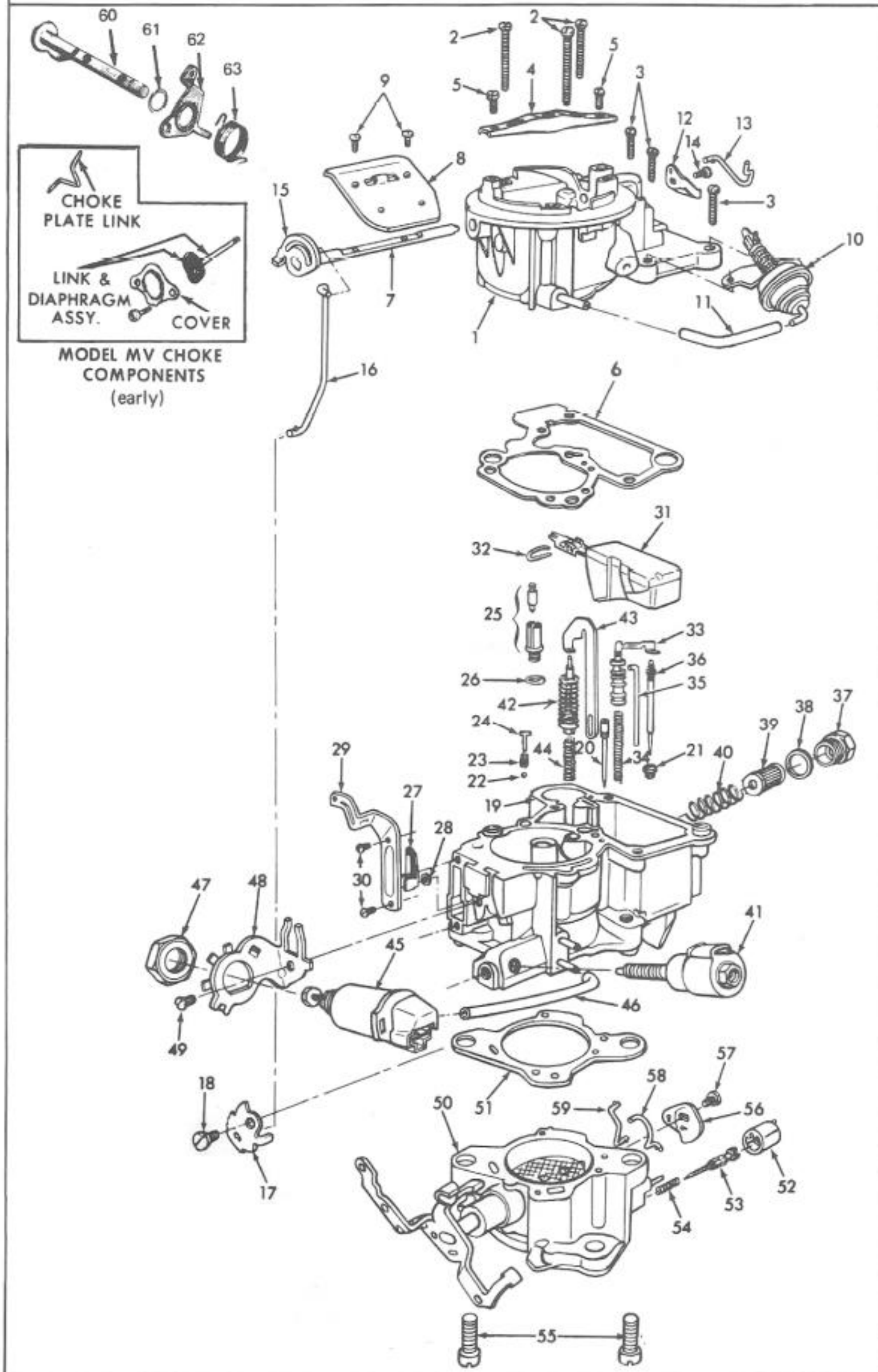
12. Install slow idle adjustment screw if used.
13. If used, install electrically operated idle stop solenoid into boss on float bowl.
14. If used, install C.E.C. valve into bracket on float bowl. Install large retaining nut and tighten securely. Then bend lock-washer retaining ears over on flats of nut so that the nut is locked securely in place. Install vacuum hose to tube on float bowl and ·o outer tube on the C. E. C. valve.

ADJUSTMENT PROCEDURES AND SPECIFICATIONS

Refer to the Delco Carburetor 9X Manual "C" Section for Replacement Parts and " D" Section for Trouble Shooting, Adjustment Procedures and Specifications, for each carburetor model. The adjustments should be performed in sequence listed as applicable to each carburetor model.

The 9X Manual, Carburetor Tools and Gauges, are available through United Delco Suppliers.

TYPICAL EXPLODED VIEW—MODEL MV MONOJET



PARTS

1. Air Horn Assembly
2. Screw—Air Horn—Long
3. Screw—Air Horn-Short
4. Bracket—Air Cleaner Stud
5. Screw—Bracket Attaching
6. Gasket—Air Horn
7. Choke Shaft and Lever Assembly
8. Choke Valve
9. Screw—Choke Valve
10. Choke Vacuum Break, Unit
11. Vacuum Break Hose
12. Vacuum Break Lever
13. Vacuum Break Link
14. Vacuum Break Lever Screw
15. Choke Lever
16. Choke Rod
17. Cam—Fast Idle
18. Screw—Cam Attaching
19. Float Bowl Assembly
20. Idle Tube Assembly
21. Jet—Main Metering
22. Ball—Pump Discharge
23. Spring—Pump Discharge
24. Guide—Pump Discharge
25. Needle and Seat Assembly
26. Gasket—Needle Seat
27. Idle Compensator Assembly
28. Gasket—Idle Compensator
29. Cover—Idle Compensator
30. Screw—Cover
31. Float Assembly
32. Hinge Pin—Float
33. Power Piston Assembly
34. Spring—Power Piston
35. Rod—Power Piston
36. Metering Rod and Spring Assembly
37. Filter Nut—Fuel Inlet
38. Gasket—Filter Nut
39. Filter—Fuel Inlet
40. Spring—Fuel Inlet
41. Idle Stop Solenoid
42. Pump Assembly
43. Lever—pump Actuating
44. Spring—Pump Return
45. C.E.C. Valve
46. C.E.C. Vacuum Tube
47. C.E.C. Valve Nut
48. C.E.C. Valve Bracket
49. C.E.C. Valve Bracket Screw
50. Throttle Body Assembly
51. Gasket—Throttle Body
52. Idle Needle Limiter Cap
53. Idle Needle
54. Spring—Idle Needle
55. Screw—Throttle Body
56. Lever—Pump and Power Rods
57. Screw—Lever Attaching
58. Link—Power Piston Rod
59. Link—Pump Lever
60. Choke Valve Shaft
61. Retainer—Choke Lever
62. Choke Lever
63. Spring—Choke Shaft