FUEL SYSTEM

MODEL HD CARBURETOR

DESCRIPTION (See Fig. 3F-1)

The Model HD carburetor is a dual-venturi, diaphragm-type carburetor with an automatic economizer and accelerating pump.

The fuel inlet needle is operated through a compression-spring balanced lever that is controlled by the diaphragm to regulate the flow of fuel into the metering chamber. The amount of fuel going into the carburetor metering chamber is exactly equal to the amount of fuel being used by the engine.

This type of fuel supply control operates at any tilt angle and is resistant to any vibration which could cause a poor fuel-air mixture or flooding.

The small primary venturi is offset to the bottom of the large secondary venturi where the main nozzle outlet protrudes from the metering chamber. The accelerating pump discharges into the small venturi to take advantage of the venturi pressure drop that breaks up the solid stream of accelerating-pump fuel.

The accelerating unit is a positive-acting plunger type pump that is connected to the throttle shaft through a cam lever. The pump plunger is a spring-loaded leather cup that operates in a smooth plastic cylinder, and draws its fuel directly from the metering chamber to provide extra fuel for accelerating.

The automatic economizer is a hydraulically-operated enrichment valve that controls the main-nozzle fuel mixture at very low engine speeds. The valve opens an auxiliary fixed main jet as the venturi air flow decreases, allowing the fuel mixture to be maintained at a full-power richness. As the air flow through the carburetor increases, or as the engine speed increases, the valve closes to prevent an over-rich mixture at intermediate speeds.

OPERATION

STARTING OPERATION (Fig. 3F-2)

Choke is in the closed position and the throttle in a slightly open position. As the engine is cranked, the entire metering system--idle, intermediate, and nozzle--is subjected to engine suction which is transmitted to the fuel chamber via the metering

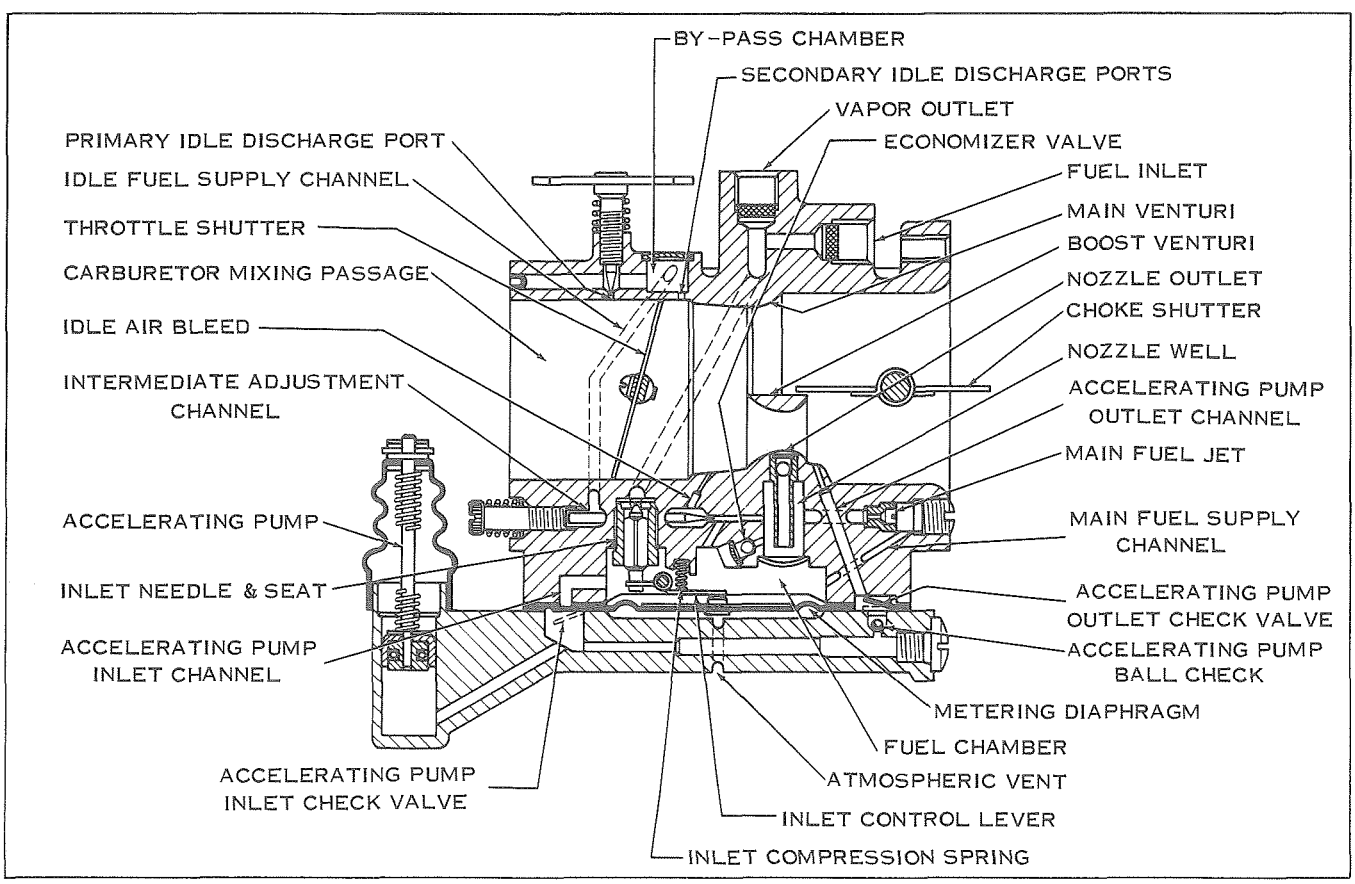


Figure 3F-1. Carburetor Cross Section - Model HD

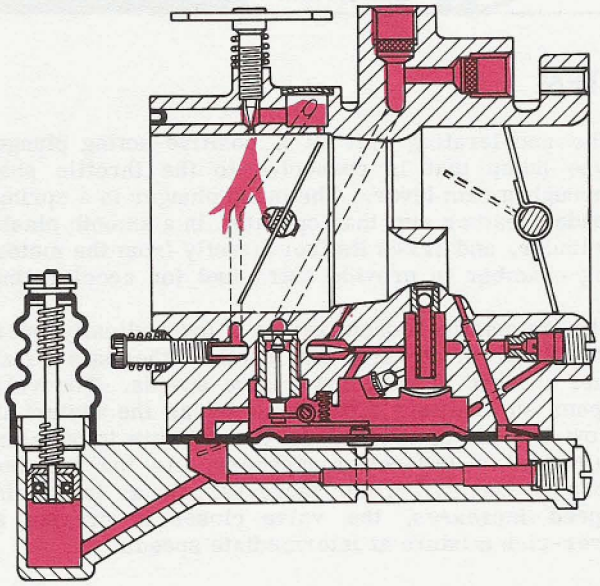


Figure 3F-2. Starting

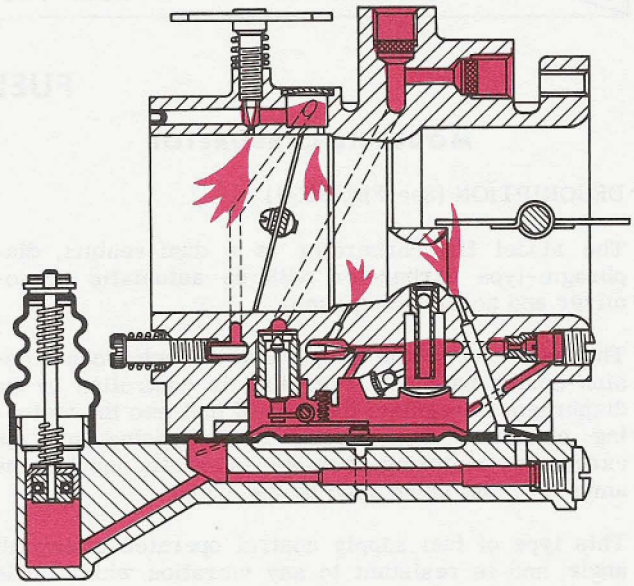


Figure 3F-3. Idle

channels, creating a low pressure on the fuel side of the metering diaphragm. Atmospheric pressure from the atmospheric vent moves the metering diaphragm toward the inlet control lever to allow fuel to enter the carburetor through the inlet needle and seat. The fuel is then forced through the metering system, out into the carburetor mixing passage, and into the manifold and engine. When the engine fires and starts to run, the volume of air drawn through the carburetor increases, and the spring-loaded top half of the choke shutter opens to provide the additional air required by the engine, to prevent an over-rich mixture. The choke can then be moved to a half-open position for engine warm-up.

During hot weather, or after an engine has been run long enough to reach stable operating temperatures, and then shut off for a short period of time, a small amount of fuel vapor may form in the fuel lines or in the fuel chamber of the carburetor. The vapor in the fuel lines will enter the fuel inlet and rise out of the vapor outlet, to be vented back into the fuel tank. The vapor that forms in the fuel chamber must escape through the metering system because there is no other vent to the fuel chamber. Starting a warm engine where vapor may be in the system, is most easily accomplished by placing the choke in the half-closed position, and starting as described above. The choke helps to get the vapor quickly out of the fuel system so that the fuel flowing through the carburetor and fuel line can cool the system to a normal temperature.

Starting is always more easily accomplished using the choke--full choke for a cold engine, and half choke for a warm engine.

IDLE OPERATION (Fig. 3F-3)

The throttle shutter is slightly open when the engine is idling and the carburetor mixing passage on the engine side of the throttle shutter is exposed to engine suction, while the mixing passage between the throttle shutter and the air cleaner is at nearly atmospheric pressure. The engine suction is transmitted through the primary idle discharge port to the fuel chamber side of the metering diaphragm via the bypass chamber, idle fuel supply channel, intermediate adjustment channel, nozzle well, main fuel jet, and main fuel supply channel, creating a sub-atmospheric pressure, in the fuel chamber. The metering diaphragm is forced upward by atmospheric pressure, moving the inlet control lever to overcome the inlet compression spring pressure, allowing fuel to enter the fuel chamber through the inlet needle and seat. The fuel flows through the main fuel supply, main fuel jet, nozzle well, intermediate adjustment channel (where it mixes with air from the idle air-bleed) idle fuel supply channel, to the bypass chamber, where it mixes with air from the secondary idle discharge ports, and on out into the carburetor mixing passage through the primary idle discharge port. The mixture of well-atomized fuel and air then travels through the manifold and into the engine combustion chamber.

ACCELERATION (Fig. 3F-4)

Acceleration is accomplished by the use of a positive-action accelerating pump that is actuated from the throttle shaft by a cam lever. The pump cylinder is filled when the pump is raised to the top of its stroke. Fuel is drawn from the fuel chamber, through the accelerating pump inlet channel, past

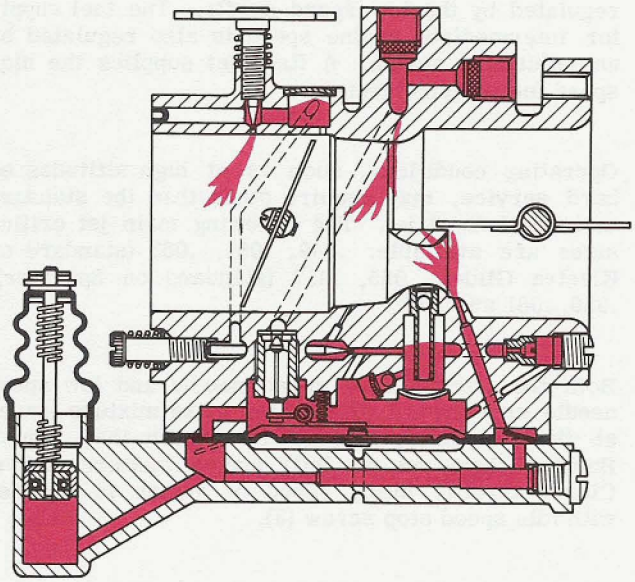


Figure 3F-4. Accelerating

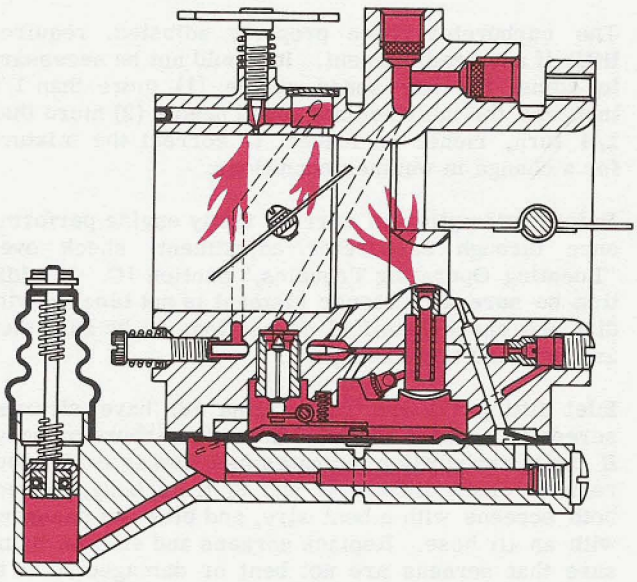


Figure 3F-5. Intermediate Speed

the inlet check valve. The outlet check valve is closed to prevent air from being drawn into the accelerating pump system. As the accelerating pump is depressed, the pressure of the fuel closes the inlet check valve, the fuel flows through the pump channels, past the outlet check valve, through the accelerating pump outlet channel, and through the boost venturi into carburetor mixing passage.

INTERMEDIATE OR CRUISE OPERATION (Fig. 3F-5)

Fuel is delivered into the carburetor as described in idle operation, and the same fuel channels are in use. As the throttle shutter opens to increase engine speed, the secondary idle discharge ports are exposed to engine suction, and fuel is delivered from both the primary and secondary idle discharge ports to supply the additional fuel demanded by the engine. As the throttle shutter is opened farther, the air velocity through the boost venturi increases, creating a low pressure area at the nozzle outlet. Fuel flows from the fuel chamber through the nozzle outlet via the nozzle well, main fuel jet, main fuel supply channel, and economizer valve when the pressure at the nozzle outlet is less than the pressure in the fuel chamber. At the idle and lower intermediate speeds, the check ball in the economizer valve is away from the valve seat, allowing free flow from the fuel chamber through the economizer valve to the nozzle well and nozzle outlet. Fuel flow from the primary and secondary idle ports decreases as fuel flow from the nozzle outlet increases.

HIGH-SPEED OPERATION (Fig. 3F-6)

Fuel flow from the nozzle outlet increases as the shutter is opened past the intermediate position to

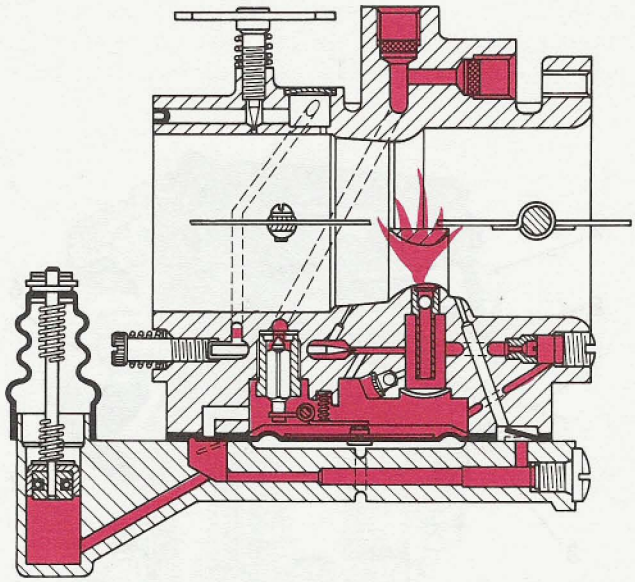


Figure 3F-6. High Speed

the fully-open position. The fuel is delivered through the nozzle outlet from the fuel chamber via the main fuel supply channel and the main fuel jet. The increased pressure difference between the small venturi and the metering chamber, plus the force of fuel flowing through the economizer valve, causes the check ball to seat, stopping the flow of fuel from this part of the main metering system. This gives increased economy at high speeds. The diaphragm action and the method of fuel delivery to the fuel chamber is the same as previously described.

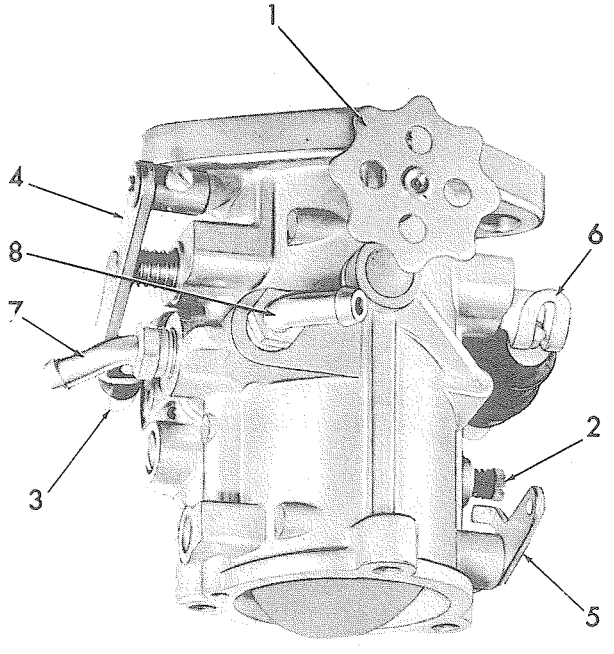
ADJUSTING CARBURETOR (See Fig. 3F-7)

The carburetor, once properly adjusted, requires little if any readjustment. It should not be necessary to adjust the low speed needle (1) more than 1/8 turn and the intermediate speed needle (2) more than 1/4 turn, richer or leaner, to correct the mixture for a change in weather conditions.

Before attempting to correct faulty engine performance through carburetor adjustment, check over "Locating Operating Troubles," Section 1C. In addition be sure air cleaner element is not blocked with dirt and check manifold connections to be sure they are tight and not leaking air.

Inlet fitting (7) and vent fitting (8) have strainer screens located in threaded holes in carburetor body. If faulty carburetion indicates fuel flow is restricted, remove elbow fittings (7 and 8) from body, extract both screens with a bent wire, and blow out passages with an air hose. Replace screens and elbows, being sure that screens are not bent or damaged so as to allow dirt to pass through.

Check to see that carburetor vent line hose leading from fitting (8) to gas tank is not blocked off. Also see that gas tank cap vent is not plugged. Either condition will restrict fuel flow.



1. Low speed needle
2. Intermediate speed needle
3. Throttle stop screw
4. Throttle lever
5. Choke lever
6. Accelerating pump
7. Inlet fitting
8. Vent fitting

Figure 3F-7. Model HD Carburetor Adjustments

The fuel supply for low engine speed is completely regulated by the low speed needle. The fuel supply for intermediate engine speed is also regulated by an adjustable needle. A fixed jet supplies the high speed fuel requirements.

Operating conditions, such as at high altitudes or hard service, may require other than the standard main fuel fixed jet. The following main jet orifice sizes are available: .049, .051, .053 (standard on Electra Glide), .055, .057 (standard on Sporster), .059, .061 and .063.

Both the intermediate speed needle and low speed needle turn inward (to right) to make mixture leaner at the respective speeds for which they adjust. Backing them out (to left) makes mixture richer. Closed throttle idling speed of engine is adjusted with idle speed stop screw (3).

Correct adjustment can be determined in the shop and verified by road test according to the following procedure.

1. Make sure carburetor control wire is adjusted so throttle lever (4) fully closes and opens with handlebar grip movement.

2. Turn both the low speed needle (1) and the intermediate speed needle (2) all the way in (to right). Do not close off either needle too tightly or damage to needle and seat may result.

3. Back up (to left) both needles about 7/8 turn. With needles in this position, engine will start, but low speed mixture will probably be too rich.

4. Start the engine and after it has reached operating temperature and the choke has been moved to the open position, adjust throttle control so engine runs at approximately 2000 RPM.

5. Without changing throttle setting, turn intermediate needle slowly in direction which produces highest engine speed (RPM). Engine should not miss or surge at this adjustment position.

6. Back off intermediate needle 1/8 turn to slightly richen mixture. This is the correct intermediate needle adjustment.

7. Readjust idle needle and idle speed stop screw to produce a smooth idle at desired idle speed (900 to 1100 RPM).

NOTE

Use of an electric tachometer is recommended.

8. Changing either mixture setting also affects the other setting to some degree. Therefore, it will be necessary to recheck the low speed mixture after the intermediate mixture final setting is obtained.

CHECK LIST

The following check list should be used to correct the most common carburetor defects.

1. Check accelerator pump operation.

2. Blow out passages through high speed screw plug hole.

3. Tighten cover screws and pressure-test inlet valve.

4. Check intermediate adjustment spring, needle, and needle seating.

5. Test main nozzle ball check valve with tool.

6. Inspect idle needle and seat.

7. Inspect choke relief disc.

8. Inspect and clean discharge ports, diaphragms and gaskets, screens and passages. Diaphragm plate must not turn.

9. Check inlet lever setting - must be flush to 1/64 inch above floor of casting. Lever and needle must be the shackled type.

10. Test economizer ball check valve with tool.

11. Check assembly order - gasket next to body, then diaphragm, last cover.

NOTE

A more detailed guide is given at the end of this Section.

TESTS (checks and tests for carburetor performance)

ALL TESTS SHOULD BE PERFORMED, IN THE SEQUENCE SHOWN BELOW, BEFORE FURTHER DISASSEMBLY OR REPAIRS ARE MADE.

PRIOR TO REMOVAL OF CARBURETOR FROM ENGINE

1. The accelerator pump should be inspected for proper operation first. Remove air cleaner, prime carburetor by inserting a toothpick through small hole in bottom of plastic pump cover and gently working diaphragm several times. Operate the throttle lever both rapidly and slowly several times, with the fuel valve turned on. The pump should deliver a strong and constant jet of fuel with each stroke. Failure to do so indicates diaphragm valves or pump plunger as being defective.

2. In cleaning of high, intermediate and low speed channels, the following procedure, most likely, will dislodge any loose dirt lodged in the passages.

Remove high speed screw plug located on rear side of carburetor, opposite intermediate adjustment needle. Lightly seat intermediate needle and apply air hose pressure (90 pounds maximum) to screw plug hole. Open intermediate and idle needles three or four turns and again apply 90 pounds maximum air pressure. Reset both adjustment screws (see ADJUSTING CARBURETOR). Evaluate carburetor's performance by road testing.

3. Check inlet needle and seat for leakage, as follows:

See that all plastic cover screws are tight. Remove fuel and vent lines, install bulb tester, Part No. 94750-68, to carburetor fuel inlet fitting, plug vent fitting with finger and pressurize tester noting any leakage. A moistened needle and seat should hold 1 to 1-1/2 pounds approximately, and release at approximately 3 to 5 pounds. A dry needle and seat will not hold as well as a moist one. See Fig. 3F-7A.

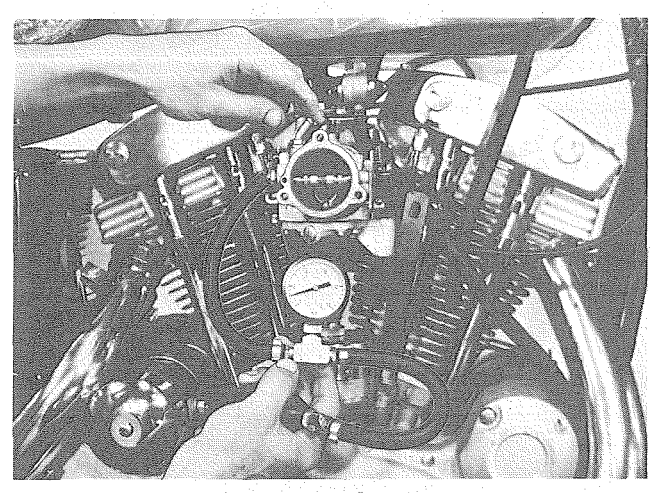


Figure 3F-7A. Checking Inlet Needle and Seat for Leakage

REMOVE CARBURETOR BUT DO NOT DISASSEMBLE

4. Inspect intermediate adjustment needle and spring to see if spring coils are binding before needle seats. If needle does not seat grind a small amount of material from each end of spring. You can check to see if needle is seating by applying blue dye to needle taper and screwing down lightly into seat and noting mark on needle taper.

5. Check main nozzle ball check valve for leakage, as follows:

Seal one side of venturi with finger and apply alternate pressure and vacuum by mouth using grommet end of tool, Part No. 96960-68, seated in venturi as shown in Fig. 3F-7B.

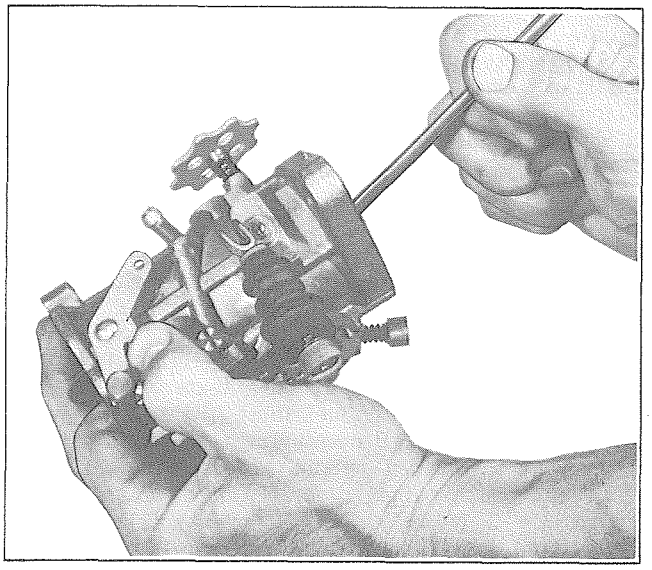


Figure 3F-7B. Checking Main Nozzle Ball Check Valve for Leakage

Vacuum should release ball, and pressure should seat ball in nozzle assembly.

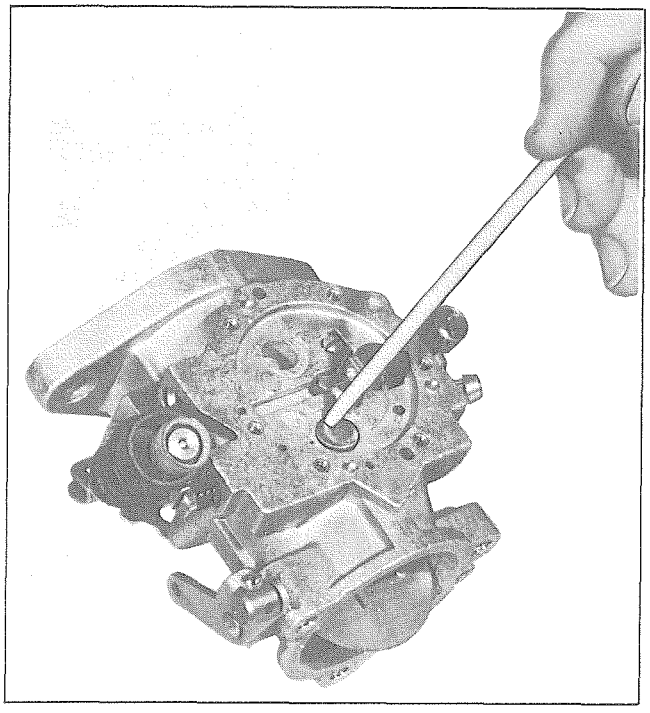


Figure 3F-7C. Removing Main Nozzle Welch Plug

If leakage is evident, carburetor must be disassembled and main nozzle check valve assembly replaced. To replace main nozzle, puncture welch plug with pointed tool, avoiding center, as shown in Fig. 3F-7C. Remove nozzle welch plug and use stepped end of punch, Part No. 96962-68, on nozzle, tapping it through into venturi using plastic hammer. See Fig. 3F-7D. Use larger end of tool to install the new check valve in the same manner. See Fig. 3F-7E.

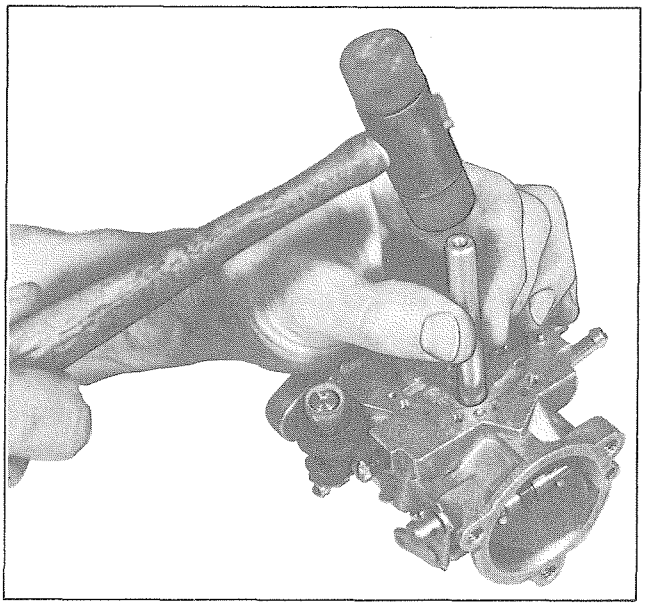


Figure 3F-7D. Removing Main Nozzle

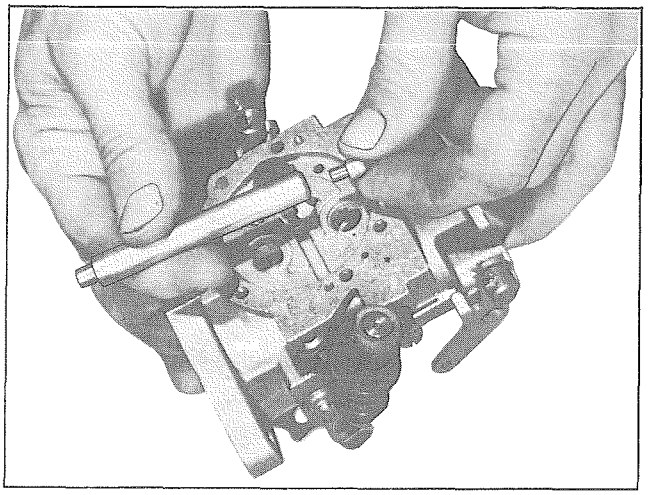


Figure 3F-7E. Installing Main Nozzle

6. Inspect idle needle and seat in carburetor bore for any distortion or a cracked casting.

7. Inspect choke relief disc (upper half of choke) for distortion or stress cracks at the area rotating on choke shaft.

DISASSEMBLY, INSPECTION AND REPLACEMENT OF PARTS

REPLACE DAMAGED PARTS ONLY AFTER COMPLETING ALL TESTS.

8. Remove plastic diaphragm cover. Inspect accelerator pump leather for fold-over or coil spring out of correct position.

Check accelerator pump outlet ball check valve to see that ball is free (Late 1968).

Inspect gasket and diaphragm for distortion or misplacement on carburetor body. Diaphragm must not

be stretched or have a rippled appearance particularly within the valley portion which should be uniform in shape. (Gasket should be assembled next to body.)

Lightly make attempt to rotate metal diaphragm washer, riveted to upper side of diaphragm. If diaphragm plate rotates freely with no drag, replace diaphragm assembly. Diaphragm plate should not be loose.

Prior to removal of the inlet lever the initial needle seat leakage test should be performed 10 to 12 times with the bulb tester, as follows: Close bulb valve. Apply pressure to the inlet, sealing the vent fitting. Open bulb valve and again apply pressure. This repetition checks the sealing of the needle in the seat insuring that it is not sticking open at lever pin or at groove in needle.

9. Inspect inlet needle lever for correct adjustment. It should be flush with surrounding floor of carburetor body. If not equipped with shackled needle, replace with kit No. 27588-66. Tighten seat to 45 in.-lbs. torque. See Fig. 3F-7F.

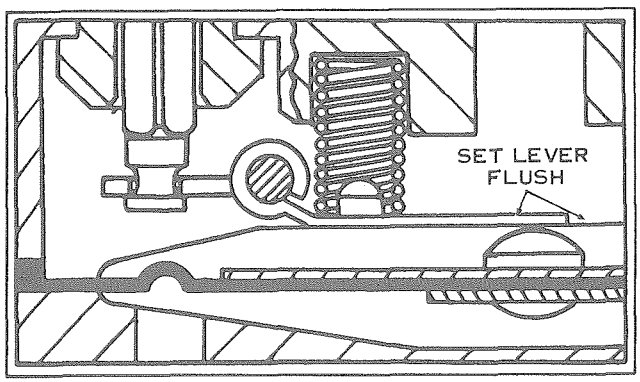


Figure 3F-7F

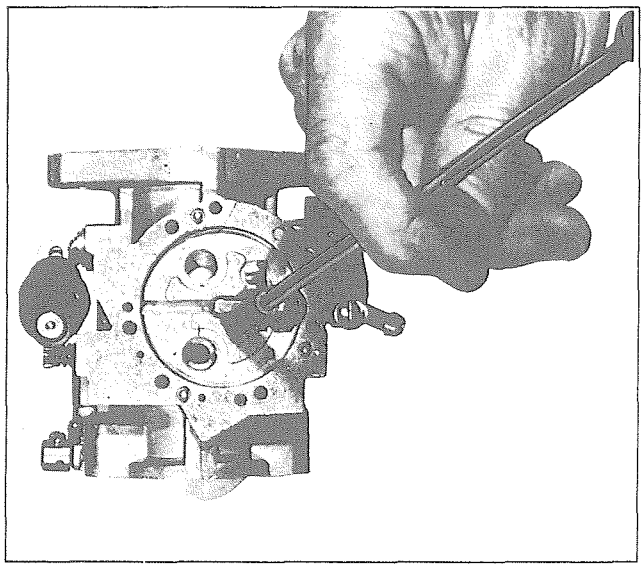


Figure 3F-7G. Checking Economizer Ball Check Valve for Leakage

10. Test economizer ball check for leakage and correct operations as follows:

Using hose end of tool, Part No. 96960-68, place it over economizer welch plug hole so it seals off surrounding area. With alternate pressure and vacuum applied with mouth, as shown in Fig. 3F-7G, ball check should release and seal. Replace any defective parts.

After plastic cover has been removed, remove welch plug at idle adjuster, all gaskets, diaphragms, needle and seat, and high speed nozzle before cleaning carburetor in a caustic carburetor cleaner, since the caustic cleaner will damage gasket material and the high speed nozzle plastic check ball. Only gaskets which are in perfect condition should be reused. The metal parts may also be cleaned in lacquer thinner with a small brush and blown dry.

Inspect by attempting to rotate, or move all welch plugs in body. A close inspection of wall area around welch plugs can disclose a leaking condition. Whenever a welch plug is removed, a new one should be reinstalled. If leakage is suspected due to rough or damaged welch plug seat in casting, apply a small amount of seal-all to edge of welch plug after installing it in recess.

After carburetor has been reassembled, recheck accelerator pump per item 1 under TESTS.

DISASSEMBLING CARBURETOR (See Fig. 3F-8)

Remove idle (24) and intermediate (35) fuel adjustments.

Remove two throttle shutter screws (48) and the throttle shutter (47). The sides of the shutter are tapered 15° to conform to the throttle bore. Observe the direction of this taper and the position of the shutter so that it can be reassembled later in the correct position.

Remove the accelerating-pump-lever retaining screw (3) and pull the throttle-shaft assembly (42) out of the carburetor body. Remove compression spring (46), washers (45), and shaft dust seals (44).

Remove six screws and washers (20) and the body cover (18).

Remove accelerating pump plunger assembly (1).

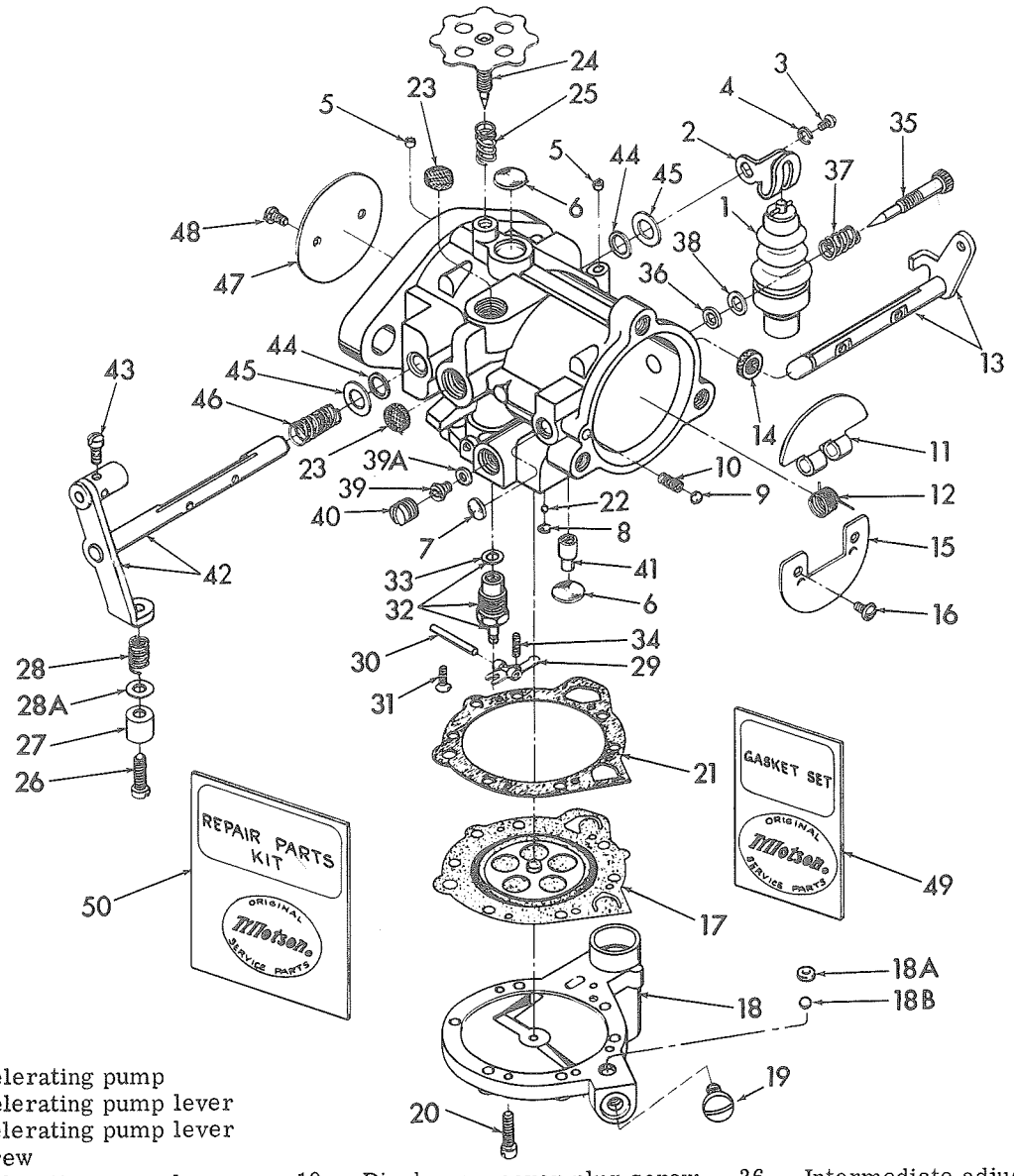
Remove channel plug screw (19).

Remove metering diaphragm (17).

Remove metering-diaphragm gasket (21). Note that the gasket is assembled next to the body casting.

Remove fulcrum-pin retaining screw (31), fulcrum pin (30), inlet control lever (29), and metering spring (34).

Remove the inlet needle (32).



1. Accelerating pump
2. Accelerating pump lever
3. Accelerating pump lever screw
4. Accelerating pump lever screw L.W.
5. Channel plug (2)
6. Welch plug
7. Welch plug
8. Welch plug
9. Choke shaft friction ball
10. Choke shaft friction spring
11. Choke shutter (top)
12. Choke shutter spring
13. Choke shaft assembly
14. Choke shaft dust seal
15. Choke shutter (bottom)
16. Choke shutter screws
17. Diaphragm
18. Cover
18A. Accelerating pump check ball retainer
18B. Accelerating pump check ball
19. Diaphragm cover plug screw
20. Diaphragm cover screws (6)
21. Diaphragm cover gasket
22. Economizer check ball
23. Fuel filter screen (2)
24. Idle adjustment screw
25. Idle adjustment screw spring
26. Throttle stop screw
27. Throttle stop screw cup
28. Throttle stop screw spring
28A. Throttle stop screw spring washer
29. Inlet control lever
30. Inlet control lever pin
31. Inlet control lever screw
32. Inlet needle and seat
33. Inlet needle seat gasket
34. Inlet control lever tension spring
35. Intermediate adjusting screw
36. Intermediate adjusting screw packing
37. Intermediate adjusting screw spring
38. Intermediate adjusting screw washer
39. Main jet
39A. Main jet gasket
40. Main jet plug screw
41. Main nozzle check valve
42. Throttle shaft assembly
43. Throttle lever wire block screw
44. Dust seal (2)
45. Washer (2)
46. Throttle shaft spring
47. Throttle shutter
48. Throttle shutter screws
49. Gasket overhaul set
50. Overhaul repair kit

Figure 3F-8. Model HD Carburetor - Exploded View

Remove the inlet seat and cage assembly (32), using a 3/8" thin wall hex socket wrench. Note the position of the inlet seat insert with the contoured side toward the outside of the cage and the smooth side toward the inside of the cage.

Remove the inlet seat gasket (33), using a small tap or bent wire.

Remove plug screw (40).

Remove fixed main jet (39) and gasket (39A).

Remove main-nozzle welch plug (6) by drilling 1/8" diameter hole off center and just breaking through the welch plug. Do not drill deeper than the welch plug because this would probably damage the nozzle assembly. Pry out the welch plug with a small punch, being careful not to damage the casting counterbore edges around the plug.

Remove idle-port welch plug (6), using the same procedure described above.

Remove welch plug (8) and economizer check ball (22). Pry out the welch plug carefully, using a small punch.

Remove two choke-shutter screws (16) and the bottom half of the choke shutter (15).

Pull the choke-shaft assembly (13) out of the body. This will release the top half of the choke shutter (11), the spring (12), the choke friction ball (9), and friction ball spring (10).

Remove the choke-shaft dust seal (14).

CLEANING, INSPECTION AND REPAIR

The carburetor body can be cleaned in commercial carburetor solvent such as Hydroseal to remove varnish from the channels and metering chamber.

NOTE

All gaskets, rubber gaskets, seals and plastic parts, including items 18, 22 and 41, should be removed and only metal parts cleaned in Gunk Hydroseal cleaning solution.

All channels and orifices in the carburetor and pump-body castings should be cleaned with compressed air. DO NOT use wires or drills to clean small holes. These might cause burrs or change the size of the holes.

Inspect all parts for wear or damage paying particular attention to the following:

Examine pump body casting for breaks and cracks.

The inlet control lever must rotate freely on the fulcrum pin and forked end must engage slot in inlet needle (see Fig. 3F-8A). The spring (34) should not be stretched or distorted.

Inspect the inlet needle (32) cone point for wear and scratches. Inspect the lever (29) contact end for burrs and wear.

ASSEMBLING CARBURETOR (See Fig. 3F-8)

Make certain that all parts are kept clean during reassembly. Do not use cloths to wipe or dry parts. Lint or threads can easily block small orifices. Welch plugs should be seated with a flat-end punch of a slightly smaller diameter than the welch plug. The seated plug should be flat, not concave, to assure a tight fit around the circumference.

The metering spring (34) should be seated into the counterbore in the body casting, and located on the protrusion on the inlet control lever (29). The lever should be adjusted flush with the floor of the metering chamber by bending diaphragm end of lever as necessary.

Two torque values are important: (1) the inlet seat assembly (32) should be tightened to 40-45 inch pounds; and (2) the accelerating-pump channel plug (19) should be tightened to 23-28 inch pounds.

TROUBLE SHOOTING GUIDE (See Fig. 3F-8)

The following symptoms and possible causes with corrective service can be used as a guide in servicing the carburetor.

A. Idle System

1. Idle operation too lean.

(a) Dirt in idle fuel channels - blow out with compressed air.

(b) Intermediate adjustment (35) closed or adjusted too lean - readjust.

(c) Welch plug (6) or channel plugs (5) missing or not tightly sealed - re-seat or replace plugs.

(d) Nozzle check valve (41) not sealing - blow out with compressed air, or replace. (See "Check List" No. 5.)

2. Idle operation too rich.

(a) Carburetor flooding - see Item E.

(b) Idle adjustment screw (24) point damaged - replace the adjustment.

(c) Idle adjustment hole damaged, forced oversize, or casting cracked in the idle port area - replace carburetor.

B. Intermediate System

1. Lean operation at steady speeds between 15 and 65 m.p.h.

(a) Intermediate adjustment (35) adjusted too lean - readjust.

(b) Dirt in intermediate fuel ports or supply channels - remove welch plug (6) and channel plugs (5) and blow out with compressed air.

(c) Welch plug (6) or channel plugs (5) not tightly sealed - re-seat or replace plugs.

(d) Nozzle check valve (41) not sealing - blow out with compressed air, or replace. (See "Check List" No. 5.)

(e) Intermediate adjustment packing (36) missing or damaged - replace.

(f) Economizer check ball (22) stuck closed - remove welch plug (8) and check ball (22) and blow out channel with compressed air. (See "Check List" No. 10.)

2. Rich operation at steady speeds between 15 and 65 m.p.h.

(a) Intermediate adjustment (35) adjusted too rich - readjust.

(b) Fixed main jet (39) too large, not tightly in place or missing - seat firmly, or replace jet.

(c) Carburetor flooding - see Item E.

(d) Nozzle check-valve welch plug (6) not tightly sealed - re-seat or replace.

(e) Choke valve partially closed - see that choke friction spring (10) and choke friction ball (9) are correctly assembled.

C. Nozzle System

1. Lean operation at speeds above 60 m.p.h.

(a) Dirt in nozzle system - remove main fuel jet plug screw (40) and blow channels out with compressed air.

(b) Main fuel jet (39) too small or damaged - replace.

(c) Main fuel jet plug screw (40) not tightly sealed - tighten to stop air leak.

(d) Nozzle check valve (41) damaged - replace. (See "Check List" No. 5.)

(e) Nozzle check valve (41) not seated correctly in casting - re-seat flush with nozzle-well surface.

2. Rich operation at speeds above 60 m.p.h.

(a) Main jet (39) too large, not tightly in place or missing - seat firmly or replace.

(b) Carburetor flooding - see Item E below.

(c) Economizer check ball (22) not seating - remove welch plug (8) and check ball (22) and blow channel out with compressed air. (See "Check List" No. 10.)

D. Accelerating Pump System

1. Lean acceleration.

(a) Incorrect carburetion adjustment - readjust idle (24) and intermediate adjustments (35).

(b) Dirt in acceleration fuel channels - blow out all channels in diaphragm cover (18) and the accelerating pump discharge channel in the body casting. (See "Check List" No. 1.)

(c) Accelerator pump assembly (1) damaged or worn - replace assembly. (See "Check List" No. 1.)

(d) Diaphragm cover plug screw (19) loose or missing - tighten or replace.

(e) Diaphragm (17) flap check valves damaged or worn - replace diaphragm.

(f) Economizer check ball (22) stuck closed - remove welch plug (8) and check ball (22) and blow channel clean with compressed air. (See "Check List" No. 10.)

E. Carburetor Flooding

1. Dirt in inlet needle and seat assembly (32) - remove and clean, or replace. (See "Check List" No. 3.)

2. Inlet seat gasket (33) missing or damaged - replace.

3. Inlet control lever (29) not correctly adjusted - readjust lever flush with metering chamber wall. (See "Check List" No. 9.)

4. Diaphragm (17) incorrectly installed - replace or correct installation.

5. Inlet control lever pin (30) loose or not correctly installed - tighten retaining screw (31) and correct installation.

6. Inlet control lever (29) tight on lever pin (30) - replace damaged part, or clean dirt from these parts.

7. Inlet needle or seat (32) damaged or worn - replace the assembly.

F. General Operation

1. Lean operation in all speed ranges.

(a) Filter screens (23) plugged or dirty - clean or replace.

(b) Inlet control lever (29) incorrectly adjusted - readjust lever flush with wall of metering chamber. (See "Check List" No. 9.)

(c) Diaphragm cover plate (18) loose - tighten six screws (20).

(d) Air leak in metering system - all channel plugs, plug screws, and lead plugs to be tightly sealed.

(e) Inlet tension spring (34) stretched or damaged - replace.

2. Rich operation in all speed ranges.

(a) Carburetor flooding - see Item E.

(b) Choke valve not staying fully open - see that choke friction spring (10) and friction ball (9) are assembled correctly.

(c) Inlet control lever (29) incorrectly adjusted - readjust lever flush with wall of metering chamber. (See "Check List" No. 9.)

MODEL M CARBURETOR

DESCRIPTION

The model M carburetor is a plain tube carburetor containing a venturi, and a discharge nozzle through which fuel is drawn into the air stream passing through the venturi. The quantity of fuel is metered by two jets or openings, one for low and one for high speed, before entering the nozzle.

Needle valves in the low and high speed passages allow the carburetor to be adjusted for the slightly varying and individual needs of the engine. Once a carburetor is adjusted, it requires little if any attention. At most, two "clicks" or notches richer or leaner on the needles are all that should be necessary to correct air-fuel mixture for changes in weather conditions. All carburetor final adjustments should be made with the engine at full operating temperature.

ADJUSTING CARBURETOR

Before attempting to correct faulty engine performance through carburetor adjustment, check over "Locating Operating Troubles", Section 1C. In addition, be sure air cleaner element is clean and check carburetor and manifold connections to be sure they are tight and not leaking air.

Both high and low speed needles (1 and 2, Fig. 3F-9), are turned clockwise, or in, to make leaner mixture, and counterclockwise, or out, to make mixture richer. Both needles are held to whatever position they are set by a spring and ball plunger which drops into notches in the needle adjusting screw.

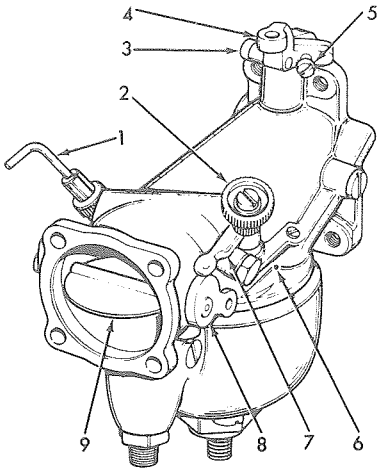
A carburetor may be adjusted as follows:

Turn both low and high-speed needles all the way in (clockwise). Back out the low speed needle five turns. Back out the high-speed needle two turns. With needles in these positions, the engine will start but the mixture will be too rich. Advance spark all the way or nearly all the way, whichever is best. Warm engine to full operating temperature and correct adjustment of both needles.

Adjust low speed first, with engine at operating temperature and idling. Turn needle in, one notch at a time, until mixture becomes so lean that the engine misses and acts starved. Back out the needle five to ten notches, or until engine hits regularly with spark advanced and throttle closed, or as nearly closed as it can be set and still have engine run at idling speed.

Adjust throttle lever stop screw (5, Fig. 3F-9) to make engine idle at desired speed with throttle fully closed. Turning screw clockwise makes engine idle faster. Never set idle adjustment to slowest possible speed. An extremely slow idle causes bearing wear, oil consumption and slow speed accelerating difficulties.

Make final readjustment on low speed needle. Try one notch at a time, first in and then out, to see if engine picks up speed or runs more smoothly. Starting and all around carburetion will be better with low speed adjustment set slightly rich rather than lean. If necessary, make further adjustment on idle stop screw to obtain desired idling engine speed. Retard spark completely. If carburetor is properly adjusted, engine will continue to run evenly and smoothly, though more slowly.



1. High speed needle
2. Low speed needle
3. Throttle lever lock screw
4. Throttle lever
5. Throttle stop screw
6. Carburetor bowl vent
7. Low speed needle lift lever
8. Choke lever
9. Choke disc

Figure 3F-9. Model M Carburetor Controls and Adjustments

During high speed operation, fuel is metered by a fixed jet which has no adjustment. However, the high speed needle may be used as "trimmer valve" to supplement the fuel flowing through the jet during extremely high speed operation (opened amount which achieves best results). It may be closed during operation at high altitudes to keep mixture from becoming too rich in the rarified air.

DISASSEMBLING CARBURETOR (Fig. 3F-9A)

Disconnect carburetor from motorcycle as follows:

Remove air cleaner cover, element and back plate.

Disconnect fuel line with strainer at carburetor.

Disconnect throttle control wire.

Remove carburetor support from top center crankcase bolt.

Remove intake (choke) lever stud nut and washer. Twist intake lever off intake lever rod, and remove intake lever rod from carburetor.

Remove four carburetor fastening bolts and pull carburetor out to right.

Disassemble carburetor as follows:

Remove bowl lock nut (1), gasket (2), main nozzle retainer spring (3) and main nozzle (4). Remove bowl (5) and bowl cover gasket (6).

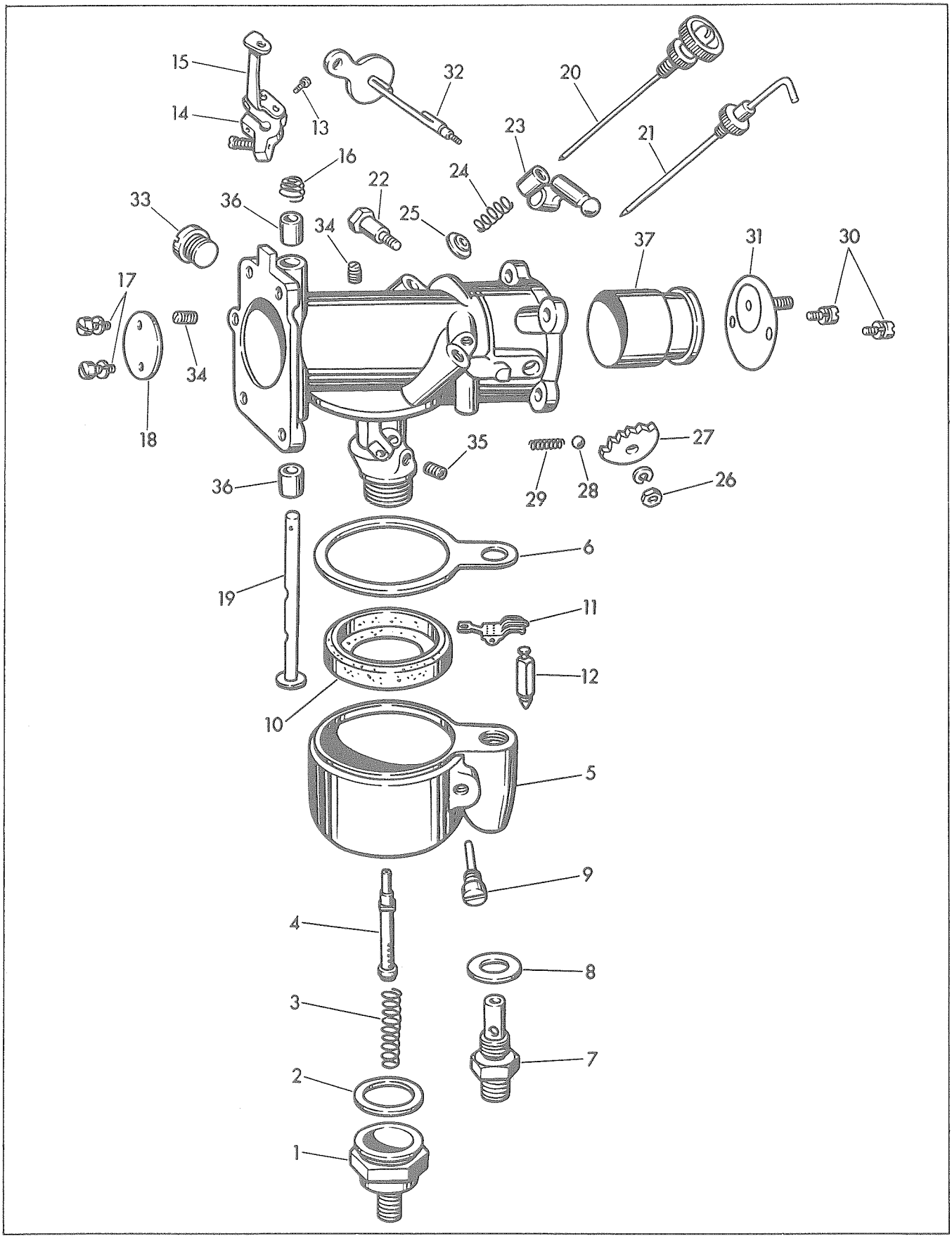


Figure 3F-9A. Model M Carburetor - Exploded View

LEGEND FOR FIGURE 3F-9A

1. Bowl lock nut
2. Lock nut gasket
3. Main nozzle retainer spring
4. Main nozzle
5. Bowl
6. Bowl cover gasket
7. Float valve seat
8. Float valve seat gasket
9. Float lever pin
10. Float
11. Float lever
12. Float valve
13. Throttle stop lock screw
14. Throttle lever
15. Throttle lever arm
16. Throttle shaft spring
17. Throttle shaft screw (2)
18. Throttle disc
19. Throttle shaft
20. Low speed needle valve
21. High speed needle valve
22. Needle valve lever screw
23. Needle valve lever
24. Needle valve lever spring
25. Lever spring collar
26. Air intake shaft nut and washer
27. Air intake shaft stop
28. Friction ball
29. Friction spring
30. Air intake disc screw (2)
31. Air intake disc
32. Air intake shaft
33. Idle hole body plug
34. Idle passage plug screw (3)
35. Fixed jet
36. Throttle shaft bushing (2)
37. Venturi (1-5/16")

Figure following name of part indicates quantity necessary for one complete assembly.

Remove float valve seat (7) and gasket (8). Turn out float lever pin (9) and slip float (10), float lever (11) and float valve (12) out of bowl.

Loosen throttle stop lock screw (13) and slip throttle lever (14) off throttle shaft with throttle lever arm (15) and throttle shaft spring (16).

Remove throttle shaft screws (17), slip throttle disc (18) out of slot in throttle shaft and pull out throttle shaft (19).

Remove low speed needle valve (20) and high speed needle valve (21).

Remove needle valve lever screw (22), needle valve lever (23), lever spring (24) and lever spring collar (25).

Remove air intake shaft nut and washer (26), air intake shaft stop (27), friction ball (28) and friction spring (29).

Remove air intake disc screws (30), air intake disc (31) and pull out air intake shaft (32).

Remove idle hole body plug (33) two idle passage plug screws (34) and carburetor fixed jet (35).

CLEANING, INSPECTION AND REPAIR (Fig. 3F-9A)

Place all parts except gaskets and float in "Gunk Hydro-Seal" or other carbon and gum dissolving agent. Wash, and dry all parts with compressed air. Blow air through all carburetor barrel passages as shown in Fig. 3F-9B. Never scrape carbon deposits from carburetor barrel or other parts with knife or other steel instrument.

Check throttle shaft fit in throttle shaft bushings (36). If excess play exists, use an appropriate size drift pin to remove old bushings. Press in replacement parts and line ream with a .250 in. drill.

Examine carburetor venturi (37). If it is extremely loose or pitted, slip out and replace.

Check float valve and float valve seat seal as follows:

Assemble parts 12 through 7 to carburetor bowl (5). Hold bowl upside down so float valve closes. Suck on bottom of float valve seat. If valve leaks, replace valve and seat.

If float is damaged or logged, replace with new part. Cut cement seal around float screw which secures float to float lever. Remove float screw and assemble new float to lever but leave screw loose. Position bowl so it is upright (the way it fits on carburetor barrel) with gasoline inlet on far side. Pull float toward you to the limit of the slot in float lever and about 1/16 in. to left of center line (see Fig. 3F-9C). This provides clearance in float bowl. Tighten float screw and cement float screw to float with any cement that is impervious to gasoline, or thick shellac.

Check float lever as follows:

Turn assembled float bowl upside down. Measure distance from lip of float bowl to top of float directly opposite float lever. This distance should be exactly 1/4 in. When adjusting carburetor float, do not bend float lever while installed in bowl. Adjusting in this manner bends and spreads fingers between which head of float needle fits and develops lash or lost motion between float and needle. Float and lever assembly should be removed from bowl, and lever then bent as required.

Check needle head fit in float lever. It should be a free fit to about .003 in. clearance. To check clearance with float assembled, hold needle against seat with small screwdriver without restricting float lever. Move float up and down and observe free play between needle head and float lever (see Fig. 3F-9C).

ASSEMBLING CARBURETOR

Assemble carburetor in reverse order of disassembly. Pay particular attention to the following points.

Install venturi with choke end (small end) facing air intake opening.

Install throttle shaft from bottom of carburetor so counterbored screw head notches are facing left side of carburetor when viewing carburetor from throttle shaft end. Notice that an edge of throttle disc has a flat on each side. Pass this edge of disc through

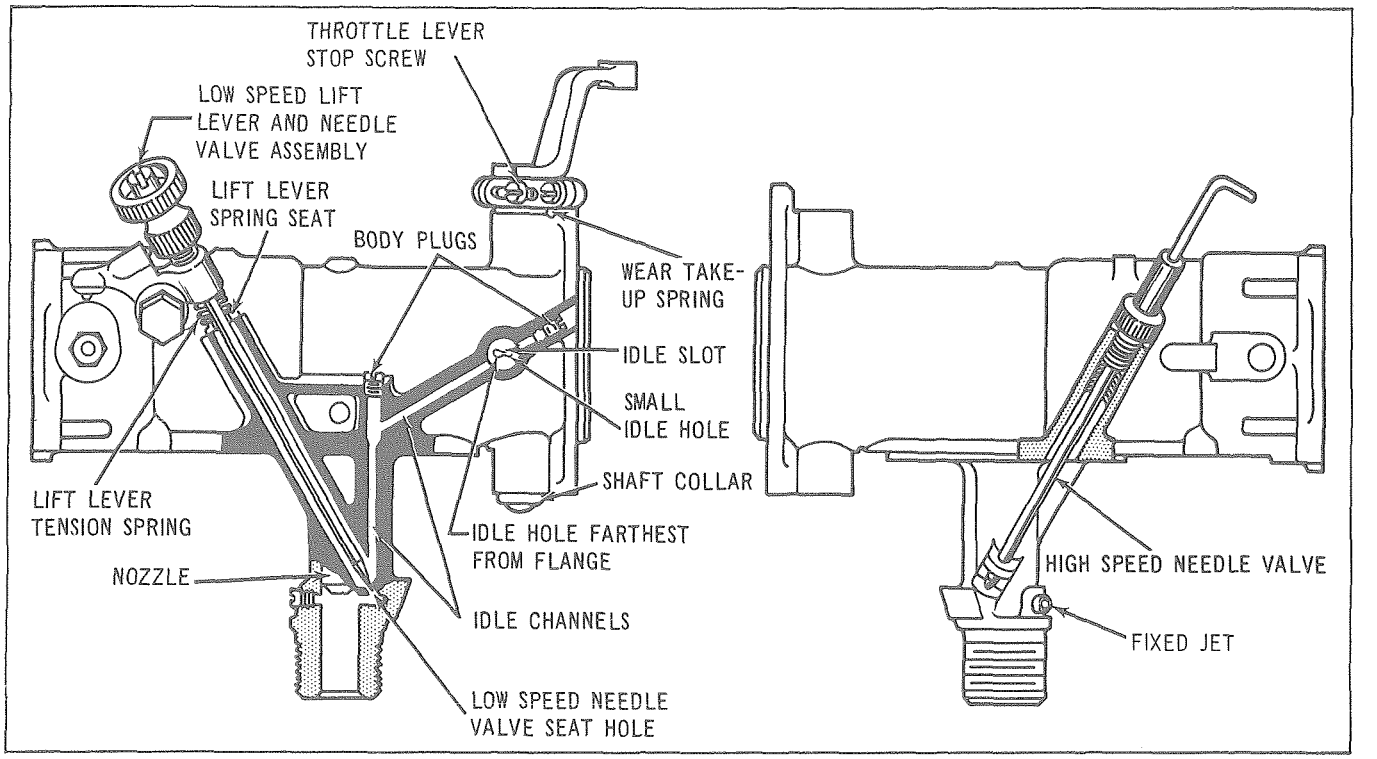


Figure 3F-9B. Model M Carburetor Passages and Needle Seats

throttle shaft, close throttle and insert throttle shaft screws (17) but do not tighten. Shift disc slightly until it seats all the way around carburetor throat. Tighten screws. Work disc several times. If there is any bind, loosen screws and reposition disc.

Position both throttle disc and throttle lever in wide open position before tightening throttle stop lock screw.

Throttle lever and shaft should open and close with just a slight drag. If too loose, loosen stop lock screw and compress parts on throttle shaft with fingers while tightening.

Install only replacement throttle disc containing same identification number on face. With disc correctly installed and closed, the number will be on right half of disc when viewed through manifold end of carburetor.

After assembly, adjust carburetor as described in "Adjusting Carburetor."

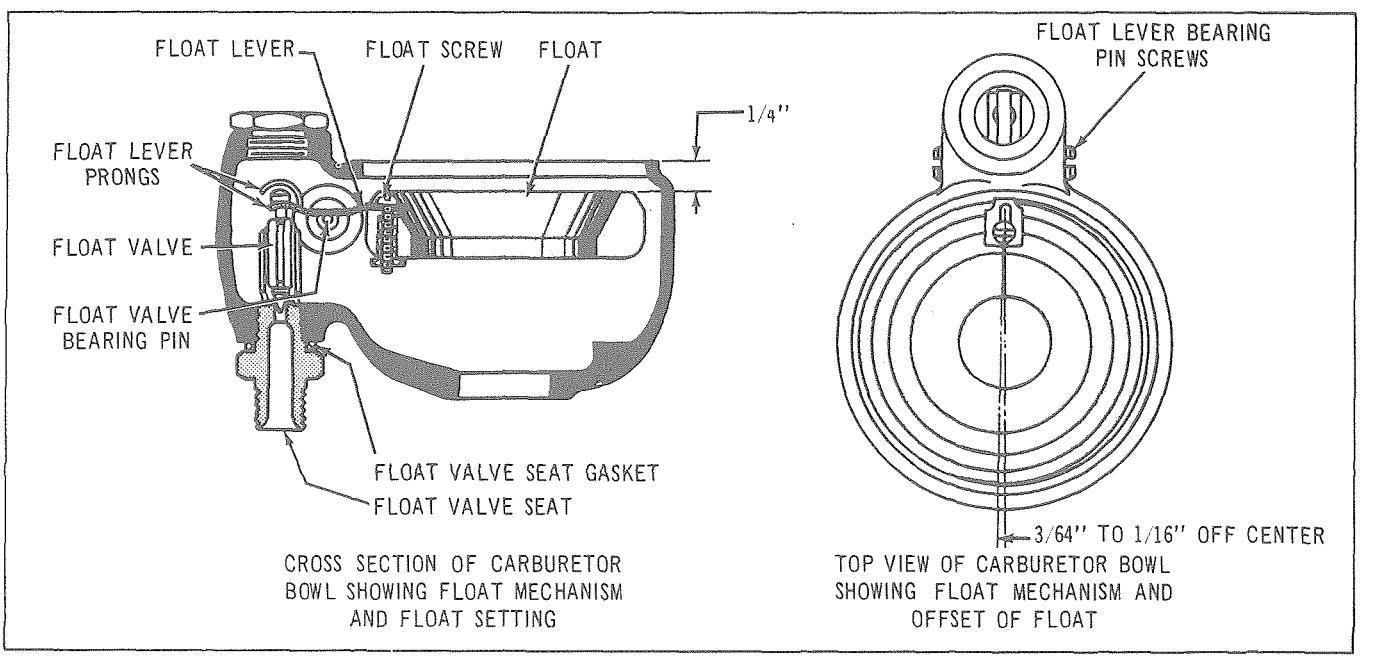


Figure 3F-9C. Adjusting Model M Bowl Float and Needle

MODEL DC CARBURETOR

DESCRIPTION

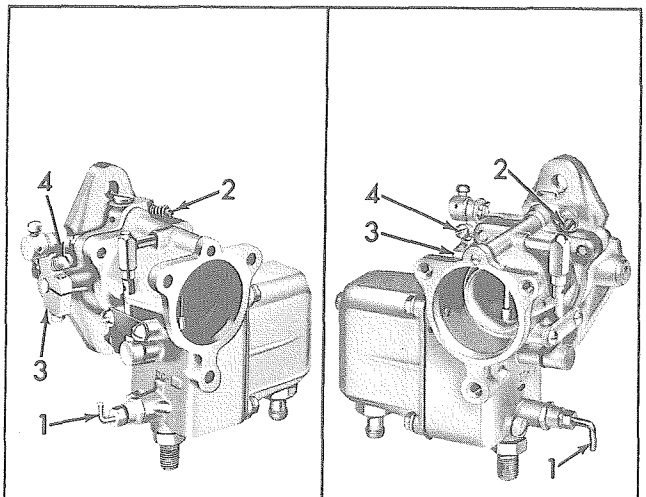
The model DC carburetor is a plain tube carburetor; that is, its main fuel-air mixture passage consists of a venturi section and discharge nozzle. A fixed jet and adjustable high-speed needle valve of limited size meter the high-speed fuel supply as it is fed into the venturi section of the throttle barrel. The low-speed needle valve meters the low-speed fuel-air mixture supply as it is fed into the throttle barrel near the throttle disc. There are no moving parts except the throttle shaft and disc and the bowl float mechanism.

ADJUSTING CARBURETOR (Fig. 3F-9D)

A properly adjusted carburetor requires little readjustment. It should not be necessary to change the adjustment of the low-speed needle more than 1/8 turn and the high-speed needle more than 1/4 turn, richer or leaner, to obtain correct mixture for a change in weather conditions.

Before attempting to correct faulty engine performance through carburetor adjustment, eliminate other possible causes for poor engine performance such as bad spark plugs, improper spark timing, misadjusted tappets, dirty air cleaner, or leaky carburetor and manifold connections.

The air-fuel mixture for low engine speed is regulated by the low-speed needle. The fuel supply for high engine speed is regulated by a combination fixed jet and adjustable needle. The fixed jet dominates the regulation of high-speed fuel supply. The high-speed needle provides a means of supplementing, to a limited degree, the fuel supplied by the fixed jet, when it is found that slightly enriching the mixture improves engine performance.



1. High-speed needle
2. Low-speed needle
3. Throttle lever
4. Throttle stop screw

Figure 3F-9D. Model DC Carburetor

Both the high-speed needle (1) and low-speed needle (2) turn inward (clockwise) to make mixture leaner at the respective speeds for which they adjust. Backing them out (counterclockwise) makes mixture richer.

A carburetor may be adjusted as follows:

1. Make sure carburetor control wire is adjusted so throttle lever (3) fully closes and opens with handlebar grip movement.

2. Turn both the high- and low-speed needle (1 and 2) all the way in (clockwise). Do not close off either needle too tightly or damage to needle and seat may result.

3. Turn low-speed needle (2) (counterclockwise) about 1-1/2 turns. With needle in this position, engine will start, but low-speed mixture will probably be too rich.

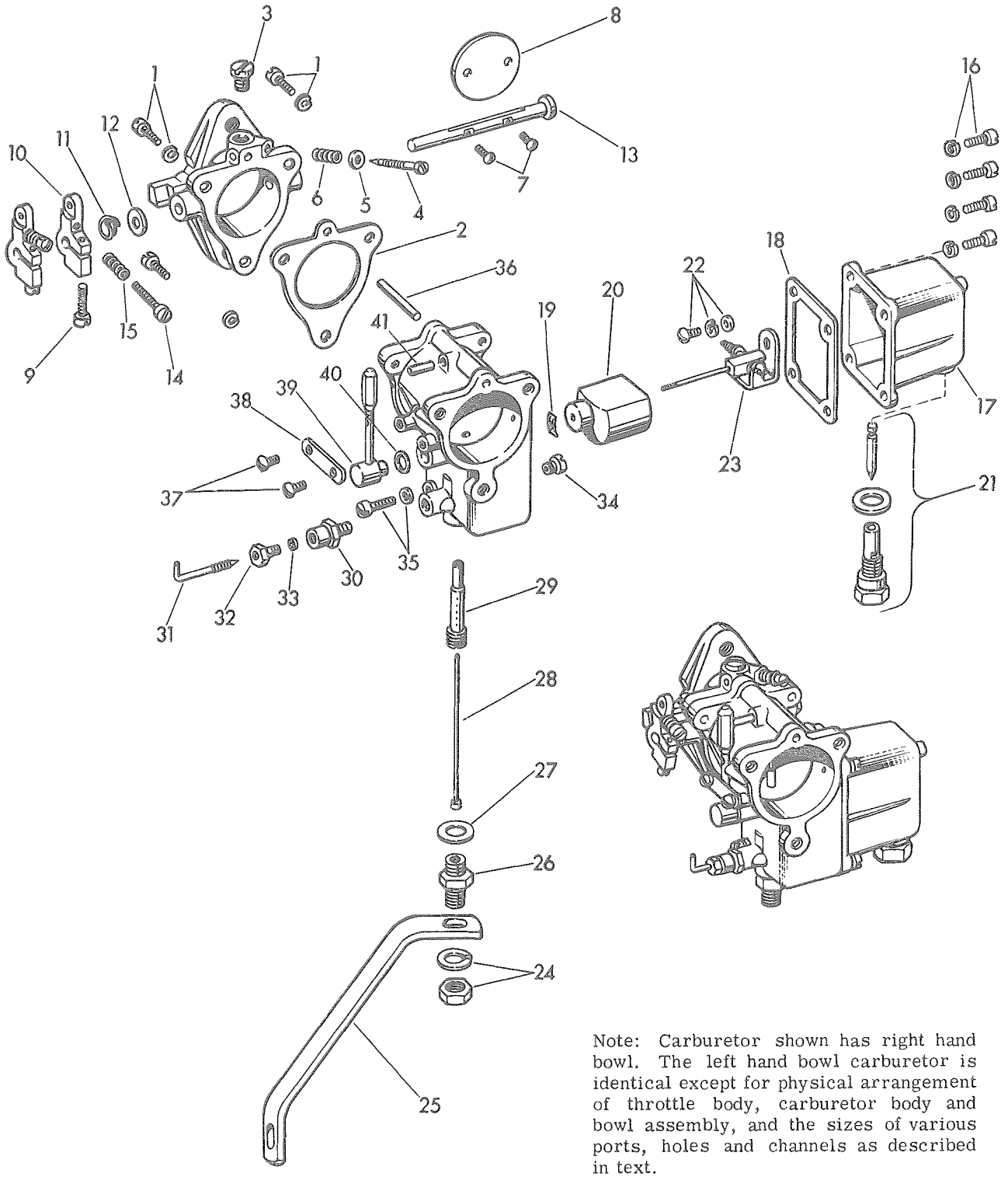
4. Start the engine and after it has reached operating temperature and the choke has been moved to the open position, correct the adjustment of low-speed needle. Turn low-speed needle (2) in (clockwise) 1/8 turn at a time until mixture becomes so lean that engine misses and is inclined to stop; then, back needle out (counterclockwise) 1/8 turn, or until engine hits regularly with spark advanced and throttle closed and engine running at idle speed. Starting and all around carburetion will be better with low-speed adjustment slightly rich, rather than too lean.

5. Adjust throttle lever stop screw (4) as necessary, to make engine idle at proper speed with throttle fully closed. Turn screw clockwise to make engine idle faster and counterclockwise to make engine idle slower. Do not idle an engine at the slowest possible speed because an extremely slow idling adjustment causes hard starting. Changing the idle speed with throttle stop screw is likely to change the low-speed mixture slightly. It will, therefore, be necessary to again check and correct low-speed needle adjustment by the same procedure followed in making the initial adjustment.

6. Check high-speed adjustment, after low-speed adjustments have been completed. Run motorcycle or Servi-Car on the road at various speeds between 20 miles per hour and maximum speed. Have spark fully advanced. Best all-around engine performance can usually be found with the high-speed needle (1) set from 3/4 to 1-1/4 turns open.

DISASSEMBLING CARBURETOR

Disconnect carburetor from motorcycle as follows:



Note: Carburetor shown has right hand bowl. The left hand bowl carburetor is identical except for physical arrangement of throttle body, carburetor body and bowl assembly, and the sizes of various ports, holes and channels as described in text.

Figure 3F-9E. Model DC Carburetor - Exploded View

LEGEND FOR FIGURE 3F-9E

1. Throttle body screw and washer (3)
2. Body gasket
3. Idle hole body plug
4. Low-speed needle valve
5. Low-speed needle valve washer
6. Low-speed needle valve spring
7. Throttle shaft screw (2)
8. Throttle disc
9. Throttle lever clamping screw
10. Throttle lever
11. Throttle shaft spring
12. Throttle shaft washer
13. Throttle shaft
14. Throttle lever stop screw
15. Throttle lever stop screw spring
16. Bowl mounting screw (4)
17. Bowl
18. Bowl gasket
19. Float nut
20. Float
21. Float valve and seat
22. Float lever screw and washers
23. Float lever and bracket assembly
24. Support bracket nut and lock washer
25. Support bracket
26. Bowl nut
27. Bowl nut gasket
28. Idle tube assembly
29. Main nozzle
30. High-speed needle valve extension housing
31. High-speed needle valve
32. High-speed needle valve packing nut
33. High-speed needle valve packing
34. Carburetor jet
35. Drain plug and gasket
36. Idle passage tube
37. Throttle shaft screw (2)
38. Vent clamp
39. Vent housing
40. Vent gasket
41. Idle bleed tube

Figure following name of part indicates quantity necessary for one complete assembly.

Remove air cleaner cover, air cleaner cartridge and back plate. Turn off fuel supply at valve and disconnect fuel line at carburetor.

Disconnect throttle control wire.

Remove carburetor support (if used).

Remove two carburetor fastening bolts and pull carburetor out.

The DC type carburetor consists of three main subassemblies; throttle body, carburetor body, and bowl assembly.

THROTTLE BODY DISASSEMBLY (Fig. 3F-9E)

To disassemble the throttle body, remove three throttle body screws and lock washers (1), body gasket (2), idle hole body plug (3), low-speed needle valve (4), washer (5) and needle valve spring (6).

Remove throttle shaft screws and lock washers (7) and free throttle disc (8) from shaft.

Loosen throttle lever clamping screw (9) from lever (10) and free spring (11), washer (12) and shaft (13) from throttle body. If necessary, remove stop screw (14) and spring (15) from throttle lever.

CARBURETOR BOWL DISASSEMBLY

To disassemble the carburetor bowl, remove four bowl attaching screws and washers (16). Tap bowl (17) lightly to break free from carburetor body. Remove gasket (18). Unscrew flat speed nut (19) from float rod and free float (20). Remove matched float valve and seat assembly (21). Remove float lever screw, lock washer and float washer (22) to free float lever and bracket assembly (23).

CARBURETOR BODY DISASSEMBLY

To disassemble the carburetor body, remove support bracket nut and lock washer (24), and support bracket (25) (if used). Remove bowl nut (26) and gasket (27). The idle tube (28) extends up through the nozzle and venturi into the upper wall of the body.

NOTE

Ordinarily the idle tube will remain in the body when the bowl nut is removed. If for any reason it should stick in the bowl nut, do not attempt to remove it from the nut.

If the tube remains in the body when the bowl nut is removed, remove it gently by moving the plug end of the tube back and forth, and pulling at the same time.

The nozzle (29) is screwed into the body and shoulders against the casting at the top. Use a good screwdriver for removing and replacing nozzle. Preferably grind a pilot on the end of a special screwdriver to fit the inside of the nozzle and grind the sides to clear the 3/8-24 thread hole. At the same time grind the blade to fit the nozzle slot. The slot is .051 in. wide.

Remove the high-speed needle valve extension housing (30) to free high-speed needle valve (31), packing nut (32) and packing (33).

Remove the high-speed metering plug or fixed jet (34) located directly opposite the high-speed needle valve hole.

Remove drain plug and gasket (35) and free idle passage tube (36).

Remove screws (37) and clamp (38) to free vent housing assembly (39), vent gasket (40), and idle bleed tube (41) from carburetor body.

CLEANING, INSPECTION AND REPAIR

Place all parts except gaskets and float in "Gunk Hydro-Seal." Wash and dry all parts with compressed air. Blow air through all passages. Never scrape carbon deposits from carburetor parts with knife or other steel instrument. Replace any gaskets that are badly worn or damaged.

Ordinarily a good cleaning in "Gunk Hydro-Seal" will be all that is necessary to clean out carburetor passages; however, if after considerable use a heavy "crust" forms, it may be essential to clean out passages with appropriate size drills. For this reason, all drill sizes needed for a complete carburetor cleaning operation are given throughout the cleaning, inspection and repair procedure.

THROTTLE BODY

After the carburetor has been in service for some time, the interior of the throttle barrel, idle port holes at the closed disc edge and idle or low-speed needle passages may accumulate a "crust" which will interfere with the idling and "off idling" characteristics. Clean the body and parts in "Gunk Hydro-Seal." If the throttle shaft (13) shows considerable wear (over .002 in. at the bearings), replace with new shaft.

Clean out the idle port holes located next to the disc (closed position) in the throttle body. Use the exact drill size specified below for the particular carburetor being worked on, being extremely careful not to increase the original hole size.

Model (Marked on Carburetor)	Drill Sizes
DC-1, 1L, 1M, 10	70 (.028)
DC-2	56 (.0465

The idle passage holes are the same for all DC carburetors and may be cleaned and checked as follows:

The idle or low-speed needle hole in which the needle seats is .043 in. diameter (#57 drill). This hole meets the angular hole inside the throttle barrel. The angular hole drill size is .0635 in. diameter (#52 drill).

CARBURETOR BOWL

Examine the carburetor body and bowl joint faces for scratches and damage that may result in fuel leakage. Replace, if necessary. Suck on bottom of float valve and seat (21). If valve leaks, replace valve and seat.

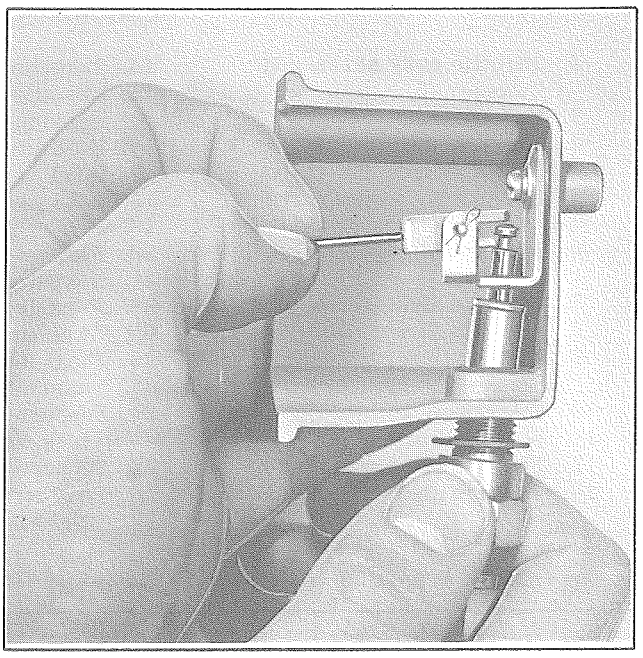


Figure 3F-9F. Engaging Model DC Float Lever in Valve Stem Groove

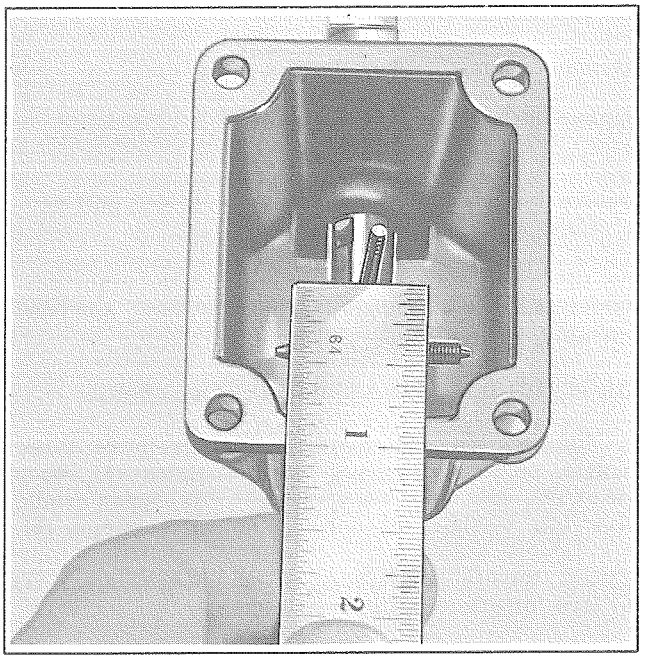


Figure 3F-9G. Checking Model DC Float Setting

CHECK AND SET FLOAT ROD

Assemble float valve and seat assembly (21). Install float lever bracket screw (22) loose, so that bracket can be adjusted if necessary. Insert float valve and seat (21) about halfway into bowl.

Position float rod at the same time for easy engagement of nylon lever fingers in float valve stem groove (see Fig. 3F-9F). Turn float valve into bowl and tighten against gasket.

NOTE

Under no condition, screw valve seat fitting with valve into bowl without first removing bowl from carburetor body, because fingers of nylon lever will be damaged if not properly engaged. To drain bowl, remove drain plug (35).

Check float lever setting with carburetor bowl held upside down, measuring the distance from top of float rod to outer edge of bowl flange opposite fuel inlet fitting as shown in Fig. 3F-9G. This measurement should be taken when lever is at the point where float valve seats lightly. Move float lever up and down to determine this seating point. Note that measurement is taken from outer edge of bowl opposite the fuel inlet fitting. Float rod position from edge should be 1 in. plus or minus 1/64 in. If setting is not 1 in. with float valve closed, adjust slotted float lever bracket.

When correct position of float rod is obtained, tighten bracket screw securely and recheck setting of float rod. Install float (20) on rod, flat side up, fastening with speed nut (19).

CARBURETOR BODY

To clean the idle tube (28) and idle feed hole, blow through the tip end. Do not use drills in end of tube or in small feed hole at bottom.

Clean the nozzle (29) bleed holes with a #54 drill (.055) and the main passage with a #17 drill (.173). Clean the high-speed needle seat holes with the exact drill size specified below for the particular carburetor being worked on.

Model	Drill Size
DC-1, 1L, 1M, 10, 6, 7, 12	55 (.052)
DC-2	70 (.028)

Be extremely careful not to change size of holes during the cleaning operation.

Examine the two bowl vents in the carburetor body, to make sure both holes are open. One hole is the brass tube permanently swaged into the body. The second hole is located adjacent to the brass tube in the bowl cavity of the main body.

The idle or low-speed mixture channel at the top of the main body accommodates the idle tube (36). When fully seated, tube will extend beyond body face through gasket (2) into the throttle body corresponding hole. The idle tube serves two purposes, one for lining up the throttle body and the other to reduce the size of idle mixture passage. It is important that no leakage occurs between the main body and throttle body. Examine the joint faces for nicks or damage, particularly where the low-speed or idle mixture enters the throttle body.

The idle or low-speed air bleed is located in the idle mixture channel, top of main body, with the entrance on middle side of body through idle bleed tube (41) and nozzle vent housing (39). The air entering the bleed mixes with fuel delivered by idle tube and passes to the throttle body.

The nozzle (29) is air bled through a passage in the main body and nozzle vent housing (39), side opposite carburetor bowl.

Be extremely careful not to damage or enlarge any of these passages. Check the nozzle vent housing assembly fit on carburetor body. These parts should fit snug and without play.

ASSEMBLY

Assemble carburetor in reverse order of disassembly. Pay particular attention to the special instructions below.

CARBURETOR BODY

Install vent housing assembly (39), gasket (40), idle bleed tube (41), clamp (38), and screws (37). Start tube into holes first, then tap housing into place. Pull clamp (38) just tight enough so that outer ends of clamp touch body bosses.

Install drain plug and gasket (35) and high-speed fixed jet (34).

Position high-speed needle valve housing (30) in body, with needle valve (31), packing nut (32) and packing (33) assembled in housing.

When installing this set of parts in the main body, always back out the needle valve so the point will not enter the valve hole in the main body when the housing is pulled up tight. Pull up the packing nut just enough to prevent the needle valve from turning too freely.

Be very careful not to jam the needle valve into the seat hole, and deform the hole entrance.

Since the fixed jet supplies the main bulk of fuel to the nozzle and is supplemented by a maximum fixed amount from the high-speed needle valve, turning the needle valve completely off may, under certain conditions, cause the mixture delivered by the nozzle to be too lean. Turning the needle valve on three to four turns will cause the nozzle mixture to be definitely on the "rich" side but not excessively rich for normal conditions. As a rule, keep the high-speed needle valve setting as "lean" as possible, consistent with good performance. See "Adjusting Carburetor."

Assemble the nozzle (29) in place using an improvised screwdriver as described under "Carburetor Body Disassembly."

Turn the entire body upside down, drop in the idle tube (28), small end first, jiggle the body, and the tube will locate itself in the body hole. Do not bend, twist or damage the idle tube in any way. Press on plug end of tube until tube is seated and the bottom of the plug extends approximately 1/32 in. out of nozzle passage. When installing bowl nut (26) and gasket (27), spring tension will hold the idle tube firmly in place.

Assemble support bracket (25), nut and lock washer (24).

CARBURETOR BOWL

Assemble bowl to carburetor main body with four attaching screws (16) and gasket (18).

THROTTLE BODY

Install throttle shaft (13), counterbored screw head notches facing towards carburetor main body. Position throttle disc (8) in shaft, milled side up and facing carburetor body. Insert and tighten shaft screws (7). Work disc several times. If there is any binding, loosen screws and reposition disc.

Install only replacement throttle disc containing same identification number on face. With disc correctly installed and closed, the number will be on top half of disc facing carburetor main body.

Install screw (14) and spring (15). Assemble throttle lever to shaft (10) with spring (11) and washer (12) allowing slight end play in the shaft when lever assembly is clamped tight. Position throttle disc and throttle lever in wide open position before tightening screw (9).

Install low-speed needle valve (4), washer (5) and spring (6). Be careful not to jam the low-speed needle point into its seat. Install idle hole body plug (3). Install idle passage tube (36) in carburetor body, chamfered end out. Install a new throttle body gasket (2), position throttle body in place and insert screws and lock washers (1).

The Model DC carburetor is attached to the manifold flange with certain thickness gasket and certain length cap screws. If for any reason the overall gasket thickness is reduced and no change is made in the cap screw length, the cap screw may bottom on the head of the lower throttle body screw (1). If it does bottom, a broken throttle body will result.

After assembly, adjust carburetor as described in "Adjusting Carburetor."

All pertinent calibration and setting figures not given in prior information appear in following chart.

Calibration and Setting Chart

DC Model	Idle Bleed	Idle Tube Feed	Fixed Jet	Turns High-Speed Setting	Turns Idle Speed Setting	Throttle Disc Mark
DC-1	#53 (.0595)	#69 (.0293)	#9 (.067)	3/4 to 1-1/4	3/4 to 1	9A
DC-1L	#53 (.0595)	#69 (.0293)	#4 (.0625)	3/4 to 1-1/4	1 to 1-1/4	9A
DC-1M	#53 (.0595)	#69 (.0293)	#1 (.052)	3/4 to 1-1/4	1	9A
DC-10, 6, 12	#53 (.0595)	#69 (.0293)	#4 (.0625)	3/4 to 1-1/4	1 to 1-1/4	9A
DC-2	#51 (.067)	#70 (.028)	#20 (.0452)	3/4 to 1-1/4	1 to 1-1/4	12
DC-7	#53 (.0595)	#69 (.0293)	- (.070)	3/4 to 1-1/4	1 to 1-1/4	9A

MODEL MD CARBURETOR (1966 AND LATER SERVI-CAR)

GENERAL

See Figure 3F-12. On the Model MD carburetor, fuel enters carburetor at inlet connection (A) flowing past inlet needle and seat (C) into the fuel bowl. Fuel flows from bowl past main nozzle adjusting screw (T) into main nozzle orifice (W) and into nozzle sump (Z).

Idle and slow speeds: Fuel reaching its level in the carburetor passes main adjusting screw (T) through main nozzle orifice (W) and into idle tube (L). High manifold vacuum at throttle disc (G) draws this fuel upward past idle tube outlet orifice (M) where it mixes with air from channel (P) adjusted to requirements by idle mixture adjustment screw (O) through channel (J) and into air stream at idle discharge ports (H) where it mixes with additional air passing the slightly opened throttle disc (G).

High speeds and full power: When engine is pulling a load throttle disc (G) has opened further reducing suction and minimizing fuel discharge at (H) and increasing air flow to a high velocity through venturi (R). This air draws fuel from main nozzle (Y) supplied from bowl, past main nozzle adjusting screw (T) through orifice (W). As engine speed or load increases air is automatically bled into the main nozzle through tube (U) which causes a proper proportion of fuel drawn from sump (Z) in relation to adjustment to be metered at that speed range.

ADJUSTING CARBURETOR (Fig. 3F-13)

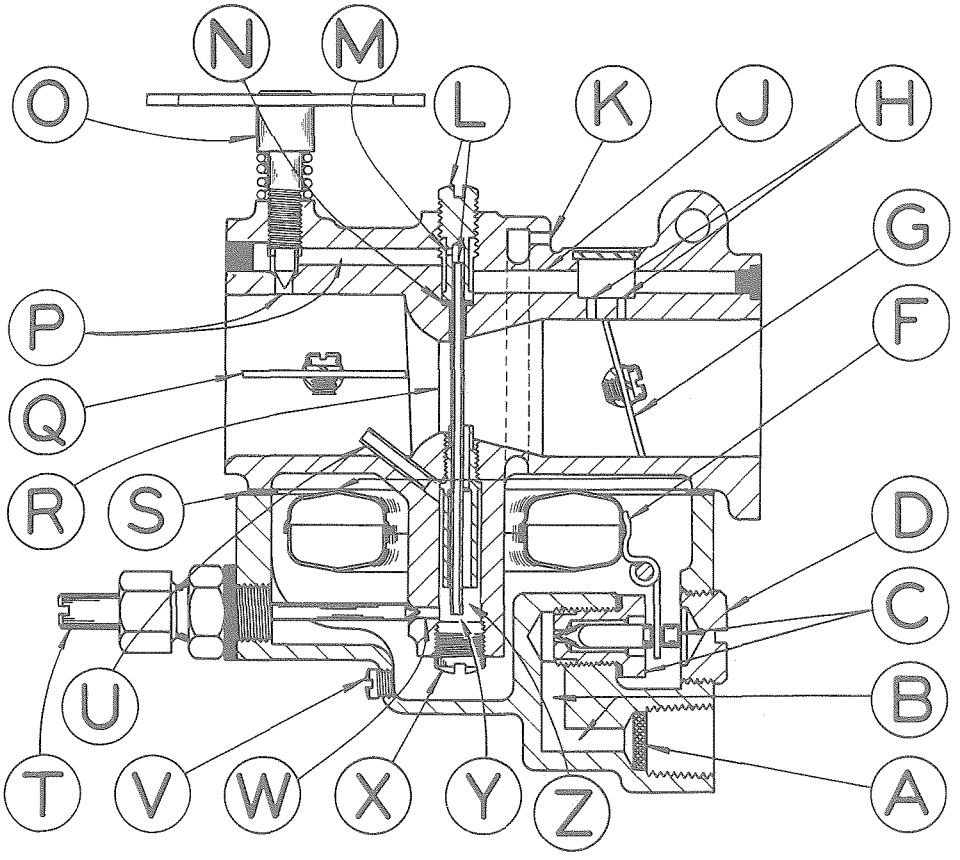
A carburetor once properly adjusted requires little if any readjustment. Before attempting to correct faulty engine performance through carburetor adjustment, eliminate all other possible causes for engine trouble. Such as bad spark plugs, incorrect spark timing, misadjusted tappets, dirty air cleaner, or leaky carburetor and manifold connections.

Idle mixture adjustment screw (1), turns to the right to enrich mixture for the idle speed range. Backing it out (turning left) makes mixture leaner.

Main nozzle adjusting screw turns to the right to lean mixture for the high speed range. Backing it out (turning left) makes mixture richer.

INITIAL ADJUSTMENT

Completely close (turn clockwise) both adjusting



A Fuel inlet screen
B Main fuel supply channel
C Inlet needle and seat
D Float valve plug screw
F Float
G Throttle disc
H Idle mixture discharge ports
J Idle mixture channel
K Bowl air vent
L Idle tube and plug
M Idle tube fuel orifice
N Idle tube gasket
O Idle adjustment screw
P Idle air bleed channels
Q Choke disc
R Venturi
S Bowl gasket
T Main nozzle adjusting screw
U Main nozzle air bleed tube
V Fuel bowl drain screw
W Main nozzle orifice
X Main nozzle channel plug
Y Main nozzle
Z Main nozzle sump

Figure 3F-12. MD Carburetor Cross Section

screws until snugly seated without forcing, then open them up to the normal setting as follows:

Main mixture (1) - 1-1/2 turns open
Idle mixture (2) - 3/4 turn open

Above normal settings are approximate and will vary for individual engines and operating conditions.

Closed throttle, idling speed of engine is adjusted with idle speed stop screw (3). Before making this adjustment, be sure throttle control wire is so adjusted that throttle fully closes with outward handle bar grip movement; engine should be at normal operating temperature.

Turn screw (3) to the right for faster idling speed; to the left for slower idling.

Readjusting idling speed may change idling mixture slightly, therefore after making this adjustment, it may be found necessary to make minor readjustment of adjusting screw (1). Final adjustment of the main mixture may be made after a performance check under road load conditions.

DISASSEMBLING CARBURETOR (Fig. 3F-14)

Disconnect throttle and choke wires from the carburetor connection. Shut off fuel supply and remove the hose from the carburetor nipple. Remove carburetor from the intake manifold.

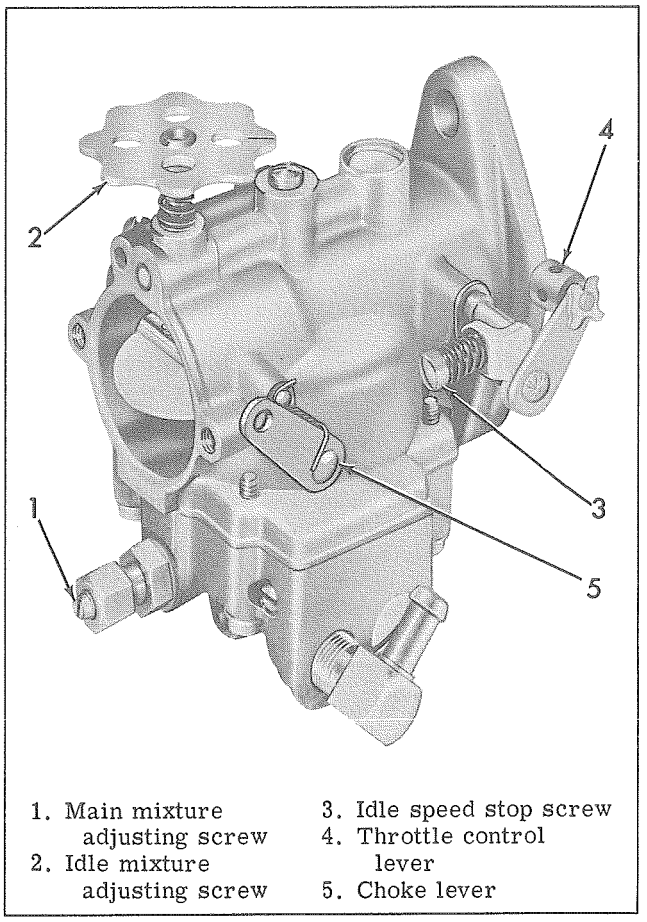
Remove carburetor to manifold mounting gasket (1), gasoline line elbow (1A) and inlet screen (1B). Remove main mixture screw (2), packing nut (3), packing (4), gland (5), and main packing screw gland gasket (6). Remove 4 bowl screws and lockwashers (7). Remove bowl (8), and gasket (9) from carburetor body. Screw out float lever pin-screw (10) securing float (11) to bowl; with a heavy blade screwdriver, remove large float bowl plug screw (12). Using tool Part No. 94816-62 and screwdriver, remove inlet needle valve (13), spring (14), seat (15) and gasket (16) from bowl. Remove small float bowl plug screw (17).

Free idle mixture screw (18), and idle mixture screw spring (19). Remove carburetor idle tube (20) and gasket (21). Remove main nozzle channel plug screw (22). Remove main nozzle (23).

The throttle and choke shaft need not be removed unless carburetor has been excessively used and examination discloses undue wear of throttle shaft and its bearings. See "Cleaning, Inspection, and Repair."

If it is necessary to remove throttle shaft and lever (26 or 26A), remove idle speed screw (24) and spring (25). Remove throttle stop lever retaining screws (27), lockwashers (28), and throttle stop lever (29) (if used). Remove throttle shaft friction spring (30). Remove throttle stop (31) and lockwasher (32). Remove throttle shaft retainer clip (33), and throttle shaft seal (34). Remove throttle disc (36) by removing 2 disc screws and lockwashers (37). Pull out throttle shaft making sure shaft seals and bushings are not lost in removal of shaft.

If it is necessary to remove choke shaft and lever (38), remove choke disc (39), screws and lockwashers (40). Remove choke shaft retainer clip screw (41), lockwasher (42), and retaining clip (43). Pull choke shaft out of carburetor body, making sure choke shaft spring (44) is not lost in removal of shaft.



1. Main mixture adjusting screw
2. Idle mixture adjusting screw
3. Idle speed stop screw
4. Throttle control lever
5. Choke lever

Figure 3F-13. Carburetor Adjustment

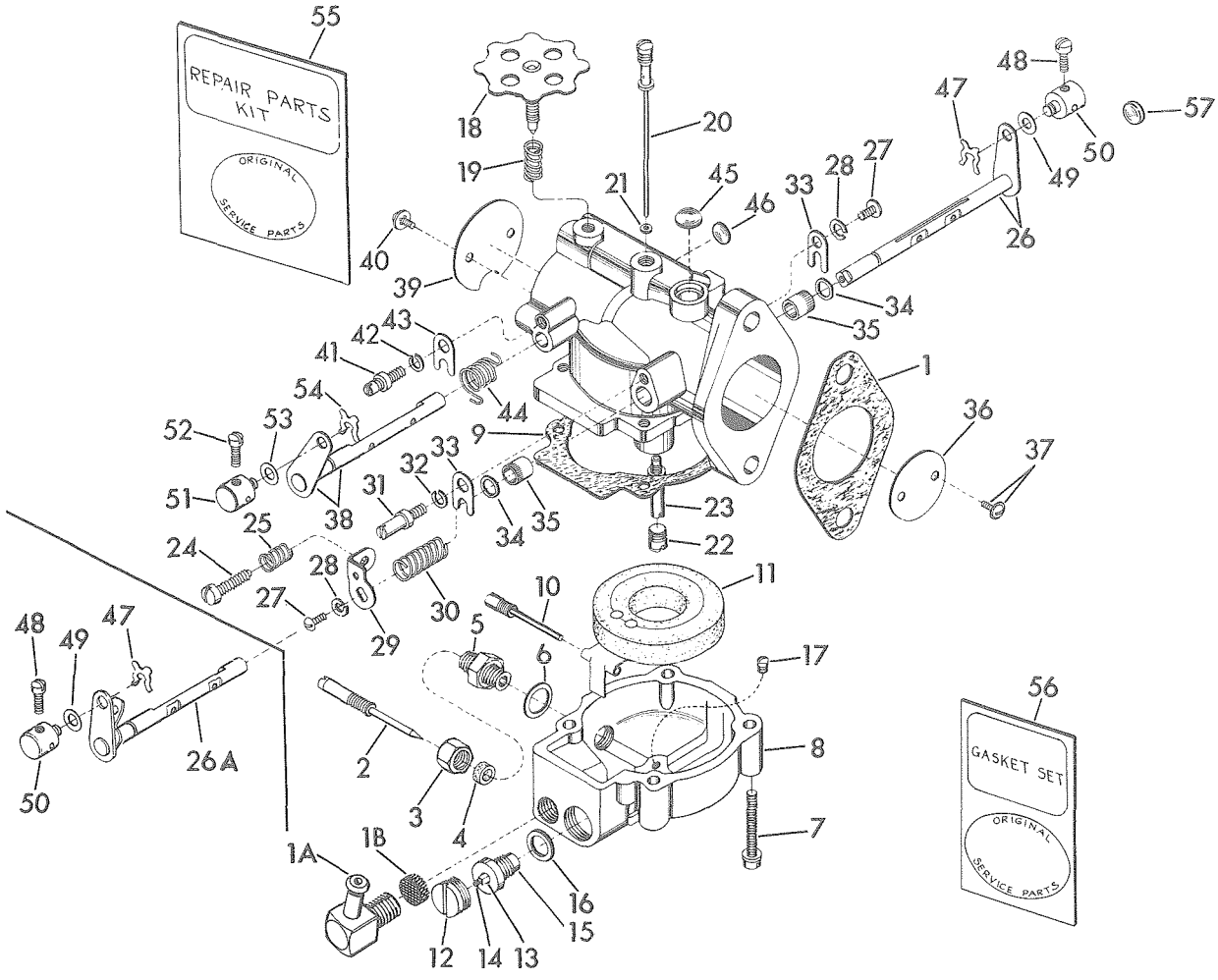
CLEANING, INSPECTION AND REPAIR

Soak all parts except gaskets in Gunk Hydro-Seal. Thoroughly wash away all grit and sediment, then blow dry with compressed air. Blow air through all internal fuel and air bleed channels.

If necessary, remove welch plug (45), and check idle mixture discharge ports (Fig. 3F-12) to be certain they are not wholly or partially plugged. Then tightly install new welch plug.

Wash and blow out main nozzle (23) and idle tube (20). Carefully inspect main mixture screw (2), idle mixture screw (18), inlet needle valve (13), valve spring (14), valve seat (15), and valve gasket (16). Especially note condition of inlet needle; a badly grooved or worn pointed surface will prevent correct fuel level. Replace as needed. Inspect float for leakage and replace if necessary.

Always renew gaskets and main mixture screw packing (4) when reassembling.



1. Carburetor to manifold gasket
1A. Gasoline line elbow
1B. Inlet screen
2. Main mixture screw
3. Main mixture screw packing nut
4. Main mixture screw packing
5. Main mixture screw gland
6. Main mixture screw gland gasket
7. Bowl screws and lockwashers (4 each)
8. Carburetor bowl
9. Body gasket
10. Float lever pin-screw
11. Float
12. Float bowl plug screw (large)
13. Inlet needle valve
14. Inlet needle valve spring
15. Inlet needle valve seat
16. Inlet needle valve gasket
17. Float bowl plug screw (small)
18. Idle mixture screw
19. Idle mixture screw spring
20. Carburetor idle tube
21. Idle tube gasket
22. Main nozzle channel plug screw
23. Main nozzle
24. Idle speed screw
25. Idle speed screw spring
26. Throttle shaft and lever (to late 1963)
26A. Throttle shaft and lever (late 1963)
27. Retaining screw (2) (to late 1963)
28. Lockwasher (2) (to late 1963)
29. Throttle stop lever (to late 1963)
30. Throttle shaft friction spring
31. Throttle stop
32. Throttle stop lockwasher
33. Throttle shaft retainer clip
34. Throttle shaft seal
35. Throttle shaft bushing
36. Throttle disc
37. Throttle disc screws and lockwashers (2 each)
38. Choke shaft and lever
39. Choke disc
40. Choke disc screws and lockwasher (2 each)
41. Choke shaft retainer clip screw
42. Choke shaft retainer clip lockwasher
43. Choke shaft retainer clip
44. Choke shaft spring
45. Body channel welch plug
46. Choke shaft bearing welch plug
47. Wire connection retainer clip washer
48. Throttle wire retainer screw
49. Throttle wire connection lockwasher
50. Throttle wire connection
51. Choke wire connection
52. Choke wire retainer screw
53. Choke wire connection lockwasher
54. Wire connection retainer clip washer
55. Repair parts kit
56. Gasket set
57. Throttle shaft bearing Welch plug (late 1963)

Figure 3F-14. Model MD Carburetor - Exploded View

NOTE

A complete repair parts kit is available and recommended when servicing an excessively used or worn unit. Using this kit will guarantee accurate work and performance.

Examine throttle and choke shaft (26) and (38) for excessive wear. Undue wear of throttle shaft and bearings will cause leakage of air resulting in improper idle performance. Throttle shaft bushings (35) can be replaced if necessary.

Check float level as follows:

Assemble parts 10-16 to carburetor bowl cover. Be sure to tighten inlet seat. Turn assembled float upside down. With float lever tang resting on spring so inlet needle is seated, a measurement of 1/64 in. should be maintained from edge of bowl (less gasket) to the top edge of float as shown in Fig. 3F-15.

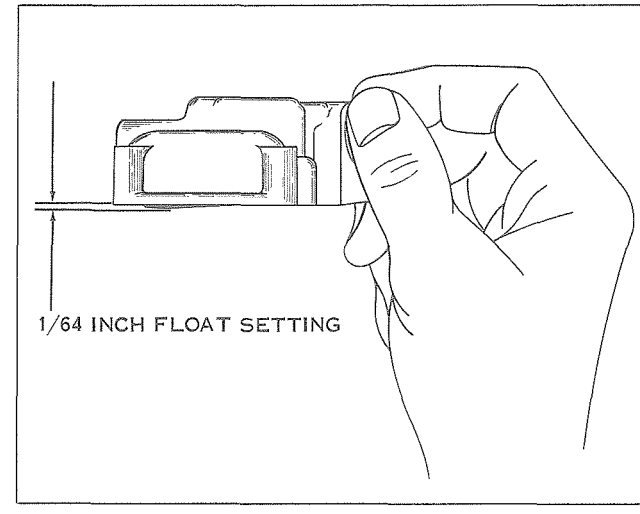


Figure 3F-15. Float Setting

Obtain correct float level setting as follows:

To raise float, insert finger in float hole and pull carefully with slight pressure on float. To lower float, remove large float bowl plug screw (12, Fig. 3F-14) to uncover float tang. Hold float down and push against float lever tang with screwdriver to bend it.

Always recheck float level after each setting as previously described.

ASSEMBLING CARBURETOR (Fig. 3F-14)

To reassemble carburetor reverse the disassembly procedure. Be sure to tighten idle tube (20). Check the float to make sure it moves freely and is set at specified level.

Insert throttle disk in slot in throttle shaft. Make certain that small identifying mark is visible when viewed from manifold end of carburetor and that mark on disk is pointing to the base of carburetor bore. Tighten throttle disc (36) on its shaft after stop and clip are secured in place.

To install choke, first insert choke shaft spring (44) on choke shaft (38). Insert shaft into carburetor body. Put on choke retaining clip (43). Put lockwasher on choke shaft clip screw and screw into place. Check to see that choke shaft spring (44) is correctly attached to lever and shaft of choke. Attach disc on shaft with screws and lockwashers.

Bolt carburetor to manifold.

After assembly, adjust carburetor as described in "Adjusting Carburetor," "Initial Adjustment."

FUEL STRAINER

MODEL M CARBURETOR

The fuel strainer, located underneath the carburetor float bowl, contains a fine mesh screen through which the fuel is forced to pass, trapping bits of dirt and any water that find their way into the fuel system. The unit should be cleaned and flushed at 2,000 mile intervals unless more frequent cleaning is indicated by irregular carburetion.

To clean the strainer, turn off fuel supply, turn off lower knurled cap and clean strainer. Washers need not be replaced unless they are faulty. The cap is replaced fingertight.

AIR CLEANER

The air cleaner consists of a back plate, filter element and cover, arranged so all air drawn into carburetor passes through the filter. A mesh element traps all air borne dust to keep it from entering carburetor and engine.

METAL MESH TYPE FILTER ELEMENT

In normal service on hard surfaced roads, remove air cleaner mesh, wash in gasoline, and saturate with engine oil at least every 1,000 miles, or oftener under dusty service conditions. In extremely dusty service, clean and oil filter mesh every 100 miles or at least once a day.

DRY CORRUGATED TYPE FILTER ELEMENT

In normal service on hard surfaced roads, remove air cleaner cartridge every 1,000 miles, and shake cartridge by tapping lightly to remove loose dirt. If surfaces of element are oily or sooted, wash in gasoline. In extremely dusty service, both cleaning and cartridge replacement should be done more often.

FUEL TANK

GENERAL

The fuel tanks are of welded steel construction.

Fuel tanks are treated to resist rusting. However, when motorcycle stands unoperated for any reasonable length of time, tanks should be drained and the tank interior bathed with an oil-fuel mixture of equal proportions. The fuel will evaporate leaving a protective oil film on tank walls. Moisture formation and subsequent damage may also be avoided by using only "good grade" anti-knock ethyl fuels with moisture absorbing additives.

REPAIRING LEAKING TANKS

Tank leaks may be arc welded, gas welded or soldered. However, only firms or persons qualified to make such repairs should be entrusted with the operation.

WARNING

If ALL traces of fuel are not purged, an open flame repair may result in a tank explosion. Extreme caution in all tank repair is recommended.

FUEL SUPPLY VALVE

DIAPHRAGM TYPE WITH STRAINER (Fig. 3F-16)

The supply valve is located under the fuel tank. The valve has two handles; one is marked "reserve" and the other is unmarked. Fuel to carburetor is shut off when both handles are in horizontal position.

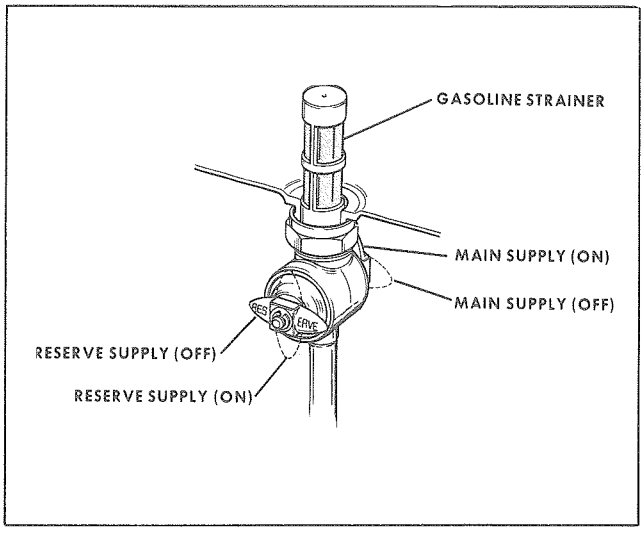


Figure 3F-16. Diaphragm Type Fuel Supply Valve and Strainer

Turning the unmarked handle to vertical position turns on main fuel supply; turning "reserve" handle to vertical position turns on reserve supply.

The fuel strainer is located on top of the supply valve inside the fuel tank. If the supply of fuel is impeded, as indicated by irregular carburetion, remove the supply valve from the tank and thoroughly clean the strainer. Be sure to drain the tank before removing the supply valve.

Before installing supply valve, coat threads with a fuel sealer.

FUEL SUPPLY VALVE (INTERNAL TANK TYPE)

Fuel supply is shut off when plunger for reserve supply valve, located just ahead of the left tank filler cap, is turned down fingertight against its seat. The plunger is unscrewed (but not lifted) to use main fuel supply. The plunger is lifted to use reserve supply.

ALIGNING FUEL SHUT-OFF VALVE FITTINGS

When a left tank has been repaired the fuel shut-off valve should be realigned using Gas Shut-Off Valve Tool, Part No. 96365-42. The tool aligns top and bottom holes and correctly spaces them so the fuel shut-off valve operates without binding.

The tool consists of four parts: 1. Aligning bar; 2. T-Handle; 3. Spacing Handle; 4. Stop Sleeve.

Use the tool as follows:

Remove left tank from motorcycle and disassemble all fuel fittings. Shift spacing handle in aligning bar so larger portion marked "aligning" is through hole. Turn aligning bar into bottom hole in tank and bend bottom of tank as needed to make end of bar line up with top hole in tank. Insert T-handle end fitting through top of tank and turn in part way.

Back out aligning bar until spacing handle may be shifted to portion marked "spacing." Turn aligning bar and spacing handle into each other until they are tight. Strike T-handle several sharp blows with hammer to square to tank fitting.

Remove tool and assemble valve rod and tank fittings.

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