ZENITH 29-SERIES CARBURETORS

OPERATION AND SERVICE

The Zenith 29 Series is a downdraft carburetor with a concentric float bowl design. This design assists in the proper metering of air and fuel to the engine, without flooding, when the vehicle is operated on extreme angles. It is a "sealed" and

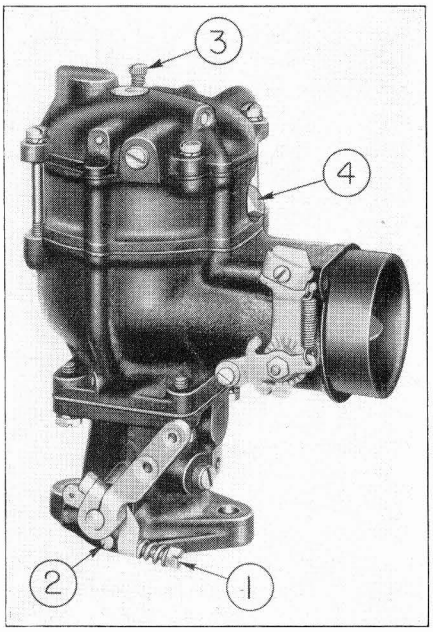


Figure 1

"balanced" carburetor in that all air for fuel bowl chamber ventilation and idling must come through the air cleaner. Air cleaner restrictions have a minimum influence on fuel-air ratio. A double venturi is employed to aid in the complete vaporization of the fuel. The power jet and accelerating pump systems are operated by engine vacuum and are completely enclosed and protected from dirt. These auxiliary jet systems are to provide the extra fuel needed for certain operations.

INSTRUCTIONS FOR ADJUSTING

ADJUSTMENTS:

1. The throttle stop screw (1), Fig. 1, should be screwed in (clockwise) against the stop pin (2) to hold the throttle just slightly open. Adjust the throttle stop screw to obtain the desired idling speed of the engine.
2. The idling adjusting screw (3) should be from 1 to 1½ full turns off its seat. Adjust the idling adjusting screw to obtain smooth idling when engine has become thoroughly warmed up. Turning the screw in (clockwise) cuts off air, making the idling mixture richer; while turning it out (counter-clockwise) admits more air, making the mixture leaner.

   If it becomes necessary to turn the screw in to less than ½ turn off the seat to obtain good idling of the engine, it would indicate either an air leak or a restriction in the flow of fuel for idling. Look for air leaks at the manifold flange; at carburetor throttle body to intake gasket, and at carburetor bowl to cover gasket, due to loosened assembly screws or damaged gaskets. A badly worn throttle shaft will produce sufficient air leakage to affect the idling mixture.

   Dirt or other foreign matter in the idling jet calibration will restrict the flow of fuel for idling and affect the mixture. If the idling jet becomes completely clogged, it will be impossible to run the engine at idling speed regardless of adjustment of the idling adjustment screw.
3. Some models of this series are supplied with a main jet adjustment which is installed in place of plug (4), Fig. 1. Turning the needle clockwise cuts off fuel making the medium and high speed mixtures leaner. The needle should be adjusted to give highest manifold vacuum (or highest R. P. M. on a tachometer) for a set-throttle position. (This is usually about 1½ full turns (counter-clockwise) from the seat.) If engine is equipped with speed governor, set the throttle to hold the engine speed just below the governed speed while adjusting the main jet adjustment. If adjustment is set too lean, the engine will lack power and the fuel economy also will be poor. If set too rich, the engine will be sluggish and the fuel economy poor.

STARTING:

Open the throttle about one-quarter. Pull the choke control all the way. Step on the starter. As soon as the engine starts, push the choke control in about one-third of the way and as the engine warms up, continue to push it in gradually until the choke valve is wide open.

Note: If the engine, after running satisfactorily, suddenly ceases to perform properly, **do not change the carburetor adjustment.** Look over the intake manifold, carburetor flange gaskets, throttle, choke, and fuel connections. Make sure that throttle and choke open and close correctly and that fuel is reaching the carburetor in a steady stream. Do not change carburetor adjustments until other causes of trouble, including ignition, have been investigated. Changes in adjustment should be necessary only with change in fuel or climate.

MODEL IDENTIFICATION

TYPE—DOWNDRAFT:

STYLE 29—Throttle and choke shafts parallel with priming plug located under air intake.

STYLE 29-B—Throttle and choke shafts at right angles with priming plug located on left hand side of throttle body.

STYLE 29-BB — Throttle and choke shafts at right angles with priming plug located on right hand side of throttle body.

STYLE R—Built-in governor.

STYLE W—Vacuum operated pump and power jet.

STYLE X—Flange next size larger than standard.

Size Designation	Nominal Size	Throttle Bore Diameter	Flange Size S.A.E. Std.
11	1⅜"	1.535—1$\frac{17}{32}$"	1¼"
12	1½"	1.653—1$\frac{21}{32}$"	1½"
14	1¾"	1.889—1$\frac{57}{64}$"	1¾"
16	2"	2.165—2$\frac{5}{32}$"	2"

OPERATION

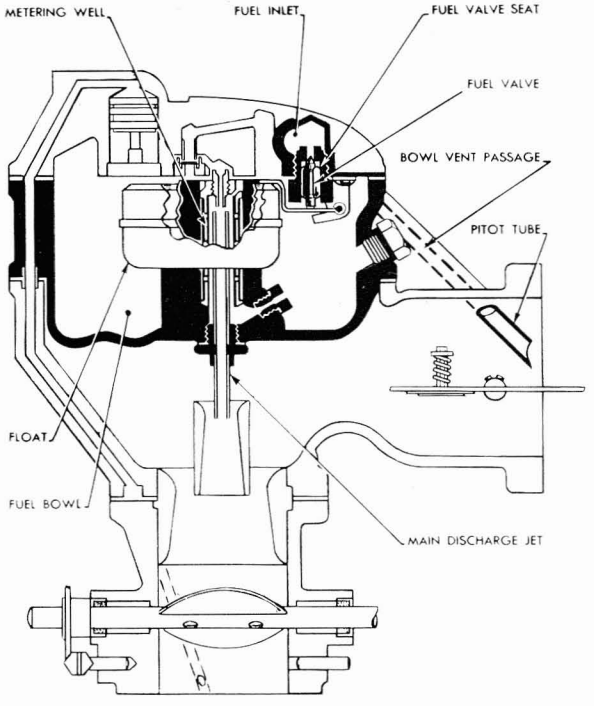


Figure 2

FUEL SUPPLY SYSTEM:

The function of the float is to maintain the correct level of fuel in the fuel bowl under all operating conditions. Gasoline passes through the fuel valve seat into the fuel chamber. When the amount of fuel reaches a predetermined level it causes the float to rise and push the fuel valve needle against its seat, stopping the inflow of gasoline. When the engine is running and fuel flows from the fuel chamber to the metering system jets, the fuel valve assumes a position with just enough opening to supply the required amount of fuel to keep the fuel level constant.

The fuel bowl is located in a central position directly above the throttle plate. The main discharge jet and metering well are located in the center of the fuel bowl.

Air for ventilation of the fuel bowl is provided through a pitot tube. The pressures in the fuel bowl and air entrance are "balanced" by venting the fuel bowl from the air entrance.

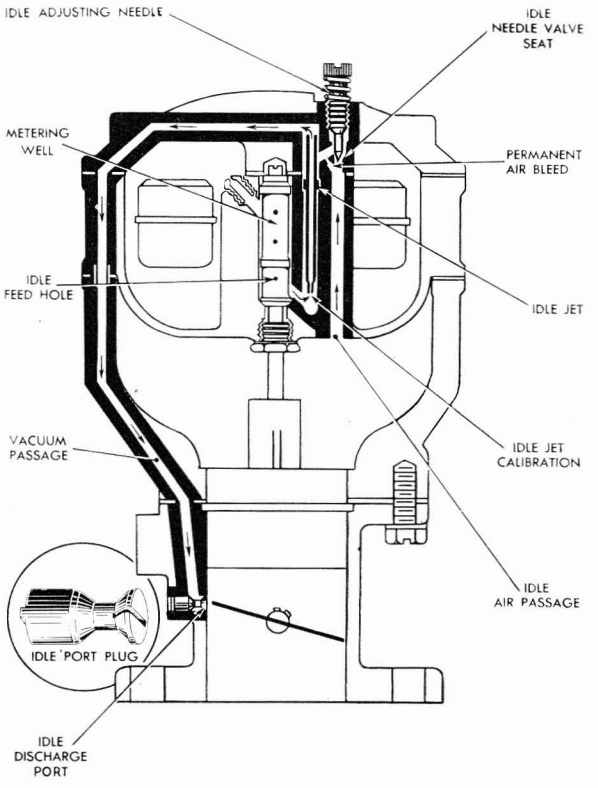


Figure 3

IDLING SYSTEM:

This system consists of an idle discharge port located in the side of the throttle body, an idle jet to meter fuel, a vacuum passage connecting with the idle port, an idle adjusting needle, an idle air intake passage, and a permanent idle air bleed. At idling speed the throttle plate is slightly advanced from a completely closed position leaving about one-half the area of the idle discharge port revealed to the suction in the engine manifold. This suction is transmitted to the idling jet through a passage running through the air intake, fuel bowl, and fuel bowl cover. Fuel from the fuel bowl chamber flows through the main jet into the metering well. Fuel for idling flows from this well through the idle feed hole at the lower end of the metering well to the idle well to be metered through the idle jet. As the fuel leaves the idle jet and enters the vacuum passage leading to the idle discharge port, it is mixed with air admitted from the air intake through the idle air passage in an amount measured by the permanent idle air bleed at the upper end of the idle air intake channel. An additional variable volume of air is admitted past the idling adjusting needle and its seat. This emulsified mixture then passes through the idle vacuum passage to be discharged into the engine manifold at the idle discharge port. The permanent idle air bleed calibration is to prevent fuel from being syphoned into the intake manifold.

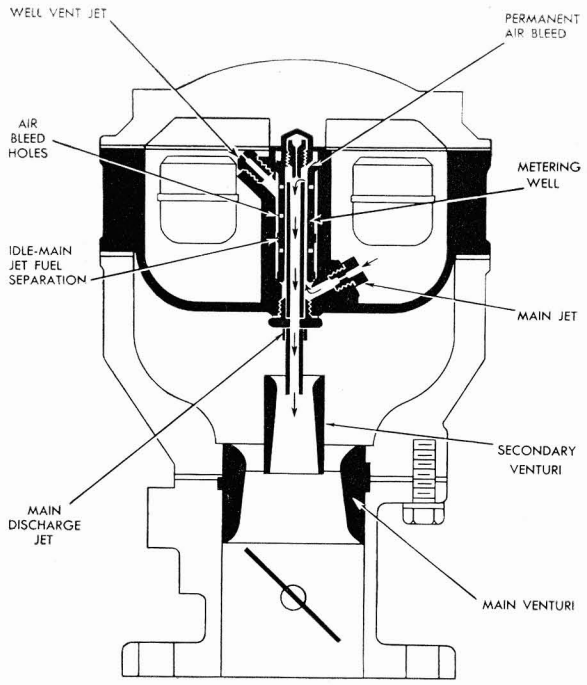


Figure 4

HIGH SPEED SYSTEM:

This system consists of: a main venturi controlling the maximum volume of air admitted into the engine; a secondary venturi to increase the suction on the discharge jet; a main jet which regulates the flow of fuel from the float chamber to the main discharge jet; a well vent jet which maintains uniform mixture ratio under changing suction and engine speeds; and a main discharge jet which delivers the emulsified fuel into the air stream. As the throttle is opened, the suction at the priming plug diminishes, but the increased volume of air entering the engine creates sufficient vacuum in the secondary venturi to draw fuel from the metering well up and over into the discharge tube. The flow characteristics from the main discharge tube are influenced by the size and number of holes used in the side of the metering well. Air from the float chamber, which is vented through a channel to the pitot tube in the air intake, is admitted to the outer side of the metering well through the well vent jet.

POWER JET SYSTEM:

This part of the high speed system consists of: a power jet valve which restricts the flow of fuel to the power jet calibration; a vacuum controlled piston assembly for operating the power jet valve; and an accelerating pump check valve located in the fuel bowl controlling the passage from the fuel bowl into the accelerating pump cylinder. The manifold vacuum is communicated through opening "B" and the vacuum passage to the vacuum piston. Under normal part throttle operating conditions, the vacuum piston is held in the upper position and the power jet valve is closed. When the throttle is opened wide, or when the load on the engine is increased due to road conditions, to a point where the manifold vacuum drops below a predetermined point, the pump assembly drops and holds the power jet valve open. This permits fuel to flow through the power jet calibration to supplement

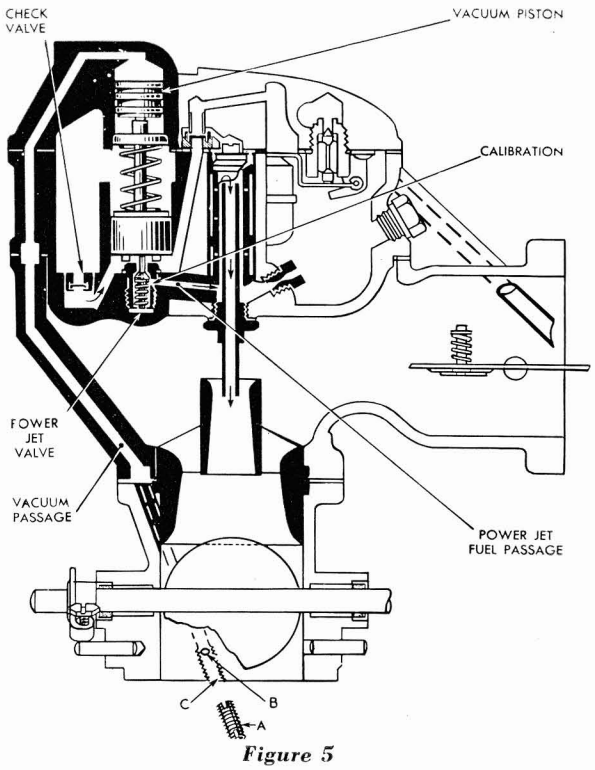


Figure 5

the main jet fuel in the well and provide a full power mixture.

When the throttle position, or the road and load condition, allows the manifold vacuum to rise above a predetermined point, the pump assembly is lifted and the power jet valve closes, permitting the carburetor to deliver an economy mixture again.

ACCELERATING PUMP SYSTEM:

This system consists of: a pump cylinder; a vacuum controlled pump piston to discharge the fuel; a check valve located in the fuel bowl to control the passage from the fuel bowl into the pump cylinder; an air vent check valve located in the fuel bowl cover; and an accelerating jet located in the center of the main metering well to meter the rate at which fuel is discharged. The length of the pump stroke determines the amount of fuel used.

Sudden throttle openings will cause the manifold vacuum to drop, allowing the accelerating pump spring to force the pump piston downward in the cylinder. This forces the fuel through the angle passage to the accelerating jet. Fuel is supplied to the pump cylinder through the check valve in the fuel bowl. The pump check valve in the bowl serves two purposes: It permits a supply of fuel to reach the pump cylinder but closes on the down stroke of the piston, preventing the fuel in the cylinder from being pushed back into

the bowl. To prevent the accelerating jet from flowing at all throttle openings above idle, the air vent check valve is placed between the accelerating jet and pump cylinder above the fuel level. At steady part throttle positions, with the pump piston held up to the top of its stroke, no pressure exists on the fuel in the pump cylinder. Under this condition the air vent check valve will be open and air enters the passage connecting the pump cylinder and accelerating jet and prevents fuel from flowing through the jet. The pressure on the fuel created by the down stroke of the pump piston causes the air vent check valve to close against its seat to prevent fuel from being discharged back into the bowl through the air vent passage.

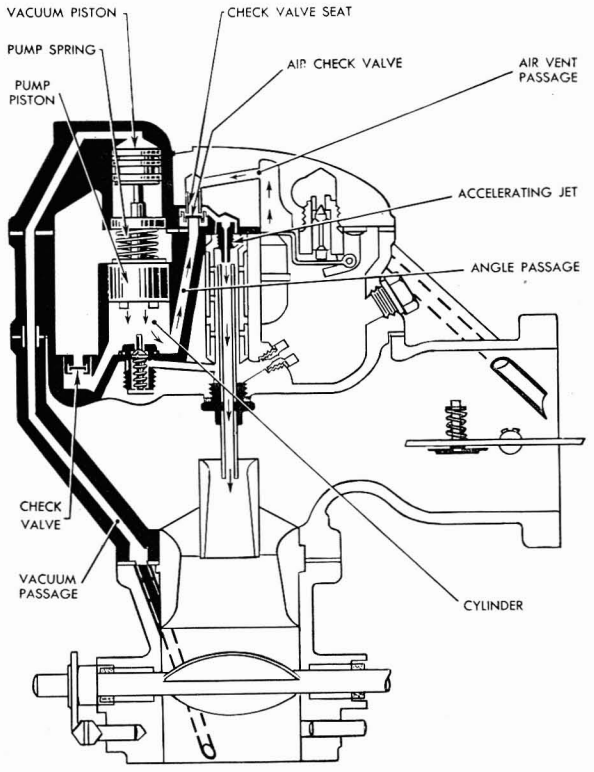


Figure 6

CHOKE SYSTEM:

This system consists chiefly of: a valve mounted on a shaft located in the air entrance and operated externally by a lever mounted on the shaft. The choke system is used to restrict the air entering the carburetor and to increase the suction on the jets when starting the engine. The choke valve has a poppet valve incorporated in its design, which is controlled by a spring.

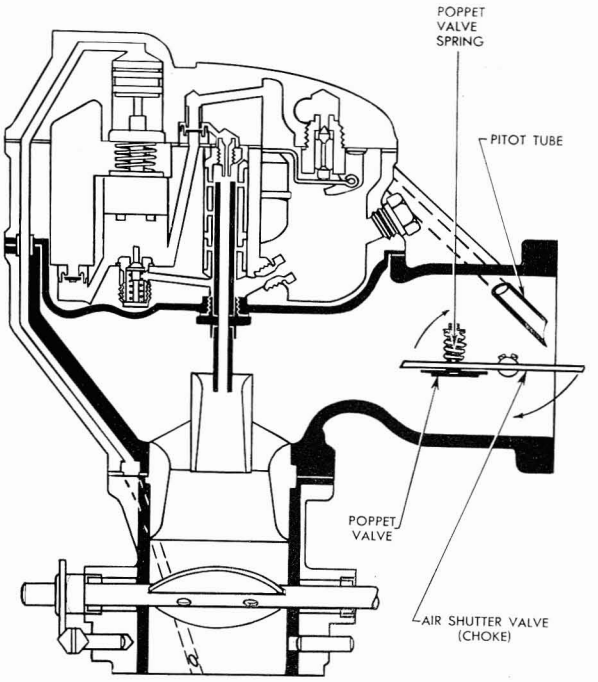


Figure 7

The poppet valve opens automatically when the engine starts. This admits air to avoid overchoking or flooding of the engine. The choke valve is completely closed when starting the engine and then must be instantly opened part way by the operator when the engine begins to run. As the engine warms up the choke valve is gradually advanced to the wide open position by the operator to supply the leaner mixtures required.

SERVICE AND REPAIR PROCEDURE

(A) IDENTIFY CARBURETOR

(a) Check the numbers on metal identification disc riveted to top of float bowl cover against carburetor outline specification chart. The inside number next to the rivet is the Zenith outline assembly number, and the one next to the outer edge of the disc is the vehicle manufacturer's.

(B) DISASSEMBLED VIEW

(a) The disassembled view will identify the various component parts and show their relation to assembly. Use the disassembled view with the identifying part numbers to identify and locate parts when performing the disassembly and reassembly operations.

(C) SUGGESTED REPAIR PROCEDURE

1. Remove idling adjusting screw (1) and spring (2), using fingers.
2. Remove bowl to air intake assembly screws (4) and lockwashers (5) using a screwdriver.
3. Lift fuel bowl assembly (28) clear of air intake and turn it upside down.
4. Remove bowl to intake gasket (32).
5. Remove discharge tube (30) and gasket (29) using service tool C161-10 (or a 7/16" wrench).
6. Turn bowl right side up and remove cover assembly screws (3) and lockwashers (6) using a screwdriver.
7. Remove bowl cover assembly (8) and turn upside down to
8. Remove gasket (16) and pump assembly (13).
9. Remove float axle (15) using a screwdriver to push the axle through the slotted end of the hinge bracket and the fingers to remove it the rest of the way.
10. Remove float assembly (14) and fuel valve needle (10).
11. Remove fuel valve seat (10) and gasket (9), using service tool C161-85 (or a ½" screwdriver).

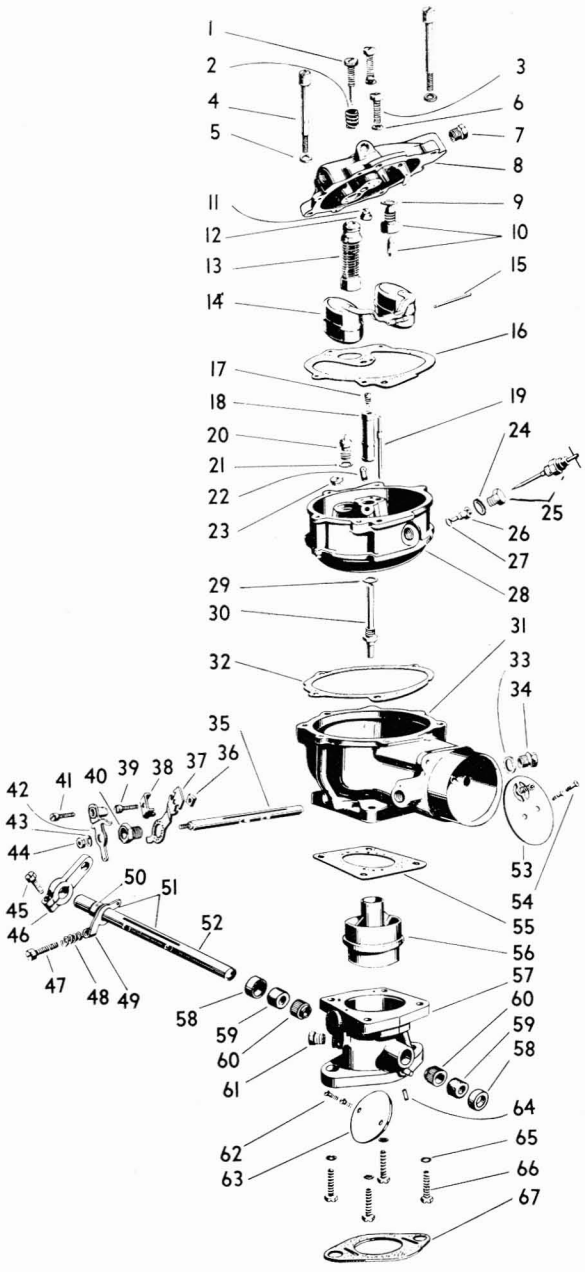


Figure 8

12. Remove pump refill check valve (12) and disc (11), using service tool C161-5.

    (a) Insert tapered thread end into the valve body and screw in (counter-clockwise) until tool is firmly attached to the body; then raise the sliding weight up sharply against the stop bar a few times to remove the part. Be careful to avoid screwing the tool too deeply into the valve body as it may damage the air vent check valve seat that is pressed into the cover directly above this point. If the hole in the valve body becomes enlarged, grind a little off the end of the tool so it will start to grip the body sooner.

    One end of the stop bar is made to install a similar valve in another model of carburetor but **should not be used to install this valve.**

    C161-22 service tool can also be used as an extractor only for this valve.

NOTE: Do not remove the air vent check valve seat, the float hinge bracket, the channel plugs, or the identification disc.

13. Remove idling jet (19), using fingers only to lift it out of the bowl casting.

14. Remove well vent (22), using service tool C161-80 (or a 3/16" wrench).

15. Remove accelerating jet (17), using a small screwdriver.

NOTE: If metering well turns with jet, proceed with item 16 and remove jet afterwards.

16. To remove metering well (18), insert a piece of small rod about 4" long in the discharge jet channel and push the metering rod well up far enough to provide finger hold to remove it.

17. Remove power jet valve (20) and gasket (21), using service tool C161-121, being careful to have the tool properly centered on the valve head.

18. Remove bowl plug (or main jet adjustment if used) (25) and gasket (24), using a ½" wrench.

19. Remove the main jet (26) and gasket (27), using a screwdriver inserted through the opening from which the plug (25) was removed.

20. Remove pump check valve assembly (23), using C161-123 extractor.

    (a) Insert tapered thread end into the valve and screw in (counter-clockwise) until the tool is firmly attached to the valve body, then strike the bent end with a hammer squarely and sharply a few times to pull the valve out. If tool pushes the valve disc out, be sure the disc is not left in the carburetor channel.

NOTE: Do not remove the channel bushings or channel plugs.

21. Turn the intake assembly (31) upside down and remove throttle body to air intake assembly screws (66) and lockwasher (65), using a 7/16" end wrench to loosen and a screwdriver to remove.

22. Lift throttle body (57) clear of the intake (31) and at the same time **note carefully** that the holes in the gasket line up with the channels in the throttle body and that there is a locating pin to prevent assembling the throttle body and air intake incorrectly.

23. As you lift the venturi assembly (56) and gasket (55) clear of the air intake, note that there is a locating boss on the side of the venturi to hold the venturi in the correct position; also note that the gasket blanks off one channel in the intake body.

24. To remove the air shutter retainer screws (54), it is necessary first to file off the riveted ends, then remove the air shutter return spring (if one is used), hold the air shutter lever (42) in closed position and remove the screws.

25. Push the air shutter (53) into the intake body (31) to remove it.

26. Remove shaft (35) and lever (43) as a unit.

27. Note the angle at which the bracket (37) is attached to the air intake (31), then remove the retainer screw (40), using a ½" wrench.

28. Remove the shaft hole plug (34) and gasket (33), using a ½" wrench.

NOTE: Do not remove pitot tube, air shutter stop pin, air shutter bracket locating pin, or channel plugs.

29. Remove the throttle plate (63), screws (62), shaft and stop lever assembly (51), throttle clamp lever (46), as follows:

    (a) Unscrew throttle stop screw (47) until threaded end is flush with lever (49).

    (b) Make match marks with center punch or file on throttle body (57) and all levers to act as a guide to reassemble these parts in the same position as removed.

(c) Loosen throttle lever clamp screw (45) and remove lever (46) from shaft (52).

(d) Remove throttle plate screws (62) and pull out the throttle plate (63).

NOTE: The threaded end of the screws are riveted and must be filed flat before removal, to avoid breakage or stripping of threads in the throttle shaft.

(e) Remove the throttle shaft and stop lever assembly (51) from the throttle body (57).

30. Remove throttle shaft packing (59) and packing retainer (58) from the throttle body shaft holes as follows:

(a) Screw a fine thread taper tap into packing retainer until it is firmly seated.

(b) Insert a long punch or rod through opposite shaft hole and drive punch against the end of the tap until retainer is free of the body.

NOTE A: Do not disassemble the throttle plate (63), throttle shaft and stop lever assembly (51), throttle packing (59) and packing retainer (58), from the throttle body (57), unless the throttle shaft is worn, bent or otherwise damaged or unless there is damage to any of the other component parts of the throttle body assembly.

NOTE B: The location of the priming hole plug in relation to the throttle plate is extremely important for uniform idling and part throttle operation. To maintain a uniform relation between the priming hole plug and the throttle plate, our factory assembles the throttle shaft and plate in the throttle body before drilling the hole in the body for the priming hole plug, locating the hole in a definite relation to the throttle plate in each case. It is readily apparent from the above that throttle plates and throttle bodies cannot be interchanged indiscriminately. When it becomes necessary to replace the throttle shaft or throttle plate, we suggest the following routine:

(a) Unscrew the throttle stop screw to permit complete closing of the throttle plate.

(b) Hold throttle in tightly closed position and mark the inside of the throttle body close to the throttle plate with a steel scriber.

(c) Using this scribed line as a guide, replace the throttle shaft or plate. It may be necessary to try more than one new plate to get one that fits very close to the scribed line when installed.

(d) If throttle body has to be replaced, we recommend obtaining a complete throttle body assembly including shaft, plate, priming hole plug, etc., built to the outline number on the identification tag. The part number is B12—outline number.

NOTE C: For Governor Type throttle body assembly, see Service Bulletin 263 or 264.

CLEAN AND INSPECT PARTS

1. Clean all metal parts thoroughly with cleaning solution and rinse in solvent.
2. Blow out all passages in the fuel bowl cover, fuel bowl, air intake, and throttle body.

NOTE: Be sure all carbon deposits have been removed from throttle bore and idle port. It is advisable to reverse flow of compressed air in all passages to insure all dirt has been removed. Never use a wire or drill to clean out jets.

3. **Float Assembly (14).** Replace float if loaded with gasoline, damaged, or if float axle bearing is worn excessively. Inspect top side of float lever for wear where it contacts the fuel valve needle.
4. **Float Axle (15).** Replace if any wear can be visually detected on the bearing surface.
5. **Fuel Valve Seat and Needle Assembly (10).** Replace fuel valve seat and needle assembly because both parts wear and may cause improper float level.
6. **Idling Adjusting Needle (1).** Inspect point of needle, this must be smooth and free of ridges.
7. **Throttle Plate (63).** Inspect plate for burrs or damaged edges. Never clean a throttle plate with a buffing wheel or a sharp instrument.
8. **Vacuum Piston Assembly (13).** Both pistons must be free of scratches, burrs, and carbon, and must fit cylinder at operating end within .003". Replacement recommended because extent of wear cannot be determined by visual inspection.
9. **Power Jet Valve (20).** Replace this part because extent of wear cannot be determined by visual inspection.
10. **Air Shutter Choke (53).** Inspect for bends, burrs, or damaged edges.
11. **Air Shutter Shaft (Choke) (35).** Check bearing surfaces for wear; see that shaft is straight.
12. **Fuel Bowl Body (28).** Examine pump cylinder at lower end for evidence of excessive wear, deep scratches, or ridges. Desirable clearance between pump piston and pump cylinder at lower operating end is .001", maximum clearance .003". Any clearance in excess of .003" will reduce accelerating pump discharge and result in poor acceleration. If above condition is found, the pump cylinder should be relined.
13. **Fuel Bowl Cover (8).** Examine pump cylinder for evidence of excessive wear, deep scratches, ridges, or any mutilation of cylinder head. Desirable clearance between vacuum piston and cylinder at upper operating end is .001", maximum clearance .003". Any clearance in excess of .003" will allow air or fuel to be discharged into manifold through vacuum passage leading from cylinder head into throttle body bore. This condition results in poor idling, power jet and pump action. If above condition is found the pump cylinder should be relined.

NOTE: Some 29 Series carburetors have removable pump liners which can be serviced by our field organization. Those that do not have removable liners must be returned to the factory for the vacuum cylinder relining operation.

14. **Throttle Shaft (52).** Replace if shaft shows evidence of wear on the bearing surfaces.
15. **Throttle Shaft Bushings (60).** Replace if new shaft has more than .005" side play. Any side play in excess of .005" will allow dirt or grit to pass into engine and result in excessive wear of cylinders, pistons, rings, etc.
16. **Accelerating Pump Check Valve (23).** Replace because this part is damaged in removal, or extent of wear cannot be determined by visual inspection.
17. **Gaskets:** Replace all gaskets and fibre washers every time carburetor is disassembled.
18. **Check Specifications:** Venturi, Main Jet, Idling Jet, Power Jet Valve, Accelerating Jet, Main Discharge Jet, Well Vent Jet, and Fuel Valve Seat.

NOTE: Do not attempt to remove the throttle shaft bushings unless new bushings are available for replacement. New bushings are under shaft size and require reaming with a line reamer to fit shaft properly. Both bushings and reamer must be available to successfully complete this operation.

(a) Screw a taper tap 1/16" larger than the throttle shaft hole into bushing until it is firmly seated.

(b) Insert long punch or rod in opposite shaft hole and drive punch against end of tap until bushing is free of body.

(c) Repeat above operation to remove bushing in opposite shaft hole.

(d) Install new throttle shaft bushings (if removed) with Zenith C161-72-3 bushing driver for 5/16" shaft hole bushing, or Zenith C161-72-4 bushing driver for ⅜" shaft hole bushings.

(e) Place new bushing on bushing driver with taper end of bushing away from shoulder.

(f) Start bushing into shaft hole and drive it in until it bottoms, using a light hammer.

(g) Repeat this operation to install second bushing in opposite shaft hole.

(h) Line ream the two throttle shaft bushings, using special reamer Zenith C161-71-3 for 5/16" shaft size, or C161-71-4 for ⅜" shaft size.

REASSEMBLY

1. Install throttle shaft and stop lever assembly (51) and throttle plate (63) in the throttle body (57). When throttle plate is properly centered, tighten the retainer screws (62) securely.
2. Rivet ends of throttle plate retainer screws, being careful to avoid springing the shaft. Use a piece of rod (about ⅜" diameter) in a vise to support the shaft, and a tinner's riveting hammer to rivet the screws.
3. Install air shutter bracket (37) at correct angle (see item 27 of disassembly procedure) using a ½" wrench to tighten the retainer screw (40).
4. Replace air shutter shaft (35) and lever assembly (42) in air intake body (31). Install air shutter shaft with threaded end of retainer screw holes down (so screws can be installed from outside).
5. Install air shutter assembly (53) from inside the air intake, with relief valve stem up.
6. Hold in closed position to start retainer screws (54), then snap the plate shut a few times to aid in properly centering it, then tighten the retainer screws securely.
7. Install shaft hole plug (34) and gasket (33), using a ½" wrench.
8. Place the venturi (56) in the throttle body, making sure that the locating boss on the side of the venturi faces the correct way to engage the notch in the intake body.
9. Place the body to intake gasket (55) on the throttle body, making sure that the holes in the gasket line up with channel openings in the throttle body.
10. Place the intake body (31) on the throttle body (57), making sure that the locating boss on the venturi engages the slot provided for it and that the locating dowel in the throttle body engages the intake flange properly. Hold parts together and turn upside down.
11. Start all four of the body intake screws (66) and lockwashers (65), tighten down evenly and securely.
12. Install new pump check valve (23), using C161-124 service tool or suitable flat-end punch.
    (a) C161-124 tool is machined at one end to fit the pump check valve body and is used with a light hammer to drive the valve assembly as far in as the shoulder on the tool will permit. If an ordinary flat-end punch is used instead of C161-124, be careful to avoid driving the check valve farther in than just below the edge of the channel opening.
13. Replace the main jet (26) and washer (27), using a suitable screwdriver inserted through the opening in the side of the fuel bowl (28).
14. Install bowl plug (or main jet adjustment) (25) and gasket (24), using a ½" wrench.
15. Replace power jet valve (20) and gasket (21), using Zenith tool C161-121, being careful to have the tool properly centered on the valve head.

NOTE: We suggest tipping the carburetor on its side as an aid to getting the valve and gasket into place more easily.

16. Install accelerating jet (17) in the metering well (18), using a small screwdriver while holding the metering well with hand only.
17. Install metering well (18) with accelerating jet (17) in the well channel of fuel bowl (28).

NOTE: The metering well is designed to extend not more than .015" above the bowl casting to insure a good seal at that point when gasket and cover are in place.

18. Install well vent jet (22), using Zenith tool C161-80 (or a 3/16" wrench).
19. Install idling jet (19), using fingers only.
20. To install pump refill check valve (12), place the valve body, head down, on a flat metal block; place the valve disc (11) in the valve body; place the cover casting (8) squarely over the valve, then strike the casting with a hammer (preferably a rawhide mallet), to drive the cover down over the valve.

NOTE: Valve body should be just flush with the casting.

21. Replace fuel valve seat (10) and gasket (9), using Zenith tool C161-85 (or a ½" screwdriver).
22. Place fuel valve needle (10) in the seat; hold the float assembly (14) in position and
23. Install float axle (15), using the fingers to push it through to the slot and the handle end of a screwdriver to force it through the slotted end of the float hinge bracket. The float axle should extend about the same distance on both sides of the bracket.

NOTE: The float should move freely on the axle.

24. Hold the cover and float upside down, as shown in Figure 9, to observe relation of float to cover. To obtain correct fuel level, with normal pump pressure, consult float setting chart for Dimension A. Do not bend the float arm, as new and undamaged parts will come within the limits.

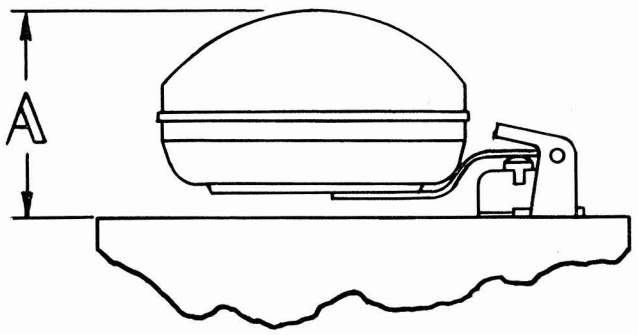


Figure 9

FLOAT SETTING CHART

Carburetor Model	Dimension A
29-11, 12	$1\frac{3}{16}" \pm \frac{1}{32}"$
29-14	$1\frac{5}{16}" \pm \frac{1}{32}"$
29-16	$1\frac{45}{64}" \pm \frac{1}{32}"$

25. Place pump assembly (13) in the pump cylinder.
26. Place the bowl to cover gasket (16) on the fuel bowl (28).
27. Hold the cover assembly (8) over the bowl (28) and guide the vacuum piston into the vacuum cylinder and the idling jet (19) into its channel, being careful to avoid damage to float and other parts.
28. Install cover to bowl assembly screws (3) and lockwashers (6). Tighten them evenly and securely, using a screwdriver.

29. Install discharge tube (30) and gasket (29) in lower side of bowl (28), using Zenith tool C161-10 (or a 7/16" wrench).

30. Place bowl to intake gasket (32) in position on the fuel bowl (28).

31. Place the bowl assembly with gasket on the air intake (31). Be sure the channel bushings enter their respective channels.

32. Install the assembly screws (4) and lockwashers (5). Tighten them evenly and securely, using a screwdriver.

33. Install idling adjusting needle (1) and spring (2), using fingers only.

NOTE: Before releasing the carburetor for service again, set the main jet adjustment (if one is used) at 1½ full turns open; set the idling adjustment needle (1) at one full turn open; and set the throttle stop screw (47) far enough in against the stop pin to hold the throttle plate just slightly open. These are preliminary adjustments that will make starting easier when the carburetor is installed.

If the carburetor is to be used with a sandwich-type speed governor, be sure the hollow vacuum channel screw (64) is installed in the carburetor flange, and that the flange gasket used has a hole that coincides with this channel.

RECOMMENDED SERVICE TOOLS FOR 29 SERIES

C161-5	Pump Refill Check Valve Extractor.
C161-10	Discharge Tube Wrench (7/16" Hex. socket, 1¼" deep).
C161-80	Well Vent Jet Wrench (3/16" Hex. socket, ½" deep).
C161-85	Fuel Valve Seat Wrench.
C161-121	Power Jet Valve Wrench.
C161-123	Pump Check Valve Extractor.
C161-124	Pump Check Valve Tool (to install).
C161-72-3	Bushing Driver (for 5/16" shaft).
C161-72-4	Bushing Driver (for ⅜" shaft).
C161-71-3	Line Reamer (for 5/16" shaft).
C161-71-4	Line Reamer (for ⅜" shaft).

ZENITH CARBURETOR DIVISION

696 HART AVENUE — DETROIT 14, MICHIGAN

Bendix AVIATION CORPORATION

Manufacturers of Zenith Carburetors and Filters

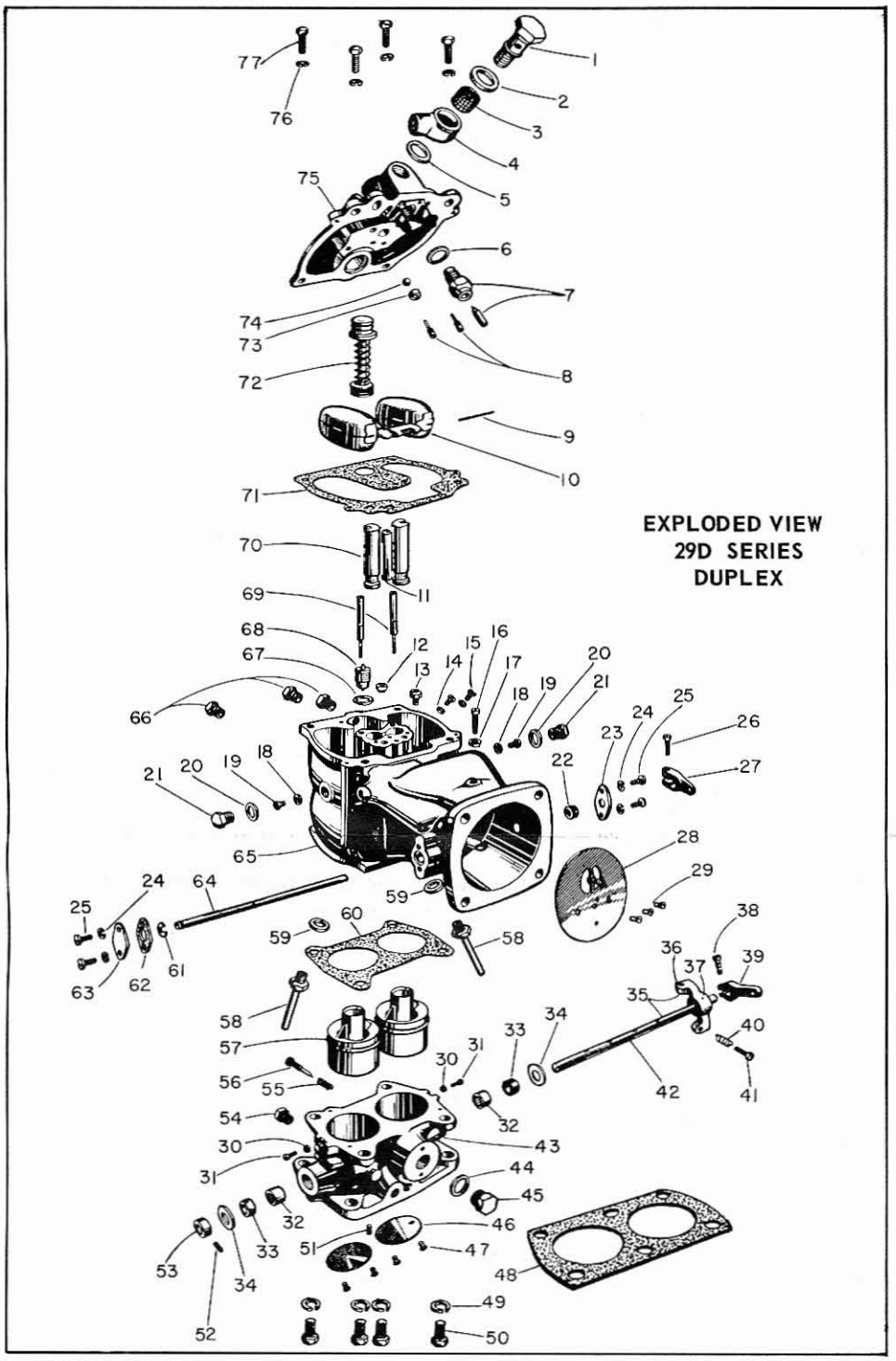
THIS SUPERSEDES BULLETIN No. 245-A OF SEPTEMBER, 1949

July, 1950

Printed in U. S. A.

ZENITH CARBURETOR RESTOROGRAPH

29D SERIES DUPLEX



KEY NO.	PART NAME
1	PLUG–Filter
2	WASHER–Filter Plug
3	SCREEN–Filter
4	BODY–Union
5	WASHER–Union Body
6	WASHER–Fuel Valve Seat
7	VALVE & SEAT–Fuel
8	JET–Idle
9	AXLE–Float
10	FLOAT
11	WELL–Secondary
12	VALVE–Pump Check
13	VENT–Well
14	WASHER–Idle Compensator
15	JET–Idle Compensator
16	SCREW–Choke Plate Stop
17	NUT–Choke Plate Stop Screw
18	WASHER–Main Jet
19	JET–Main
20	WASHER–Main Passage Plug
21	PLUG–Main Passage
22	PACKING–Choke Shaft
23	PLATE–Shaft Cover R.H.
24	LOCKWASHER
25	SCREW–Plate or Bracket Assy.
26	SCREW–Choke Lever Clamp
27	LEVER–Choke
28	PLATE–Choke
29	SCREW–Choke Plate
30	LOCKWASHER
31	SCREW–Venturi
32	BEARING–Shaft Needle
33	SEAL–Throttle Shaft
34	WASHER–Lever Spacer
35	LEVER & SHAFT–Throttle
36	LEVER–Throttle
38	SCREW–Throttle Lever Clamp
39	LEVER–Throttle Clamp
40	SPRING–Lever Stop Screw
41	SCREW–Throttle Lever Stop
42	SHAFT–Throttle
43	BODY–Throttle
44	WASHER–Degasser Plug
45	PLUG–Degasser Channel
46	PLATE–Throttle
47	SCREW–Throttle Plate
48	GASKET–Flange
49	LOCKWASHER
50	SCREW–Body to Bowl Assy.
51	SCREW–Vacuum Channel
52	SET SCREW–Thrust Coller
53	WASHER–Throttle Shaft Thrust
54	PLUG–Degasser Vacuum Channel
55	SPRING–Idle Adjusting Needle
56	NEEDLE–Idle Adjusting
57	VENTURI
58	JET–Discharge
59	WASHER–Discharge Jet
60	GASKET–Bowl to Throttle Body
61	WASHER–Choke Shaft Thrust
62	GASKET–Cover Plate
63	PLATE–Shaft Cover L.H.
64	SHAFT–Choke
65	BOWL–Fuel
66	PLUG–Level Line & Bowl Drain
67	WASHER–Power Jet Valve
68	VALVE–Power Jet
69	JET–Accelerating
70	WELL–Metering
71	GASKET–Bowl to Cover
72	PUMP ASSEMBLY
73	BODY–Check Valve
74	BALL–Air Vent Check
75	COVER–Fuel Bowl
76	LOCKWASHER
77	SCREW–Bowl Cover

1. DISASSEMBLY

Disassembly consists of separating the carburetor into two basic groups: fuel bowl and air intake-throttle body and the disassembly of each of these groups. Use exploded illustration above as a guide for disassembly and reassembly.

2. CLEANING AND INSPECTION

Thoroughly clean all metal parts in Bendix Metalclene or Speedclene. Blow out all parts and channels with air pressure. Inspect housing for damage, excessive wear, burrs or warpage. DO NOT CLEAN NON-METALLIC PARTS in Bendix Metalclene or Speedclene.

3. REASSEMBLY

When reassembling carburetor use essentially the reverse order from disassembly.

THROTTLE BODY ASSEMBLY

1. Install both throttle body dust seals (33) with thin edge of seals facing outwards, using fingers only.

2. Place one throttle shaft washer (34) on throttle shaft and install throttle shaft and lever assembly (35) in throttle body. Align levers to match marks made at time of disassembly.

3. Place throttle body assembly on bench with mounting flange up and facing idle ports on inside of throttle bores, then rotate throttle shaft to wide open position.

4. Install throttle plate (46) by inserting side with shorter distance between screw holes and beveled edge into shaft first, with bevel on longer side of plate up. Center throttle plate; rotate shaft to close position; start two throttle plate screws (47) in place but do not tighten.

5. Install other throttle plate in same manner. Make sure both plates are properly centered so that edges fit throttle bores closely, then tighten all four throttle plate screws securely.

6. Place throttle shaft washer (34) on end of shaft and install thrust collar (53) while holding throttle in fully closed position and tighten thrust collar set screw (52).

NOTE: Shaft end play should not be more than .003'' and shaft should rotate freely. If thrust collar is too close, causing a ''drag'' when shaft is rotated, strike end of shaft lightly with hammer to remove ''drag''.

7. With throttle plates held in closed position turn throttle stop screw (41) IN (clockwise) until screw just contacts stop pin, then turn stop screw IN 1-1/2 turns as a preliminary idle speed adjustment.

8. Install degasser channel plug (45) and gasket (44), and also install 1/8'' pipe plug (54) and tighten securely.

9. Install idle adjusting needle (56) and spring (55), using fingers only. Turn idle needle in lightly against seat, then back out needle 1/2 to 3/4 of a turn as a preliminary adjustment.

10. Place the bowl to body gasket (60) in position on throttle body, then install two venturi assemblies (57) and secure with venturi screws (31) and lockwashers (30).

ASSEMBLY OF CHOKE IN AIR INTAKE

1. Install ''C'' washer (61) on end of choke shaft and insert choke shaft in air intake from side shown. Align shaft to match marks made at time of disassembly, then rotate shaft to open position.

2. Install choke plate (28) from inner side of shaft by sliding relief side of choke plate over choke shaft first with valve stem towards vent tube; and then work plate back into slot of shaft. Center choke plate and rotate choke to closed position. Then start three choke plate screws (29). Align choke for best closing and tighten choke plate screws.

3. Install choke shaft packing felt (22) in counterbore and cover plate (23), cover plate screws (25) and lockwashers (24) on side of air intake.

4. Install choke lever (27) on choke shaft and align to match marks made at time of disassembly and then tighten clamp screw (26).

5. At opposite side from choke lever, install cover gasket (62), shaft hole cover plate (63), screws (25) and lockwashers (24).

NOTE: If choke adjusting screw (16) was loosened, then it will be necessary to readjust screw. Adjust screw to close choke plate, as far as possible without sticking.

ASSEMBLY OF FUEL BOWL BODY

1. To install new pump check valve (12), insert formed end of C161-124 tool into check valve body and drive valve into counter-bore until top surface is slightly below surrounding surface of casting.

2. Install power jet valve (68) and fiber washer (67) in bottom of pump cylinder, using C161-121 power jet valve wrench.

3. Install two main jets (19) and fiber washers (18); tighten securely.

4. Install two main jet passage plugs (21) and fiber washers (20) in threaded openings at opposite sides of fuel bowl.

5. Install two compensating jets (15) and fiber washers (14) in bottom of fuel bowl at side opposite pump cylinder.

6. Invert fuel bowl assembly and install two discharge jets (58) and fiber washers (59), using fingers to start jets and C161-149 wrench to tighten jets.

ASSEMBLY OF THROTTLE BODY TO BOWL

1. With fuel bowl assembly inverted, align match marks made prior to disassembly on throttle body and fuel bowl flanges.

2. Place throttle body assembly on fuel bowl assembly and align holes in throttle body flange with holes in gasket and fuel bowl; then attach throttle body with throttle body assembly screws (50) and lockwashers (49). Tighten screws evenly and securely.

3. Place assemblies in upright position with bowl up and install three metering wells (11 and 70), fitted together as a unit, in well cavities of fuel bowl.

4. Install two accelerating jets (69), using fingers only; then install well vent jet (13), using a screwdriver.

ASSEMBLY OF BOWL COVER

1. With bowl cover in inverted position, drop pump refill check ball (74) into place in center passage and install check valve (73) with smooth side out. Use a flat end punch and a light hammer to drive check valve into place flush with the casting surface.

2. Install fuel valve seat (7) and fiber washer (6), using 5/8'' socket wrench.

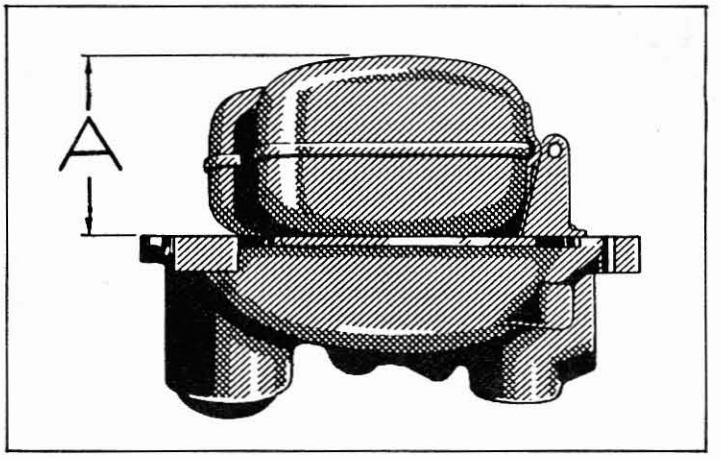
3. Install two idle jets (8) and tighten firmly, using small screwdriver.

4. Place pump (72) in vacuum cylinder. Push spring retainer disc into recess in casting, using fingers or flat side of screwdriver blade.

5. Place fuel bowl cover gasket (71) in position on cover, making sure holes in gasket coincide with channel openings; then place fuel valve needle in seat.

6. Position float and lever assembly in hinge bracket and install float axle (9), using finger to push axle through bracket and bushing to slotted side of hinge bracket. Use handle end of screwdriver to push axle through slotted side of bracket. Center axle.

7. FLOAT SETTING - To insure correct fuel level in fuel chamber, check distance ''A'' from top of floats to machined surface of cover (no gasket)



with cover inverted. This dimension should be 1-5/8''. To increase or decrease distance between float bodies and machined surface, use long nose pliers and bend lever close to float body.

NOTE: DO NOT bend, twist or apply pressure on the float bodies. The float bodies when viewed from the free end of bodies must be centered and at right angles to the machined surface of cover and must move freely on the float axle.

ASSEMBLY OF COVER TO FUEL BOWL

1. Position cover above fuel bowl and guide pump into pump cylinder, being careful not to damage floats.

2. Align holes in cover and gasket with holes in fuel bowl and install four cover to bowl assembly screws (77) and lockwashers (76). Tighten screws evenly and securely.

3. Install fuel union (4), fuel filter screen (3), two fiber washers (2 and 5) and fuel filter plug (1), using 15/16'' wrench.