

# GRAVELY

## Zenith 68 Series Carburetor

### ZENITH 68 SERIES CARBURETOR FOR GRAVELY TRACTORS

The Zenith 68 Series carburetors are of updraft single venturi design. These carburetors are "balanced" and "sealed", and the semi-concentric fuel bowl allows operation to quite extreme angles without flooding or starving.

#### FUEL SUPPLY SYSTEM (See Fig. 1)

The fuel supply system is made up of the threaded fuel inlet, the fuel valve seat, fuel valve needle, float and fuel bowl.

The fuel supply line is connected to the threaded inlet. The fuel travels through the fuel valve seat and passes around the fuel valve and into the fuel bowl. The level of the fuel in the fuel chamber is regulated by the float through its control of the fuel valve. The fuel valve does not open and close alternately but assumes an opening, regulated by the float, sufficient to maintain a proper level in the fuel chamber equal to the demand of the engine according to its speed and load.

The inside bowl vent as illustrated by the passage originating in the air intake and continuing through to the fuel bowl, is a method of venting the fuel bowl to maintain proper air fuel mixtures even though the air cleaner may become restricted. This balancing is frequently referred to as an "inside bowl vent".

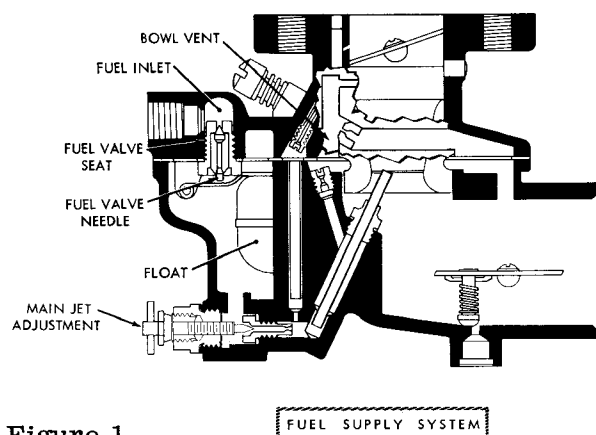


Figure 1

#### IDLE SYSTEM (See Fig. 2)

The idle system consists of two idle discharge holes, idle air passage, idle adjusting needle, idle jet, and fuel pick-up passage.

The fuel for idle is supplied through the main jet to a well

directly below the main discharge jet. The pick-up passage is connected to this well by a restricted drilling at the bottom of this passage. The fuel travels through this channel to the idle jet calibration. The air for the idle mixture originates back of (or from behind) the main venturi. The position of the idle adjusting needle (normally one turn from its seat) in this passage controls the suction on the idle jet and thereby the idle mixture. Turning the needle in closer to its seat results in a greater suction with a smaller amount of air and therefore a richer mixture. Turning the needle out away from its seat increases the amount of air and reduces the suction, and a leaner mixture is delivered. The fuel is atomized and mixed with the air in the passage leading to the discharge holes and enters the air stream at this point.

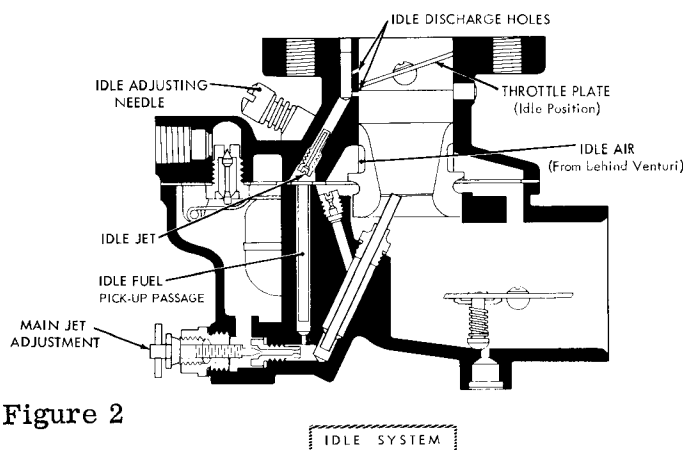


Figure 2

#### HIGH SPEED SYSTEM (See Fig. 3)

The high speed system controls the fuel mixture at part throttle speeds and at wide open throttle. This system consists of a venturi, controlling the maximum volume of air admitted into the engine; the main jet, which regulates the flow of fuel from the float chamber to the main discharge jet; the well vent, which maintains uniform mixture ratio under changing suction and engine speeds; and a main discharge jet, which delivers the fuel into the air stream.

The main jet controls the fuel delivery during the part throttle range from about one-quarter to full throttle opening. A main jet adjustment permits a limited control of the main jet fuel. Ordinarily an adjustment of 2-1/4 turns from its seat will give proper mixture. To maintain a proper mixture ration a small amount of air is admitted through the well vent into the discharge jet through the air bleed holes in the discharge jet at a point below the level of fuel in the metering well.

At high speeds the fuel flows from the fuel chamber

through the main jet and into the main discharge jet where it is mixed with air admitted by the well vent, and the air-fuel mixture is then discharged into the air stream of the carburetor.

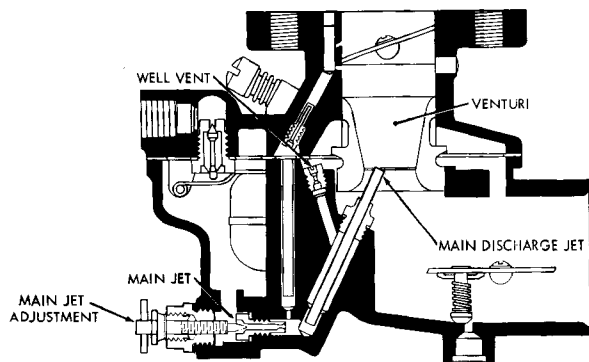


Figure 3

### CHOKE SYSTEM (See Fig. 4)

The choke system consists of a valve mounted on a shaft located in the air entrance and operated externally by a lever mounted on the shaft. The choke valve is used to restrict the air entering the carburetor. This increases the suction on the jets when starting the engine. The choke valve is of a "semi-Automatic" type, having a poppet valve incorporated in its design, which is controlled by a spring.

The poppet valve opens automatically when the engine starts and admits air to avoid over-choking or flooding of the engine. The mixture required for starting is considerably richer than that needed to develop power at normal temperatures. As the engine fires and speed and suction are increased, the mixture ratio must be rapidly reduced. This change is accomplished through adjustment of the choke valve and the automatic opening of the poppet valve to admit more air when the engine fires.

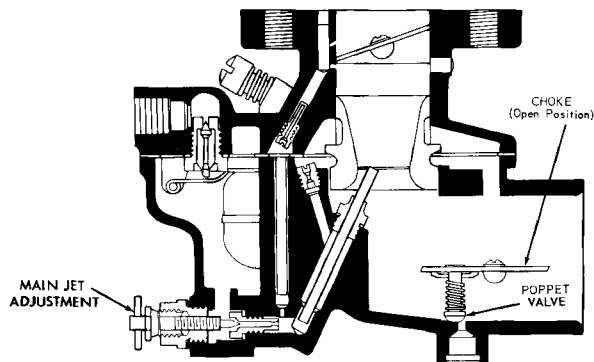


Figure 4

### SERVICE AND REPAIR PROCEDURE

#### A. 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.

#### B. SELECTION OF TOOLS AND REPAIR PARTS KIT

- (a) The use of the proper Zenith tools and the proper repair kit is essential if the best service and repair procedure is to be performed on the carburetor.

##### (b) Zenith Special Tools

C-161-83	Main Jet Wrench
C-161-10	Plug Wrench
C-161-9	Main Discharge Wrench
C-161-82	Fuel Valve Seat Wrench
C-161-25	Shaft Nut Tool
C-161-72-1	Bushing Driver

- (c) Repair Kit, part number K12108 is required to repair carburetor assembly 12108.

#### C. SEPARATE CARBURETOR BODIES

- (a) Remove the four assembly screws (25) using a screwdriver.
- (b) Separate the throttle body (6) from the fuel bowl assembly (20).

#### D. DISASSEMBLE THROTTLE BODY

- (a) Remove float axle as follows:
  - (1) Press screwdriver against float axle (15) at slotted side of float hinge bracket and force through hinge bracket.
  - (2) Remove float axle (15) completely with fingers from opposite side and remove float (16).
- (b) Remove fuel valve needle (18).
- (c) Remove the assembly gasket (19).
- (d) Remove the venturi (45).
- (e) Remove the fuel valve seat (18) and fibre washer (17) using Zenith Tool No. C161-82.
- (f) Remove the idle jet (14) using a small screwdriver.
- (g) Remove the idle adjusting needle (5) and friction spring (4).
- (h) Remove the throttle plate (3), screws (2), shaft and stop lever assembly (13), as follows:
  - (1) Unscrew throttle stop screw (12) until

threaded end is flush with lever (11)

- (2) Make match marks with file on throttle body (6) and all levers to act as a guide to assemble these parts in the same position as removed.
- (3) File off the riveted or peened end of the throttle plate screws (2).

NOTE: When such screws are riveted or peened the threaded end of the two screws must be filed flat before removal to avoid breakage or stripping of threads in the shaft. In some cases it may be necessary to use a small (1/4") round file and cut slightly below the surface of the shaft because of a slight counter bore around the screw hole.

BE SURE TO AVOID STRIKING AND CUTTING THE SIDE OF THE THROTTLE BODY BORE OR THE THROTTLE PLATE WHEN FILING THE SCREWS.

- (4) Remove the screws (2) and pull out the throttle plate (3).
  - (5) Remove the throttle shaft and stop lever assembly (3).
- (I) Remove the throttle shaft packing (8) and packing retainer (9) from the throttle body shaft as follows:
- (1) Screw a 5/16" fine thread taper tap into packing retainer (9) until it is firmly seated.
  - (2) Insert long punch or rod through opposite shaft hole and drive punch against the end of the tap until retainer (9) is free of the body. (Repeat operation for other packing and retainer.)

NOTE: Do not disassemble the throttle plate, (3), throttle shaft and stop lever assembly (13), throttle packing (8), and packing retainer (9) from the throttle body (6) unless the throttle shaft is bent or otherwise damaged or unless there is damage to any of the other component parts of the throttle assembly.

#### E. DISASSEMBLE FUEL BOWL BODY

- (a) Remove the main jet adjusting needle assembly (21) and fibre washer (22) using a 1/2" wrench.
- (b) Remove the drain plug (hex) (26) from bottom of fuel bowl (20), using Zenith Tool No. C-161-10.
- (c) Remove main jet (23) and fibre washer (24) with Zenith Tool No. C161-83.
- (d) Remove main discharge jet (43) and fibre washer (42) from center of large opening in ma-

chined surface of the fuel bowl (20) with Zenith Tool No. C161-9.

- (e) Remove well vent jet (44) from center of large opening in machined surface of the fuel bowl (20) with a small screwdriver.
- (f) Disassemble choke as follows:

- (1) Make match marks with a file on air intake body (20) and lever (31) to act as a guide to reassemble these parts in same position as removed.
- (2) Remove the choke shaft thrust washer (49) and taper pin (41).
- (3) Remove the choke plate screws (40) and remove the choke shaft (31) and choke plate (39).

NOTE: This carburetor employs choke shaft packing washers (37) and packing washer retainers (27) in the choke shaft holes around the choke shaft. The disassembly of these packing washers and retainers should be performed in the same manner as the disassembly of the throttle shaft packing washers and retainers which is described in detail in the disassembly of the throttle body.

NOTE: DO NOT DISASSEMBLE THE CHOKE LEVER AND SHAFT (31) AND PLATE (39) UNLESS THERE IS DAMAGE TO ANY ONE OF THE ABOVE MENTIONED PARTS OR DAMAGE TO ANY OF THE OTHER COMPONENT PARTS OF THE CHOKE ASSEMBLY.

#### Cleaning and Inspection of Parts

##### A. CLEANING PARTS

- (a) Clean all metal parts thoroughly with cleaning solution and rinse in solvent.
- (b) Blow out all passages in the air intake and fuel bowl casting (20) and throttle body (6).

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

##### B. INSPECTION OF PARTS

- (a) Float Assembly. Replace float assembly (16) if loaded with gasoline, damaged, or if float axle bearing is worn excessively. Inspect top side of float lever for wear where it contacts fuel valve needle.

NOTE: Such wear can affect the float level.

- (b) Float Axle. Replace if any wear can be visually detected on the bearing surface.
- (c) Fuel Valve Seat and Needle Assembly. Always replace fuel valve seat and needle (18) because both parts wear and may cause improper float level.
- (d) Idling Adjustment Needle and Spring. Inspect point of needle (5). This must be smooth and free of ridges.
- (e) Throttle Plate. Inspect plate (3) for burrs or damaged edges. Never clean a throttle plate with a buffing wheel or sharp instrument.
- (f) Choke Plate (39). Inspect for bends, burrs or damaged edges.
- (g) Choke Shaft. Check bearing surfaces for wear; see that shaft (31) is straight.
- (h) Gaskets: Replace all gaskets and fibre washers every time the carburetor is disassembled.
- (i) Throttle Shaft. Replace if throttle shaft (48) shows evidence of wear on the bearing surfaces.

#### REASSEMBLY

##### A. FUEL BOWL BODY

###### (a) Choke Assembly

- (1) Install the choke shaft packing (37) and retainers (27) in fuel bowl body (20) as follows. Use bushing driver tool Zenith C161-72-1.
- (2) Assemble packing (37) and retainer (27) and place completed assembly on bushing driver tool with packing facing small end of tool.
- (3) Insert small end of tool into choke shaft hole, start retainer (27) into counter bore in body (20) and lightly drive retainer (27) into body (20) until it is flush with machined surface.
- (4) Insert choke shaft and lever (31) into air intake (20).
- (5) Insert choke plate (39) into air intake (20).

NOTE: Be sure the choke plate (39) is located in the same position in the air intake (20) as regards the poppet valve as when it was disassembled.

- (6) Install choke plate screws (40) using a

small screwdriver.

- (7) Install the choke shaft thrust washer (49) and taper pin (41).

NOTE: Use the "Match Marks" put on the choke lever (31) and air intake body (20) during disassembly to properly align the choke assembly during reassembly.

- (b) Install main discharge jet (43) and fibre washer (42) in fuel bowl (20) and tighten firmly with Zenith Tool No. C161-9.
- (c) Install well vent jet (44) in fuel bowl (20) and tighten with a small screwdriver.
- (d) Install main jet (23) and fibre washer (24) using Zenith Tool No. C161-83.
- (e) Install the drain plug (hex) in threaded passage bottom of fuel bowl using Zenith Tool C161-10 Wrench.
- (f) Install main jet adjustment (21) seat lightly and back out 2-1/4 turns.

##### B. THROTTLE BODY

- (a) Install the two new throttle shaft packings (8) and retainers (9) in throttle body (6) as follows. Use bushing driver tool Zenith C161-72-1.
- (1) Assemble packing (8) and retainer (9) and place completed assembly on bushing driver tool with packing facing small end of tool.
- (2) Insert small end of tool into throttle shaft hole, start retainer (9) into counter-bore in body (6) and lightly drive retainer (9) into body (6) until it is flush with machined surface.

NOTE: The packing retainer (9) must be flush with machined surface or slightly below to avoid striking throttle lever (11).

- (b) Install the throttle shaft and stop lever assembly (13), throttle plate (3), screws (2) as follows:
  - (1) Insert the throttle shaft and stop lever assembly (13) in throttle body (6).
  - (2) Rotate throttle shaft (48) to wide open position, insert throttle plate (3) and rotate to closed position holding the plate in position with fingers.
  - (3) Start throttle plate screws (2) and tighten with small screwdriver, being sure that the throttle plate (3) is properly centered in the throttle body bore.

NOTE: The screw holes in the throttle plate are off center. Start the side of the throttle plate with the shortest distance between the screw holes and beveled edge into the shaft first. The throttle plates are made with two opposite edges beveled to fit the throttle body bore when the plate is closed. The throttle plate will not close tightly if installed upside down. To properly center the plate in the throttle body bore, the screws should be started in the shaft and then with the plate closed, it should be tapped on the mounting flange side. Pressure on the plate must be maintained with the finger until the screws are tightened. When properly installed, the side of the throttle plate farthest away from the mounting flange will be aligned with the idle discharge holes when the plate is closed.

- (c) Install idle adjusting needle (5) and friction spring (4) in threaded passage on side of throttle body. Seat lightly with screwdriver and back out one full turn.
- (d) Install idle jet (4).
- (e) Install fuel valve seat (18) and fibre washer (17) using Zenith Tool No. C161-82.
- (f) Place new throttle body to fuel bowl gasket (19) on machined surface of fuel bowl cover (6), making sure venturi flange is set in throttle body recess below gasket.
- (g) Install fuel valve needle (18) in seat (18) followed by float (16) and float axle (15).

SEE FIG. 5 The "A" dimension should be  $1 \frac{5}{32}$ " plus or minus  $\frac{3}{64}$ ".

- (h) Float Level. Check position of float assembly for correct measurement to obtain proper float level using depth gauge.

NOTE: Do not bend, twist or apply pressure on the float bodies.

- (1) With bowl cover assembly (6) in an inverted position, viewed from free end of float (16) the float bodies must be centered and at right angles to the machined surfaces. The float setting is measured from the machined surface (no gasket) of cover to top side of float bodies at highest point.
- (2) Bending Float Lever. To increase or decrease distance between float body and machined surface use long nosed pliers and bend lever close to float body.

NOTE: Replace with new float if position is off more than  $\frac{1}{16}$ ".

- (i) Insert venturi (45) in throttle body bore, large opening first. Making sure venturi flange is set in throttle body recess below assembly gasket.

#### C. ASSEMBLE CARBURETOR BODIES

- (a) Assemble the two completed bodies (6 and 20) and four screws (25) and tighten screws evenly and firmly.
- (b) Hold the throttle lever (11) in a closed position and turn the throttle stop screw (12) in until it just contacts the stop on body (6), then turn screw (12) in  $1\frac{1}{2}$  additional turns.

## GRAVELY TRACTORS

A DIVISION OF STUDEBAKER-PACKARD CORPORATION  
DUNBAR, WEST VIRGINIA

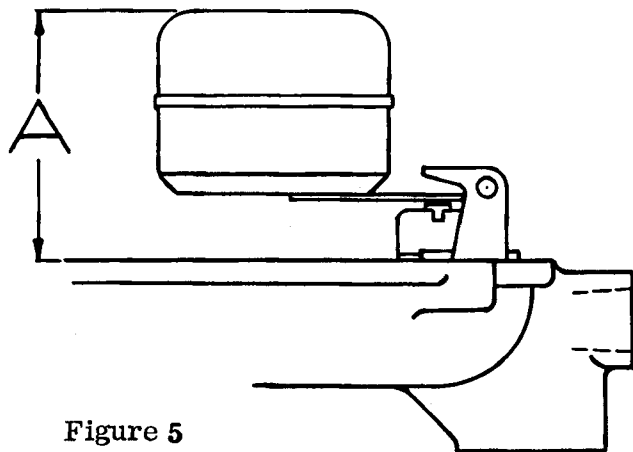


Figure 5