

# SECTION 9 FUEL AND EXHAUST SYSTEM

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## REGULAR CORVAIR ENGINE

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## GENERAL DESCRIPTION

The 1962 and 1963 Corvair engine uses two identical Rochester Model "H" automatic choke, single barrel down draft carburetors (figs. 9-1 to 9-4), one located on each intake manifold, separated from the manifold

by an insulator block.

The automatic choke mechanism consists of: a thermostatic control coil mounted to the lower side of the cylinder head (fig. 9-5), linked directly to the carburetor choke valve shaft; a vacuum diaphragm mounted on the air horn.

The gas tank, fuel lines, fuel pump and exhaust system, and muffler are serviced the same as in 1961.

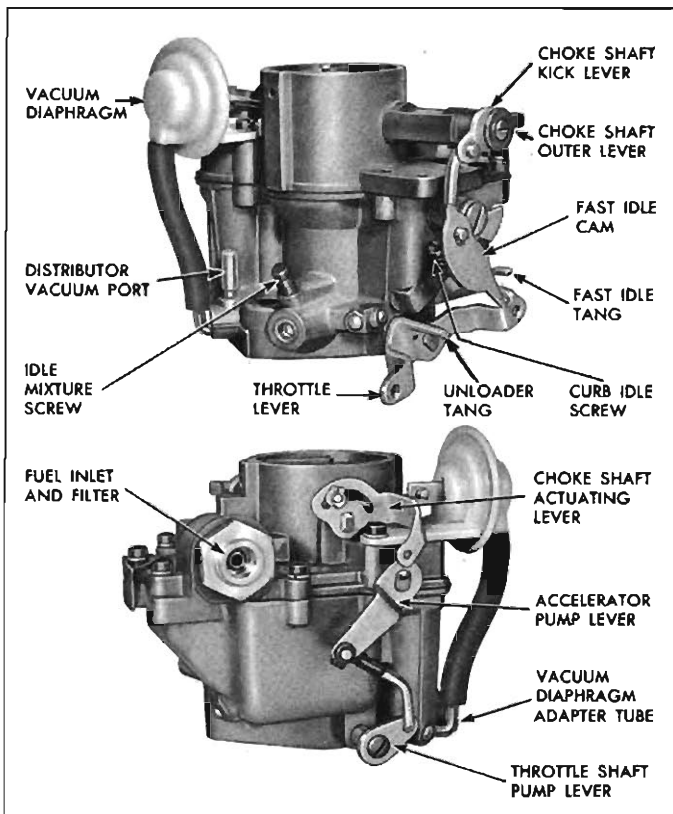


Fig. 9-1—Rochester Model "H" Automatic Choke Carburetor

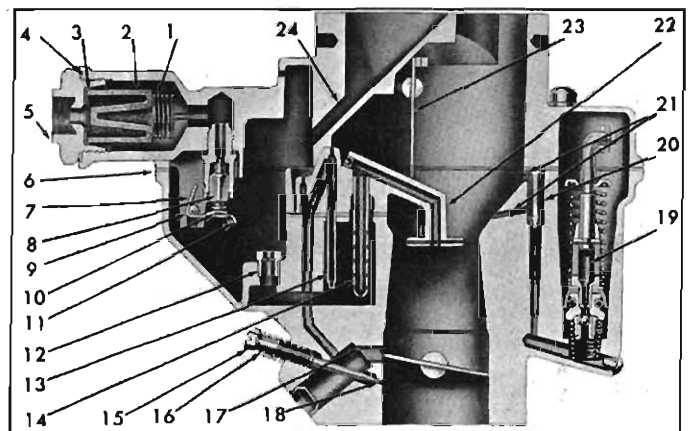


Fig. 9-2—Carburetor Schematic Cross-Section

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1. Filter Spring               | 14. Main Well Tube                |
| 2. Filter                      | 15. Idle Mixture Adjusting Screw  |
| 3. Filter Gasket               | 16. Idle Mixture Adjusting Spring |
| 4. Inlet Nut Gasket            | 17. Secondary Idle Port           |
| 5. Inlet Nut                   | 18. Primary Idle Port             |
| 6. Float Seal Gasket           | 19. Accelerator Pump              |
| 7. Float Drop Adjusting Tang   | 20. Pump Discharge Valve          |
| 8. Float Needle                | 21. Pump Discharge Ports          |
| 9. Float Hinge Pin             | 22. Venturi Cluster               |
| 10. Float Level Adjusting Tang | 23. Choke Valve                   |
| 11. Float Hanger Arm           | 24. Bowl Internal Vent            |
| 12. Main Metering Jet          |                                   |
| 13. Idle Tube                  |                                   |

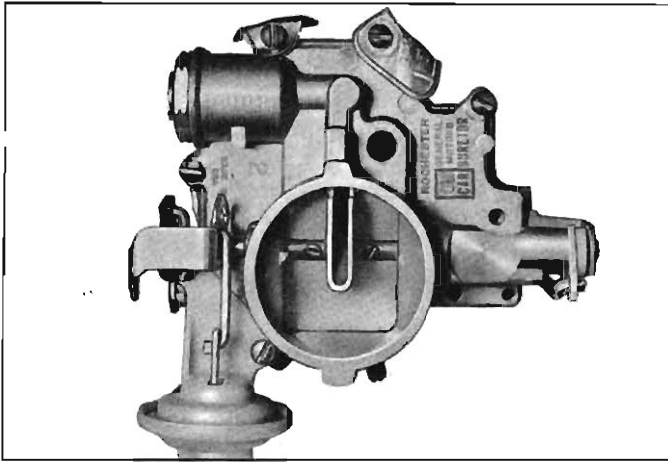


Fig. 9-3—Carburetor—Top View

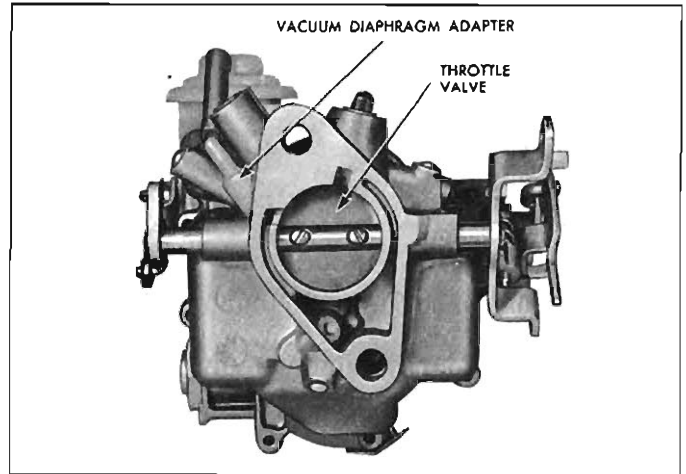


Fig. 9-4—Carburetor—Bottom View

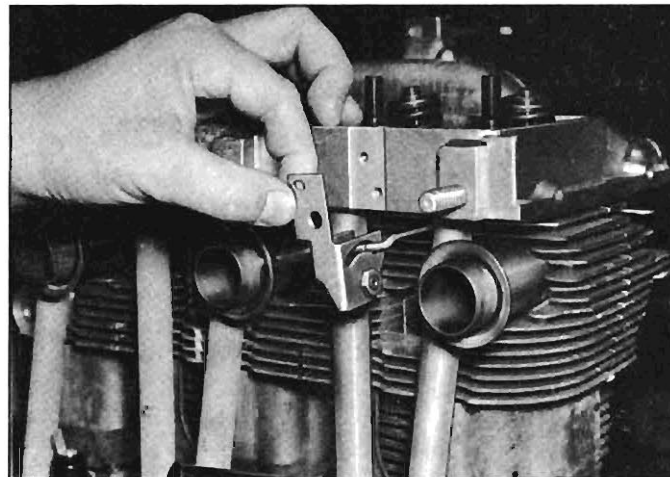


Fig. 9-5—Choke Thermostat Mounting

## MAINTENANCE AND ADJUSTMENTS

### CARBURETOR SYNCHRONIZATION

(Refer to Section 7—Tune-up)

### FAST IDLE CAM CLEARANCE

(Refer to Fig. 9-6)

**NOTE:** This adjustment must be made after curb idle speed has been set on the car.

- Stop engine.
- With throttle lever on second highest step of fast idle cam, bend tang to obtain .078" clearance between idle speed screw and throttle lever.
- Start engine and recheck speed as above.

### VACUUM DIAPHRAGM ADJUSTMENT (Refer to Figure 9-7)

- a. Hold vacuum diaphragm arm in against diaphragm.

- b. Measure clearance between lower edge of choke valve and wall of air horn. Clearance should be .160"-.175".

- c. If necessary to adjust, bend diaphragm link.

- d. At this setting, throttle lever fast idle tang should rest on second highest step of fast idle cam. If not, adjust by bending outer choke shaft lever tang (fig. 9-7 insert).

### CHOKE ADJUSTMENT (Refer to Section 7—Tune-up)

### UNLOADER ADJUSTMENT (Refer to Figure 9-8)

Check unloader adjustment by holding throttle valve in wide open position and insert a .250" wire gauge between choke valve lower edge and wall of air horn. To adjust, if necessary, bend tang on throttle lever.

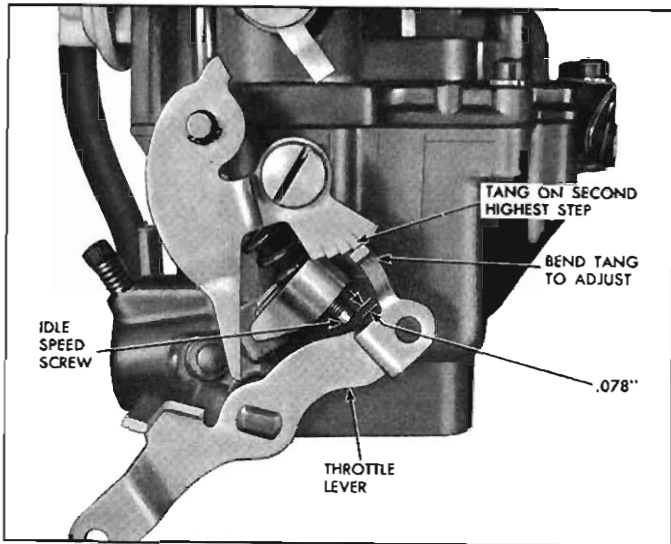


Fig. 9-6—Fast Idle Adjustment

**NOTE:** Unloader adjustment should be checked especially if it has been necessary to adjust the choke shaft outer lever tang during choke diaphragm link check.

**PUMP ROD ADJUSTMENT**

1. Back off curb and fast idle screws until throttle valve is completely closed.
2. Holding throttle valves closed, check to see that the scribe mark on the accelerator pump lever is aligned with the raised cast tang (front edge) on the bowl cover shown in Figure 9-9.

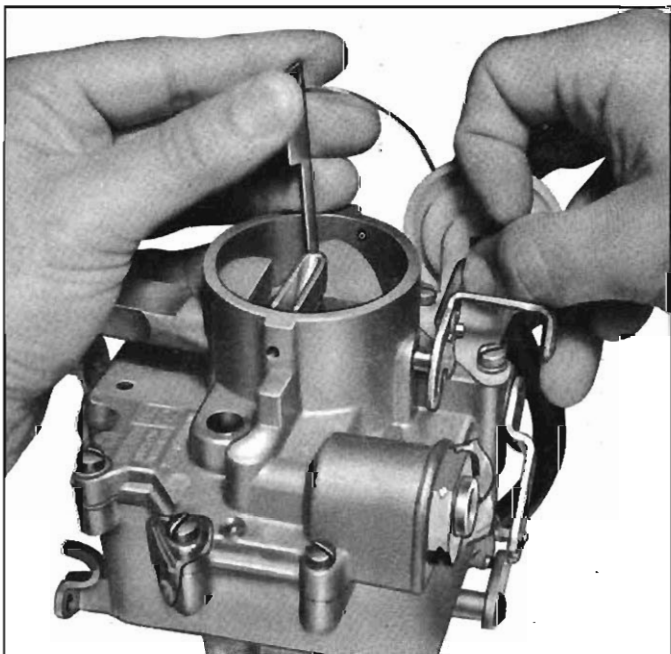


Fig. 9-7—Vacuum Diaphragm Adjustment

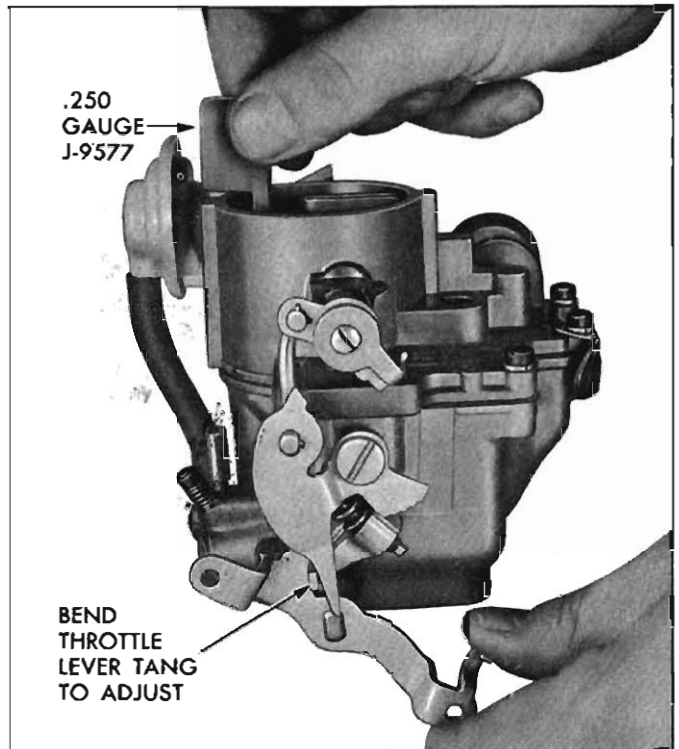


Fig. 9-8—Unloader Adjustment

3. The accelerator pump rod may be carefully bent, using a carburetor rod bending tool, such as Tool J-4552, to obtain the correct adjustment.
4. Refer to Carburetor Synchronization and re-adjust carburetors.

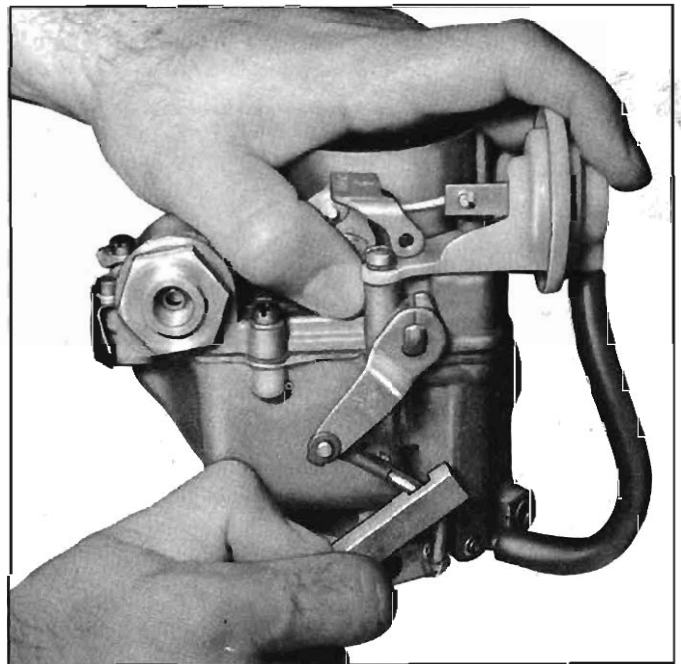


Fig. 9-9—Adjusting Pump Rod

### FLOAT LEVEL AND DROP ADJUSTMENTS

1. Remove bowl cover with gasket from carburetor as described under "Service Operations."
2. Invert the cover on a flat surface. Place float level tool in chain gauge set J-9577 over float as shown in Figure 9-10.
3. Bend tang located just above the float needle until each float just touches the top of the gauge. Move gauge fore and aft to check that the floats are parallel within  $\frac{1}{32}$  to the bowl cover. Carefully bend float arms horizontally until floats are centered between the gauge legs. Tilt the assembly each way to check that the floats do not touch or

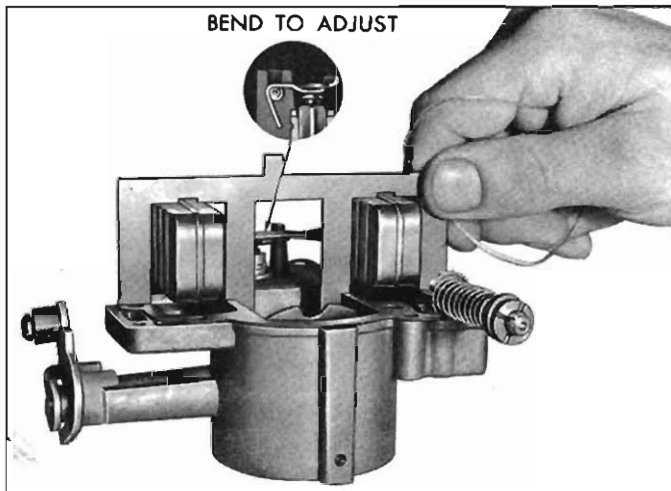


Fig. 9-10—Checking Float Level

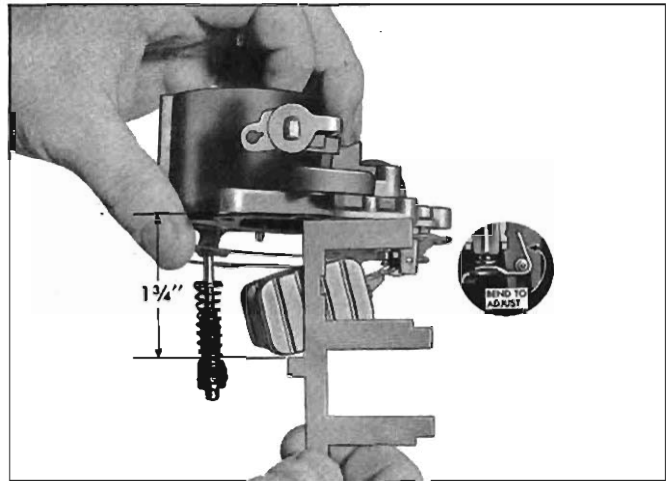


Fig. 9-11—Checking Float Drop

rub gauge legs. Recheck float level if alignment is necessary. The float level dimension (top of float to gasket) should be  $1\frac{3}{4}$  if measured without the gauge.

4. Hold bowl cover in an upright position and measure the distance from the gasket to the bottom of the float, as shown in Figure 9-11. Tool J-9577 includes a tab with which to make this check. This dimension should be  $1\frac{3}{4}$ ". Bend the tang at the end of the float hinge arm to obtain the correct drop, recheck setting after this adjustment.
5. Install the bowl cover outlined under "Service Operations."
6. Synchronize and readjust carburetors.

## SERVICE OPERATIONS

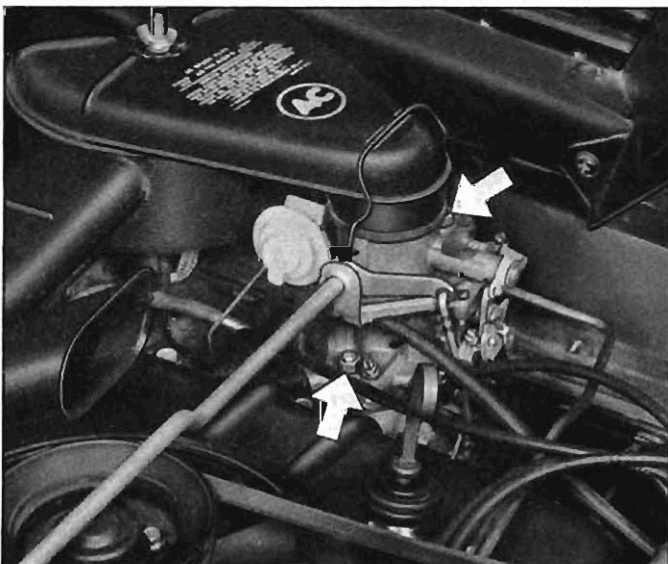


Fig. 9-12—Removing Carburetor

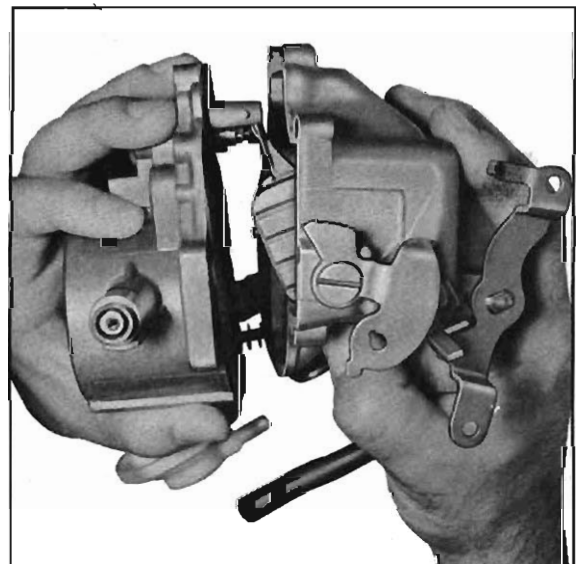


Fig. 9-13—Removing Bowl Cover

The following procedures may be used for both carburetors.

### CARBURETOR ASSEMBLY

#### Removal from Engine

1. Remove wing nut attaching each air cleaner to each air cleaner support. Release air cleaner holding clamp and remove air cleaner assemblies.
2. Disconnect choke control rod at each carburetor choke shaft lever.
3. Disconnect accelerator return spring and accelerator rod. Remove carburetor rods at cross-shaft.
4. Remove all cross-shaft retainer screws and remove cross-shaft assembly.
5. Remove gas inlet line from carburetors.
6. Remove two nuts and washers attaching carburetor to intake manifold studs (fig. 9-12).
7. Remove vacuum advance hose from right carburetor.
8. Remove carburetor from the mounting studs.

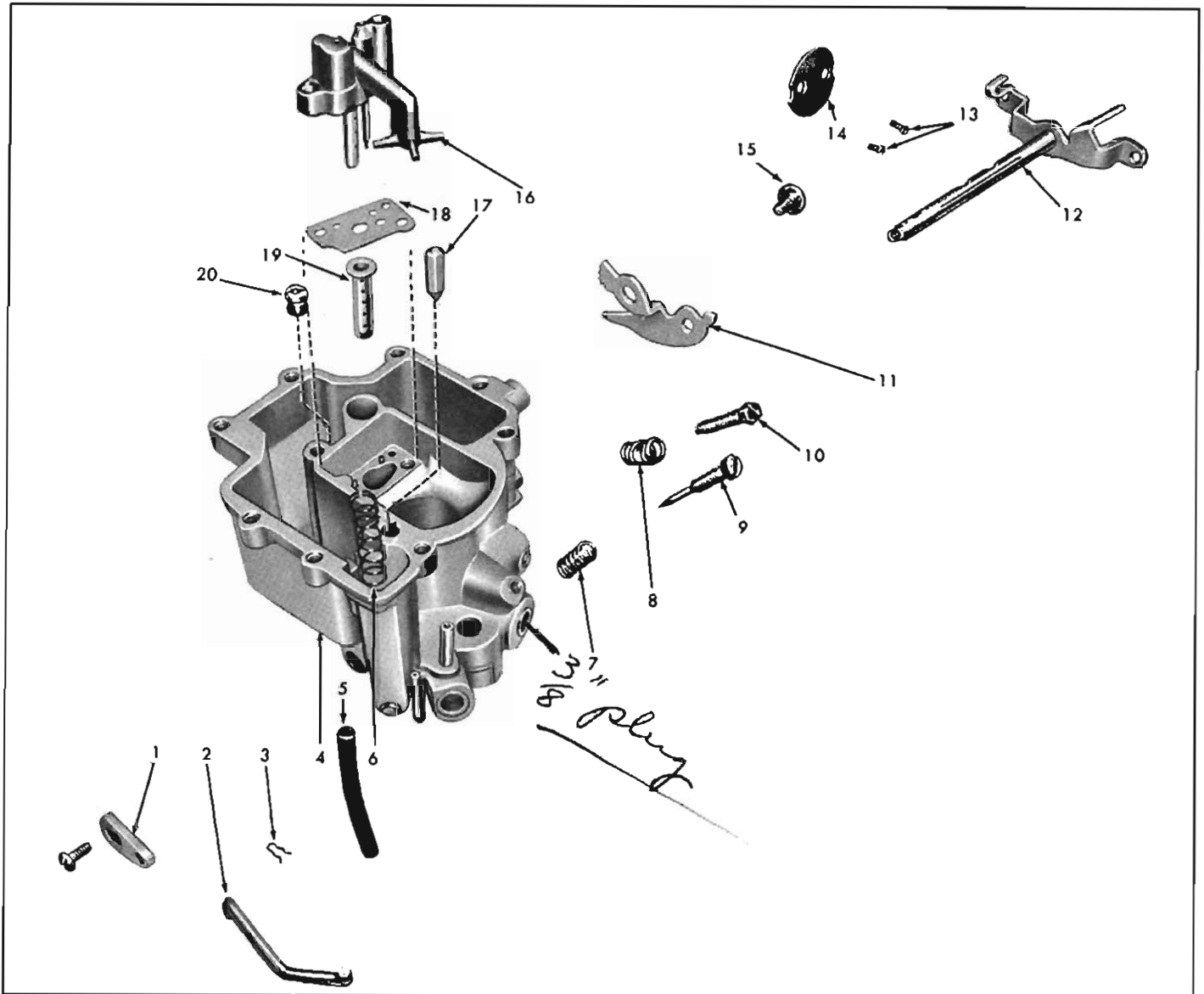


Fig. 9-14—Body—Exploded

- |  |                                     |                                  |
|--|-------------------------------------|----------------------------------|
| 1. Accelerator Actuating Pump Lever    | 8. Curb Idle Adjusting Screw Spring | 15. Fast Idle Cam Mounting Screw |
| 2. Pump Rod                            | 9. Idle Mixture Adjusting Screw     | 16. Venturi Cluster              |
| 3. Clip                                | 10. Curb Idle Adjusting Screw       | 17. Pump Discharge Needle        |
| 4. Float Bowl                          | 11. Fast Idle Cam                   | 18. Venturi Cluster Gasket       |
| 5. Diaphragm Hose                      | 12. Throttle Valve Lever and Shaft  | 19. Main Well Insert             |
| 6. Accelerator Pump Return Spring      | 13. Throttle Valve Retaining Screws | 20. Main Metering Jet            |
| 7. Idle Mixture Adjusting Screw Spring | 14. Throttle Valve                  |                                  |

**Disassembly**

(Refer to Figures 9-14 and 9-15)

1. Detach clip attaching pump rod to pump lever, remove clip and detach rod from pump lever.
2. Remove fuel inlet nut and gasket and remove filter element and spring.
3. Remove choke trip lever attaching screw and levers from choke shaft.
4. Remove remaining bowl cover attaching screws then remove cover assembly and gasket (fig. 9-13).
5. Remove vacuum diaphragm assembly by rotating assembly to align notch and free it from link.
6. Remove pin attaching floats to bowl cover assembly.
7. Lift out float needle (fig. 9-16). Check seat for dirt or corrosion.
8. If necessary, needle seat and gasket may be removed by using a large size screwdriver (fig. 9-17). It may then be cleaned or replaced as needed.
9. Accelerator pump may be removed if necessary. Remove "C" clip and pump. Remove shaft and lever, if desired, by removing clip, shaft and lever.
10. Remove the two screws and lockwashers attaching venturi cluster to the bowl assembly and lift out the cluster, gasket and main well insert, (fig. 9-18).
11. Remove the pump discharge valve.
12. Remove the idle mixture adjusting needle and spring. Remove main metering jet.
13. If necessary, remove two choke valve retaining screws and slide choke valve out of choke shaft.
14. Remove fast idle cam.
15. If necessary, invert carburetor bowl and remove throttle valve retaining screws (fig. 9-4) and remove throttle valve and shaft assembly.

**Cleaning and Inspection**

Dirt, gum, water or carbon contamination in the carburetor or on the exterior moving parts are often

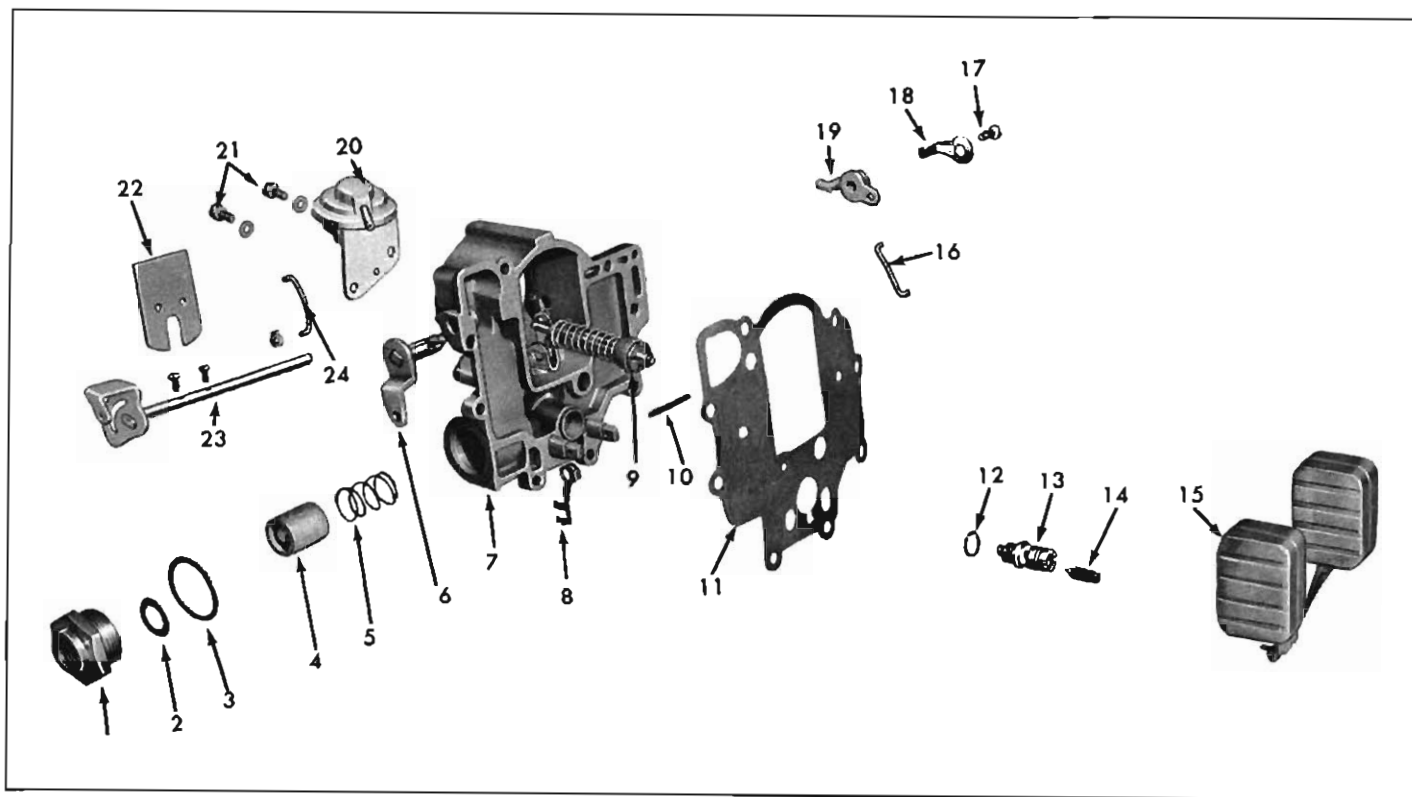


Fig. 9-15—Bowl Cover—Exploded

- |                                     |                        |                                    |
|-------------------------------------|------------------------|------------------------------------|
| 1. Inlet Nut                        | 9. Accelerator Pump    | 17. Choke Shaft Lever Screw        |
| 2. Fuel Filter Gasket               | 10. Float Pin          | 18. Choke Shaft Outer Lever        |
| 3. Inlet Nut Gasket                 | 11. Bowl Cover Gasket  | 19. Choke Shaft Kick Lever         |
| 4. Fuel Filter Element              | 12. Needle Seat Gasket | 20. Vacuum Diaphragm               |
| 5. Fuel Filter Spring               | 13. Needle Seat        | 21. Retainer Screws                |
| 6. Accelerator Pump Lever and Shaft | 14. Needle             | 22. Choke Valve                    |
| 7. Bowl Cover                       | 15. Float Assembly     | 23. Choke Shaft and Lever Assembly |
| 8. Clip                             | 16. Fast Idle Rod      | 24. Diaphragm Link                 |

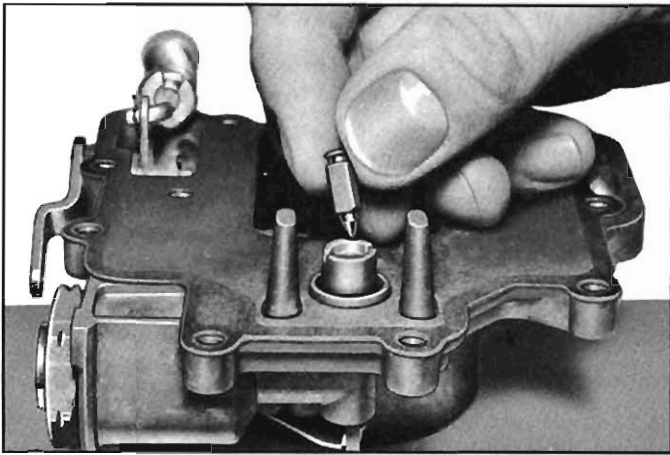


Fig. 9-16—Removing Float Needle

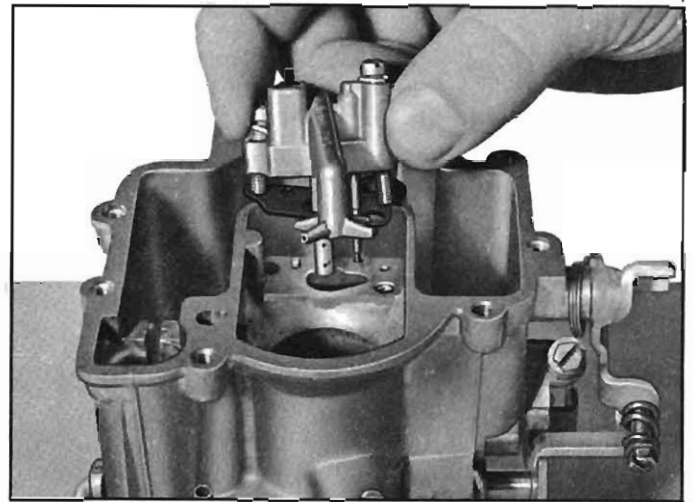


Fig. 9-18—Removing Venturi Cluster

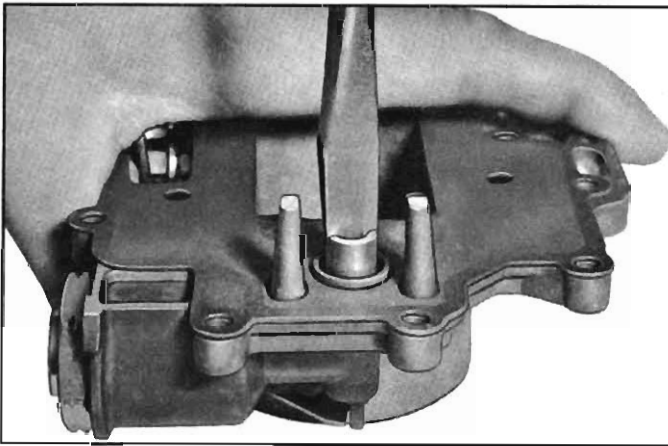


Fig. 9-17—Removing Needle Seat

responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Thoroughly clean carburetor castings and metal parts in clean cleaning solvent.

**CAUTION:** Pump plunger and gaskets should never be immersed in carburetor cleaner.

2. Blow out all passages in castings, dry with compressed air and blow out all parts until they are dry. Make sure all jets and passages are clean. Do not use wires or drills for cleaning fuel passages or air bleeds.
3. Check all parts for wear. If wear is noted, defective parts must be replaced.

**NOTE ESPECIALLY THE FOLLOWING:**

- A. Check float needle and seat for wear. If wear is noted the assembly must be replaced.
- B. Check float hinge pin for wear and float for dents or distortion. Check floats for fuel leaks by shaking.

- C. Check throttle shaft for wear and out-of-round in the throttle body section of the bowl casting.
- D. Inspect idle adjusting needles for burrs or grooves and misalignment. Such a condition requires replacement.
- E. Inspect pump plunger leather; replace pump if damaged or worn.
- F. Inspect pump well in fuel bowl for wear or being scored.
- G. Check that main well nozzle and idle tube is not bent. Should be exactly 90° from body.
- H. Check choke shaft for wear and choke valve for nicks.

4. Inspect gaskets to see if they appear hard or brittle or if the edges are torn or distorted. If any such condition is noted they must be replaced.
5. Check filter element for dirt or lint. Clean and if it is distorted or remains plugged, replace.
6. If for any reason parts have become loose or damaged in the cluster casting, it must be replaced.

### Assembly

1. Install throttle shaft and throttle valve, if removed, with two screws, carefully center and seat valve in shaft end bore. See Figure 9-4.
2. Install venturi cluster and gasket in bowl assembly, and install the two screws and lockwashers.
3. If accelerator pump has been removed, replace pump assembly and install "C" clip.

**NOTE:** Be sure that the pump return spring is in place in bowl assembly.

4. Install pump discharge needle (fig. 9-19).
5. Install choke valve, choke kick lever and outer lever cam. Retain choke valve with two screws.



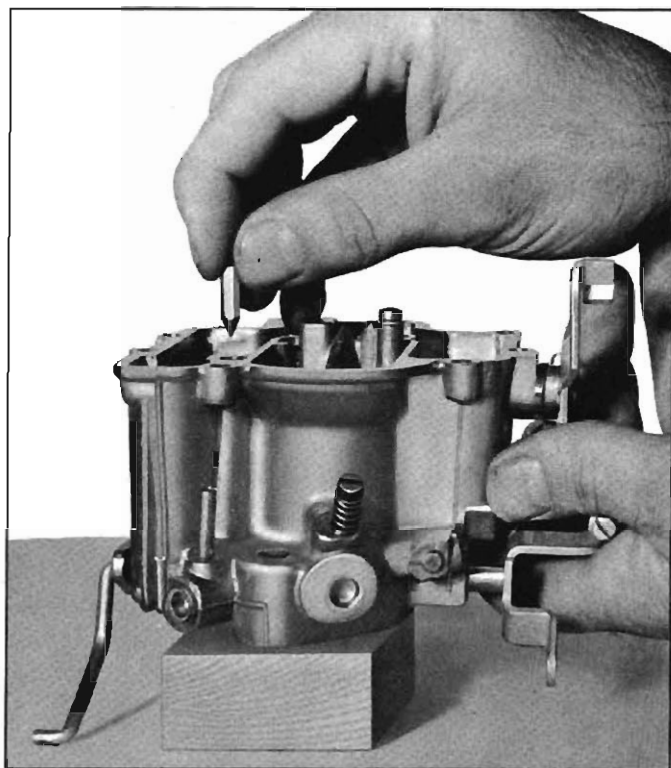


Fig. 9-19—Installing Pump Discharge Needle

(Choke shaft assembly should rotate freely without binds).

6. Install float needle seat if previously removed from bowl cover.
7. Carefully replace float needle.
8. Install a new gasket and replace float and pin (fig. 9-20). Check float level and float drop with Tool J-9577 (figures 9-10 and 9-11).
9. Carefully place bowl cover assembly and new gasket on bowl assembly and install the six screws and lockwashers in original positions.

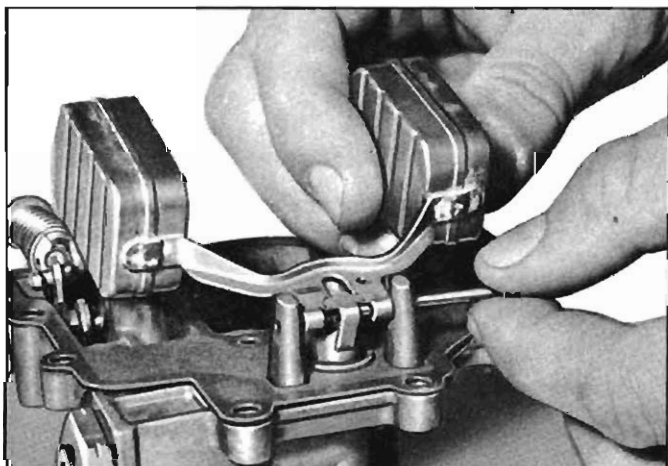


Fig. 9-20—Replacing Floats

10. Replace filter return spring, filter gasket, gasket and inlet nut.
11. Install pump rod in pump lever and retain with clip.

Refer to pages 4-5, and 6 and perform the following:

- Pump rod adjustment (fig. 9-9).
- Vacuum break adjustment (fig. 9-7).
- Unloader adjustment (fig. 9-8).
- Fast idle cam clearance adjustment (fig. 9-6).

### Installation on Engine

1. Install insulator block in place, install carburetor on intake manifold studs. Install two attaching nuts and washers and tighten evenly (fig. 9-12). On right carburetor, replace vacuum advance line with other end to distributor advance. On the left carburetor, the vacuum port tube is capped with a plastic cap.
2. Replace cross-shaft lever support and install three hex head attaching screws at each carburetor.
3. Replace gas inlet lines.
4. Replace accelerator rod and return spring. Connect throttle rods to cross-shaft.
5. Install choke control rod to each carburetor. Adjust as outlined under "Choke Adjustment." (See Tune-up.)
6. Check carburetors for "Carburetor Synchronization." (See Tune-up.)
7. Clean air cleaner elements if necessary.
8. Install air cleaners, gaskets and connector (oval air intake tube) between each air cleaner. Install wing nut retainers.

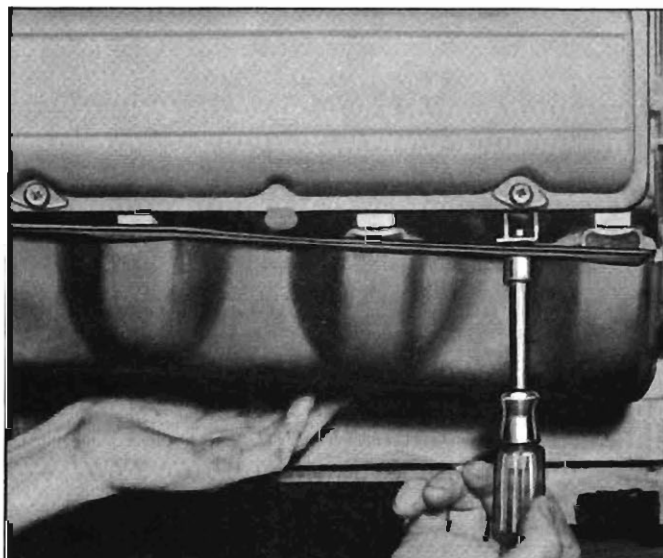


Fig. 9-21—Installing Choke Thermostat



**CHOKE THERMOSTAT ASSEMBLY REPLACEMENT (Refer to Figures 9-5 and 9-12)**

1. Remove engine lower shroud.
2. Remove thermostat bracket drive screw (using a chisel), and slide thermostat and bracket from lower control rod.
3. File the rest of drive screw level with machined surface on head.
4. Install thermostat and bracket over end of control rod.
5. Place lower shroud in position and start three screws into the block side of shroud letting the outer side hang.
6. Hold outer edge of shroud near installation position; place a screw through shroud and thermostat bracket, and start it into cylinder head while guiding thermostat into place.
7. Complete installation of lower shroud.
8. Perform choke rod adjustment.

**TROUBLE SHOOTING CHART**

**(MODEL "H" CARBURETOR)**

**ALWAYS CHECK FIRST:**  
Heat Insulator, Carburetor Mounting Nuts, Compression, Ignition System.

COMPLAINT									CHECK POINTS*	WHAT TO LOOK FOR	
FLOODING	ROUGH IDLE	ECONOMY	HESITATION	ACCELERATION FLATNESS	SURGE	LOW TOP SPEED OR POWER	COLD OPERATION	STALLING			HARD HOT STARTING
	1	★		★			★	1	★	IDLE ADJUSTMENT	Correct speed and mixture
	2	2		★		1	1	2		CARBURETOR SYNCHRONIZATION	Improper linkage adjustments Air leakage at vacuum hoses
2		3		★	3	2		4	1	FLOAT ADJUSTMENT	Use correct gauge
			1	★			★			PUMP ROD ADJUSTMENT	Use correct dimension, throttle valves closed
	★	★							★	EXTERNAL VENT	Dirty or plugged (must be open)
		★				4	2	★	★	CHOKE ADJ.	Choke valve not opening or not closing fully
							3	★		FAST IDLE ADJUSTMENT	Improper clearance
★	★	★								CHOKE VALVE	Sticking choke valve—binding control rod inoperative choke thermostat
		4		2	1	3	★			METERING JET	Loose, plugged, incorrect part
1	★	★							2	NEEDLE & SEAT	Worn, damaged, dirty, incorrect part
	★	★	5	3	2	★		3		VENTURI CLUSTER	Dirty, loose screws, incorrect part
3		★			★			★	★	FLOAT	Bent, leaky
	4							★		IDLE NEEDLE	Worn, damaged
	5		★	★		★	★	★		THROTTLE VALVES	Sticking open or closed, damaged
4	★	★	★	★	★	★	★	★	★	GASKETS	Improper seal, hard or brittle material, loose screws
	3							★	★	IDLE PASSAGES	Dirty
	★	★								PUMP BODY	Crack or loose fit on plunger shaft
			3				★			PUMP PLUNGER	Hard or worn leather, distorted spring, stuck vent ball check
★										FUEL FILTER	Clogged or dirty
			4				★			PUMP INLET CHECK	Out-of-round, damaged seat, stuck
	★		★				★	★	★	PUMP DISCHARGE NEEDLE	Out-of-round, damaged seat, stuck needle
		1					4		3	DRIVER	Driving habits, correct procedures
			2	1						PUMP DISCHARGE JETS (4)	Dirt, must be open

\*Numbers under each complaint heading indicate probable order of trouble.  
★Star indicates other possible troubles.

## SPECIAL TOOLS

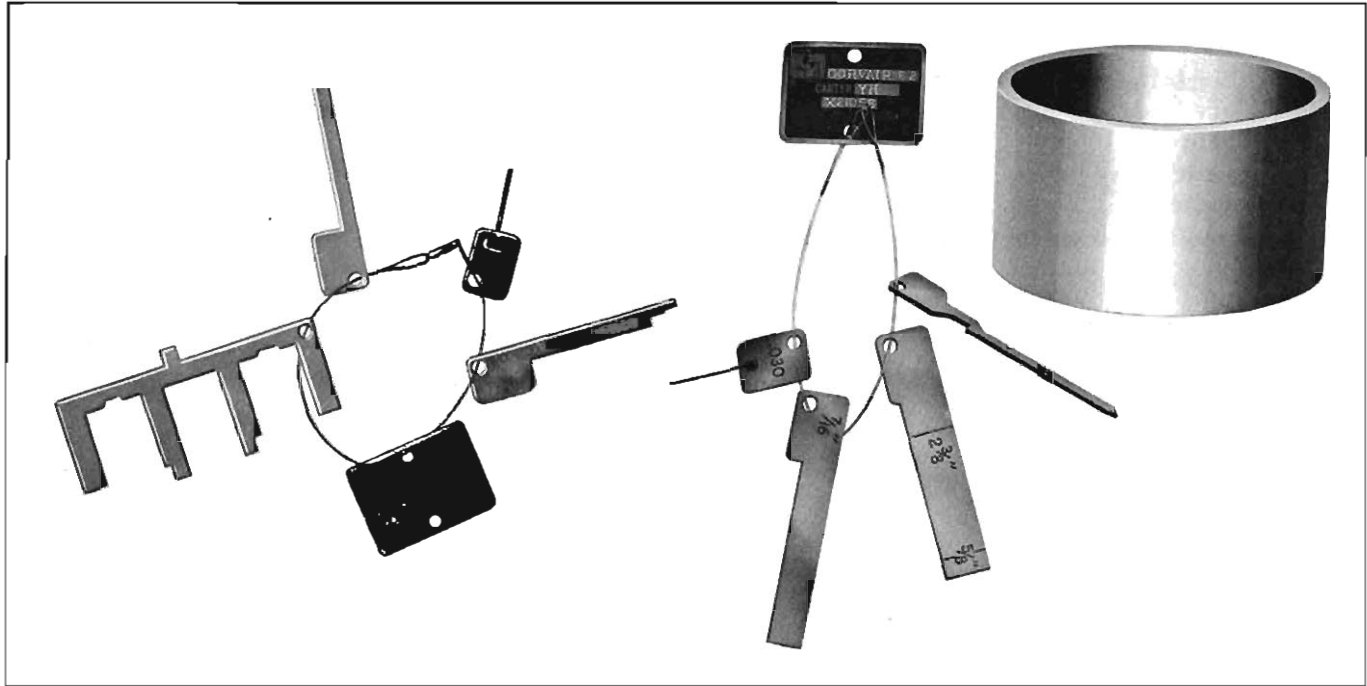


Fig. 9-22—Special Tools

J-9577—Carburetor Chain Gauge

J-21056—Carburetor Chain Gauge

J-21004—Supercharger Support

# TURBO-SUPERCHARGED ENGINE

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## GENERAL DESCRIPTION

### TURBO-SUPERCHARGER OPERATION

The supercharger on the Monza Spyder is an exhaust driven unit that forces air-fuel mixture into the intake manifold at higher-than-atmospheric pressure, thereby improving engine breathing and power output. It con-

sists of a precision balanced rotating group with a turbine wheel at one end and a centrifugal impeller at the other, each wheel enclosed in a contoured housing (fig. 9-1).

The hot exhaust gases are directed against the tur-

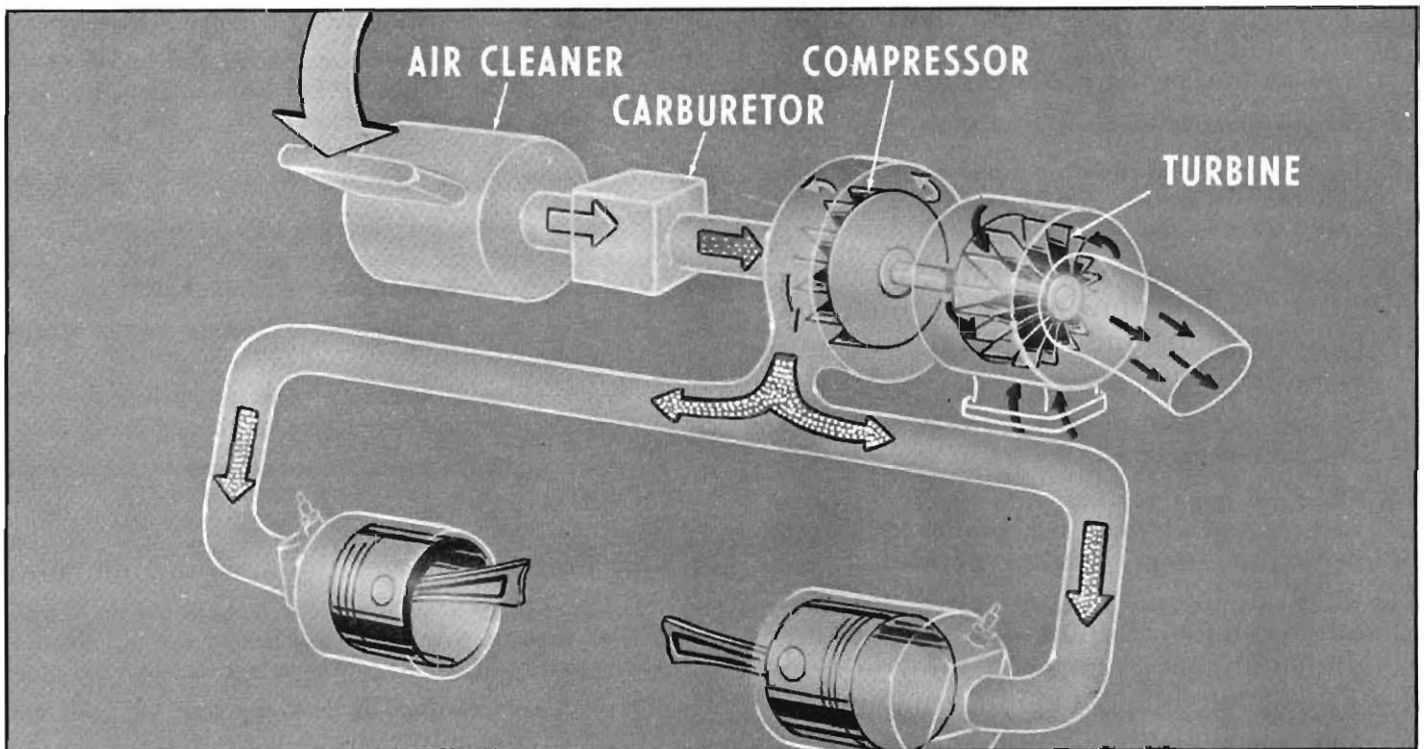


Fig. 9-23—Turbo-Supercharger Operational Schematic

bine wheel blades, spinning the wheel, shaft and impeller wheel at a high rate of speed. The impeller, in the compressor housing, draws air-fuel mixture from the carburetor and passes it to the intake manifold under a higher-than-atmospheric pressure. This increases the amount of air-fuel mixture available to the cylinder resulting in a greater horsepower output.

Under heavy load, the supercharger speed automat-

ically increases (due to increase in exhaust gases) providing more air-fuel mixture to meet the engine's demand.

The supercharger is provided with a semi-floating sleeve bearing which is lubricated with engine oil taken from the oil filter adapter and drained through a larger tube into the rocker arm area of the right cylinder head.

## MAINTENANCE AND ADJUSTMENTS

### ENGINE OIL

This engine is filled at the factory with a special break-in-oil which should be drained at 1000 miles. The oil recommendations and change interval are the same as regular Corvair engine after initial oil change.

### FUEL REQUIREMENT

A good quality premium fuel is required with this engine. A low grade gasoline may cause detonation and lead to engine damage.

### AIR CLEANER

The polyurethane element should be cleaned, inspected and reoiled at approximately 4000 mile intervals or more often in dusty or other adverse conditions.

#### Removal from Vehicle

1. Remove 2 mounting bracket-to-air cleaner bolts.
2. Loosen clamp at carburetor air horn.
3. Disconnect choke clean air tube hose at air cleaner and remove cleaner assembly from vehicle. Discard "O" ring seal.

#### Cleaning and Inspection (Fig. 9-24)

1. Remove wing nut from cleaner cover stud and remove cover.
2. Remove polyurethane element from cleaner body and remove screened support from element.
3. Check element for rips or tears and replace if necessary; check cover and body for holes or other damage and repair or replace as needed.
4. Clean the polyurethane element in kerosene or mineral spirits, then squeeze out the excess cleaner.

**CAUTION:** Do not use a hot degreaser or acetone type solvent.

5. Dip the element in engine oil and squeeze out ex-

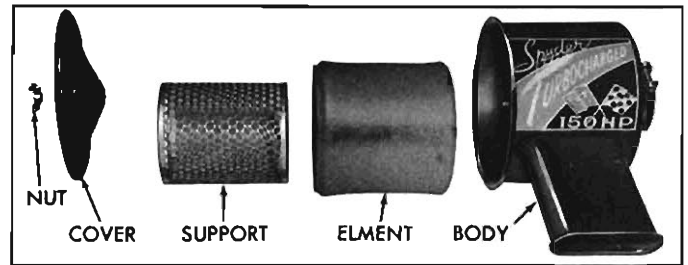


Fig. 9-24—Air Cleaner Assembly

cess oil, then wrap the element in a clean cloth and squeeze again to remove more oil.

**CAUTION:** Always **SQUEEZE** the element to remove excess cleaner or oil. **Wringing, swinging or shaking may rip or tear the polyurethane or shaking etc**

6. Clean the cleaner cover and body sections.
7. Install screened support in polyurethane element.
8. Place element into cleaner body and install cover and wing nut (be sure the element does not fold or bend causing a poor seal).

#### Install on Vehicle

1. Using a new carburetor-to-air cleaner "O" ring seal, install air cleaner over carburetor air horn and turn to approximate installed position.
2. Install support bracket-to-cleaner body screws loosely.
3. Hold cleaner assembly against carburetor and tighten clamp screw, then tighten support bolts.
4. Connect choke clean air tube hose to air cleaner adapter.

### FUEL FILTER

The fuel filter is a separate unit mounted on the air cleaner support bracket at the left of the air cleaner. It should be replaced at 10,000 mile intervals.

Replacement consists of disconnecting the inlet and outlet fuel lines, loosening clamp screw (fig. 9-25) and removing filter unit. Reverse to install new unit. (Arrows show flow direction.)

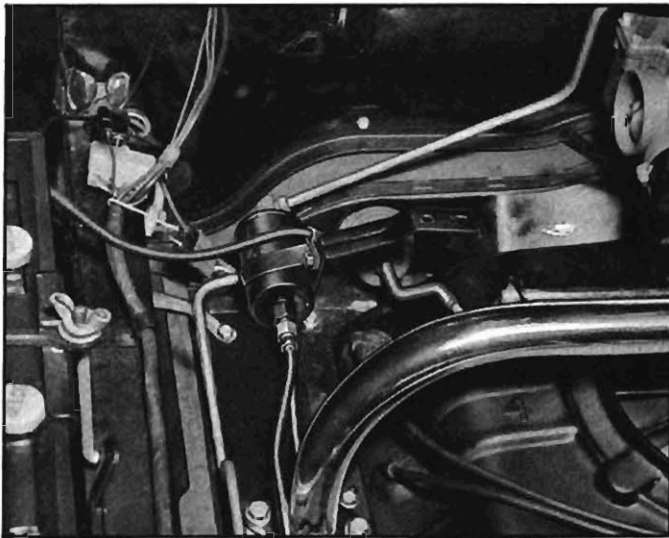


Fig. 9-25—Fuel Filter Installed

## CARBURETOR ADJUSTMENTS ON VEHICLE

### Accelerator Linkage Adjustment (Refer to Figure 9-26)

This adjustment must be performed with the engine at operating temperature or with air cleaner off to block choke valve open (engine stopped).

1. Disconnect accelerator rod swivel (3) from cross-shaft lever (4).
2. Check throttle lever to see that it is against idle speed screw, then check to see that linkage angle "X" is approximately 126° as shown in Figure 9-5. Adjust this angle by lengthening or shortening rod (1).
3. Pull accelerator rod (5) rearward against bell-crank stop on transmission and rotate lever (4) to full throttle position (throttle lever on carburetor will rest against stop boss on flange).
4. Adjust swivel (3) to just enter the hole in lever (4), then connect swivel to lever and install retaining clips.

**NOTE:** It is better for swivel pin to be just short of lever hole than just past, or linkage may be bent.

5. Move accelerator rod from idle to full throttle and check to see that the throttle lever on carburetor goes to full throttle and back to idle with no bind.

### Idle Speed and Mixture Adjustment

1. Start engine and bring to operating temperature.
2. Stop the engine and perform following preliminary adjustments:

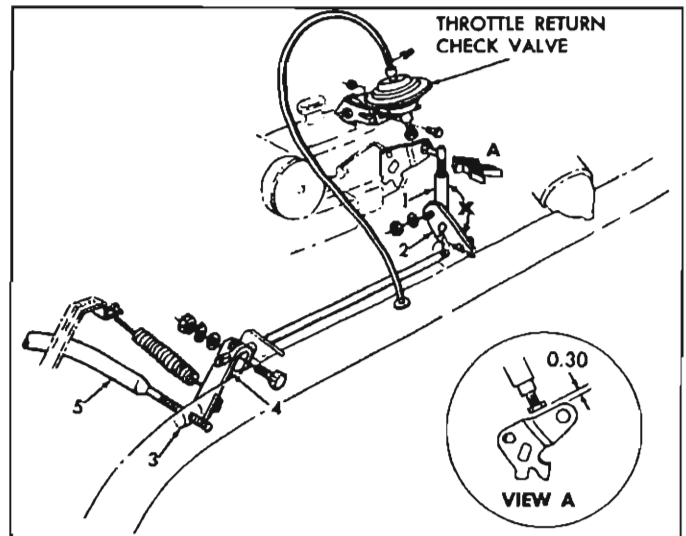


Fig. 9-26—Accelerator Linkage

- a. Back idle speed screw away from throttle lever, then adjust in until the throttle valve is slightly open.
  - b. Turn idle mixture screw lightly to its seat and back out  $\frac{3}{4}$  turn.
  - c. Attach tachometer at coil and vacuum gauge at manifold connection for distributor.
3. Make sure the fast idle linkage is off fast idle. This can be determined by removing air cleaner and looking at choke valve. It should be wide open.
  4. Start engine and adjust idle speed screw to obtain speed of 850 rpm, then adjust mixture screw and speed screw (alternately as needed) to obtain the highest steady vacuum at 850 rpm.
  5. Stop engine, disconnect instruments and reconnect distributor vacuum hose.

### Throttle Return Check Valve Adjustment (If Equipped)

**NOTE:** This adjustment must be made after the idle speed and mixture adjustment is completed and while engine is still at operating temperature.

1. With engine stopped, make sure choke is open and throttle is closed.
2. Start engine and run at idle speed (850 RPM).
3. Measure clearance between throttle valve lever and return check valve bolt (figs. 9-26 and 9-27) using .030" wire gauge on Tool Set J-21056.
4. If necessary to adjust, hold wrench on flat of diaphragm stem and turn self-locking bolt in the required direction.

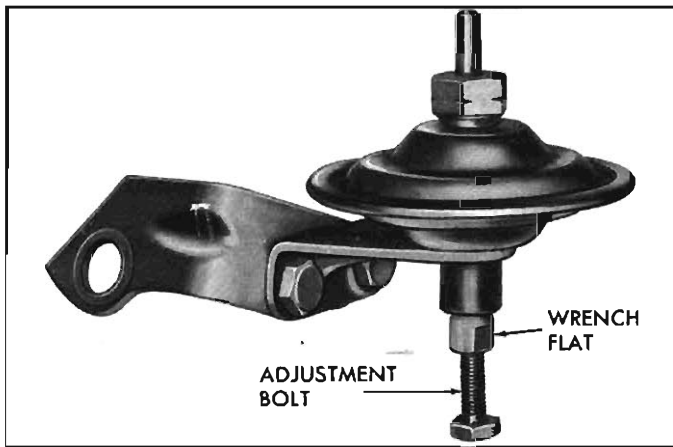


Fig. 9-27—Throttle Return Check Valve

### Adjust Float Level and Float Drop

1. Disconnect fuel line at carburetor.
2. Remove six bowl cover screws and remove bowl cover (fig. 9-28).

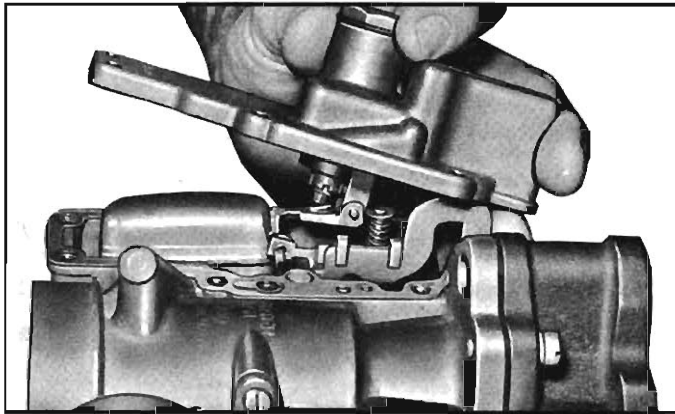


Fig. 9-28—Removing Bowl Cover

3. Invert cover and measure the distance between cover gasket surface and float at center of float (fig. 9-29). This **FLOAT LEVEL** dimension should be  $\frac{5}{8}$ " or use Tool J-21056.

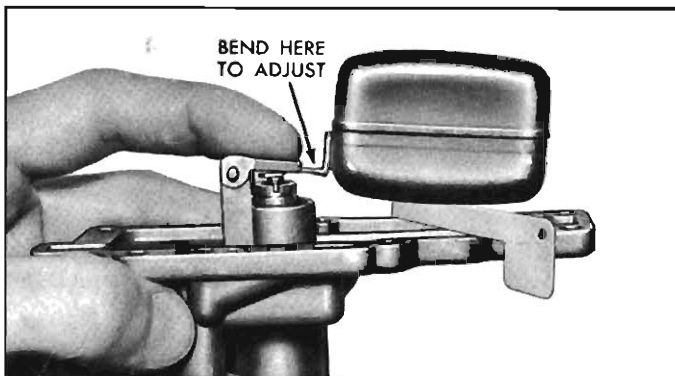


Fig. 9-29—Adjusting Float Level

4. Adjust, if necessary, by bending float arm as shown in Figure 9-29.
5. Invert cover to upright position allowing float to hang down.
6. Measure the distance between cover gasket surface and bottom of float at free end (fig. 9-30). This **FLOAT DROP** dimension should be  $2\frac{3}{8}$ "  $\pm$  .16.
8. Adjust by bending the tang at hinge end.
9. Install new bowl cover gasket on bowl and install cover and cover screws.

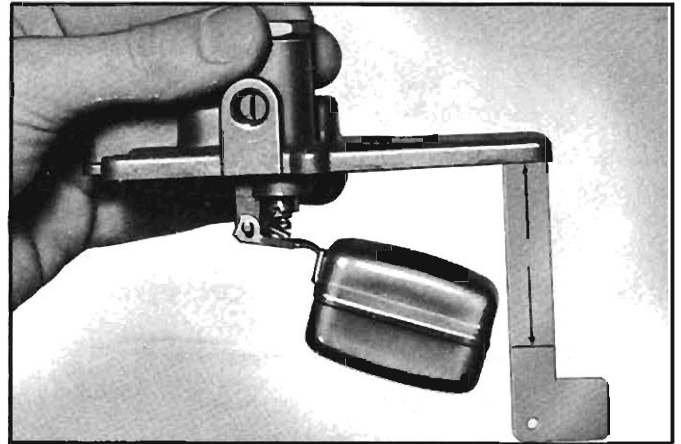


Fig. 9-30—Measuring Float Drop

### Automatic Choke Adjustment

The automatic choke setting is one notch lean and accomplished by loosening three choke coil housing retaining screws and rotating (by hand) the housing; then hold in position and tighten the screws.

### ADJUST IGNITION TIMING

1. Connect tachometer and timing light to engine same as regular Corvair.
2. Start engine and adjust idle (if necessary) to 850 rpm (with engine at operating temperature).
3. Aim timing light at timing tab (fig. 9-31) above crankshaft pulley and adjust timing to  $24^\circ$  advance by turning distributor the same manner as on regular Corvair engine.

**CAUTION:** Under no conditions should the timing be set more than  $24^\circ$  advance.

**NOTE:** It is not necessary to disconnect the spark advance hose and block the vacuum port on this engine.

4. Stop engine and disconnect test instruments.

### SUPERCHARGER

#### Periodic Inspection

Whenever routine service of the engine is performed, inspect the supercharger as follows:





Fig. 9-31—Ignition Timing Setting

1. Inspect the hoses and connections of the air intake system between the carburetor and the supercharger and from supercharger to intake manifold for leakage due to cracks, damaged gaskets, loose clamps or connections and for restriction due to collapsed hoses or dented tubing.
2. Inspect for exhaust leakage due to cracked exhaust manifold, loose supercharger mountings or damaged gaskets.
3. Inspect oil lines and fittings for kinks, damage or leakage.
4. Observe engine exhaust. Excessive smoke may indicate a restricted air cleaner, overrich mixtures or faulty supercharger (seal) operation.
5. Note unusual noises or vibration that would warrant further inspection of supercharger.

### Major Inspection and Cleaning

Every 50,000 miles, or if trouble is suspected in supercharger, it should be inspected and serviced as follows:

1. Disconnect oil drain line at supercharger elbow: connect a hose from the elbow to a container placed at side of engine), then start engine and run at idle speed for one minute to determine oil flow (should be approximately 1 quart per minute at idle).
2. Remove supercharger and carburetor assembly from the engine (see "Service Operations—Supercharger Removal from Vehicle," Page 21).

3. Remove carburetor from supercharger assembly.
4. Inspect the turbine wheel for:
  - a. Cracks, erosion: chipped, nicked, missing or bent blades.
  - b. Carbon build-up on blades.
  - c. Carbon accumulation on back face of turbine wheel.
  - d. Free rotation by depressing the shield against the spring ring, then rotating the wheel. If the turbine wheel does not rotate freely, disassemble the unit and inspect for damaged parts or foreign material causing the interference.
5. Remove six retaining bolts (fig. 9-32) and remove compressor housing and gasket.
6. Inspect compressor housing for scoring, wiping, erosion or pit marks on the inner contour.
7. Inspect impeller wheel for damaged blades or evidence of rubbing in the housing.
8. Note any oil accumulations in housing or on impeller indicating a defective oil seal.
9. If the impeller requires cleaning, use a nylon bristle brush and a solvent such as Diesel fuel or

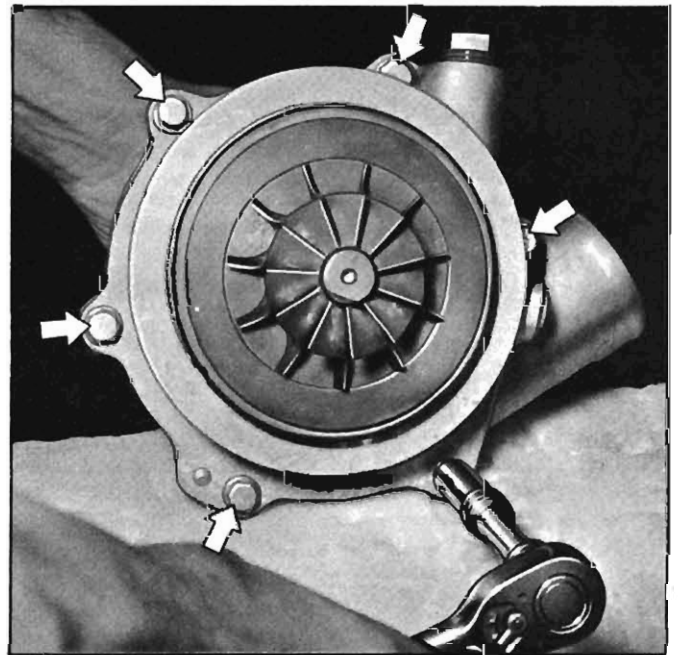


Fig. 9-32—Compressor Housing Retaining Bolts

kerosene to remove accumulated dirt. Thoroughly clean the impeller and compressor housing.

**NOTE:** Failure to remove all dirt may result in a more severe unbalance than existed prior to cleaning.

10. Measure turbine shaft end play as follows:
  - a. Attach a dial indicator to the bearing housing

- so that indicator point is resting on the impeller nut (fig. 9-33).
- b. Rest assembly squarely on hub of turbine wheel, then push down on housing and record the indicator reading. Release pressure on the housing and then repeat the operation at least once to check measurement. (The shield spring ring acts to return the wheel and shaft opposite the pressure on housing; it is not necessary to hold the shield away from the turbine wheel.)

- c. Allowable end play is .005" to .008". If end play is excessive, the supercharger should be rebuilt.
11. Measure turbine shaft radial play as follows:
    - a. With the assembly on the support ring (Tool J-21004), position the dial indicator so its point is resting on a flat of the impeller nut (fig. 9-34) and needle set at zero.
    - b. Push the impeller from side to side against indicator point and record readings, then repeat at least once to check your reading.

### TROUBLE SHOOTING CHART

Trouble	Probable Cause	Remedy
Smoking engine exhaust, loss of engine power, low boost pressure.	Dirty air cleaner, undersize air cleaner.	Clean or replace air cleaner as required.
	Restricted intake manifold or piping.	Remove restriction.
	Foreign matter or dirt accumulation on impeller.	Clean impeller (see par. 2b).
	Interference or binding in rotating assembly.	Disassemble unit.
	Damaged impeller or turbine wheel.	Disassemble unit.
Noisy rotating assembly.	Excessive oil leakage from seals.	Disassemble unit, replace seals.
	Damaged bearing or other components causing rotating assembly to rub against housing.	Disassemble unit, replace defective components.
Excessive vibration.	Foreign matter or carbon accumulation obstructing rotation.	Clean and inspect unit (see par. 2), disassemble if required.
	Damaged gearing.	Disassemble unit, replace bearing.
	Damaged impeller or turbine blades.	Disassemble unit, replace defective parts.
Excess oil in intake manifold or exhaust stack.	Restricted induction system.	Inspect and clean (see par. 2a).
	Excessive oil leakage from seals.	Disassemble unit, replace seals.
Supercharger speed low, power low, clean exhaust.	Insufficient fuel supply to engine.	Clean or reset fuel pump.
	Leaking intake or exhaust manifold connections.	Tighten all connections and replace gaskets where required.
	Back pressure on supercharger exhaust too high.	Reduce restriction in exhaust stack.
	Improper accelerator linkage adjustment.	Adjust linkage.
	Improper ignition timing.	Adjust timing.
Fails to return to idle.	Throttle return check valve.	Adjust or replace.
	Accelerator linkage adjustment.	Adjust linkage.
Other engine trouble.	See 1961 Corvair Shop Manual.	Pages 6A-58 to 60.

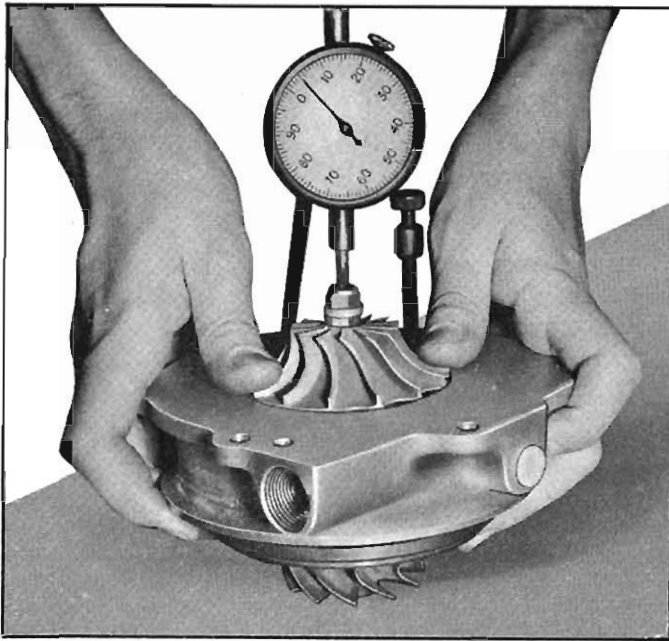


Fig. 9-33—Gauging Turbine Shaft End Play

- c. Recheck at 90° position to give cross reading.
- d. The maximum allowable radial play is .022". If radial play is excessive, rebuild the supercharger.
- e. Remove dial indicator.

12. If the unit is in satisfactory condition, install compressor housing (using a new gasket and torque the six bolts to 80 inch lbs.
13. Install carburetor to supercharger, then install the assembly onto the vehicle (as outlined in "Service Operations—Supercharger Installation to Vehicle," Page 28).

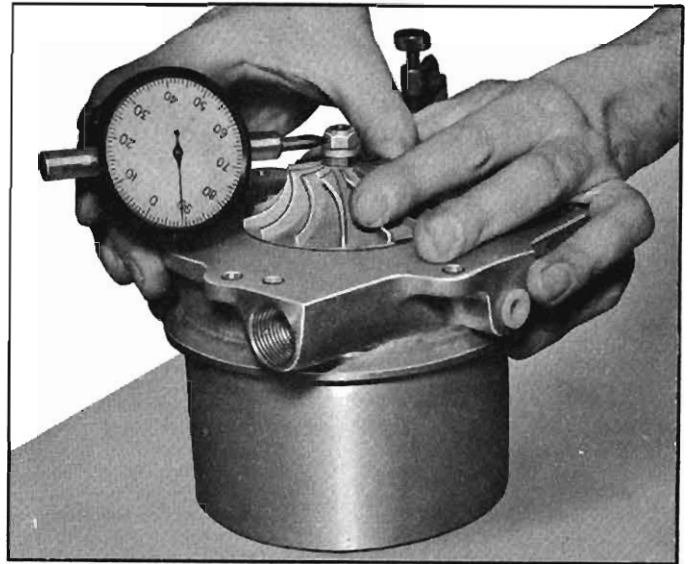


Fig. 9-34—Gauging Turbine Shaft Radial Play

## SERVICE OPERATIONS

### CARBURETOR

There are two methods to remove the carburetor from the vehicle.

#### Removal (with Supercharger as an assembly)

This method is outlined under "Supercharger—Removal from Vehicle." When this method is used, caution is necessary to prevent damage to turbine wheel, during disassembly of carburetor from supercharger.

#### Removal (Separately from Supercharger)

1. Remove air cleaner and disconnect throttle return check vacuum tube at valve.
2. Disconnect choke heat tube, fuel line and accelerator linkage at carburetor.
3. Remove upper mounting nut and throttle return check valve assembly.
4. Remove carburetor mounting nuts and remove carburetor from vehicle.

**NOTE:** It will be necessary to use a short or

curved open-end wrench to remove the front nut.

#### Disassembly (Fig. 9-35)

1. Remove inlet filter screen nut and screen.
2. Remove six screws and float bowl cover.
3. Remove float hinge pin, float and float needle and seat.
4. Remove float bowl cover gasket, tip carburetor and remove pump discharge needle.
5. Loosen pump lever screw from throttle shaft and slide lever off shaft and link.
6. Depress small spring on pump with a screwdriver and remove spring seat and spring.
7. Lift metering rod arm and metering rod from pump rod and metering jet.
8. Raise pump arm enough to remove the link, then remove pump arm.
9. Remove 4 screws and remove diaphragm pump assembly.
10. Remove fuel splash deflector plate and metering jet.

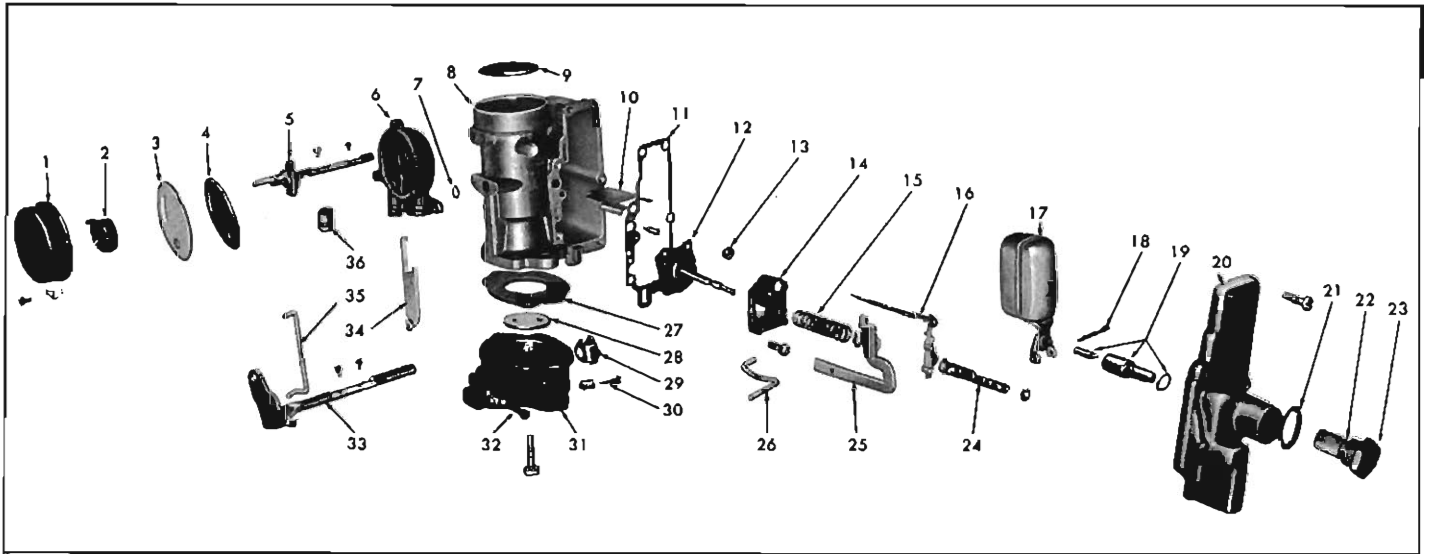


Fig. 9-35—Carburetor (Exploded View)

- |                                 |                                   |                              |                              |
|---------------------------------|-----------------------------------|------------------------------|------------------------------|
| 1. Choke Coil Housing           | 10. Bowl Splash Baffle            | 19. Needle and Seat Assembly | 28. Throttle Plate           |
| 2. Choke Coil                   | 11. Bowl Cover Gasket             | 20. Bowl Cover               | 29. Throttle Lever Pump Arm  |
| 3. Gasket                       | 12. Diaphragm Pump Assembly       | 21. Gasket                   | 30. Idle Mixture Screw       |
| 4. Baffle Plate                 | 13. Main Jet                      | 22. Inlet Screen             | 31. Throttle Body            |
| 5. Choke Shaft                  | 14. Pump Housing                  | 23. Screen Nut               | 32. Idle Speed (Air) Screw   |
| 6. Choke Housing                | 15. Pump Lower Spring             | 24. Upper Pump Spring        | 33. Throttle Shaft           |
| 7. Vacuum Passage "O" Ring Seal | 16. Metering Rod and Arm Assembly | 25. Pump Actuating Link      | 34. Fast Idle Link           |
| 8. Carburetor Body              | 17. Float                         | 26. Connector Link           | 35. Fast Idle Connector Link |
| 9. Choke Plate                  | 18. Hinge Pin                     | 27. Gasket                   | 36. Choke Piston             |

11. Remove choke link clip and choke link.
12. Remove choke housing cover screws, cover, gasket and baffle plate, then slide choke lever out of housing.
13. Remove three throttle flange-to-carburetor body screws and remove flange and gasket from body section.
14. Remove idle speed screw and spring from flange. For normal cleaning and inspection, the carburetor is disassembled as far as is necessary. The choke valve, choke piston or throttle valve should be removed only if valve is damaged or shaft and piston are binding. If either condition exists, complete the disassembly as follows:
15. File staked ends of throttle plate screws, level with throttle shaft (to avoid damaging throttle shaft threads), then remove the screws and throttle valve and slide shaft from flange.
16. File staked ends of choke valve screws, level with choke shaft, then remove screws and choke plate.
17. Remove choke shaft and choke piston by rotating the shaft until the piston comes out of the bore, then slide shaft assembly from carburetor.
18. Remove three choke housing screws, remove housing and discard vacuum passage "O" ring seal.

### Cleaning and Inspection

The most frequent causes of carburetor malfunction are gum, dirt, carbon and water. Carefully clean and inspect all parts and castings during carburetor overhaul.

1. Wash all parts, except choke coil housing and pump, in carburetor cleaning solution.
2. Choke coil housing should be cleaned in gasoline.
3. Inspect links and operating lever holes for wear.
4. Inspect throttle and choke plates for gouges or other damage and their shafts for binding or excessive wear.
5. Inspect float for dents or leaks.
6. Inspect choke piston for free operation in its cylinder. Remove welch plug from cylinder only if piston sticks and it is necessary to clean the cylinder. Clean the cylinder with fine sandpaper if necessary.
7. Inspect float needle and seat for burrs or ridges. If present, replace both the needle and seat; never replace separately or try to file burrs or ridges.
8. Inspect metering rod and jet. Replace if bent, burred or distorted.
9. Inspect all mating surfaces of castings and flanges for burrs, gouges or surface irregularities. Use a

square edge to check throttle flange for warpage. All surfaces must be smooth and square to prevent leaks.

10. Inspect accelerator pump diaphragm for damage. Replace diaphragm and rod assembly if necessary.

### Assembly

1. If throttle shaft was removed:
  - a. Slide shaft in throttle flange.
  - b. Position throttle plate on flat of shaft with numbered side to shaft, then install new screws loosely.
  - c. Center throttle plate on shaft and in the bore and tighten the screws. Peen the screws securely.
2. If choke shaft was removed:
  - a. Use a new vacuum passage "O" ring seal, position the choke housing on air horn and install three attaching screws just snug.
  - b. Slide choke shaft into air horn part way, then install piston to shaft and position the shaft by rotating while installing piston into its cylinder.
  - c. Tighten choke housing attaching screws.
  - d. Position choke plate on flat of shaft with identification numbers on air cleaner side.
  - e. Install new choke plate attaching screws loosely, center the plate on shaft and in bore and tighten the screws. Peen the screws securely (using pliers).
3. Install throttle flange gasket and flange onto carburetor body with three retaining screws.
4. Install pump diaphragm assembly in diaphragm housing, then install diaphragm spring (lower) and spring retainer.
5. Install metering rod jet (no gasket with this jet).
6. Install diaphragm housing screws in housing and thread them 2 or 3 threads into diaphragm (to hold diaphragm in alignment), then install the assembly in carburetor bowl and tighten screws (fig. 9-36).
7. Install splash shield between metering rod jet and pump housing.
8. Install metering rod onto the metering rod arm, hook the spring and install retainer clip (fig. 9-35).
9. Install pump and metering rod linkage as follows: (Refer to fig. 9-37.)
  - a. Pump lifter link in guide opening, insert throttle lever connector link onto pump lifter link (connector must be installed before lifter link is completely in position) then place lifter arm down over pump rod.
  - b. Metering rod in jet and arm over pump rod and lifter arm.

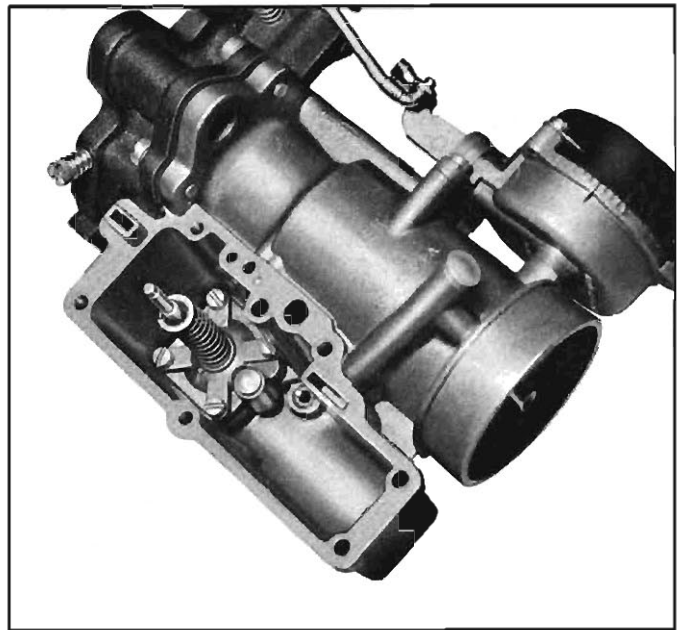


Fig. 9-36—Pump Diaphragm and Metering Jet Installation

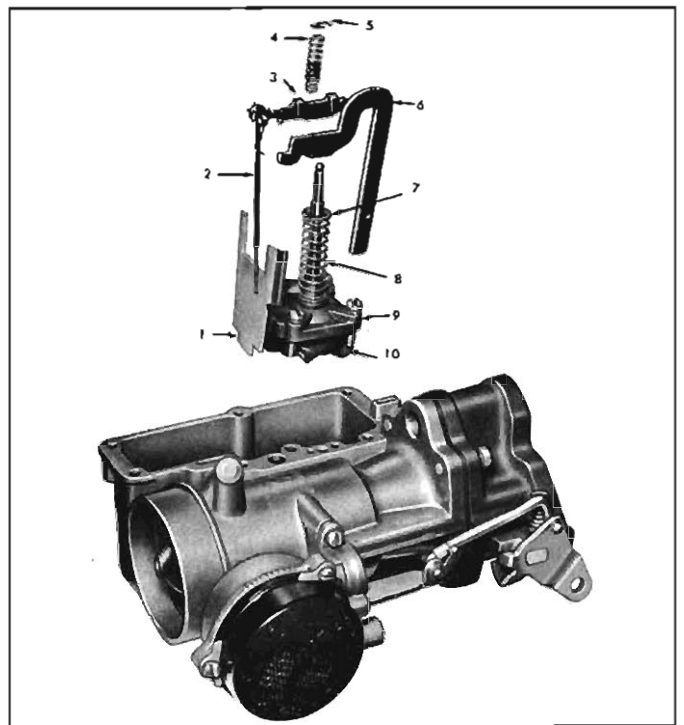


Fig. 9-37—Pump and Metering Rod Assembly

- |                       |                        |
|-----------------------|------------------------|
| 1. Shield, Splash     | 6. Pump Link           |
| 2. Metering Rod       | 7. Lower Spring Seat   |
| 3. Metering Rod Arm   | 8. Lower Spring        |
| 4. Upper Springs      | 9. Pump Housing        |
| 5. Upper Springs Seat | 10. Diaphragm Assembly |

- c. Upper spring over pump rod, compress with screwdriver and install retainer.
- d. Install throttle shaft pump lever over throttle shaft and pump link, then tighten retaining screw.

10. Adjust metering rod as follows:
  - a. Hold throttle valve tightly closed.
  - b. Remove metering rod from carburetor and place gauge tool J-21056 in metering jet (fig. 9-38).

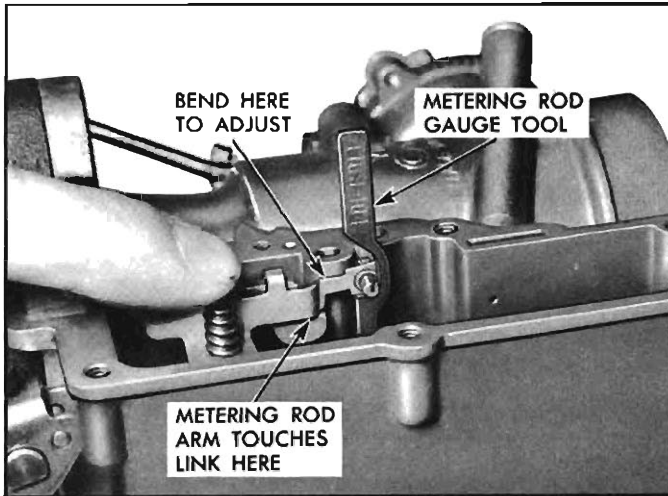


Fig. 9-38—Adjust Metering Rod Arm

- c. Push down on pump diaphragm rod until the metering rod arm just touches the lifter link (at point A, Figure 9-38).
  - d. With the gauge (tool J-21056) in the jet, the metering rod arm pin should just contact the top surface of gauge tool.
  - e. If necessary, adjust by bending metering rod arm at point shown in Figure 9-38.
11. Install new float needle valve seat and needle valve in bowl cover, then install float and float hinge pin with the hinge pin shoulder to outboard side of carburetor bowl.
12. Check and adjust (if necessary) float level and drop (described under "Maintenance and Adjustments," Page 14).
13. Install pump discharge needle (fig. 9-39) then install a new cover gasket on bowl and install bowl cover and six screws.
14. Install fast idle link into choke housing and hook unloader projection over tang on fast idle cam assembly (fig. 9-40).
15. Install choke link connector link to throttle lever keyed hole then to choke link with clip.
16. Adjust fast idle as follows:
  - a. Hold choke valve tightly closed and close throttle valve as far as it will go. (This places fast idle link on high step of cam.)
  - b. Hold the throttle valve in this position, a .030" gauge (Tool J-21056) should just go between throttle valve and bore at side opposite idle port.

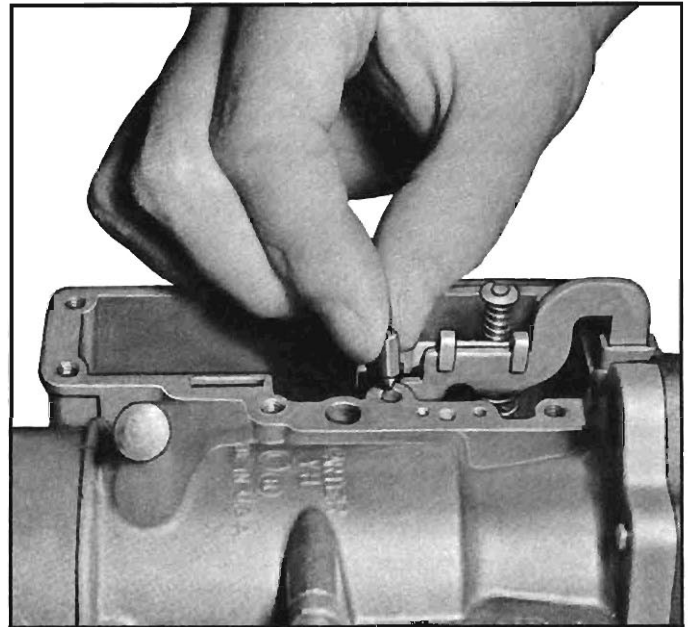


Fig. 9-39—Install Pump Discharge Needle

- c. If necessary, adjust by bending fast idle connector link at curvature.

**NOTE: Always perform fast idle adjustment before unloader adjustment.**

17. Check unloader adjustment as follows:
  - a. Open throttle to wide open position while holding tension in opposite direction on choke valve.
  - b. Measure the distance between choke valve edge and bore opposite the vent tube side. This unloader measurement should be  $\frac{7}{16}$ ".
  - c. If necessary, adjust by bending unloader tang on fast idle cam.
18. Install choke baffle plate, gasket, choke coil hous-

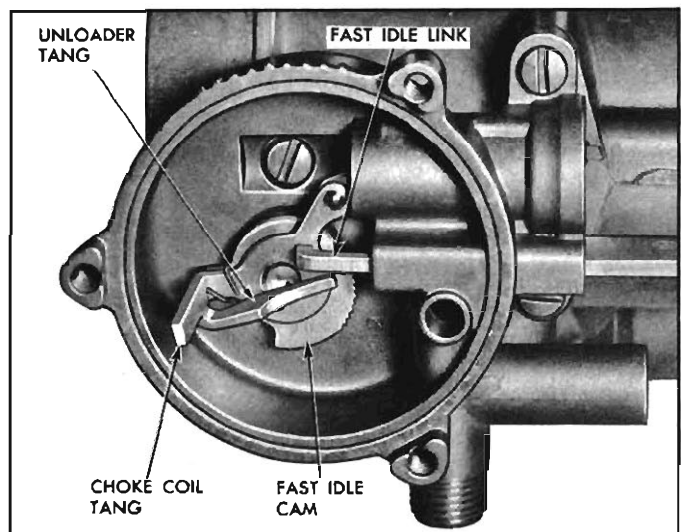


Fig. 9-40—Choke Housing and Fast Idle Linkage



ing, housing retainer clips and screws onto choke housing with screws just snug.

19. Adjust coil housing to 1 notch rich, then tighten housing retainer screws.

### Installation to Vehicle with Supercharger as a Unit

This method outlined under "Supercharger Installation to Vehicle."

### Separately, with Supercharger Installed

1. Install carburetor over mounting studs on supercharger; install lower front nut and washer first, then install throttle return check valve, the other two nuts and washers and tighten.
2. Connect choke heat tube and fuel line at carburetor.
3. Install air cleaner and connect clean air tube at air cleaner (be sure air cleaner to carburetor "O" ring seal is in place).
4. Connect accelerator linkage at carburetor.
5. Start the engine and adjust idle speed and mixture and throttle return check valve clearance (see Page 13).

## SUPERCHARGER ASSEMBLY

**NOTE:** Always cover supercharger openings when working on other parts of engine requiring supercharger openings to be exposed or when unit is stored.

### Removal from Vehicle

1. Remove spare tire.
2. Remove air cleaner assembly, then disconnect fuel line and choke heat tube at carburetor.
3. Remove supercharger heat shield, then disconnect oil feed line and drain line at supercharger housing (fig. 9-41).
4. Disconnect accelerator linkage at carburetor.
5. Loosen the turbine housing "V" clamp nut, then support the supercharger and carburetor; remove the clamp and lift the assembly out of the vehicle carefully to avoid damage to the turbine wheel or spillage of gas from carburetor bowl into engine.

**NOTE:** A holding fixture is provided as a special tool for the purpose of avoiding possible damage to the uncovered turbine wheel vanes and for convenience during supercharger overhaul.

6. Remove carburetor attaching nuts and remove carburetor from supercharger assembly.

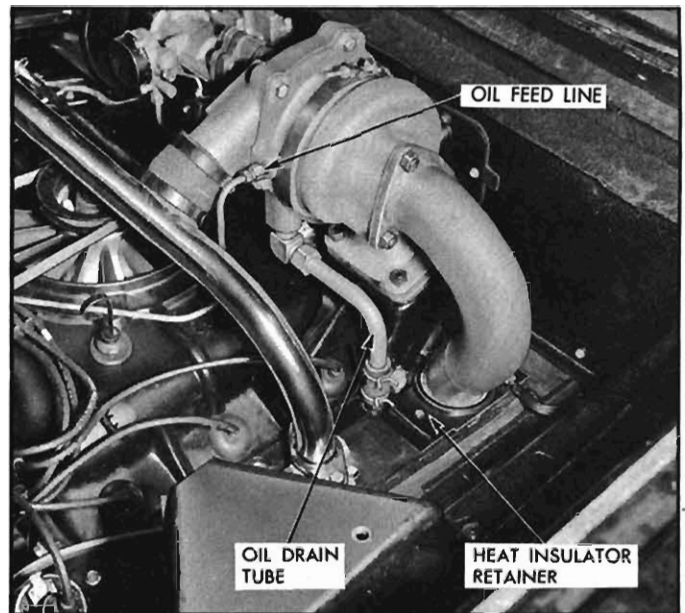


Fig. 9-41—Supercharger Oil Lines

7. Remove 7 turbine housing inlet and outlet flanges bolts and remove the housing if inspection (see Page 15) shows need.

### Disassembly

**NOTE:** Disassemble the supercharger in a clean, dust-free location, using clean tools and equipment. Avoid contact with dust or grit that could score the highly machined parts and result in premature failure of the unit.

1. Remove the six bolts that secure the compressor housing to the bearing housing, then remove the compressor housing and gasket (fig. 42).

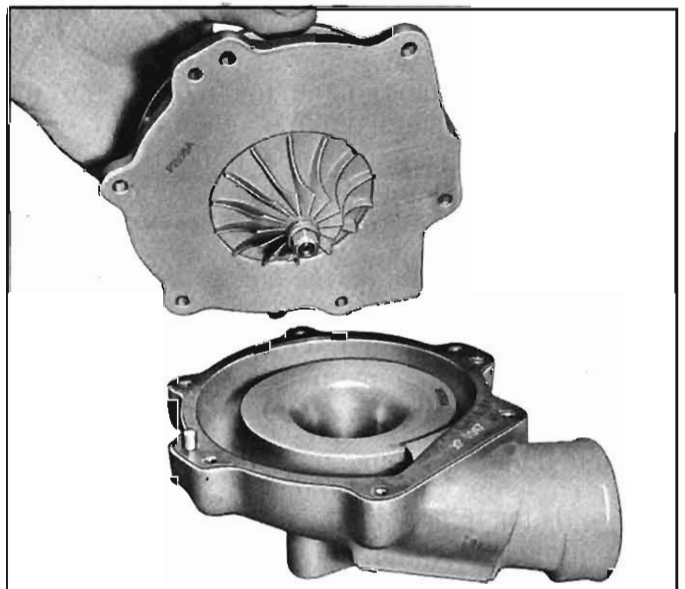


Fig. 9-42—Removing Compressor Housing

2. Hold the turbine wheel blades with a cloth and remove the self-locking nut (LEFT HAND THREADS) from the impeller end of the turbine shaft by turning clockwise (fig. 9-43), then remove the impeller washer.

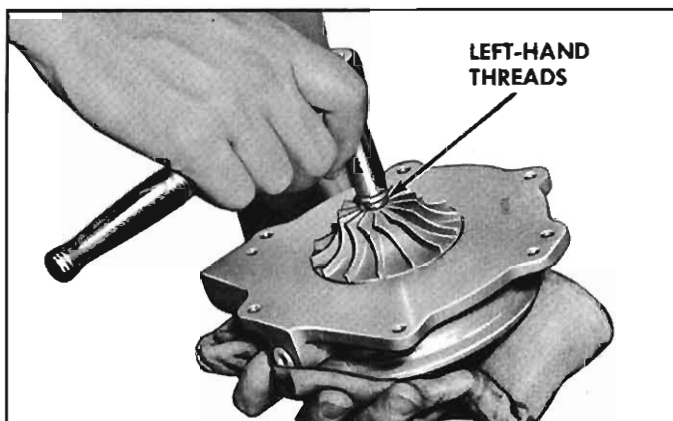


Fig. 9-43—Removing Impeller Nut

3. Support the supercharger in a press (using parallel blocks or support ring Tool J-21004, Figure 9-44) with the impeller wheel upward.

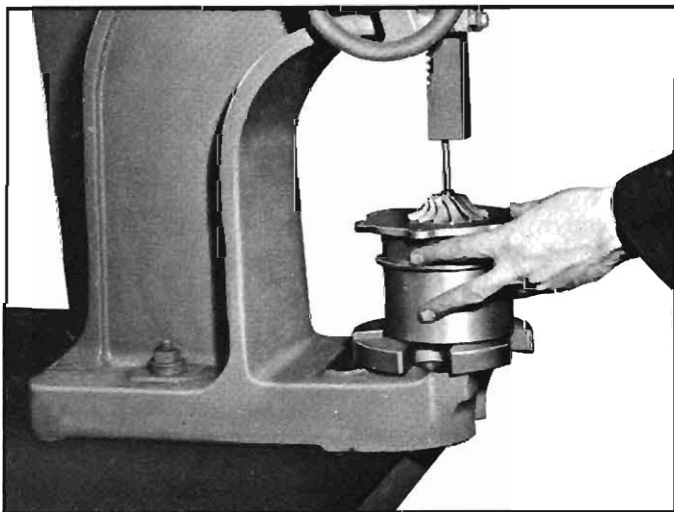


Fig. 9-44—Pressing Turbine Shaft from Impeller

4. Place a folded cloth on the bed of the press (between parallel bars or inside the support ring) to avoid damage to the turbine wheel as it drops out of the housing.
5. Place a 1/4" diameter brass rod on the end of the turbine shaft (fig. 9-44) and press turbine shaft from impeller wheel.
6. Remove impeller wheel, shim or shims, shaft sleeve, turbine wheel and shaft assembly, turbine shield and shield spring ring.
7. Remove the oil seal retaining ring from bearing

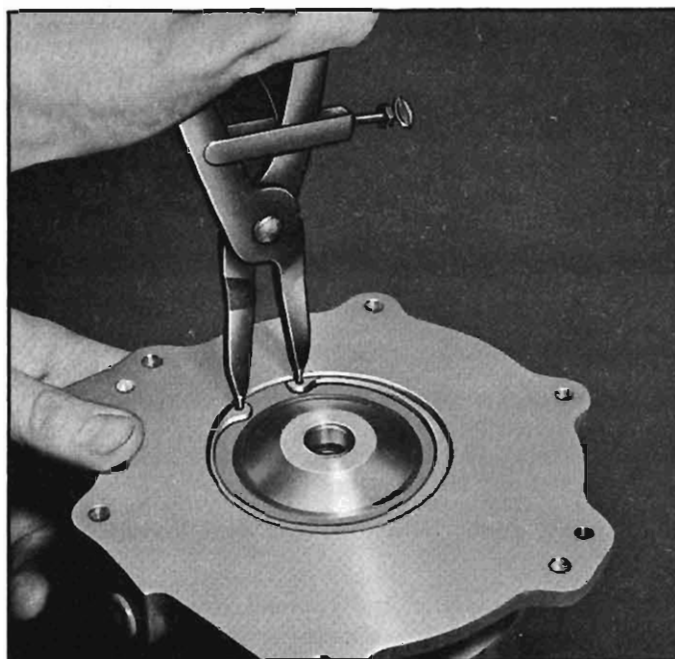


Fig. 9-45—Oil Seal Retainer Ring Removal

housing with snap ring pliers (fig. 9-45).

8. Turn the bearing housing over and, using a 1/2 inch diameter rod, push oil seal, "O" ring and mating ring out of the bearing housing.
9. Remove the bearing retaining ring (fig. 9-46), then remove the bearing and shim.

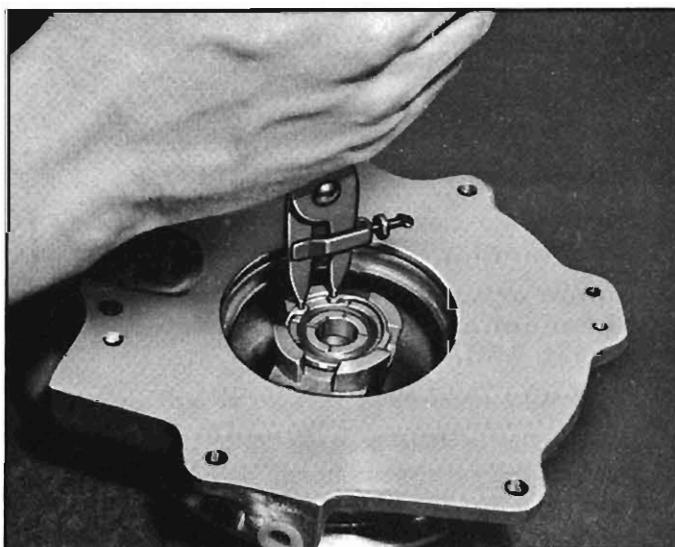


Fig. 9-46—Removing Bearing Retainer Ring

### Cleaning and Inspection

1. Wash the supercharger parts with Diesel oil or kerosene, allowing to soak, if required, to remove carbon deposits. A small nylon bristle brush may be used to remove heavy deposits.

**CAUTION:** Never use caustic solutions or other cleaner that may attack metal, or a wire brush that could score highly finished parts.

2. Inspect the turbine housing for:
  - a. Wiping, scoring or pit marks in the inner contour.
  - b. Cracks along dividing tongue.
  - c. Damaged threads in tapped holes or on studs.
3. Inspect compressor housing for:
  - a. Wiping, scoring, eroding or pit marks in the inner contour and scroll.
  - b. Damage on gasket surface.
4. Inspect turbine wheel and shaft assembly for:
  - a. Nicked, bent, broken or missing blades.
  - b. Cracks at edge of blades.
  - c. Scoring on back face or back hub.
  - d. Excessive side wear or carbon build-up in shaft seal ring groove.
  - e. Shaft discoloration due to overheating (normal color is light tan).
5. Inspect impeller for:
  - a. Nicked, broken or missing blades.
  - b. Evidence of rubbing on blades or back face.
  - c. Fit of impeller on turbine shaft (must be press fit).
6. Inspect bearing housing for:
  - a. Scoring, heavy wear on the bearing bore.
  - b. Cracked or damaged bearing flange face.
  - c. Damaged "O" ring seats or snap ring grooves.
  - d. Thread damage in oil inlet or outlets.
  - e. A secure bearing roll pin.
7. Inspect the bearing for:
  - a. Scuffing, pit marks, scratches.
  - b. Imbedded foreign material.
  - c. Damage to thrust surfaces.
  - d. Damage on external diameter or shim surface.
8. Inspect turbine shield for flatness, scoring, eroding or pitting and spring ring for damage, warpage or loss of tension.

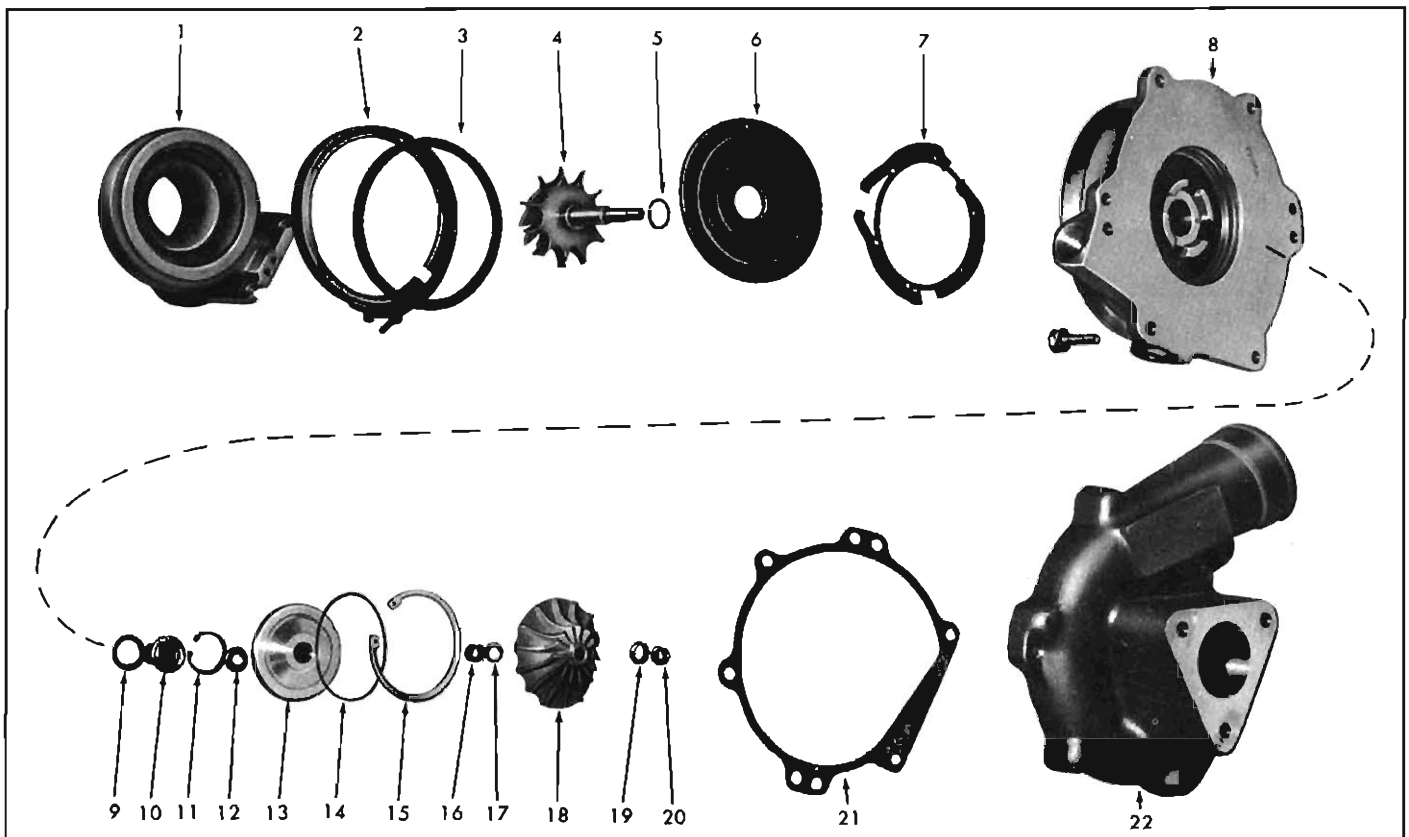


Fig. 9-47—Turbo-Supercharger (Exploded View)

- |                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| 1. Turbine Housing             | 9. Bearing Shim            | 16. Shaft Sleeve              |
| 2. Charger Housing Clamp       | 10. Bearing                | 17. Impeller Shim             |
| 3. Gasket                      | 11. Bearing Retaining Ring | 18. Impeller                  |
| 4. Turbine Wheel and Shaft     | 12. Mating Ring (Washer)   | 19. Impeller Special Washer   |
| 5. Turbine Shaft Oil Seal Ring | 13. Oil Seal Assembly      | 20. Impeller Nut              |
| 6. Shield Plate                | 14. "O" Ring Seal          | 21. Compressor Housing Gasket |
| 7. Spring Ring                 | 15. Seal Retaining Ring    | 22. Compressor Housing        |
| 8. Bearing Housing             |                            |                               |

9. Check mating ring for scuffing, discoloration or carbon build-up on sealing or thrust surfaces.
10. Inspect the oil seal assembly:
  - a. For chipping, scoring or uneven and excessive wear on the carbon face seal insert.
  - b. For damage to "O" ring seal groove.
  - c. To see that the carbon seal is free floating and has satisfactory spring tension.
11. Inspect the housing "V" clamps for cracks, stripped threads, distortion or other damage.

**Assembly (Fig. 9-47)**

**NOTE:** Replace all gaskets, the "O" ring seal and unserviceable parts.

**NOTE:** It is important to have cleaned all parts and work in a clean area using clean tools.

1. Support the bearing housing on support ring (Tool J-21004) with flat surface (impeller side) upward.
2. Install a new roll pin in the bearing housing (if required) so the slot is aligned radially inward.
3. Determine shaft-to-bearing end play as follows:
  - a. Place bearing, mating ring and sleeve on turbine shaft.
  - b. Hold the mating ring against the shoulder on the turbine shaft, then hold the bearing up against the mating ring and measure the clearance between the bearing and lower shoulder of the shaft using a feeler gauge (fig. 9-48).

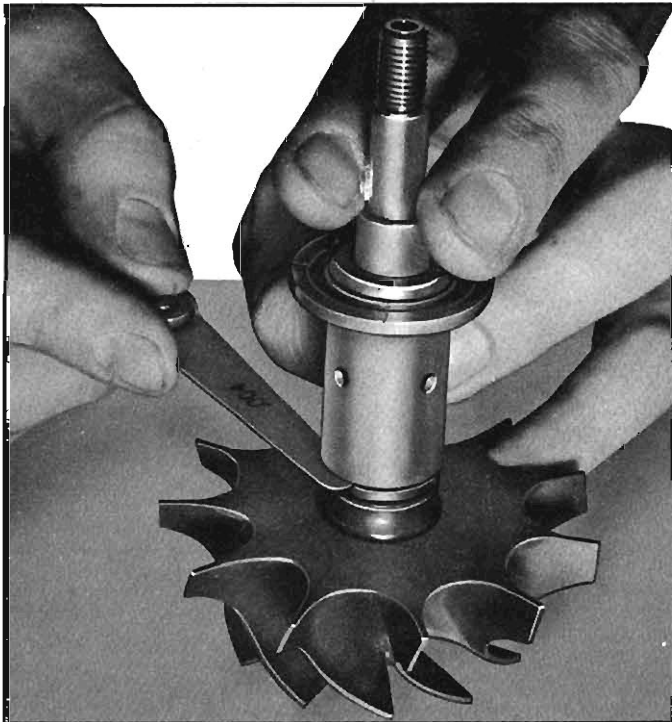


Fig. 9-48—Measuring Bearing-to-Shaft End Play

- c. Write this clearance down on paper for later reference (when determining impeller end clearance).
4. Determine bearing-to-housing end play and select the proper shim.
  - a. Install the bearing into the housing (line up roll pin and hole in flange) then install retaining snap ring.
  - b. Position a dial indicator with point resting on the bearing (fig. 9-49) and set indicator needle at zero.



Fig. 9-49—Gauging Bearing-to-Housing End Play

- c. Push the bearing upward against the retaining ring and then down to bottom in the housing and record the variation (repeat at least once to be sure of reading).
  - d. Remove the retaining snap ring and bearing and select the shim that will reduce the end play to .001"-.002". (i.e. indicator shows end play was .015"; use one .014" shim to reduce to .001-.002.)

**NOTE:** Shim available sizes are .008, .009, .010, .011, .012 and .014.

- e. The adjusted end play of bearing-to-housing (.001-.002) plus the shaft-to-bearing end play (paragraph 3c) is the total shaft end play.

shaft-to-bearing end play..... .004  
i.e.

plus bearing-to-housing end play..... .001  
total shaft end play..... .005

4. Install selected shim, bearing and bearing retainer ring (bevel side up).

5. Position mating ring centered on the bearing flange face.
6. Lubricate "O" ring seal with silicone grease and install in groove of oil seal assembly.
7. Install oil seal assembly into the housing by pressing by hand as far as it will go, then install the retaining ring (bevel side up) to hold it in place.
8. Determine the impeller shim requirements (for impeller-to-housing clearance) as follows:
  - a. Place the shaft sleeve in center of oil seal assembly, then place the impeller over the seal so its center hub rests on the shaft sleeve.
  - b. Install gasket and compressor housing in place on bearing housing and install every other bolt (3). Torque the bolts to 80 inch lbs.
  - c. Position a dial indicator as shown in Figure 9-50 with indicator point resting on turbine hub and set at zero.

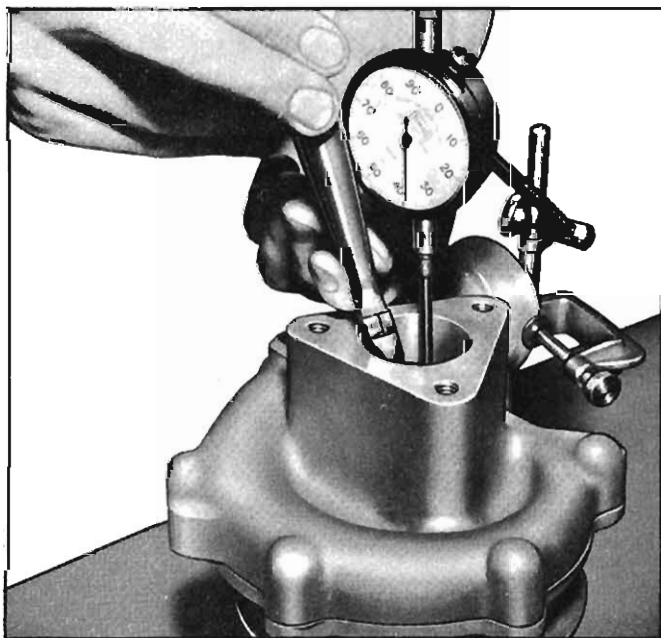


Fig. 9-50—Gauging Impeller-to-Housing Clearance

- d. Use long-nose pliers to hold hub of the impeller and lift straight up on the impeller as far as it will go and note indicator reading. (Repeat impeller lift at least once to check your reading.)
- e. Subtract the total shaft end play (paragraph 4e) from the indicator reading just recorded to obtain impeller-to-housing clearance and select shims as follows:

Impeller movement indicated reading..	.037
Less total shaft end play.....	.005
Indicated clearance .....	.032

- f. Select shim to reduce impeller clearance to .015-.020 from valve determined in Step e as follows:

Measured in Step e.....	.032	.032
Less clearance needed.....	.015	.020
Shim thickness must be between .....	.017	.012
	Max.	Min.

**NOTE: Shim available in .010" and .015".**

9. Remove the compressor housing, gasket, impeller, shaft sleeve and turbine wheel and shaft assembly from bearing housing.
10. Turn the bearing housing over (on ring support tool) and install spring ring. Position the turbine shield to install with three projections spaced over flat areas of the spring ring (fig. 9-51).

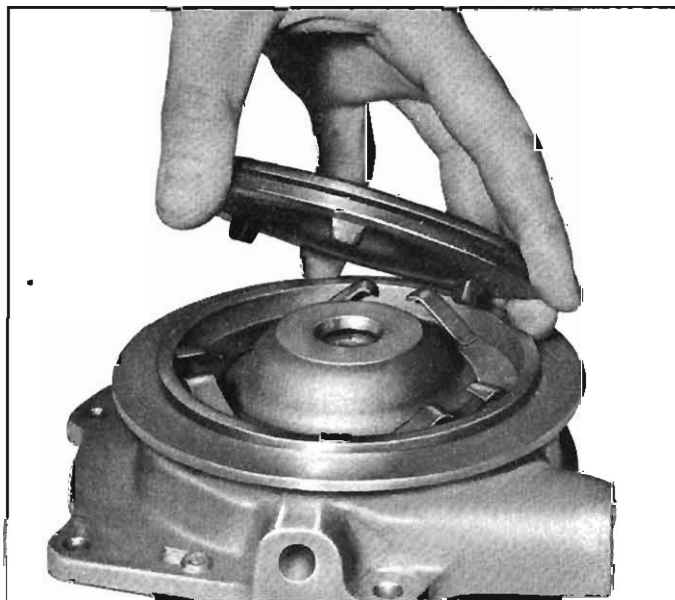


Fig. 9-51—Heat Shield Spring Ring Installation

11. Lubricate the turbine shaft seal ring groove with oil and install ring into groove. Compress the ring into the groove using tag wire (fig. 9-52) or a plastic compression ring (fig. 9-53). If tag wire is used, make one twist with pliers and bend the wire to form it along the curvature of shaft and wheel back face as shown in Figure 9-52). (Remember direction of twist for removal.)
12. Lubricate the shaft (bearing area) and carefully install through the bearing (fig. 9-54). The plastic ring is left on the shaft after installation since it will burn away. If wire is used, remove the wire by a reverse twist and slide it out from between shield and wheel.

**CAUTION: Hold wheel so it will not slide out past ring.**

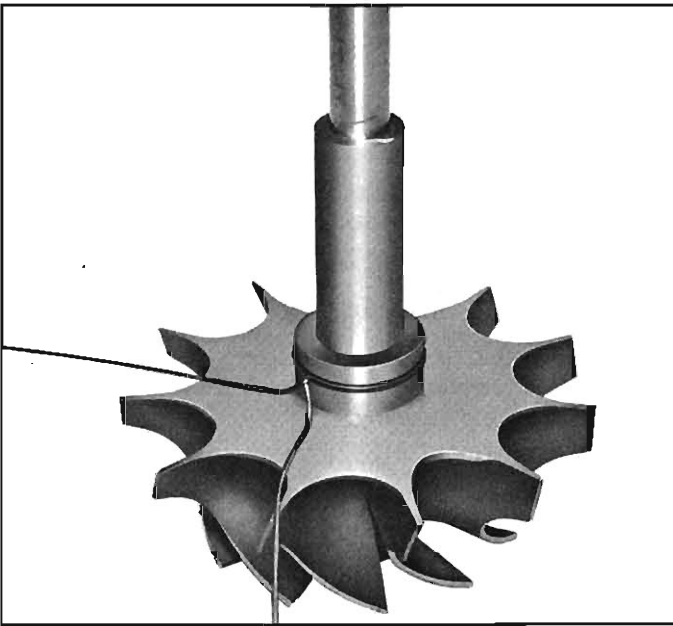


Fig. 9-52—Ring Compressed, Using Tag Wire

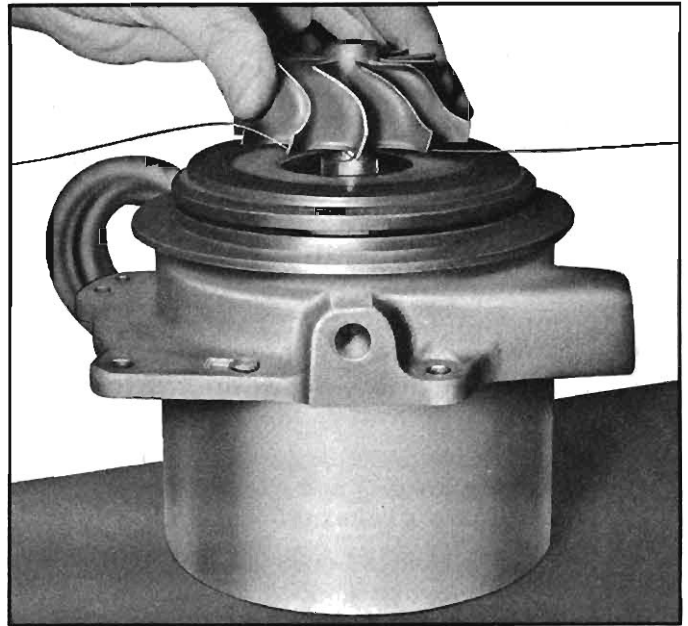


Fig. 9-54—Installation of Turbine Wheel and Shaft

14. Install the shaft sleeve (fig. 9-55), impeller shim (determined in Step 8f) and start the impeller on the turbine shaft.

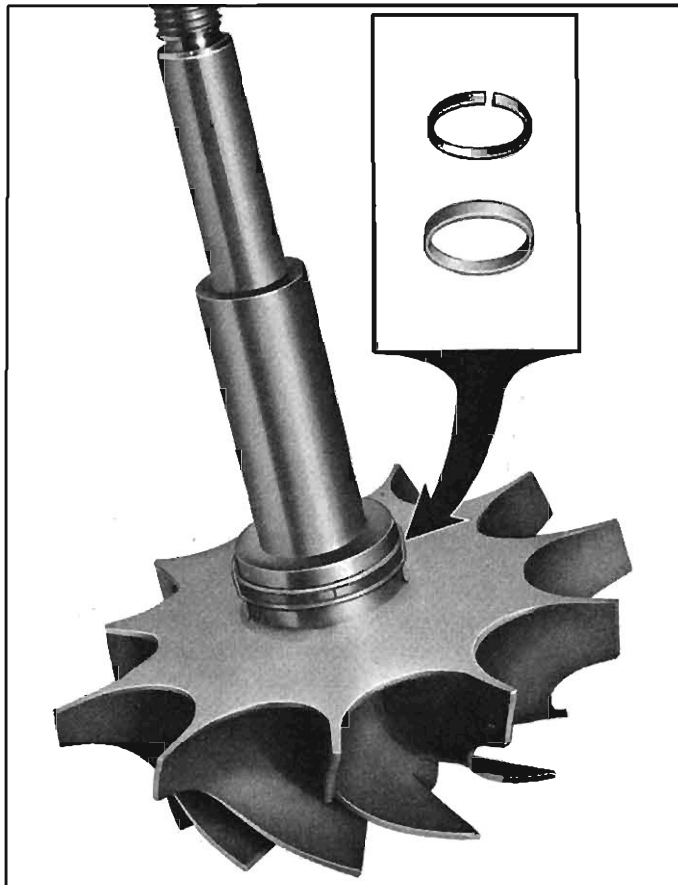


Fig. 9-53—Compressing Ring, Using Plastic Installer Ring

13. Hold turbine wheel tightly against the shield (so ring seal will not fall out of seal area), turn the assembly over and place in a press so turbine wheel hub rests on press plate.

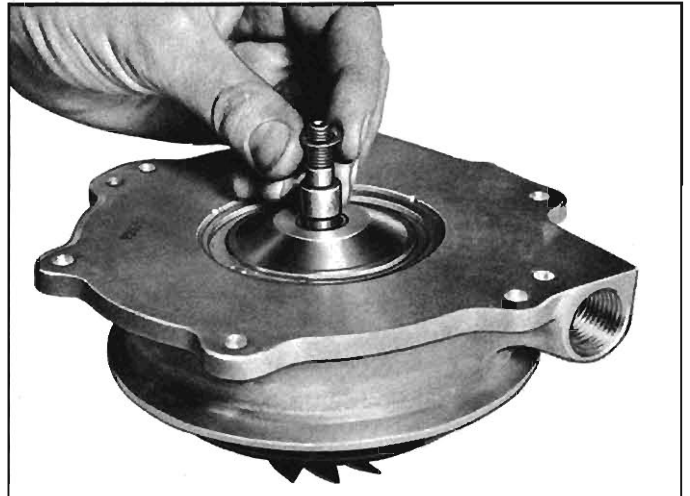


Fig. 9-55—Shaft Sleeve and Shim Installation

15. Press the impeller onto the shaft, using a hollow spacer such as Tool J-6880 until it bottoms in place (fig. 9-56).

**NOTE:** As an alternate method of assembly, the impeller may be heated to a temperature of not more than 300° F. and installed onto the turbine shaft by hand, without the need for a press.

16. Remove assembly from press and position the special impeller washer (fig. 9-57) with dished side upward and install (LEFT HAND THREADS) the self-locking nut on the turbine



shaft. Use a folded cloth to hold the turbine wheel and torque the nut to 80 inch lbs.

17. Place the gasket and compressor housing on bear-

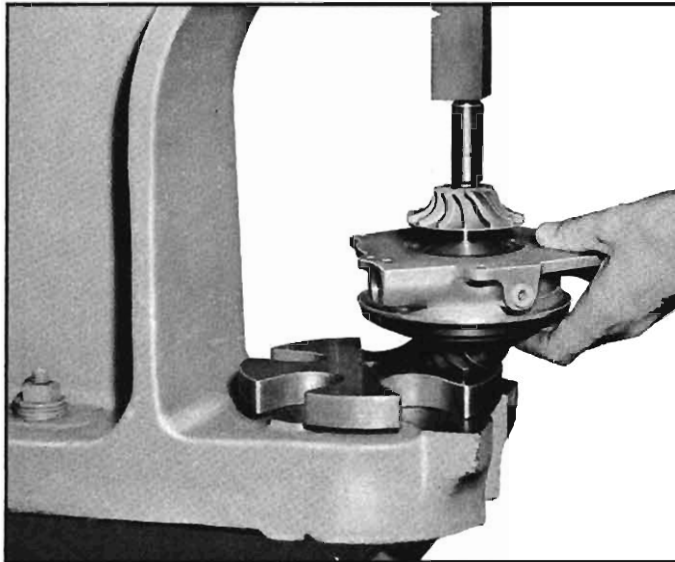


Fig. 9-56—Impeller Installation

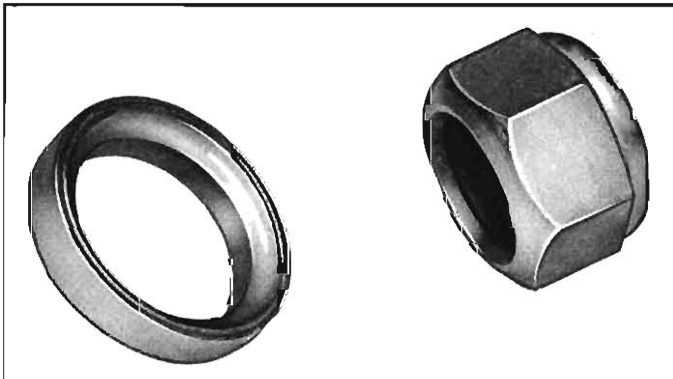


Fig. 9-57—Special Washer and Nut

ing housing, secure with six bolts and torque to 80 inch lbs.

18. Remove the holding tool from the oil drain opening, then (with assembly in approximate installed position) add oil into oil inlet until it flows from drain opening; install holding tool and install carburetor for installation on vehicle.

**NOTE:** If the supercharger is not going to be installed immediately, cover all openings to prevent damage or entrance of foreign matter.

19. If inspection shows turbine housing damage, remove housing for replacement as follows:
  - a. Remove 4 nuts from turbine inlet flange and 3 nuts from outlet flange.
  - b. Loosen muffler mounting strap so turbine outlet pipe can be wobbled.
  - c. Slide turbine outlet pipe flange from turbine by wobbling as needed, then lift turbine housing from inlet pipe flange.
  - d. Remove 2 choke heat tubes from inlet flange on housing and install them in new housing flange.

20. Install turbine housing as follows:

- a. Place new inlet flange gasket over studs on inlet pipe flange.
- b. Place new outlet flange gasket on turbine housing outlet flange studs.
- c. Hold outlet pipe outboard on vehicle and install turbine housing over inlet flange studs and gasket.
- d. Slide outlet pipe over turbine outlet flange studs and gasket.
- e. Install seven stud nuts (4 on inlet, 3 on exhaust) and torque to 80 in. lbs.
- f. Tighten muffler mounting strap.

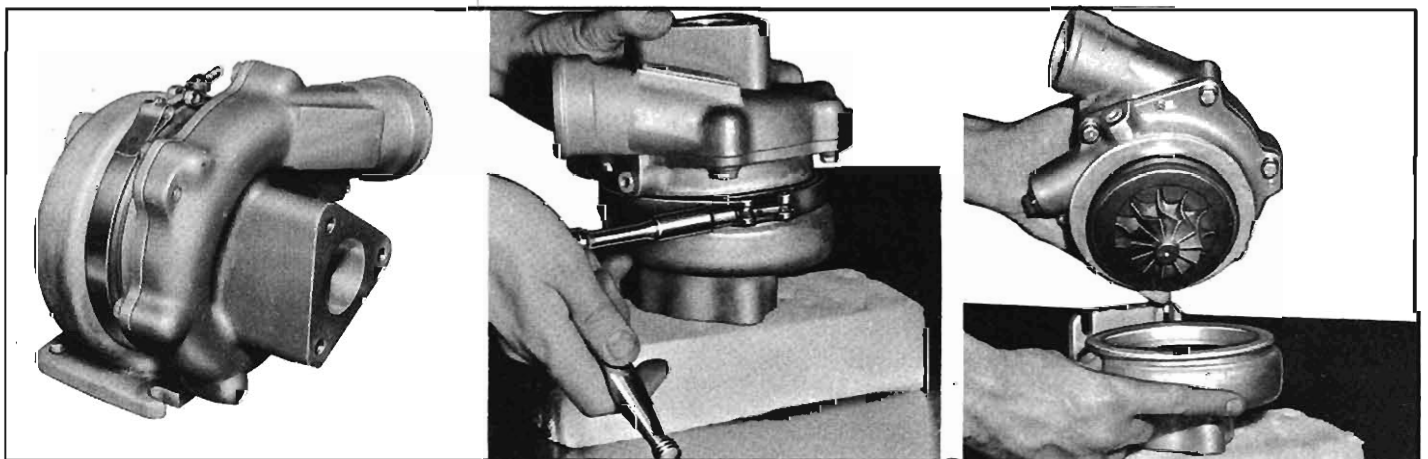


Fig. 9-58—Removal of the Turbine Housing for Installation of Replacement Supercharger

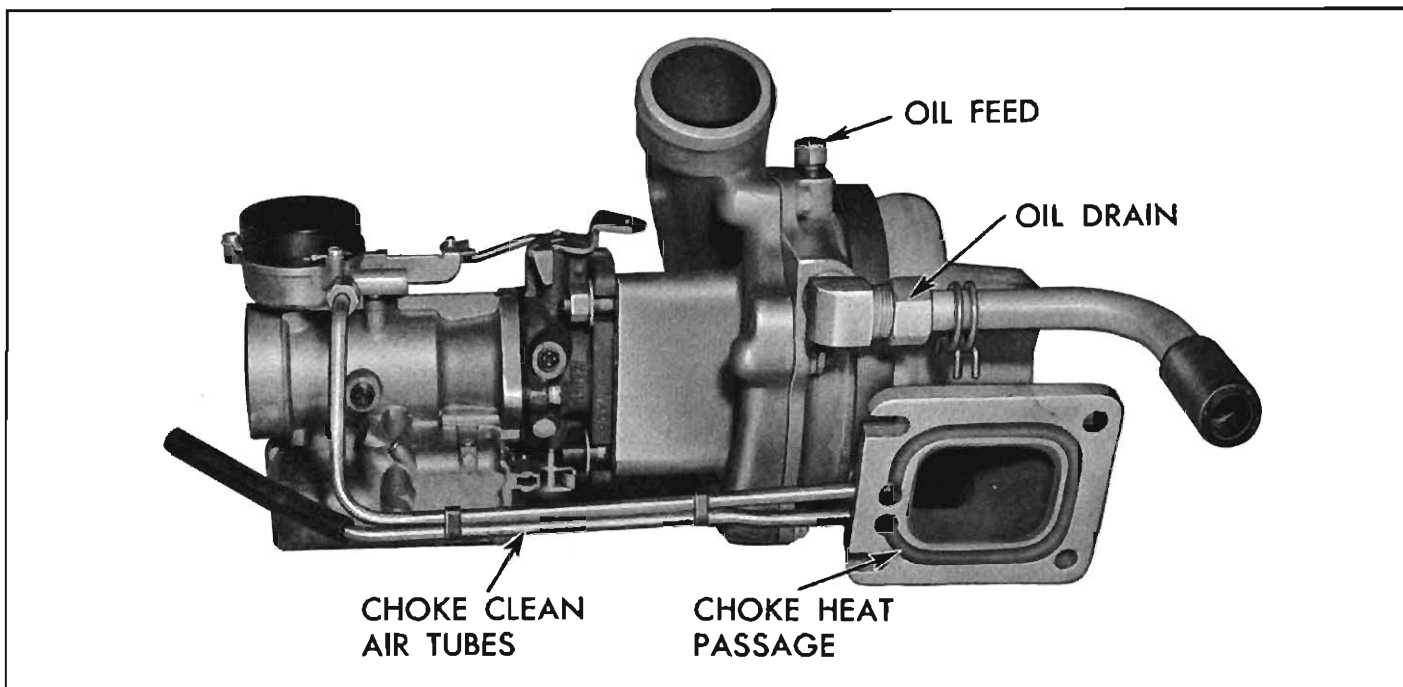


Fig. 9-59—Carburetor Fittings and Passages

**Installation to Vehicle**

1. Position gasket around turbine wheel shield and CAREFULLY hold supercharger and carburetor assembly in place against turbine housing on vehicle and install turbine housing ("V" type) clamp around flanges so the clamp nut and stud will be to the top of the assembly with nut installed from rear of vehicle.
2. Rotate the assembly as necessary to align manifold tube hose and oil lines, then torque the clamp nut to 30-40 inch lbs.
3. Connect manifold cross tube hose, oil drain and oil feed lines at supercharger bearing housing.
4. Connect accelerator linkage at carburetor and check adjustment (see Page 4).
5. Connect fuel line and choke heat tube at carburetor.
6. Install air cleaner and connect choke clean air tube at cleaner.

**INSTALLATION OF A REPLACEMENT SUPERCHARGER UNIT (Figs. 9-58 and 9-59)**

When installing a replacement unit, remove the supercharger "V" clamp and separate the turbine housing from the rest of supercharger; install choke heat tubes, then install the turbine housing section separately at outlined above.

Transfer oil line fittings to supercharger housing; install carburetor to supercharger, then install this assembly as outlined above.

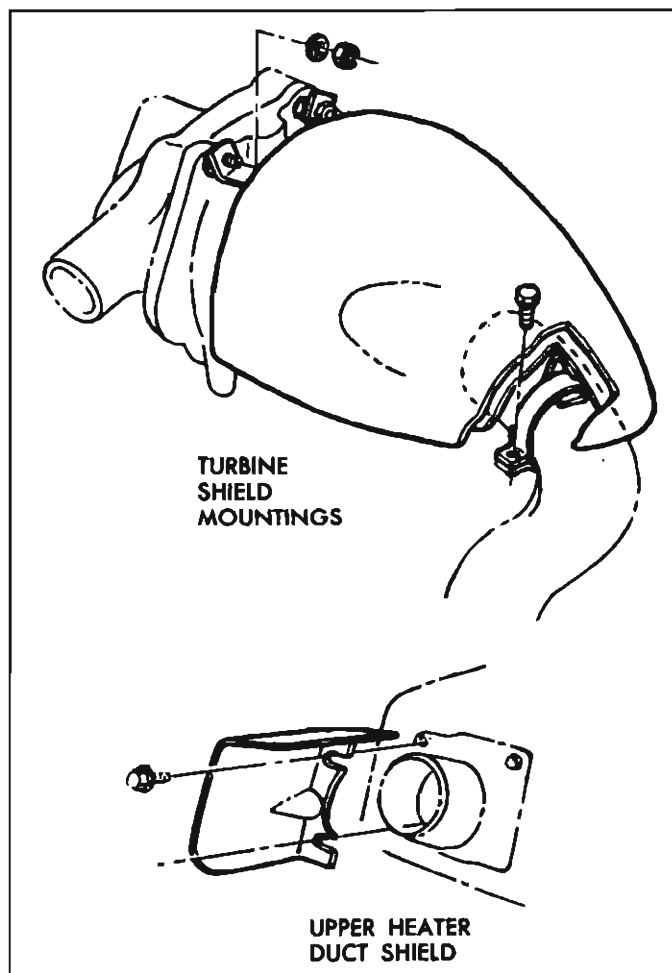


Fig. 9-60—Turbine Exhaust Heat Shields

## EXHAUST SYSTEM

The exhaust system consists of exhaust pipe, turbine inlet pipe, turbine outlet pipe, engine shield insulator, muffler, tail pipe and turbine heat shield (figs. 9-60-61-62).

### Charger Exhaust Heat Shield, Remove and Install (Fig. 9-60)

1. Remove spare tire.
2. Remove two bolts at compressor housing and loosen clamp bolt at outlet pipe under shield.
3. Lift large end of shield away from turbine and slide shield attaching leg from clamp on outlet pipe.
4. Reverse removal procedure to install.

### Muffler Replacement (Fig. 9-61)

The muffler is replaced in the same manner as on the regular Corvair engine except that the tail pipe is a separate part and must be removed from the muffler and reinstalled on new muffler if it is reusable.

### Exhaust Pipe, Replace (Fig. 9-61)

1. Raise vehicle and support it on stands.
2. Remove 2 bolts at each manifold flange and slide flange plates off studs.
3. Remove clamp at turbine inlet pipe connection. (This clamp may have to be cut in order to remove it.)
4. The exhaust pipe may now be wobbled for removal from turbine inlet pipe. (If new exhaust pipe is to be installed, cutting the pipe near the "Y" weld may facilitate removal.)
5. Position new pipe (or reusable one) in approximate installed position and wiggle it to work the pipe over the turbine inlet connection.

**NOTE:** Be sure flange plate on left side is near the manifold since there is not enough clearance to slide it across the pipe under the trans-axle.

6. Slide flange plates over manifold studs and install nuts.

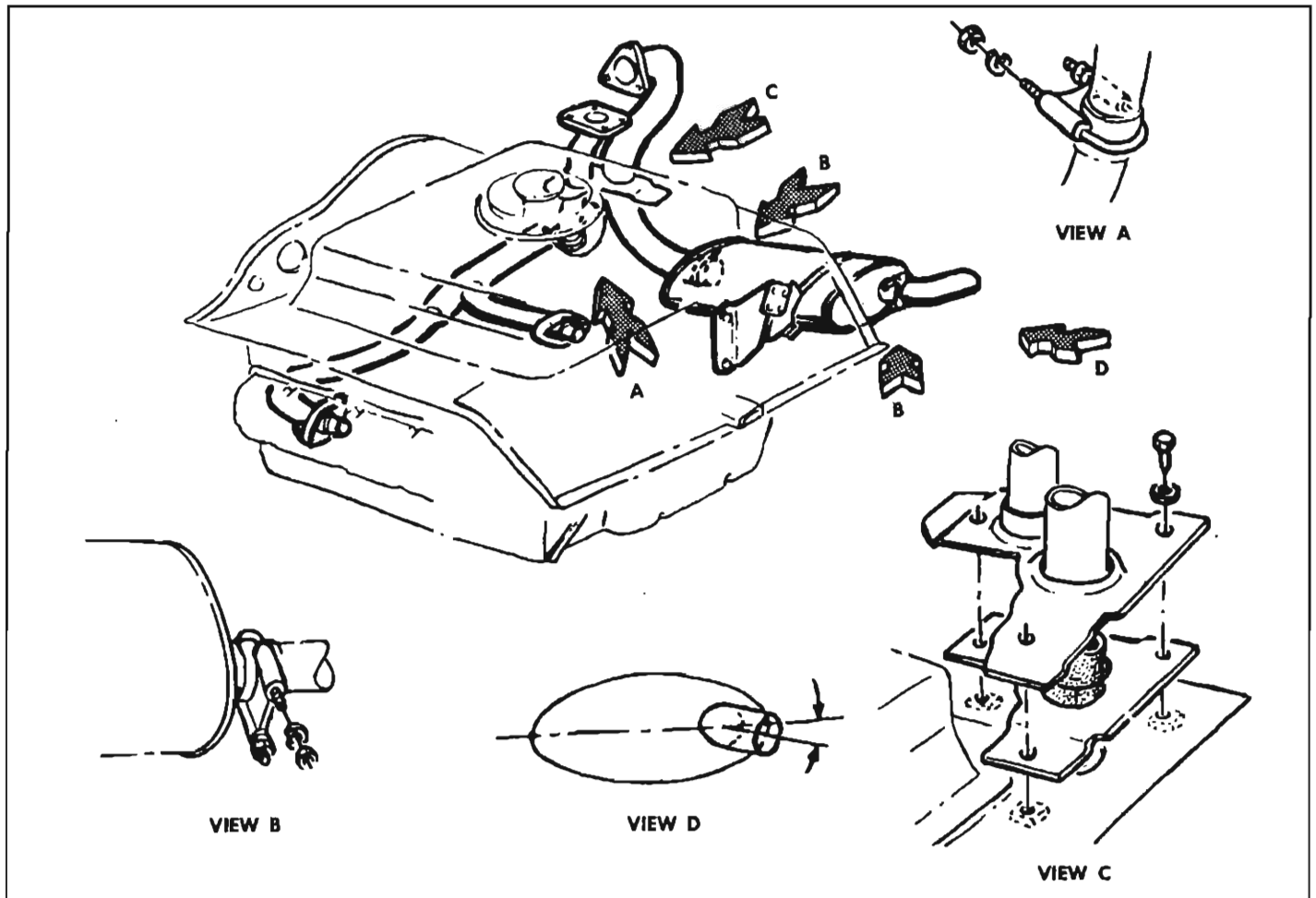


Fig. 9-61—Exhaust System Components

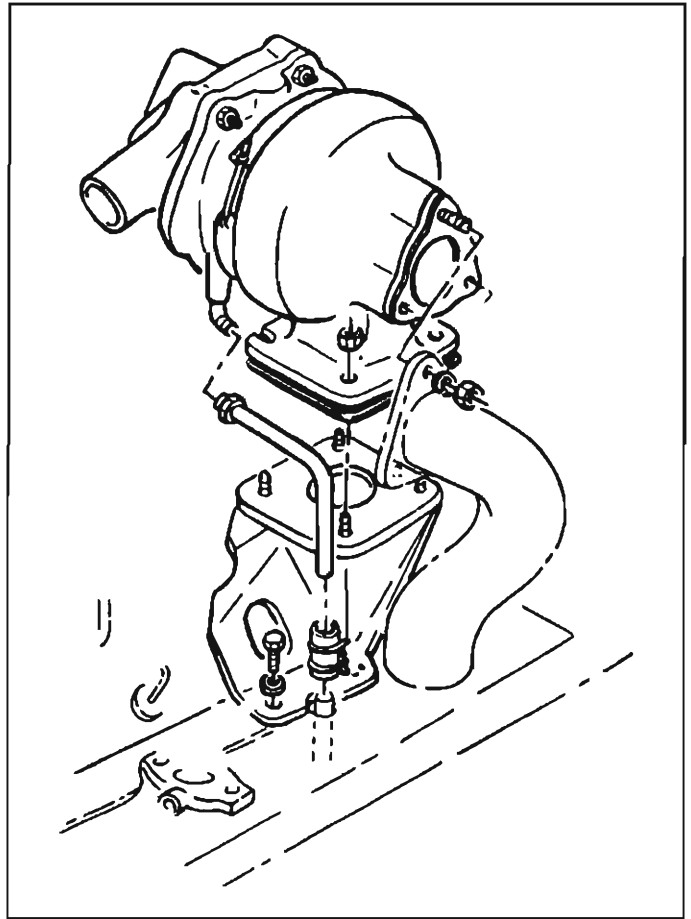
7. Install new clamp at turbine inlet connection.
8. Remove stands and lower vehicle.

### **Turbine Outlet Pipe, Replace**

1. Raise vehicle enough to work under rear end and support on stands.
2. Remove muffler and tail pipe as an assembly.
3. Remove spare tire and turbine exhaust shield.
4. Remove three nuts and washers from turbine flange studs (fig. 9-62).
5. The pipe now may be pulled off the turbine flange studs and twisted as needed for removal upward through insulator in engine side shield.
6. Reverse removal procedure for installation using a new turbine outlet flange gasket and a new clamp at muffler.

### **Turbine Inlet Pipe, Replace**

1. Raise vehicle enough for work clearance and support on stands.
2. Remove engine exhaust pipe assembly.
3. Loosen muffler support band so turbine outlet pipe may be jiggled while removing supercharger assembly.
4. Remove spare tire and turbine exhaust shield.
5. Disconnect supercharger oil feed and drain lines at charger.
6. Remove air cleaner and disconnect charger to induction tube hose.
7. Disconnect accelerator linkage and gas line at carburetor.
8. Remove 3 nuts and washers on turbine outlet flange and 4 on inlet flange.
9. Swing outlet pipe of supercharger flange and lift



**Fig. 9-62—Turbine Housing Flanges and Gaskets**

- supercharger and carburetor (as an assembly) out of vehicle.
10. Remove 2 bolts and washers from turbine support and remove turbine inlet pipe and support as an assembly up out of insulator on engine side shield.
  11. Remove support from inlet pipe flange.
  12. Reverse removal steps to install, using new gaskets at turbine inlet and outlet flanges and a new clamp at exhaust pipe connection to turbine inlet pipe.