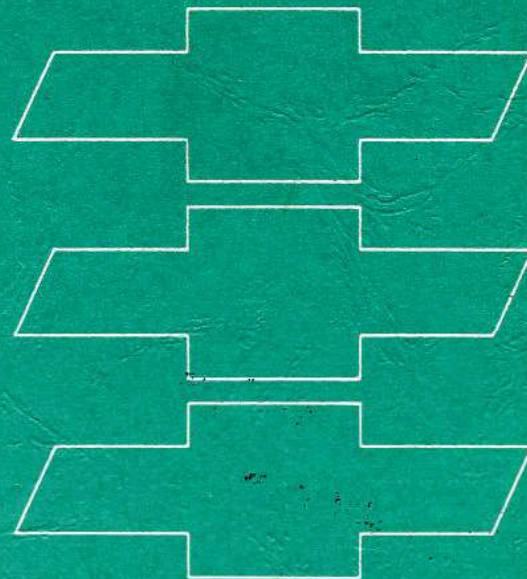
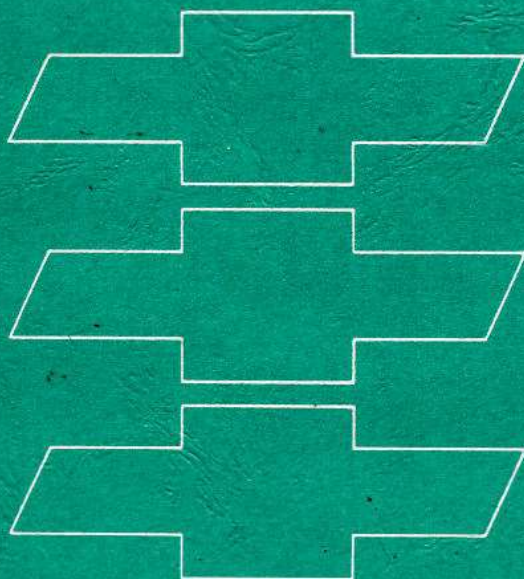


**1965**



**CORVAIR**



**CHASSIS  
SHOP  
MANUAL**



# 1965 CHEVROLET CORVAIR CHASSIS SHOP MANUAL

## FOREWORD

This manual is designed to provide complete information on the maintenance and repair of various units, except the Body, of the 1965 Chevrolet Corvair Passenger Vehicles. Service information for 1965 body items for these vehicles is contained in the 1965 Body Service Manual. For service information on the 1965 Corvair Greenbrier refer to the 1961 Corvair Shop Manual and the 1964 Corvair Shop Manual Supplement.

An effort has been made to produce a manual that will serve as a ready reference book for the experienced service man and also cover step by step procedure for the guidance of the less experienced man.

The Section Index on this page enables the user to quickly locate any desired section. At the beginning of each section, a Table of Contents gives the page number on which major subjects begin. An Index is placed at the beginning of each major subject within the section.

Summaries of Special Tools, when required, are found at the end of major sections, while Specifications covering vehicle components are presented at the rear of the manual.

This manual should be kept in a handy place for ready reference. If properly used, it will enable the technician to better serve the owners of Chevrolet Corvair vehicles.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

## CHEVROLET MOTOR DIVISION

General Motors Corporation  
DETROIT, MICHIGAN

## SECTION INDEX

| SECTION | NAME                                |
|---------|-------------------------------------|
| 0       | GENERAL INFORMATION AND LUBRICATION |
| 3       | FRONT SUSPENSION                    |
| 4       | REAR AXLE AND REAR SUSPENSION       |
| 5       | BRAKES                              |
| 6       | ENGINE                              |
| 6M      | ENGINE FUEL                         |
| 6Y      | ENGINE ELECTRICAL                   |
| 7       | TRANSMISSION, CLUTCH AND CONTROLS   |
| 8       | FUEL TANK AND EXHAUST SYSTEM        |
| 9       | STEERING                            |
| 10      | WHEELS AND TIRES                    |
| 11      | SHEET METAL                         |
| 12      | CHASSIS ELECTRICAL                  |
| 14      | BUMPERS                             |
| 15      | HEATER AND ACCESSORIES              |
|         | SPECIFICATIONS                      |



# SECTION 6M

## ENGINE FUEL

### CONTENTS OF THIS SECTION

|                        | Page  |                         | Page  |
|------------------------|-------|-------------------------|-------|
| Carburetors . . . . .  | 6M-1  | Turbocharger . . . . .  | 6M-17 |
| Rochester HV . . . . . | 6M-1  | Fuel Pump . . . . .     | 6M-26 |
| Rochester H. . . . .   | 6M-8  | Air Cleaners . . . . .  | 6M-28 |
| Carter YH . . . . .    | 6M-12 | Special Tools . . . . . | 6M-30 |

## CARBURETORS

### ROCHESTER HV

#### INDEX

|   | Page |                                     | Page |
|---|------|-------------------------------------|------|
| General Description . . . . .               | 6M-1 | Cleaning and Inspection . . . . .   | 6M-3 |
| Service Procedures . . . . .                | 6M-1 | Assembly and Adjustments . . . . .  | 6M-5 |
| Carburetor Synchronization . . . . .        | 6M-1 | Float Adjustments . . . . .         | 6M-5 |
| Idle Speed and Mixture Adjustment . . . . . | 6M-1 | Pump Rod Adjustment . . . . .       | 6M-6 |
| Choke Adjustment . . . . .                  | 6M-1 | Vacuum Break Adjustment . . . . .   | 6M-6 |
| Additional Checks and Adjustments . . . . . | 6M-1 | Choke Unloader Adjustment . . . . . | 6M-6 |
| Choke Coil Replacement . . . . .            | 6M-2 | Fast Idle Cam Adjustment . . . . .  | 6M-7 |
| Repair Procedures . . . . .                 | 6M-2 | Vapor Vent Adjustment . . . . .     | 6M-7 |
| Removal . . . . .                           | 6M-2 | Installation . . . . .              | 6M-7 |
| Disassembly . . . . .                       | 6M-2 |                                     |      |

### GENERAL DESCRIPTION

This section covers the two identical Rochester HV Carburetors (fig. 1) used on Corvair 10100 and 10500

series and also used as primary carburetors on the Corvair 10700 series (4 x 1 Carburetors).

### SERVICE PROCEDURES

For Carburetor Synchronization, Idle Speed and Mixture Adjustment and Choke Adjustment refer to Section 6, Engine Tune-Up.

#### Additional Checks and Adjustments

The following checks and adjustments may be made without removing the carburetor from the vehicle. Refer to Repair Procedures, Assembly and Adjustments.

- Float Adjustments
- Pump Rod Adjustment
- Vacuum Break Adjustment
- Choke Unloader Adjustment

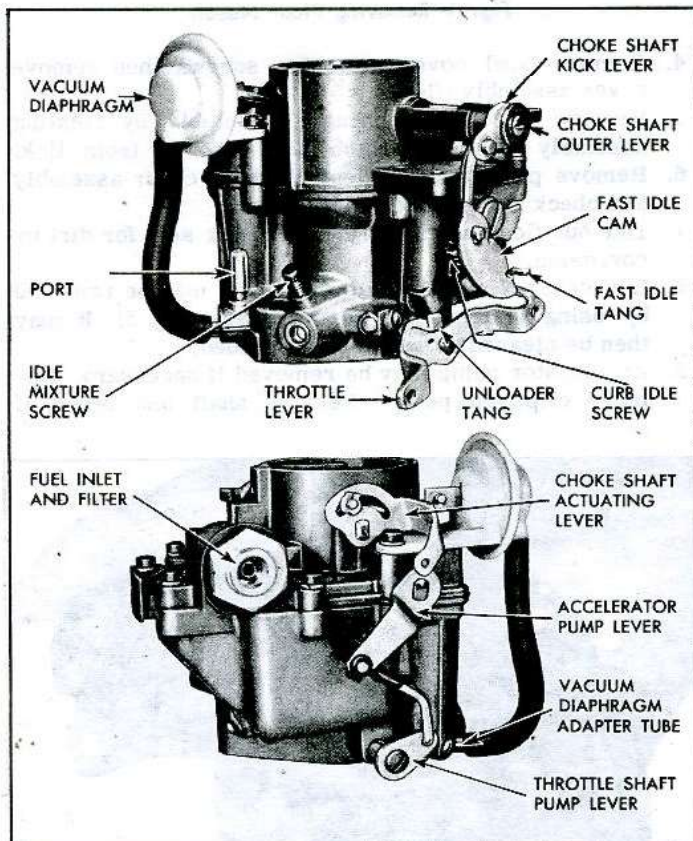


Fig. 1—Rochester HV Carburetor

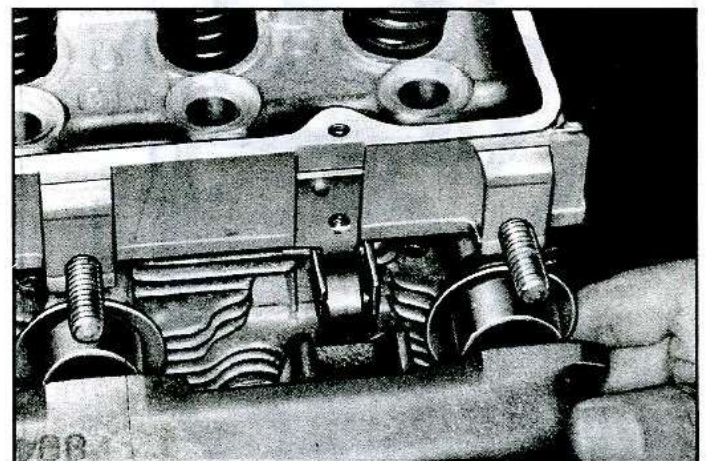


Fig. 2—Choke Coil Mounting



- Fast Idle Cam Adjustment
- Vapor Vent Adjustment

**Choke Coil Replacement**

1. Disconnect and remove upper choke control rod.
2. Remove engine lower shroud as outlined in Section 6.
3. Using a sharp chisel and hammer, with light blows, (hard blows will snap head off rivet), tap head of twist rivet in a counter-clockwise direction until rivet starts out.
4. Grip head of twist rivet with vise-grip pliers and remove by turning counter-clockwise.
5. Remove choke coil and control rod assembly from cylinder head (fig. 2).
6. Remove control rod from choke coil and install in new choke coil.
7. Position choke coil and control rod assembly in cylinder head and tap twist rivet in place with a hammer.
8. Install lower shroud as outlined in Section 6.
9. Install, adjust and connect upper choke control rod as outlined in Section 6, Engine Tune-Up.

**REPAIR PROCEDURES****Removal**

1. Remove air cleaner assembly.
2. Disconnect choke control rod at each carburetor choke shaft lever.
3. Disconnect accelerator return spring and accelerator rod. Disconnect carburetor rods at carburetor throttle levers.
4. Remove all cross-shaft retainer screws and remove cross-shaft assembly.
5. Disconnect gas inlet line from carburetors.
6. Remove two nuts and washers attaching carburetor to intake manifold studs.
7. Remove vacuum advance hose from right carburetor.
8. Remove carburetor from the mounting studs.

**Disassembly**

**CAUTION:** A power enrichment circuit has been added to the 1965 Rochester HV carburetor and care should be taken not to loose the power enrichment needle valve (located under venturi cluster) during carburetor disassembly.

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.

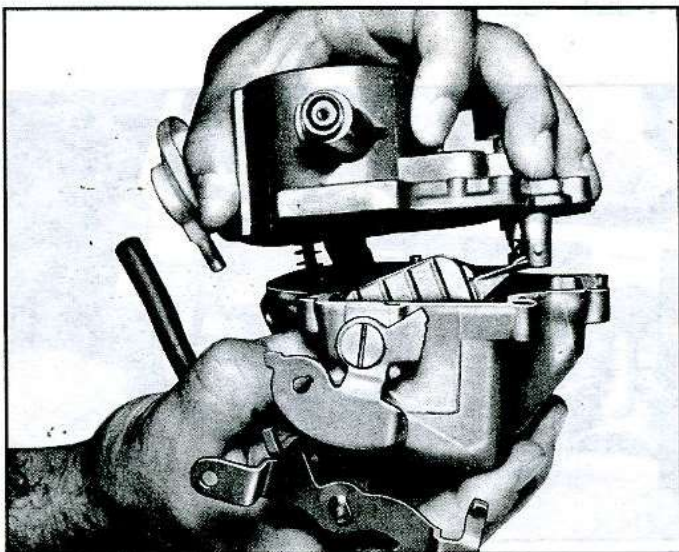


Fig. 3—Removing Bowl Cover

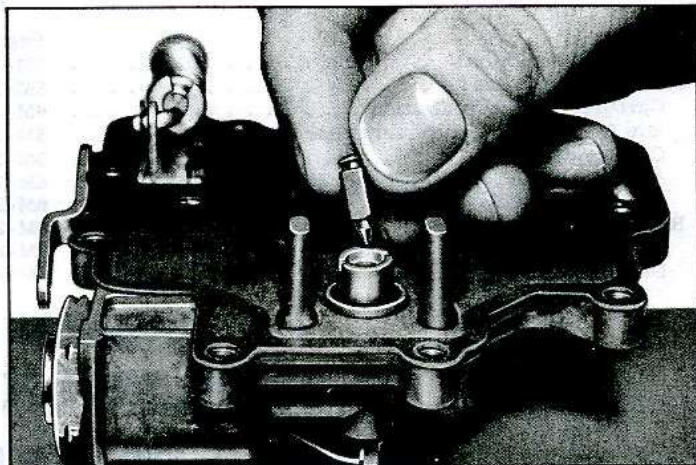


Fig. 4—Removing Float Needle

4. Remove bowl cover attaching screws then remove cover assembly (fig. 3).
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 and check floats for damage.
7. Lift out float needle (fig. 4). Check seat for dirt or corrosion.
8. If necessary, needle seat and gasket may be removed by using a large size screw driver (fig. 5). It may then be cleaned or replaced as needed.
9. Accelerator pump may be removed if necessary. Remove clip and pump. Remove shaft and lever, if

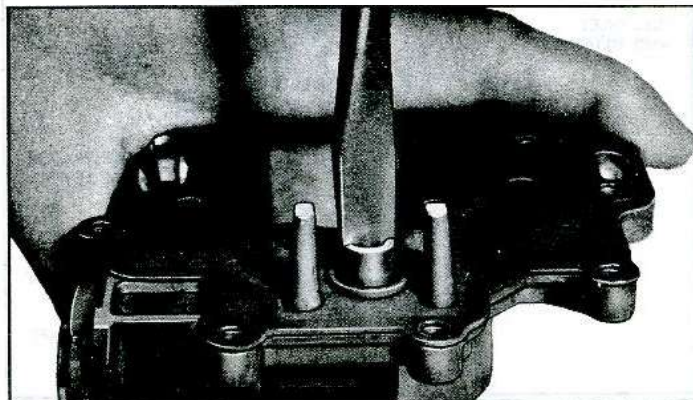


Fig. 5—Removing Needle Seat



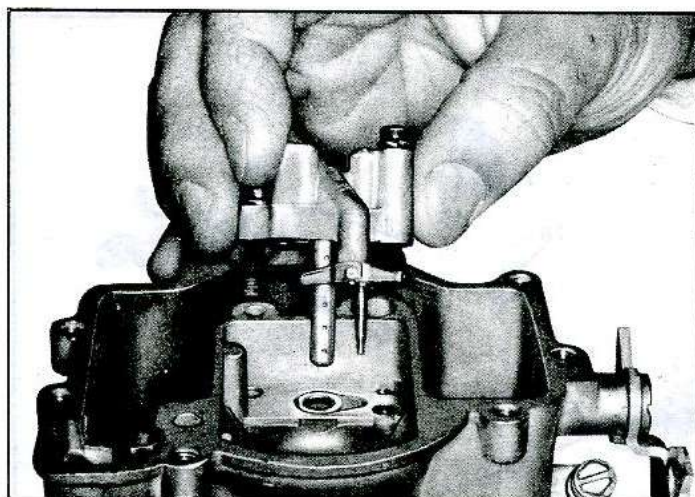


Fig. 6—Removing Venturi Cluster

- desired, by removing clip, shaft and lever.
10. Remove the two screws and lock washers attaching venturi cluster to the bowl assembly and lift out the cluster, gasket and main well insert, (fig. 6).

11. Remove the pump discharge needle valve and power enrichment needle valve.
12. Remove the idle mixture adjusting needle and spring. Remove main metering jet.
13. Remove vapor vent assembly.
14. If necessary, remove two choke valve retaining screws and slide choke valve out of choke shaft. Remove choke shaft from carburetor bowl cover.
15. Remove fast idle cam.
16. If necessary, invert carburetor bowl and remove throttle valve retaining screws 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 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.

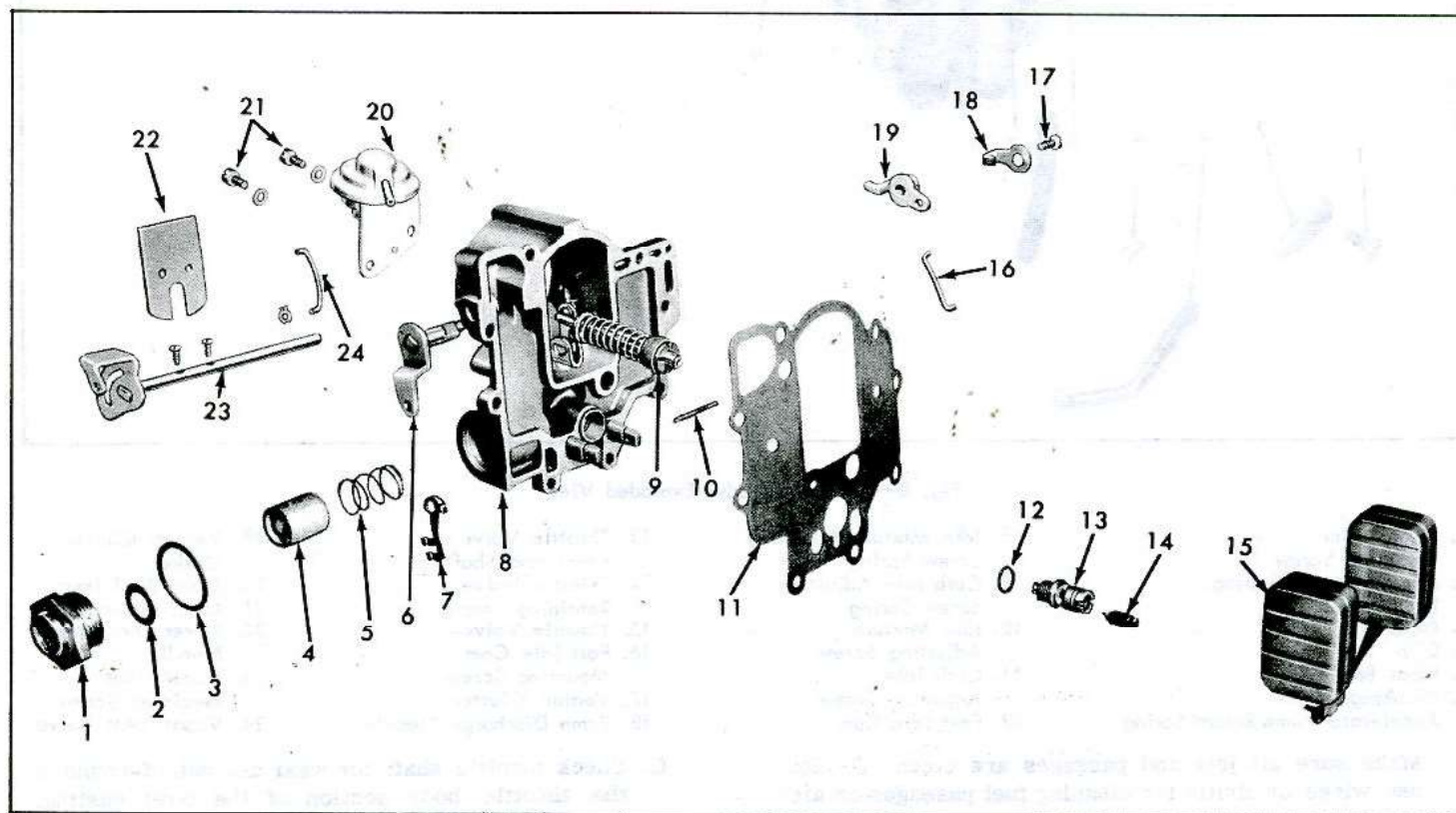


Fig. 7—Bowl Cover—Exploded View

1. Inlet Nut
2. Fuel Filter Gasket
3. Inlet Nut Gasket
4. Fuel Filter Element
5. Fuel Filter Spring
6. Accelerator Pump Lever and Shaft

7. Clip
8. Bowl Cover
9. Accelerator Pump
10. Float Pin
11. Bowl Cover Gasket
12. Needle Seat Gasket
13. Needle Seat

14. Needle
15. Float Assembly
16. Fast Idle Rod
17. Choke Shaft
18. Choke Shaft Outer Lever
19. Choke Shaft Kick Lever

20. Vacuum Diaphragm
21. Retainer Screws
22. Choke Valve
23. Choke Shaft and Lever Assembly
24. Diaphragm Link



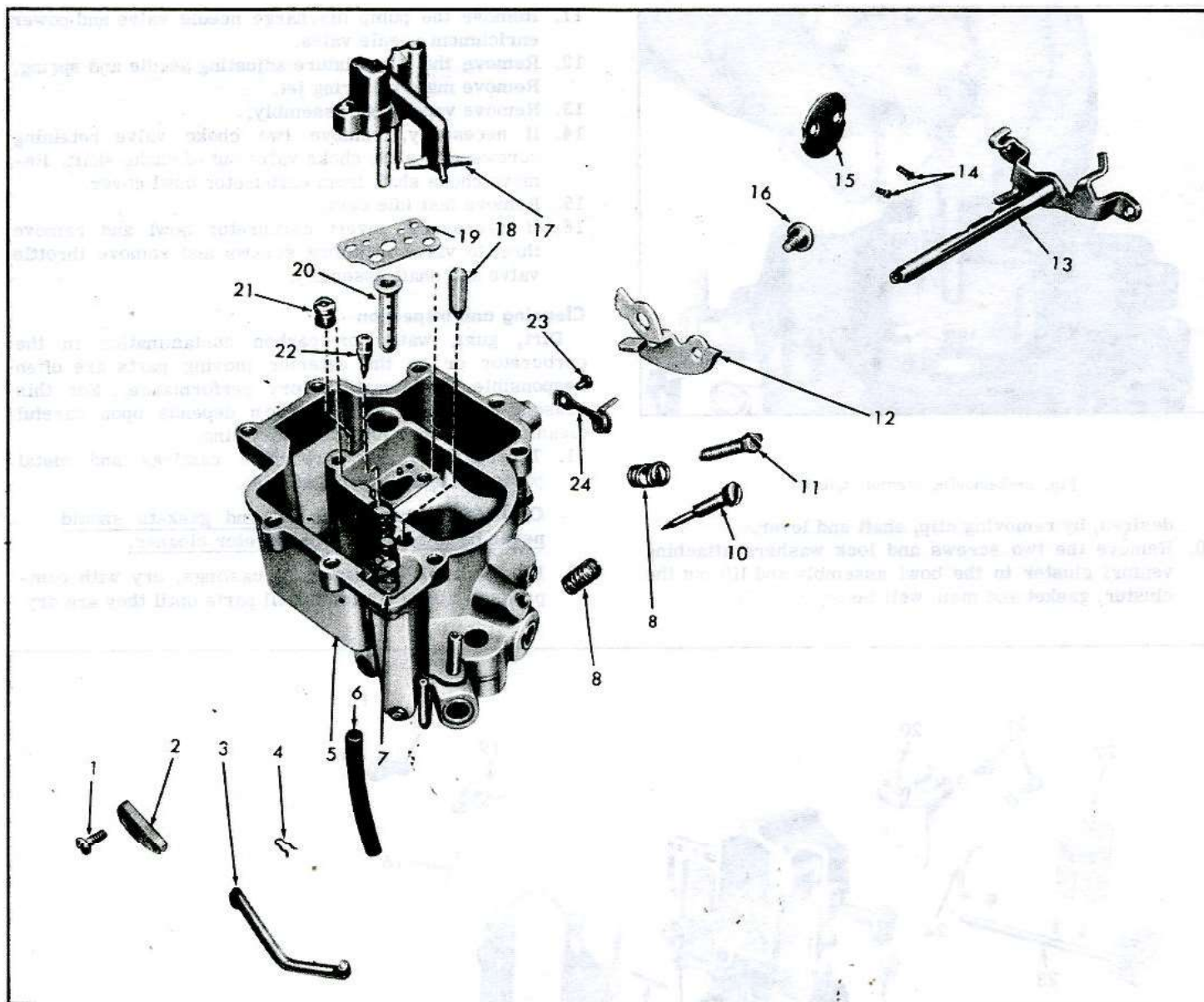


Fig. 8—Carburetor Body—Exploded View

- |                                     |  |                                     |                                |
|-------------------------------------|--|-------------------------------------|--------------------------------|
| 1. Pump Lever Retaining Screw       | 8. Idle Mixture Adjusting Screw Spring | 13. Throttle Valve Lever and Shaft  | 19. Venturi Cluster Gasket     |
| 2. Accelerator Actuating Pump Lever | 9. Curb Idle Adjusting Screw Spring    | 14. Throttle Valve Retaining Screws | 20. Main Well Insert           |
| 3. Pump Rod                         | 10. Idle Mixture Adjusting Screw       | 15. Throttle Valve Mounting Screw   | 21. Main Metering Jet          |
| 4. Clip                             | 11. Curb Idle Adjusting Screw          | 16. Fast Idle Cam                   | 22. Power Enrichment Needle    |
| 5. Float Bowl                       | 12. Fast Idle Cam                      | 17. Venturi Cluster                 | 23. Vapor Vent Retaining Screw |
| 6. Diaphragm Hose                   |  | 18. Pump Discharge Needle           | 24. Vapor Vent Valve           |
| 7. Accelerator Pump Return Spring   |  |                                     |                                |

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 rubber; 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 cluster.



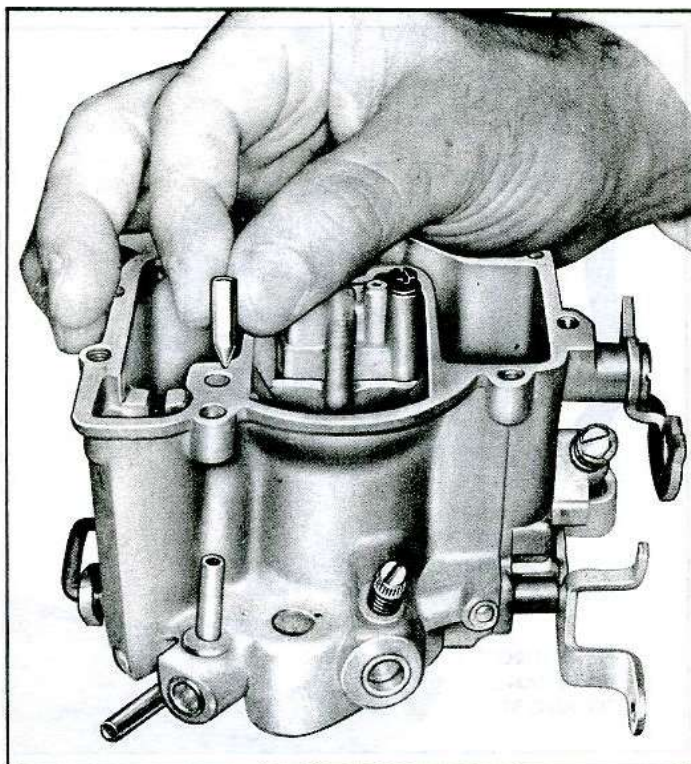


Fig. 9—Installing Pump Discharge Needle

- H. Check choke shaft for wear and choke valve for nicks.
- I. Inspect pump discharge needle and power enrichment needle for wear, burrs or grooves.
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 and Adjustments

1. Install throttle shaft and throttle valve, if removed, with two screws, carefully center and seat valve in shaft and bore.
2. Install vapor vent assembly,

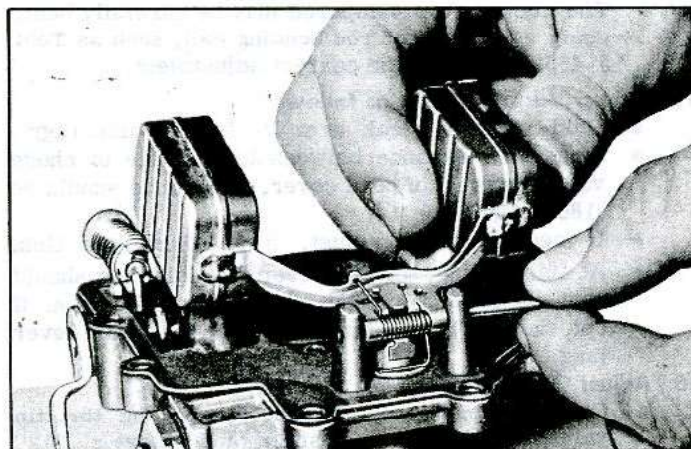


Fig. 10—Replacing Floats

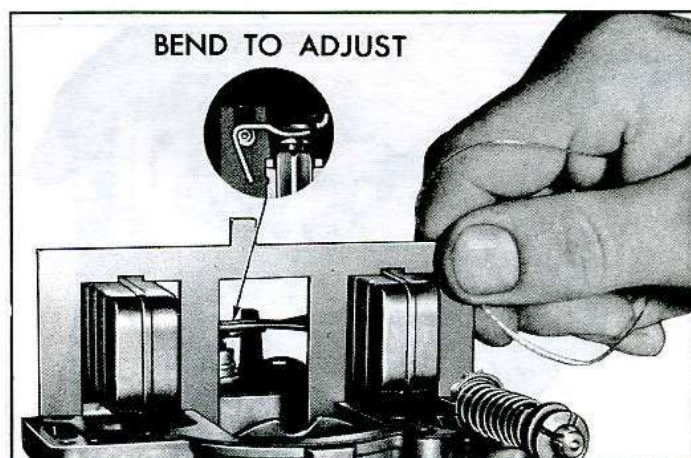


Fig. 11—Checking Float Level

3. Install power valve and main well insert, then install venturi cluster and gasket in bowl assembly, and install the two screws and lock washers.
4. If accelerator pump has been removed, replace pump assembly and install clip.

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

5. Install pump discharge needle (fig. 9).
6. Install choke valve, choke kick lever and outer lever cam. Retain choke valve with two screws. (Choke shaft assembly should rotate freely without binds).
7. Install float needle seat if previously removed from bowl cover.
8. Carefully replace float needle.
9. Install a new gasket and replace float and pin (fig. 10). Check float level and float drop with Tool J-21614 as follows:

#### 10. Check float level and float drop with Tool J-21614 as follows:

- Invert the cover on a flat surface. Place float level tool in Chain Gauge Set J-21614 over float (fig. 11).
- Bend tang located just above the float needle until each float just touches the top of the gauge. Move

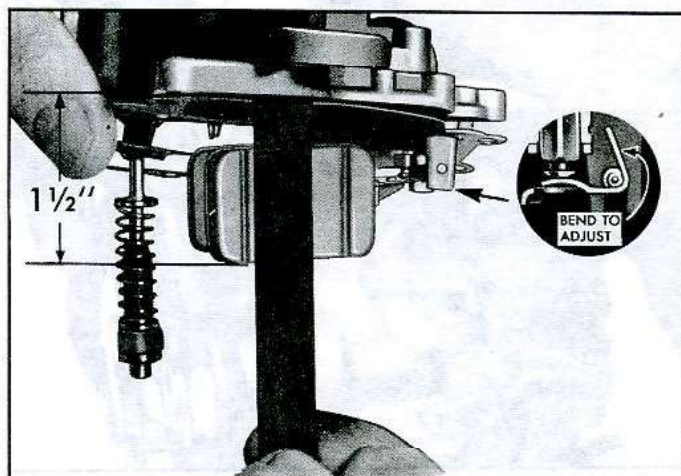


Fig. 12—Measuring Float Drop



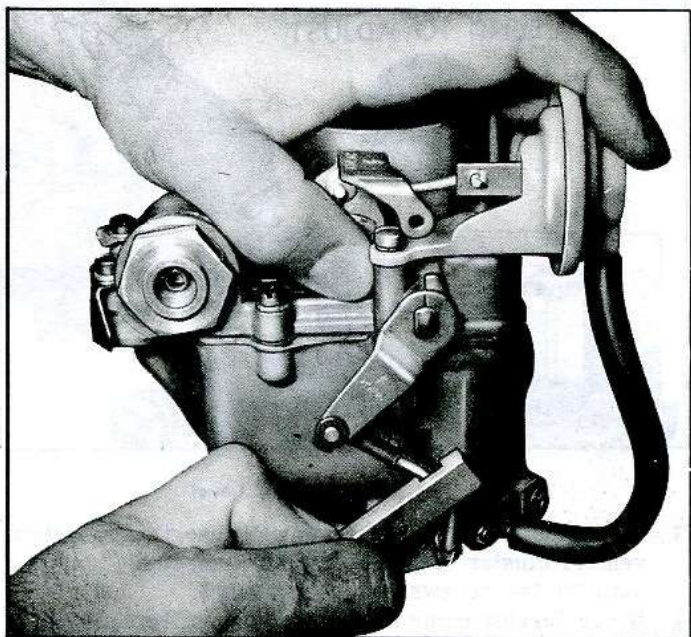


Fig. 13—Adjusting Pump Rod

gauge fore and aft to check that the floats are parallel within  $1/32$  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 rub gauge legs. Recheck float level if alignment is necessary. The float level dimension (top of float to gasket) should be  $1-13/64$  if measured without the gauge.

- Hold bowl cover in an upright position and measure the distance from the gasket to the bottom of the float (fig. 12). This dimension should be  $1-1/2$ ". Bend the tang at the end of the float

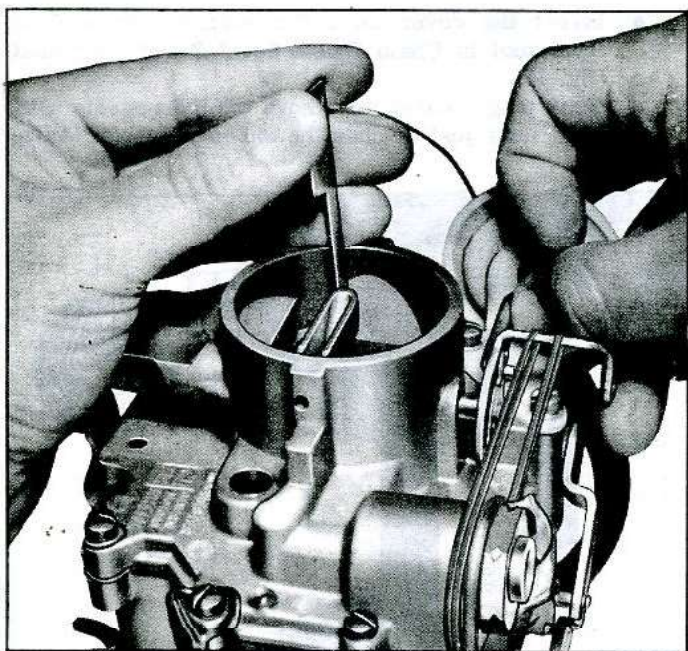


Fig. 14—Vacuum Diaphragm Adjustment

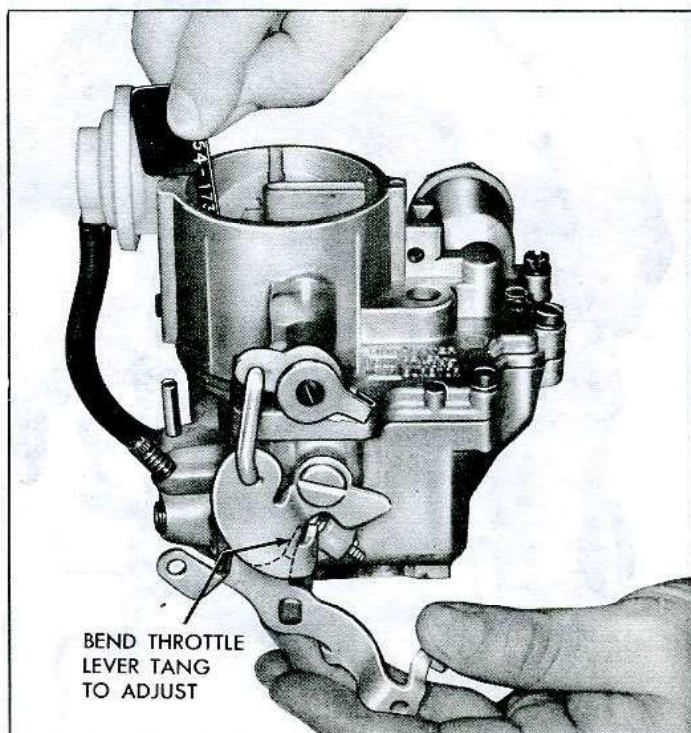


Fig. 15—Choke Unloader Adjustment

hinge arm to obtain the correct drop, recheck setting after this adjustment.

**NOTE:** Float gauge can be indexed at the  $1-1/2$ " point as a permanent gauge.

11. Carefully place bowl cover assembly and new gasket on bowl assembly and install the six screws and lock washers.
12. Replace filter spring, filter gasket, gasket and inlet nut.
13. Install pump rod in pump lever and retain with clip.
14. **Adjust Pump Rod as follows (Fig. 13):**
  - Back off curb and fast idle screws until throttle valve is completely closed.
  - 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.
  - The accelerator pump rod may be carefully bent, using a carburetor rod bending tool, such as Tool J-4552, to obtain the correct adjustment.
15. **Adjust Vacuum Break as follows:**
  - Hold vacuum break arm in against diaphragm.
  - Measure clearance between lower edge of choke valve and wall of bowl cover. Clearance should be  $.180$ "-. $.195$ " (fig. 14).
  - If necessary to adjust, bend diaphragm link.
  - At this setting, throttle lever fast idle tang should rest on second highest step of fast idle cam. If not, adjust by bending other choke shaft lever tang.
16. **Adjust Choke Unloader as follows:**
  - Check unloader adjustment by holding throttle valve in wide open position and insert a  $.312$ " wire gauge between choke valve lower edge and wall of bowl cover (fig. 15).



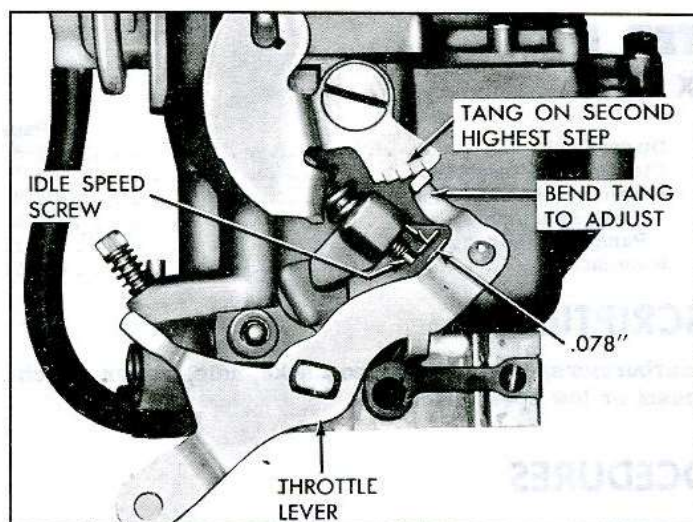


Fig. 16—Fast Idle Adjustment

- To adjust, if necessary, bend tang on throttle lever.

**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.

#### 17. Adjust Fast Idle Cam as follows:

- Insert a strip of paper between idle screw and throttle lever, then holding throttle lever in the closed position with a rubber band, turn idle screw in until a firm drag is felt on the strip of paper.
- Turn idle screw in 1-1/2 additional turns.
- With throttle lever on second highest step of fast idle cam, bend tang to obtain .078" clearance between idle speed screw and throttle lever (fig. 16).

#### 18. Adjust Vapor Vent as follows:

- The vent should just start movement when idle screw is on high step of fast idle cam. The valve will then be open at curb idling setting.

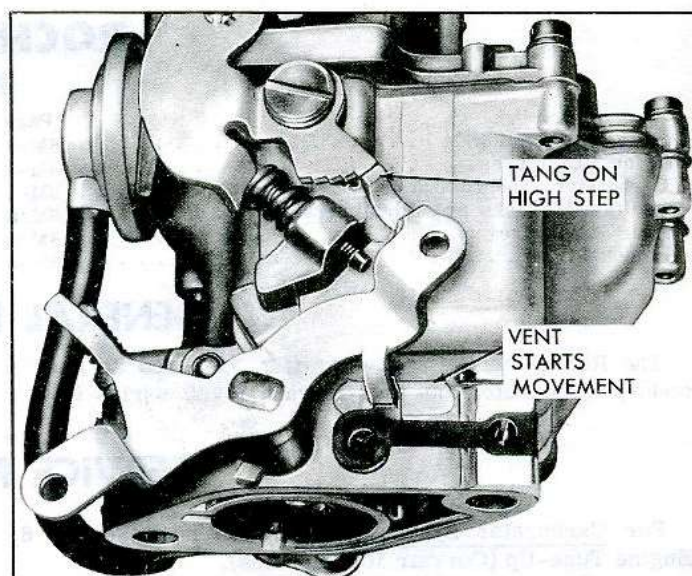


Fig. 17—Vapor Vent Adjustment

- If necessary, adjust by bending throttle lever tang (fig. 17).

#### Installation

1. Install insulator block in place, install carburetor on intake manifold studs. Install two attaching nuts and washers and tighten evenly. On right carburetor, install 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 attaching screws at each carburetor.
3. Connect gas inlet lines.
4. Connect accelerator rod and return spring. Connect throttle rods to throttle levers.
5. Install choke control rod to each carburetor. Adjust as outlined under Section 6, Engine Tune-Up.
6. Check carburetors for Carburetor Synchronization as outlined in Section 6, Engine Tune-Up.
7. Replace air cleaner assembly.



## ROCHESTER H INDEX

|   | Page |                                   | Page  |
|---|------|-----------------------------------|-------|
| General Description . . . . .               | 6M-8 | Disassembly . . . . .             | 6M-8  |
| Service Procedures . . . . .                | 6M-8 | Cleaning and Inspection . . . . . | 6M-9  |
| Carburetor Synchronization . . . . .        | 6M-8 | Assembly and Adjustment . . . . . | 6M-9  |
| Additional Checks and Adjustments . . . . . | 6M-8 | Float Adjustment . . . . .        | 6M-9  |
| Repair Procedures . . . . .                 | 6M-8 | Pump Rod Adjustment . . . . .     | 6M-11 |
| Removal . . . . .                           | 6M-8 | Installation . . . . .            | 6M-11 |

### GENERAL DESCRIPTION

The Rochester H Carburetor (fig. 18) used as a secondary carburetor on the Corvair 10700 series (4 x 1

carburetors) (fig. 19) has no choke, idle, power enrichment or low speed circuits.

### SERVICE PROCEDURES

For Carburetor Synchronization, refer to Section 6, Engine Tune-Up (Corvair 10700 series).

#### Additional Checks and Adjustments

The following checks and adjustments may be made

without removing the carburetor from the vehicle.

- Float Adjustments
- Pump Rod Adjustment

### REPAIR PROCEDURES

#### Removal

1. Disconnect carburetor rods at carburetor throttle levers.
2. Remove linkage bracket retaining screws and swing bracket and linkage up for clearance.
3. Remove two nuts and washers attaching carburetor to intake manifold studs, then remove carburetor.

#### Disassembly

1. Remove clip attaching pump rod to pump lever and disconnect rod from lever.

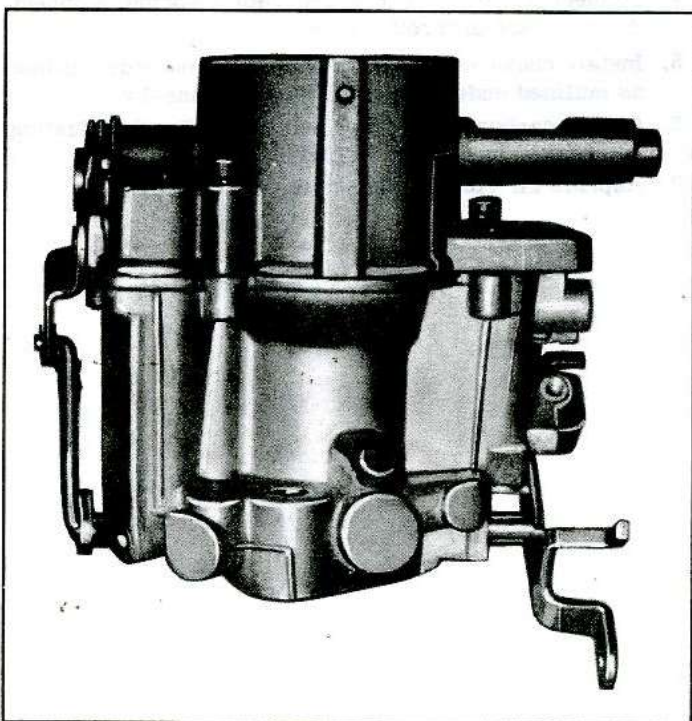


Fig. 18—Rochester H Carburetor

2. Remove fuel inlet nut and gasket and remove filter element and spring.
3. Remove bowl cover attaching screws then remove cover assembly.
4. Remove pin attaching floats to bowl cover assembly and check floats for damage.
5. Lift out float needle. Check seat for dirt or corrosion.
6. If necessary, needle seat and gasket may be removed by using a large size screw driver. It may then be cleaned or replaced as needed.
7. Accelerator pump may be removed if necessary. Remove clip and pump. Remove shaft and lever, if desired, by removing clip, shaft and lever.
8. Remove the two screws and lock washers attaching venturi cluster to the bowl assembly and lift out the cluster, gasket and main well insert.
9. Remove pump discharge needle valve.
10. If necessary, invert carburetor bowl and remove throttle valve retaining screws and remove throttle valve and shaft assembly.

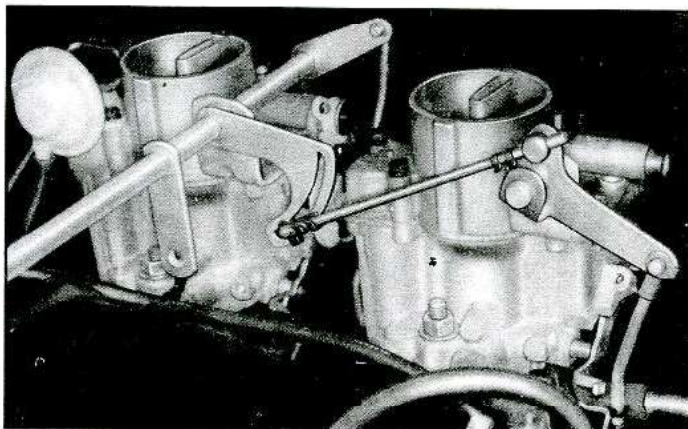


Fig. 19—Rochester H Carburetor Installed



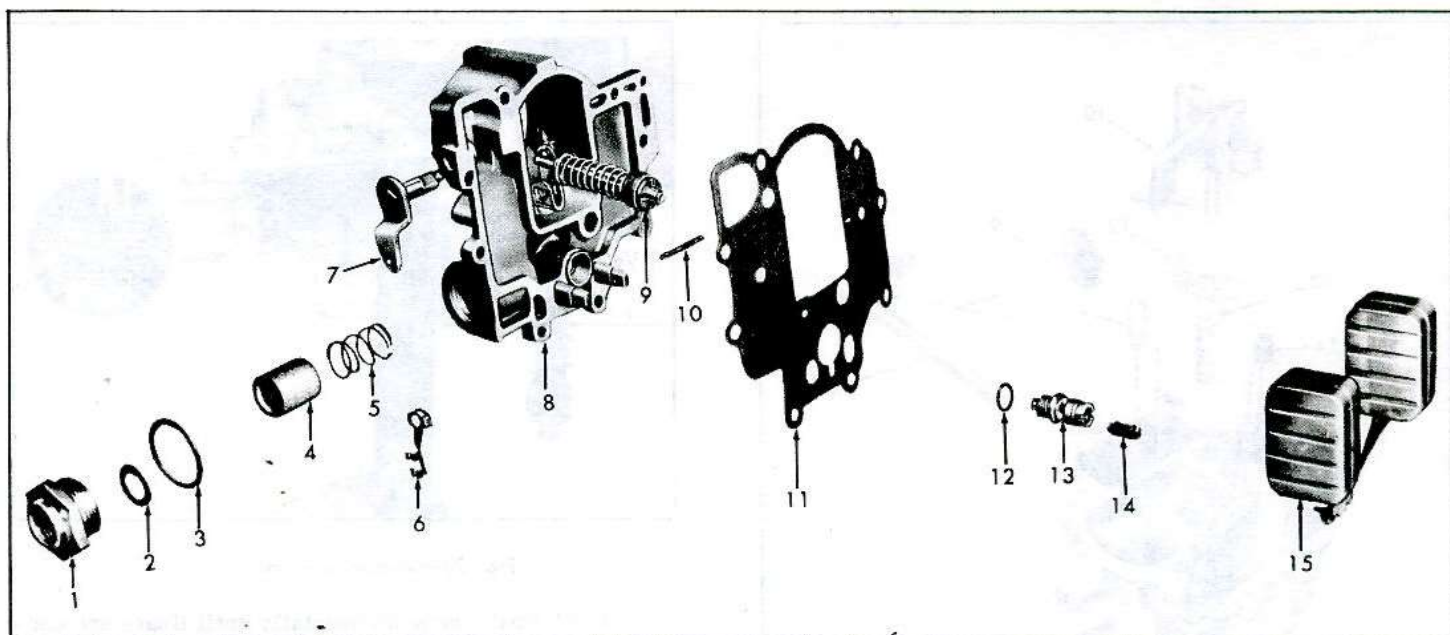


Fig. 20—Bowl Cover—Exploded View

1. Inlet Nut
2. Fuel Filter Gasket
3. Inlet Nut Gasket
4. Fuel Filter Element

5. Fuel Filter Spring
6. Clip
7. Accelerator Pump Lever and Shaft

8. Bowl Cover
9. Accelerator Pump
10. Float Pin
11. Bowl Cover Gasket

12. Needle Seat Gasket
13. Needle Seat
14. Needle
15. Float Assembly

### Cleaning and Inspection

Dirt, gum, water or carbon contamination in the carburetor or on the exterior moving parts are often 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 pump discharge needles for burrs or grooves. Such a condition requires replacement.
- E. Inspect pump plunger rubber; replace pump if damaged or worn.
- F. Inspect pump well in fuel bowl for wear or being scored.
- G. Check that main well nozzle is not bent. Should be exactly 90° from cluster.

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 and Adjustments

1. Install throttle shaft and throttle valve, if removed, with two screws, carefully center and seat valve in shaft and bore.
2. Install main well insert, then install venturi cluster and gasket in bowl assembly and install the two screws and lock washers.
3. If accelerator pump has been removed, replace pump assembly and install clip.

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

4. Install pump discharge needle.
5. Install float needle seat if previously removed from bowl cover.
6. Carefully replace float needle.
7. Install a new gasket and replace float and pin.

### 8. Check float level and float drop with Tool J-21614 as follows:

- Invert the cover on a flat surface. Place float level tool in Chain Gauge Set J-21614 over float (fig. 22).
- 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 1/32 to the bowl cover. Carefully



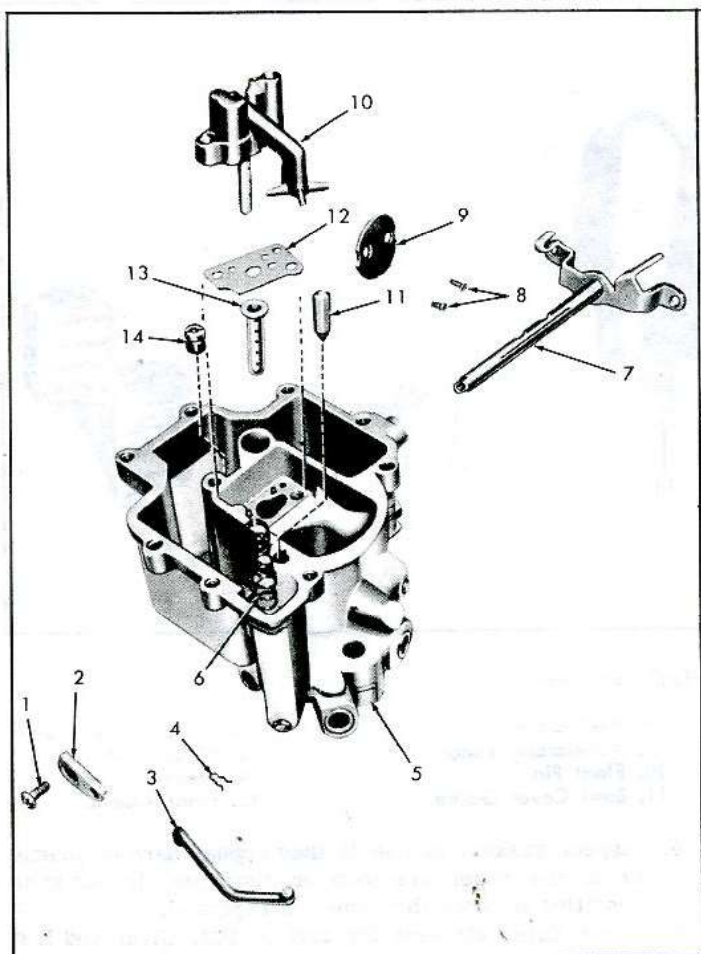


Fig. 21—Carburetor Body—Exploded View

- |                                     |                                    |
|-------------------------------------|------------------------------------|
| 1. Pump Lever Retaining Screw       | 8. Throttle Valve Retaining Screws |
| 2. Accelerator Actuating Pump Lever | 9. Throttle Valve Venturi Cluster  |
| 3. Pump Rod                         | 10. Venturi Cluster                |
| 4. Clip                             | 11. Pump Discharge Needle          |
| 5. Float Bowl                       | 12. Venturi Cluster Gasket         |
| 6. Accelerator Pump Return Spring   | 13. Main Well Insert               |
| 7. Throttle Valve Lever and Shaft   | 14. Main Metering Jet              |

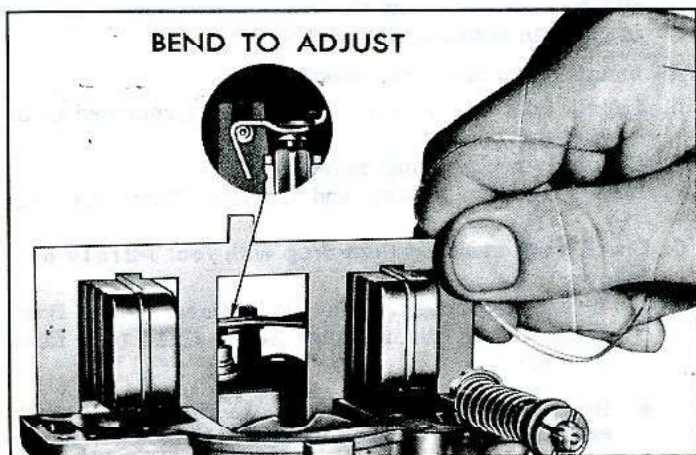


Fig. 22—Checking Float Level

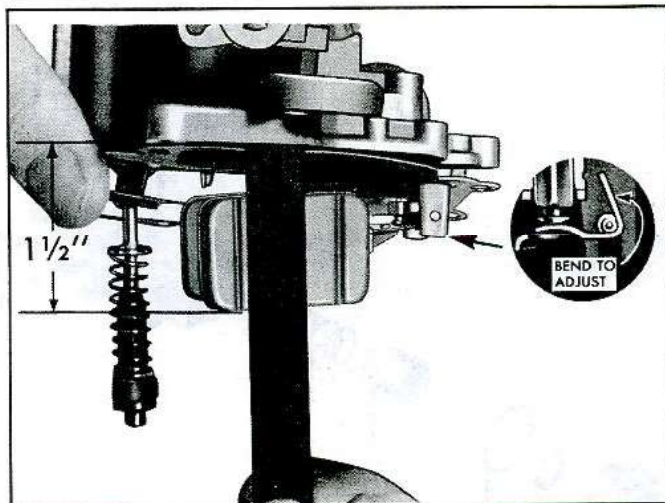


Fig. 23—Measuring Float Drop

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 rub gauge legs. Recheck float level if alignment is necessary. The float level dimension (top of float to gasket) should be 1-13/64 if measured without the gauge.

- Hold bowl cover in an upright position and measure the distance from the gasket to the bottom of the float (fig. 23). This dimension should be 1-1/2". Bend the tang at the end of the float hinge arm to obtain the correct drop, recheck setting after this adjustment.

**NOTE:** Float gauge can be indexed at the 1-1/2" point as a permanent gauge.

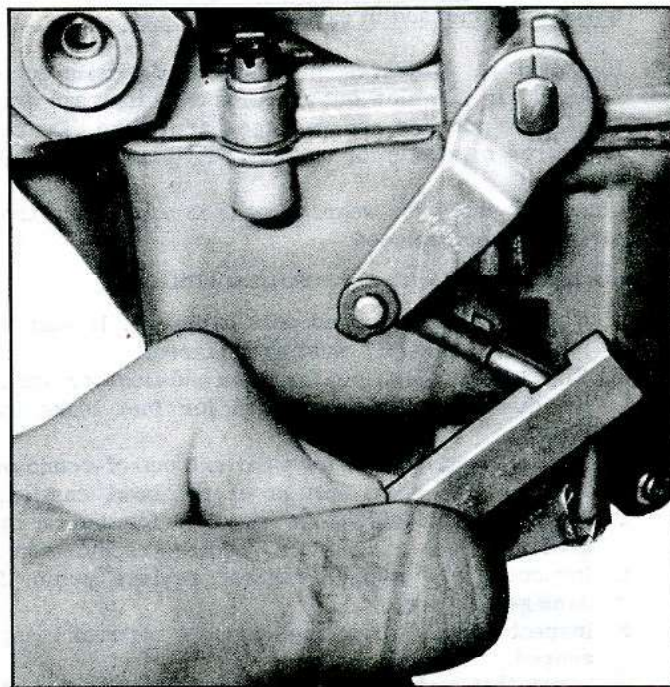


Fig. 24—Adjusting Pump Rod



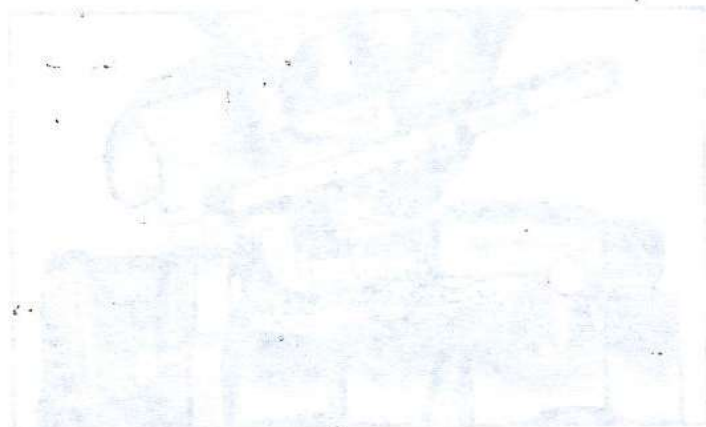
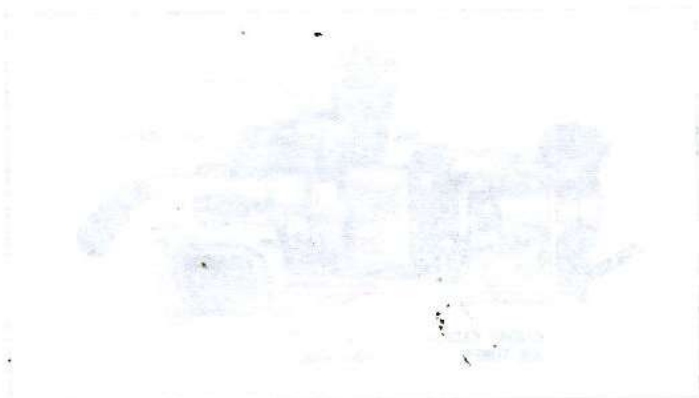
9. Carefully place bowl cover assembly and new gasket on bowl assembly and install the six screws and lock washers.
10. Replace filter spring, filter gasket, gasket and inlet nut.
11. Install pump rod in pump lever and retain with clip.
12. **Adjust Pump Rod as follows (Fig. 24):**

- 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.
- The accelerator pump rod may be carefully bent,

using a carburetor rod bending tool, such as Tool J-4552, to obtain the correct adjustment.

#### Installation

1. Install insulator block in place, install carburetor on on intake manifold studs.
2. Install two attaching nuts and washers and tighten evenly.
3. Swing linkage bracket down and install attaching screws.
4. Connect gas inlet line.
5. Connect carburetor rod at carburetor throttle lever.
6. Check carburetors for Carburetor Synchronization as outlined in Section 6, Engine Tune-Up (Corvair 10700 series).





## CARTER YH

### INDEX

|   | Page  |
|---|-------|
| General Description . . . . .               | 6M-12 |
| Service Procedures . . . . .                | 6M-12 |
| Accelerator Linkage Adjustment . . . . .    | 6M-12 |
| Idle Speed and Mixture Adjustment . . . . . | 6M-12 |
| Choke Adjustment . . . . .                  | 6M-12 |
| Additional Checks and Adjustments . . . . . | 6M-12 |
| Fuel Filter Replacement . . . . .           | 6M-12 |
| Repair Procedures . . . . .                 | 6M-12 |
| Removal . . . . .                           | 6M-12 |

|                                     | Page  |
|-------------------------------------|-------|
| Disassembly . . . . .               | 6M-12 |
| Cleaning and Inspection . . . . .   | 6M-13 |
| Assembly and Adjustments . . . . .  | 6M-14 |
| Metering Rod Adjustment . . . . .   | 6M-15 |
| Float Adjustment . . . . .          | 6M-15 |
| Fast Idle Adjustment . . . . .      | 6M-15 |
| Choke Unloader Adjustment . . . . . | 6M-15 |
| Choke Adjustment . . . . .          | 6M-15 |
| Installation . . . . .              | 6M-16 |

## GENERAL DESCRIPTION

This section covers the Carter YH Carburetor, used in

conjunction with the Turbocharger, as optional equipment (fig. 25).

## SERVICE PROCEDURES

For Accelerator Linkage Adjustment, Idle Speed and Mixture Adjustment and Choke Adjustment refer to Section 6, Engine Tune-Up (Turbocharger Option).

### Additional Checks and Adjustments

The following checks and adjustments may be made without removing the carburetor from the vehicle. Refer to Repair Procedures, Assembly and Adjustments.

- Metering Rod Adjustment
- Float Adjustments
- Fast Idle Adjustment
- Choke Unloader Adjustment
- Choke Adjustment

### Fuel Filter Replacement

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 as recommended in Section 0.

Replacement consists of disconnecting the inlet, outlet and bypass fuel lines, loosening clamp screw and re-

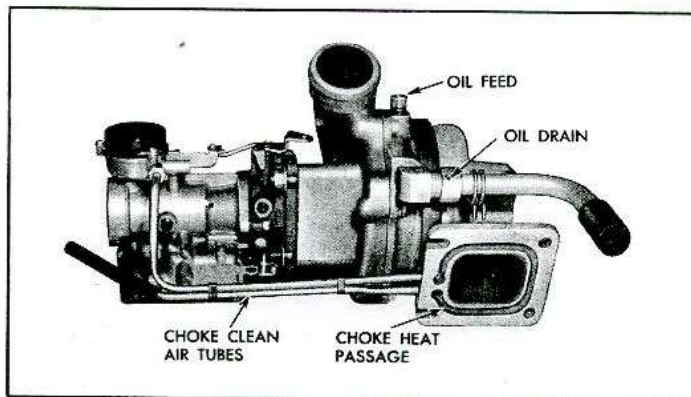


Fig. 25—Carter YH Carburetor

moving filter unit. Reverse to install new unit. (Arrows show flow direction.)

## REPAIR PROCEDURES

### Removal

#### With Turbocharger as an Assembly

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

#### Separately from Turbocharger

1. Remove air cleaner.
2. Disconnect choke heat tube, fuel line and accelerator linkage at carburetor.
3. 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

1. Remove inlet filter screen nut and screen.
2. Remove six screws and float bowl cover (fig. 26).
3. Remove float hinge pin, float and float needle and seat.
4. Remove float bowl cover gasket, tip carburetor and remove pump discharge needle.

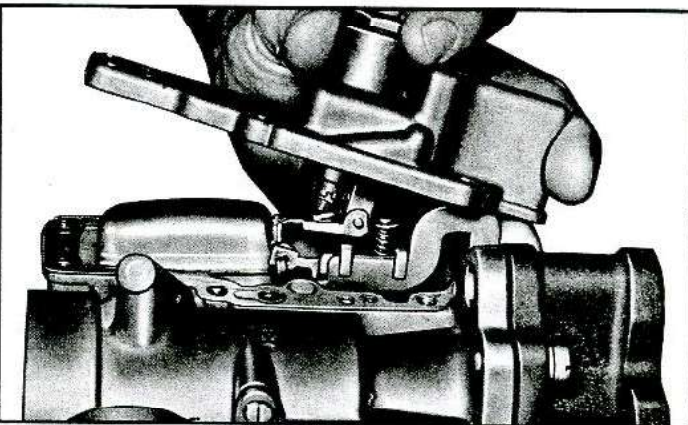


Fig. 26—Removing Bowl Cover



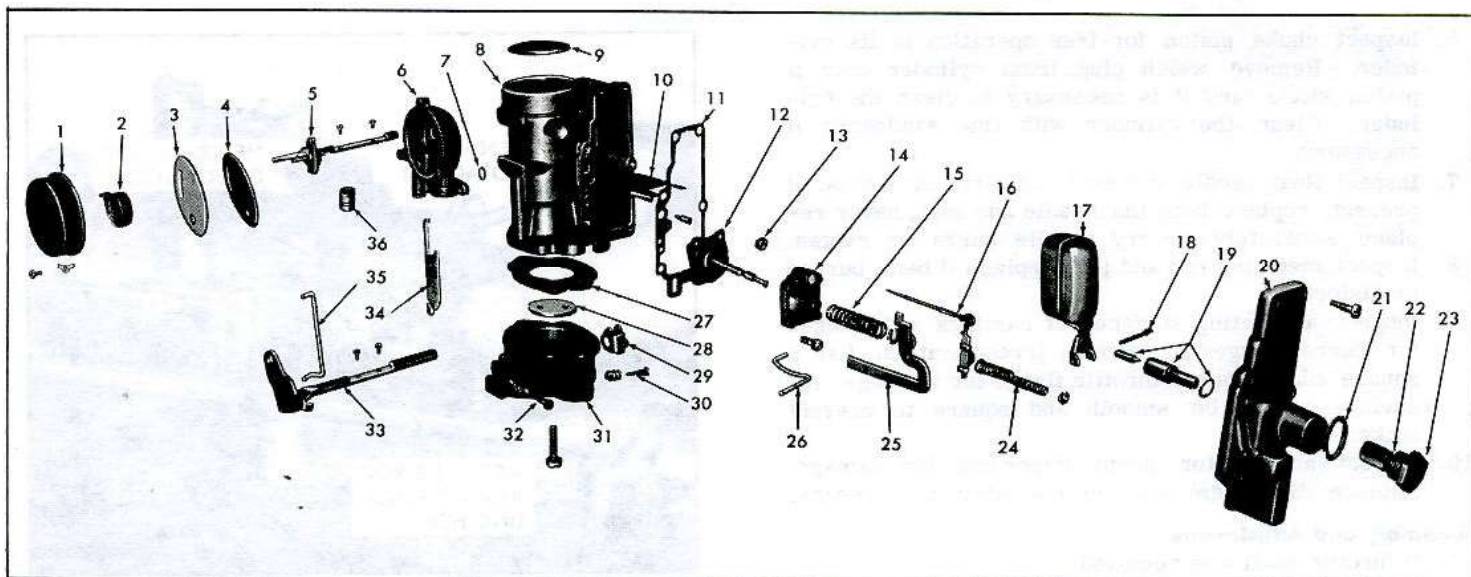


Fig. 27—Carburetor—Exploded View

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

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.
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.

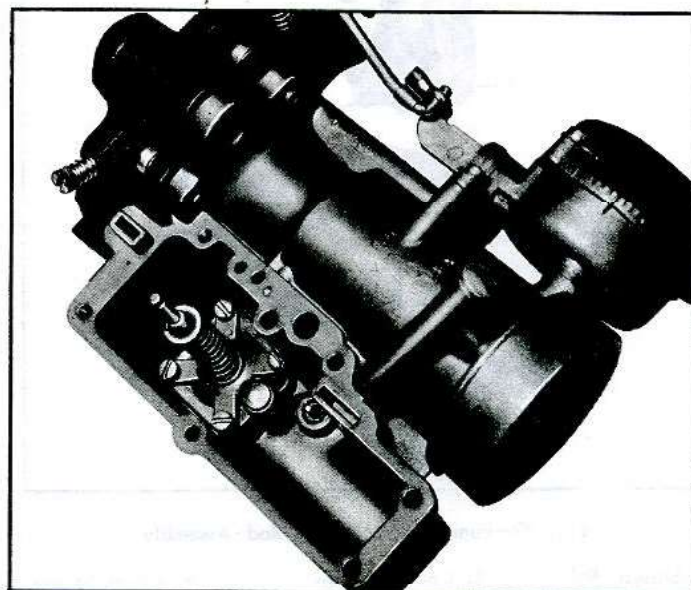


Fig. 28—Pump Diaphragm and Metering Jet Installation



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 and Adjustments

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

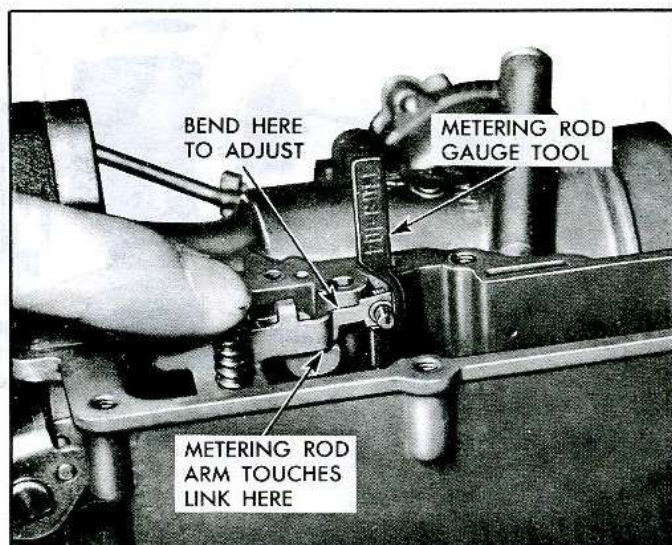


Fig. 30—Adjust Metering Rod Arm

- 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. 28).
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. 29).
9. Install pump and metering rod linkage as follows:
  - a. Pump lifter link in guide opening, insert throttle

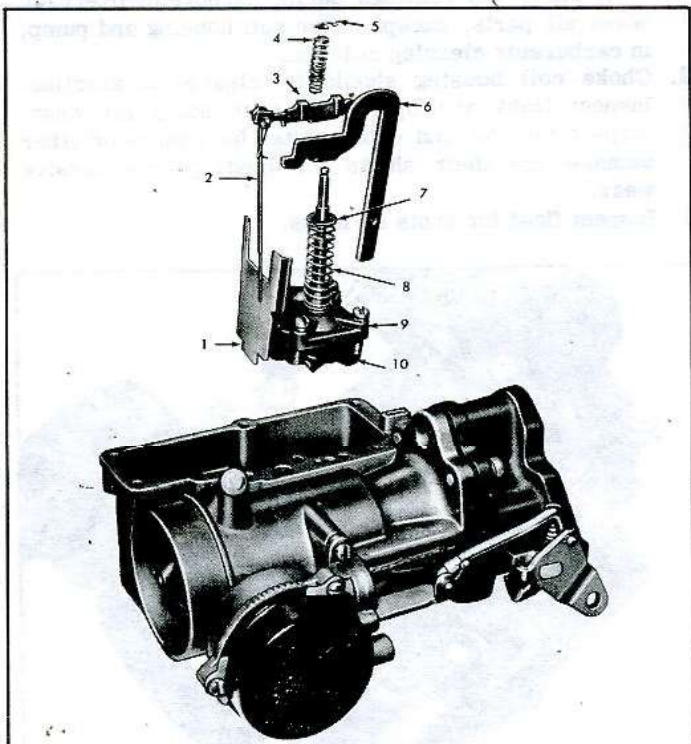


Fig. 29—Pump and Metering Rod Assembly

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

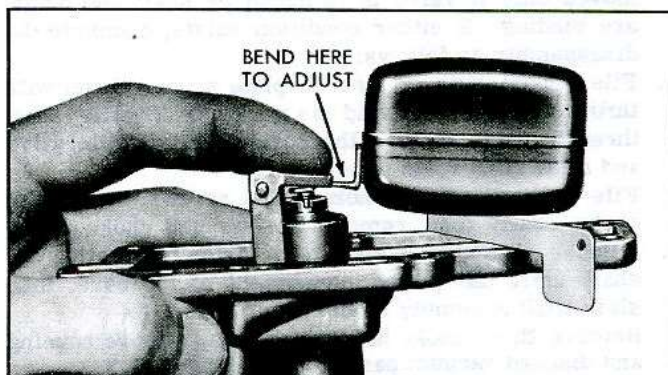


Fig. 31—Adjusting Float Level



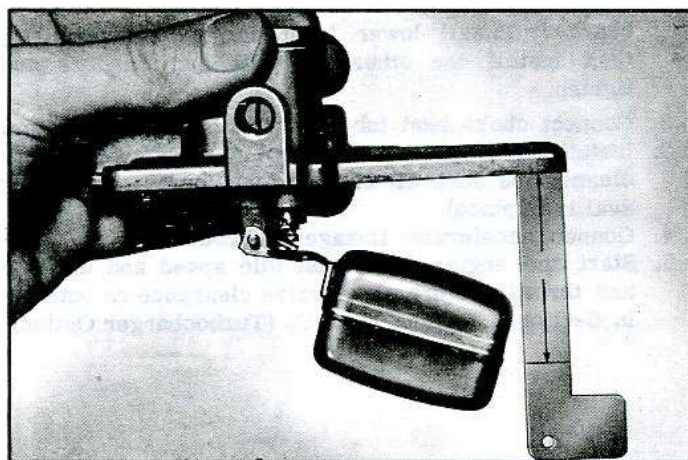


Fig. 32—Measuring Float Drop

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.
- c. Upper spring over pump rod, compress with screw driver 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. ).
- c. Push down on pump diaphragm rod until the metering rod arm just touches the lifter link (fig. 30).
- d. With the gauge (Tool J-21056) in the jet, the metering rod arm pin should just contact the top surface of gauge tool.

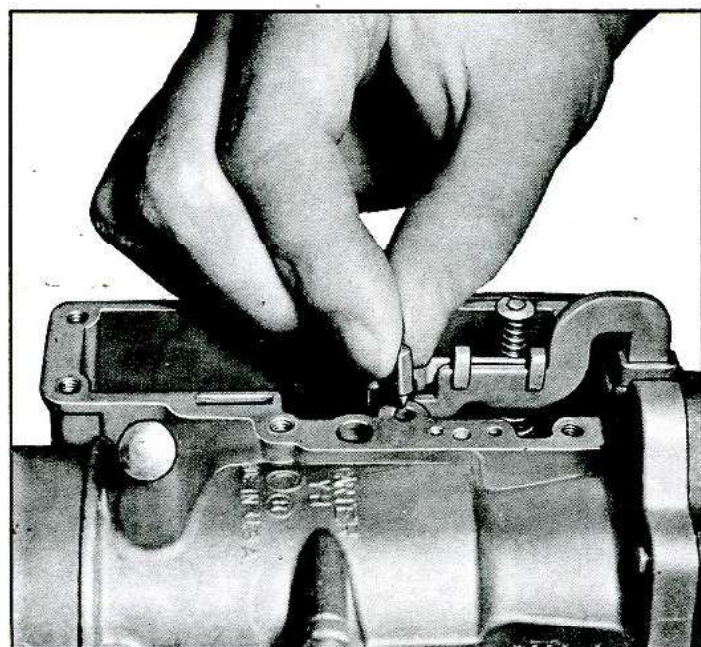


Fig. 33—Install Pump Discharge Needle

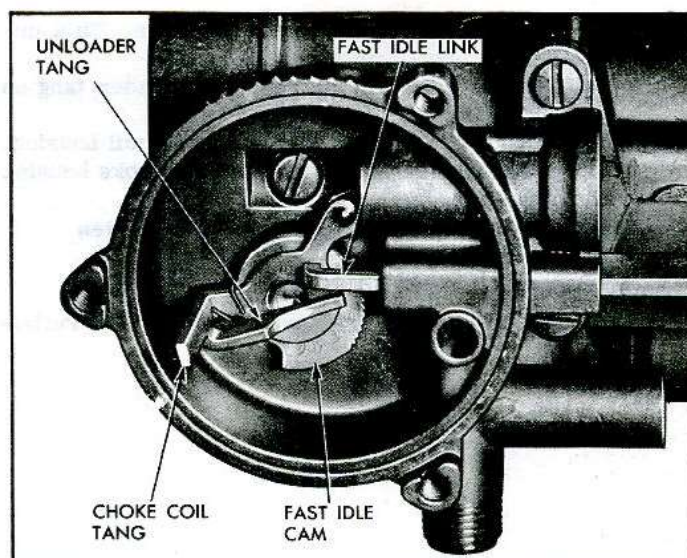


Fig. 34—Choke Housing and Fast Idle Linkage

- e. If necessary, adjust by bending metering rod arm at point shown.
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. **Adjust Float as follows:**
  - Invert cover and measure the distance between cover gasket surface and float at center of float (fig. 31). This **FLOAT LEVEL** dimension should be  $5/8"$  or use Tool J-21056.
  - Adjust, if necessary, by bending float arm.
  - Invert cover to upright position allowing float to hang down.
  - Measure the distance between cover gasket surface and seam of float at free end (fig. 32). This **FLOAT DROP** dimension should be  $2-3/8" \pm 1/16"$ .
  - Adjust by bending the tang at hinge end.
13. Install pump discharge-needle (fig. 33) 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. 34).
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.
  - 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 7/16".

c. If necessary, adjust by bending unloader tang on fast idle cam.

18. Install choke baffle plate, gasket, choke coil housing, housing retainer clips and screws onto choke housing with screws just snug.

19. Adjust coil housing to specifications, then tighten housing retainer screws.

#### Installation

1. Install carburetor over mounting studs on Turbo-

charger; install lower front nut and washer first, then install 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 as outlined in Section 6, Engine Tune-Up (Turbocharger Option).



# TURBOCHARGER

## INDEX

|                               | Page  |   | Page  |
|-------------------------------|-------|---|-------|
| General Description . . . . . | 6M-17 | Disassembly . . . . .                         | 6M-19 |
| Maintenance . . . . .         | 6M-17 | Cleaning and Inspection . . . . .             | 6M-20 |
| Periodic Inspection . . . . . | 6M-17 | Assembly . . . . .                            | 6M-21 |
| Major Inspection . . . . .    | 6M-18 | Installation . . . . .                        | 6M-24 |
| Repair Procedures . . . . .   | 6M-19 | Installing Replacement Turbocharger . . . . . | 6M-25 |
| Removal . . . . .             | 6M-19 |   |       |

## GENERAL DESCRIPTION

The Turbocharger for the Corvair engine is a device to improve engine breathing, thereby increasing horsepower output. The Turbocharger consists of a precision balanced rotating group, enclosed in a contoured housing, with a turbine wheel at one end and a centrifugal impeller at the other. The name Turbocharger is used because the impeller is turbine driven, rather than mechanical as in a supercharger.

Hot exhaust gases are directed against the turbine blades, spinning the turbine, shaft and impeller at a high rate of speed. The impeller, in the Turbocharger housing, draws air-fuel mixture from the carburetor and passes it to the intake manifold at a higher-than-atmospheric pres-

sure. This increases the amount of air-fuel mixture available to the cylinders and results in a greater horsepower output.

As a result of the increase in volume and temperature of the exhaust gases when the engine is under heavy load, the Turbocharger speed automatically increases. This provides more air-fuel mixture, to meet the engine demand (fig. 35).

The Turbocharger turbine and impeller shaft rotates on a semi-floating sleeve bearing. The bearing is lubricated with engine oil, under pressure, from the oil filter adapter. The oil is drained through a large tube into the rocker arm area of the right cylinder head.

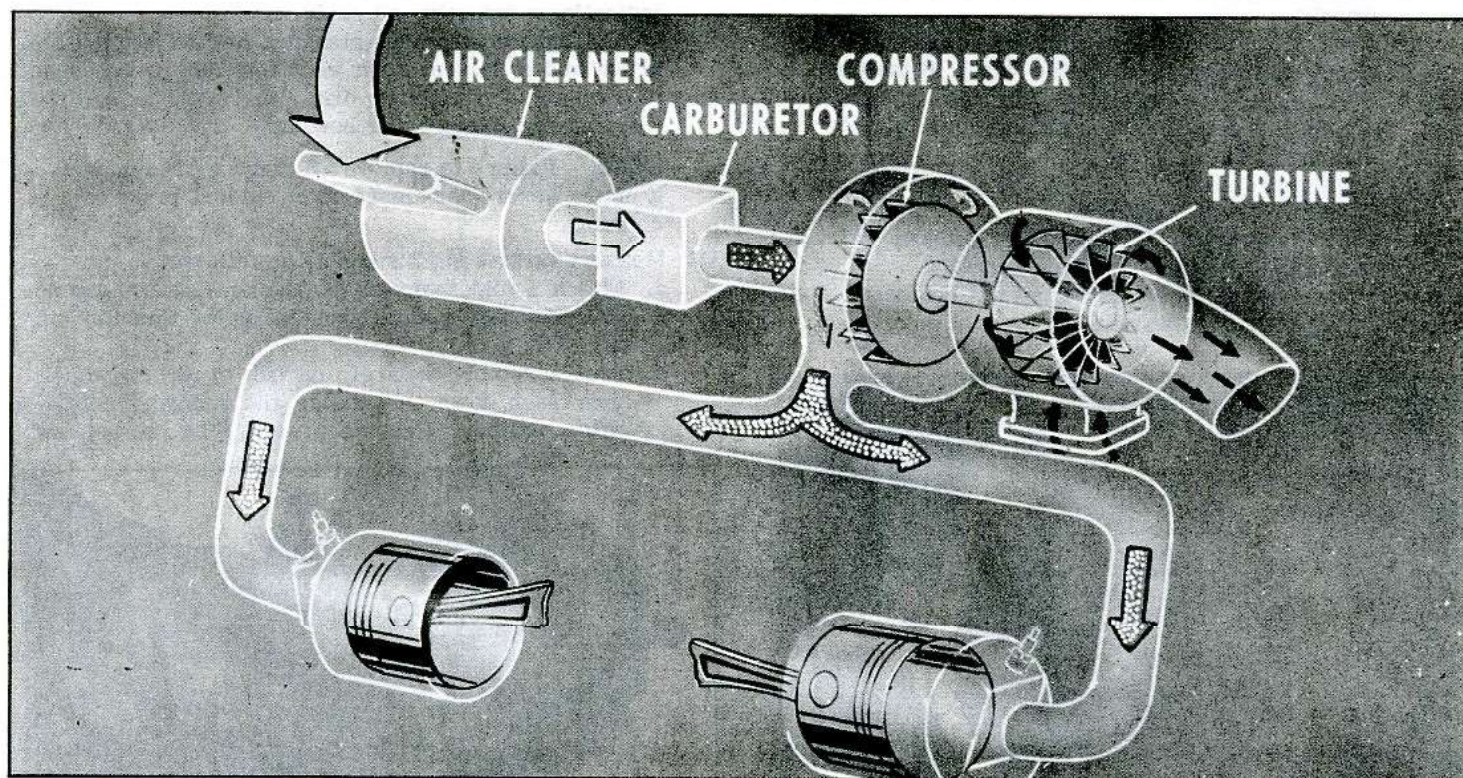


Fig. 35—Turbocharger Operational Schematic

## MAINTENANCE

### Periodic Inspection

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

1. Inspect the hoses and connections of the air intake system between the carburetor and the Turbocharger

and from Turbocharger 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 Turbocharger 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 Turbocharger (seal) operation.
5. Note unusual noises or vibration that would warrant further inspection of Turbocharger.

#### Major Inspection

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

1. Disconnect oil drain line at Turbocharger 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 Turbocharger and carburetor assembly from the engine.
3. Remove carburetor from Turbocharger 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. 36) 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.

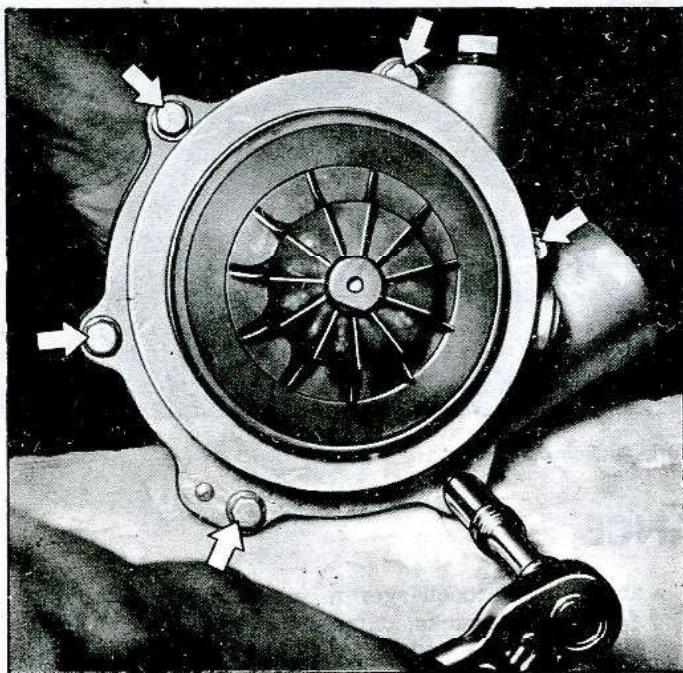


Fig. 36—Compressor Housing Retaining Bolts

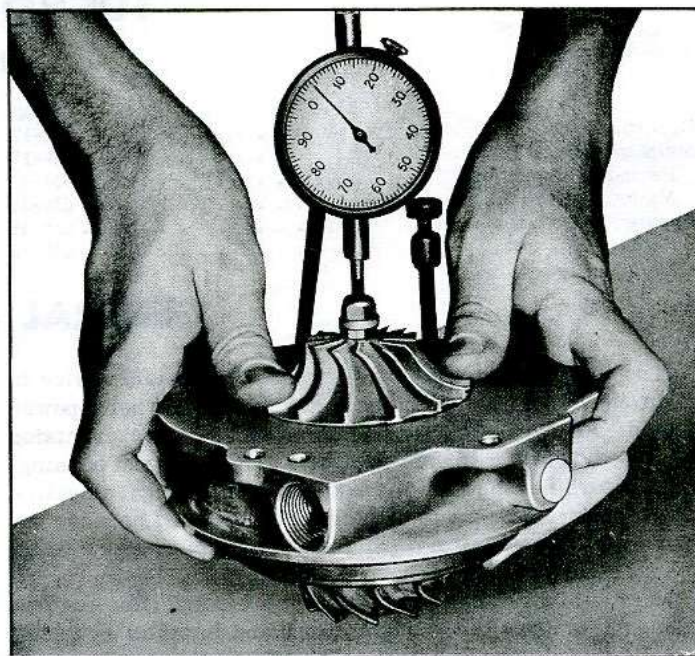


Fig. 37—Gauging Turbine Shaft End Play

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 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. 37).
  - b. Rest assembly squarely on hub of turbine wheel, then push down on housing and record the indicator reading. Release pressure on the housing



Fig. 38—Gauging Turbine Shaft Radial Play



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 Turbocharger 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. 38) 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.
- c. Recheck at 90° position to give cross reading.
- d. The maximum allowable radial play is .022". If radial play is excessive, rebuild the Turbocharger.

- 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 Turbocharger, then install the assembly onto the vehicle.

## REPAIR PROCEDURES

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

### Removal

1. Remove spare tire.
2. Remove air cleaner assembly, then disconnect fuel line and choke heat tube at carburetor.
3. Remove Turbocharger heat shield, then disconnect oil feed line and drain line at Turbocharger housing.
4. Disconnect accelerator linkage at carburetor.
5. Loosen the turbine housing "V" clamp nut, then support the Turbocharger 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 Turbocharger overhaul.

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

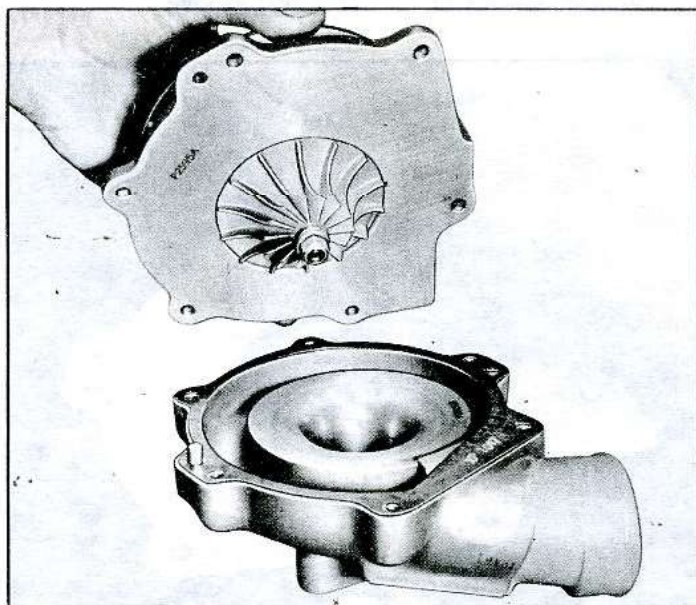


Fig. 39—Removing Compressor Housing

7. Remove 7 turbine housing inlet and outlet flanges bolts and remove the housing if inspection shows need.

### Disassembly

**NOTE:** Disassemble the Turbocharger 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. 39).
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. 40), then remove the impeller washer.
3. Support the Turbocharger in a press (using parallel blocks or support ring Tool J-21004, with the impeller wheel upward).
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. 41) 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.

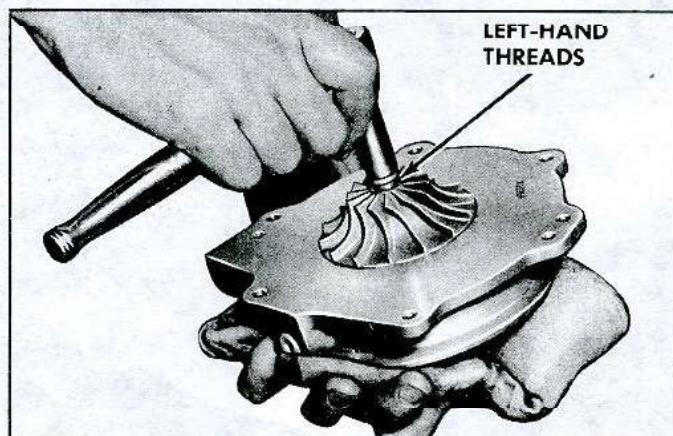


Fig. 40—Removing Impeller Nut



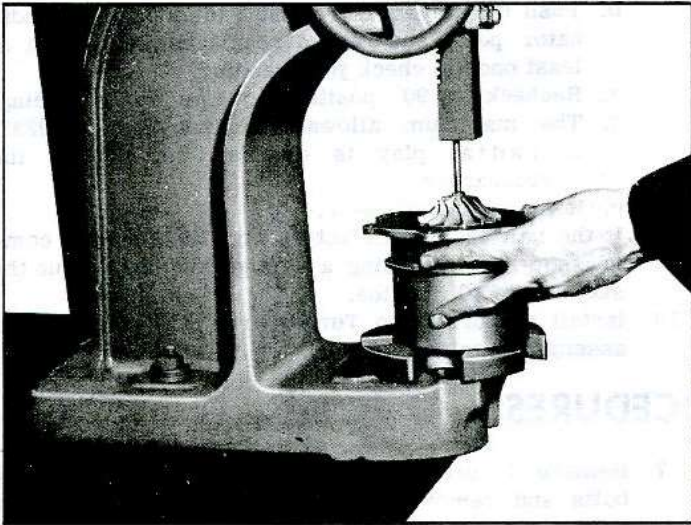


Fig. 41—Pressing Turbine Shaft from Impeller

7. Remove the oil seal retaining ring from bearing housing with snap ring pliers (fig. 42).
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 retainer ring (fig. 43), then remove the bearing and shim.

#### 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.
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.

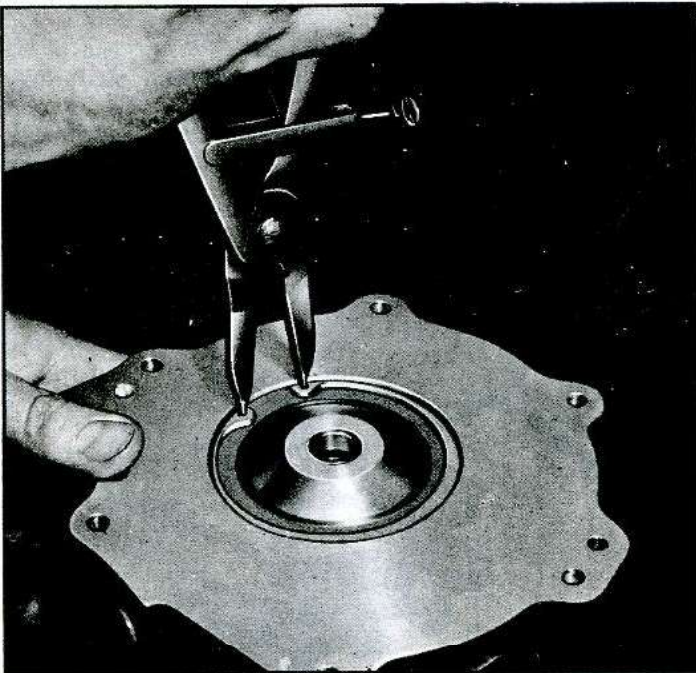


Fig. 42—Oil Seal Retainer Ring Removal

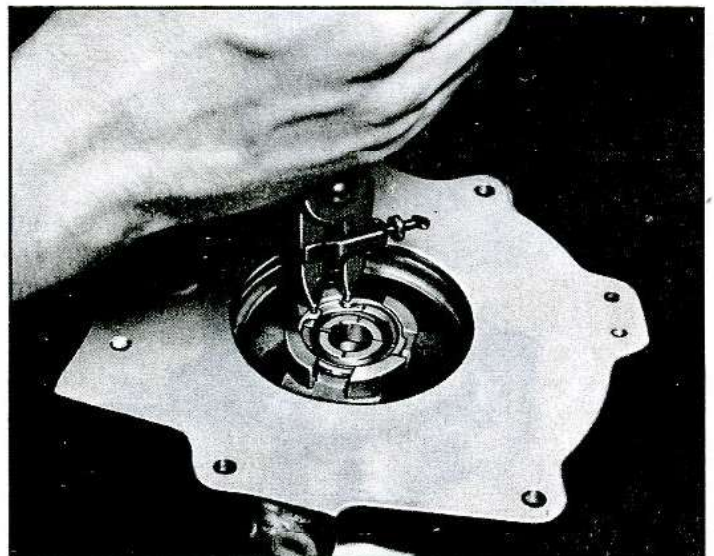


Fig. 43—Removing Bearing Retainer Ring



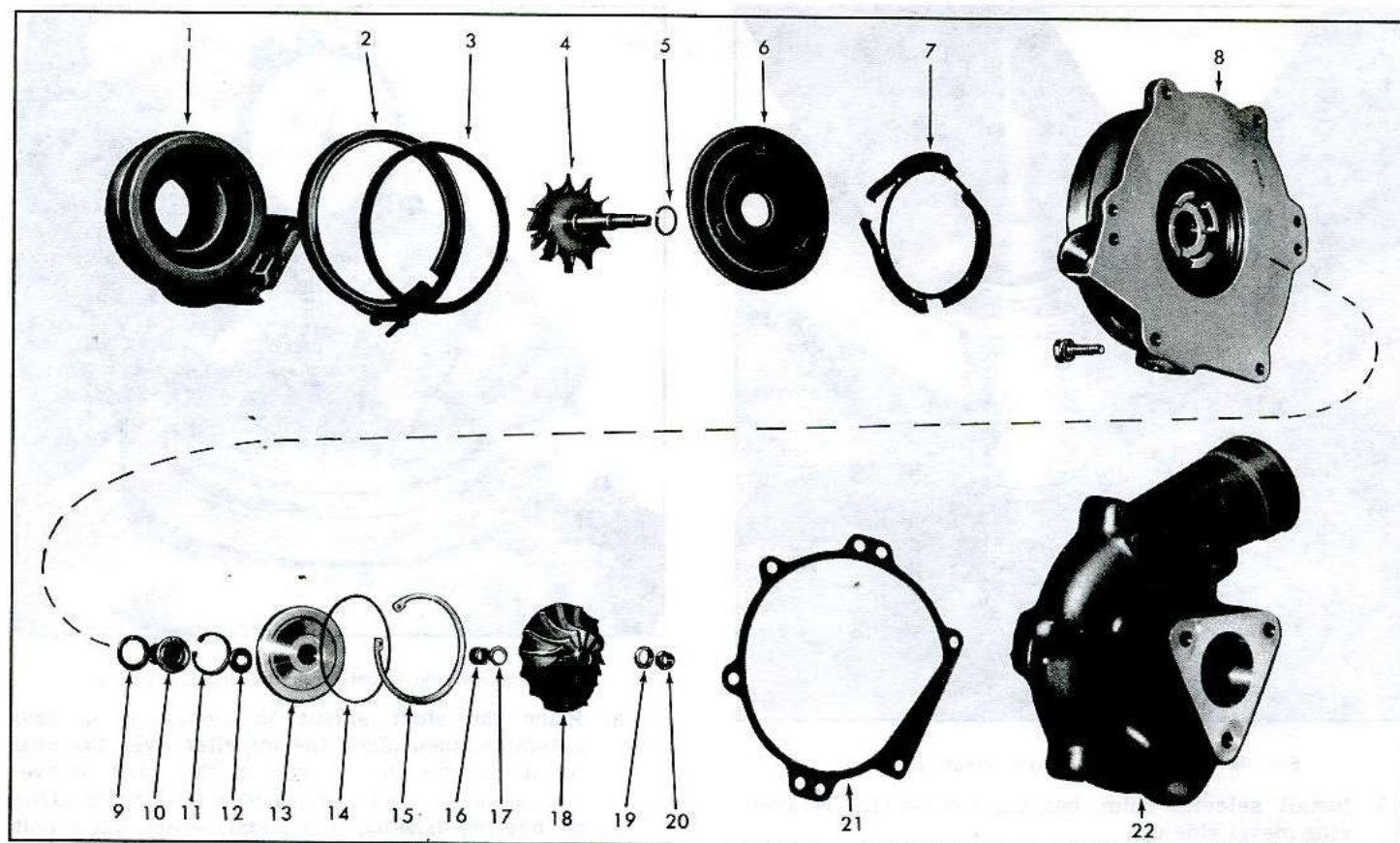


Fig. 44—Turbocharger—Exploded View

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

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

**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.

- Support the bearing housing on support ring (Tool J-21004) with flat surface (impeller side) upward.
- Install a new roll pin in the bearing housing (if required) so the slot is aligned radially inward.
- Determine shaft-to-bearing end play as follows:
  - Place bearing, mating ring and sleeve on turbine shaft.
  - 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. 45).
  - 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.

- Install the bearing into the housing (line up roll pin and hole in flange) then install retaining snap ring.
- Position a dial indicator with point resting on the bearing (fig. 46) and set indicator needle at zero.
- 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).
- 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.

i.e.

|  |      |
|--|------|
| shaft-to-bearing end play . . . . .        | .004 |
| plus bearing-to-housing end play . . . . . | .001 |
| total shaft end play is . . . . .          | .005 |





Fig. 45—Measuring Bearing-to-Shaft End Play

5. Install selected shim, bearing and bearing retainer ring (bevel side up).
6. Position mating ring centered on the bearing flange face.
7. Lubricate "O" ring seal with silicone grease and install in groove of oil seal assembly.
8. 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.
9. Determine the impeller shim requirements (for impeller-to-housing clearance) as follows:

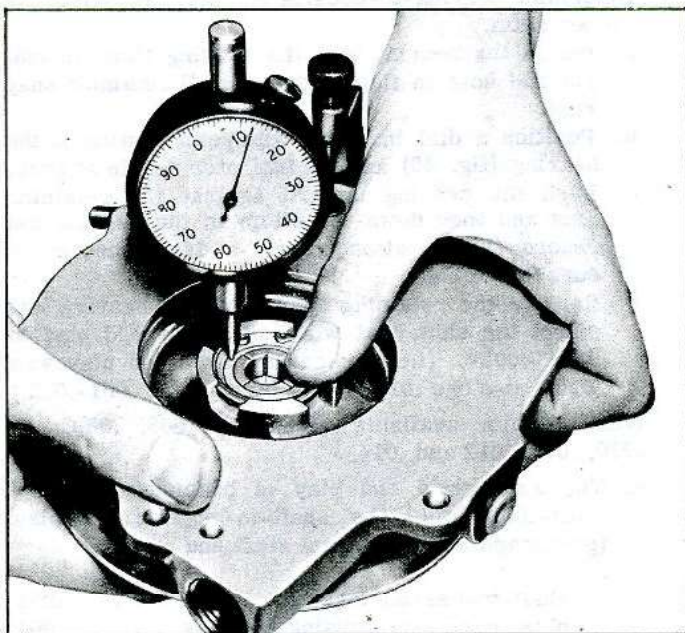


Fig. 46—Gauging Bearing-to-Housing End Play

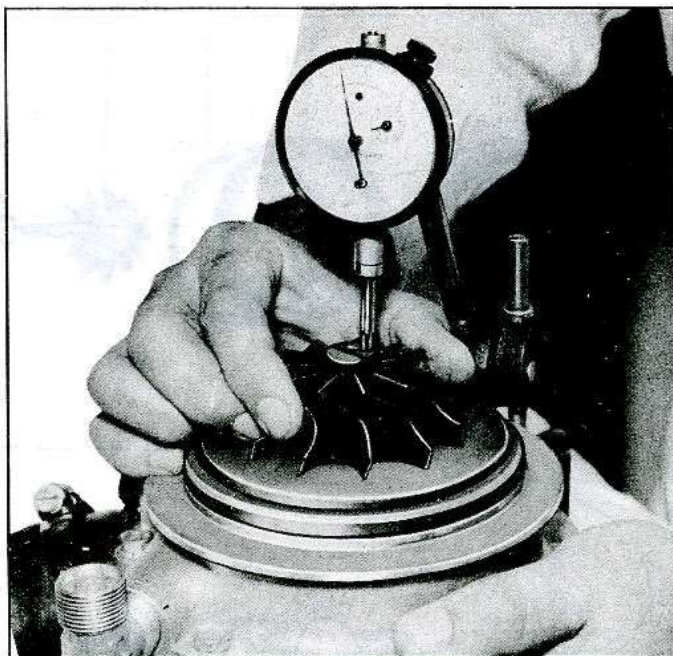


Fig. 47—Gauging Impeller-to-Housing Clearance

- 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 in. lbs.
- c. Install turbine wheel and shaft assembly (without seal) into impeller just enough to hold impeller to shaft.
- d. Position a dial indicator as shown in Figure 47 with indicator point resting on turbine hub and set at zero. Lift straight up on the turbine wheel as far as it will go and note indicator reading. (Repeat impeller lift at least once to check your reading.)



Fig. 48—Heat Shield Spring Ring Installation



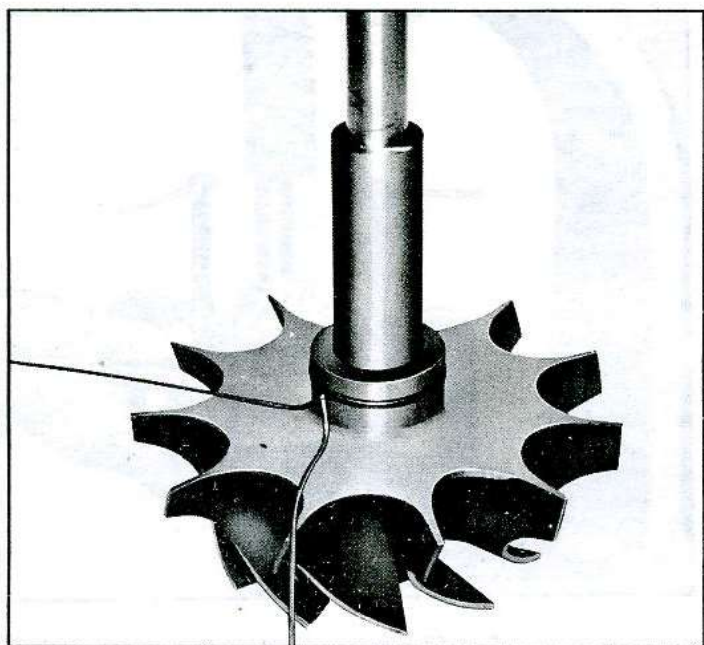


Fig. 49—Ring Compressed Using Tag Wire

- 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 value determined in Step e as follows:

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

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

10. Remove the compressor housing, gasket, impeller, shaft sleeve and turbine wheel and shaft assembly from bearing housing.
11. 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. 48), then install "C" clamps to hold spring ring compressed.
12. Lubricate the turbine shaft seal ring groove with oil and install ring into groove. Compress the ring into the groove using tag wire (fig. 49) or a plastic compression ring (fig. 50). 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 49. (Remember direction of twist for removal.)
13. Lubricate the shaft (bearing area) and carefully install through the bearing (fig. 51). 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.

14. 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.
15. Install the shaft sleeve (fig. 52), impeller shim (determined in Step 8f) and start the impeller on the turbine shaft.
16. Press the impeller onto the shaft, using a hollow spacer such as Tool J-6880 until it bottoms in place (fig. 53), then remove "C" clamps.

**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.

17. Remove assembly from press and position the special impeller washer (fig. 54) 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.
18. Place the gasket and compressor housing on bearing housing, secure with six bolts and torque to 80 in. lbs.
19. 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



Fig. 50—Compressing Ring, Using Plastic Installer Ring



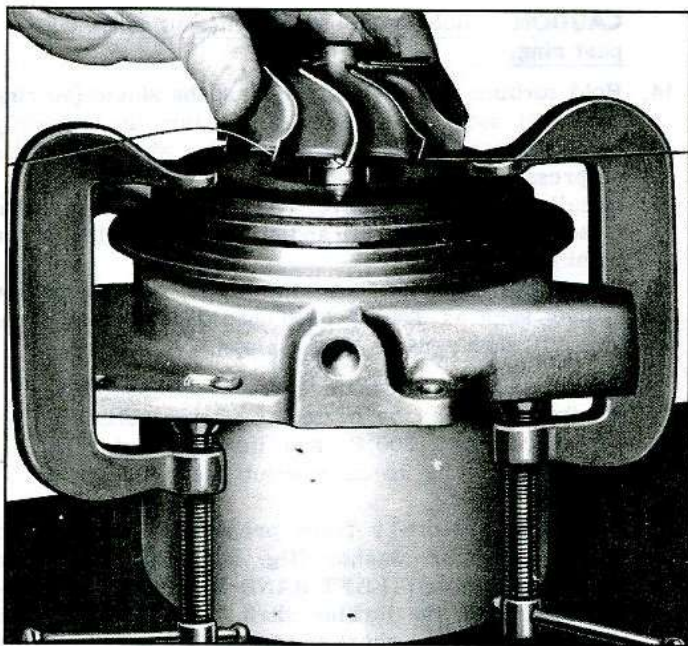


Fig. 51—Installation of Turbine Wheel and Shaft

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.

20. 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.

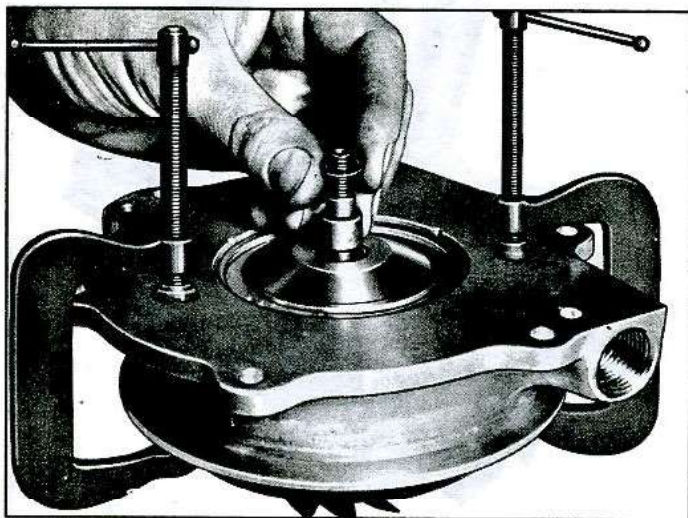


Fig. 52—Shaft Sleeve and Shim Installation

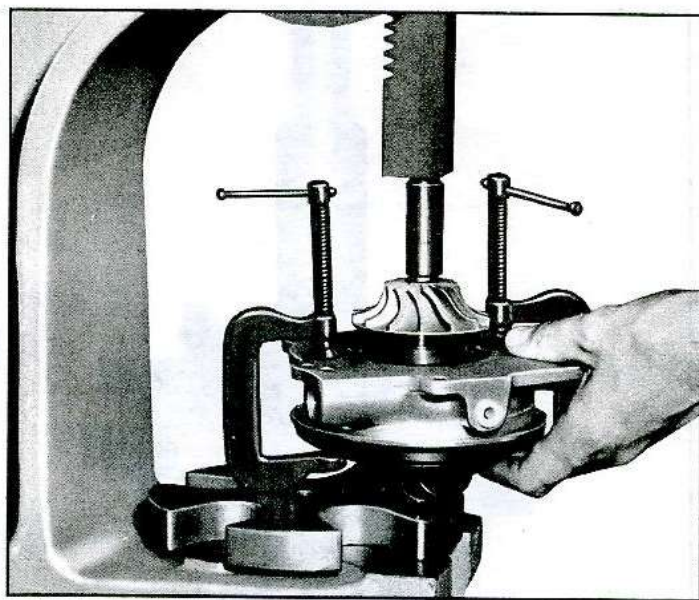


Fig. 53—Impeller Installation

21. 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.

#### Installation

1. Position gasket around turbine wheel shield and CAREFULLY hold Turbocharger 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 in. lbs.

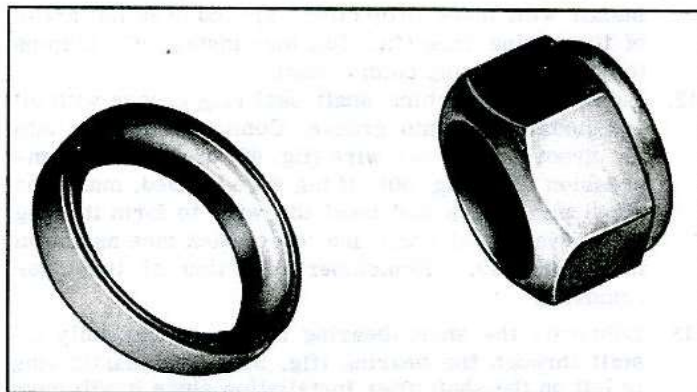


Fig. 54—Special Washer and Nut



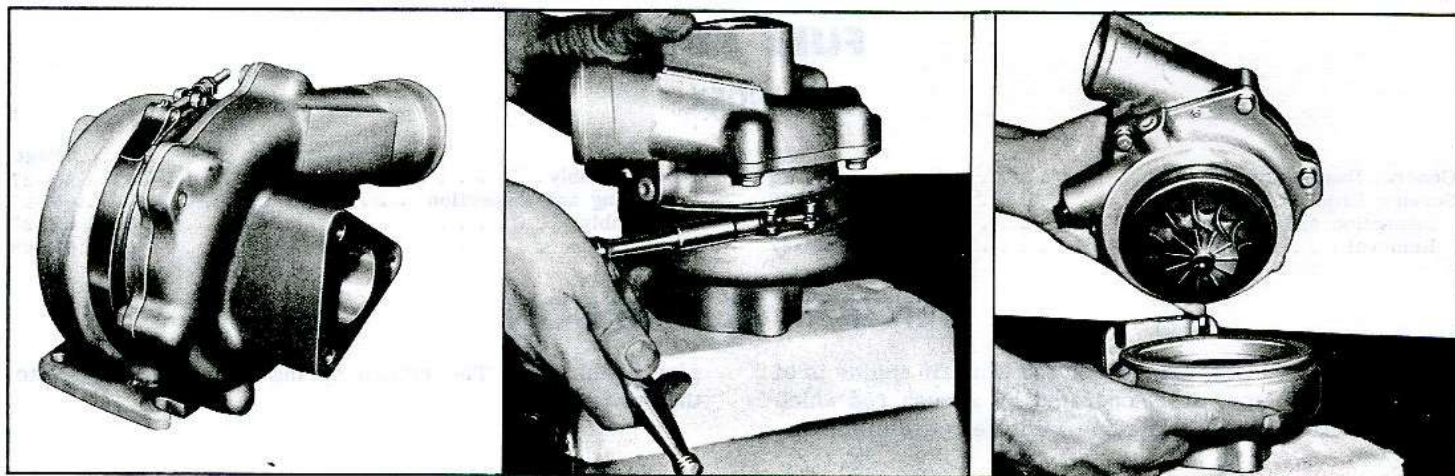


Fig. 55—Removal of the Turbine Housing for Installation of Replacement Turbocharger

3. Connect manifold cross tube hose, oil drain and oil feed lines at Turbocharger bearing housing.
4. Connect accelerator linkage at carburetor and check adjustment.
5. Connect fuel line and choke heat tube at carburetor.
6. Install air cleaner, connect choke clean air tube at cleaner, and ventilation hose at air cleaner to engine tubing.

#### Installing Replacement Turbocharger

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

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

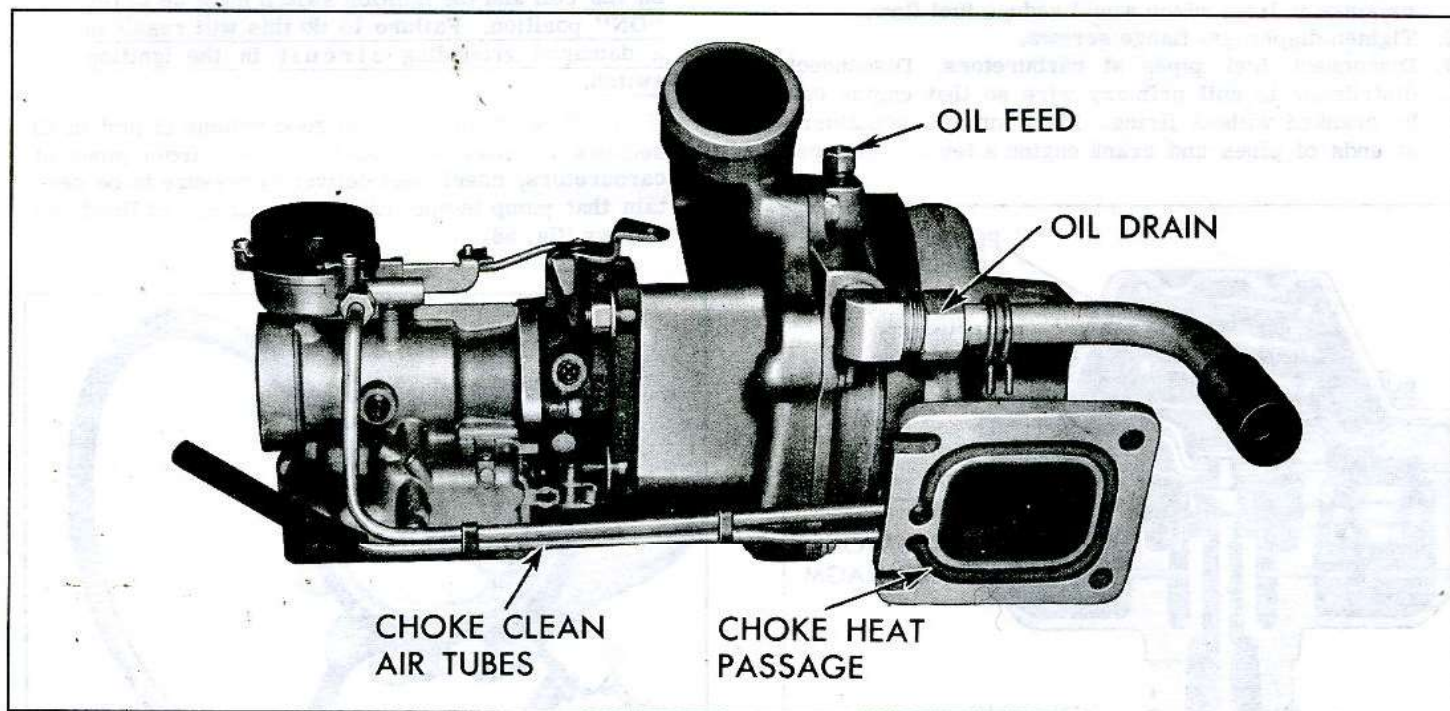


Fig. 56—Turbocharger Fittings and Passages



# FUEL PUMP

## INDEX

|                               |               |
|-------------------------------|---------------|
| General Description . . . . . | Page<br>6M-26 |
| Service Procedures . . . . .  | 6M-26         |
| Inspection and Test . . . . . | 6M-26         |
| Removal . . . . .             | 6M-27         |

|                                   |               |
|-----------------------------------|---------------|
| Disassembly . . . . .             | Page<br>6M-27 |
| Cleaning and Inspection . . . . . | 6M-27         |
| Assembly . . . . .                | 6M-27         |
| Installation . . . . .            | 6M-28         |

## GENERAL DESCRIPTION

The fuel pump (fig. 57) used on the Corvair engine is of the diaphragm type. It is operated by a push rod which rides on an eccentric located near the rear end of the en-

gine crankshaft. The return spring is incorporated into the push rod.

## SERVICE PROCEDURES

### Inspection and Test

Always check pump while it is mounted on the engine and be sure there is gasoline in the tank.

The line from the tank to the pump is the suction side of the system and the line from the pump to the carburetors is the pressure side of the system. A leak on the pressure side, therefore, would be made apparent by dripping fuel, but a leak on the suction would not be apparent for its effect of reducing volume of fuel on the pressure side.

1. Tighten any loose line connections and look for bends or kinks in lines which would reduce fuel flow.
2. Tighten diaphragm flange screws.
3. Disconnect fuel pipes at carburetors. Disconnect distributor to coil primary wire so that engine can be cranked without firing. Place suitable containers at ends of pipes and crank engine a few revolutions.

If little or no gasoline flows from open end of pipes then fuel pipe is clogged or pump is inoperative. Before removing pump disconnect fuel pipe at gas tank and inlet pipe and blow through them with an air hose to make sure they are clear. Reconnect pipes to pump and retest while cranking engine.

**CAUTION:** Whenever the engine is cranked remotely at the starter, with a special jumper cable or other means, the primary distributor lead must be disconnected from the negative post on the coil and the ignition switch must be in the "ON" position. Failure to do this will result in a damaged grounding circuit in the ignition switch.

4. If fuel flows from pump in good volume (1 pint in 40 seconds or less at cranking speed) from pipes at carburetors, check fuel delivery pressure to be certain that pump is operating within specified limits as follows (fig. 58):

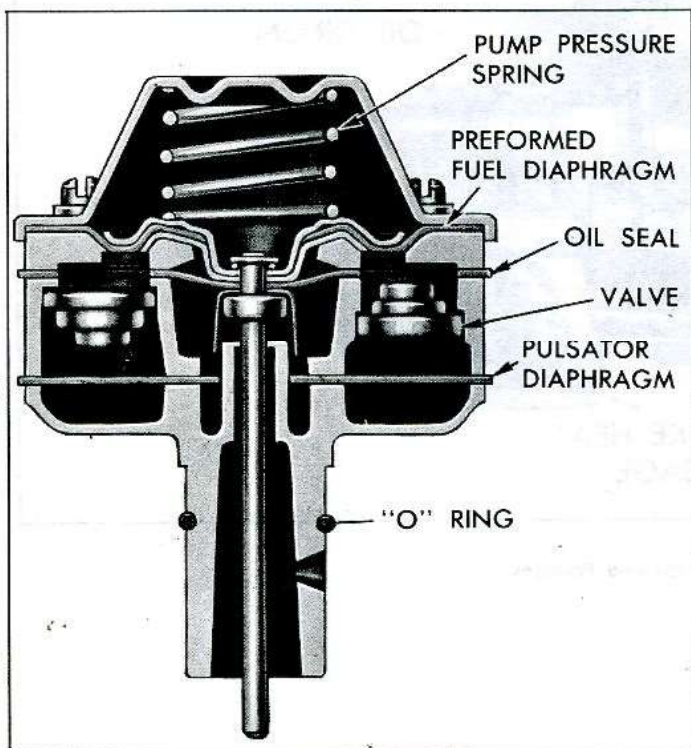


Fig. 57—Fuel Pump—Section View

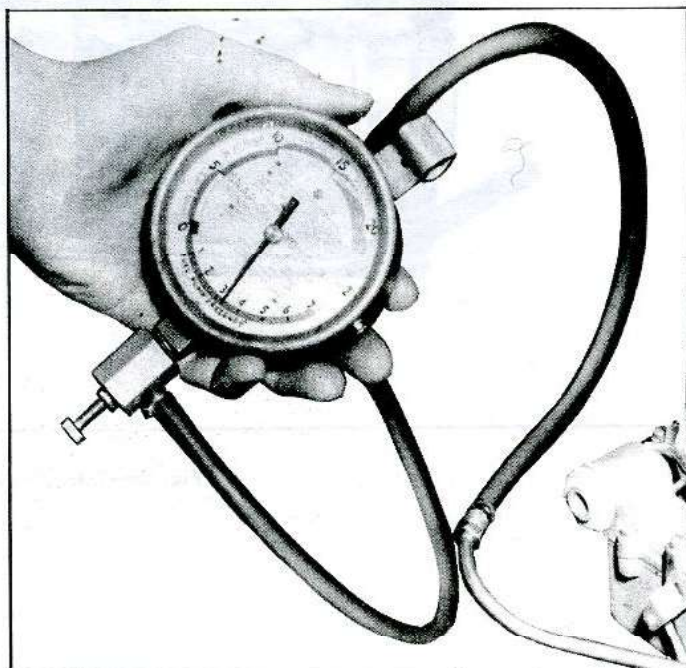


Fig. 58—Pressure Test



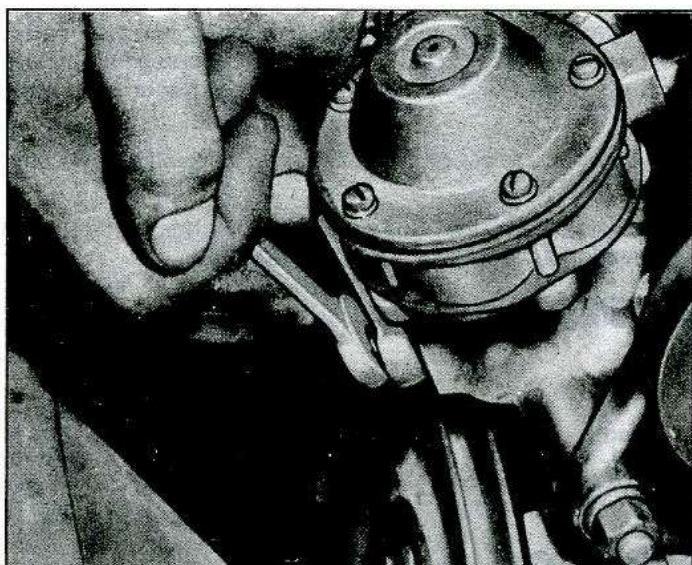


Fig. 59—Loosening Locknut

- Attach a fuel pump pressure test gauge to disconnected end of pump to carburetor pipe.
- Run engine at approximately 500 to 1,000 rpm on gasoline in carburetor bowls and note reading on pressure gauge.
- If pump is operating properly the pressure should be 4 to 5 lbs. and will remain constant at speeds between idle and 1,000 rpm. If pressure is too low or too high, or varies materially at different speeds, the pump should be removed for repair or replacement.

#### Removal

1. Disconnect fuel inlet line at fuel pump and both outlet lines at the "T" connector. Leave the "T" connector and pipe in pump.
2. Loosen the jamb nut locking set screw in place and remove set screw (fig. 59).
3. Carefully remove fuel pump, and push rod assembly (fig. 60) from engine.

After removal of pump from engine and before disassembly, plug all openings, and carefully wash exterior of pump with cleaning solvent to remove all dirt and grease.

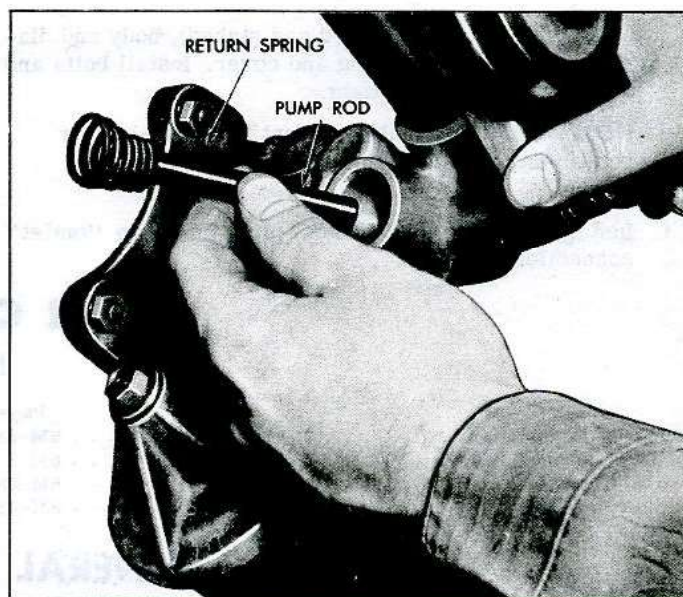


Fig. 60—Removing Push Rod

#### Disassembly

1. Remove five bolts attaching diaphragm cover to body. Remove cover, spring and diaphragm and body assembly.

**NOTE:** Diaphragm and body assembly includes the fuel diaphragm, oil seal, and control rod.

2. Remove lower body and pulsator diaphragm from pulsator cover.
3. Remove valves from lower body by removing metal displaced by staking and pulling out valves with hook shaped tool.

#### Cleaning and Inspection

1. Clean and rinse all metal parts in solvent. Blow out all passages with air hose.
2. Inspect all parts for cracks, breakage and distortion. Examine all screw holes for stripped or crossed threads. Replace damaged parts.

#### Assembly

1. Assemble pulsator cover, pulsator diaphragm, lower

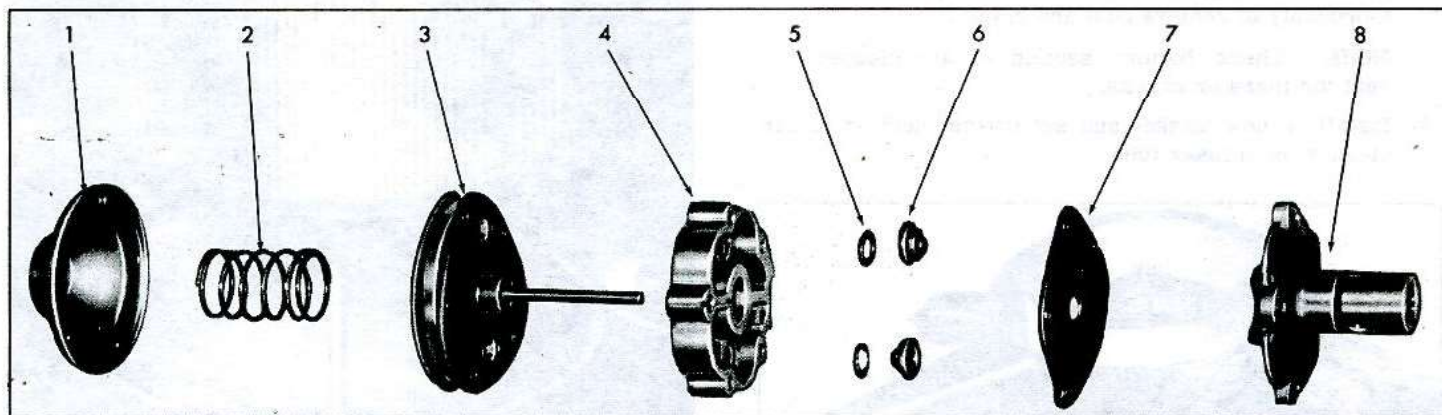


Fig. 61—Fuel Pump—Exploded View

1. Cover  
2. Spring

3. Diaphragm and Body Assembly  
4. Lower Body

5. Valve Gasket  
6. Valve

7. Pulsator Diaphragm  
8. Pulsator Cover



body (with valves replaced and staked), body and diaphragm assembly, spring and cover. Install bolts and draw up equally until tight.

**NOTE:** One bolt hole is offset to assure proper positioning of component parts.

#### Installation

1. Install "T" connector and pipe in pump "outlet" connection.

2. Install the pump into the accessory housing, outlet connection to front. Carefully feel pump position with set screw, being sure set screw pilots in locking hole.
3. Tighten set screw 9 to 15 ft. lbs. Then tighten locknut 9 to 15 lbs.
4. Install inlet fuel line to inlet connection on fuel pump and outlet lines to the "T" connector.

## AIR CLEANERS

### INDEX

|                               | Page  |
|-------------------------------|-------|
| General Description . . . . . | 6M-28 |
| Service Procedures . . . . .  | 6M-28 |
| Oil Wetted Paper . . . . .    | 6M-28 |
| Replacement . . . . .         | 6M-28 |

|                               | Page  |
|-------------------------------|-------|
| Testing . . . . .             | 6M-28 |
| Tool J-7825 . . . . .         | 6M-29 |
| Oil Bath Precleaner . . . . . | 6M-29 |
| Maintenance . . . . .         | 6M-29 |

## GENERAL DESCRIPTION

The Corvair uses one large oil-wetted paper element air cleaner (fig. 62). All except the Turbocharger air cleaner are centrally mounted on a diffuser tube between the carburetors. The diffuser tube assembly is gasket mounted and held down by a J-shaped bolt and a nut at

each carburetor.

The sedan with air conditioning uses two oil-wetted paper element air cleaners (fig. 63).

Oil-bath type pre-cleaner air cleaners are available as an option for extremely dusty driving conditions.

## SERVICE PROCEDURES

### OIL WETTED PAPER

Every 12,000 miles or more often in dusty areas, either replace paper air cleaner element or test element using Tool J-7825.

Before testing, inspect for holes or breaks in the element, as these defects require immediate replacement. If testing indicates that the element restriction is satisfactory at 12,000 miles, the element need not be replaced but should be retested every 6,000 miles thereafter, until replaced.

#### Replacement

1. Remove wing nut and cover.
2. Remove paper element and discard.
3. Remove bottom section of air cleaner and gasket on diffuser tube. Discard gasket.
4. Clean bottom section of air cleaner and cover pieces thoroughly to remove dust and grime.

**NOTE:** Check bottom section of air cleaner seal for tears or cracks.

5. Install a new gasket and set bottom section of air cleaner on diffuser tube.

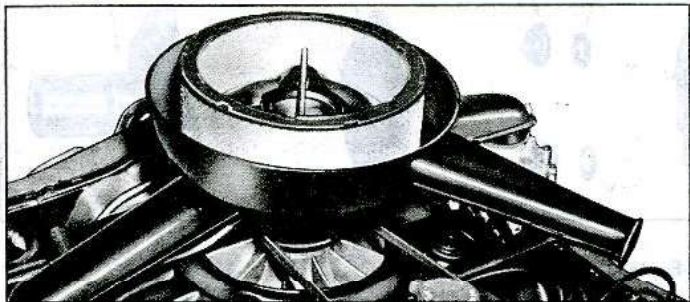


Fig. 62—Single Air Cleaner

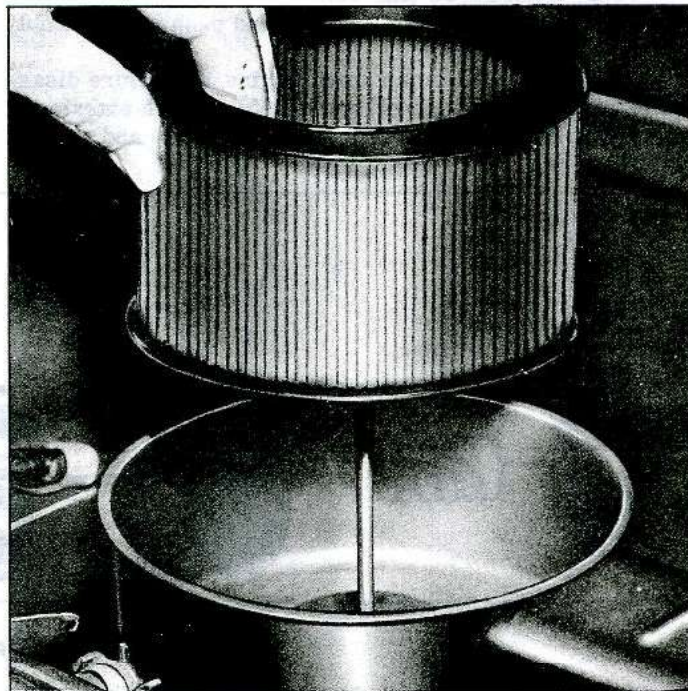


Fig. 63—Dual Air Cleaner



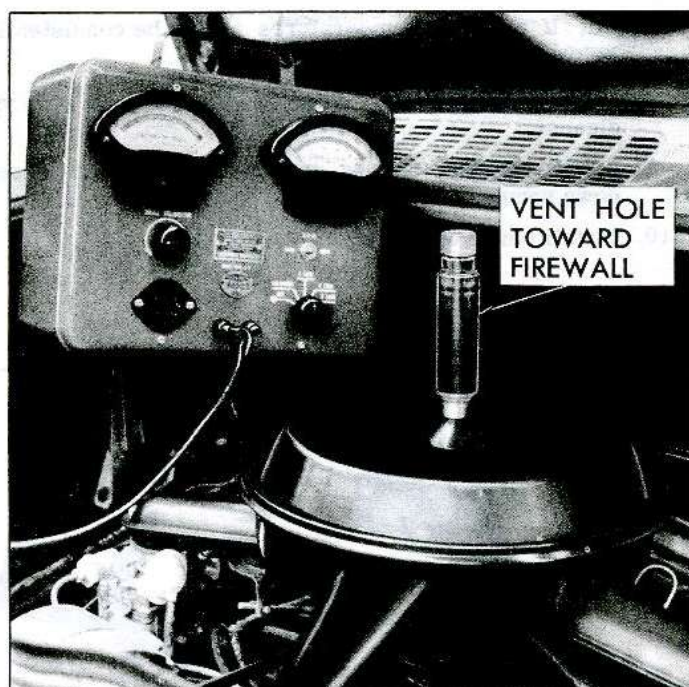


Fig. 64—Tool Installed on Air Cleaner

cleaners to determine whether the element has materially decreased in efficiency and should be replaced or has only slightly increased air restriction and is suitable for further service. In combination with a tachometer, this instrument will quickly and accurately determine the air cleaner element condition without removing the element from the air cleaner.

1. Remove the wing nut and washer (if used) from the air cleaner cover stud, then screw Tool J-7825 onto the stud until it seals tightly against the air cleaner cover. Rotate the entire gauge so that the scale can be read from the rear of the car (fig. 64).
2. Connect a tachometer and place so that it may be read simultaneously with Tool J-7825 (fig. 64).



Fig. 65—Tool J-7825

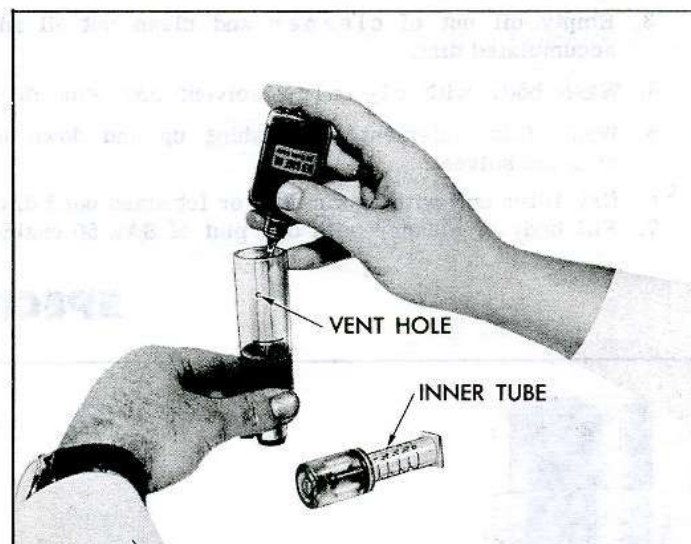


Fig. 66—Filling Tool with Oil

3. Start engine. If engine is cold, allow to run for 2 to 3 minutes. The automatic choke must be fully open.
4. Accelerate the engine slowly until the oil level in Tool J-7825 just reaches the 1/4" mark. Allow engine speed to stabilize and note tachometer reading. Decelerate engine.
5. If the tachometer reading is at or below the following, the paper air cleaner element is restricted beyond the allowable limit and should be replaced.

| Engine           | Minimum Allowable<br>RPM @ 1/4" H <sub>2</sub> O |
|------------------|--|
| 95 H.P.          | 2600 R.P.M.                                      |
| 110 H.P.         | 2600 R.P.M.                                      |
| 140 H.P.         | 1900 R.P.M.                                      |
| Dual Air Cleaner | 2400 R.P.M.                                      |

6. Remove tachometer and Tool J-7825 from vehicle and push down inner tube until seal is below vent hole to prevent oil loss.

#### Tool J-7825

Tool J-7825 (fig. 65) is shipped dry and must be filled with the red gauge oil (specific gravity .826) provided.

#### Filling Tool

Pull the knurled inner tube completely out of the gauge and add oil to the reservoir until the oil level is between the two "FILL" lines, Figure 66. Refill whenever the level falls below the lower "FILL" line.

#### Storing Tool

When the gauge is not in use, fully depress the inner tube. This seals off the oil reservoir from the vent hole to prevent oil loss if the gauge is tipped.

#### OIL BATH PRECLEANER

##### Maintenance

1. Loosen and remove wing stud.
2. Remove air cleaner from the vehicle and then remove the filter element assembly.



3. Empty oil out of cleaner and clean out oil and accumulated dirt.
4. Wash body with cleaning solvent and wipe dry.
5. Wash filter element by slushing up and down in cleaning solvent.
6. Dry filter unit with an air hose or let stand until dry.
7. Fill body of cleaner with one pint of SAE 50 engine

oil. If expected temperatures are to be consistently below freezing, use SAE 20 engine oil.

8. Assemble filter and cover assembly to body of cleaner.
9. Install cleaner, making sure it fits tight and is set down securely.
10. Install cover wing stud.

## SPECIAL TOOLS

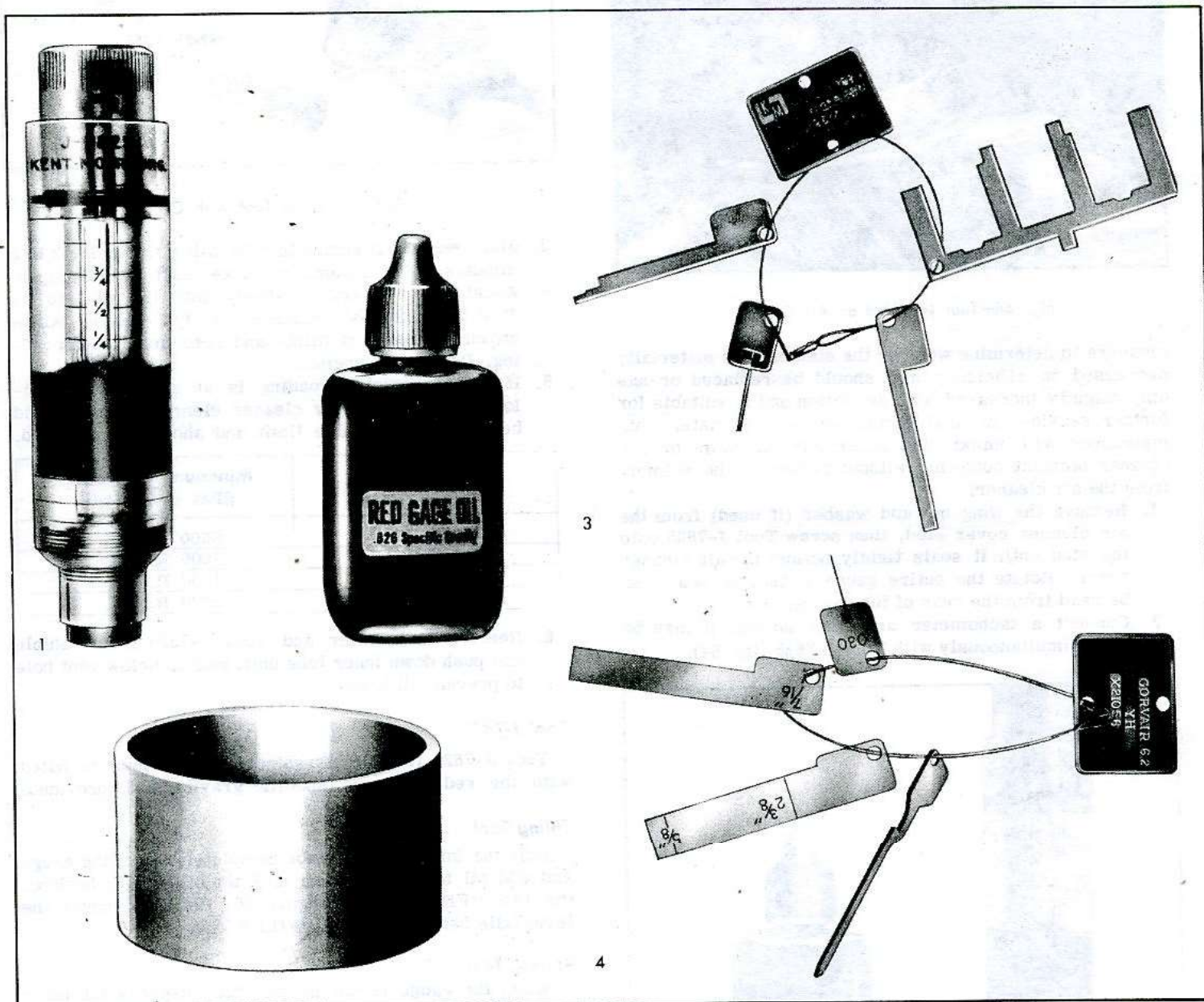


Fig. 67—Engine Fuel Special Tools

1. J-7825 Air Cleaner Tester
2. J-21004 Turbocharger Support

3. J-21604 Carburetor Chain Gauge
4. J-21056 Carburetor Chain Gauge



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