HOLLEY

CARBURETOR MODEL 1904
FOR
GENERAL MOTORS TRUCKS

DOWNDRAFT
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SERVICE MANUAL

VAN DYKE, MICHIGAN U.S.A. . . . PUBLICATIONS DEPARTMENT
# TABLE OF CONTENTS

## DESIGN
- 1. DESIGN .......................................................... 2
- 2. APPLICATION .................................................. 2
- 3. MAJOR SUBASSEMBLIES ........................................ 2

## OPERATION
- 1. FUEL INLET SYSTEM ............................................ 3
- 2. MAIN WELL AND ECONOMIZER BODY ...................... 4
- 3. IDLE SYSTEM .................................................... 4
- 4. THE CHoke ....................................................... 4
- 5. ACCELERATING PUMP SYSTEM ............................... 5
- 6. MAIN METERING SYSTEM ..................................... 6
- 7. POWER ENRICHMENT SYSTEM ............................... 7

## OVERHAUL
- 1. INTRODUCTION .................................................. 8
- 2. SPECIAL TOOLS ................................................ 9
- 3. MASTER REPAIR KITS AND REPLACEMENT PARTS ....... 9
- 4. DISASSEMBLY ................................................... 9
  - A. Preparation .................................................. 9
  - B. Disassembly - Main Body from Throttle Body ....... 9
  - C. Disassembly - Main Body Assembly .................. 10
  - D. Disassembly - Throttle Body Assembly ............ 15
- 5. CLEANING AND INSPECTION .................................. 16
  - A. Cleaning .................................................... 16
  - B. Inspection ................................................ 16
- 6. REASSEMBLY .................................................... 17
  - A. Throttle Body Assembly ................................ 17
  - B. Reassembly - Main Body Assembly .................. 17
  - C. Reassembly - Main Body Assembly to Throttle Body Assembly .... 20

## INSTALLATION
- 1. INSTALLATION ON THE ENGINE ............................ 20
- 2. CARBURETOR ADJUSTMENTS .................................. 20
  - A. Adjusting the Idle ....................................... 20

## SERVICE HINTS
- A. INSPECTING THE VEHICLE .................................. 21
- B. INSPECTING THE ENGINE ................................... 21
- C. INSPECTING THE FUEL SYSTEM ............................ 21
- D. INSPECTING THE CARBURETOR ............................. 21

## TROUBLE SHOOTING CHART
INTRODUCTION

Holley Carburetor Model 1904 is a single-barrel downdraft unit of advanced design, it has been engineered to meet the ever increasing demands for efficient modern automotive accessories.

Model 1904 is a sturdy, compact carburetor, reduced to two-thirds the size of standard design units with a comparable capacity. Advanced engineering design to the choke plate, now located in the venturi, enables the choke plate to do two jobs instead of one. In addition to its normal function, the choke plate in the open position, facilitates the distribution and vaporization of the fuel discharged by the main nozzle. The elimination of the conventional air horn together with the improved design mentioned above aided in the engineering of an improved smaller size carburetor.

A feature which provides more positive action and increases service life for Model 1904 is the use of neoprene diaphragms in place of the conventional economizer piston and accelerating pump piston.

To aid in efficient profitable carburetor service, this manual includes a complete overhaul procedure together with much valuable information on the description, operation and adjustment of the Model 1904 carburetor.
DESCRIPTION

1. DESIGN

Many noteworthy new features are included in Holley Carburetor Model 1904. One of these features is the diaphragm-type economizer, which can be removed without disassembling the whole carburetor. This type economizer provides improved control of the power enrichment system.

Fuel from the carburetor fuel inlet discharges below the fuel level in the float chamber to prevent foaming or splashing, assuring a constant, uninterrupted fuel flow to the metering components of the carburetor. Fuel in the float chamber circulates completely around the easily removable main well and economizer body which contains most of the fuel metering elements and passages. This circulation has a cooling effect on the fuel being metered through the passages in the main well and economizer body. In addition to that factor, the high-lift design of the carburetor main well gives this carburetor improved hot operation and anti-percolation qualities.

Combined with the new features in Model 1904 are many of the same time proven engineering characteristics found in other Holley carburetor models. The main fuel flow is metered by a fixed jet which has been individually flow tested to insure proper calibration of the carburetor. Added fuel for high power operation is delivered by a fully automatic vacuum actuated power enrichment system of improved design. The diaphragm type accelerating pump has a spring overriding feature to prolong the discharge of fuel for smoother acceleration. All air bleeds are supplied with filtered air from air cleaner, giving necessary protection against accumulation of foreign matter in these passages.

2. APPLICATION

Holley Carburetor Model 1904 is used on General Motors six-cylinder trucks.

NOTE

Specific identification of carburetor list numbers applicable to each vehicle can be found in the Holley Carburetor Catalog Sheets General Motors Section.

3. MAJOR SUBASSEMBLIES

This carburetor model is composed of two major subassemblies; the main body assembly and the throttle body assembly. The die cast main body contains the float and fuel inlet valve, the metal fuel bowl, the carburetor air inlet, the venturi, the choke mechanism, the economizer diaphragm and stem assembly, the accelerating pump, and the main well and economizer body assembly. The main well and economizer body assembly includes many of the various fuel metering parts and fuel passages of the carburetor. The cast iron throttle body contains the throttle plate, the idle discharge ports, and the idle speed and mixture adjusting screws.

OPERATION

The fuel-air mixture requirements of an automotive engine vary considerably throughout its range of operation. An efficient carburetor must deliver an economical mixture for normal cruising conditions, a richer mixture when high power output is desired, and a still richer mixture for smooth idle and low speed performance. In order to supply the correct mixture to the engine under all operating conditions, Holley Carburetor Model 1904 has four basic fuel metering systems. These are: the main metering system, the idle system, the power enrichment system, and the accelerating pump system. In addition, a fuel inlet system provides the various fuel metering systems with a supply of fuel at a virtually constant head. A choke provides a means of temporarily enriching the mixture to aid in starting and operating a cold engine.
1. FUEL INLET SYSTEM

All fuel used by the four basic fuel metering systems enters the carburetor through the fuel inlet needle valve and seat assembly. The fuel, under pressure from the engine’s fuel pump, flows past the needle valve and into the float chamber. The float rises and falls with the fuel level in the float chamber, moving the fuel inlet needle valve correspondingly to control the amount of fuel admitted to the carburetor. When the fuel in the float chamber reaches a specified level, the float moves the needle valve to a position where it restricts the flow of fuel so that only enough fuel is admitted to replace that being used. Any slight change in the fuel level causes a responsive movement of the float, opening or closing the fuel inlet needle valve to immediately restore the proper fuel level. The fuel inlet system must constantly maintain this specified level of fuel because the basic fuel metering systems are calibrated to deliver the proper mixtures only when the fuel is at this level.

A spring and pin, inside the hollow fuel inlet needle valve, cushions the needle valve for protection against road shocks and vibration. A fuel valve clip is attached to the bottom of the needle valve under the tab of the float lever to insure that the needle will open properly when the float drops.

The float chamber is vented to the carburetor air inlet through interconnected passages near the top of the float chamber. These passages lead to the balance tube in the air inlet.
2. MAIN WELL AND ECONOMIZER BODY

Fuel passages of the four basic fuel metering systems originate at the main well and economizer body assembly in the carburetor float chamber. A study of the passages in this assembly will result in a clearer understanding of the explanations of the four fuel metering systems.

3. IDLE SYSTEM

At idle and low speeds, the air flow through the carburetor is reduced and the vacuum created in the venturi is not sufficient to operate the main metering system. Intake manifold vacuum is high, due to the great restriction to air flow by the nearly closed throttle plate. This high manifold vacuum is used to provide a pressure difference which will operate the idle system.

At idle, fuel flows through the main jet into the bottom of the main well. The high manifold vacuum, acting on this fuel through the idle system passages, draws the fuel from the main well through a vertical passage to the idle well. The narrow passage in the upper portion of the idle well is a calibrated restriction which meters the flow of fuel. The fuel passes out the top of the idle well and into the idle system passages in the main body. The top of the vertical idle system passage in the main body, contains the idle air bleed which admits a metered flow of air to the fuel. The idle air bleed also vents the idle system to prevent any siphoning effect at higher speeds or when the engine is stopped. The fuel continues down through the idle restriction and past the idle transfer holes in the throttle body. The idle transfer holes act as additional air bleeds at idle. The fuel is discharged from the idle discharge hole into the strong manifold vacuum below the throttle plate. The pointed tip of the idle adjusting needle is set a short distance off its tapered seat at the idle discharge hole. The setting of the idle adjusting needle controls the fuel discharge at idle, thus providing a means of adjusting the idle mixture. Turning the idle adjusting needle in, moves its pointed tip closer to the seat, restricting the fuel flow out the idle discharge hole. This results in a leaner idle mixture. Conversely, turning the needle out, moves the tip farther from the seat, allowing more fuel to flow out the idle discharge hole for a richer idle mixture.

During off-idle operation, the throttle plate is moved slightly past the transfer hole, which begins discharging fuel as it is exposed to manifold vacuum. As the throttle plate is opened still wider, and engine speed increases, the air flow through the carburetor is also increased. This creates a vacuum in the venturi strong enough to bring the main metering system into operation. The flow from the idle system tapers off as the main metering system begins discharging fuel. The two systems are engineered to provide a smooth, gradual transition, from idle to cruising speeds.

4. THE CHOKE

When starting a cold engine, much of the vaporized fuel from the carburetor condenses to a liquid on contact with the cold surfaces of the intake manifold. This results in hard starting, loss of power, and stalling. Closing the choke plate in the venturi confines manifold vacuum within the carburetor, thus drawing a rich flow of fuel from the idle and main metering systems. When the engine starts, enough air is drawn through the spring-loaded poppet valve in the choke plate to prevent flooding. The curved extension of the choke lever, commonly called a fast idle cam, contacts the throttle stop screw at idle and is designed to increase the throttle plate opening at idle during choking. This allows the engine to operate at a fast idle to prevent stalling.
5. ACCELERATING PUMP SYSTEM

Air flow through the carburetor responds almost immediately to any increase in throttle opening, but there is a brief interval before the fuel can gain the necessary speed to maintain the desired balance of fuel and air. The accelerating pump system operates during this interval, supplying fuel until the other systems can provide the proper mixture.

When the throttle is closed, the pump return spring expands to move the pump diaphragm toward the back of the pump chamber, drawing fuel into the chamber through the pump inlet. The ball check valve in the pump inlet opens to admit fuel to the pump chamber, and closes to prevent a reverse flow of fuel when the pump is functional.

The throttle lever is connected to the pump operating lever by the pump link. As the throttle is opened, the throttle lever moves upward, and the pump link turns the pump operating lever. The pump operating lever presses the pump rod sleeve inward, compressing the pump spring. The pump spring in turn presses on the diaphragm, forcing fuel into the pump discharge passage. The illustration shows the accelerating pump in action with the pump spring partially compressed. The spring overriding feature provides a sufficiently long interval of discharge, regardless of how suddenly the throttle is opened.

The fuel, under pressure from the diaphragm, flows through the pump discharge passage and forcing the pump discharge ball check valve and weight up, flows out of the pump discharge nozzle. The pump discharge ball check valve seals the passage when the pump is not discharging fuel. This prevents air from being drawn into the system when the throttle is again closed and the pump draws in another charge of fuel. The hexagonal weight holds the ball check valve on its seat, preventing fuel from being drawn from the pump chamber by the suction of the airstream at high speeds.
The fuel flows up inside the hollow pump discharge nozzle screw and out through holes in the side of the screw into the pump discharge nozzle. The accelerating charge is sprayed out of a small hole into the airstream in the venturi. The vent slot, which opens to the air at the top of the pump discharge nozzle, weakens or dissipates the suction created by the airstream at high speeds. This prevents the suction from lifting the pump discharge ball check valve and weight to draw fuel from the pump chamber.

6. MAIN METERING SYSTEM

Air drawn in by the downward movement of the pistons in the engine passes through the carburetor venturi. This creates a drop in air pressure, commonly called vacuum, in the venturi. The strength of the vacuum is proportional to the amount of air being drawn through the venturi, which, in turn, is governed by the speed and power output of the engine.

At normal cruising speeds, the difference in pressure between the normal air pressure in the top of the float chamber and the vacuum in the venturi, forces a metered flow of fuel from the float chamber through the main metering system and out the main nozzle, which is located in the venturi. The fuel is metered (or measured) by the main jet as it flows into the bottom of the main well. The fuel moves up the main well past the narrow air bleed passages. Filtered air from the carburetor air inlet passes through the high speed bleed into the air bleed well, and enters the fuel flow in the main well through the short horizontal air bleed passages. The high speed bleed meters a properly increasing amount of air to the fuel at higher speeds, stabilizing the fuel discharge and maintaining the required mixture ratios. This emulsion of fuel and air, being lighter than the raw fuel, responds faster to any change in venturi vacuum. It also vaporizes more readily than raw fuel when it is discharged. The fuel continues up the main well and flows into the...
main nozzle where it is sprayed onto the open choke plate in the venturi. The action of the air-stream distributes the fuel evenly over the lower portion of the choke plate and from that area it is vaporized and mixed with the air flowing through the carburetor.

The throttle plate controls the amount of the fuel-air mixture admitted to the intake manifold, regulating the speed and power output of the engine in accordance with accelerator pedal movement. The distribution pin, extending horizontally from both sides of the choke shaft, diverts the air flow in the carburetor to aid in providing proper distribution of the mixture to all cylinders of the engine.

7. POWER ENRICHMENT SYSTEM

When high-power output is required, the carburetor delivers a richer mixture than that supplied for normal cruising, when no great load is placed on the engine. The added fuel for high power operation is provided by the power enrichment system, sometimes called the economizer system.

The power enrichment system is actuated by manifold vacuum, which gives an accurate indication of the power demands placed on the engine. Manifold vacuum is strongest at idle, when there is no load on the engine, and it is reduced correspondingly as the load on the engine is increased. This is due to the fact that, as the load on the engine increases, the throttle plate must be opened wider to maintain any given speed. Manifold vacuum is reduced because the throttle plate offers less resistance to the air flow entering the intake manifold.

Manifold vacuum, at the bottom of the throttle bore below the throttle plate, is transmitted through the vacuum passage to the top of the economizer diaphragm in the vacuum chamber. The vacuum, acting on the economizer diaphragm at idle and normal cruising speeds, is strong enough to hold the economizer diaphragm and stem up, thus compressing the spring on the stem.
When high power demands place a greater load on the engine and reduces the manifold vacuum beyond a predetermined point, the economizer spring expands, over coming the reduced vacuum above the diaphragm, to force the stem down. The expansion of the spring depresses the pin in the center of the power valve, opening the valve. Fuel from the float chamber flows into the valve and passes through a horizontal passage to the main well where it is added to the fuel flow in the main metering system, enriching the mixture for full power. The drilled plug in the passage, between the power valve and the main well, is a calibrated restriction which meters the flow of fuel through the power enrichment system.

POWER ENRICHMENT SYSTEM

OVERHAUL

1. INTRODUCTION

To properly overhaul the carburetor, Model 1904, it must be completely disassembled and all parts must be thoroughly cleaned. Then, each part must be inspected for wear, deterioration, and damage, and all defective parts must be discarded and replaced with genuine Holley replacement parts. The carburetor must then be carefully rebuilt, and accurately adjusted to insure the power, economy, and performance engineered into every Holley Carburetor. The
following overhaul procedure is easily accomplished with the use of a few factory approved special carburetor tools. These tools are strongly recommended for use on parts which could be damaged by ordinary tools. However, if special tools are not available, this carburetor can be overhauled using good ordinary hand tools with a reasonable amount of care.

2. SPECIAL TOOLS

Special tools recommended for use in overhauling this carburetor are listed below.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Snap-On Tool No.</th>
<th>Holley Tool No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Jet Wrench</td>
<td>TMC-36A</td>
<td>82R-49</td>
</tr>
<tr>
<td>Power Valve Wrench</td>
<td>MC-128</td>
<td>82R-34</td>
</tr>
<tr>
<td>Float Gauge</td>
<td>See Holley Catalog sheets for specific gage.</td>
<td></td>
</tr>
</tbody>
</table>

3. MASTER REPAIR KITS AND REPLACEMENT PARTS

Use the proper Master Repair Kit for the carburetor, as specified in the Holley Carburetor Parts Catalog, to assure a complete and satisfactory overhaul. This kit contains Holley replacements for all parts which are subject to wear in operation or are likely to be damaged during disassembly. A complete parts list for every carburetor in the Model 1904 series is included in the Holley Carburetor Parts Catalog. To insure "like new" performance in the overhauled carburetor, use only genuine Holley Replacement Parts. Use of unauthorized replacement parts could lead to faulty carburetion. When removing the parts to be replaced, observe their placement for reference in installing the new parts from the kit.

4. DISASSEMBLY

A. PREPARATION

Use a separate container for the component parts of both major subassemblies: the main body assembly, and the throttle body assembly. This procedure will facilitate cleaning, inspection, and reassembly.

B. DISASSEMBLY - MAIN BODY FROM THROTTLE BODY

Figure 1. Disassembly - Main Body from Throttle Body

The following list contains all the parts removed in separating the main body from the throttle body. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

<table>
<thead>
<tr>
<th>PART NAME</th>
<th>REF. NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump link cotter pin (2)</td>
<td>2</td>
</tr>
<tr>
<td>Pump link assembly</td>
<td>1</td>
</tr>
<tr>
<td>Throttle body screws and lockwashers (2)</td>
<td>3</td>
</tr>
<tr>
<td>Throttle body gasket</td>
<td>1</td>
</tr>
</tbody>
</table>
1. Remove the two pump link cotter pins and remove the pump link assembly.

![Figure 2. Removing Pump Link Cotter Pin](image)

2. Remove the two throttle body screws and lockwashers. Separate the throttle body and main body and discard the throttle body gasket.

![Figure 3. Removing Throttle Body Screws](image)

C. DISASSEMBLY - MAIN BODY ASSEMBLY

The following list contains all the parts removed in disassembly the main body assembly. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

<table>
<thead>
<tr>
<th>ORDER OF REMOVAL</th>
<th>PART NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 1</td>
<td>Float bowl screw and lockwashers (4)</td>
</tr>
<tr>
<td>5 2</td>
<td>Float bowl</td>
</tr>
<tr>
<td>5 3</td>
<td>Float bowl gasket</td>
</tr>
<tr>
<td>6 4</td>
<td>Fuel inlet seat screw</td>
</tr>
<tr>
<td>4 5</td>
<td>Fuel inlet seat screw gasket</td>
</tr>
<tr>
<td>4 6</td>
<td>Fuel inlet seat gasket</td>
</tr>
<tr>
<td>7 7</td>
<td>Float shaft</td>
</tr>
<tr>
<td>7 8</td>
<td>Float and lever assembly</td>
</tr>
<tr>
<td>7 9</td>
<td>Fuel inlet valve and seat assembly</td>
</tr>
<tr>
<td>8 10</td>
<td>Economizer body screw and lockwashers (3)</td>
</tr>
<tr>
<td>9 11</td>
<td>Economizer body cover</td>
</tr>
<tr>
<td>10 12</td>
<td>Economizer diaphragm and stem assembly</td>
</tr>
<tr>
<td>11 13</td>
<td>Economizer body cover gasket</td>
</tr>
<tr>
<td>11 14</td>
<td>Main well and economizer body screws and lockwashers (5)</td>
</tr>
<tr>
<td>11 15</td>
<td>Main well and economizer body</td>
</tr>
<tr>
<td>4 16</td>
<td>Pump return spring</td>
</tr>
<tr>
<td>12 17</td>
<td>Main jet</td>
</tr>
<tr>
<td>13 18</td>
<td>Pump inlet check valve retainer</td>
</tr>
<tr>
<td>13 19</td>
<td>Pump discharge valve retainer</td>
</tr>
<tr>
<td>14 20</td>
<td>Pump inlet check valve ball</td>
</tr>
<tr>
<td>14 21</td>
<td>Pump discharge valve weight</td>
</tr>
<tr>
<td>14 22</td>
<td>Pump discharge valve ball</td>
</tr>
<tr>
<td>15 23</td>
<td>Main well body spacer gasket</td>
</tr>
<tr>
<td>15 24</td>
<td>Pump diaphragm and rod assembly</td>
</tr>
<tr>
<td>16 25</td>
<td>Pump rod sleeve retainer ball</td>
</tr>
<tr>
<td>16 26</td>
<td>Pump rod sleeve</td>
</tr>
<tr>
<td>16 27</td>
<td>Pump spring</td>
</tr>
<tr>
<td>17 28</td>
<td>Pump operating lever retainer</td>
</tr>
<tr>
<td>17 29</td>
<td>Pump operating lever</td>
</tr>
<tr>
<td>19 30</td>
<td>Pump discharge nozzle screw</td>
</tr>
<tr>
<td>19 31</td>
<td>Pump discharge nozzle</td>
</tr>
<tr>
<td>4 32</td>
<td>Pump discharge nozzle gasket</td>
</tr>
<tr>
<td>20 33</td>
<td>Choke bracket screw &amp; lockwasher</td>
</tr>
<tr>
<td>21 34</td>
<td>Distribution pin</td>
</tr>
<tr>
<td>22 35</td>
<td>Choke plate screws and lockwashers</td>
</tr>
<tr>
<td>22 36</td>
<td>Choke plate</td>
</tr>
<tr>
<td>23 37</td>
<td>Choke shaft and lever assembly</td>
</tr>
<tr>
<td>23 38</td>
<td>Choke bracket</td>
</tr>
</tbody>
</table>
Figure 4. Disassembly - Main Body Assembly

1. Remove the four float bowl screws and lockwashers. Remove the float bowl and gasket, discard the gasket.

Figure 5. Removing Float Bowl Screws

2. Using Snap-On Tool No. MC-128, remove the fuel inlet seat screw and gasket. Discard the gasket.

Figure 6. Removing Fuel Inlet Retainer Screw

3. Lift out the float and fuel inlet assembly, and discard the fuel inlet seat gasket.
4. Remove the float shaft and separate the float and lever assembly from the fuel inlet valve and seat assembly.

5. Remove the three economizer body cover screws and lockwashers.

6. Remove the economizer body cover and lift the economizer diaphragm and stem assembly out of the main body. Discard the economizer body cover gasket.

7. Remove the five main well and economizer body screws and lockwashers. (Place a thumb against the main well and economizer body to retain it in position until the screws and lockwashers have been removed.) Lift out the main well and economizer body.
8. Remove the pump return spring which bears against the metal disk of the accelerating pump piston.

9. Using Snap-On Tool No. TMC-36A, remove the main jet from the main well and economizer body.

10. Remove the pump inlet check valve retainer and the pump discharge valve retainer.

11. Invert the main well and economizer body and allow the pump inlet check valve ball, the pump discharge valve weight and the pump discharge valve ball to drop out. Note size of balls for proper reassembly.

12. Remove and discard the main well body spacer gasket.

13. Slide the pump diaphragm and rod assembly out of the main body.

14. Disassemble the pump diaphragm and rod assembly. Press the pump rod sleeve toward the pump diaphragm, compressing the pump

CAUTION

Care must be taken when removing the pump diaphragm and rod assembly as the pump rod sleeve is under considerable spring tension. The assembly must be pulled straight out and NOT rotated during this operation.
spring, and allow the pump rod sleeve retainer ball drop out. Slide the sleeve and spring off the rod.

15. Using a thin bladed screwdriver, pry the pump operating lever retainer off the pump operating lever stud.

16. Slide the pump operating lever off the stud.

17. Remove the pump discharge nozzle and gasket, discard the gasket.

18. Remove the choke bracket screw and lockwasher.

19. Rotate the choke plate past the full open position until it is nearly inverted. Place the distribution pin in a section of brass tubing with the end of the tube bearing against the choke shaft. Using a flat tip punch, drive the rolled pin out of the choke shaft.
NOTE

In the illustration (Figure 21), a section of the upper portion of the brass tubing is shown cut away for the purpose of clarity. Do not cut out this section of tubing.

CAUTION

Care is to be taken when removing the distribution pin to prevent damaging the choke shaft.

20. Remove the two choke plate screws and slide the choke plate out of the choke shaft.

NOTE

Care must be taken, when filing the staked end of the choke plate screw, to avoid damaging the carburetor bore, choke shaft, or other components.

21. Slide the choke shaft and lever assembly out of the main body. Remove the choke bracket.

NOTE

Do not attempt to remove any of the pressed-in passage plugs, air bleed plugs or the main nozzle in the main body.

D. DISASSEMBLY - THROTTLE BODY ASSEMBLY

The following list contains all parts removed in disassembling the throttle body assembly. During disassemble discard all gaskets, also all parts which have replacements in the Master Repair Kit.
5. CLEANING AND INSPECTION

A. CLEANING

1. Soak all castings and metal parts in a cleaning solution long enough to soften and loosen all foreign deposits. If a commercial carburetor cleaning solvent is not available, lacquer thinner or denatured alcohol may be used. Place the parts and castings to be cleaned in a metal basket suspended in the solution to keep them out of the sediment which collects in the bottom of the container. Agitating the parts in the solution usually promotes a more thorough cleaning. After the parts and castings have soaked sufficiently, rinse them in hot water to remove all traces of the cleaning solution. While rinsing the parts and castings, scrub away all remaining foreign matter with a stiff bristle brush.

2. Compressed air should be directed through all passages in the casting and through all jets and tubes. Do not use compressed air on any diaphragm assembly as this may rupture the diaphragm.

CAUTION

Never attempt to clean a passage with a drill, wire, or similar object, as this is liable to distort the passage and affect carburetor performance. Do not use a buffing wheel, wire brush, file, or other sharp instrument to remove carbon deposits, since these methods may also remove the protective plating on the part.

NOTE

Gaskets, neoprene diaphragms, and felt seals should not be exposed to the cleaning fluid. Most commercial solvents will deteriorate these parts. Never re-use old gaskets, neoprene diaphragms, or felt seals when rebuilding the carburetor.

B. INSPECTION

1. Major Castings - Discard and replace if stripped threads, cracks, or damaged gasket mating surfaces are found. Be sure the venturi in the main body casting is in good condition, free of nicks, scratches, and foreign deposits. Any slight irregularity in the venturi may affect the calibration of the carburetor. Be sure the main discharge nozzle in the venturi is undamaged.
Check passages in the castings by directing compressed air into one end of every passage and feeling for a flow of air out the other end. (Refer to section on "Operation" beginning on page 2 for the location of the passages in the castings.)

2. Choke Shaft - Discard and replace if the shaft is bent, or if there are stripped threads, and if the lever riveted to the end of the shaft is loose.

3. Float and Lever Assembly - Discard and replace the float and lever assembly if the float leaks, or if the assembly is corroded or damaged in any way. Shake the float to determine if fuel has leaked into it.

4. Throttle Shaft and Throttle Plate - If edges are nicked or if the protective plating has been damaged and the bare metal exposed, discard plates and shaft.

5. Choke Plate - Discard and replace if the plate is bent or corroded, or if the edges are badly nicked, and if the poppet valve spring is damaged. Be sure the shaft, inside the poppet valve spring, is clean and the poppet valve operates freely.

6. Choke Linkage - Discard and replace the choke lever and swivel assembly, if there are stripped threads in the swivel, or if it is no longer securely riveted to the choke lever.

7. Springs and Retainers - Discard and replace if distorted or broken.

8. Screws, Lockwashers and Nuts - Discard and replace if stripped threads, bending, or other damage is noted.

6. REASSEMBLY

A. THROTTLE BODY ASSEMBLY

1. Slide the throttle shaft and lever assembly into position in the throttle body. Referring to the marks scribed on the plate during disassembly, set the plate in place on the throttle shaft and run the screws down snugly but do not tighten. Hold the throttle body up to the light, if little or no light shows between the throttle plate and throttle bore, and there is no binding when the plate is rotated, tighten the screws firmly and stake.

2. Place the idle adjusting needle spring on the needle and insert the needle in the throttle body. Turn the needle in gently with the fingers until it seats, then back it off one full turn. Be careful not to force the needle against its seat, as this will groove the tip of the needle, making it impossible to correctly adjust the idle mixture.

B. REASSEMBLY - MAIN BODY ASSEMBLY

1. Place the choke bracket in position on the main body but do not install choke bracket screw and lockwasher. Insert the choke shaft and lever assembly through the bracket into the main body.

2. Rotate the choke lever until the choke lever swivel is directly below the choke shaft. Insert the choke plate into the slot in the choke shaft with the stem and spring of the poppet valve extending upward.

CAUTION

Take care not to damage the tip of the main nozzle while installing the choke plate.

3. Rotate the choke lever counter-clockwise to close the choke plate. Be sure the choke plate is centered when closing, to avoid damaging the venturi. Install the two choke plate screws snugly, but do not tighten. The longest screw is to be inserted in the screw hole furthest from the choke lever. Turn the choke lever until the choke plate is nearly inverted and the poppet valve stem and spring extend downward. Align
the distribution pin hole in the choke shaft with the corresponding hole in the choke plate. Brace the choke shaft from beneath and drive the distribution pin in position. Install the distribution pin so the clearance between the tip of the pin and the venturi wall is equal on both sides when the choke plate is in the full open position.

4. Check the choke plate for binding by moving the choke lever through the extent of its travel. If it moves freely, tighten the two choke plate screws, and stake the smallest of the two screws.

5. Install the choke bracket screw and lockwasher.

6. Place the pump discharge nozzle in position, using a new gasket and insert the proper discharge nozzle screw.

7. Place the pump operating lever on the stud in the main body and fit the pump operating lever retainer into the groove at the end of the stud.

8. Place the pump spring on the rod of the pump diaphragm and rod assembly. Position the pump rod sleeve on the pump diaphragm rod with the small hole in the sleeve aligned with the center of the flat cutaway portion of the rod. Press the sleeve on the rod, compressing the pump spring, and insert the pump rod sleeve retainer ball into the small hole in the pump rod sleeve. Insert the assembly into position in the main body.

9. Install the pump inlet check ball and the pump discharge valve ball in the main well and economizer body. The steel balls are to be seated by placing a thin brass rod on the top of each ball and tap the rod lightly three or four times with a fiber mallet. Be sure the balls move freely in their chambers before installing the retainers.

NOTE

The pump inlet check ball is slightly larger than the pump discharge valve ball. Be sure these two parts are installed in the proper location.

10. Install the pump inlet check valve retainer, the pump discharge valve weight and the pump discharge valve retainer in position.

11. Install the main jet in the main well and economizer body, using Snap-On Tool No. TMC-36A.

12. Place the new main well and economizer body spacer gasket over the pump diaphragm and rod assembly.

13. Install the pump return spring, seating the larger end of the spring in the metal disk of the pump diaphragm and rod assembly.

14. Align all holes in the main well and economizer spacer gasket with the corresponding holes in the pump diaphragm and the main body. Insert the five main well and economizer body screws and lockwashers in the main well and economizer body with the two long screws placed in the center top and bottom holes. Set the power valve situated at the extreme right end of the main well and economizer body into its position in the main body, then press the main well and economizer body into place against the pump diaphragm using the following procedure. Grasp the main body in the left hand, holding the thumb over the protruding end of the pump rod sleeve and the fingers over the main well and economizer body. Apply pressure with thumb and fingers to compress the pump spring and pump return spring. This pressure must be applied evenly to prevent the tension of the pump return spring from disturbing the alignment of the holes in the diaphragm, spacer gasket, and the main body. After the main well and economizer body is pressed into position, maintain the pressure until the five main well and economizer body
screws have been started in their holes and a check is made on the alignment of the diaphragm and spacer gasket. Do not tighten the screws, but turn them in as far as possible without compressing the lockwashers. Release the pump rod sleeve. This will allow the pump return spring to expand, stretching the accelerating pump diaphragm to insure full travel when the accelerating pump is operated. Then tighten the five main well and economizer body screws.

Figure 29. Installing Main Well and Economizer Body Assembly

15. Place the new economizer body gasket, the economizer diaphragm and stem assembly, and the economizer body cover in position in the main body. Check to insure the alignment of the vacuum passage and screw holes, then install the three economizer body cover screws and lockwashers. Check to make certain that the economizer stem is resting on the power valve.

16. If the fuel inlet needle assembly has been received unassembled, it is to be assembled as follows: Fit the fuel inlet needle spring over the fuel inlet needle pin and insert those parts into the fuel inlet needle. Install the wire fuel valve clip in the groove in the fuel inlet needle.

CAUTION

Fuel inlet needles and seats are matched assemblies. Factory tested to insure proper operation, their component parts are not interchangeable.

17. Install the float and lever assembly in the fuel inlet assembly with the float shaft.

Figure 30. Fuel Inlet Needle Assembly

18. Place the new fuel inlet seat retainer screw gasket on the fuel inlet seat retainer screw in the fuel inlet fitting boss on the main body. Place the new fuel inlet seat gasket on the end of the fuel inlet seat retainer screw which protrudes into the fuel bowl. Ease the float and fuel inlet valve assembly into position and secure it in place by tightening the fuel inlet seat retainer screw, using Snap-On Tool No. MC-128.

19. At this point the float setting should be checked and necessary adjustments made. Invert the main body assembly, allowing the float to drop to the closed position. Using gauge as specified on catalog sheet, gauge the float, checking the setting on both the “touch” and “no touch” legs of the gauge. The level of the float may be adjusted by bending the small tab in the float lever which contacts the head of the fuel inlet needle pin. Use needle-nosed pliers for this correction and recheck the float setting after adjustments have been made.

Figure 31. Setting Float
20. Fit the new float bowl gasket in the recess in the rim on the main body. Place the float bowl in position and insert the four screws and lockwashers. Tighten the screws alternately a little at a time in order to evenly compress the float bowl gasket.

C. REASSEMBLY - MAIN BODY ASSEMBLY

TO THROTTLE BODY ASSEMBLY

1. Place the new throttle body to main body gasket on the throttle body and check to insure the alignment of all holes in the gasket with corresponding holes in the throttle body. Hold the two throttle body screws and lockwashers in position in the throttle body to maintain the gasket alignment, then set the main body on the throttle body, invert the carburetor, and tighten the two throttle body screws alternately, a little at a time to compress the gasket evenly and eliminate the possibility of an air leak.

2. Install the lower end of the pump link assembly in hole in the throttle lever closest to the throttle shaft. This setting is for normal climatic driving conditions, while the farthest settings if for continuous extreme cold weather operation. Place the other end of the pump link assembly in the end of the pump operating lever. Install the two pump link cotter pins.

This completes the reassembly of Carburetor Model 1904. It is now ready for installation on the engine.

INSTALLATION

1. INSTALLATION ON THE ENGINE

Be sure the carburetor mating surface on the intake manifold is clean. Fit a new carburetor flange gasket on the manifold and install the carburetor. Do not tighten the two nuts on the studs until the fuel line and distributor vacuum line fitting threads have been engaged. Then draw the two nuts down evenly, turning first one, then the other, a little at a time until the flange gasket has been compressed and the nuts are tight. This will eliminate the possibility of an air leak past the flange gasket. Connect the throttle and choke linkages. Make sure the choke plate in the carburetor venturi is fully open when the choke control knob is pushed in. Clean and install the air cleaner.

2. CARBURETOR ADJUSTMENTS

Start and warm up the engine. When the engine reaches its normal operating temperature, adjust the throttle stop screw to idle the engine at the speed specified by the engine manufacturer, first checking to insure that the choke plate is fully opened and that the vehicle is on level ground.

NOTE

The accelerating pump stroke can be adjusted for seasonal or climatic conditions by changing the position of the pump link in the throttle lever. The hole in the lever nearest the throttle shaft is the normal setting and should be satisfactory for nearly all operating conditions. If a richer accelerating pump discharge is desired for extreme cold weather operation, set the pump link in the outer hole in the throttle lever. Pump link position can be changed by removing the cotter pin at the lower end of the pump link, moving the pump link to the outer hole, and re-installing the cotter pin.

A. ADJUSTING THE IDLE

Set the idle adjusting needle to give the highest steady manifold vacuum or the smoothest running and maximum idle speed. Turning the idle adjusting needle in (clockwise) gives a leaner mixture. Turning the needle out (counterclockwise) gives a richer mixture. If this adjustment results in an increase in idle rpm great enough to require resetting the throttle stop screw, then the idle adjusting needle should also be reset, leaving it slightly on the rich side.
SERVICE HINTS

Carburetor service should be performed only with the proper equipment. This equipment should include float setting gage, and special carburetor tools. In addition, the proper specification sheets must be utilized. Refer to the Holley Carburetor Catalog Sheet for the proper engine and carburetor specifications relative to the carburetor being overhauled.

A. INSPECTING THE VEHICLE

Road check the vehicle, if possible, before making any adjustments on the carburetor. Dragging brakes, poor wheel alignment, low tire pressures, and other causes of undue friction should be remedied. Evidence of leakage, dents or clogging in the exhaust system should be corrected. Check the color of the exhaust for indications of an over-rich mixture.

B. INSPECTING THE ENGINE

Many faults may be detected by a visual inspection of the engine in operation. Remedy loose or disconnected wiring, leaking water connections, possible short circuits, slipping fan belts and other faults. Check and set the following in accordance with the manufacturer's specifications: distributor breaker points, spark plug gap, ignition timing, condenser capacity, valve setting compression and inlet fuel pressure. Check all gaskets and intake manifold for leakage.

C. INSPECTING THE FUEL SYSTEM

The fuel system should be thoroughly inspected. Examine all fuel lines for collapsed sections and for other signs of damage. Make a manual check of fuel lines connections for looseness or leakage. Check the fuel tank vent to insure that it is unobstructed. Even a partially clogged vent may cause the engine to cut out after a few minutes of high-speed operation. Clean the fuel pump sediment chamber and the fuel filter, if one is used. With a vacuum gage connected to a "T" in the fuel line leading to the fuel pump, check for air leaks at all ranges of engine speed. A vacuum reading less the normal at all engine speeds indicates an air leak or a faulty fuel pump. Low pump pressure leads to a lean mixture and poor performance. Excessive fuel pump pressure may lead to the engine being flooded and will result in poor fuel economy.

D. INSPECTING THE CARBURETOR

Remove the air cleaner first and then make a preliminary inspection of the carburetor. Turn on the engine and check position of the choke plate. Throttle the engine down to idle and completely close the idle adjusting needle. If the engine continues to run even a short interval after this is done, it may be an indication of several faults. The tips of the idle adjusting needle or its seat is damaged, or there may be carbon deposits in the throttle bore near the throttle plate, or else the idle speed is too high.

Stop the engine and check all carburetor connections and linkages. Check the accelerating pump link to insure that it is correctly positioned for the prevailing climatic conditions.

If it is apparent that the above items are not at fault and the trouble is in the carburetor, remove the carburetor from the engine and disassemble.

Thoroughly clean and inspect each part, using the procedure laid down in the Service Manual. The accompanying chart lists specific carburetor complaints and discusses the various parts which may be at fault. A rigorous cleaning and inspection, coupled with the replacement of faulty parts and care in reassembly, should prevent recurrence of the complaint.

NOTE

Many performance complaints attributed to the carburetor may be the result of poor driving habits. It will be impossible to obtain fuel economy if the engine is needlessly raced, or if the throttle is opened too suddenly or harshly.
# TROUBLE SHOOTING CHART

<table>
<thead>
<tr>
<th>POSSIBLE CAUSE</th>
<th>DIAGNOSIS</th>
<th>CORRECTION</th>
</tr>
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<tbody>
<tr>
<td><strong>COMPLAINT:</strong> Hard Starting or Stalling.</td>
<td></td>
<td></td>
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<tr>
<td>Excessive choking.</td>
<td>Rough running engine from over-rich mixture on starts and warm up. Black exhaust, fouled plugs, loss of power, poor economy may result.</td>
<td>Check choke linkage for binding or damage. Check condition of balance tube to float chamber. With engine idling check for air leaks between carburetor and manifold.</td>
</tr>
<tr>
<td>Insufficient choking.</td>
<td>Sluggish rough running engine in cold starts. Stalling and back-firing into carburetor may result.</td>
<td>Check all items listed above.</td>
</tr>
<tr>
<td><strong>COMPLAINT:</strong> Rough Idle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idle adjusting needle improperly set.</td>
<td>May be particularly noticeable following seasonal weather changes. Turn needle off present setting in both directions and check for increases in rpm.</td>
<td>Readjust both adjusting needle as outlined in “Adjustments” section of this manual. Be sure that idle adjusting needle spring is tight.</td>
</tr>
<tr>
<td>Damaged tip on idle adjusting needle.</td>
<td>Impossible or extremely difficult to set idle mixture correctly. Remove idle adjusting needle and inspect tip.</td>
<td>Replace damaged needle with authorized Holley replacement parts. Adjust as outlined in “Adjustments” section of this service manual.</td>
</tr>
<tr>
<td>Loose or damaged main well and economizer assembly. Clogged or restricted fuel passages.</td>
<td>Idle is erratic or insensitive to adjustment.</td>
<td>Remove and inspect main well and economizer assembly. Replace if damaged. Tighten assembly securely when assembling.</td>
</tr>
<tr>
<td><strong>COMPLAINT:</strong> Faulty Acceleration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inoperative pump inlet check valve.</td>
<td>Sluggish engine response. Little or no fuel discharged at pump discharge nozzle upon acceleration.</td>
<td>Replace pump inlet ball check valve with authorized Holley replacement parts.</td>
</tr>
<tr>
<td>Inoperative pump discharge valve.</td>
<td>Continual discharge from pump discharge nozzle at higher speeds. Economy complaint usually accompanies this.</td>
<td>Check pump discharge valve and its seat for damage or foreign matter which would prevent valve from seating properly. Replace damaged or worn valve with authorized Holley replacement part.</td>
</tr>
<tr>
<td>POSSIBLE CAUSE</td>
<td>DIAGNOSIS</td>
<td>CORRECTION</td>
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</tr>
<tr>
<td>Damaged or undersize main jet and/or low fuel level.</td>
<td>Poor performance in entire range from slow cruising speeds to top speed. Economy may also be affected.</td>
<td>Remove main jet and inspect for foreign matter and proper size stamped on side. Never attempt to gage or clean jet orifice with wire gage, drill, or similar object. Replace damaged or improper main jet with authorized Holley replacement part. Check for specified fuel level and reset floats if necessary. See “Reassembly” section of this manual.</td>
</tr>
<tr>
<td><strong>Economizer stem binding or power valve clogged or damaged.</strong></td>
<td>Poor performance under high loads at normal cruising speeds as well as reduced top speed.</td>
<td>Check economizer stem for freedom of movement and damaged parts. Check economizer for cleanliness, proper operation.</td>
</tr>
</tbody>
</table>

**COMPLAINT: Poor Fuel Economy.**

<table>
<thead>
<tr>
<th>POSSIBLE CAUSE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Damaged or improper main jet.</td>
<td>Mixture too rich or too lean, possibly resulting in sluggish operation.</td>
<td>Remove main jet and inspect for proper size stamped on jet. Never use wire gage to check jet orifice. Replace worn, damaged, or improper size main jet with authorized Holley replacement main jet of the specified size. Too small a main jet will also adversely affect fuel economy.</td>
</tr>
<tr>
<td><strong>Economizer stem held down or power valve stuck open.</strong></td>
<td>Satisfactory high load performance but high fuel consumption at normal cruising conditions.</td>
<td>Check economizer stem for freedom of movement. Check for damage to economizer diaphragm and other evidence of air leaks past diaphragm. Remove economizer and inspect for cleanliness, damage, and proper operation. Check economizer valve gasket for splits or other evidence of leakage. Use new gasket when installing economizer. In extreme cases, remove carburetor and check entire vacuum passage in throttle body for clogging. Replace faulty parts only with authorized Holley replacement parts.</td>
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</tbody>
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