SECTION 3-E
CARTER CARBURETOR AND CLIMATIC CONTROL

CONTENTS OF SECTION 3-E

SERVICE BULLETIN REFERENCE

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3-20 CARTER CARBURETOR IDENTIFICATION NUMBERS

Carter Carburetors used on 1948 and 1949 engines have the following model and code numbers:

Series	*Model*	*Code No.*
40-50	WCD	663 S
70	WCD	664 S

The model designation, which is cast on the main body below the gasoline inlet, indicates the basic design of the unit. The code number, which is stamped on a metal tag attached by one bowl cover screw, furnishes the key to the size, calibrations, and other alterations required for the particular year and series engine for which the unit is specified.

Carburetors having different code numbers are not interchangeable even though the model designations are identical. The variations between carburetors of different code numbers may not be apparent on inspection, but they have a very important bearing on the performance of the engine.

When ordering or using replacement parts for a Carter carburetor always make certain that they are as specified for the carburetor model and code number, as well as for the car model and series.

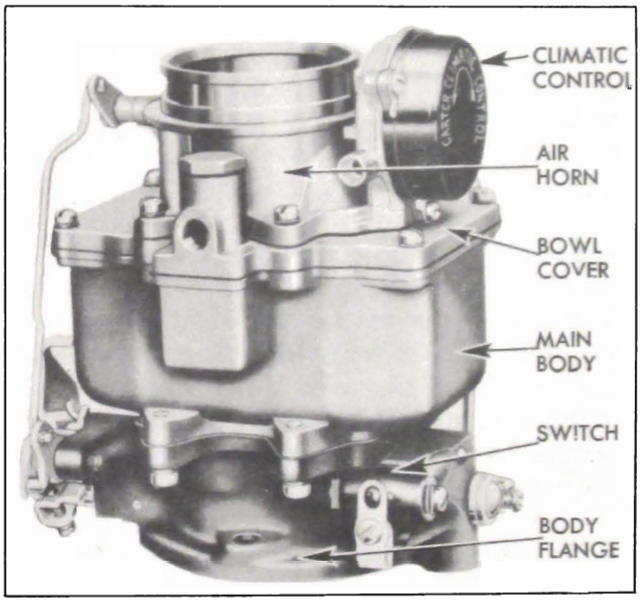

Fig. 3-32—Carter Carburetor Assembly

3-21 DESCRIPTION AND OPERATION OF CARTER CARBURETOR

a. General Description

The WCD Carter carburetor is a dual-barrel down draft type. See figure 3-32. It contains a float system, low speed (idle) system, high speed system, power system, accelerating system, and climatic control (automatic choke). An accelerator vacuum switch, which is part of

the cranking motor control circuit, is incorporated in the throttle body flange of carburetor.

Air enters both barrels of carburetor through the air horn which has one inlet and contains the choker valve. Fuel is supplied to both barrels from one float chamber. The float chamber encircles both barrels and contains a dual type float and lever assembly which operates one float needle or valve. The accelerating pump jet in each barrel is supplied with fuel from one pump located in the float chamber. The power systems of both barrels are controlled by one vacuum piston and link.

Except as noted above, each barrel forms a complete carburetor system. Each barrel contains a low speed system with an adjustment screw, a high speed system with a metering rod, accelerating pump discharge jet, a triple venturi system, and a throttle valve. The throttle valves of both barrels are mounted in line on one shaft. The dual construction combines the advantages of two carburetors in one compact unit. The dual carburetor and dual intake manifold provide more uniform distribution of fuel to all cylinders than would be possible with one single barrel carburetor.

Operation of each system of the WCD Carter carburetor is described in the following subparagraphs. The climatic control is described in paragraph 3-22, which follows. The accelerator vacuum switch is described in paragraph 10-32.

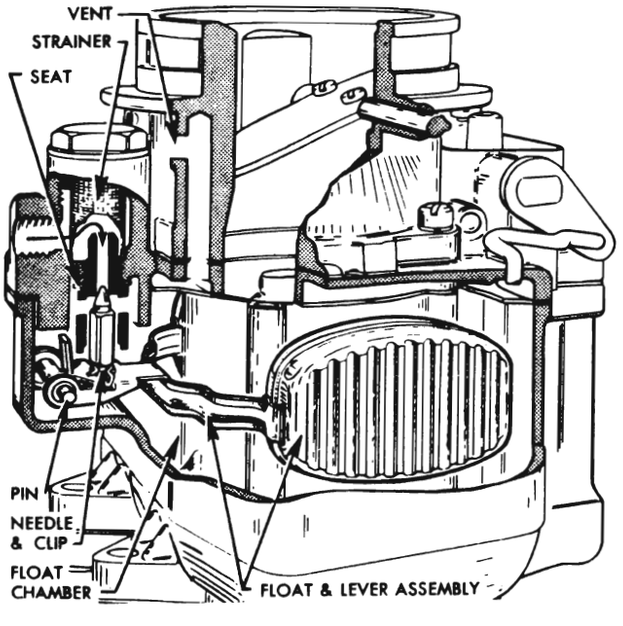

Fig. 3-33—Float System—Carter Carburetor

b. Operation of Carter Float System

Fuel enters the carburetor at the gasoline connection and flows through the strainer and needle seat into the float chamber. When the fuel reaches the prescribed level in float chamber, the dual float presses the needle against its seat to shut off the flow of fuel. Thereafter, the fuel is maintained at the prescribed level by opening and closing of needle as required. The float lever is hinged on a pin and connected to the float needle by a clip. The float chamber is vented externally through a port in air horn to allow fuel to be smoothly withdrawn through the various systems. See figure 3-33.

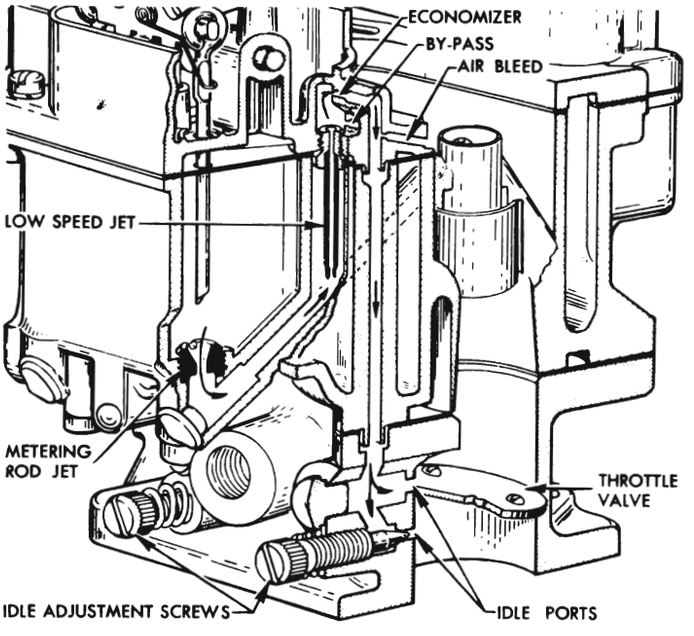

Fig. 3-34—Low Speed System—Carter Carburetor

c. Operation of Carter Low Speed or Idle System

Fuel is delivered to the egine through the low speed system at closed throttle and light load speeds up to approximately 20 MPH. The low speed system also partially controls fuel supply for light load speeds up to approximately 30 MPH.

The operation of the low speed system in each barrel of the carburetor is identical. Fuel flows from the float chamber through the metering rod jet into a passage which supplies both the low speed jet and the main nozzle. It then flows upward through the low speed jet which meters the fuel used by the low speed system. At the upper end of the low speed jet the fuel is combined with a stream of air coming in from the carburetor throat through a by-pass. The combining of the air stream with the fuel tends to atomize or break up the gasoline into a vapor. See figure 3-34.

The fuel-air mixture passes through a small drilled passage called the economizer and is combined with an additional air stream coming

through the air bleed from the throat of the carburetor. This additional air tends to break the fuel particles into a still finer vapor.

The fuel-air mixture that flows downward through the idle mixture passage and out through the two idle ports is still richer than an idle mixture needs to be, but when it mixes with the air coming in past the throttle valve, it forms a combustible mixture of the right proportions for idle speed. The idle adjustment screw permits regulation of the quality of the low speed mixture.

The upper idle port is slotted vertically. As the throttle valve is opened it not only allows more air to come in past it but also uncovers more of the idle port, thereby allowing a greater quantity of the fuel-air mixture to enter the carburetor throat from the idle mixture passage.

The closed position of the throttle valve is such that at idle speed of 8 to 10 MPH, it leaves enough of the slotted idle port in reserve to cover the range in speed between idle and the point where the high speed system begins to operate.

As the speed increases from approximately 20 MPH, the low speed system starts cutting out as the high speed system cuts in until the high speed system is carrying the entire load and the low speed system is doing nothing.

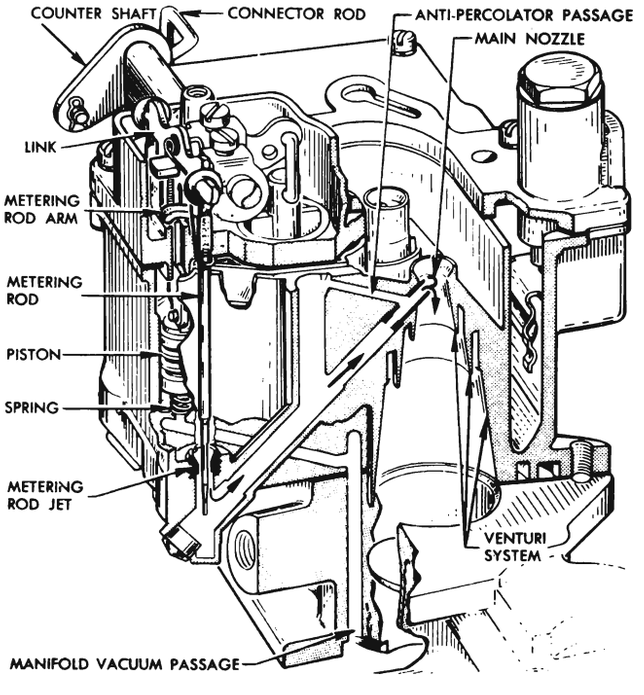

Fig. 3-35—High Speed and Power Systems—Carter Carburetor

d. Operation of Carter High Speed System

The high speed system controls the flow of fuel during the intermediate or part throttle operation, starting at approximately 20 MPH and continuing up to approximately 75 MPH.

The operation of the high speed system in each barrel of the carburetor is identical. Air entering the barrel through the air horn passes through the triple venturi system which increases the velocity of the air and creates a suction on the main nozzle. This causes fuel to flow from the float chamber through the metering rod jet into the main nozzle from which it is discharged into the air stream passing through the small venturi. The triple venturi system tends to atomize or break up the fuel into a vapor and mix it with the air stream. See figure 3-35.

If any vapor bubbles are formed in the hot gasoline in the main nozzle passage, they rise in the low speed jet well and the vapor exhausts through the anti-percolator passage into the main nozzle. This avoids percolating difficulties which might occur if the vapor bubbles rose directly into the main nozzle.

The amount of fuel entering the high speed system is metered or controlled by the area of the opening between the metering rod jet and the end of the metering rod which extends into the jet. The lower end of the metering rod has steps of three different diameters to provide three different metering areas, depending upon the position of the metering rod in the jet. The metering rod is connected by a link, countershaft and connector rod to the throttle shaft so that it is raised when the throttle valve is opened and lowered when the throttle valve is closed.

At approximately 20 MPH the largest or economy step of metering rod extends into the jet, thereby giving the smallest possible metering area. As the throttle valve is opened for higher speed or greater power, the metering rod is raised so that the middle step and later the smallest or power step provides increased metering area between rod and jet. At top speed, the smallest or power step is in the jet.

Engines operated at part throttle on level road use a mixture of maximum leanness. The mixture for greatest power and acceleration is somewhat richer, and is furnished by the power and accelerating systems described below.

e. Operation of Carter Power System

For maximum power or high speed operation above approximately 75 MPH, a richer mixture is required than that necessary for normal throttle opening. The richer mixture is supplied through the high speed systems of both barrels of carburetor by means of the power system.

The power system consists of a vacuum piston located in a cylinder connected to manifold vacuum, a spring which tends to push the piston upward against manifold vacuum, and a vacumeter piston link attached to the piston and supporting the two metering rods. See figure 3-35.

Under part throttle operation, manifold vacuum is sufficient to hold the piston and link down against the tension of the spring, so that the link is held against the tongue of the metering rod arm. The metering rods are then raised and lowered mechanically as the throttle valve is opened and closed. When the throttle valve is opened to a point where additional fuel is required for satisfactory operation, manifold vacuum decreases sufficiently so that the piston spring moves the piston, link and metering rods upward to the proper metering rod step position to give the required richer mixture, independently of throttle opening. As soon as the demand is passed, manifold vacuum moves the piston link down against the metering rod arm so that the metering rods are controlled mechanically again.

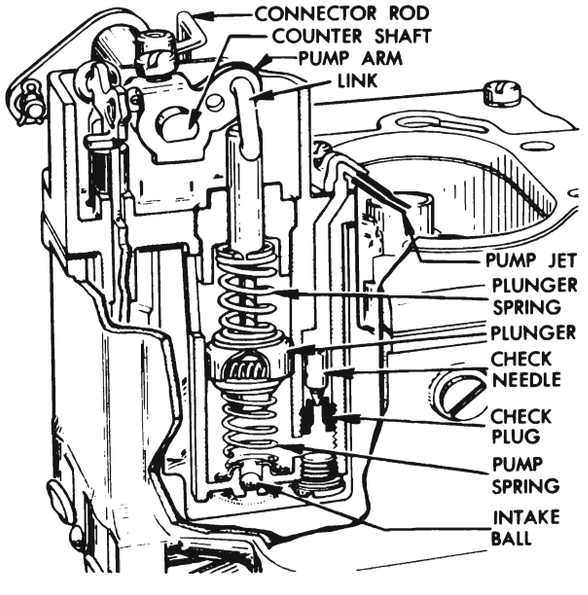

Fig. 3-36—Accelerating System—664S Carter Carburetor (Series 70)

f. Operation of Carter Accelerating System

The accelerating system supplies the extra quantity of fuel which is needed momentarily for smooth and rapid acceleration when the throttle valve is suddenly opened.

A pump plunger, located in a cylinder extending into the float chamber, is mechanically operated from the throttle valve shaft by means of the throttle shaft arm, throttle connector rod, pump operating arm and countershaft assembly, pump arm and pump arm link. The pump cylinder contains intake and discharge check valves and a discharge passage leading to a pump jet in each barrel of carburetor. See figure 3-36.

When the throttle is closed, the pump plunger moves up and draws a supply of fuel from the float chamber past the intake ball into the pump cylinder. When the throttle is opened, the pump plunger on its downward stroke exerts pressure on the fuel which presses the intake ball against its seat, raises the check needle off the discharge check plug, and discharges a metered quantity of fuel through the pump jets into each barrel of carburetor. This occurs only momentarily during the accelerating period. The pump plunger spring provides a follow-up action so that the fuel discharge carries out over a brief period of time. See figure 3-36. In the 664 S (Series 70) carburetor only, a relief valve in the pump discharge passage plug prevents excessive build-up of pressure in the accelerating system when the throttle is suddenly snapped open.

When the desired speed is reached and the throttle is held in fixed position, the pressure on the fuel in pump cylinder decreases sufficiently so that fuel ceases to discharge from the pump jets. With the throttle held in a fixed position the fuel flows only through the low speed or high speed systems as previously described.

3-22 DESCRIPTION AND OPERATION OF CARTER CLIMATIC CONTROL (AUTOMATIC CHOKE)

a. General Description

The climatic control consists of a choker valve mounted on a shaft in the carburetor air horn, a bi-metal thermostatic coil and housing attached to a housing cast on air horn, a vacuum actuated choke piston located in a cylinder in the housing on air horn, and a fast idle con-

nector rod which connects a lever on the choke shaft to a fast idle cam mounted on carburetor body flange. An upper heat pipe connects the choke housing to a lower heat pipe in the exhaust manifold.

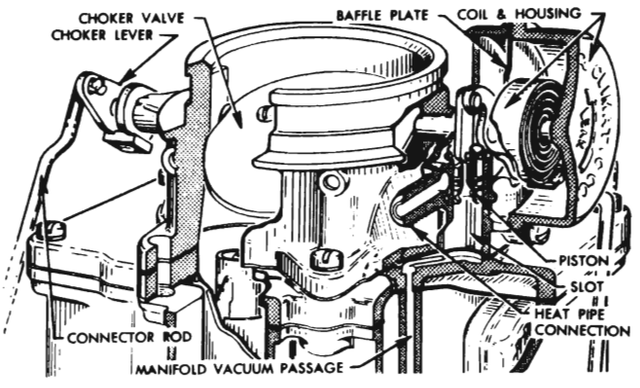

Fig. 3-37—Carter Climatic Control

The choker valve is mounted off-center on the choke shaft so that the force of air stream passing through the air horn tends to move the valve to the open position. A short lever riveted to choke shaft is engaged by the free outer end of the thermostatic coil which, when cold, tends to close the choker valve. The choke piston, which is actuated by intake manifold vacuum, is connected by a link to the short lever on choke shaft and tends to open the choker valve when the engine is running. See figure 3-37.

The lower heat pipe in the exhaust manifold heats the air which is drawn through it and the upper heat pipe into the thermostatic coil housing. Two slots in the choke piston cylinder permit manifold vacuum to draw this heated air through the thermostatic coil housing and down into the manifold. A baffle plate separates the thermostatic housing from the housing on air horn to insure circulation of heated air around the thermostatic coil.

The fast idle cam trip lever is connected by a rod to a choker lever on the outer end of choke shaft so that the fast idle cam is rotated as the choker valve moves. In closed throttle position when choker valve is not wide open, a fast idle adjustment screw on throttle shaft lever bears against the edge of the fast idle cam to give a greater throttle opening than that provided by the throttle lever adjustment screw. The edge of the cam is graduated in height from center to give increased throttle opening as choker valve moves toward closed position. When choker valve is in wide open position, the fast idle adjustment screw is opposite an opening in edge of cam so that throttle may close against the throttle lever adjustment screw.

b. Choke Operation—Cold Engine

When the engine becomes cold the thermostatic coil also becomes cold and increases its spring tension sufficiently to close the choker valve. It is prevented from closing the valve, however, because the fast idle adjustment screw holds the fast idle cam in the slow idle position; consequently, the choker valve is held partially open.

When the accelerator pedal is depressed to start the engine, the fast idle adjustment screw is lifted clear of the fast idle cam and the thermostatic coil then closes the choker valve. After the engine starts running, intake manifold vacuum causes the piston to partially open the choker valve against the spring tension of thermostatic coil, thereby admitting sufficient air to give a satisfactory running mixture.

When accelerator pedal is released after starting the engine, the fast idle adjustment screw comes to rest against a high point of fast idle cam which was rotated to the fast idle position by the closing of choker valve. This provides proper throttle opening to prevent stalling of the cold engine.

If the throttle is partially opened while the running engine is cold, the vacuum piston and the increased force of air flow against the offset choker valve will open the valve against the spring tension of the thermostatic coil. These opposing forces balance the choker valve at a position which provides the required choke action without causing loading or an excessively rich mixture. At wide open throttle the vacuum piston does not help to open the choker valve.

c. Choke Operation—Warm-Up Period

As the engine and exhaust manifold warm up, warm air is drawn through the heat pipes into the thermostat housing by manifold vacuum operating through the slots in choke piston cylinder. This warms the thermostatic coil, causing it to reduce its spring tension on choker valve in proportion to the increase in temperature. The choke piston moves the choker valve to a more open position within the range permitted by the fast idle cam trip lever, which can move independently of the fast idle cam which is held stationary at closed throttle by the fast idle adjustment screw.

When the throttle is opened and fast idle adjustment screw is lifted from the fast idle cam, the cam then rotates to bring a lower point into position for the fast idle adjustment screw. The engine will then run at a slower speed at closed throttle.

d. Choke Operation—Hot Engine

When the engine reaches normal operating temperature, the thermostatic coil is heated to the point where it no longer exerts any spring tension on the choker valve. The choker valve is in the wide open position and the fast idle cam is in the slow idle position so that the fast idle adjustment screw no longer contacts it at closed throttle. The throttle lever adjustment screw then governs throttle valve opening at closed throttle.

e. Choke Unloader Operation

If the engine becomes flooded for any reason, the choker valve can be partially opened by depressing accelerator pedal to the full extent of its travel. This causes a tongue or arm on the throttle lever to contact and rotate the fast idle cam, which forces the choker valve open. See figure 3-39.

3-23 ADJUSTMENT OF FAST IDLE CAM, CHOKE UNLOADER, AND FAST IDLE ADJUSTMENT SCREW

If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, adjust fast idle cam, choke unloader, and fast idle adjustment screw.

1. Remove air cleaner and silencer.
2. Hold choker valve in closed position and see that the cam trip lever is in contact with the fast idle cam, then check the clearance between the arm of fast idle cam and the boss on throttle body, using feeler gauge .020" thick and not over 3/16" wide. See figure 3-38.
3. If clearance is not .020", slightly loosen choker lever lock screw, hold choker valve closed and rotate choker lever on shaft until specified clearance is obtained. Tighten lock screw securely and recheck the clearance.

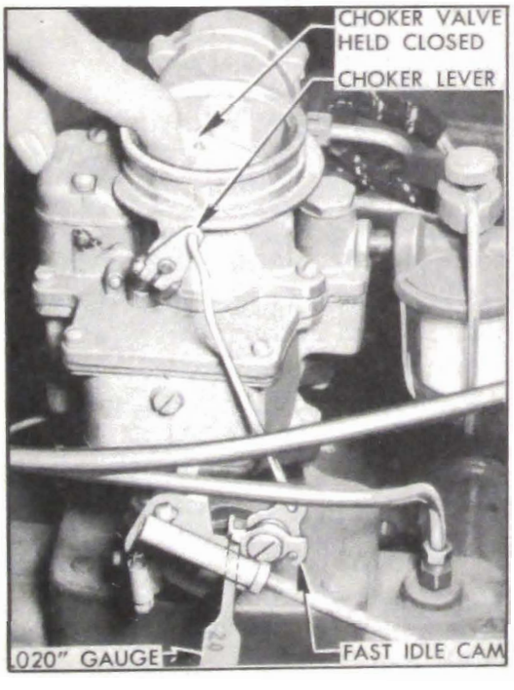

Fig. 3-38—Clearance Between Fast Idle Cam and Boss

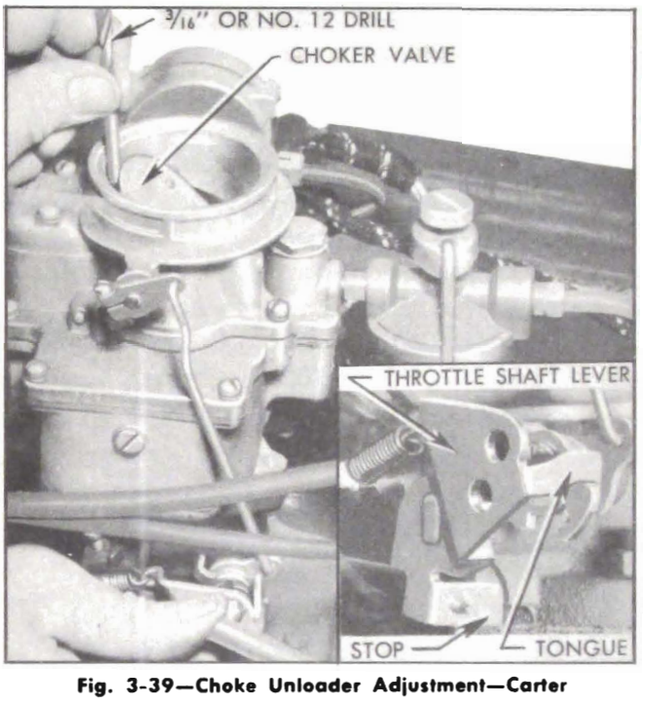

Fig. 3-39—Choke Unloader Adjustment—Carter

4. Open throttle until the stop on throttle shaft lever strikes the stop on throttle body, hold choker valve closed as far as possible, then check the clearance between the wall of air horn and the center of upper edge of choker valve using a 3/16" or No. 12 drill as a gauge (.187" to .189"). See figure 3-39.
5. If clearance is not correct, bend the tongue on throttle shaft lever as required to provide a close fit of drill gauge.
6. Start engine and warm it up to normal operating temperature. Connect a tachometer to register engine speed.
7. Remove pin spring and disconnect the fast idle connector rod from the cam trip lever.
8. While holding the arm of fast idle cam in contact with boss on throttle body so that the fast idle adjustment screw bears against the highest section of cam, turn adjustment screw to obtain engine speed of 1200 RPM. See figure 3-40.

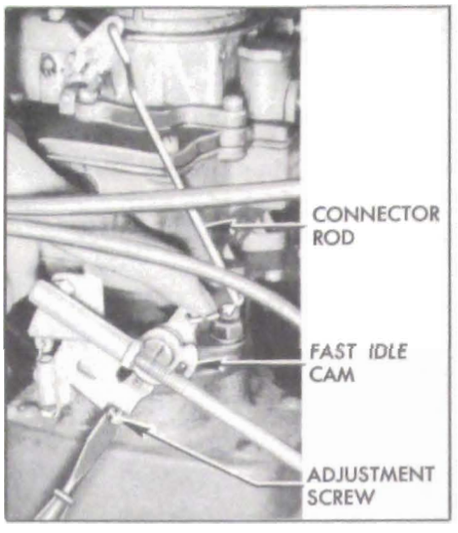

Fig. 3-40—Setting Fast Idle—Carter

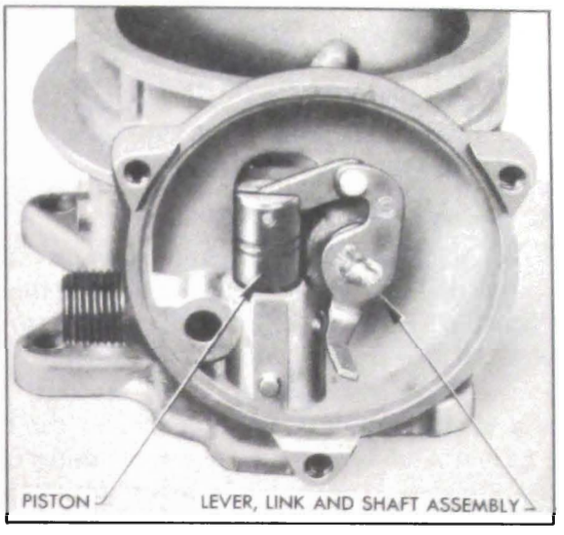

Figure 3-41—Removing Shaft and Piston

NOTE: *If tachometer is not available, approximately the same setting may be made with car on level road in high gear, engine at normal operating temperature and fast idle connector rod disconnected. Set car speed at 20 miles per hour with fast idle adjustment screw against highest point on fast idle cam. With rod connected to cam, cold idle speed will be lower than 20 miles per hour, depending on temperature.*

9. Connect fast idle connector rod to cam trip lever and install pin spring.

10. Install air cleaner and silencer.

3-24 DISASSEMBLY, CLEANING, ASSEMBLY OF CARTER CLIMATIC CONTROL

It is not necessary to remove the carburetor assembly from the engine in order to overhaul the climatic control.

a. Removal and Disassembly

1. Remove air cleaner and silencer. Disconnect choke upper heat pipe.

2. Disconnect fast idle connector rod from fast idle cam trip lever, then remove air horn and climatic control assembly from carburetor.

3. Disconnect fast idle connector rod from choker lever and remove lever from choker shaft.

4. Remove thermostatic coil and housing assembly, gasket, and baffle plate. See figure 3-42.

5. Remove choker valve, then remove choker shaft and lever assembly with piston attached. See figure 3-47. Remove piston pin and piston from link.

b. Cleaning and Inspection

Soak all parts, *except thermostatic coil and housing assembly*, in Bendix Carburetor Cleaning Solvent or its equivalent, then thoroughly rinse in kerosene, distillate, or white gasoline to remove all gummy deposits that have been softened by the solvent. Wipe parts dry with clean cloth.

It is particularly necessary for the piston and its cylinder in air horn to be thoroughly clean and free of burrs or scores. Do not use any abrasive material for cleaning piston and cylinder. If piston or cylinder is scored replace the affected part.

Check choker shaft for free action in air horn. If shaft is worn so that excessive play in bearings exists, replace the shaft assembly. If chocker valve is bent or otherwise damaged it should be replaced.

Inspect thermostatic coil housing for cracks and thermostatic coil for distortion or other damage. If damaged, replace the coil and housing assembly.

Raise the air horn gasket and check the choke suction hole in bowl cover, which may be partially clogged with carbon. Check and clean out suction hole with drill of proper size as specified under Carter Carburetor and Choke Calibrations (par. 3-1).

c. Assembly and Installation

1. Connect choke piston to shaft link with piston pin, install shaft in air horn, and guide piston into cylinder. See figure 3-41.

2. Install choker valve on shaft with small "c" in circle on valve upward; *use new screws.*

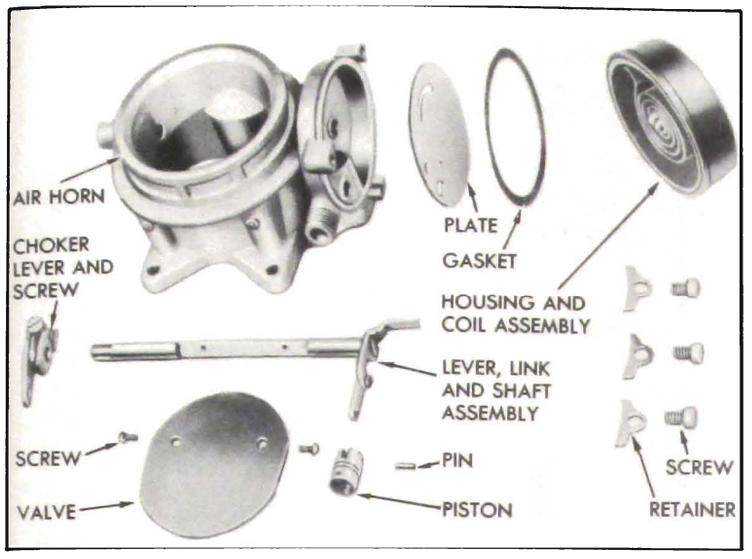

Figure 3-42—Air Horn and Climatic Control—Disassembled

Close valve and check for uniform clearance between edges of valve and wall of air horn. If clearance is not uniform, or valve sticks in air horn at any point, loosen screws and shift valve to obtain uniform clearance and freedom from sticking. It is important to have the choker valve fit properly otherwise hard starting may result.

3. Install coil housing baffle plate and a new coil housing gasket. Place housing on air horn with indicator mark at bottom and install retainers, leaving screws loose. Revolve housing clockwise (opposite to arrow) until indicator mark is at large index rib on air horn, then tighten retainer screws.

4. Install choker lever and screw assembly on choker shaft and attach fast idle connector rod to lever.

5. Install air horn and climatic control assembly on carburetor. Connect fast idle connector rod to fast idle cam trip lever with a spring pin. Connect choke upper heat pipe to choke housing.

6. Adjust fast idle cam, choke unloader, and fast idle adjustment screw as described in paragraph 3-23.

7. Install air cleaner and silencer.

3-25 DISASSEMBLY, CLEANING, INSPECTION OF CARTER CARBURETOR

a. Removal and Disassembly

1. Remove air cleaner and silencer. Disconnect throttle rod, accelerator vacuum switch wires, choke upper heat pipe, vacuum spark control pipe, and gasoline pipe.

2. Remove gasoline filter assembly, then remove carburetor from engine.

3. Remove air horn and climatic control assembly from carburetor and disassemble it, following procedure given in paragraph 3-24.

4. Remove strainer nut and gasket, and bowl strainer.

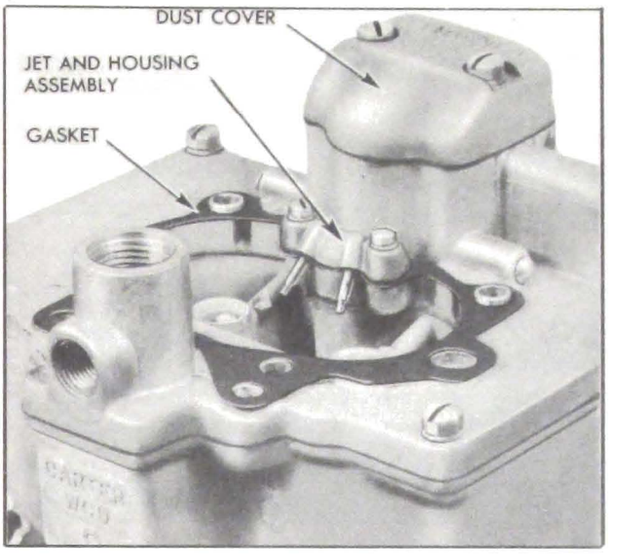

Figure 3-43—Pump Jet and Housing Assembly

5. Remove pump jet and housing assembly and lift off air horn gasket. Remove dust cover. See figure 3-43.

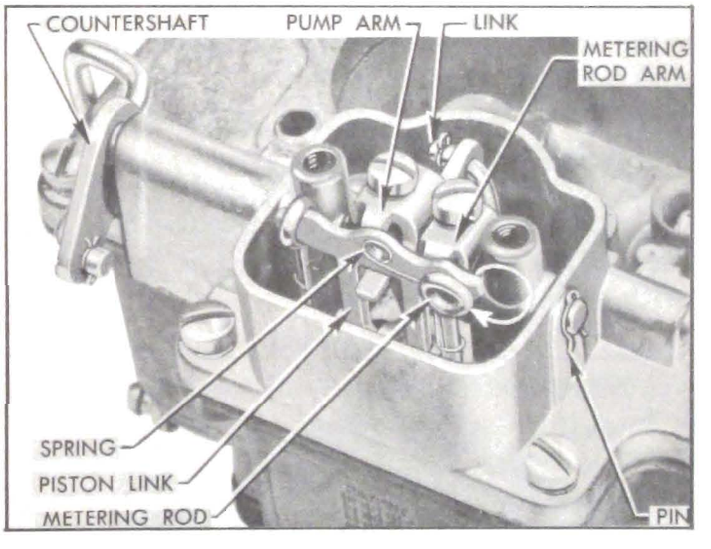

Figure 3-44—Removal of Metering Rod and Operating Parts

6. Rotate eyes of metering rods off pins on vacumeter piston link and lift rods out, using care to avoid bending them. Remove metering rod spring from link to avoid damaging it in later operations. See figure 3-44.

7. Remove throttle connector rod and pump arm link. Loosen screws in metering rod and pump arms, remove spring pin from end of countershaft, and remove shaft. Lift out metering rod and pump arms. See figure 3-44.

8. Hold finger on pump plunger guide while removing guide retainer screw, then remove

pump plunger and guide and lift pump spring from pump cylinder.

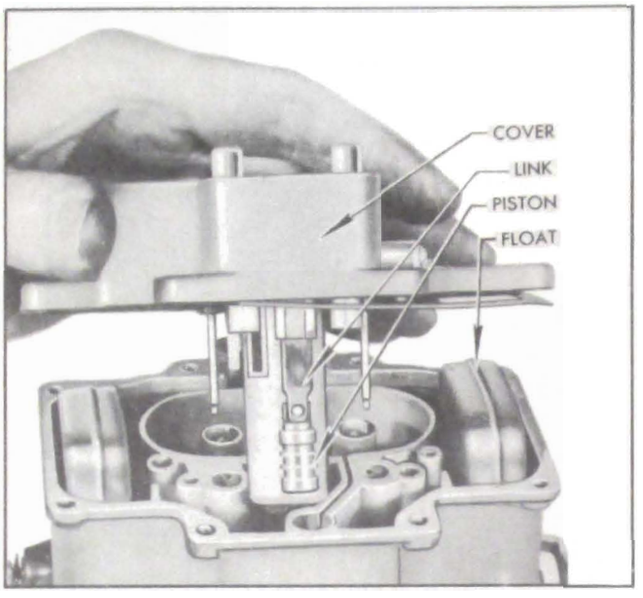

Figure 3-45—Removing Bowl Cover

9. Note the location of code tag and wire clips so that these can be reinstalled in their original positions, then remove bowl cover, using care to avoid damaging the float. See figure 3-45.

10. Swing vacumeter piston one-quarter turn and remove it from piston link, then remove link. Remove piston spring from cylinder in main body.

11. Remove float lever pin and lift off float and lever assembly. Remove needle from float lever. Shake float to see whether it is "loaded" with gasoline due to a leak.

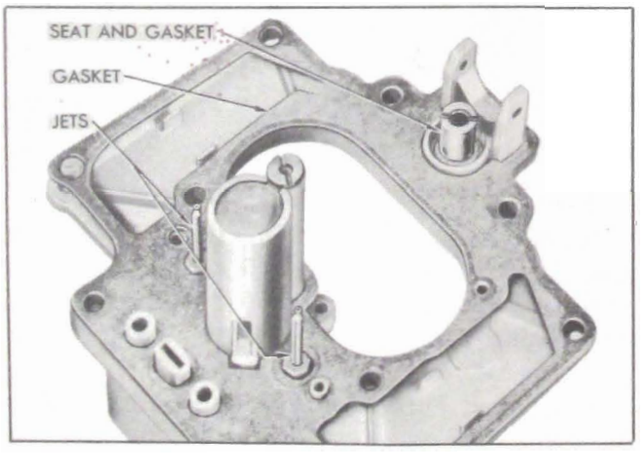

Figure 3-46—Needle Seat, Gasket, and Low Speed Jets

12. Remove float needle seat and gasket, using large screwdriver. Remove both low speed jets, and cover gasket from bowl cover. See figure 3-46.

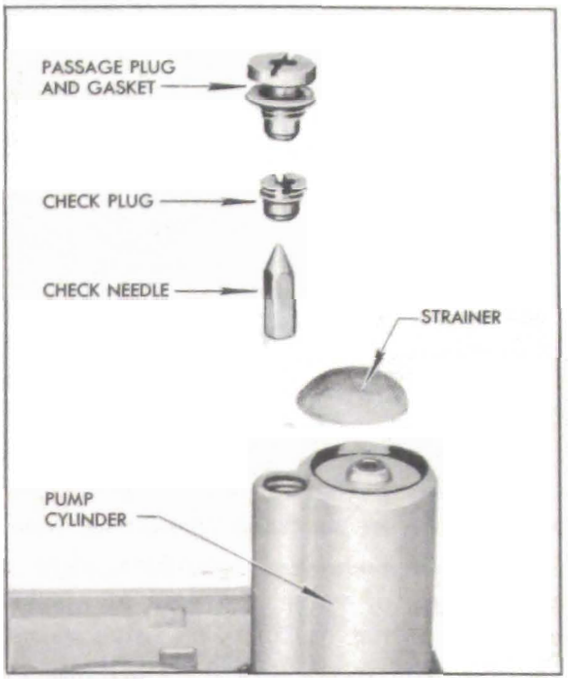

Figure 3-47—Pump Discharge Check Parts

13. Remove pump discharge passage plug, discharge check plug, and pump check needle from lower end of pump cylinder. Remove pump strainer from lower end of pump cylinder. See figure 3-47.

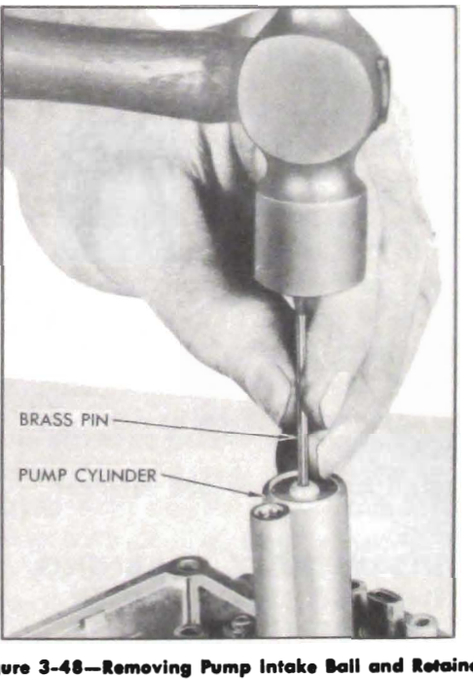

Figure 3-48—Removing Pump Intake Ball and Retainer

14. Insert soft brass pin through hole in bottom of pump cylinder and tap out the pump intake ball and retainer. See figure 3-48.

15. Remove two idle channel rivet plugs from bowl cover, using Rivet Extractor T109-43. See

figure 3-49.

16. Remove metering rod jets from interior of main body. *Do not, under any circumstances, attempt to remove nozzles from main body.*

17. Remove body flange and vacuum switch assembly from main body. Remove body flange gasket.

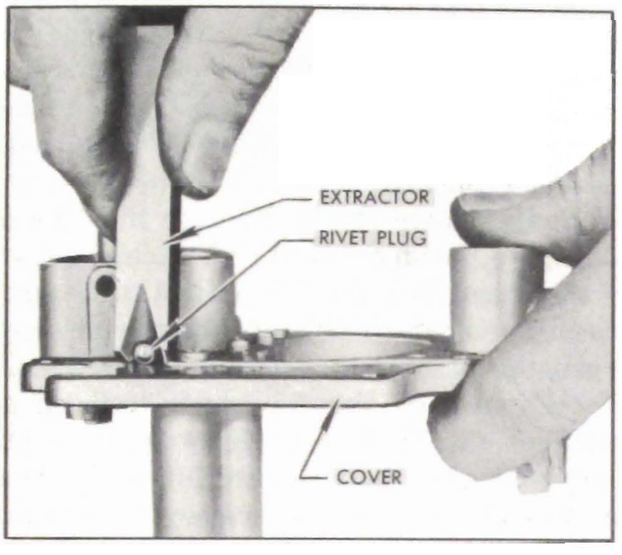

Figure 3-49—Removing Rivet Plug

18. Remove the two nozzle passage rivet plugs from main body, using Rivet Extractor T109-42. See figure 3-50.

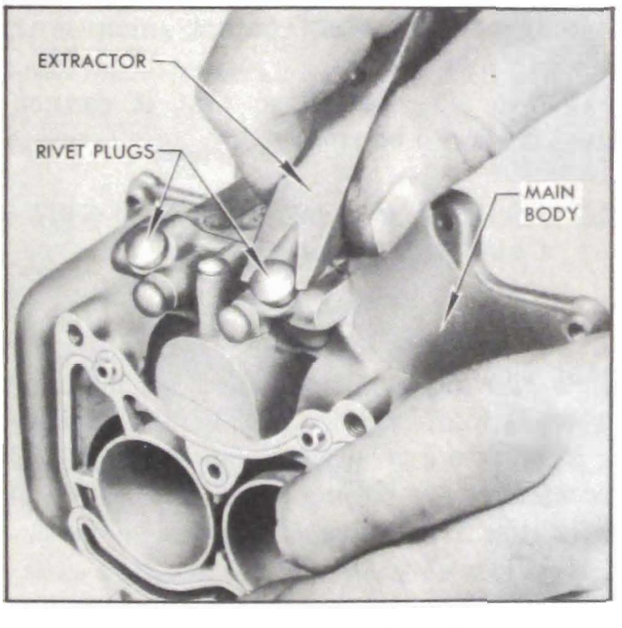

Figure 3-50—Removing Rivet Plug

19. Hold down on vacuum switch terminal cap while removing hold-down clip. Remove terminal cap and switch return spring, then lift out switch guide block with contact spring and shims. Do not lose timing shims and the spring washer on contact spring. Turn body flange over to allow plunger and ball to drop into hand. See figure 3-51.

20. Using a sharp scriber, lightly scratch one line on one throttle valve and its barrel and two lines on the other valve and barrel; also scribe lines on valves along the near edge of throttle shaft. These marks will assist in installing valves in their original positions on throttle shaft. After marking valves, remove valves from shaft.

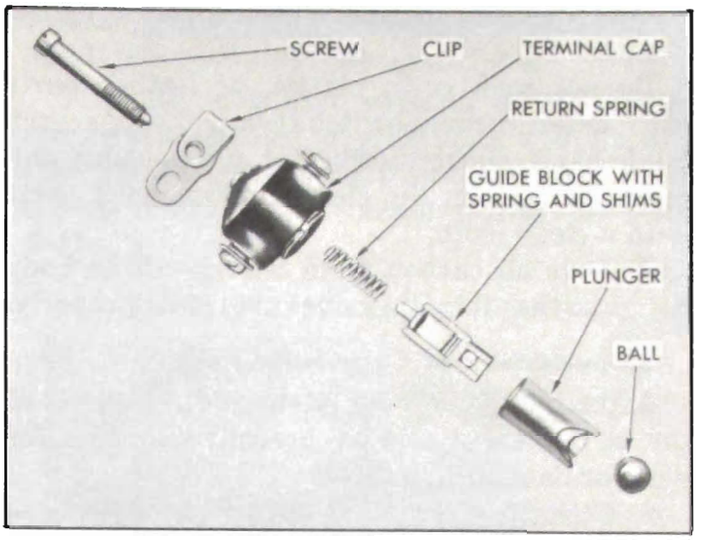

Figure 3-51—Vacuum Switch Parts

21. Remove screw, washer, and arm from end of throttle shaft. Using rawhide mallet or equivalent, tap end of shaft through the shaft retaining ring then remove throttle shaft and lever assembly from body flange.

22. Remove fast idle cam and cam trip lever from body flange. See figure 3-52.

23. Remove idle adjustment screws and springs from body flange. It is not necessary to remove the idle port rivet plugs unless they are leaking.

b. Cleaning Carburetor Parts

Regardless of the number of new parts that are used in rebuilding a carburetor, the job in the end will not be satisfactory unless all metal parts are thoroughly cleaned. Because of the nature of carburetor parts, with numerous small passages subject to fouling with tenacious carbon and gum deposits, ordinary cleaning processes are entirely inadequate. The correct procedure is to use a cleaning bath in which metal parts can be immersed and "soaked" for sufficient time after disassembly to thoroughly clean all surfaces and passages.

Bendix Carburetor Cleaning Solvent has been developed especially for cleaning carburetors, and is recommended for this purpose. Regardless of the cleaning material used, however, be sure to thoroughly rinse the parts in kerosene, distillate, or white gasoline to remove all

gummy deposits that have been softened by the cleaner.

Do not soak cork, plastic, or leather parts such as the vacuum switch terminal cap, switch guide block, choke thermostat and housing, and pump plunger in the cleaner. Wipe such parts with a clean cloth.

Remove all carbon from barrels of the body flange so that throttle valves may close properly.

c. Inspection of Carburetor Parts

After being thoroughly cleaned, all parts of the carburetor should be carefully inspected for wear or damage as follows:

1. Climatic Control. Inspect control parts as described in paragraph 3-24.

2. Bowl Cover. Check for warped surfaces with a straight edge. Make sure that idle and pump channels are clean and clear. Inspect pump cylinder for scoring or roughness. Inspect bearings of pump operating countershaft for wear or scoring. If bowl strainer is damaged or clogged so that it cannot be cleaned, it should be replaced.

3. Float Needle and Seat. Because of the wear that normally occurs in these parts and the necessity of having a tight seating needle, it is advisable to replace these parts if the carburetor has been used for considerable mileage.

4. Accelerating Pump Parts. Inspect countershaft assembly for wear of shaft and make sure that lever is tight on countershaft.

Inspect throttle connector rod and holes in throttle shaft arm and pump operating lever for excessive wear.

Inspect pump plunger leather washer for cracks, creases, turned edges, or other damage. Check holes in plunger shaft and pump arm, also pump arm link, for excessive wear.

Inspect pump check needle for groove on tapered end and inspect needle seat in discharge check plug. If pump discharge passage plug contains a relief valve, test seating of valve by sucking on threaded end of plug. Inspect pump intake ball for corrosion and the retainer for distortion.

Blow through each pump jet to make sure it is clear.

5. Low Speed Jets. Test jets by blowing or sucking to make sure that metering holes are clear. Inspect small ends for damage which might deform the metering holes.

6. Metering Rods, Jets, and Spring. Metering rods and jets are subject to wear in normal use. As the parts wear, the metering orifice becomes larger and a richer mixture results. If carburetor has been used for considerable mileage, it is advisable to replace these parts since wear cannot readily be detected by inspection. If metering rod spring is distorted or damaged it should be replaced since it performs an important function in keeping wear of metering rods and jets at a minimum.

7. Vacumeter Piston. Inspect vacumeter piston and the cylinder in main body for scoring or roughness. Piston and cylinder must be clean and smooth. If piston spring is distorted it should be replaced.

8. Body Flange Parts. Be sure that the idle discharge ports are clean of all carbon deposits and that the seats for idle adjustment screws are not damaged. If ends of adjustment screws are grooved or bent they should be replaced.

Check wear of throttle shaft bearing and throttle shaft. There should not be more than about .005" play between shaft and bearings, otherwise air leaks will interfere with performance.

Make sure that throttle valves are not bent and do not have burrs or sharp edges.

9. Accelerator Vacuum Switch. Inspect ball, plunger, and cylinder in body flange to make sure all are clean and smooth. Check terminal cap for cracks. Switch contact surfaces must be smooth and free of corrosion. If strainer is damaged or is clogged so that it cannot be cleaned it should be removed.

3-26 ASSEMBLY AND ADJUSTMENT OF CARTER CARBURETOR

a. Assembly of Carburetor

In the assembly of carburetor, use all new gaskets and any additional new parts found to be necessary during inspection. *The following new gaskets must be soaked in 90 proof denatured alcohol for 15 minutes, installed on part, and let dry before installing the parts:*

Needle seat gasket
Pump discharge passage plug gasket
Bowl strainer nut gasket

1. Install new idle port rivet plugs if old plugs were removed from body flange. Install springs and idle adjustment screws in body flange. Seat screws lightly with fingers, then turn each screw out exactly one full turn off seat. Do not force a screw against its seat; this will score the point of screw and ruin it for service.

2. Place fast idle cam and cam trip lever

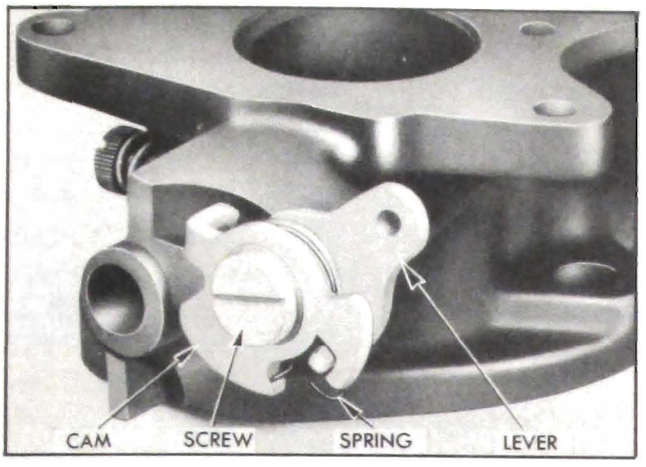

Figure 3-52—Fast Idle Cam, Spring and Trip Lever

over attaching screw so that tongue on trip lever is located in notch in cam under hooked end of cam spring, then install parts on body flange. See figure 3-52.

3. Place throttle shaft dog and screw assembly on throttle shaft and hook throttle flex spring to dog and throttle lever. Slide throttle shaft into body flange, move to closed throttle position, and push retaining ring *with prongs outward* over end of shaft far enough to obtain snug fit with no end play in shaft.

4. Install throttle arm with side having small "c" in circle outward, then install washer and screw on end of throttle shaft.

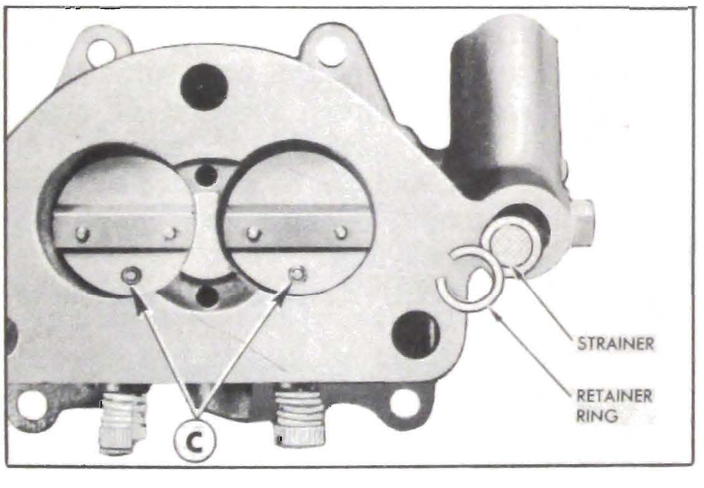

Figure 3-53—Vacuum Switch Strainer and Throttle Valves

5. Install throttle valves on shaft in accordance with scribe marks made at removal, *using new screws*. The small "c" in circle on valves must be toward idle ports when viewing body flange from manifold side. See figure 3-53. Back off throttle lever adjustment screw and close valves. Center valves in barrels of body flange and hold firmly with fingers while tightening screws.

6. If vacuum switch strainer was removed during inspection, install new strainer and the retainer ring using sleeve of Inserter T109-122 U to install ring. See figure 3-59.

7. Make sure that vacuum switch contact spring is assembled in guide block with the original number of timing shims and that return spring washer is on contact spring. See figure 3-51.

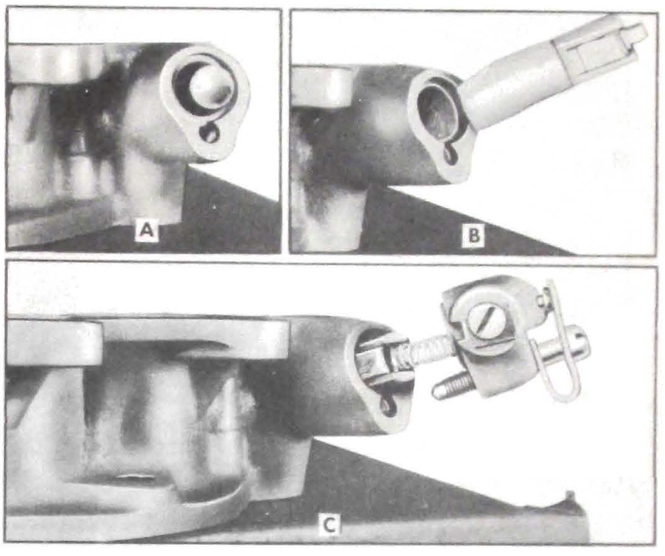

Figure 3-54—Installation of Switch Parts

Place switch ball in body flange. Place guide block in switch plunger and install in body flange with *grooved side of plunger upward* toward main body flange. Install switch return spring and terminal cap, holding cap down while installing hold-down clip and screw. See figure 3-54.

8. Drive new nozzle passage rivet plugs securely into main body, using the depression in Extractor T109-42, then install body flange on main body, using a new gasket.

9. Install metering rod jets. See figure 6-55. Jets must be tightened firmly but not so tightly as to cause distortion.

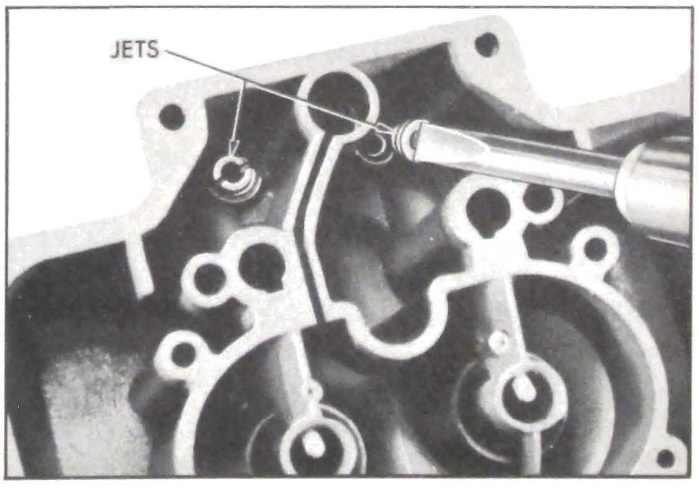

Figure 3-55—Installation of Metering Rod Jets

10. Drive new idle channel rivet plugs securely into bowl cover using the depression in Extractor T109-43.

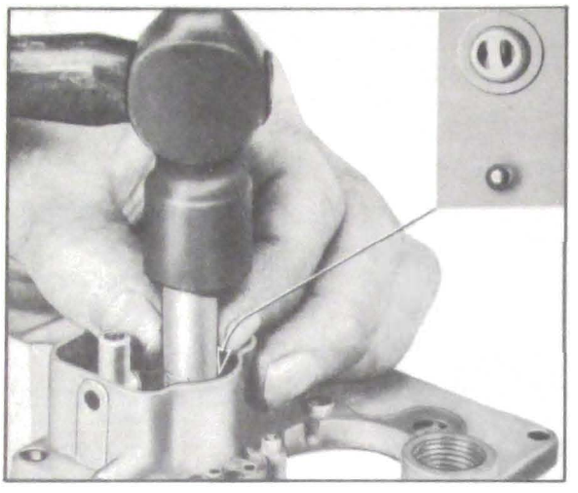

Figure 3-56—Installation of Intake Ball and Retainer

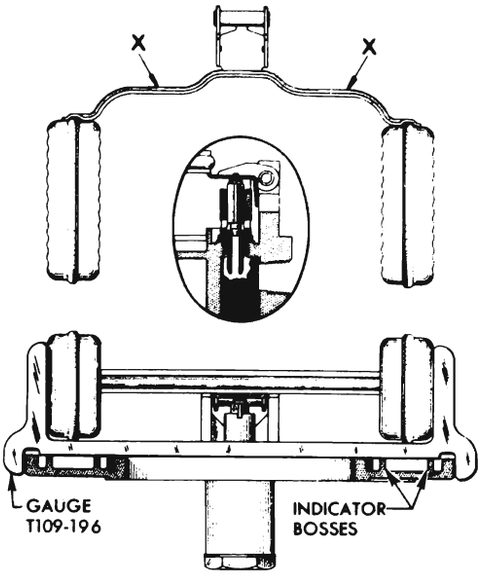

Figure 3-57—Checking Float with Gauge

11. Install intake ball in pump cylinder, then install ball check retainer. See figure 6-56. Use rod of Ring Inserter T109-122U to put retainer in place and then use sleeve of tool to tap retainer firmly into recess at bottom of pump cylinder.

12. Install pump strainer, using care to avoid distorting it or leaving openings around the edge. Install pump check needle, blunt end first. Install discharge check plug, then discharge passage plug with new gasket. See figure 3-53.

13. Install both low speed jets; no gaskets are used. Install float needle seat with new gasket, using large screw driver. Tighten seat firmly but not so tightly as to cause distortion. See figure 3-52.

14. Attach float needle to float lever by means of clip, then install float with lever pin.

15. *Adjust Float for Proper Fuel Level.* To obtain the most efficient operation of the carburetor, the fuel level must be maintained at the bottom of the threads of sight hole in the side of float chamber with engine idling. See figure 3-17. This level will be produced in practically all cases by carefully setting the floats with Float Gauge T109-196.

(a) With bowl cover inverted (gasket off), place the float gauge under the middle of the floats as shown in figure 3-57.

(b) Adjust floats as required so that the outer sides just touch the upright guides of gauge, without clearance and without excessive drag on gauge. Adjust the height of both floats so that the seams *just clear* the horizontal section of gauge. Make both adjustments by bending float lever with pliers applied at points "X". (fig. 3-57) ; *do not use pressure on floats.*

NOTE: *If the Float Gauge T109-196 is not available, sight down the sides of floats and align the sides with the small indicator bosses cast in bowl cover (fig. 3-57), then adjust the height with a suitable gauge $\frac{5}{32}$" in width or diameter.*

(c) When floats are properly set, turn bowl cover over and measure the downward travel of floats from the closed position of needle valve. Float travel must be $\frac{1}{2}$", measured at outer end of float, and can be adjusted by bending the short tongue of float lever which contacts the float needle seat.

(d) After all adjustments are completed,

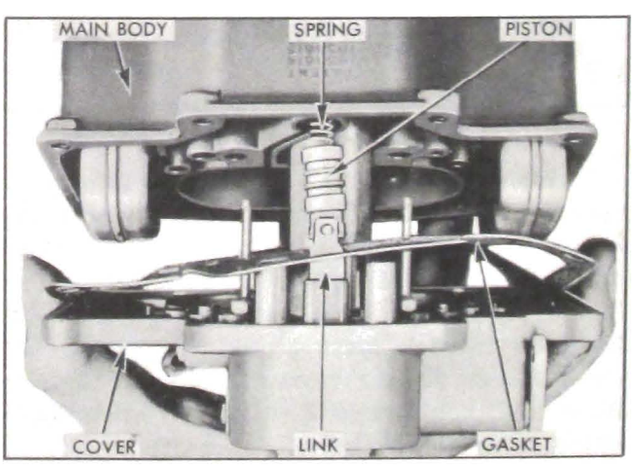

Figure 3-58—Assembling Main Body and Bowl Cover

carefully remove float, install a new bowl gasket, and reinstall float.

16. Install vacumeter piston link in bowl cover with lug at center opening toward outer side of cover, then install piston on lower end of link. Invert cover and place piston spring in piston, then place main body over bowl cover while guiding spring and piston into cylinder. See figure 3-58. Use care to avoid damaging float or changing adjustment during this operation.

When installing bowl cover screws and lock washers attach the code tap and wire clips in their original locations.

17. Place pump spring in cylinder, place guide on plunger shaft and install in cylinder, using care to avoid creasing or curling edges of plunger leather washer. Hold guide down with finger while installing retainer screw.

18. Start pump operating countershaft into its bearing in bowl cover. Hold pump arm so it is centered over pump plunger shaft and push countershaft through arm. While holding metering rod arm so that it engages opening in vacumeter piston link, push countershaft through the arm and bearing in bowl cover. Install spring pin on end of countershaft.

19. Tighten pump arm screw. Install pump arm link in *outer hole* of pump arm and hole in pump plunger shaft, then install spring pin on link.

20. Install throttle connector rod, with spring pin on upper end and flat washer, spring, and spring retainer on lower end.

21. *Adjust Accelerating Pump Plunger Travel.* Since the pump plunger travel controls the amount of fuel discharged through the pump jets, correct plunger travel is very important and should be checked and adjusted each time the carburetor is assembled.

Pump plunger travel should be measured by using Pump Stroke Gauge T109-117S shown in figure 3-59. If this gauge is not available, pump plunger travel may be measured with a machinists depth gauge having a scale reading in 64ths of an inch, using it in the same manner as described for the pump stroke gauge.

(a) Back out throttle lever stop screw and fully close throttle valves.

(b) Place Pump Stroke Gauge T109-117S on edge of dust cover boss of bowl cover and turn knurled nut until gauge finger "C" just touches upper end of pump plunger shaft as shown in figure 3-59.

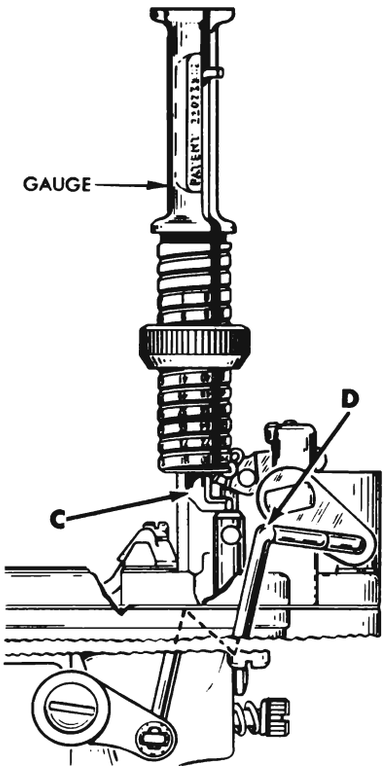

Figure 3-59—Use of Pump Stroke Gauge T109-117S

(c) Read figure on gauge at notch in knurled nut, then open throttle slowly until plunger just bottoms (at approximately half throttle). This will be indicated by the additional force required to move throttle lever. Hold throttle lever at this point and take a second reading on gauge.

(d) The difference between the first and second reading on gauge should be 21. When using a machinists depth gauge the difference should be $^{21}/_{64}$".

(e) If pump plunger travel is not $^{21}/_{64}$", adjust as required by bending the throttle connector rod at the upper angle indicated by "D" in figure 3-59.

22. Install metering rod spring through hole in piston link. Insert end of each metering rod in hooked end of spring, push metering rod down and rotate eye of rod over pins on link, using care to avoid bending metering rod. See figure 3-44.

23. *Adjust Metering Rods.* Proper setting of the metering rods is of vital importance to engine performance and fuel economy; therefore the following adjustment must be carefully made after adjusting the pump plunger travel.

(a) Back out throttle lever stop screw to allow throttle valves to seat in bores of carburetor and loosen metering rod arm clamp screw.

(b) Press down on vacumeter link until me-

tering rods bottom in carburetor body casting.

(c) While holding rods down and throttle valves closed, revolve metering rod arm until finger on arm contacts lip of vacumeter link, then carefully tighten metering rod arm clamp screw. See figure 3-60.

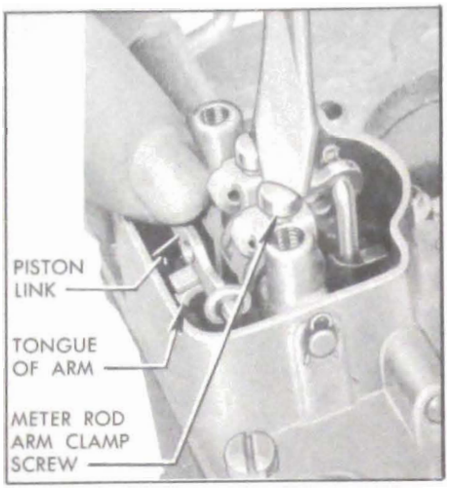

Figure 3-60—Adjusting Metering Rods

24. Pack dust cover screw holes in bowl cover with a light graphite grease and install dust cover. Install new air horn gasket and the pump jet and housing assembly. See figure 3-43.

25. *Adjust Accelerating Pump Jets.* Good acceleration performance at low speeds depends primarily on the gasoline discharged from the pump jets. Each of the two jet streams must be directed to its proper section of the venturi system, and in order to obtain maximum efficiency each stream must strike a target point marked on the primary venturi.

(a) Fill float bowl with gasoline through float bowl inlet.

(b) Operate accelerating pump with a short, quick movement of throttle shaft lever and note whether the stream from each jet strikes its specified target point. See figure 3-61.

(c) Carefully bend jets, if necessary, to properly aim the streams. *Only a slight bend should be necessary; use care to avoid distorting the jets.*

26. Install bowl strainer and strainer nut with a new gasket.

27. Assemble and install air horn and climactic control assembly, following procedure given in paragraph 3-24. Adjust fast idle cam and choke unloader as described in paragraph 3-23, but use the following bench method for setting fast idle adjustment screw.

(a) With adjustment screw in contact with highest section of fast idle cam, adjust screw until a wire gauge just can be inserted between edge of throttle valve and the throttle body diametrically opposite the idle ports.

(b) Use a wire gauge .015" in diameter for the 663 S (series 40-50) carburetor, and .018" in diameter for the 664 S (series 70) carburetor.

28. Check the timing of the accelerator vacuum switch as described in paragraph 10-32. Use Carter Indicator Gauge T109-155 S if available; otherwise use a 6-volt battery and test light.

b. Installation of Carburetor

1. Make sure that carburetor gasket is in good condition, then install carburetor on intake manifold.

2. Clean the gasoline filter (par. 3-9), install filter on carburetor and connect the gasoline pipe. Connect the vacuum spark control pipe and choke upper heat pipe.

3. Adjust and connect throttle linkage as described in paragraph 3-10.

4. Connect the accelerator vacuum switch wires. If timing of switch was not checked on the bench, it may be checked after installation of carburetor, as described in paragraph 10-32.

5. Install air cleaner and silencer.

6. Check float bowl fuel level and adjust carburetor as described in paragraph 3-12.

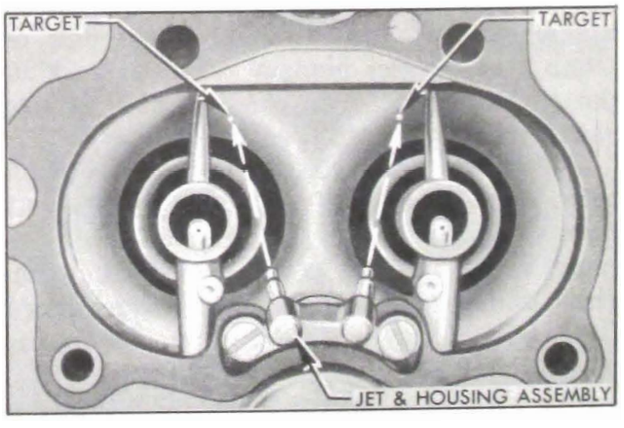

Figure 3-61—Pump Jet Targets