Figure 1 Model AA Carburetor

The carburetor developed by the Rochester Products Division, Rochester, New York is an entirely new design and differs from previous carburetors, as the air entrance is horizontal. The carburetor incorporates a number of distinctly new features of importance to the car owner and also the service mechanic.

Foremost of the major advantages of the new carburetor is the comparative low gasoline bowl temperatures during all driving conditions. This marks a definite stride forward in reducing vapor lock, and the minimizing of hot starting complaints. The gasoline temperatures in the carburetor are better than 25 degrees cooler than a conventional carburetor under all comparable conditions of engine operation. This feature is primarily due to the fact that the float bowl, containing the fuel, is suspended from the cover within the outer housing of the carburetor and cooled by incoming air.

The carburetor presents a new ease of service to the service mechanic. By the simple removal of the eight outside cover screws and the disconnection of the fuel line, the cover and bowl assembly may be removed from the outer housing for cleaning or inspection. Only in rare instances will the air cleaner and entire carburetor be removed from the engine. The cover and bowl assembly, which is the very heart of the carburetor, contains all the calibrated parts of the carburetor. This unit may also be purchased as a service assembly, thereby eliminating the need for a complete replacement carburetor.

Of importance also is the need for only four simple but important external adjustments. These are the Choke Rod, Unloader, Fast Idle, and Accelerating Pump Discharge Adjustments.

Since carburetion is dependent upon both compression and ignition, the carburetor should always be adjusted last in engine tune-up. The fuel systems within the carburetor are basically simple and can be readily traced and understood.

(The following illustrations are schematic)
IDLE SYSTEM

The carburetor idle system controls the fuel/air mixtures from the car idle setting up to approximately 30 mph. As shown on Figure 2 the fuel first passes through the centrally located main metering jets “A” to the Idle Tubes “B” in the bowl, each of which have calibrated orifices. These orifices control the amount of solid fuel metered by the idle system. At the junction of the cover and bowl air mixes with the solid fuel through two calibrated air bleeds “C”. This fuel/air mixture then passes horizontally through a cored passage in the cover; additional air is also metered by the idle channel bleed “D”. The mixture continues to follow the path of suction downward through the idle passages in the Housing to the Throttle Body where it is metered to the engine by the idle adjusting screws, and the secondary and top idle holes “E” as they are exposed to manifold suction by the opening of the throttle valves “F”.

PART THROTTLE SYSTEM

At a point of sufficient throttle opening manifold vacuum or suction is applied to the nozzles, which then take over the fuel delivery to the engine. This point is termed the transfer point as the fuel delivery is transferred from the idle system to the main metering system. To a large degree the calibrated main metering jets govern the fuel mixtures throughout this range of 30-60 mph, assisted by the air bleeds in the Main Well Tubes admitting varying amounts of air from within the outer bowl to mix with fuel passing from the nozzles according to engine demand. As shown on Figure 3 the throttle valves “F” are opened sufficiently so that the manifold suction is now greater upon the nozzles “G” than at the idle discharge holes “E” in the throttle body; as a consequence, fuel continues to pass through the calibrated main metering jets “A” to the main wells. However, the suction being now greater upon the nozzles, the fuel passes upward along the Main Well Tubes “H” rather than through the Idle Tubes and out the discharge nozzles “G”.

The Main Well Tubes “H” have four calibrated holes which admit air from the main well bleed “C” in the Cover. As the throttle valves are opened to a greater degree the suction is increased upon the nozzles causing them to deliver more fuel to meet the engine demand. This increase in fuel delivery lowers the fuel level in the main wells; consequently, the holes in the Main Well Tubes are exposed in turn by the lowering of the fuel level to admit more air to
join with the fuel being delivered by the nozzles. Thus, although the nozzles suction is increased by throttle opening, the fuel/air mixture to the engine remains constant throughout the Part Throttle range.

HIGH SPEED SYSTEM
(POWER SYSTEM)

To achieve the power mixtures needed for wide open throttle operation the Rochester Products Carburetor employs a vacuum operated power diaphragm, stem and calibrated spring located in the Cover and the Power Valve in the Bowl. This system is built upon the principle that sudden acceleration is always accompanied by an immediate corresponding decrease in intake manifold vacuum. A direct vacuum passage “M” through the carburetor throttle body, outer housing, and cover to the intake manifold insures instantaneous diaphragm action to operate the power system.

Attached to the Cover of the carburetor is the neoprene diaphragm, stem, and calibrated spring assembly “J”. Directly underneath the stem in the Bowl is the power valve “K”, pressed into the connecting passages between the power valve and the main metering jets are the calibrated power restrictions “L”. At any manifold vacuum above 8” the diaphragm is held “UP” by vacuum which in turn holds the stem above the spring loaded plunger in the power valve, so that no fuel passes through this valve. Opposing this suction is the power spring surrounding the stem. This calibrated spring at any vacuum lower than 8” forces the stem down, which unseats the spring loaded plunger in the power valve, permitting fuel to pass through the power valve. This fuel is then metered by the power restrictions “L” and joins with the fuel from the main metering jets to be delivered to the engine.

Figure 4. Power System
The float system of the Carburetor is in line with the advanced design of the entire unit. It consists of the Float Needle Seat and Gasket “A”; the Needle Valve “B”; and the Float Assembly “C”.

The carburetor bowl acts as a reservoir to hold the supply of fuel. To maintain the proper fuel level under all road conditions the Float Tang “D” is always in contact with the Balance Spring “E”. This balance spring serves a two fold purpose: first, it acts as an effective vibration damper to prevent needle wear and to maintain the correct fuel level; secondly, it permits the use of smaller and more efficient float.

**ACCELERATING PUMP SYSTEM**

The Carburetor has a diaphragm type of accelerating pump that is positive displacement in action, so that immediate pump delivery is guaranteed by the slightest movement of the accelerator pedal. The pump housing, diaphragm, jets, actuating lever and spring are attached to the bottom side of the float bowl. The pump diaphragm actuating lever is connected by a yoke within the carburetor housing to a pump lever and rod outside of the housing. This pump rod is in direct linkage to the throttle lever.

The source of fuel for the pump system originates in the float bowl. To exclude dirt the fuel must first pass through a finely meshed screen “A” in the float bowl. The fuel then travels up through the bowl passage past the intake ball check valve “B” and into the cavity in the back of the float bowl, created by the attaching of the pump diaphragm “C”. Upon acceleration, the pump actuating spring moves the diaphragm against the cavity by means of a simple rack and pinion, thereby displacing fuel. This fuel passes vertically up the passage “D” in the float bowl, past the outlet pump needle “E” and down the passageway to the pump jets “F” which spray the fuel onto the opposite edge of the main venturi to be mixed with air prior to entering the manifold.

**NOTE:** In the 1950 Model “AA” Carburetor, the pump fuel is sprayed against the pump splashers, which are cast onto the inside of the secondary venturii.
CHOKE SYSTEM

The Rochester Products Carburetor employs a thermostatically operated choke valve to insure proper starting and driving during cold weather operation. This choke system is composed of a thermostatic coil “A”, choke piston “B”, choke valve “C”, and the choke valve shaft “D”. It is controlled by a combination of intake manifold vacuum, the offset choke valve, atmospheric temperature, and exhaust manifold heat.

When the engine is cold the thermostatic coil is calibrated to hold the choke valve closed. As the engine is started air velocity against the offset unbalanced choke valve causes the valve to open slightly. Vacuum from the intake manifold is applied, by means of a calibrated hole, to the bottom side of the choke piston, which is hinged to the choke valve shaft. This vacuum pull exerted upon the piston opens the choke valve until it assumes a position where the torque of the thermostatic coil is balanced by the pull of vacuum on the piston and offset choke valve. Consequently, a reduced amount of air is allowed to enter the carburetor, which provides a richer mixture for the warm-up period.

The choke piston serves to modify the choking action to compensate for varying loads upon the engine. Any acceleration during the warm-up period is accompanied by a corresponding drop in intake manifold vacuum, as discussed in the Power System. This decrease in pull upon the choke piston allows the thermostatic coil to momentarily partially close the choke valve, providing the engine with a sufficiently richer mixture for the acceleration.

As the engine warms up, heat from the exhaust manifold is drawn into the thermostatic coil cover. This rise in temperature, being applied to the coil, causes it to slowly relax and allows the choke valve to move gradually to the full open position.
DISASSEMBLY OF CARBURETOR

1. Remove cover and bowl assembly from housing by removing 8 outside cover to housing attaching screws.

2. Hold throttle in FULL open position, to free pump actuating lever from pump yoke inside of housing, then lift cover and bowl assembly from housing.

3. Remove 6 bowl cover to bowl attaching screws and separate bowl and cover by lifting straight up on cover to prevent damage to float.
   NOTE: Remove gasket and lay cover aside for disassembly later.

4. With a 5/16" width screw driver, remove power valve (K-Fig. 4) with red fibre gasket from bottom of bowl.

5. Remove 2 main metering jets (A-Fig. 3) from bottom of bowl.

6. With use of a small pointed object or small thin screw driver blade, remove retaining ring and pump screen (A-Fig. 6) from bottom of bowl.

7. Turn bowl upside down (top on palm of hand) and the 2 main well tubes, (H-Fig. 3) 2 idle tubes (B-Fig. 2) and brass pump outlet check valve (E-Fig. 6) should drop from bowl.
   NOTE: A small wedge, may be used to facilitate lifting main well tubes and idle tubes from bowl.

8. With a small tag wire positioned into outside hook of pump actuating spring, unwind spring three full turns—full relaxed position. DO NOT DISTORT OR STRETCH PUMP ACTUATING SPRING.

9. Remove 5 pump housing attaching screws. Use care so as not to disturb the position of the 2 pump jets, as they are targeted at the factory for proper direction of gasoline discharge.

10. Remove conical-shaped pump return spring. DO NOT REMOVE MAIN NOZZLES FROM BOWL.

11. Remove pump intake check valve plug and "ball type" intake check valve (B-Fig. 6).
   NOTE: Use a screw driver of 3/4" width to prevent damage to internal threads of pump well. Disassembly of the Rochester Products Carburetor at this point permits servicing one or all of the individual units.
   The following disassembly procedure will cover the disassembly of each individual unit.
DISASSEMBLY OF BOWL COVER

1. Remove float hinge pin and carefully lift float from cover.
2. Remove steel float needle from float needle seat.
3. Remove 3 power diaphragm assembly attaching screws. Remove assembly.
4. Using a 3/4" width screw driver, remove float needle seat with gasket.
5. Grip cover in vise by fuel inlet boss. Using a 3/4" wrench, remove fuel inlet nut, and screen. DO NOT PASS DRILLS OR WIRE THROUGH CALIBRATED HOLES.

DISASSEMBLY OF HOUSING AND THROTTLE BODY

1. Remove balance tube from air horn. On later models Balance Tube is not removable.
2. Remove 3 attaching screws with lugs from choke housing cover. Remove cover and thermostat coil as an assembly. DO NOT DISTORT COIL.
3. Remove choke valve screws and valve.
4. Remove cotter pin from pump rod.
5. Remove pump rod. DO NOT BEND PUMP ROD.
6. Remove cotter pins from choke rod, remove rod.
7. Remove choke counterweight attaching screw, collar, washer and counterweight.
8. Remove choke vacuum piston and shaft by revolving choke shaft until piston is free from cylinder.
9. Remove 8 housing to throttle attaching screws.
10. Remove pump yoke nut and lock washer.
11. Remove pump yoke from inside of housing.

NOTE: There is a small felt washer in the counterbore of housing (outside), when removing nut or yoke use care so as not to lose felt (packing) washer.
DISASSEMBLY OF THROTTLE BODY

1. Remove fast idle cam attaching screw, remove fast idle cam.
2. Remove 2 idle adjusting screws with springs.
   NOTE: The Carburetor throttle valves and throttle shaft need not be removed from the throttle body. By holding a light to passage holes, will readily determine if they are clean.

DISASSEMBLY OF PUMP

1. Remove small conical spring.
2. Lift rack and diaphragm from housing, allowing pump lever to rotate.
3. Remove cotter pin from end of pump shaft.
4. Remove metal washer.
5. Tap pump shaft from pinion gear with brass drift.
6. Remove pinion gear.
7. Remove small felt washer from housing and felt washer from pump shaft.

CLEANING AND INSPECTION OF CARBURETOR PARTS

1. Place all parts into regular carburetor cleaning container.
   EXCEPT THE PUMP DIAPHRAGM ASSEMBLY AND VACUUM POWER DIAPHRAGM ASSEMBLY.
2. Clean parts in regular carburetor cleaning solvent.
3. Dry all parts with compressed air.
4. Passages may be cleaned with compressed air.

INSPECTION OF PARTS

1. Check float for dents and wear at pin or pin hole.
2. Examine float needle and seat, if grooved replace both needle and seat assembly.
3. Inspect throttle shaft and choke shaft for wear in their bores. If worn excessively replace part.
4. Inspect pump diaphragm. If diaphragm is damaged replace rack and diaphragm assembly.
5. Inspect pump intake check valve by blowing ball against seat.
6. Inspect rods and holes in levers, if worn out of round, they should be replaced.
   IMPORTANT: All fiber gaskets should be stored in a dry place.
ASSEMBLY OF CARBURETOR

IMPORTANT: TO PREVENT POOR ECONOMY DUE TO FUEL LEAKAGE ALL THREADED PARTS MUST BE INSTALLED TIGHTLY. THIS APPLIES ESPECIALLY TO BRASS PUMP PLUG, STRAINER NUT AND FLOAT NEEDLE SEAT.

1. With housing upside down on flat surface, lay a new gasket on housing.
2. Attach throttle body with 3 attaching screws, with lock washers, tighten evenly.
3. Install 2 idle adjusting screws and springs.
   NOTE: Temporary idle adjustment should be made by turning idle screws into throttle body finger tight and back each screw out 1 turn. Final adjustment is made after the carburetor is installed on the engine.
4. Install fast idle cam. Be sure cam operates freely.
5. Install choke valve shaft and vacuum piston assembly.
6. Install choke valve having the letters RP facing outward.
7. Center valve in air horn and install new screws. Offset weight of choke valve should cause valve to fall to open position freely.
8. Install choke counterweight, washer and collar to choke shaft.
   NOTE: Tang on collar must be over tang on counterweight.
9. Install choke rod having offset end into hole in counterweight. Install cotter pin, and bend 180° to prevent binding.
10. Install felt washer into counterbore of pump yoke bore.
11. Holding washer in place, slide pump yoke in place from inside of housing.
12. Assemble the pump actuating lever onto the pump shaft, having the letters RP facing out and the (3) position holes facing air horn.
13. Install pump rod into prescribed hole of actuating lever, install end with cotter pin hole in throttle lever. Install cotter pin, do not spread ends of cotter pin until pump adjustment has been made.
   NOTE: The OUTSIDE hole in pump lever is MINIMUM. The CENTER hole is MEDIUM and the INSIDE hole is MAXIMUM, pump stroke.
14. Install thermostatic cover and coil assembly with new gasket. Rotate cover to INDEX marks and tighten securely. Be sure to use lock lug on one screw.
   NOTE: Choke valve should be closed lightly in air horn at 75° Fahrenheit with INDEX marks in line.
15. Install balance tube, being sure flat on tube is in place in air horn.
ASSEMBLY ON CARBURETOR COVER

1. With a screw driver having at least a ½” width blade, install the float needle seat, using a new red fibre gasket, place float needle (STEEL) into float needle seat. FLOAT NEEDLE AND SEAT ARE FACTORY MATCHED and if replacement is required, they should be replaced in pairs at FACTORY MATCHED needle and seat.

IMPORTANT: The float needle seat must be tightened securely to prevent a gasoline leak. Also a ¾” width screw driver must be used to tighten seat securely without damaging the cross slot. Care should be used so as not to damage float balance spring. If spring measures more than ¾” free length, it must be replaced.

2. Install power diaphragm assembly with 3 attaching screws.

CAUTION: The power diaphragm must not be torn at screw holes, edges or be distorted, as poor performance and gasoline economy will result from malfunctioning diaphragm action.

3. Place float carefully over diaphragm stem, assemble in place with the small tang on the outside of balance spring or nearest fuel inlet.

4. Install float hinge pin.

5. With cover gasket removed, hold the cover upside down and check float level height from face of cover to top of soldered seam. Dimensions should be ¾” and should be checked with a scale or carb. gauge. Bend tang on float which contacts top of float needle to obtain the ¾” given above. DO NOT BEND AT FRONT OF FLOAT. Float should appear in close parallel with cover face. See specifications and adjustment bulletin for correct dimension and procedure.

IMPORTANT: The float tension adjustment is always made after adjustment of the float level height to insure proper float level drop and consequent sufficient entry of fuel into bowl under high speed operation. Adjustment is made as follows:

6. Bend float tang against spring to lessen drop and away from spring to increase drop. Tension is correct when float drop is such that outside edge of float (bottom) is level with power diaphragm stem when suspended freely from cover.

7. Replace strainer screen, new gasket and strainer nut.
ASSEMBLY OF PUMP

Careful and proper assembly and installation of the pump and bowl are of the utmost importance to insure smooth acceleration and performance.

To properly assemble the pump proceed as follows:

1. Place felt washer over pump shaft.

2. Assemble pump actuating spring over pump shaft having the small hooked end against the actuating lever.

3. Drop the pinion gear into pump housing cavity.

4. Insert and align pump shaft through housing and pinion gear, until the knurled portion on shaft contacts pinion gear.

5. Lightly tap pump shaft through pinion gear. DO NOT FORCE PUMP SHAFT.

6. Assemble small felt washer then flat washer over end of shaft and install cotter key. Pump shaft should now rotate freely.

7. Start the pump rack assembly in contact with pinion gear, so that in the "pump refill" "cocked" position the pump lever arm will be parallel with the pump housing face (See Fig. 8).

   This will require lifting of rack and rotating pump shaft and checking each time until proper position is made.

   NOTE: As an additional check for correct position the tang of the pump lever should be in alignment with pump jets when pump is in "cocked" position.

8. Place conical shaped pump return spring into retaining cup of diaphragm assembly. Open last coil of spring slightly to make spring stick into retaining cup.

9. Place top of conical spring in counterbore in pump cavity.

10. Insert the 5 pump to housing attaching screws with lock washers through the housing and diaphragm.

11. Hold housing in place and partially install 5 screws while holding housing in place, inspect diaphragm to see that edges are not pinched or distorted.
ASSEMBLY OF PUMP (Cont'd)

12. With pump housing held in this position, finish tightening the 5 attaching screws evenly and securely.

IMPORTANT: Test pump shaft for binding. The arm should return from the “discharge” to the “cocked” position by the internal conical spring. It may be necessary to tap either end of shaft lightly to obtain free movement.

13. As a starting point, with straight end of pump actuating spring, against pump housing, wind up the pump actuating spring past the pump lever 2½ times before hooking end of spring over lever. Use a small wire, such as tag wire. DO NOT DISTORT OR STRETCH PUMP SPRING. Pump actuating spring coils should be flush with hub of pump lever.

14. Again test pump for proper operation by operating lever against spring tension. Pump should now work freely from “cocked” to “discharged” position when lever is actuated by hand.

ASSEMBLY OF CARBURETOR BOWL

1. Install 2 main metering jets.
   CAUTION: Do not pass drills or wires through jets as these are flow tested at the factory for proper calibration.

2. Using a screw driver of 4" width, install power valve with new red fibre washer.

3. Install pump intake check valve into pumpwell.

4. Install pump intake check valve threaded brass plug and tighten securely.

5. Install pump screen and small retaining ring.

6. Drop pump outlet needle (BRASS) into well, tap very lightly with brass rod to insure a seat.

7. Place idle tubes into their respective cavities.

8. Place the main well tubes into their respective cavities.
   CAUTION: Be sure the “flat” on each main well tube is positioned with the “flat” in bowl. THIS IS VERY IMPORTANT FOR PROPER FUNCTION OF CARBURETOR.
ASSEMBLY OF COVER AND HOUSING

1. Assemble new gasket on bowl cover.

2. Place cover over bowl and carefully align gasket.

3. Insert and tighten 6 attaching screws.

4. Hold throttle lever in full wide open position to insure that pump actuating lever will rest within yoke in housing.

5. CHECK TO SEE THAT BALANCE TUBE IS FACING AIR HORN. NOTE: BALANCE TUBE MUST FACE DIRECTLY INTO AIR STREAM OR CARBURETOR WILL NOT FUNCTION PROPERLY.

6. Assemble cover onto housing, being sure pump actuating lever rests in yoke inside of housing.

7. Install 8 cover to housing attaching screws.

8. Finish tightening all bowl cover screws evenly and securely. Test the operation of throttle lever for free movement (closed to wide open position), note that when in closed position the pump spring will partially open throttle valves, this functioning determines that the pump is free of binds.