

CARBURETOR OVERHAUL

Before we actually get into carburetor overhaul we should fix a few important facts in our mind.

First, a carburetor has but one task to perform, it mixes fuel with air and feeds it into the combustion chamber. It must do this at all speeds.

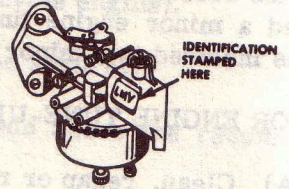
Second, there are only three areas of carburetor malfunction, it may be too lean, or it may be too rich or it may leak.

Third, the operational efficiency of a carburetor may be endangered by any foreign material, be it solid or liquid, if that material retards the flow of air or the movement of fuel.

Fourth, in overhauling a carburetor your task is to restore the unit to its original condition in order to get like-new performance.

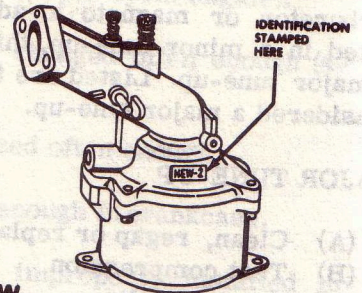
Fifth, more carburetors are rendered useless by neglect and abuse than all of the operational ills combined.

Sixth, in overhauling any carburetor it is advised that the engine be thoroughly tuned in order to handle the revised fuel distribution that is gained from correct metering.



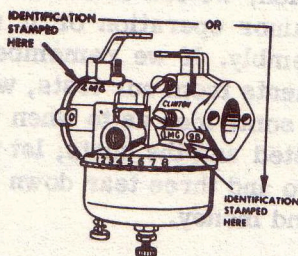
LMV

Figure 47



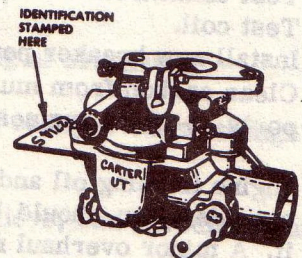
HEW

Figure 48



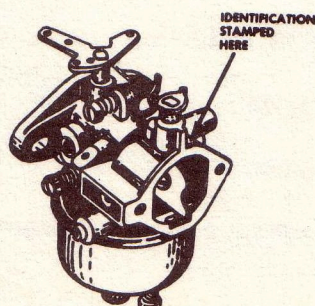
LMG

Figure 45



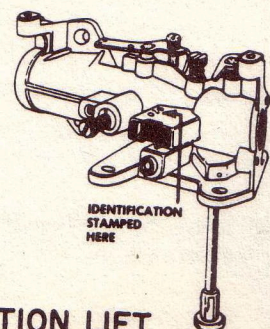
UT

Figure 49



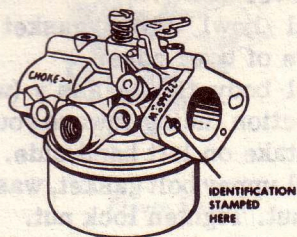
LMB

Figure 46



SUCTION LIFT

Figure 50



CARTER

Figure 51

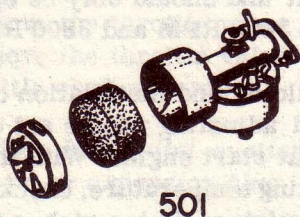


Figure 52

CARBURETOR DIAGNOSIS

In this area of service, we try to determine if the carburetor will require minor readjustment or major service as a detached unit. With older carburetors, that have had considerable service, we suggest checking the correctness of the throttle shaft to main casting tolerance. This is one area of the carburetor in which we cannot make repair, the oversized hole is not repairable and any additional money spent on such carburetors is wasted. Illustration No. 53 points out this area.

If the carburetor is equipped with a bowl drain, press this valve and let a small amount of fuel leak out onto the deck or in a flat container; look for puddles of water in the fuel. If you do find water in the carburetor at this point we can assume it came through the fuel tank, fuel line and may have caused damage to the main casting of the carburetor.

You will have to run the engine to determine if the engine will respond to varying the low speed and high speed adjustment needles. Failure to get proper reaction will indicate that the fuel

mixture may be out of true setting or that an orifice in the carburetor is restricted by dirt or corrosion.

With some carburetors it will be difficult to determine the appearance of water in the bowl for lack of a drain valve. We will cover all Clinton carburetors separately with complete details on each series.

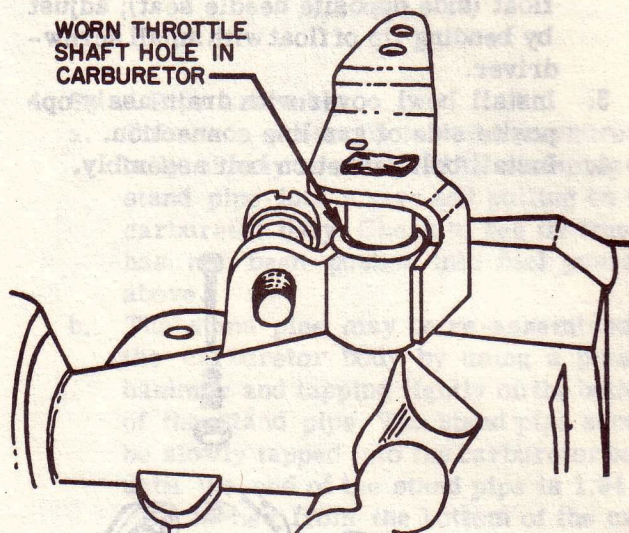


Figure 53

501 ENGINE CARBURETOR

Disassemble (See Illus. No. 54)

1. Remove carburetor from engine.
2. Remove choke assembly and air filter.
3. Remove adjusting screw and spring.
4. Remove bolt, lock nut, washer and upper body gasket.
5. Remove body assembly and lower cover gasket.
6. Remove bolt and jet assembly and bolt gasket.
7. Remove bowl (bowl drain) assembly.
8. Remove float pin, float ass'y and bowl ring gasket.
9. Remove pin, spring and gasoline intake needle. **CAUTION: Needle seat is not removable; when replacement is needed, install new bowl cover, needle pin, spring and seat assembly.**
10. Clean all parts in clean solvent. Blow off all parts with compressed air. Replace worn and damaged parts. Always use new gaskets.
11. Check to make sure atmospheric vent is open.

Re-Assemble

1. Install intake needle, spring and pin in needle seat of bowl cover assembly.
2. Install bowl ring gasket, float ass'y and float pin. Set float level. With bowl cover inverted, float resting lightly against intake needle pin, there should be $13/64''$ (plus or minus $1/32''$) clearance between outer edge of bowl cover and free end of float (side opposite needle seat); adjust by bending lip of float with small screw-driver.
3. Install bowl cover with drain ass'y opposite side of gas line connection.
4. Install bolt gasket on bolt assembly.

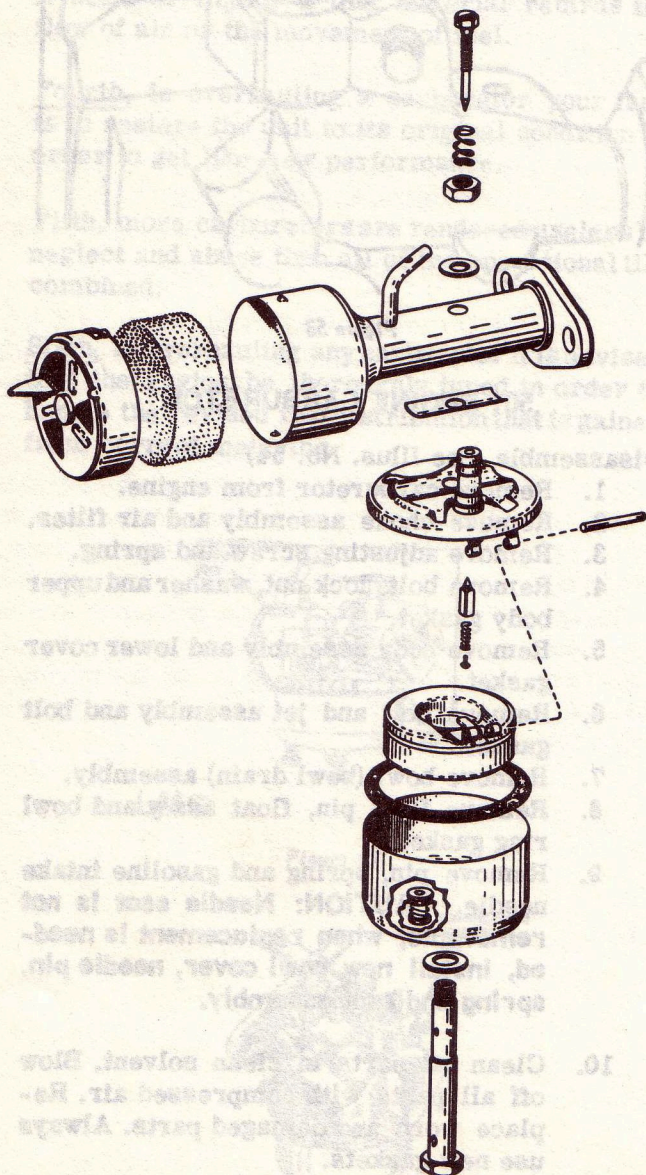


Figure 54

5. Install bolt and jet ass'y entering bowl and cover ass'y.
6. Install bowl cover gasket resting in groove of bowl cover.
7. Install body flange ass'y (with gas line connection facing toward you), choke and air intake on left hand side.
8. Install upper bolt gasket, washer and bolt lock nut. Tighten lock nut.
9. Install adjusting needle and spring, if tight. Set adjusting needle one turn open from seat to start engine.
10. Install air filter and choke ass'y (choke shutter opener at top of air intake).
11. This carburetor does not have an idle circuit and should only be operated between 3000 RPM and 3800 RPM.

After rebuilding and installation on engine is completed and adjusting needle set one (1) turn open from seat start engine. With the engine at normal operating temperature, check engine performance. If mixture is too rich, adjust needle clockwise, $1/16$ turn at a time to correct this condition.

NOTE: This carburetor does not have an idle system and will not operate at speeds below 3000 RPM no load.

LIFT CARBURETORS

(See Illustration Nos. 55-A and 55-B.)

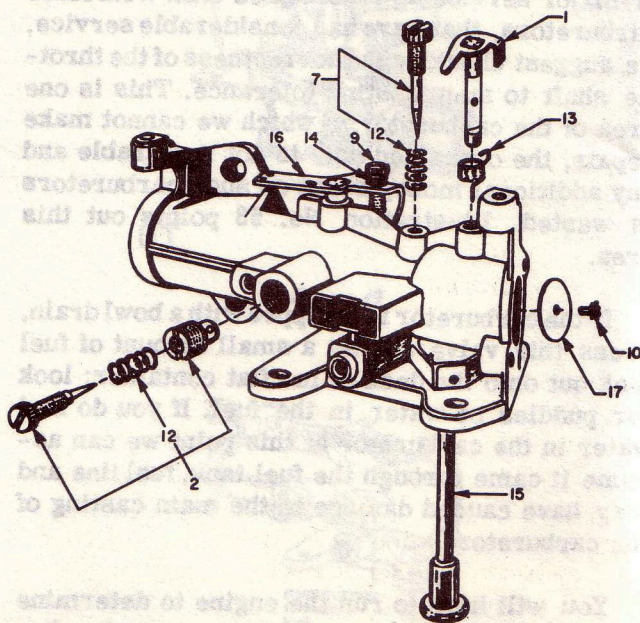


Figure 55-A

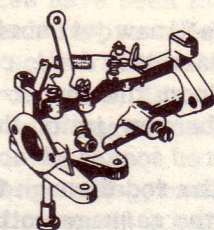


Figure 55-B

1. Throttle Shaft Disassembly

- Drill through the expansion plug at the rear of the carburetor body.
- Insert a drift punch into the drilled hole and force out the expansion plug.
- Remove the plastic plug.
- Remove the throttle valve screws.
- Remove the throttle valve and lift out the throttle shaft assembly.

NOTE: The horizontal suction lift does not have a plastic or expansion plug.

2. Throttle Shaft Re-Assembly

- Insert the throttle shaft assembly into the carburetor body.
- Insert the throttle valve into the carburetor body.
- Fasten the throttle valve to the shaft and torque the screw from 5 to 6-1/2 inch pounds.
- Throttle valve assembly should be completely free with no tendency to bind in any position.
- Insert the plastic plug from the rear.
- Insert a new metal expansion plug into its seat and strike the plug in the center until it expands and will not drop out.
- Seal the contact area between the plug and carburetor body with the following recommended sealer. Gasolia—made by the Federal Process Co., Cleveland, Ohio, or equivalent.

NOTE: The horizontal suction lift does not have a plastic or expansion plug.

3. Choke Shaft Assembly

- This is fastened like the throttle shaft assembly and may be assembled and disassembled at the front of the carburetor body by removing the air cleaner cover and filter element.
- Illustration No. 56 shows changes made on later production carburetor choke shaft lever, to eliminate breakage.

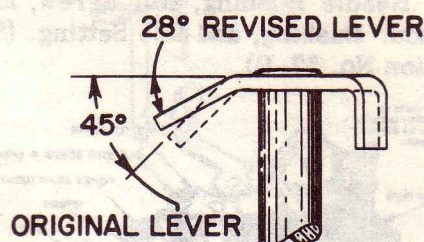


Figure 56

4. Stand Pipe Assembly

- This is a press fit into the carburetor body. It may be removed by clamping the stand pipe into a vise and pulling on the carburetor body. Check to see that metal has not been pushed into fuel passage above.
- The stand pipe may be re-assembled to the carburetor body by using a plastic hammer and tapping lightly on the bottom of the stand pipe. The stand pipe should be slowly tapped into the carburetor body until the end of the stand pipe is $1.94 \pm .045$ inches from the bottom of the carburetor body.
- Seal the contact area between the stand pipe and carburetor body with the recommended sealer.
- See Illustration No. 57-A for stand pipe changes.

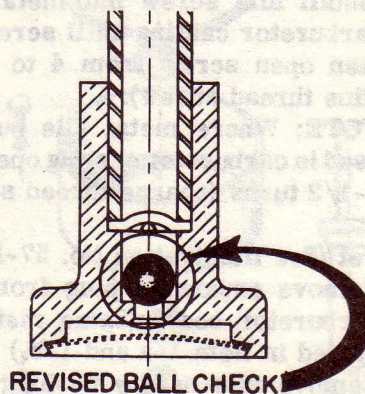


Figure 57-A

5. Idle Needle Bushing, Idle Screw, Idle Screw without Bushing, and Idle Setting. (See Illustration No. 57-B)

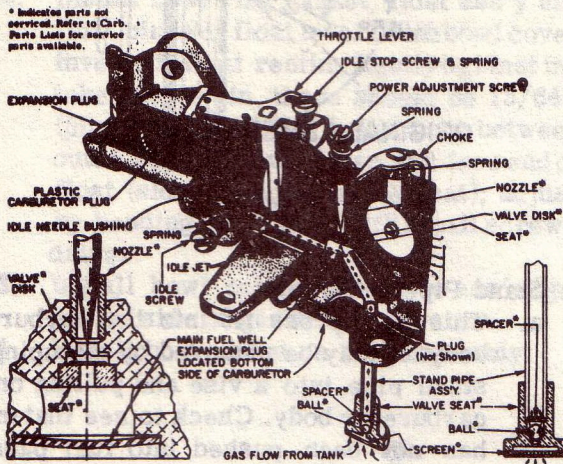


Figure 57-B

- Remove idle needle from bushing (turn idle needle in counter-clockwise direction). NOTE: Later model vertical-shaft-carburetor will not have this bushing.
- Use large screwdriver to remove bushing (turn in ccw direction).
- Before installing idle needle bushing into carburetor body, apply a light coating of the recommended sealer to the external threads of the bushing.
- Install idle bushing and torque from 40 to 50 inch pounds.
- Install idle screw into metal bushing or carburetor casting until screw seats and then open screw from 4 to 4-1/4 turns (fine thread screw).
NOTE: Where metal idle bushing is not used in carburetor casting open idle screw 1-1/2 turns (coarse thread screw).

6. Idle Jet (See Illustration No. 57-B)

- Remove expansion plug from bottom of carburetor body. (Same method as employed in Item 1-a and 1-b.)
- Remove idle needle bushing (Item 5), if applicable.
- The idle jet is located in the passage connecting the fuel well (under high speed nozzle) to the idle needle.
- To remove idle jet, push a piece of 1/16 diameter drill rod through the fuel well and up the idle passage until the jet is pushed out of the passage and into the idle fuel reservoir.

- To install new jet, scribe a mark on the 1/16 diameter drill rod exactly 1-1/4 inches from the end.
- Place the new jet on the end of the drill rod.
- Insert the rod through the main well and up into the passage until the mark on the rod is exactly in the center of the main fuel well.
- Remove the rod and install the idle needle bushing (Item 5), if applicable.
- Insert a new expansion plug and seal it with the same method used in Items 2-f and 2-g.

7. High Speed Screw and Main Nozzle

- Remove screw inspect for damage to taper; if screw taper is damaged replace.

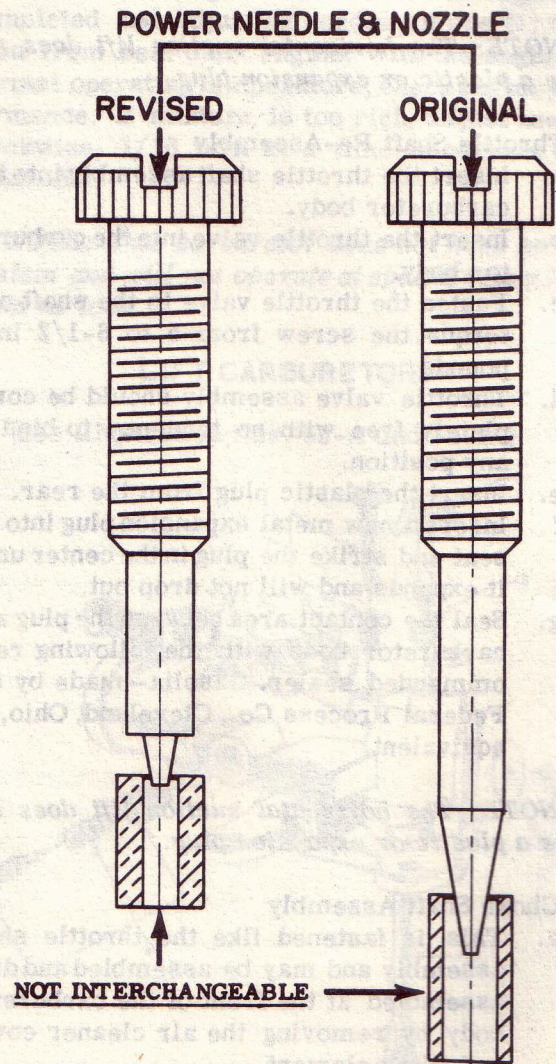


Figure 58

- b. Some changes have been incorporated in the later carburetors which changes the high speed screw and main nozzle from the first production, Illustration No. 58 illustrates the changes made.
- c. The main nozzle cannot be removed from the carburetor casting; however, it should be inspected to see if it has been tapered or split by forcing the high speed screw into the nozzle. If the main nozzle is split or tapered the complete carburetor should be replaced.
- d. The high speed power screw should be turned in clockwise until it seats. **Do Not Force**, then open $3/4$ to 1 turn, carburetor having screw with straight taper no shoulder and $1-1/4$ to $1-1/2$ turns open on screw having a shoulder or step above the taper.

NOTE: (A) Air leaking into the fuel system will cause the carburetor to malfunction and may be corrected by applying the recommended sealer to the following contact areas:

- (1) Standpipe to carburetor body.
- (2) External threads of idle needle bushing to carburetor body.
- (3) Expansion plug to carburetor body.

LMG, LMB AND LMV TYPE CARBURETORS

Disassemble (See Illus. No. 59-A)

1. As you remove the governor link from the throttle lever, tie a short wire in the hole to insure that you will reinstall the link correctly. This wire can remain hooked in the hole, even though you soak the unit in cleaner solution. Remove air cleaner.
2. Remove power adjustment needle ass'y, gasket and bowl.
3. Remove float shaft, float ass'y, float valve, float valve seat and gasket. Float should be examined for pin holes, leaks or wear in hinge pin holes on the float bracket.
4. Remove bowl ring gasket.
5. Remove idle adjusting needle and spring ass'y.
6. Remove throttle valve screws, valve, throttle shaft and lever ass'y if necessary.
7. Remove choke valve screws, valve, choke shaft and lever ass'y.

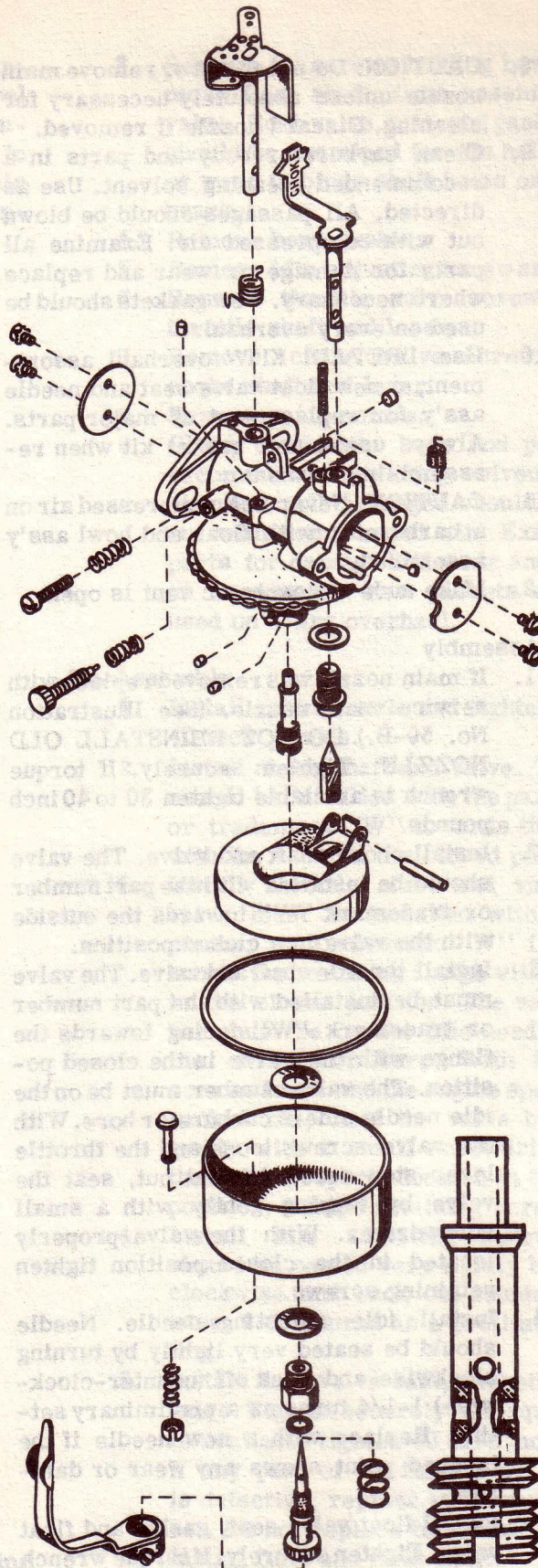


Figure 59-A

Figure 59-B

8. **CAUTION:** Do not adjust or remove main nozzle unless absolutely necessary for cleaning. Discard nozzle if removed.
9. Clean carburetor body and parts in a recommended cleaning solvent. Use as directed. All passages should be blown out with compressed air. Examine all parts for damage or wear and replace where necessary. New gaskets should be used on every overhaul.
10. Use "REPAIR KIT" overhaul assortment, a new float valve seat and needle ass'y for replacement of major parts. Always use a new gasket kit when re-assembling.
11. **CAUTION:** Never use compressed air on a carburetor with float and bowl ass'y assembled.
12. Make sure atmospheric vent is open.

Re-Assembly

1. If main nozzle was removed replace with service main nozzle. (See Illustration No. 59-B.) **DO NOT REINSTALL OLD NOZZLE.** Tighten securely. If torque wrench is available tighten 30 to 40 inch pounds.
2. Install choke shaft and valve. The valve should be installed with the part number or trademark "W" towards the outside with the valve in a closed position.
3. Install throttle shaft and valve. The valve must be installed with the part number or trademark "W" facing towards the flange with the valve in the closed position. The valve number must be on the idle needle side of carburetor bore. With the valve screws loose and the throttle lever stop screw backed out, seat the valve by tapping gently with a small screwdriver. With the valve properly located in the closed position tighten retaining screws.
4. Install idle adjusting needle. Needle should be seated very lightly by turning clockwise and back off (counter-clockwise) 1-1/4 turns as a preliminary setting. Replace with a new needle if the tapered point shows any wear or damage.
5. Install float valve seat, gasket and float valve. Tighten securely. If torque wrench is available, tighten 40 to 50 inch-pounds. This assembly is carefully matched and should any parts become separated, a

complete assembly should be re-installed. Any damage or signs of wear to any portion of the assembly should be replaced by a complete new Float Valve and seat (matched) set.

6. Install float and float shaft. It is advisable on older carburetors to replace the float shaft.

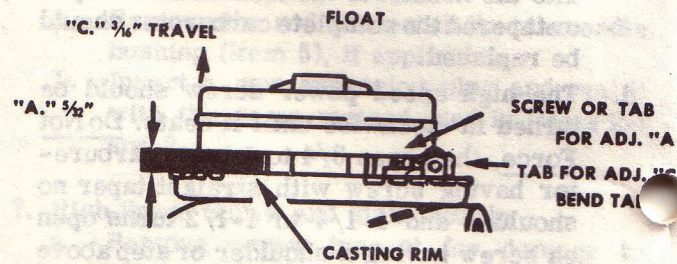


Figure 59-C

7. **FLOAT SETTING:** (See Illustration No. 59-C.) Invert the casting and float ass'y. There should be a clearance of 5/32 inch between the outer rim of the casting and the nearest part of the float at the opposite side from the hinge. If measurement is difficult, the float should be adjusted to rest lightly on the float valve and extend horizontally parallel with the casting rim. The height adjustment can be made by bending the tab resting against the float valve. If a screw is provided in place of a tab this may be turned for proper height adjustment. Reverse casting to normal position. The float would not drop more than 3/16 of an inch. A restricting tab is located in back of the hinge. This may be bent if necessary so that the float will not drop more than 3/16 of an inch in this position.
8. Install bowl ring gasket to nestle in the groove provided in the casting.
9. Install bowl using the fiber gaskets on the inner and outer side of the bowl, fitted to the bowl nut.
10. Install power adjusting needle ass'y with gaskets in place. Back out the needle before tightening securely. If torque wrench is available, tighten 50 to 60 inch pounds.
11. Seat power adjusting needle very lightly by turning clockwise and back off (counter-clockwise) 1-1/4 turns as a preliminary setting.

12. Using a new flange gasket install carburetor on the engine. Throttle control and governor linkage or any remote controls should be assembled exactly as in the original location. Service the air cleaner as directed in the Engine Manual and replace to carburetor.

H. E. W. CARBURETORS

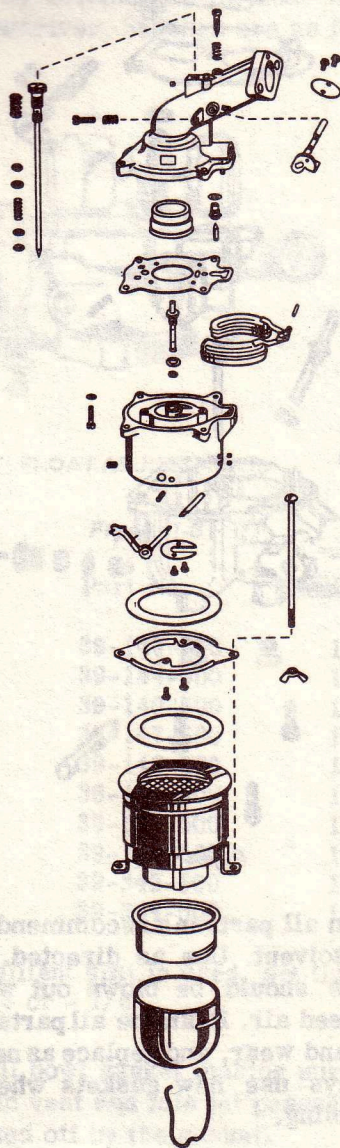


Figure 60-A

Disassembly (See Illus. No. 60-A)

1. Remove carburetor from engine, noting carefully all linkages and connections. Remove the air cleaner.
2. Remove high speed adjustment screw:

3. Remove (4) screws holding bowl on. Remove float shaft, float assembly, float valve, float valve seat, and gasket. Float should be examined for pin holes, leaks or wear in hinge shaft holes on the float bracket.
4. Remove bowl gasket.
5. Remove idle adjusting screw and spring.
6. Remove throttle valve screws, valve, throttle shaft and lever.
7. Remove choke valve screws, valve, choke shaft and lever.
8. Remove main nozzle.
9. Clean carburetor body and parts in a recommended cleaning solvent. Use as directed. All passages should be blown out with compressed air. Examine all parts for damage and wear and replace as necessary. New gaskets should be used on every overhaul.

Re-Assembly

1. Install main nozzle and tighten to 30 to 40 inch pounds.
2. Install choke shaft and valve. The valve should be installed with the part number or trademark 'W' towards the outside with the valve in the closed position.
3. Install throttle shaft and valve. The valve must be installed with the part number or trademark 'W' facing towards the mounting flange with the valve in the closed position. The valve number must be on the idle needle side of the carburetor bore. With the valve screws loose and the engine speed screw backed out, seat the valve by tapping gently with a small screwdriver. With the valve properly located in the closed position, tighten retaining screws.
4. Install idle adjusting screw. Screw should be seated very lightly by turning clockwise and back out counter-clockwise, 1-1/2 turns as a preliminary setting.
5. Install float valve seat, gasket and float valve. Tighten securely. If torque wrench is available tighten 40 to 50 inch pounds. If any part of the float valve assembly is defective, replace with a new matched set. Do not replace individual parts.
6. Install float and float shaft.
7. **FLOAT SETTING:** (See Illustration No. 60-B.) Invert the casting. Float assembly should be 3/16 of an inch from the

casting rim and outer tip of both sections of the float. The height adjustment can be set by bending the tab resting on the float valve. Reverse casting to normal position and set float travel down from seat to $\frac{3}{16}$ of an inch by bending the restricting tab located in back of the float hinge.

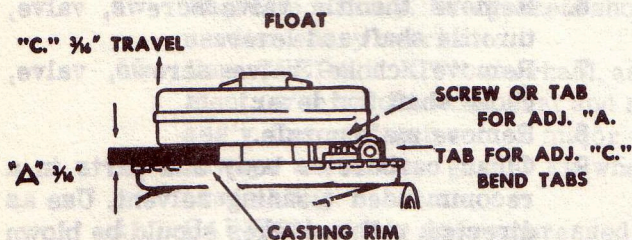


Figure 60-B

8. Install high speed adjusting screw in casting, do not tighten down. Use the end of the screw for locating the spring and gaskets that fit around the high speed adjusting screw.
9. Install bowl gasket.
10. Assemble bowl to carburetor casting, tighten hold down screws 50 to 60 inch pounds.
11. Seat high speed adjusting screw very lightly by turning clockwise, and back off counter-clockwise 1-1/2 turns as a preliminary setting.

U. T. CARBURETORS

Disassembly (See Illus. No. 61-A)

1. Remove carburetor from engine.
2. Remove bowl screws.
3. Remove float pin, float, needle and needle and seat. Check float for dents, leaks, and wear on float lip or in float pin holes.
4. Remove bowl gasket.
5. Remove idle and high speed adjusting screw assembly and springs.
6. Remove nozzle and idle jet tube.
7. Remove throttle valve screws, valve and shaft assembly.
8. Do not remove choke valve and shaft unless replacement of parts is necessary. A spring loaded pin retains choke in open position. Care should be taken if disassembled so that pin and spring are not lost.

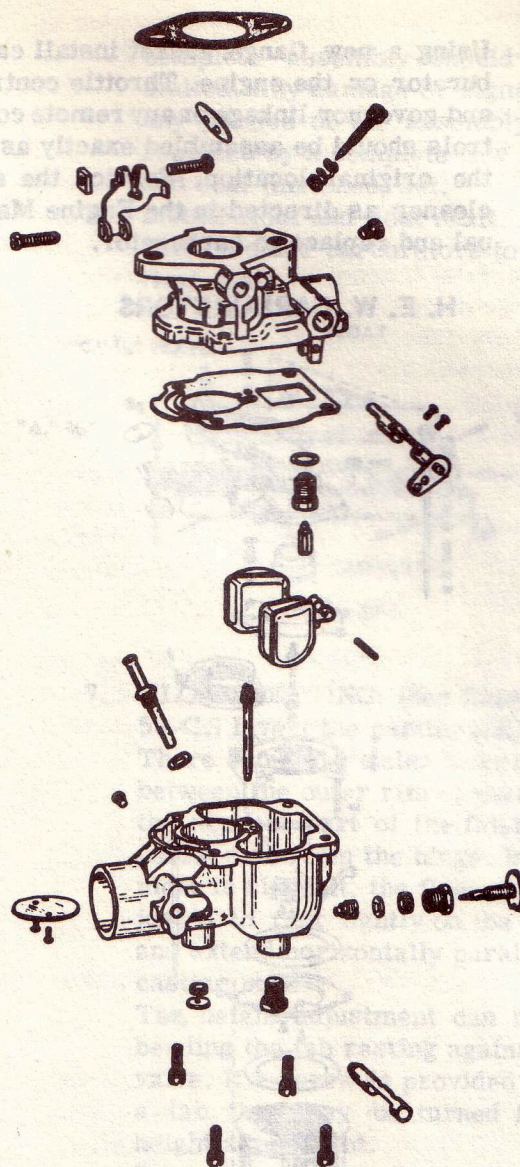


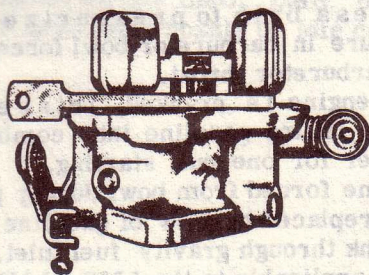
Figure 61-A

9. Clean all parts in a recommended cleaning solvent. Use as directed. All passages should be blown out with compressed air. Examine all parts for damage and wear, and replace as necessary. Always use new gaskets when re-assembling.

Re-Assembly

1. Install throttle shaft and valve assembly. Valve must be installed with trademark "C" on side toward idle part when viewing from mounting flange side. Always use new screws. With valve screws loose and throttle lever stop screw backed out seat valve by tapping lightly with a small screwdriver. Hold in place while tightening screws.

2. Install main nozzle, making sure it seats in casting.
3. Install needle seat, needle, float and float pin.
4. Set float level. (See Illustration No. 61-B.) With carburetor casting inserted, float resting lightly against needle in its seat, and bowl gasket removed, there should be the following clearance between float seam and throttle body. Adjust by bending lip of float with small screwdriver. Settings are as follows:



FLOAT ADJUSTMENT

Figure 61-B

Ident. No.	Part No.	Float Setting
2712-S	39-143-500	19/64
2713-S	39-144-500	19/64
2714-S	39-140-500	1/4
*2398-S	39-147-500	1/4
2336-S	39-146-500	1/4
2336-SA	39-146-500	1/4
2337-S	39-145-500	1/4
2337-SA	39-145-500	1/4
2230-S	39-343-500	17/64
2217-S	39-344-500	11/64

*When resilient seat is used, set float level at $.9/32 + \text{or} - 1/64$.

5. Install bowl gasket making sure atmospheric vent and idle jet passage are not blocked off by the gasket.
6. Install idle jet tube.
7. Install high speed screw assembly. Turn in until it seats, then back out 1-1/4 turns.
8. Install idle adjusting screw finger tight, back out approximately 1-1/2 turns.
9. Assemble bowl to throttle shaft assembly casting.

CARTER CARBURETOR

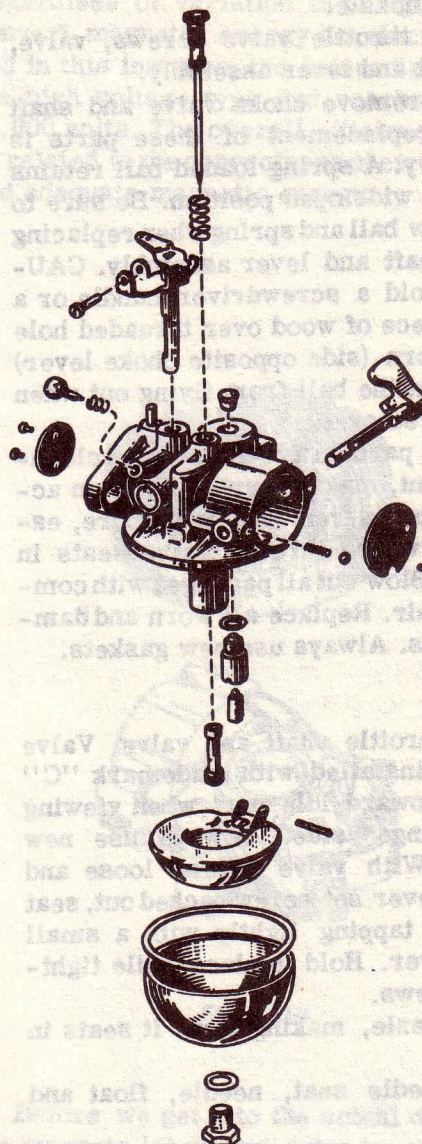


Figure 62

Disassembly (See Illus. No. 62)

1. Remove carburetor from engine.
2. Remove bowl nut, gasket and bowl.
3. Remove float pin, float, needle and needle seat. Check float for dents, leaks, and wear on float lip or in float pin holes.

4. Remove bowl ring gasket.
5. Remove low speed jet and high speed adjusting needle assembly and spring.
6. Remove idle adjustment screw and spring.
7. Remove nozzle.
8. Remove throttle valve screws, valve, and shaft and lever assembly.
9. Do not remove choke valve and shaft unless replacement of these parts is necessary. A spring loaded ball retains choke in wide open position. Be sure to use a new ball and spring when replacing choke shaft and lever assembly. **CAUTION:** Hold a screwdriver handle or a small piece of wood over threaded hole in air horn (side opposite choke lever) to prevent the ball from flying out when shaft is removed.
10. Clean all parts in a recommended cleaning solvent, making sure all carbon accumulation is removed from bore, especially where throttle valve seats in casting. Blow out all passages with compressed air. Replace all worn and damaged parts. Always use new gaskets.

Re-Assembly

1. Install throttle shaft and valve. Valve must be installed with trademark "C" on side toward idle port when viewing from flange side. Always use new screws. With valve screws loose and throttle lever set screw backed out, seat valve by tapping lightly with a small screwdriver. Hold in place while tightening screws.
2. Install nozzle, making sure it seats in casting.
3. Install needle seat, needle, float and float pin.
4. Set float level. With carburetor casting inverted, float resting lightly against needle in its seat, there should be 3/16" clearance between machine surface of casting and free end of float (side opposite needle seat). Adjust by bending lip of float with small screwdriver.
5. Install bowl ring gasket, bowl, bowl nut gasket and bowl nut. Tighten securely after making sure bowl is centered in gasket.

6. Install low speed jet and high speed needle assembly. Turn in until it seats in nozzle, then back out 2 turns.
7. Then install idle adjusting screw finger tight. Back out approximately 1-1/2 turns.

TOUCH 'N' START PRIMER CARBURETOR

Steps in operation of primer. (See Ill. No. 62 A)

1. Seal bowl vent with finger.
2. Depress bulb to pressurize bowl.
3. Pressure in carburetor bowl forces fuel into carburetor throat.
4. When engine is cranked, intake valve opens, letting gasoline into combustion chamber for one pull starting.
5. Gasoline forced from bowl during priming is replaced by flow of gasoline from fuel tank through gravity fuel inlet.

This primer is applicable to the LMG, LMB, and LMV carburetors. Servicing this carburetor would be the same as listed for the LMG, LMB, and LMV, except choke lever and choke valve are not used. **NOTE:** The bowl atmospheric vent is routed back through the primer tube and bulb.

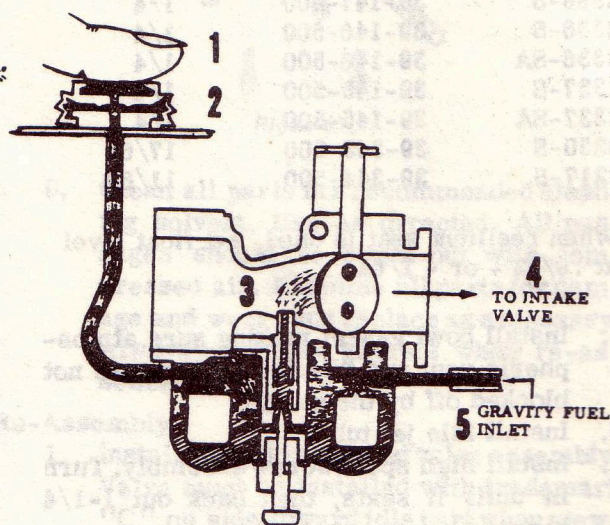


Figure 62A

FIXED SPEED CARBURETOR

Steps in operation. (See Illustration No. 62 B.)

1. Rotate control knob counter-clockwise to open throttle (4 cycle engines) (2 cycle not equipped with control knob)
2. To stop engine rotate control knob clockwise. (4 cycle engines) (2 cycle engines use shorting device)

NOTE: Governor spring is located on throttle shaft between lever and carburetor casting. Setting on high speed screw is $1\frac{1}{4}$ to $1\frac{1}{2}$ turns. Servicing this carburetor would be the same as listed for the LMG, LMB, or LMV except there is no main nozzle or idle circuit.

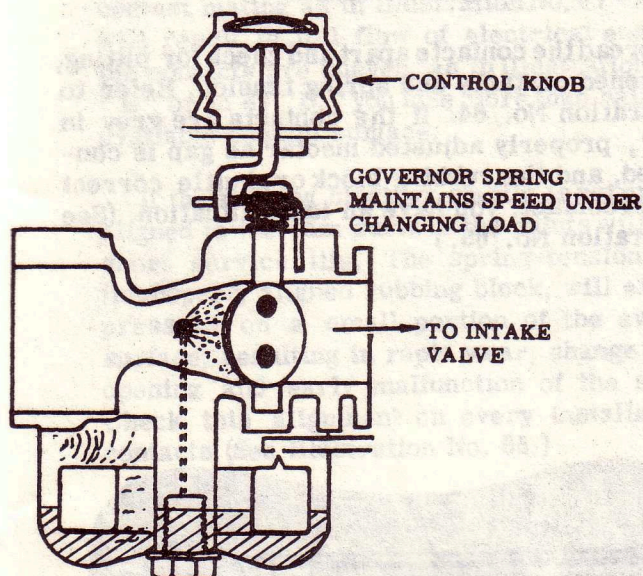


Figure 62 B

MAGNETO OVERHAUL

Illustration No. 63-A illustrates one of the magneto assemblies used on Clinton Engines. Regardless of variation in design all magnetos convert magnetic energy to electrical energy, and in this instance, the induced electricity is of the high voltage type and reaches as much as 18,000 volts. The overall efficiency of a magneto is related to the correctness of circuit conditions and adequate magnetic energy.

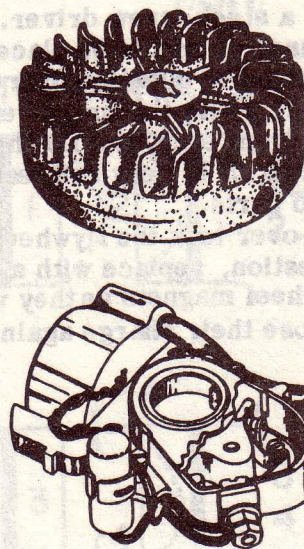


Figure 63-A

Before we get into the actual disassembly of the magneto let us understand one with reference to an engine "miss." The energy required to fire a spark plug under compression depends on the compression, the spark plug gap and the circuit conditions. If everything is in good order, the available voltage from the magneto will be maximum. If everything in the spark plug circuit is in good condition, it will require minimum voltage. When the required voltage is higher than the available voltage, electrical malfunction will result. The maintenance to the electrical circuit is to maintain high available voltage and to require minimum required voltage.