



# SERVICE BULLETIN NO. 88

SEC. VIII, DIV. A  
VALVE SERVICING  
ISSUED MAY, 1959  
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## Subject: VALVE SERVICING

One of the main points of service on any one-cylinder, air cooled, four-cycle engine is the valves. As there is only one intake and one exhaust valve, if one of these is not functioning, the engine is then inoperative. Valves sticking or hanging up is nothing new in the engine business and can be caused by many things.

Below are listed some of the reasons that valves may stick:

1. Engine operated low on oil or improper weight oil for temperature. Refer to S. B. #9 for oil.
2. Engine operated with diluted and/or dirty oil.
3. Climatic conditions such as salt air, high humidity, etc.
4. Improper storage of engine, where oil and dirt and/or moisture cause damage or rust.
5. Improper cooling---air intake plugged, cooling fins plugged with dirt or grease, air shrouds removed, engine boxed in, not allowing proper cooling.
6. Improper fuels, i. e., white or premium fuels---2-cycle mix.
7. Distortion due to improper torque.
8. Improper air cleaner service (dirt).
9. Excessive carbon---filling oil bath air filter too full---2-cycle mix---etc.
10. Rust due to hosing off engine with water.
11. Lean mixture of gas and air in combustion chamber due to lean carburetor adjustment or air leak between carburetor and combustion chamber.
12. Overheating due to overspeed or overload.
13. Improper break-in---overheating due to load being applied before engine is broken in (engine should be run without load at half speed for a minimum of 20 to 30 minutes).
14. Warped valves.
15. Weak or broken valve spring.
16. Reduced tension on spring due to valve seat being cut too deep in block and valve being refaced.

The procedure for repairing an engine with a stuck valve is as follows:

1. Remove "C" lockwasher from valve stem by using two screwdrivers or as shown in Figure 1 with Clinton tool No. TL-925 or TL-974.
2. After removing valve spring retainer and valve spring, remove any burr that may be on valve stem with file (this is only necessary when engine has operated for a long period of time). (Fig. 2.)
3. Valve can then be removed.  
CAUTION: DO NOT force engine over to use camshaft to force valve out as internal damage could be caused.

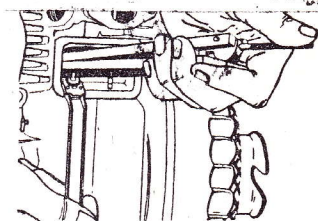


Fig. 1. Removing Valve Keeper ("C" lockwasher)

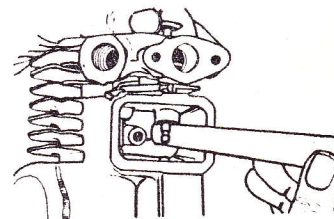


Fig. 2. Removing Burr

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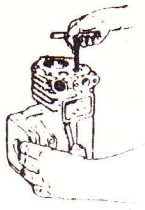


Fig. 3. Cleaning out Valve Guide

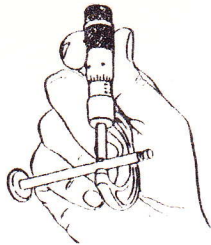


Fig. 4. Miking Valve Stem

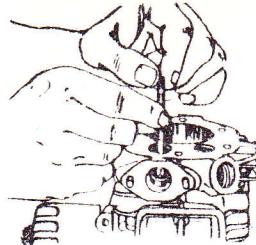


Fig. 5. Miking Valve Guide

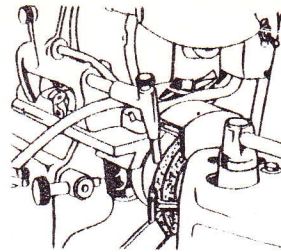


Fig. 6. Refacing Valve

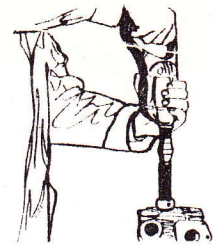


Fig. 7. Reworking Valve Seat with Stone

4. Run reamer through valve guide to clean out foreign material (Fig. 3). A .250 to .251 (1/4") reamer should be used on all Clinton engines. Clinton Part No. TL-977, 1/4" reamer, or similar type reamer should be used, except on the Red Horse series, which uses 5/16".
5. Valve guide should then be cleaned of any chips or foreign material--- compressed air can be used for this.
6. If the valve is reusable, the stem should be polished with crocus cloth and miked (Fig. 4). Clearance between valve stem and valve guide should be checked (Fig. 5). Proper clearance should be at least .002 minimum.
7. If necessary, reface the valve (Fig. 6).
8. If seat requires reworking, do so with 44° seat cutter or stone, holding the seat width between 1/32" and 3/64" (Fig. 7).
9. If valve seat cutter is used (Fig. 8), it should be deburred with fine lapping compound. (If valve seat and valve face appear in good condition, they should be touched up lightly with lapping compound.)
10. All traces of lapping compound should be removed from the valve, valve seat and valve guide before reassembling engine.
11. Valve clearance should then be set (Fig. 9). The clearances should be between .009 and .012 on all engines except the 300 series which are set at between .006 and .009. After clearance is set, a 45° bevel should be ground on the outer edge of the valve stem (Fig. 10).
12. Apply good grade motor oil in the valve guides to afford lubrication of valve to valve stem.
13. Reassemble valve, valve spring, valve spring retainer and "C" lockwasher (Fig. 12). Note: "C" lock fits with curved outer edge against valve spring retainer.

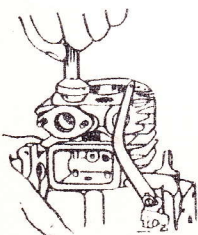


Fig. 8. Reworking Valve Seat with Cutter

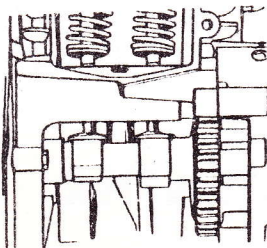


Fig. 9. Proper Position of Camshaft for Checking Valve Clearance

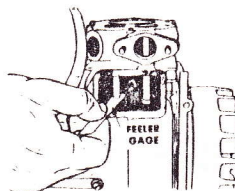


Fig. 10. Checking Valve Clearance

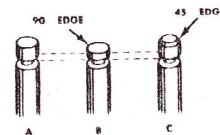


Fig. 11. Proper Valve Stems

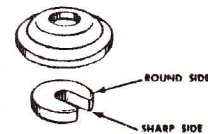


Fig. 12. Proper Assembly of "C" Lockwasher