GENERAL INFORMATION

L-Head engines have inherent design advantages which result in a more simple engine of lower height, weight and cost. All valves, cams, valve lifters and all other moving parts are a part of the cylinder block assembly.

The cross-section of an L-Head engine resembles the letter "L" written upside down and engines with this type of combustion chamber are also called side-valve engines.

Intake and exhaust valves are located in the side pocket and both are directly operated through tappets from a single camshaft. This provides a simple and heavy duty valve gear, since there is no deflection.

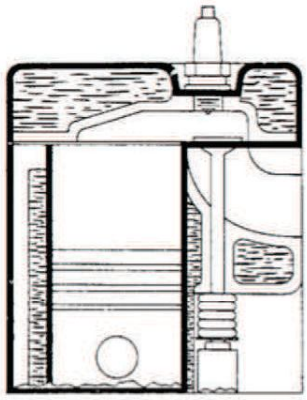


Figure 2 — L-head design

CONTINENTAL L-HEAD ENGINES

Continental has eight basic four-cylinder and ten six-cylinder L-Head type engines, ranging in size from 56 to 427 cubic inch displacement.

The combustion chamber design has been tailored for the required turbulence, charge flow and burning characteristics to provide dependable and economical heavy duty service.

Some of the principal design features are:

1. **Individual Porting** — of the intake manifold whereby each cylinder is fed with the fuel-air mixture individually and not influenced by other cylinders of the engine.

This is accomplished by casting the cylinder block with individual intake valve passages for each cylinder and connecting these passages to an intake manifold which also has individualized passages for each cylinder.

This equal distribution results in maximum power, smooth operation, easy starting and longer engine life.

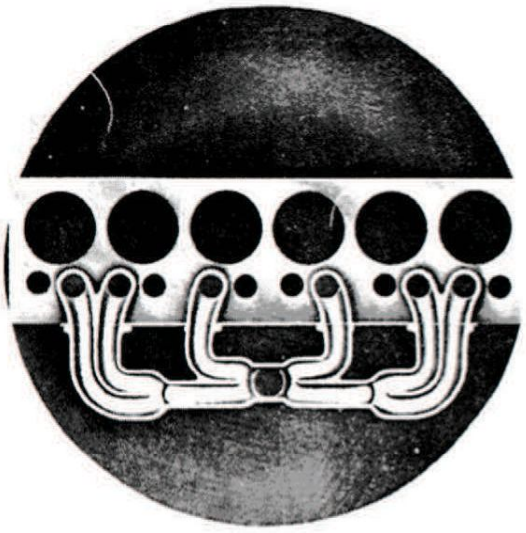


Figure 3 — Individual Porting

2. **Directional Cooling** — is accomplished by regulating the course of the cool water from the water pump so it first comes in contact with exhaust valve seats and then to other points as indicated by their relative temperatures.

This feature promotes uniform cooling throughout the system, prevents hot-spots and prolongs valve life.

This coupled with the by-pass and thermostat included in the engine assembly, insures rapid warm-up and even temperature distribution.

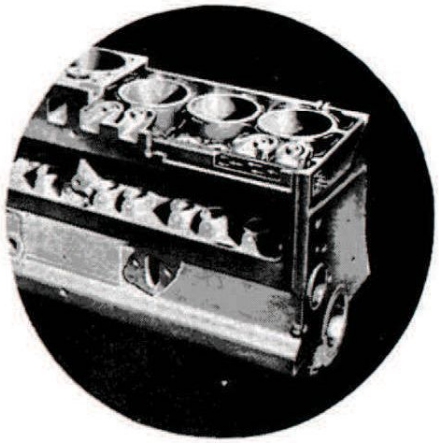


Figure 4 — Directional Cooling in Block

3. **Full Length Water Jackets** — completely surround all cylinder bores the full length of the piston travel.

This insures uniform cooling with minimum bore distortion — which results in lower oil consumption; less blow-by and minimum tendency to sludge.

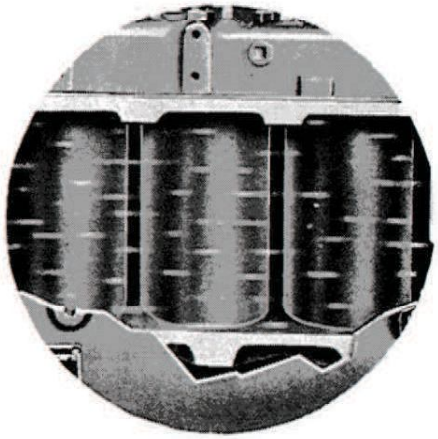


Figure 5 — Full Length Water Jackets

4. **Removable Tappets** — The large, barrel shaped, pressure lubricated tappets are so designed that by removing the adjusting screw — the main body can be lifted out and replaced from above through the valve chamber. This eliminates the costly service operation of dropping the oil pan and pulling the camshaft. Locking of the adjustment is both simple and effective.

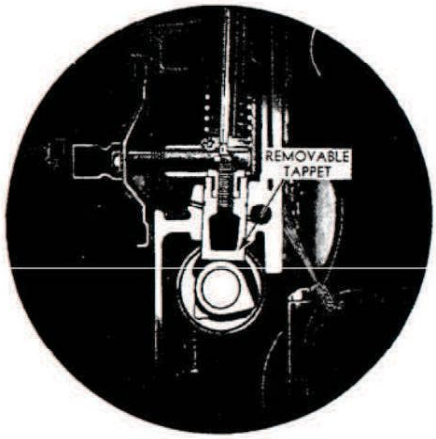


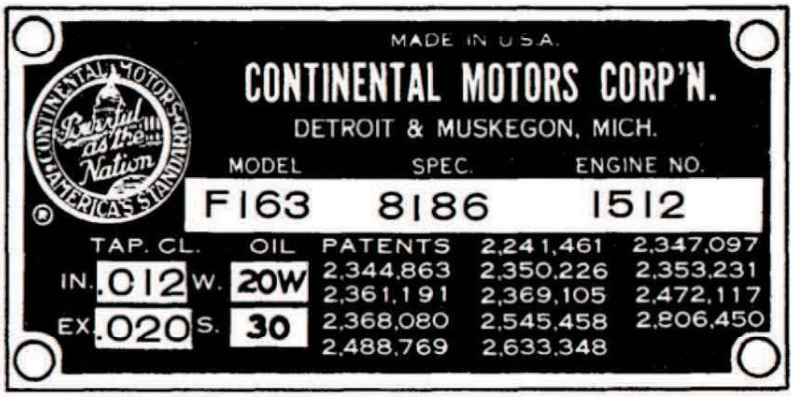
Figure 6 — Removable Tappets

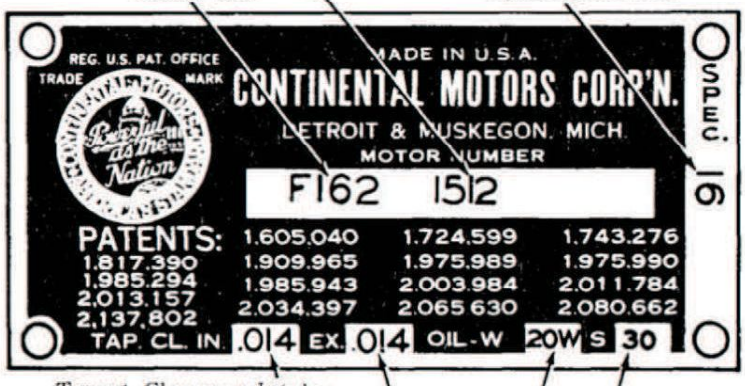
5. **Choice of Fuels** — Gasoline - LPG - Natural Gas - Fuel Oil — Continental L-Head engines have been tailored for heavy-duty operation using gasoline - LPG - natural gas - fuel oil fuels.

INFORMATION FOR ORDERING PARTS

When ordering parts, refer to the **engine name plate** attached to side of the cylinder block, which lists the **model** and **serial number.** In most cases a **specification** number is listed. This data is of vital importance in obtaining the correct parts: **always include this information on your parts order.**

NEW STYLE NAMEPLATE





OLD STYLE NAMEPLATE

Figure 7 -- Nameplate (New Style and Old Style)

LUBRICATION

ENGINE LUBRICATION SYSTEM

Continental L-Head engines have full pressure lubrication to all main, connecting rod and camshaft bearings as well as tappets and timing gears.

To insure piston pin lubrication and prevent piston scuffing during the warm-up period in cold weather — the large end of the connecting rods have drilled spurt holes pointing toward the thrust side of the pistons. These line up with the oil hole in the crank pin so that once each revolution, oil is sprayed on the cylinder wall for lubrication.*

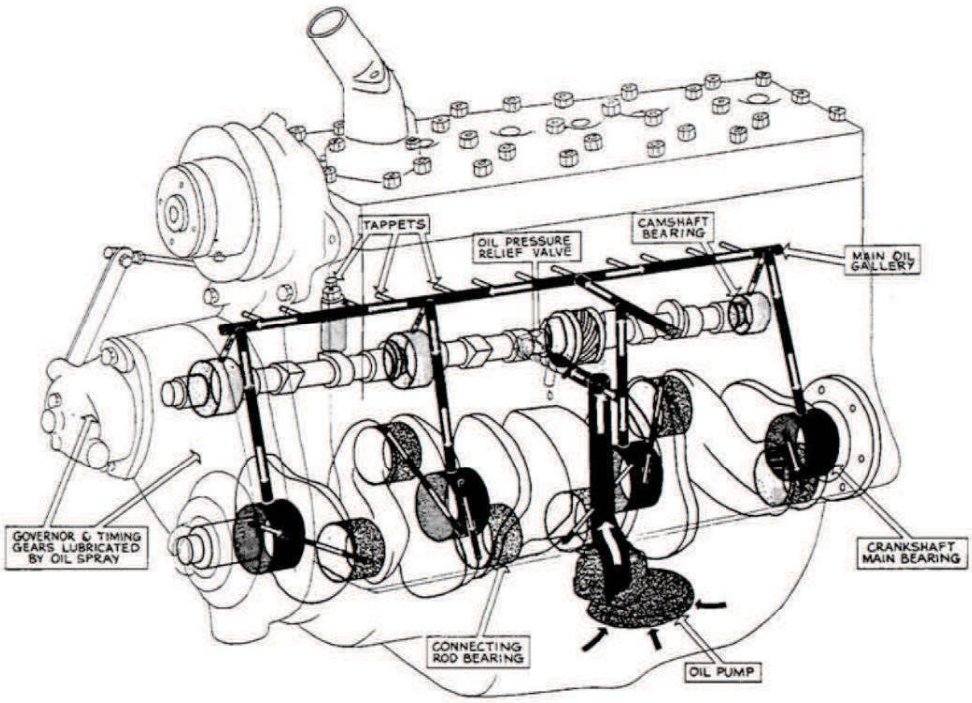


Figure 8 — Oiling Diagram

* NOTE: On some recent models, the connecting rod spurt holes have been plugged or eliminated. This does not in any way effect the lubrication of the engine.

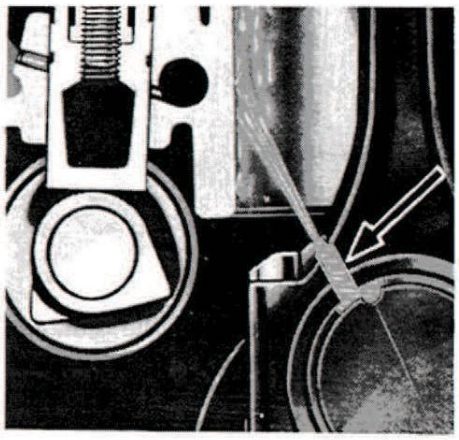


Figure 9 — Connecting Rod Spurt Hole
(see note on page 00M152E)

OIL PUMP

On all engines except the N-series, a large capacity, submerged, gear type oil pump is driven off the camshaft and protected by a large screen inlet; on the N-series the oil pump is mounted on the rear end plate.

An adjustable by-pass valve maintains suitable oil pressure from idle to maximum speed automatically. The normal oil pressure at full throttle is 20-30 pounds for the N-F type engines and 40-50 pounds for the B engines and should not fall below 7 pounds pressure at 400-600 R.P.M. idling speed.* (M and Y engines are 30-40 pounds.)

CAUTION: If the oil pressure is erratic or falls below these limits, stop the engine IMMEDIATELY and find the cause of the trouble. Refer to trouble shooting section for this information.

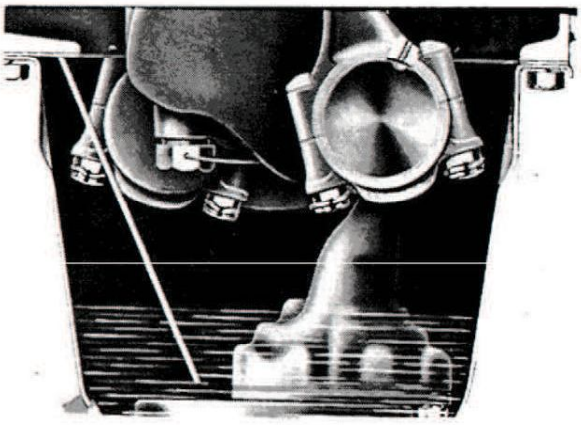


Figure 10 — Oil Pump

*Other pressures are available, based on customer specifications.

A by-pass type oil filter is normally provided to remove dirt and foreign elements from the oil, a percentage of which is passed through the filter during the operating period. The removal of grit, sludge and foreign particles causes filter elements to clog and become ineffective unless they are normally replaced every 150 hours.

OIL CHANGE FREQUENCY

Engine oil does not "wear out". However, the lubricating oil in internal-combustion engines becomes contaminated from the by-products of combustion: dirt, water, unburned fuel entering the crankcase, and the detergents holding the carbon particles in suspension in the crankcase.

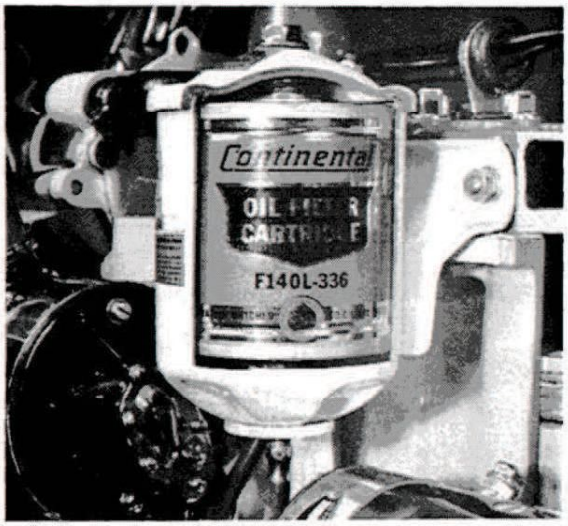


Figure 11 — Oil Filter

The schedule for changing oil is directly dependent upon the operational environment: an extremely clean operation could go 150 hours while a dirty operation (foundry or cement factory) could be 50 hours **or less.**

FOR LUBRICATION RECOMMENDATIONS

REFER TO GROUP 01

DO NOT FLUSH CRANKCASE WITH KEROSENE

Some operators unwisely put kerosene in the crankcase after draining the engine oil, then turn the engine over with the starter — in the belief they are doing a better job of crankcase cleaning.

In doing this, kerosene is circulated through the oil pump, the main oil header and the branches leading into the engine bearings — thereby washing away the protective oil film. In addition, some of the kerosene will be trapped and remain to thin out the new oil, reducing its lubricating qualities.

Do not put kerosene into the crankcase. The best method is to drain the oil when the engine is thoroughly heated — which will carry off most of the sediment.

AIR CLEANER

All engines, when operating, consume several thousand cubic feet of air per hour. Since dusty air is full of abrasive matter, the engine will soon **wear excessively** if the air cleaner does not remove the dust before entering the cylinders.

Two basic types of air cleaners are normally used — the oil bath type and the dry replaceable element type.

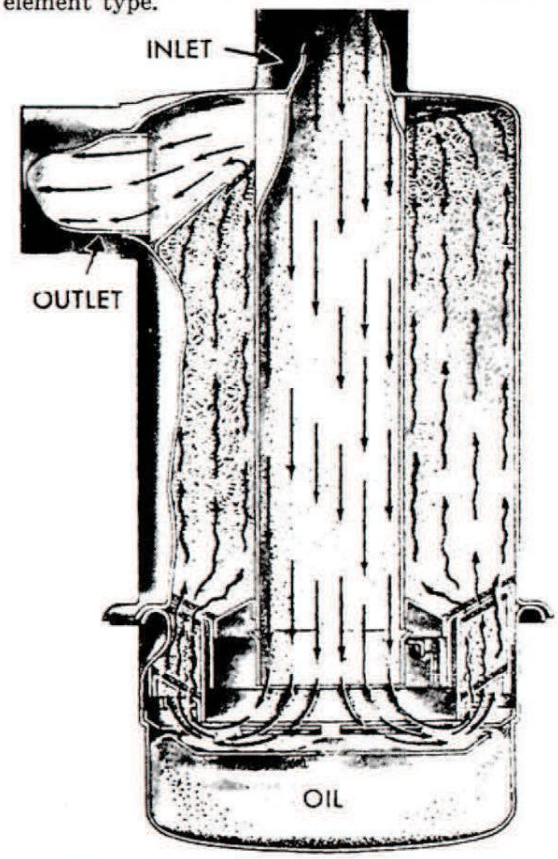


Figure 12 — Sectional View of Oil Bath Air Cleaner

Operating conditions determine the air cleaner service periods. In extremely dusty operations, this may be once or twice daily. In dust protected areas, the air cleaner should be serviced when changing oil.

As the dirt is strained from the air flowing through the cleaner, it thickens the oil in the cup and raises the level. If the level is too high, agitation of the oil on the screen is affected and gritty oil is carried over into the air stream, through the carburetor and into the engine cylinders. This would actually introduce a grinding compound with resulting very rapid wear.

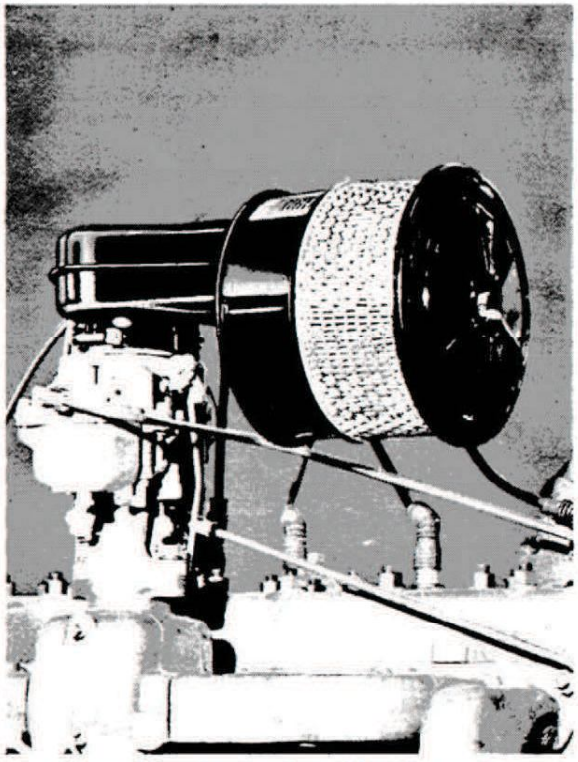


Figure 13 — Dry Replaceable Element Type Air Cleaner

By actual measurement, the amount of dust shown below, when admitted in the volume shown every hour, will completely ruin an engine in an eight hour day.

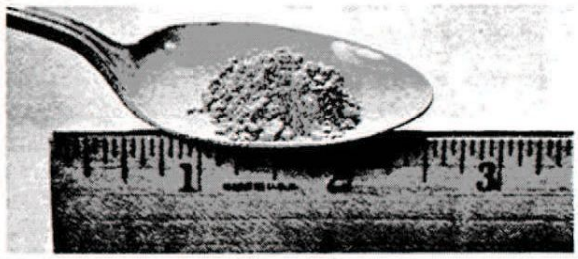


Figure 14

Proper servicing means **Cleaning Thoroughly** and **Refilling with New Engine Oil,** and **Maintaining Air-Tight Connections** between the air cleaner and intake manifold so that **All Air Entering The Engine Is Filtered.**

ENGINE REPAIR AND OVERHAUL

This section includes instructions for repairs and overhaul of the component units of Continental Red Seal L-Head engines.

Provide a clean place to work and clean the engine exterior before you start disassembling — dirt causes engine failures. Many shop tools have been developed to save time and assure good workmanship; these should be included in your equipment.

Use only genuine Red Seal parts in Continental engines since years of development and testing have gone into these specifications to assure maximum life and performance.

CYLINDER HEAD

The cylinder head is an important part of the engine assembly since it contains the complete combustion chamber and cored passage for water flow. Remove the cylinder head in the following sequence:

1. Drain water from engine and disconnect radiator or heat exchanger outlet hose.

2. Loosen and remove the nuts holding the cylinder head to the block.

3. Lift the cylinder head off the engine and carry to a clean bench for further disassembly.

4. Remove all carbon from combustion areas using a scraper and wire brush.

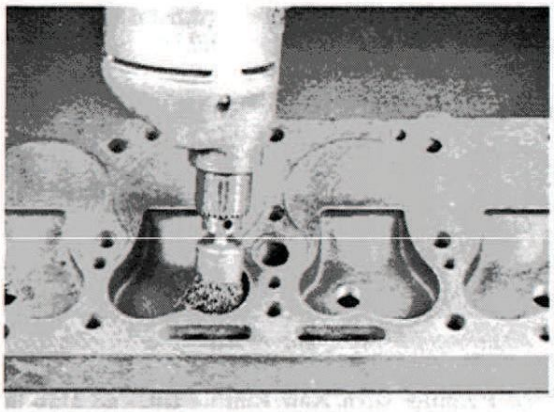


Figure 15 — Cleaning carbon from combustion chamber

5. Clean the cylinder head thoroughly with a solvent or degreasing solution and blow it off with air pressure.

6. Make sure that gasket contact surfaces on the head and block are clean, smooth and flat.

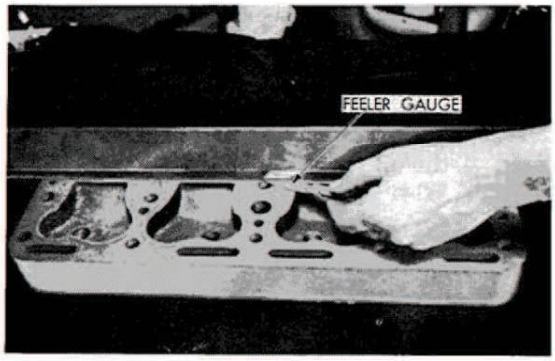


Figure 16 — Checking cylinder head flatness lengthwise.

7. Check out-of-flatness with straight edge and feeler gauge: maximum permissible is .00075 inches per inch of width or length. Thus, for a cylinder head 16″ long, maximum permissible lengthwise out-of-flatness is .012″. Out-of-flatness should vary gradually and uniformly from end to end and side to side. Localized depressions or high spots should not exceed .003.

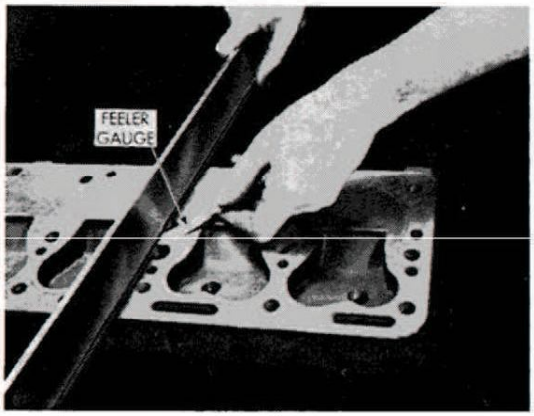


Figure 17 — Checking cylinder head flatness crosswise.

CYLINDER BLOCK

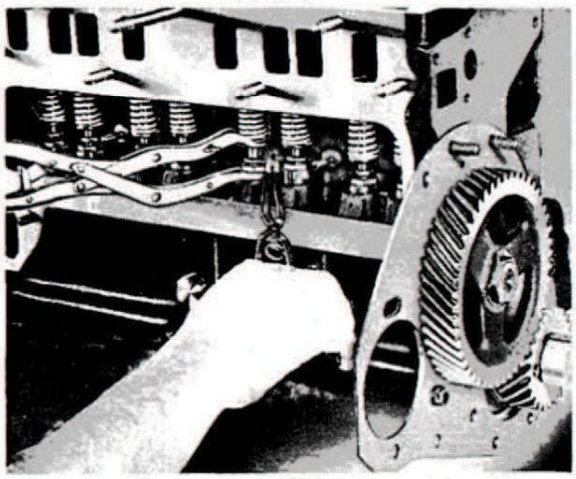


Figure 18 — Valve Removal

1. With a valve spring lifter, compress the springs and remove the locks or pins from the valve stems which are in a closed position. Close the other valves by rotating the crankshaft and remove the locks (or pins) from these valves in the same manner. Remove all valves and place in order in a rack, with holes numbered for both intake and exhaust valves so they will not be mixed in handling.

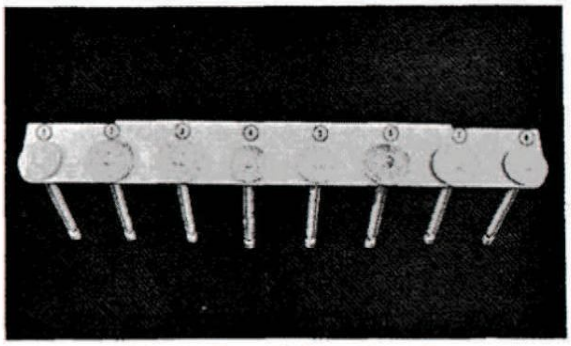


Figure 19 — Valves in rack

VALVE GUIDES

1. Clean the valve stem guides, removing lacquer or other deposits by running a valve guide cleaner or wire brush through the guides.

2. Check guides for wear by using "Go and No-Go" plug gage or a telescope gage and 1" micrometer. Replace all guides that are worn bell-mouthed and have increased .0015 in diameter. See Limits and Clearance Section for maximum diameter permissible to determine actual amount the diameter has increased. Remove all valve guides when necessary by using an arbor press and pressing them out from the combustion chamber side with a driver slightly smaller than the O.D. of the valve guide.

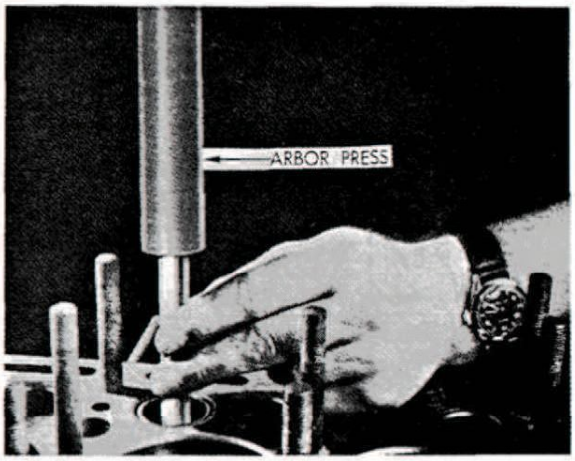
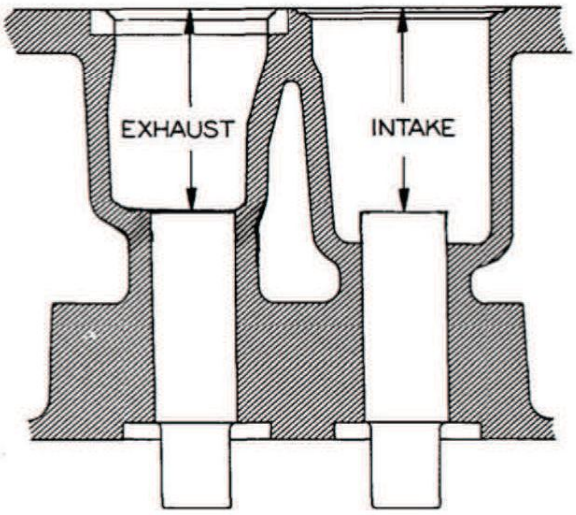


Figure 20 — Removing valve guides

3. Replace worn guides as required by using a suitable driver and an arbor press from the combustion side to the correct depth below the valve seat as given in the Limits and Clearance Chart.



Engine	Distance from Block Face to Top of Guide	
	Intake	Exhaust
N56, N62	25/32	25/32
Y69, Y91, Y112	7/8	7/8
F-4, F-6 Series	1 13/32	1 13/32
M271, M290 M330, M363	1 1/4	1 9/16
B371, B427	1 7/8	1 5/16

Figure 21 — Diagram and chart showing valve guide location

CAUTION: When replacing guides that are ferrox coated do not ream since these are all pre-reamed before being ferrox coated — any further reaming will remove the coating.

VALVE SEAT INSERTS

1. The exhaust valve seat insert is held in place by a shrink fit.

Inspect all exhaust valve inserts in the block and replace any that are loose, cracked or otherwise damaged. Use puller for removing faulty insert as shown in illustration.

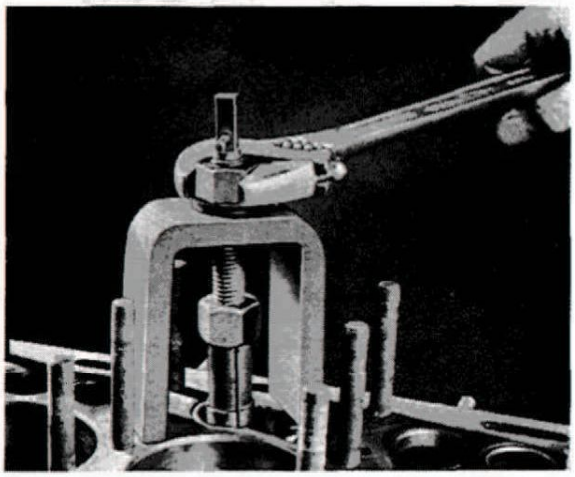


Figure 22 — Removing exhaust valve seat insert

2. When required to replace with new insert, clean and counterbore for .010 larger insert using counterbore tool with correct fitting pilot.

When machining the counterbore, be sure to go deep enough with the tool to clean up the bottom so that the insert will have full contact to carry away the heat.

Continental does not recommend installing new inserts having the same outside diameter as the one removed. The following chart shows the dimensions of Standard Inserts and counterbores:

DIMENSIONS OF STANDARD INSERTS AND COUNTERBORES

Engine Model	Outside Dia. of Insert (A)	Inside Dia. of Counterbore (B)	Press Fit
N-56 N-62	1.068-1.067	1.063-1.062	.004-.006
Y-69 Y-91 Y-112	1.1295-1.1285	1.1255-1.1245	.003-.005
F124 F135 F140 F163 F244 F245 F162	1.3485-1.3475	1.3445-1.3435	.003-.005
F-186 F-209 F-226 F-227	1.442-1.441	1.438-1.437	.003-.005
M-271 M-290 M-330 M-363	1.692-1.691	1.688-1.687	.003-.005
B-371 B-427	1.8785-1.8775	1.8755-1.8745	.003-.005

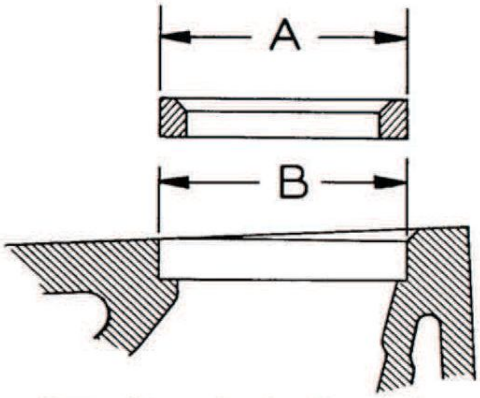


Figure 23 — Insert and counterbore

When OVERSIZE inserts are used, dimensions of the insert and counterbore increase proportionately (.010, .020 — depending on the oversize).

New insert installation should have a press fit. Chill insert in container with dry ice for 20 minutes before assembling.

Insert may then be installed in the counterbore using a piloted driver, tapping in place with very light hammer blows, without the possibility of shearing the side walls. This assures it being seated firmly on the bottom of the counterbore.

Figure 24 — Installing valve seat insert with an arbor press

3. Grind the intake and exhaust valve seats in the block in accordance with instructions in the limits and clearance chart and before removing the arbor, indicate the seat. Total indicator reading of the run-out must not be more than .002". Use a pilot having a solid stem with a long taper, as all valve seats must be ground concentric and square with either new or worn valve stem guide holes.

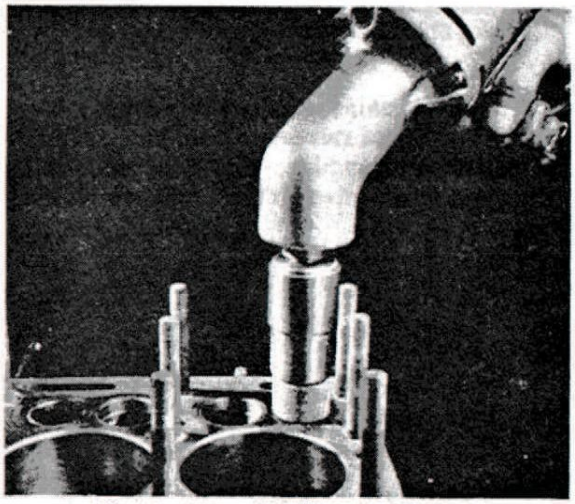


Figure 25 — Grinding Valve Seat

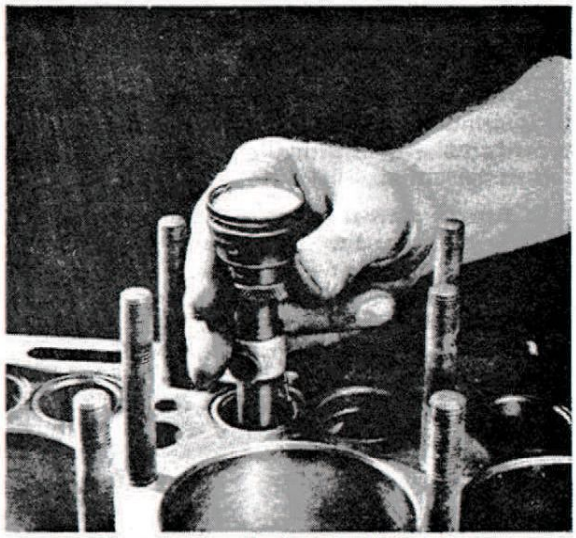


Figure 26 — Indicating Valve Seat

VALVES

1. Inspect valves for condition and replace any that are "necked", cracked or burned, also any on which valve stems are bent or worn more than .002 over the maximum allowable limits. Reface or replace all valves.