Fig. 263B illustrates this blade being used to test the clearance between the push rod and valve of the V8. The "GO" end of the gauge must pass between the push rod and the valve freely. If it does not pass freely, the clearance is too little and the valve stem must be ground off until it does.

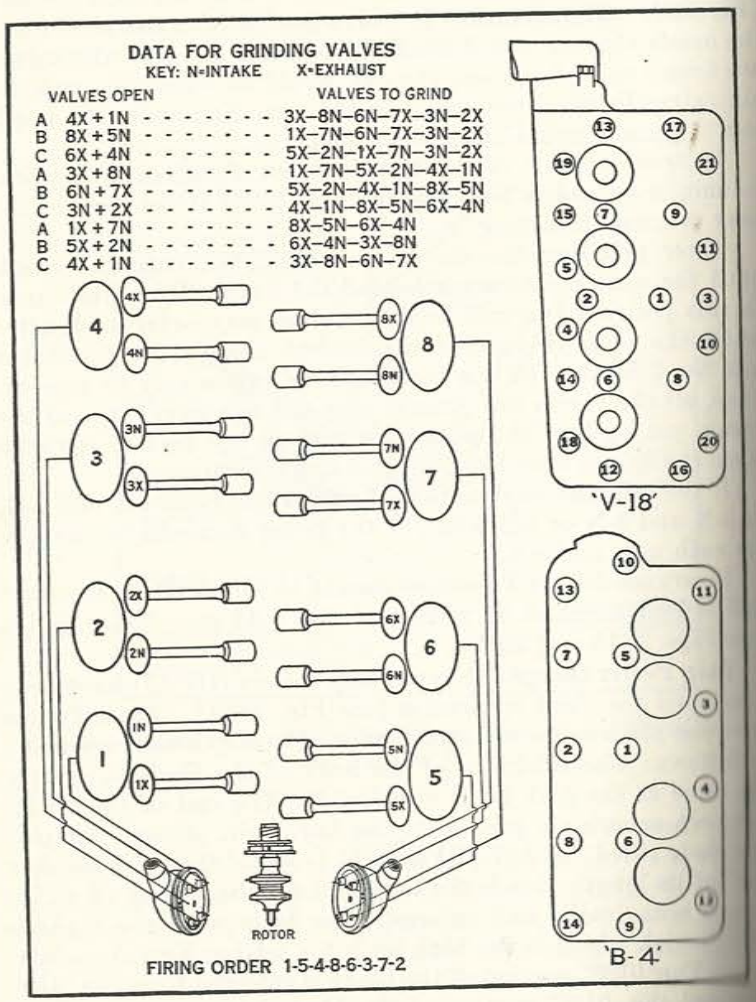


Fig. 262.—At Left, Data for Grinding Ford V8 Valves. At Right, Correct Order for Tightening Cylinder Head Bolts of Ford Engines.

The "NO-GO" portion of the gauge must not pass between the push rod and the valve. When correctly spaced, the step on the feeler should stop against the valve stem. If the "NO-GO" portion of the blade does pass between the push rod and the valve the clearance is too great and the valve must be ground "in" until clearance is correct.

The eight blades in the gauge shown at Fig. 263 are as follows:

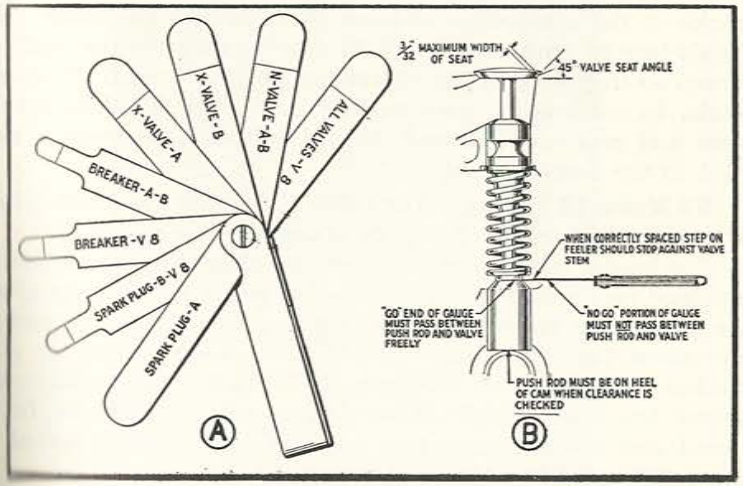


Fig. 263.—A Illustrates Feeler Gauge for Setting Clearances of Models A, B, and V8 Ford Engine Valves, Breaker Points and Spark Plugs. B Indicates How the Blade or Feeler Gauge is Used.

NAME	"GO"	"NO-GO"
ALL VALVES—V8	.0125″	.0135″
X—VALVE A-B	.010″	.013″ *
X—VALVE B	.020″	.022″ ‡
N—VALVE A	.015″	.017″
BREAKER—A-B	.018″	.022″
BREAKER—V8	.012″	.014″
SPARK PLUG—B-V8	†	†
SPARK PLUG—A	§	

* "N" represents intake.
‡ "X" represents exhaust.
† "SPARK PLUG—BV8" this blade is .025" and .030"; this is not a "GO" and "NO" gauge. The end or .025" size is for setting "V8" spark plug points and the .030" portion is for setting the "B" spark plug points.
§ The blade titled "SPARK PLUG—A" has no step and is .035" thick which is the correct spacing for spark plug points with the A-6050-A cylinder head. When setting "A" plugs used in the A-6050-B head, use the end or .025" portion of the SPARK PLUG-B-V8 blade.

Checking Valve Timing.—The timing of the V8 engine can be checked by removing the timing gear case to expose the marks on the crankshaft and camshaft gears. The mark "O" should line up with the "I" on the other gear when the shaft is turned so they meet if the valves are properly timed. If these marks do not line up, the camshaft gear must be taken out of mesh and gear and camshaft turned enough to engage to the teeth at the correct point.

V8 Model 18 Timing.—The valve timing for the eight-cylinder engine in degrees of crankshaft rotation is as follows:

The intake valve opens 9½ degrees before the piston reaches top dead center and the exhaust valve closes 6½ degrees after the piston has passed top dead center. Transposed to piston movement, the intake valve should start to open when the piston has reached a point .024-inch (between 1/64 and 1/32-inch) before top dead center. The exhaust valve should be fully closed and resting on its seat when the piston has reached a point .010-inch after top dead center.

Clearances are maintained in the V8 engine by the extremely liberal bearing surface on the bottom of the valve stem mushroom and as the valve is ground in if the clearance is not enough, it is necessary to grind some off of the bottom of the stem in a special fixture forming part of the K.R.W. machine shown at Fig. 258.

Maintaining Tappet Clearances.—Among the factors making for efficient operation of the gasoline engine, especially of the multiple cylinder type used for automobile propulsion, there is none of more importance than proper valve timing. In the Ford eight cylinder four-cycle motor there are sixteen of these members, two to each cylinder, the function of the inlet valves being to permit the cylinders to fill with gas while the exhaust valves open to clear the cylinders of the products of combustion.

The inlet valve usually opens when the piston is at approximately the top of its stroke in the cylinder or during that portion of the engine cycle where the piston is starting to go down to draw in a charge of gas. This valve is opened at a period equal to the down-stroke of the piston and sometimes more, but is closed during the succeeding compression, explosion and scavenging strokes.

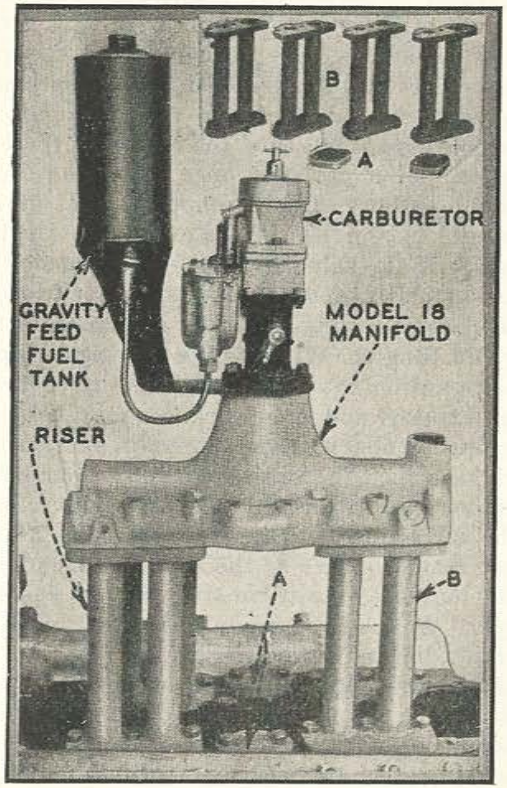


Fig. 264.—Manifold Risers Permit Running Ford Engine With Valve Cover Off to Observe Action or Test Valve Springs With Engine Operating.

The operation of the exhaust valve is very much the same as the inlet except that it is opened for a longer period, starting to open before the piston has completed the downward stroke

produced by the explosion and it is sometimes still opened slightly after the end of the return or scavenging stroke.

When the space between the valve stem and the valve lifter is more than it should be there are two methods of compensating for this depreciation. On Ford V8 motors no adjustment is provided between the valve stem and the valve stem plunger as in other engines so if the space is too great, the valve seat must be machined to permit the head to seat deeper. If the clearance is too close, the end of the valve stem is ground.

The clearance between the push rod and the valve stem should never be greater than the clearances mentioned. If too much clearance is present the valve will open late and close early. If the clearance is less than the minimum there is danger of the valve remaining partially open all of the time because the valve stem lengthens after the motor warms up due to expansion produced by the heat of the explosion. In the new V8 engine, the ends of the valve stems are mushroomed out and a large bearing surface is provided that is not apt to pound out of shape as valve stems having a smaller seating area might.

Running V8 Engine With Valve Springs Exposed.—By using a set of manifold risers, the engine may be run with the valve springs exposed and the clearances may be checked and valve spring tension also with the engine in operation. It there is not enough clearance, the valve stem mushroom is faced off in a special grinder as previously described. If there is too much clearance, the valve must be seated into the block a little deeper with a proper reamer cutter or the eccentric grinder shown at Fig. 261. The length of the valve stem may be checked with a vernier caliper. Wear of the guide or warped valve head may be tested with a dial indicator (Fig. 254).

Manifold Risers.—Manifold risers, as illustrated in Fig. 264 are available, which permit watching of the valve action with the V8 engine running. These risers consist of four double barrels which are installed between the manifold and the cylinder block, two covers for the small exhaust ports and a covered can for gasoline with which the engine may be run.

Most dealers and garages will prefer to leave the manifold risers attached to an old manifold to save time in installation in which case a single manifold and single throat carburetor is used. It will prove an advantage if as much of the manifold as possible is sawed off as illustrated in Fig. 264. This will make

the valves more accessible and make the fixture more easily handled. These manifold risers, V-151, are available from K. R. Wilson, Buffalo. These risers will prove particularly valuable in locating the valve or push rod at fault when one or more are noisy.

Weak or Broken Valve Springs.—If the valves fail to seat themselves properly there is a possibility that the valve springs may be weak or broken. It is stated that a weak inlet valve spring will not affect the running of the engine as much as a sluggish acting exhaust spring. Weakness in a valve spring can be easily detected by using the manifold riser and inserting a screw driver between the coils of the spring while the engine is running. Each of the exhaust valve springs is tried in turn, and if the extra tension thus produced results in the engine picking up speed the spring that has had its tension increased by the spreading of its coils is too weak and should be replaced with a new one.