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SHOP TALKS

for

INTERNATIONAL TRUCK SERVICEMEN

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Ave. CHICAGO, ILLINOIS

RECONDITIONING

HD Engine Valves and Valve Mechanism

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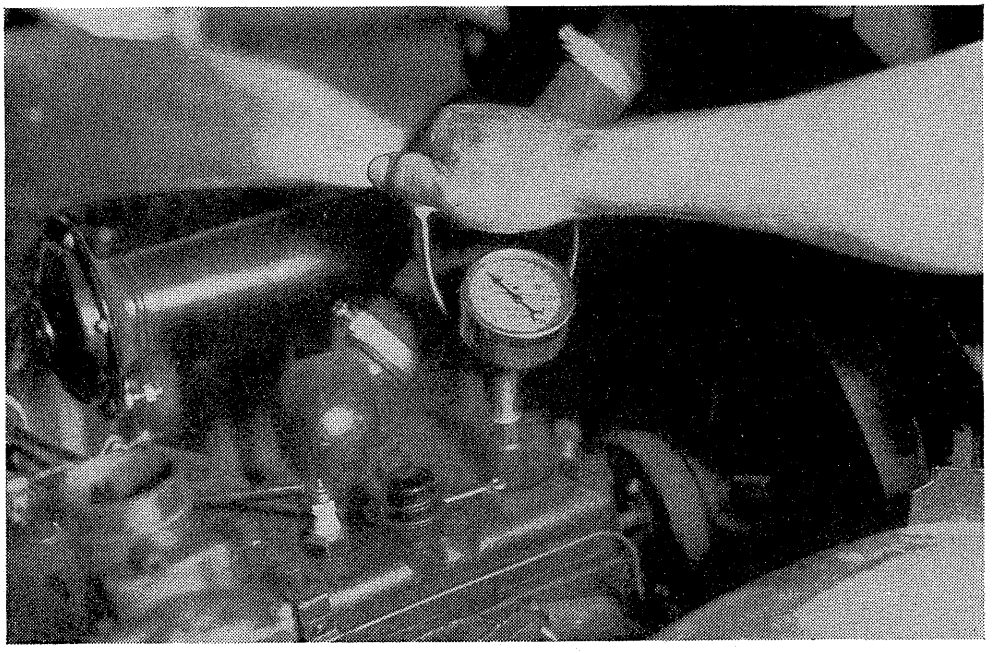
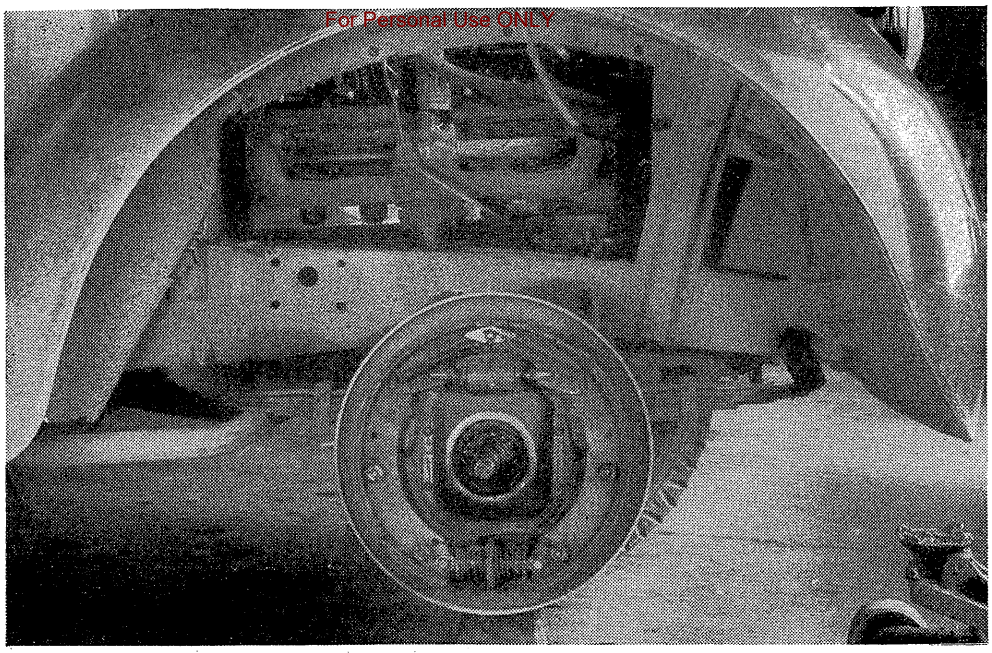
Good engine performance depends upon the condition of the valves and valve mechanism. Valves in poor condition result in low compression, which causes loss of power and poor fuel economy. Here in detail we follow through step by step the valve and valve mechanism reconditioning procedure recommended for International HD engines, in Models D-2, D-3, D-15, D-30, DS-30, D-300, DS-300, D-186-T, and DS-186-T.

Precision equipment and methods must be employed in reconditioning if the best results are to be obtained. Each approved piece of service station tool equipment carries a Service Equipment (S.E.) number. In the accompanying material many references are made to the tools required under our respective S.E. numbers (for example, under Illust. 1, reference is made to compression gauge S.E.-834). All tool equipment referred to is described in the Dealer Equipment Manual recently issued.

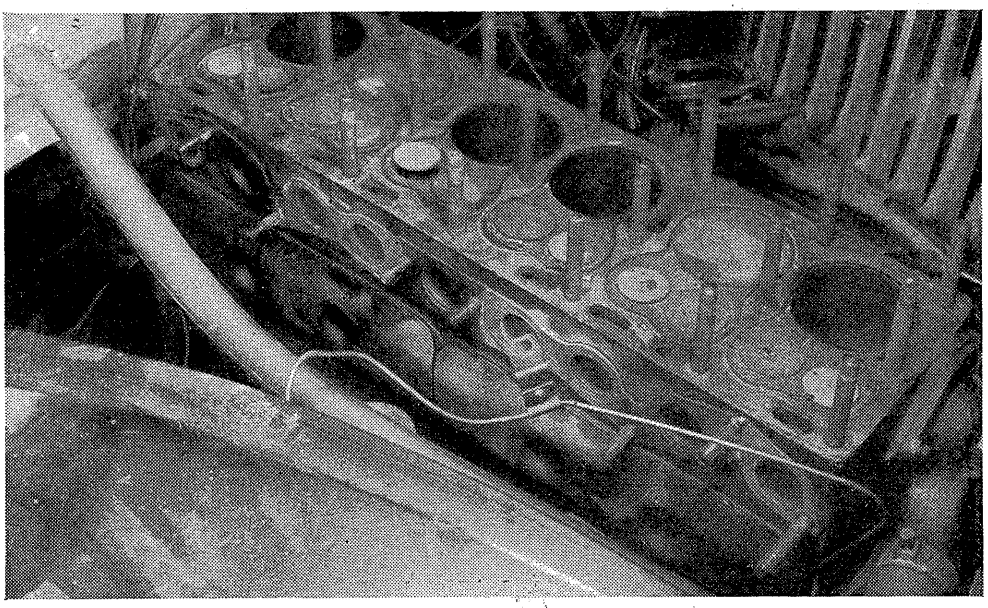
Shop Talk for Servicemen Bulletin No. 2 (Form No. A-562-DD), punched to fit the service manual, reprinting the illustrative and descriptive material shown on these pages, is available on request.



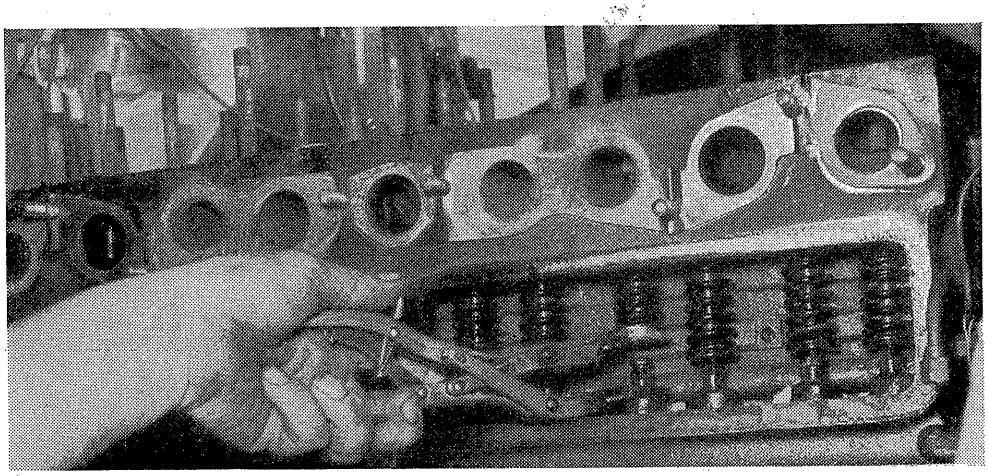
1. A compression test on each cylinder will substantiate the necessity for valve reconditioning. Such tests should be made with compression gauge S.E.-834 or its equivalent. A variation in compression between cylinders of 10 or more pounds is cause for alarm.



2. Drain radiator, remove hood, remove right front wheel, and right front fender apron, and support truck on steady-rest. Removal of these parts permits easier access to the engine.

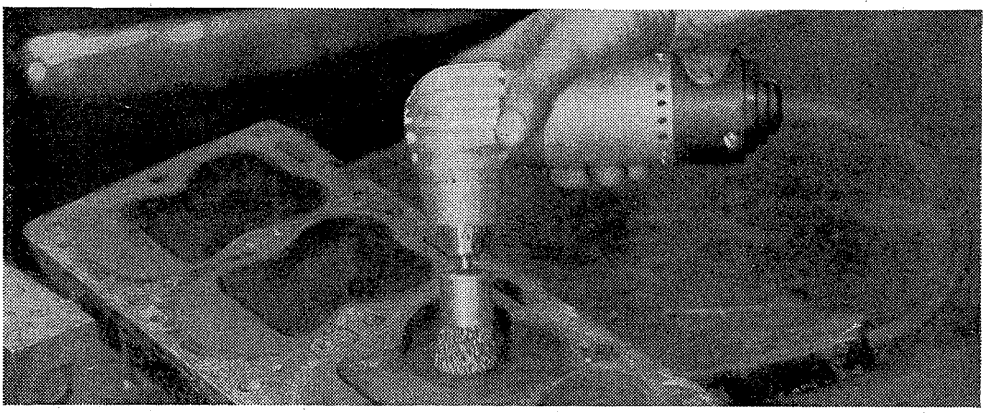


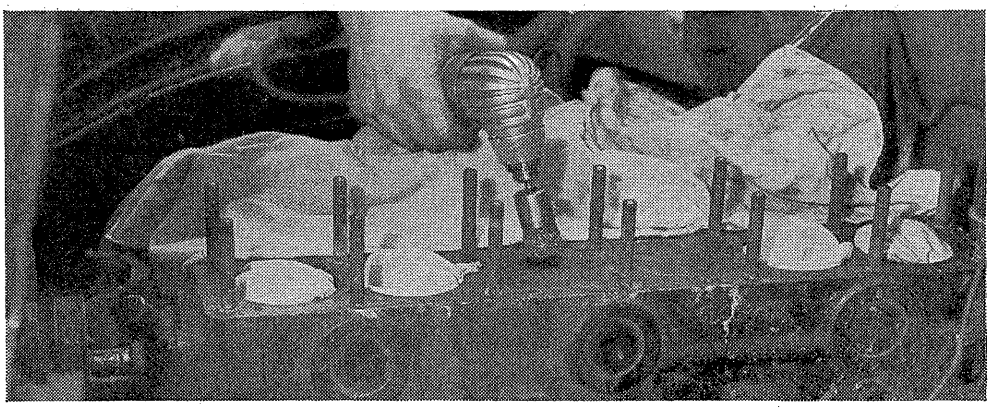
3. Electrical connections, cylinder head and manifolds are now removed preparatory to subsequent operations.



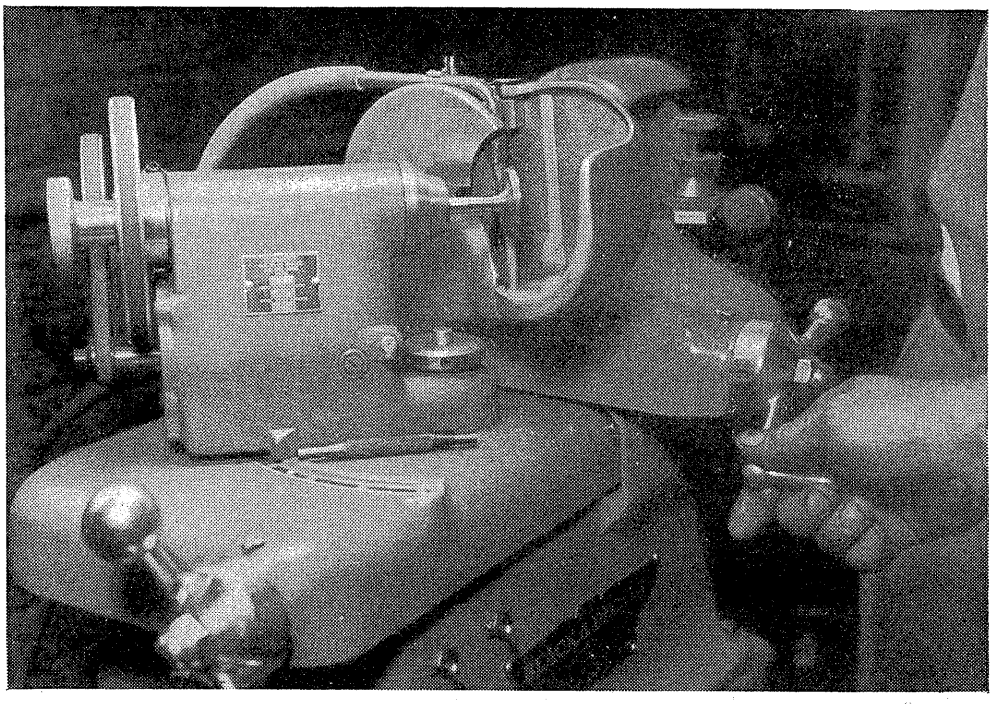
4. Remove valve spring covers, valves and valve springs. Packing the holes around the base of the valve chamber with a clean cloth will prevent valve spring retainer locks from falling into the crankcase. *These packings must be removed at the conclusion of the job.* Valves and valve springs may readily be removed with a valve spring compressor as shown.

5. After the valves have been removed from the block they should be carefully cleaned and inspected. A power-operated wire brush is best adapted to this purpose, for such a brush is both rapid and efficient. Any valve which is badly burned should be discarded without further attention.



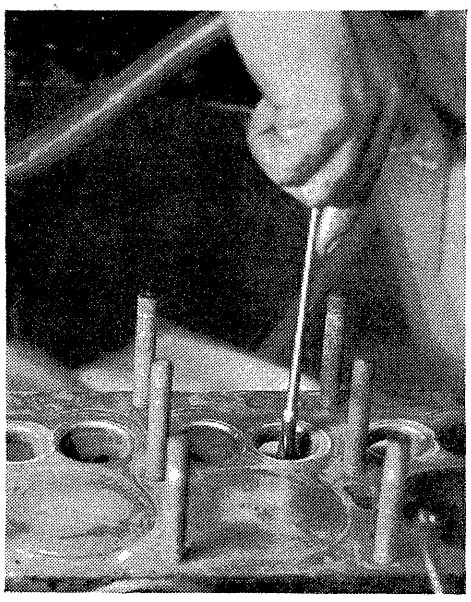


6. Accumulated carbon must be removed from the top of the block, the tops of the pistons, and from the combustion chambers in the cylinder head. Clean cloths placed in adjoining cylinders and parts will prevent carbon and abrasive from being scraped into them. A scraper or wire brush will be found best for carbon removal, and compressed air may be used after the operation for removing the loosened carbon.

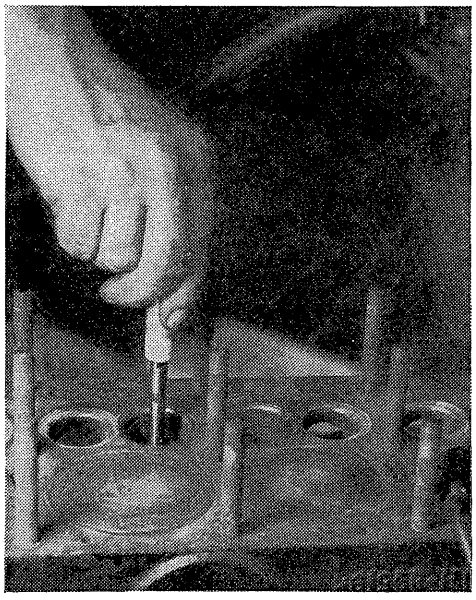


7. After the valves have been thoroughly cleaned they are ready for refacing. Here again precision equipment is necessary so that the valve faces are ground true and smooth, maintaining the proper angle. The equipment shown is a modern wet type grinder.

Any valves which require excessive grinding or which are warped should be discarded and new valves installed. For complete information on valve refacing, see Motor Truck Service Bulletin No. 151-'39 Revised.

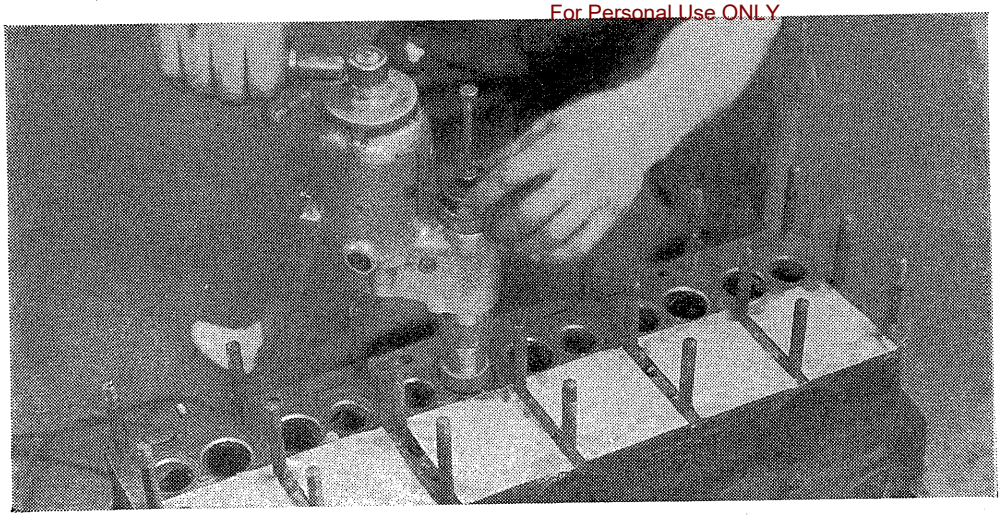


8. An accumulation of carbon is generally found deposited in the valve stem guides. Suitable tools should be used to clean the guides before proceeding with the work. The illustration shows S.E.-7701 valve guide cleaner in use.



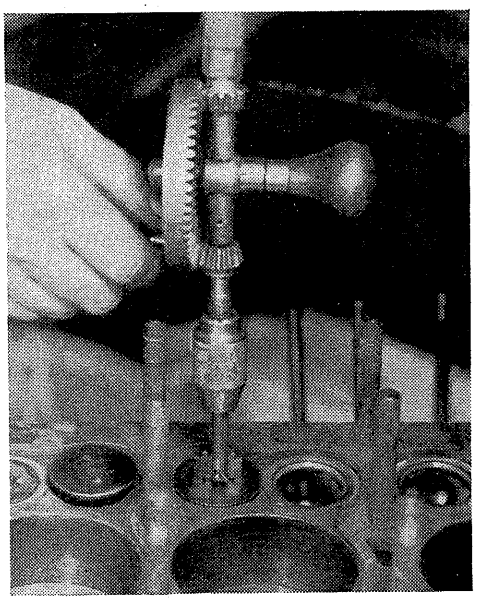
9. After valve guides have been cleaned they may be checked for wear with a Go and NoGo gauge, such as S.E.-145 shown in this illustration. If guides are worn excessively they should be replaced. Recommended valve stem clearance in the guides is:

Intake	.003″ —.004″
Exhaust:	.0015″—.0025″



10. With valve guides in acceptable condition the valve seats must now be ground to an identical angle with that of the valve faces. The valves are refaced to an angle of 45°, therefore the seats must have this same angle.

Because of the alloy exhaust valve seat inserts, a grinder is best adapted to reseating. The grinding stones on both the valve refacing machine and valve seat grinder should be dressed before starting a reconditioning job. You will be unable to determine how closely the angle of the seat will match the valve face until the valve and seat have been ground and a check made with a very light tint of Prussian blue. If a full seat-width contact around the entire circle of the seated valve is not shown, the angles do not match. It will then be necessary to redress the valve seat grinding stones, changing the angle sufficiently to correct the error. The correction should be made on the valve seat and *not on the valve*. The equipment shown is a modern, eccentric type grinder and is a companion tool to the precision equipment used in refacing the valves.



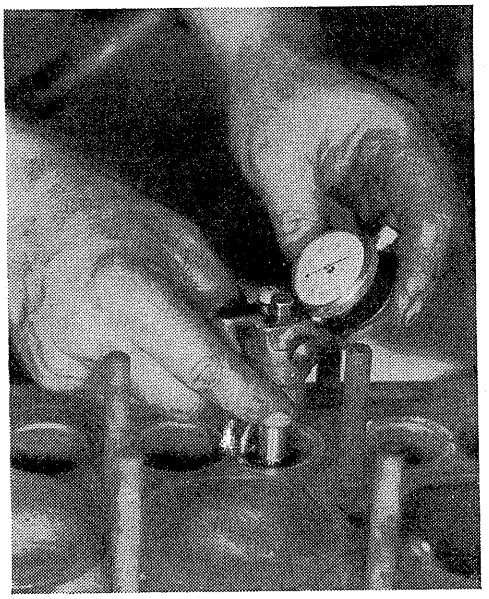
12. When the seats in the block have been ground to the desired width and location, a *good check of accuracy* of the combined valve refacing and block reseating operation is to lap the valves *lightly* to their seats, using a fine grade of compound. This serves merely as a test, for lapping of valves must not be considered a substitute for a grinding operation. *A poor grinding job cannot be corrected by lapping.* This picture shows a common type of tool used for the lapping operation.

The width of valve seats and location on the valve face are of major importance to valve life. Valve seats should be located centrally or slightly above the center of the valve face. Maximum seat widths are best for severe or heavy service while minimum seat widths are recommended for light service. Recommended valve seat widths are:

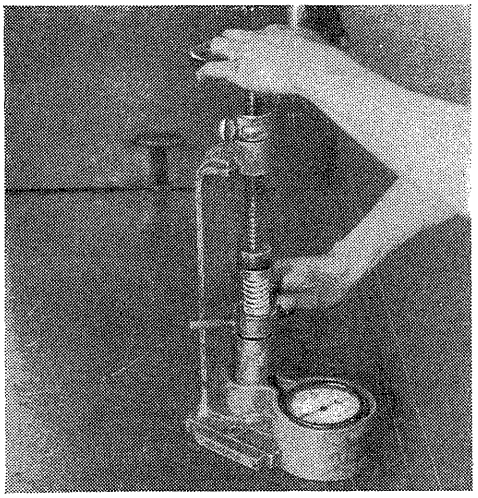
Intake valves, severe service:	3/32"
moderate service:	1/16"
Exhaust valves, severe service:	7/64"
moderate service:	5/64"

(See Motor Truck Service Bulletin No. 159-'39 Revised for further detail.)

Seat widths may be corrected in the block by the use of wide or narrow angled stones operated with the seat grinder previously shown.



11. After the seats have been properly ground, as shown in Illustration 10, they should be checked with an accurate dial indicator mounted on the same arbor or pilot used for the grinding operation. When valve-face and valve-seat angles are identical it is possible to hold maximum runout within .002".

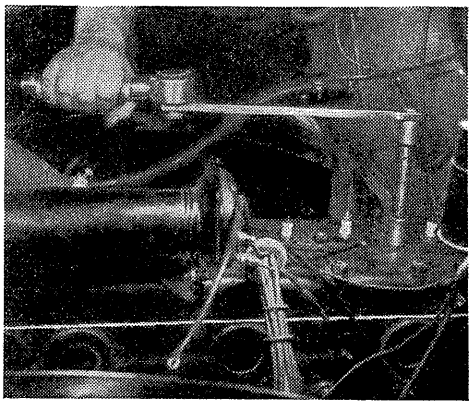


13. Valve springs should be carefully checked for tension before installation. The recommended spring tension when compressed to $1^{15}/_{16}$ inches is 83 to 88 pounds.

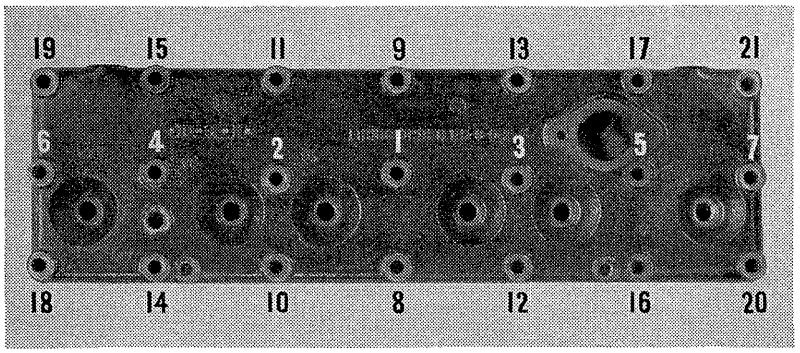
Install valve springs, valves, and keepers. Adjust valve tappet clearance with the valves cold as follows:

Intake valves, severe service:	.012″
moderate service:	.010″
Exhaust valves, severe service:	.014″
moderate service:	.010″

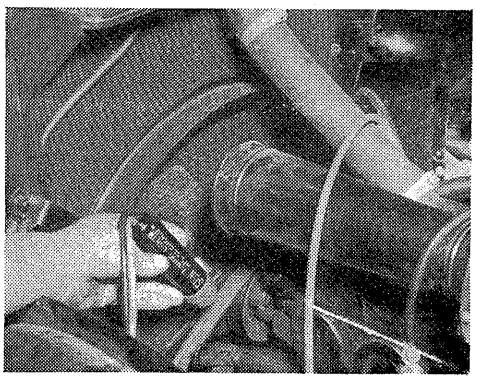
Spark plugs should be cleaned and the gaps spaced at .028″ to .032″, as measured with a wide, round wire gap gauge.



14. Install cylinder head, and draw nuts down uniformly to 60-foot pounds with a tension indicating wrench (S.E.-1137 or equivalent).



15. (*Left*): The nuts should be drawn down a little at a time in the sequence shown until the specified tension of 60-foot pounds has been attained.



16. (*Left*): Install manifolds; clean carburetor and fuel filter; check distributor points and replace if necessary, specified distributor point gap .018″ to .028″; refill radiator; start engine and permit it to warm to operating temperature.

Recheck valve tappet clearance with valves hot. Specified clearance for severe service with valves hot: Intake valves .010″—Exhaust valves, .012″—Specified clearance for moderate service with valves hot: Intake valves, .008″—Exhaust valves, .010″.

Install valve springs, covers, hood, fender apron, front wheel, and lower truck to floor.

Adjust carburetor idling speed and check ignition timing with a synchroscope, similar to S.E.-939, as shown in the above illustration.

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