

# SAFEGUARDING QUALITY Machining the Cylinder Block

## Retail Sales Manager's Film Service

COPYRIGHTED 1927 BY WILLYS-OVERLAND, INC.

One in a series of original filmstrips preserved for their historical value and presented to the members of the  
[Willys Overland Knight Registry](#)

Assembled January 2001 by Spence Fowler  
(member #4536)

[sdf@att.net](mailto:sdf@att.net)

<http://sdf.home.att.net>

COPYRIGHTED 1927 BY WILLYS-OVERLAND, INC.

Safeguarding Quality  
**MACHINING THE  
CYLINDER BLOCK**

*Retail Sales Manager's Film Service*

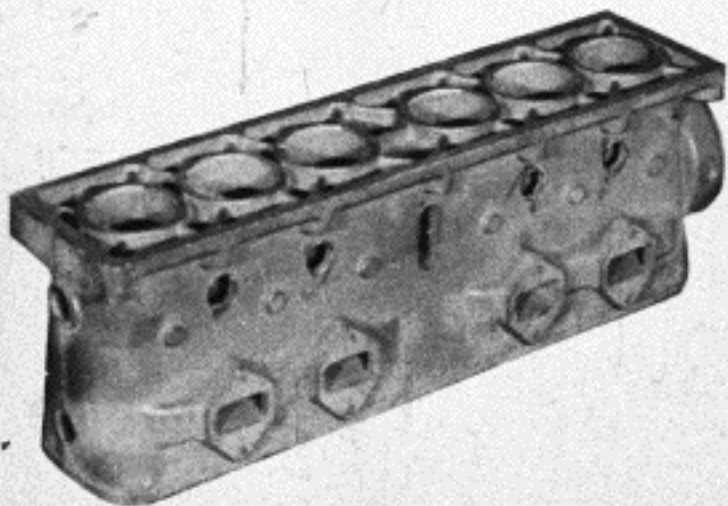
Long life, smooth operation and quality performance in a motor car are largely the result of perfect alignment of parts, smooth bearing surfaces, accuracy and precision in fitting and machining the variety of units.

WILLYS-KNIGHT AND WHIPPET  
FINE MOTOR CARS

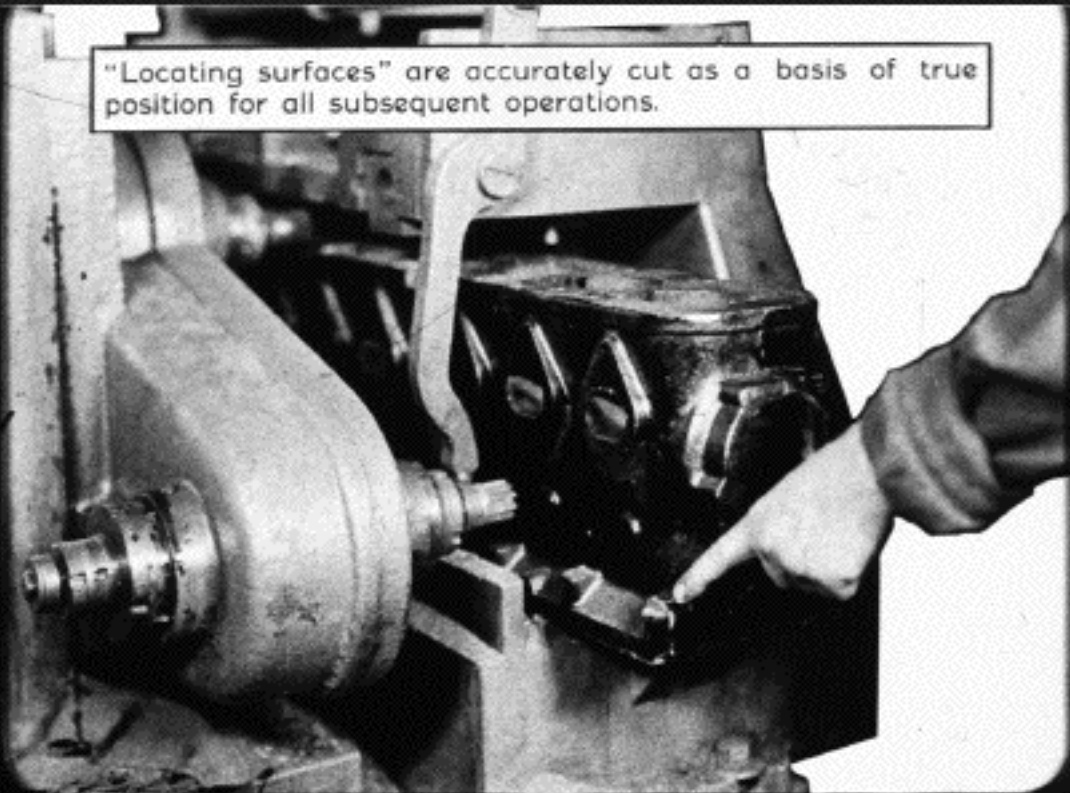


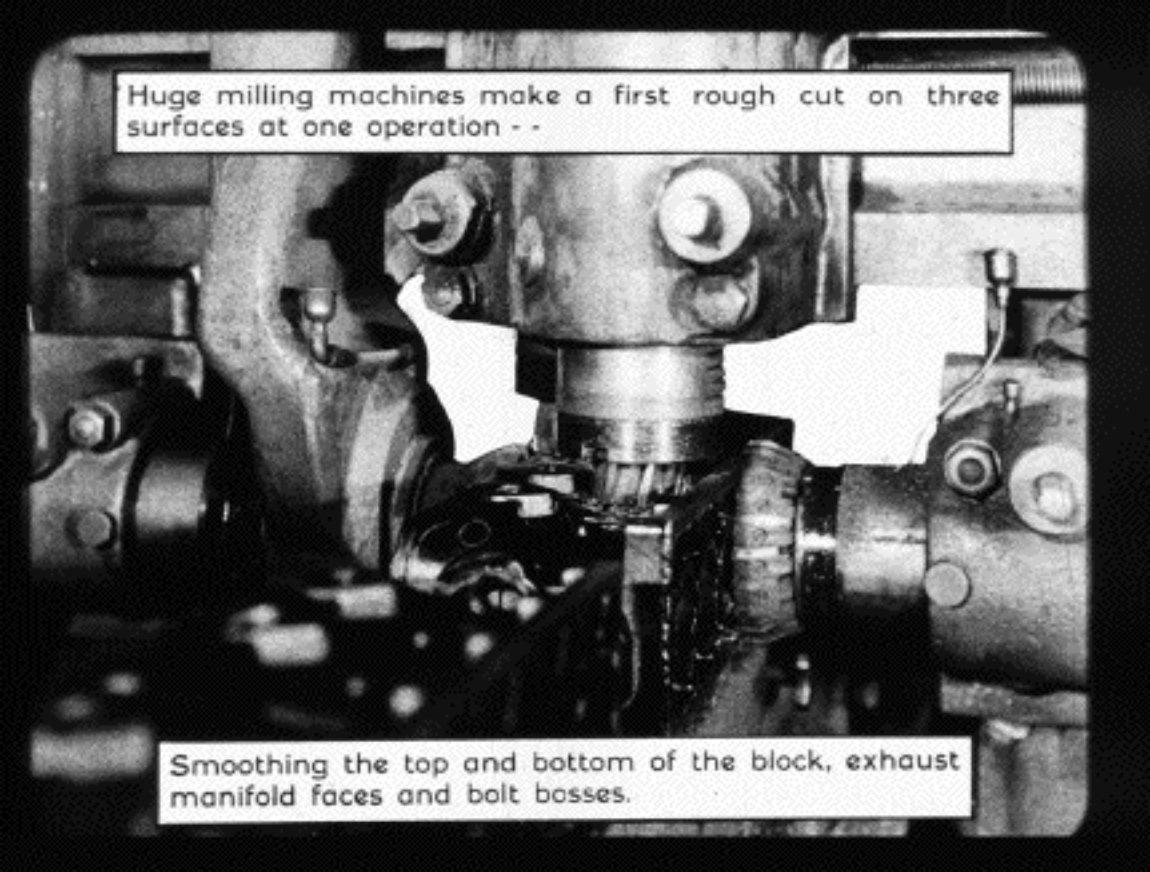
are the product of highly skilled machinists operating especially designed precision machines.

As a cylinder block, the foundation of the engine is received from the foundry-



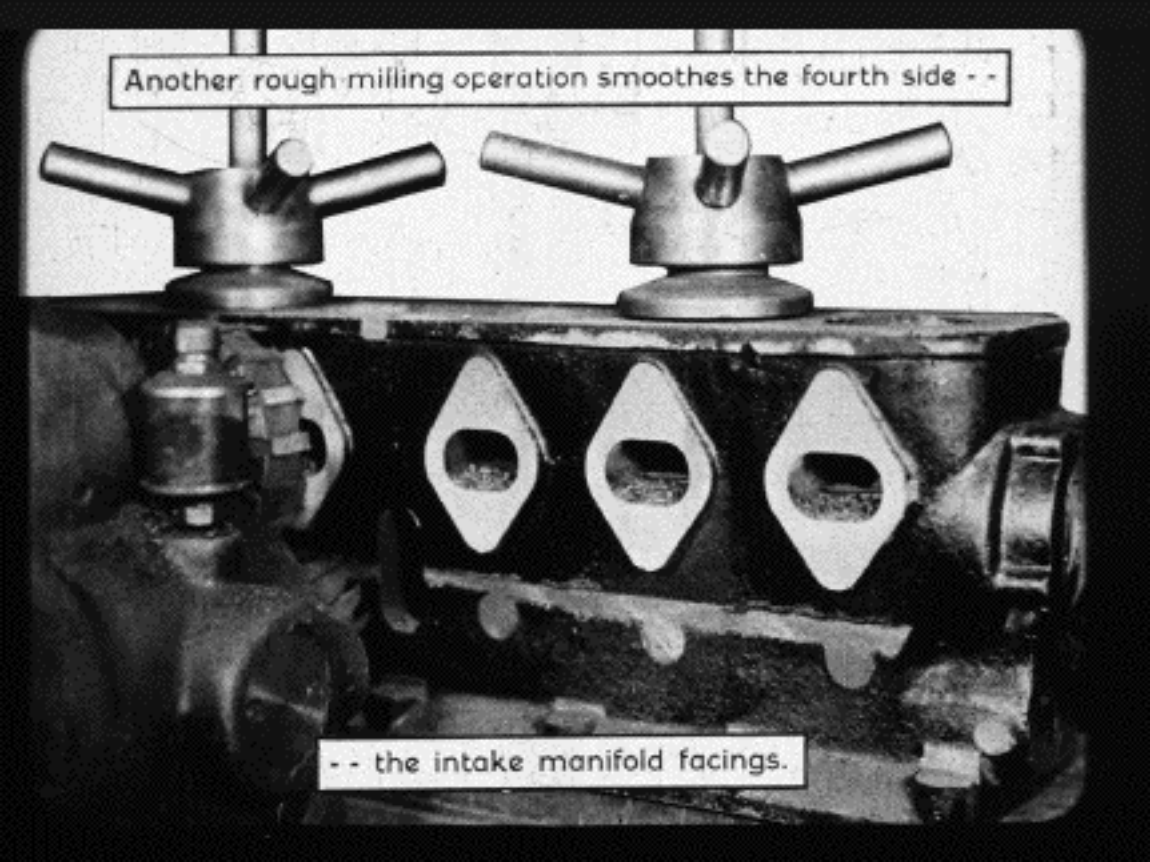
"Locating surfaces" are accurately cut as a basis of true position for all subsequent operations.





Huge milling machines make a first rough cut on three surfaces at one operation - -

Smoothing the top and bottom of the block, exhaust manifold faces and bolt bosses.



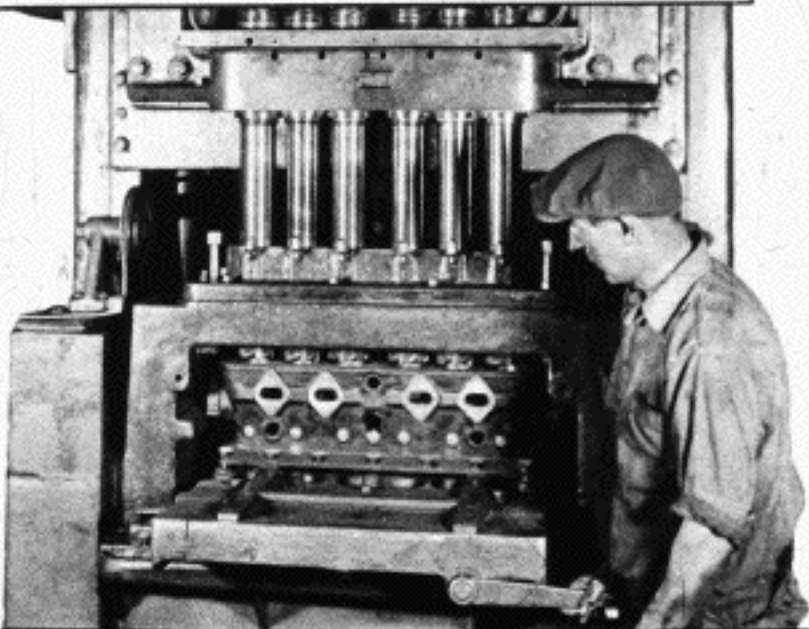
Another rough-milling operation smooths the fourth side - -

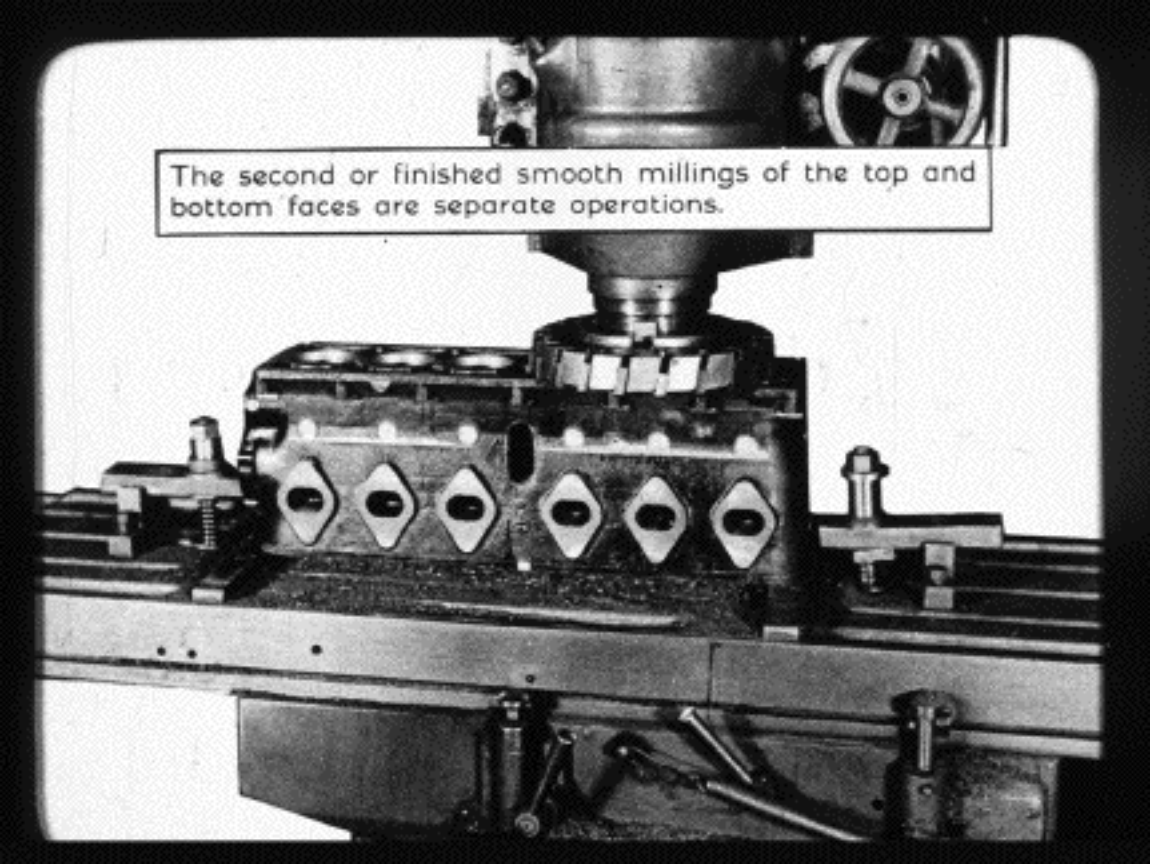
- - the intake manifold facings.



The next step, first boring operation of the cylinders, is an important one. Here the center of the bore is fixed and its proper direction insures perfect alignment to all reciprocating parts.

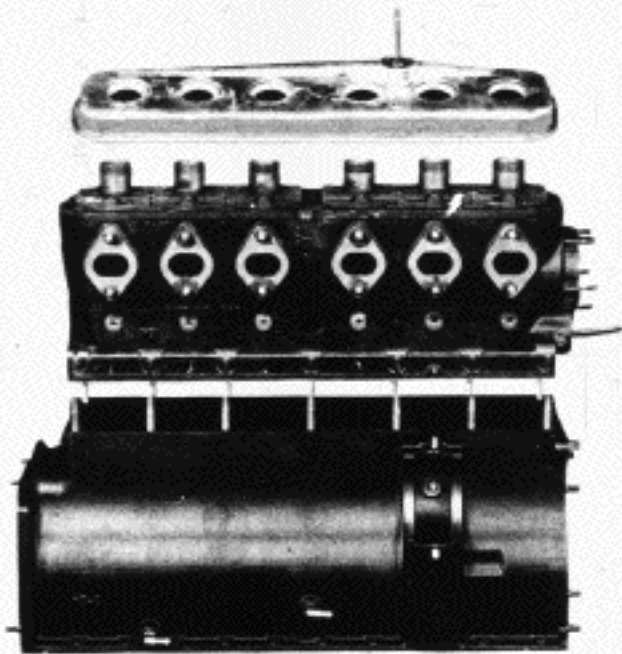
Boring cutters bore their way straight downward shaving the metal to a smooth surface.



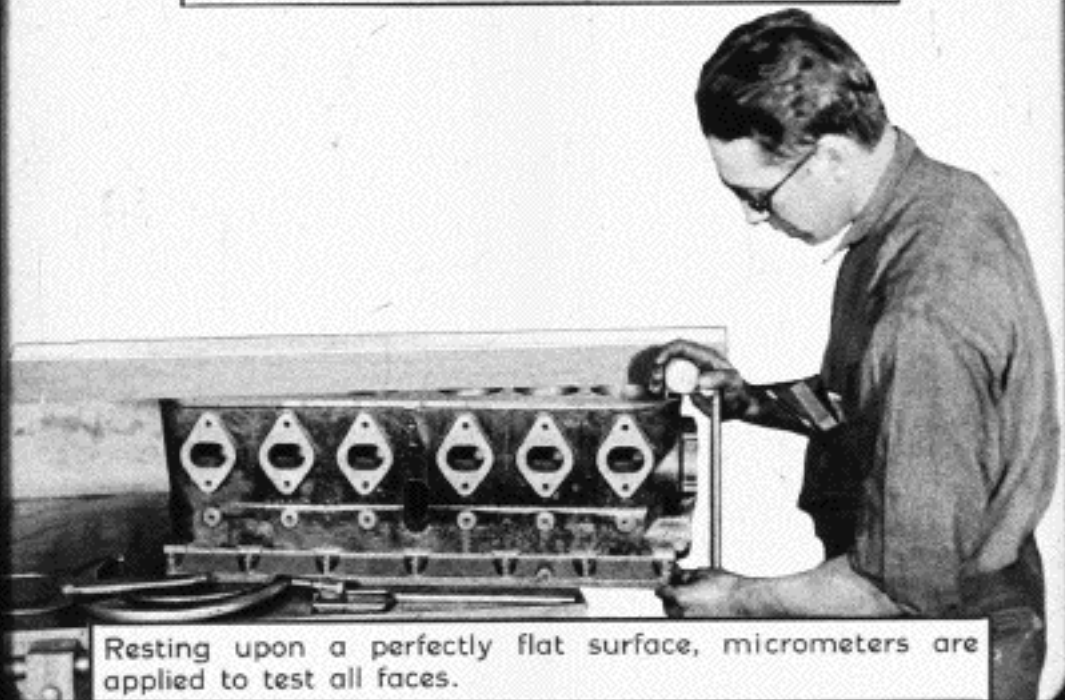


The second or finished smooth millings of the top and bottom faces are separate operations.

Fine, accurate, finish cutting insures a perfect fit with cylinder heads, cylinder head cover and crankcase.



At this point the block is thoroughly inspected for all operations.



Resting upon a perfectly flat surface, micrometers are applied to test all faces.

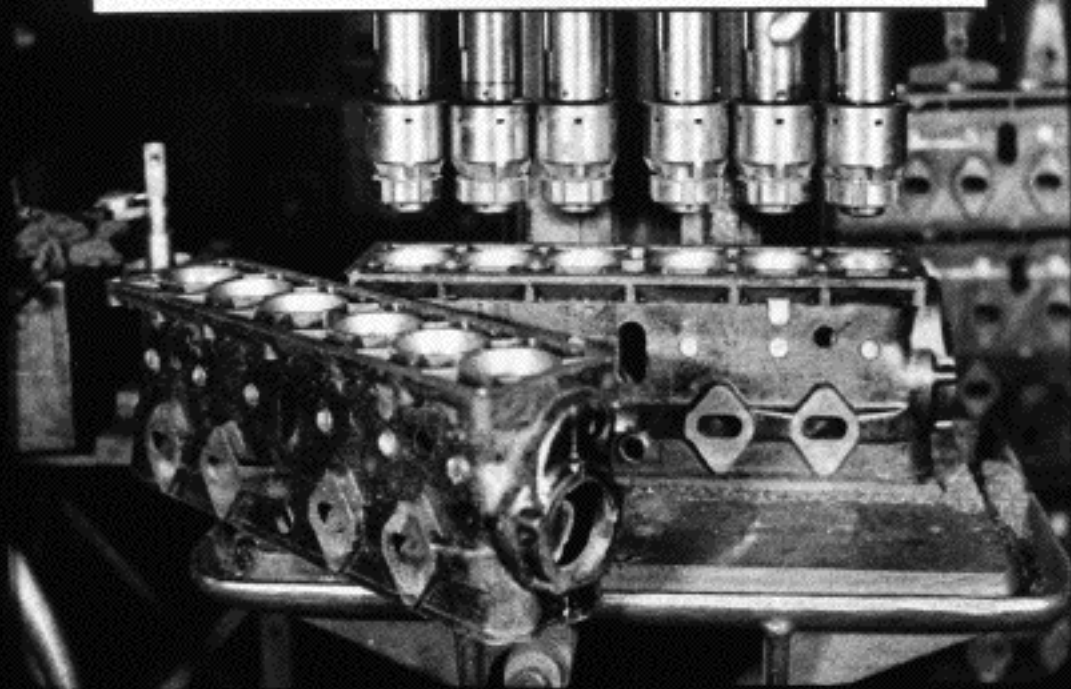
With the first stages of machining proven accurate the block passes to a second and finer boring of the cylinders after which it receives —



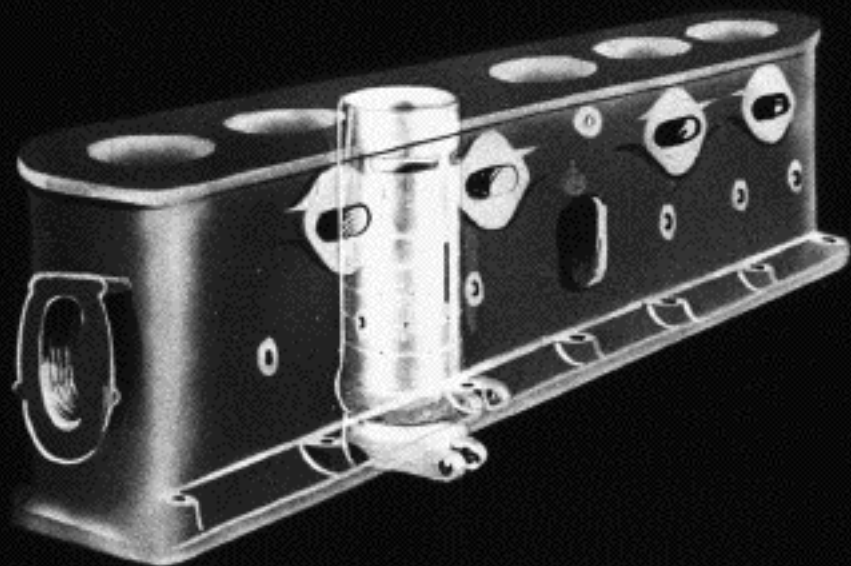
- - a semi-finish reaming.

Reaming takes off a much finer cut than the boring operations and leaves a perfectly smooth surface.

The bottom edge of the cylinder bore is then bevelled to facilitate insertion of pistons and piston rings.

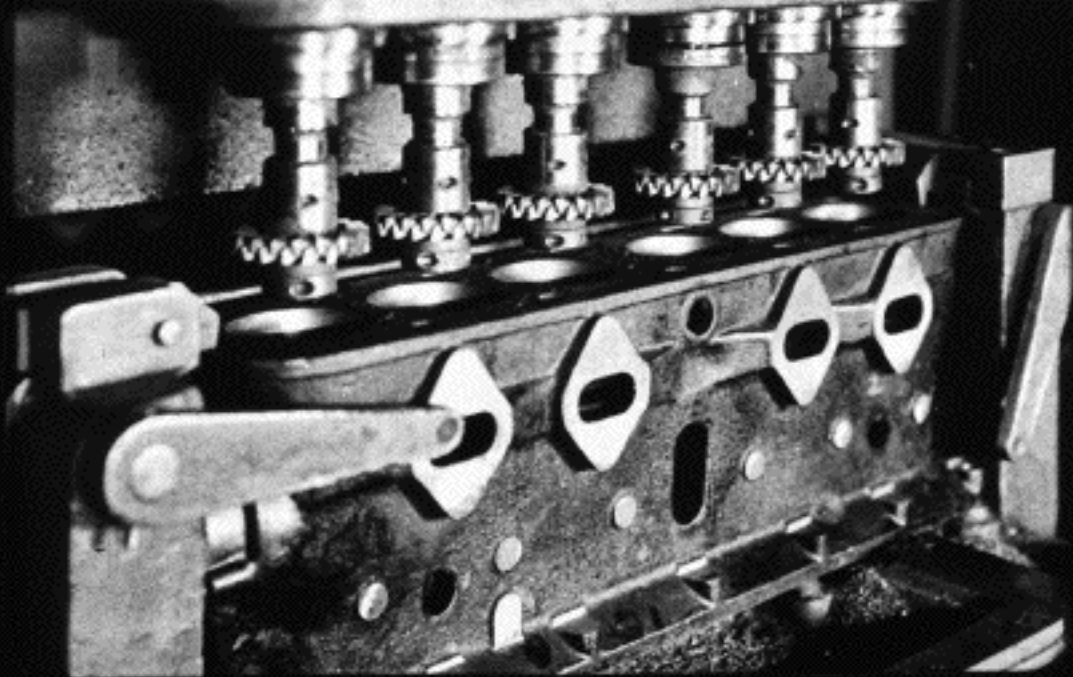






The exhaust and intake ports now come in for their share of attention.

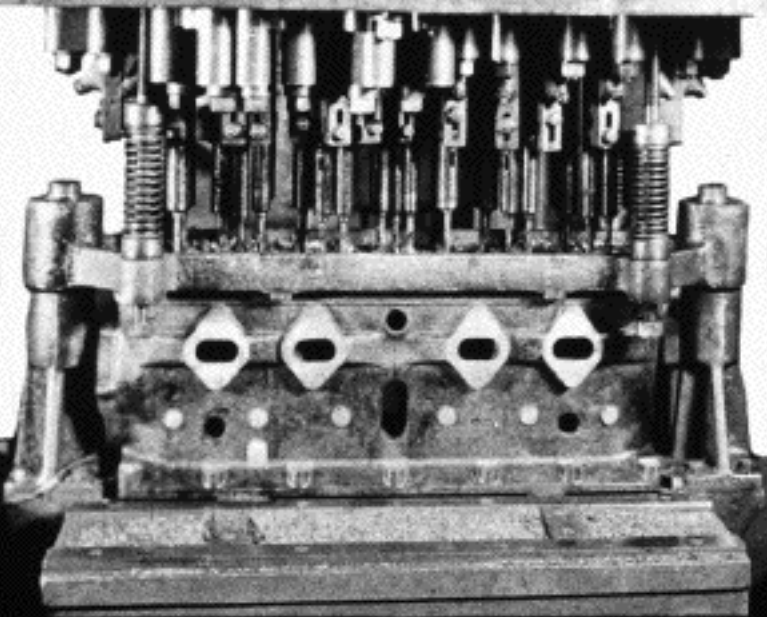
Specially designed machines cut these ports to proper size from within the cylinder.



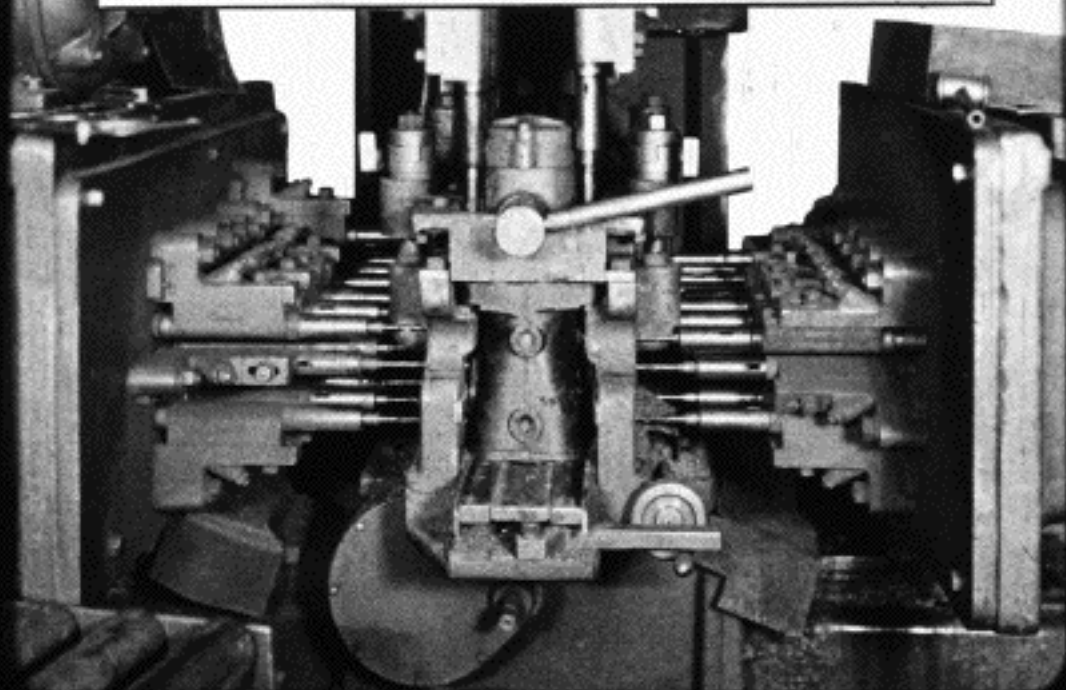
The cylinder block is then tested with an accurate gauge for proper location of both intake and exhaust ports.



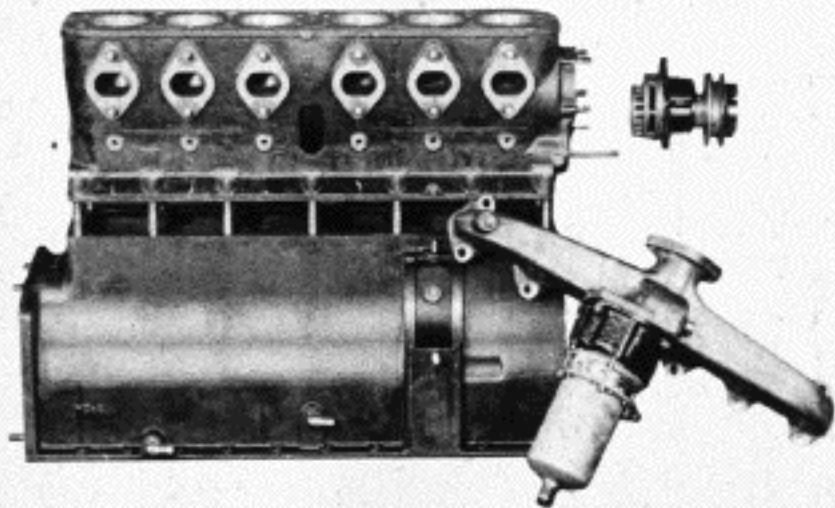
A gang of 33 drills in one operation provide bolt holes for attaching cylinder heads and cylinder head cover.



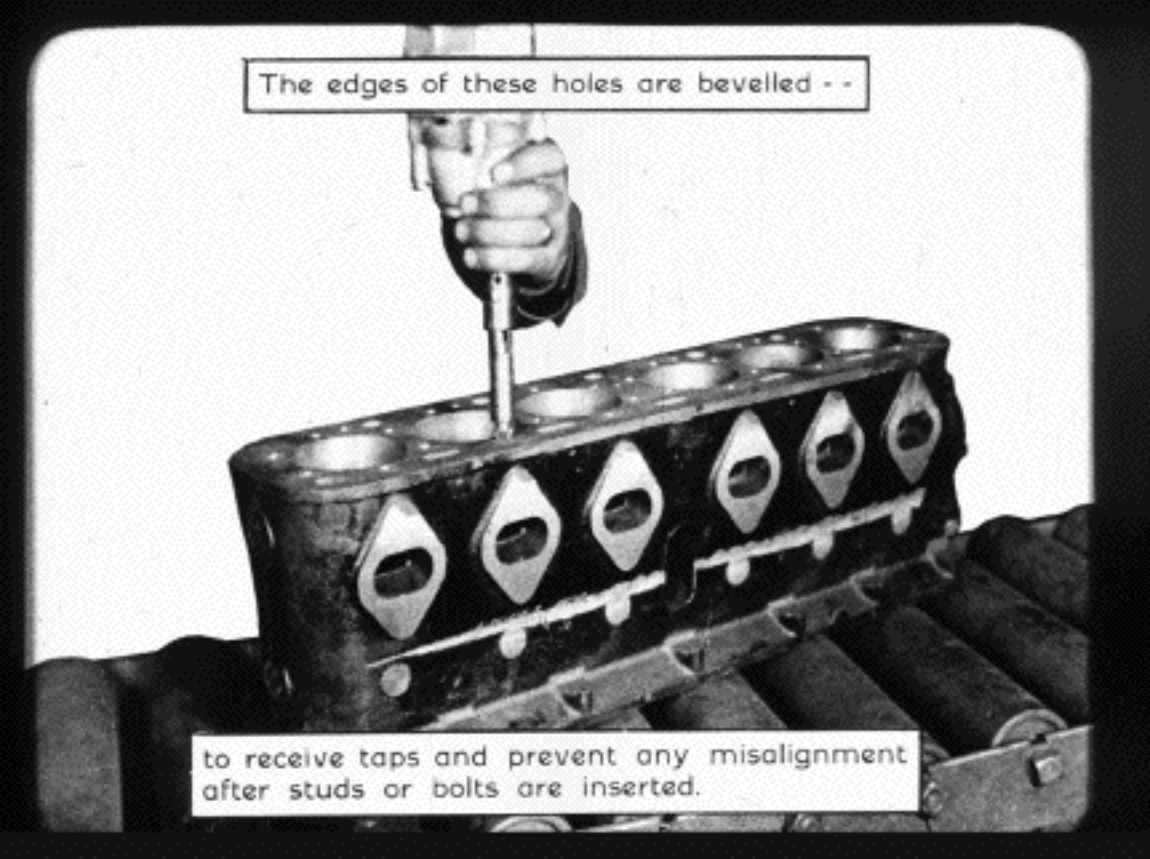
A second gang of 53 drills enters the bottom, two sides and end of the block at the same time - -



- - providing bolt holes for attaching the crankcase, manifolds, oil rectifier, water pump, etc.

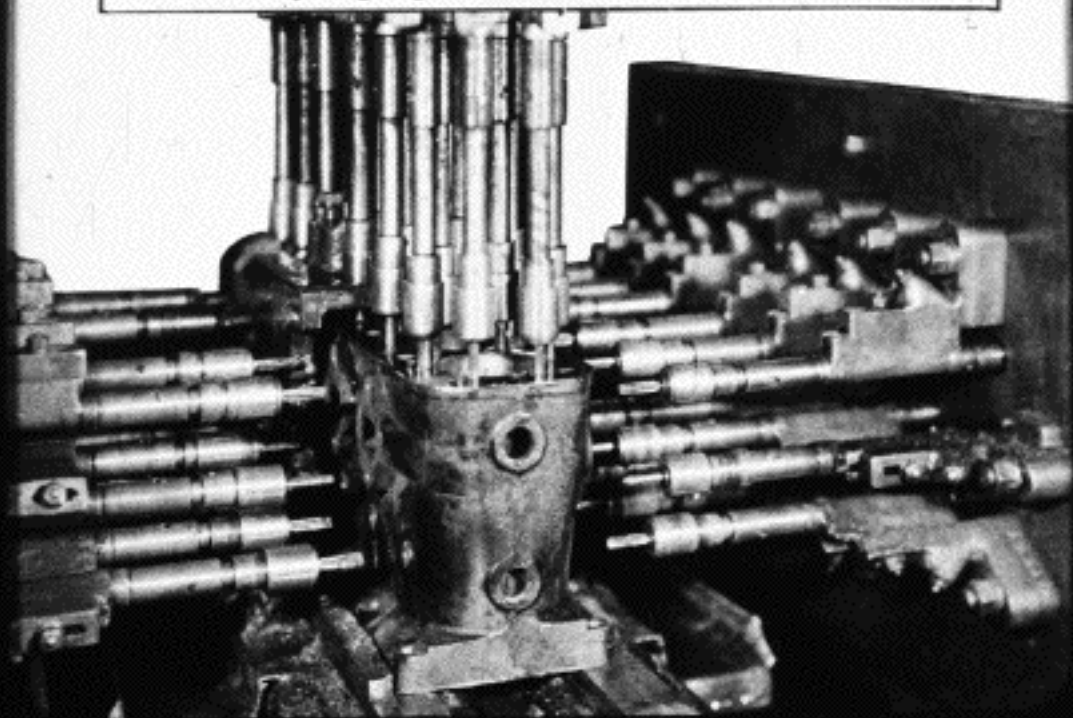


The edges of these holes are bevelled - -



to receive taps and prevent any misalignment  
after studs or bolts are inserted.

Screw threads are provided in all bolt holes at top, end and both sides by a gang of 67 taps at one operation.

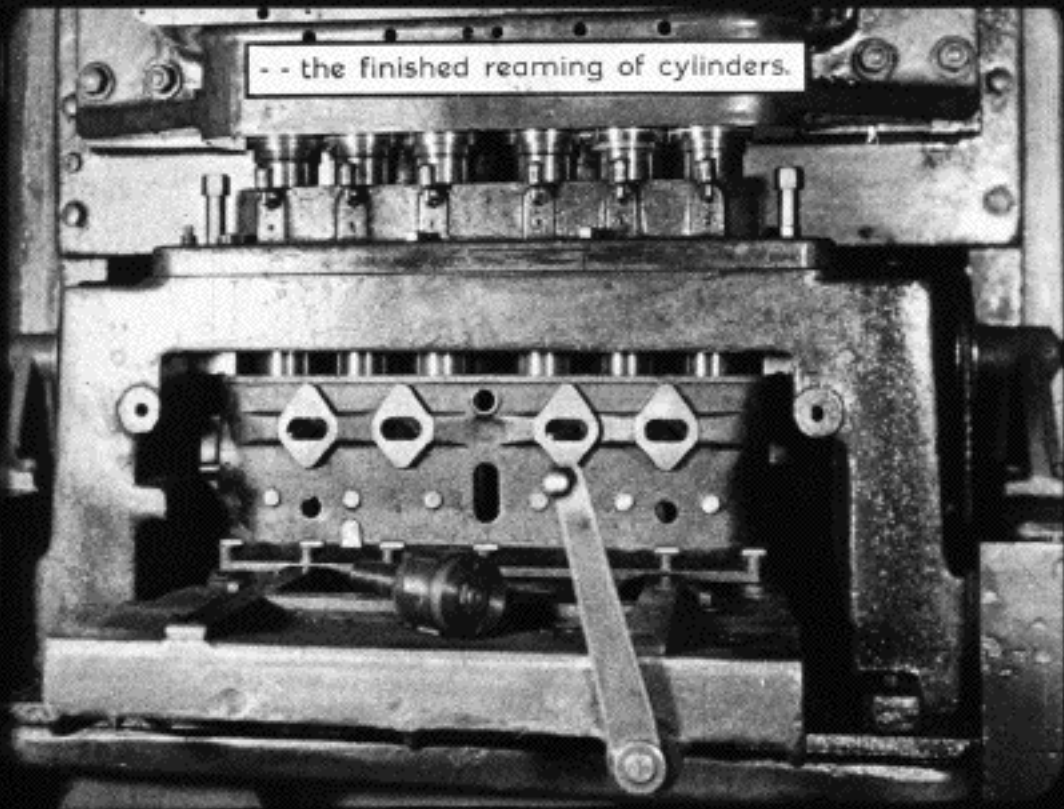




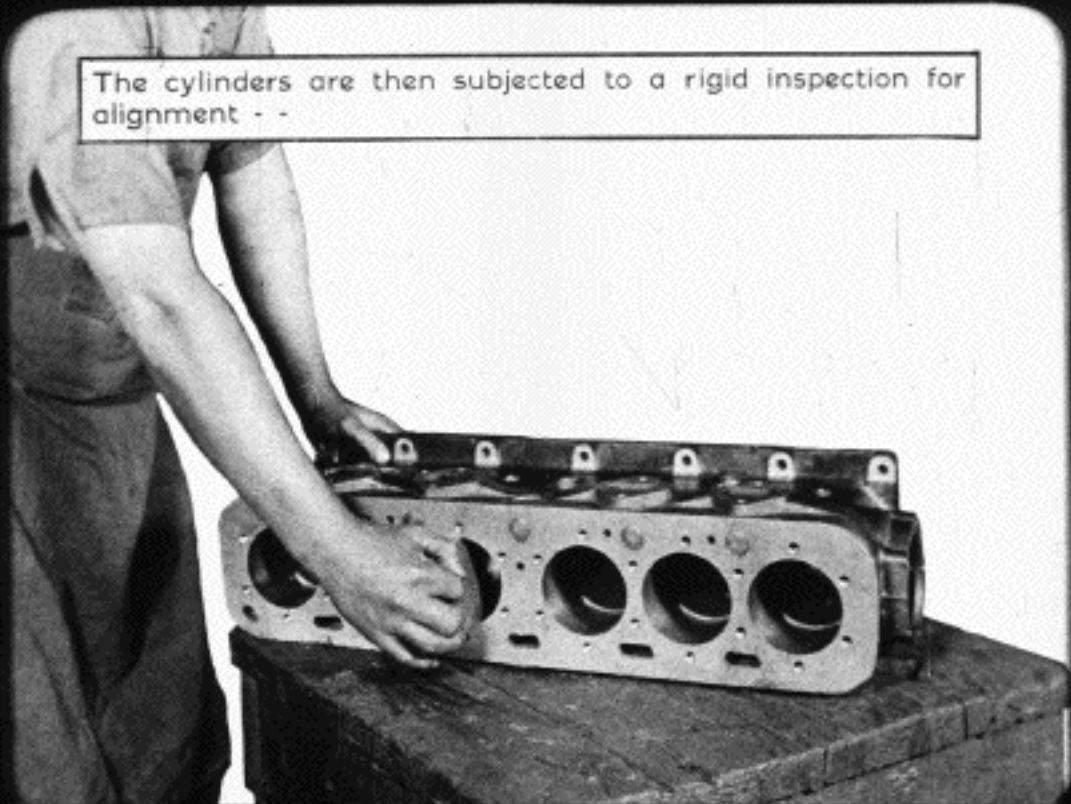
All holes are cleaned out by air pressure and undergo a rigid inspection.



-- the finished reaming of cylinders.



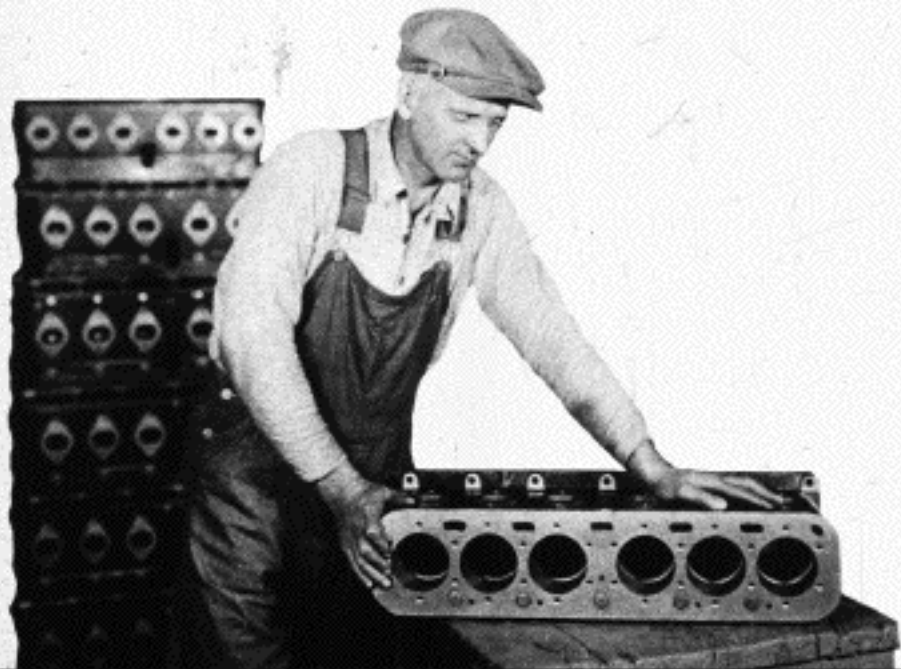
The cylinders are then subjected to a rigid inspection for alignment - -

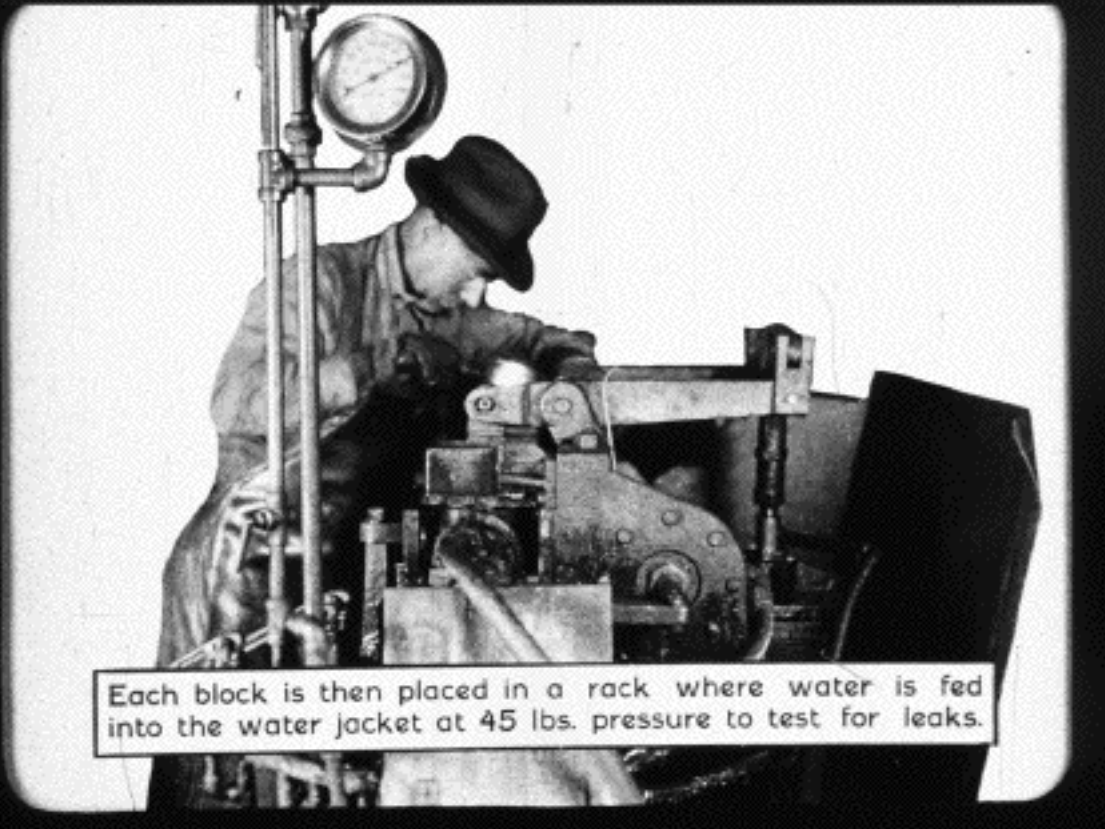


- - proper diameter - -



- - and smoothness of surface.

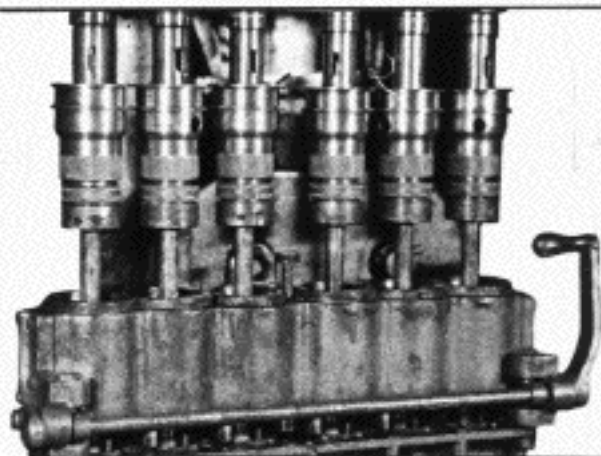




Each block is then placed in a rack where water is fed into the water jacket at 45 lbs. pressure to test for leaks.

In spite of the fact that in a Willys-Knight engine a sleeve travels only one inch on the walls of the cylinder we find those cylinders finished with extreme care.

You will recall that the cylinder has thus far been subjected to two boring operations and two finishing operations by reaming. Now - -

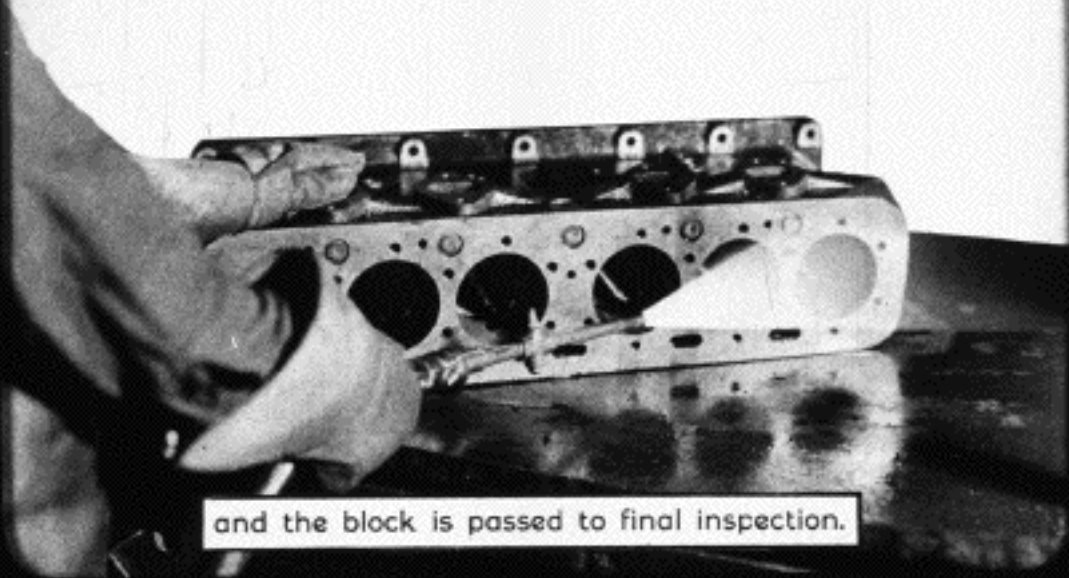


A series of carborundum honing stones lap each cylinder to a glass-like finish.



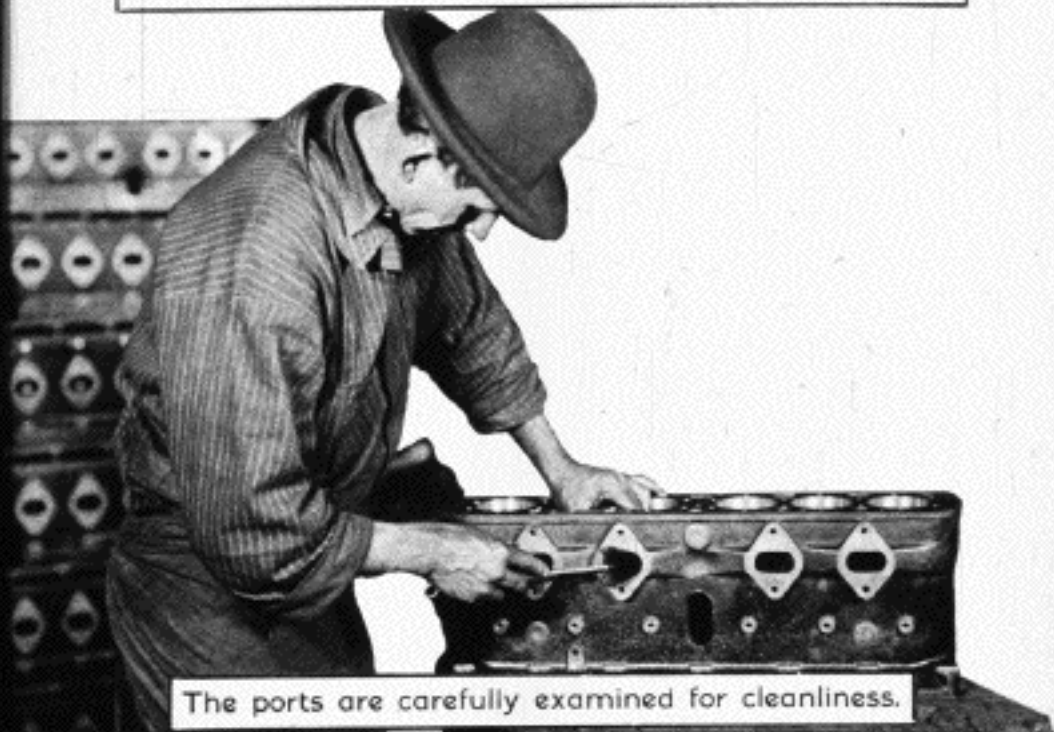
Thus by perfect alignment, smooth bearing surfaces, accuracy and precision in the heart of the automobile. Willys-Overland products are assured long life, smooth operation and quality performance.

The finished cylinder block is then thoroughly cleaned with an alkaline solution under pressure,



and the block is passed to final inspection.

The first examination is for chips, burrs or rough edges.



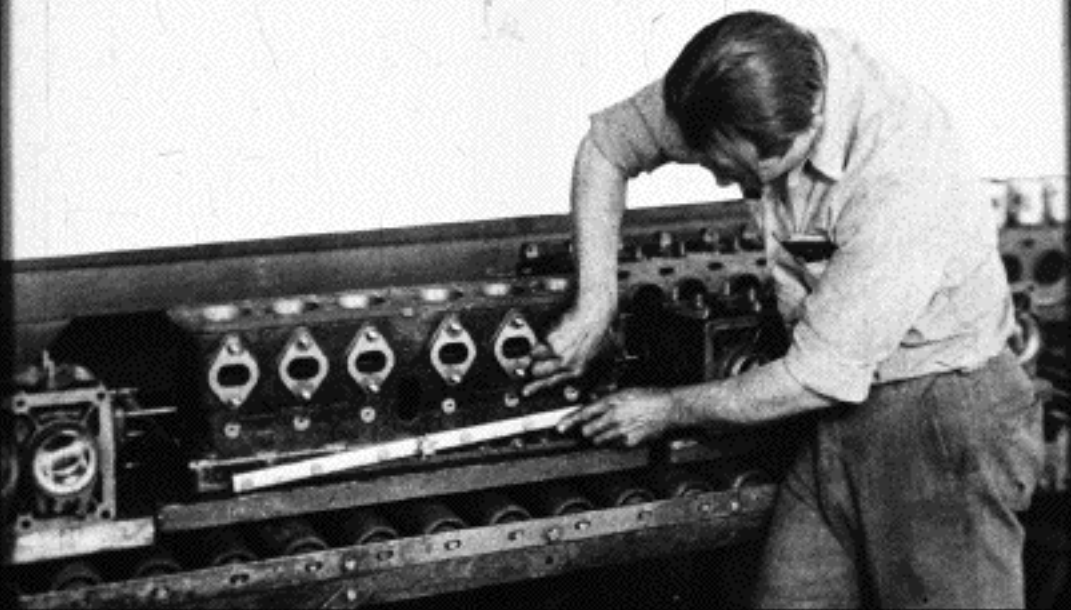
The ports are carefully examined for cleanliness.

The alignment of the cylinders is checked - -



- - for size, taper and finish of surfaces.

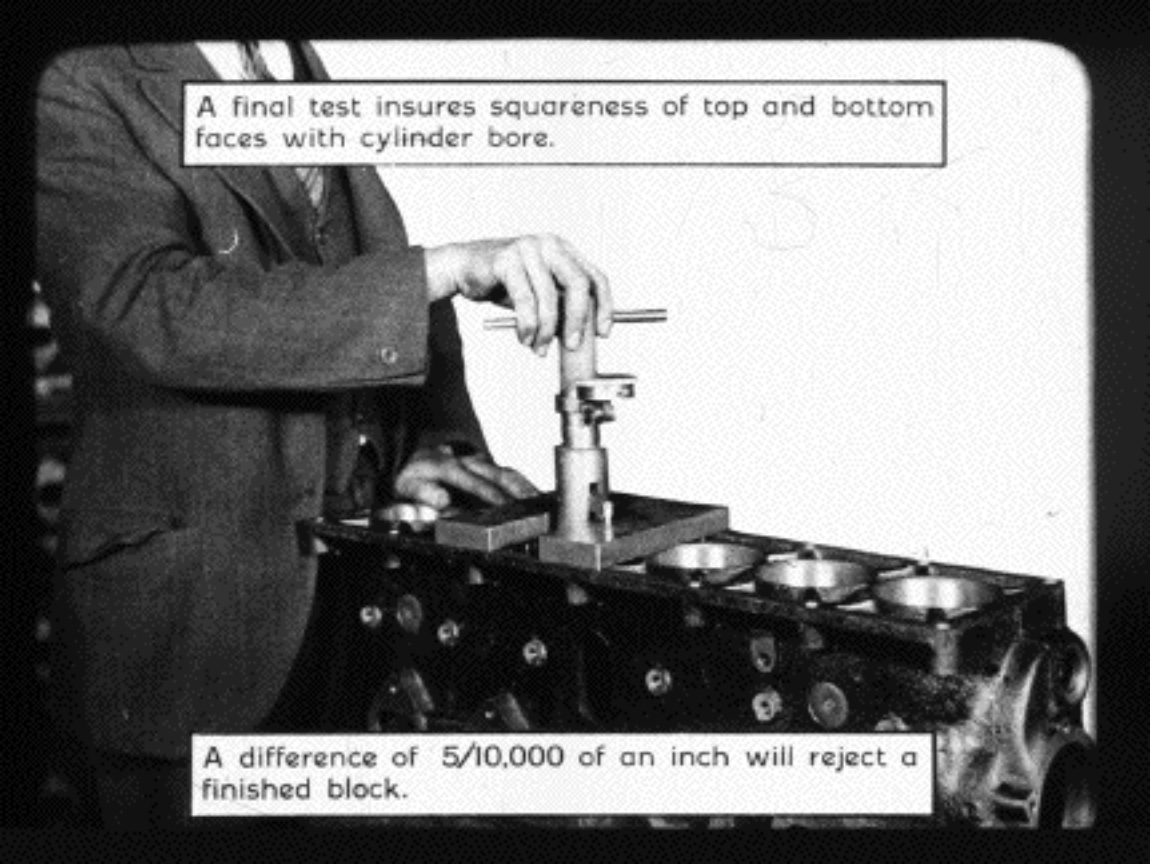
Rectifier bosses are inspected for smooth clean surface.





All tap holes are tested.

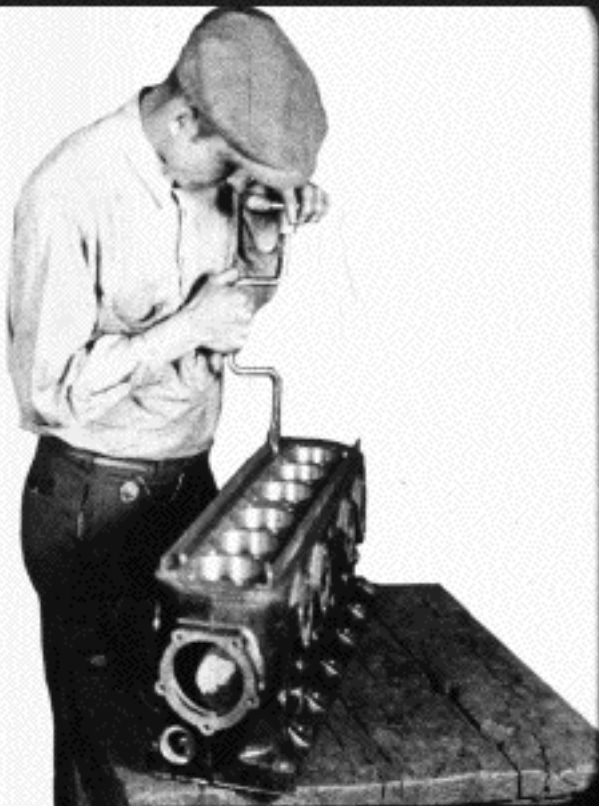
Water pump clearance is checked and all faces examined for smooth surface.



A final test insures squareness of top and bottom faces with cylinder bore.

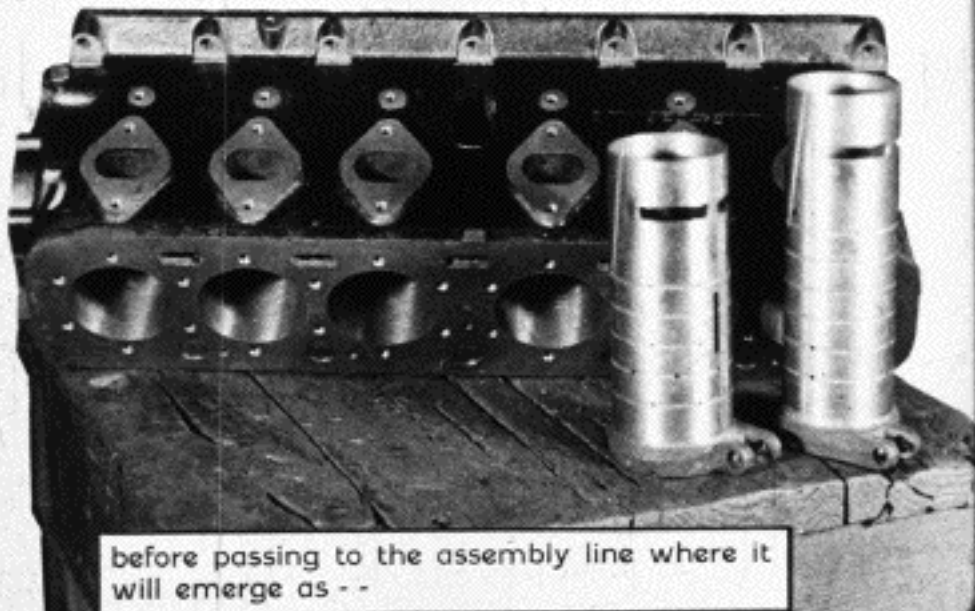
A difference of  $\frac{5}{10,000}$  of an inch will reject a finished block.

With the final O. K. temporary iron strips are bolted to the edges of the block to protect the finished surface during subsequent operations.



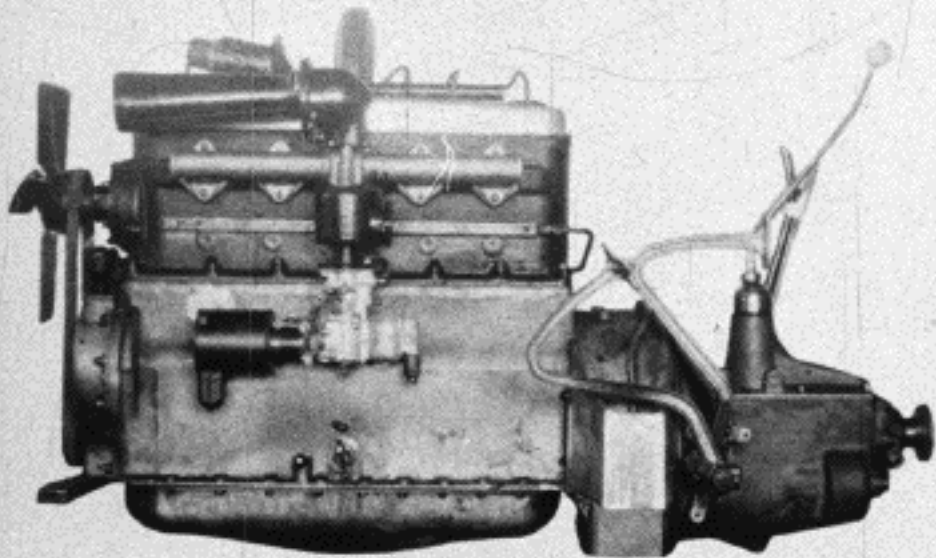


The finished cylinder block is now ready for the insertion of sleeves - -

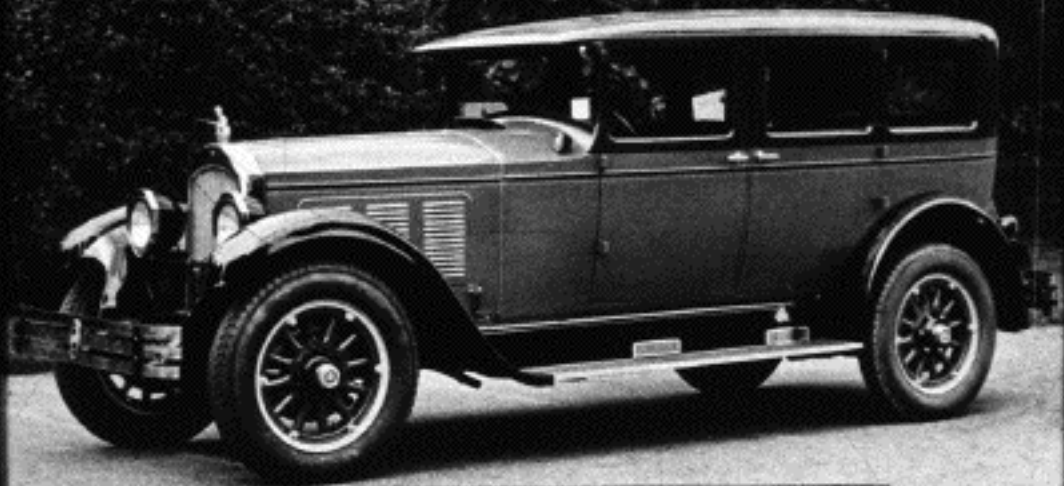


before passing to the assembly line where it will emerge as - -

A FAMOUS WILLYS-KNIGHT SLEEVE VALVE ENGINE.



SILENT, SMOOTH, FLOWING POWER.



A DISTINGUISHED MOTOR CAR FOR THOSE  
WHO WANT THE FINEST.

The  
End