

REBUILDING YOUR MUSTANG'S ENGINE

by Lee Wilmot

Now, your parts are in the machine shop and for the last month, you should have been cleaning and painting parts. It is also a good time to clean up your working area. You don't need anything in the way when it comes assembly time.

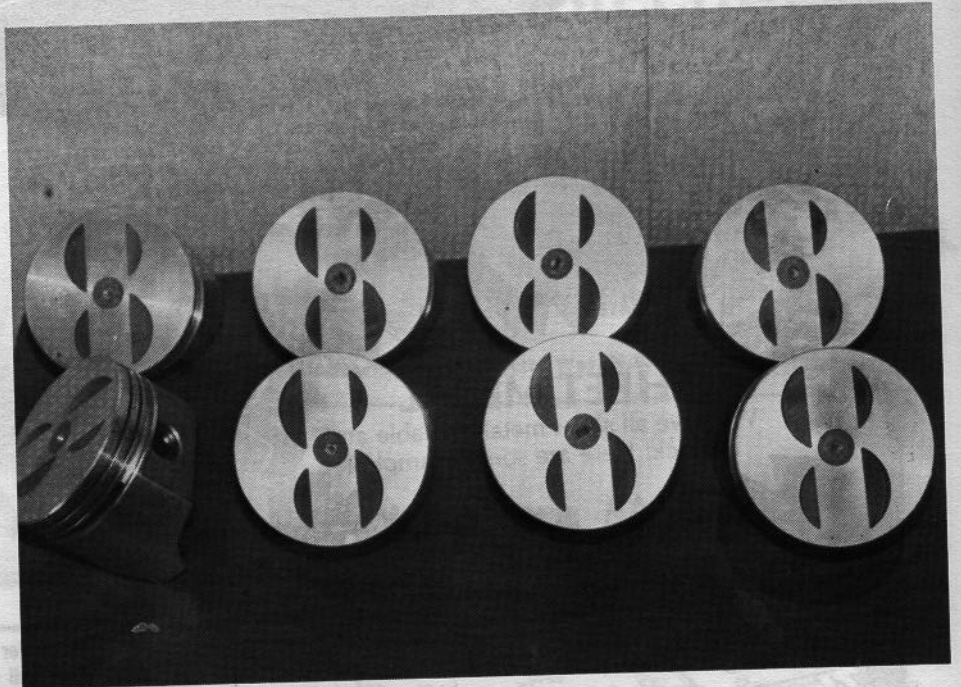
At this point you need to decide exactly what you want to do to the engine. If you go back stock, you won't have any decisions to make. However, the fun starts when you start changing camshafts, milling heads, using larger valves, etc. I'll give you a few "Rules-of-Thumb" for a street-driven engine.

1. Never go over 280° on a high performance camshaft.
2. With gas the way it is today, do not use a multi-carb system.
3. Do not exceed 600 cfm carbs on Windsor engines, 780 cfm on Cleveland engines, or 780 cfm on big blocks.
4. Do not use a double-pumper carb.
5. Do not mill heads more than .030 inch.
6. Do not exceed 10.5 to 1 compression.

With this in mind you should decide exactly how to go back with your engine. A good set of headers helps the Ford engines considerably. When installing headers on a 2V engine, increase carb jet size at least four sizes to prevent leaning in the engine and burning pistons.

Always use forged pistons. This prevents skirt damage and prolongs engine life. If your engine previously had dished pistons and you intend to use a stock or very mild camshaft, I suggest flat top pistons. These will increase the compression from about 9.5 to 1 to about 10.0 to 1. Be sure to have these balanced. I suggest chrome-moly piston rings.

If your engine has to be bored (and most of them will) do not exceed .030



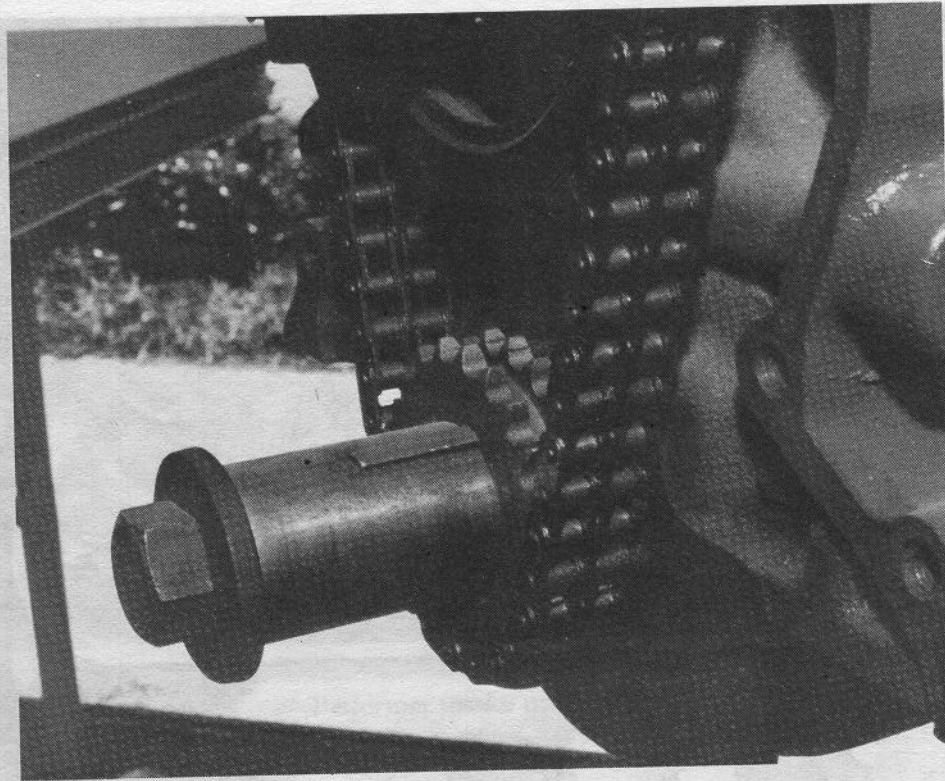
Forged flat top pistons.

inch over. Your engine will run hot at .040 over, and NEVER go to .060 inch. If your machinist suggests the block should be bored more than .030, buy a used block and have it magnifluted and bored. DO NOT mix main caps, or the block will have to be align-bored.

The real drawback on Windsor engines is the poor head ports, exhaust and intake. If you're looking for performance, check and see what your machine shop will charge to port both exhaust and intake ports. Instant horsepower! If your engine is equipped with rail rocker arms and you plan to modify your engine for more horsepower and r.p.m. gain, the rails must be exchanged for conventional rocker arms. This will mean installing screw-in

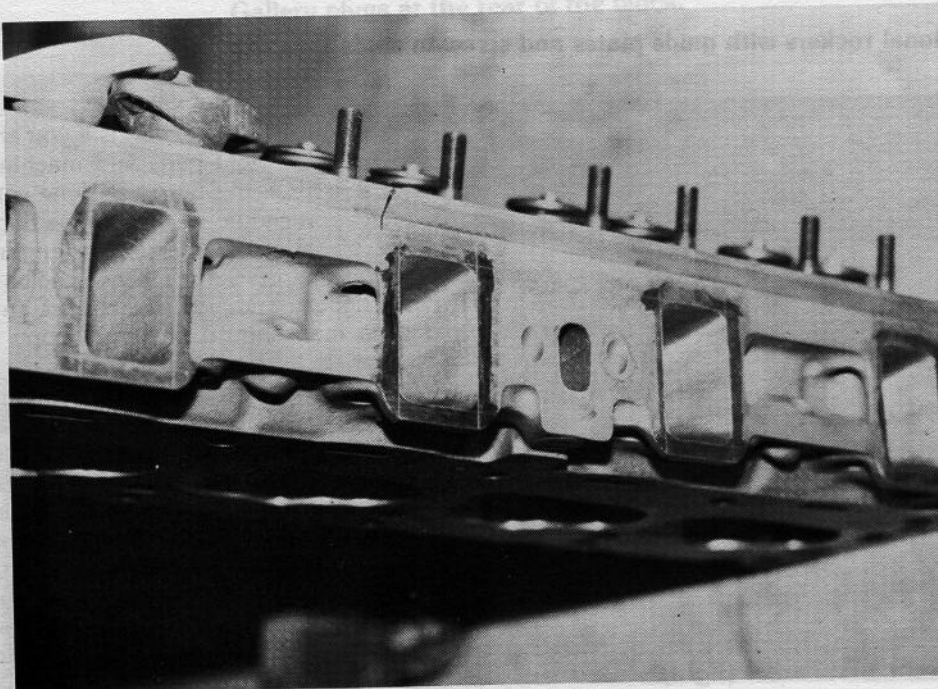


Miller 84



Cloy's Double Roller.

Ported and polished heads. Expensive!



studs and guide plates, along with HARDENED pushrods. This will be an additional outlay of about \$300.00 to complete this process if all parts are purchased new. That's a lot of money but it is a MUST for high r.p.m. engines. Your machinist will know to install the plates and studs.

If you use the pushrods that came with the rail rockers on the guide plates, they will break in a matter of just a few miles! If you use the rail rockers on a high revving engine, your engine will break in a matter of just a few miles! Remember, horsepower is not cheap.

Back to camshafts. Most people have a tendency to do two very dumb things. One is to put about four times more carb than is needed. The other is to put about eight times more camshaft than is needed. The outcome of either will make you very ill. Talk with your local machine shop or a speed shop, and pick a camshaft with an r.p.m. range of around 2500 to 5800. How often would you use the capabilities of a camshaft that starts making horsepower at 5800 r.p.m.? Not very often!

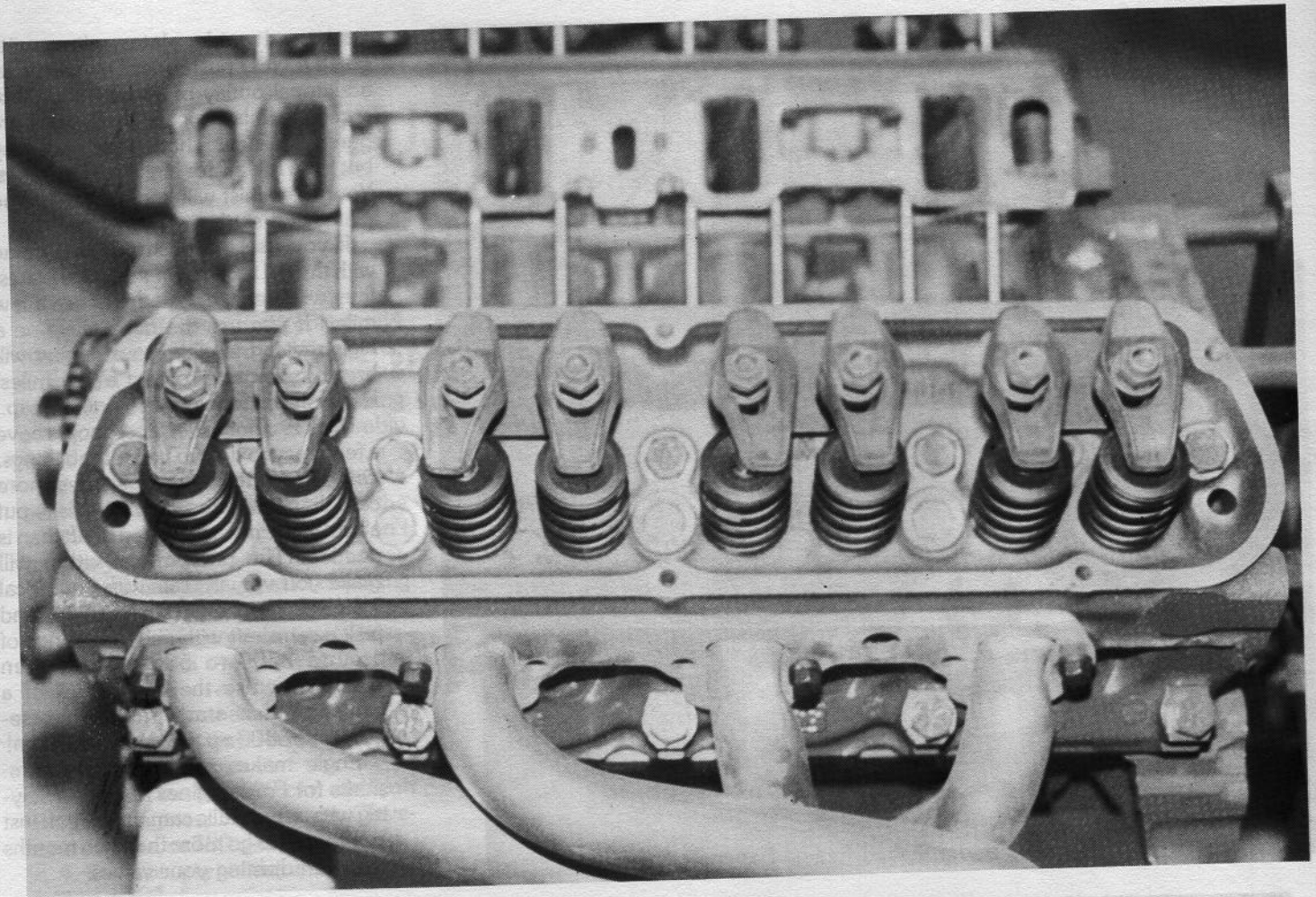
Engle makes some excellent camshafts for Ford engines. I suggest staying with a hydraulic cam unless you just can't stand to go more than two months without adjusting your valves.

I indicated earlier that the timing gears and chain should be replaced. I suggest this be done with a Cloy's Double Roller. The stock gears and chain are adequate, but the Cloy's is much better. I won't go into degreasing your camshaft. If you decide to do this (and it will make your car run better) have someone with experience help you.

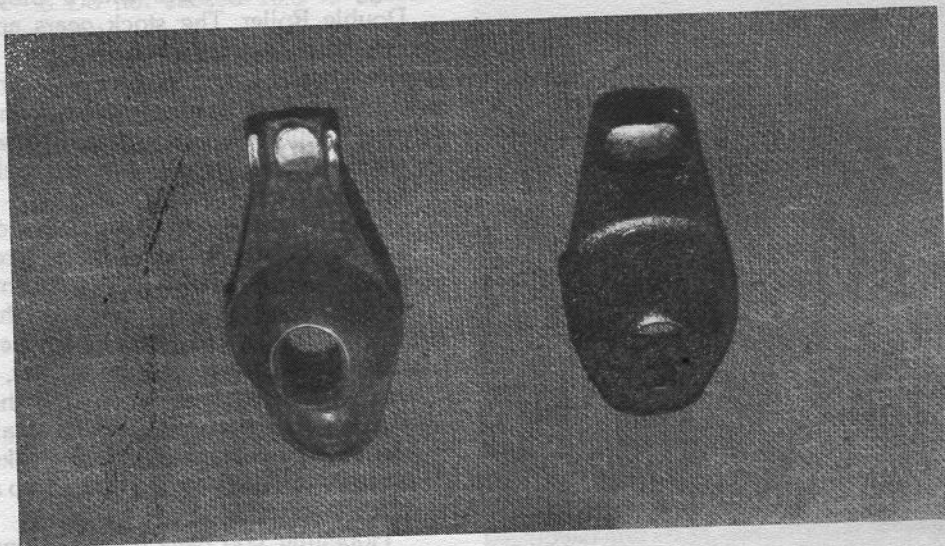
Checking piston to valve clearance will not be necessary on a stock rebuild. If you do opt for a "killer" camshaft, be sure to tell your machinist the lift and duration and ask for his advice.

If you choose to change intakes, I suggest the Edlebrock Performer or the obsolete Edlebrock F-4B for the small blocks. If you put an aluminum intake of any kind on a big block, you drop a quick 50 pounds.

Hopefully, you have been working closely with your machine shop and parts supplier. They both have to know



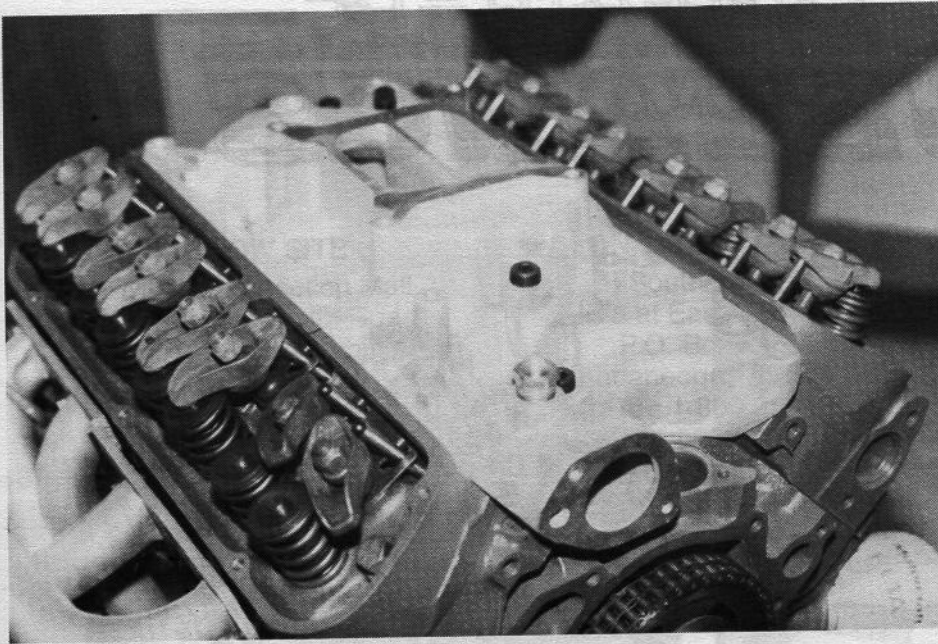
Conventional rockers with guide plates and screw-in studs.



Rail rocker (left) and conventional rocker (right).

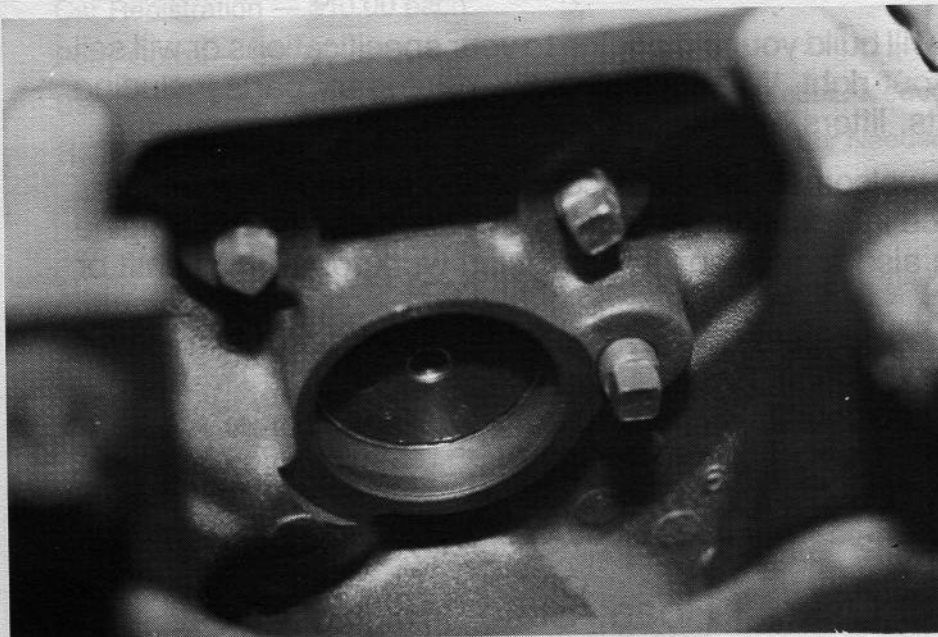
what your final objection is if you are to have the right parts and machine work. If all of this has been done correctly you should have a garage floor full of shiny new parts, old engine "pieces-parts," your wallet should be a lot lighter, and your machinist and parts man should be very happy. I never said it would be cheap!

Place your engine on the engine stand and push it outside. With a hose and detergent, wash every nook and cranny, along with the oil galleries. This should be done with the main caps removed. Wipe away excess water and allow the engine to air dry. When this is done, oil down each cylinder wall. Replace all gallery plugs, and hand wipe all parts to be put into the engine. Clean pistons and crank



Performer intake manifold.

Gallery plugs at the rear of the block.



with mineral spirits. Do not use solvent or cleaner on the new camshaft. Wipe with dry towel only. Inspect all engine parts, new and used and make sure they are the correct parts.

When you are not working on the engine, place a cover over it to keep out dust. Try to keep your hands as clean as possible.

Clean all parts and surfaces to be painted with lacquer thinner or some type of solvent and paint the outside area. Allow the paint to dry for at least two hours. With a rag and solvent, clean the machined surfaces of the block and any area that will have a gasket or sealed surface. Make sure there is no old gasket material or new paint on these sealing surfaces. Keep it neat.

Remove your piston rings from the box, being careful not to mix them. There will be an instruction sheet in each box showing where each ring goes on the piston. Take one top compression ring and carefully place it about two inches down in a cylinder bore of the block. Take a bare piston, turn upside down and push the ring down another $\frac{1}{2}$ inch with the top of the piston. This should locate your ring about half way down the bore. There should be a noticeable gap in the ring. With a feeler gauge, check the width of this gap. Also supplied with your piston set will be a chart for your engine. This will tell you what your end gap should be. If you have too much or too little, consult your machinist.

If everything falls within specs, install rings on the pistons as shown on your instruction sheet. DO NOT put the pistons in a vise, and be very careful not to break the rings. Stagger end gap on each ring as instructed. Rod caps should be removed before installing rings. Submerge pistons and rings into container of clean oil. This will coat the inside and outside of the rings. Lay the pistons on the valve side in a clean flat area and cover them. Do not lay pistons on their side with new rings installed.

Now your engine is cleaned and painted, rings are installed, your engine is on the stand, and your work area is clean. In the next issue we'll put it back together. **MT**