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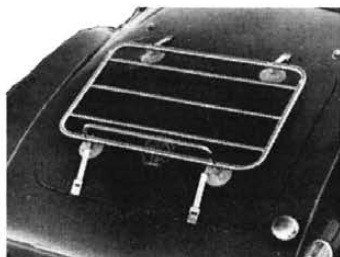


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# TUNE UP CLINIC



by Bill Corey

## THE COST OF POWER: PART II

**P**orting and polishing is usually helpful only if the breathing capacity of the engine has been increased through camshaft change, more carburetion or larger valves. The operation is seldom worthwhile by itself and can cause serious low-speed flat spots in extreme cases. This step is advised only when an engine is completely modified. The cost is based on prevalent hourly rates and averages \$25 to \$75, plus the cost of removing and reinstalling the cylinder head and manifolds. The valves should be ground, so tack on the cost of this work as well.

**Engine balancing** gives an increase in power that seldom can be measured, but is there. Its primary virtue is in a sweeter running engine which at least *seems* to perform better, often solely because those extra revs may be used without trepidation. A first-rate balancing job costs \$50 to \$75 after the engine is torn down.

**Flywheel lightening**, recommended only with balancing, can increase acceleration potential considerably on some cars. The advantage here can be measured with a watch even though no more power is available at any constant speed. It has been my experience that this single operation, combined with balancing, can do more for acceleration through the gears than all the extra carburetors you can hang on the average small car. Don't expect to go any faster up hills, however. The cost is small—about \$12 to \$20—but you must add disassembly work, which cost may not be so small.

**Additional clearances** are not recommended, at least in extremes, for "street" cars. Lower drag seldom gives much added punch for normal driving and means more noise and oil consumption. It is common practice to loosen up clearances slightly when an engine is put back together after balancing. Internal friction does steal power, but unless the pistons, bearings, etc., are very tight, normal wear will loosen them fast enough. Try to confine your efforts to *equal* clearances, not excess ones! The cost is small, not more than a few dollars for the extra time involved.

**A change in axle ratio** is the simplest answer to the quest for improved acceleration and hill climbing, but unfortunately it reduces most imported automobiles to single-purpose machines. On the other hand, if the car has overdrive and optional ratios are available, this idea is worth serious consideration. As one example, a Jaguar with a 4.55:1 ratio (with overdrive) in place of the stock 4.09 would offer truly sparkling high-gear performance; yet it would still cruise comfortably at very high speeds in overdrive. Other opportunities for ratio change present themselves providing the car in question has a short-stroke engine and will breathe quite adequately at high revolutions.

**Supercharging** is the cheapest way to gain the most power for average driving, provid-

ing a specifically engineered kit is available for the car of your choice. Otherwise it is no less expensive than any other way, and it is usually unsatisfactory if cobbled on the engine by a local mechanic unfamiliar with the principle involved. If a kit is available from a reputable manufacturer, other advantages include the ability to return the engine quickly to stock at trade-in time, and the fact that the kit can be then resold to recover part of the cost. Disadvantages of superchargers are that many mechanics don't understand their function or operation, and that they can permit speed maniacs to run the engine fast enough to destroy itself. Cost is in the \$145 to \$400 range for imported cars.

An increase in compression ratio is the time-honored backyard and mass production method of adding power. Providing you are willing to shop for fuel and no mechanical obstacles are involved (such as the valves hitting the pistons), this is a very satisfactory manner in which to achieve moderate gains. Don't expect miracles, however. The amount you can accomplish the cheap way (head milling) is limited, and special pistons or head filling cost money. A milling job will cost \$5 to \$15 plus the removal of the head and any necessary disassembly of the valve mechanism.

By this time you may have gathered that the fellow who walks into any shop expecting to purchase a lot of extra horsepower for \$50 or \$60 is due for a big disappointment. A properly blended combination of all the items we have mentioned this month and last (except supercharging) could increase horsepower noticeably. At the factory, such changes would add practically nothing to the cost of a new model, but all reliable shops would charge around \$500 for the same work. What, then, are our conclusions?

1. If you have a nearly new car and desire better than average performance at minimum cost, at about 5000 miles have the valves and seats refaced, some modest port matching and a thorough tune-up. This will put you about 10% ahead of the crowd. If you'd like a little more, have the head shaved lightly while it is off. Cost? Less than \$100 for most makes.

2. If you intend to keep the automobile and overhaul time will roll around soon, very little more money will buy quite a bit of additional performance if the work is all done at once. Specify the largest standard oversize pistons for an increase in displacement and bore to an extra 0.002-inch clearance. While the engine is out, balance everything that moves. The flywheel should be lightened and the clutch, flywheel and pulleys balanced as an assembly. Some moderate port work might be in order to go along with the increased compression and displacement brought on by the larger pistons and probable head milling. You might want to investigate one of the milder reground cams to go along with these steps (the tired stock cam may have some chewed up lobes). The carburetor(s) should receive some attention, too, as you are now going to have increased breathing capacity. I suggest the next larger choke size with jets to match. Unless cost is no object, leave valve size alone and don't fuss with coils or trick ignition systems.

There you are . . . for not very much more money than for a normal overhaul, you, too, can join the horsepower race! But ask an expert for help, if you need it.



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