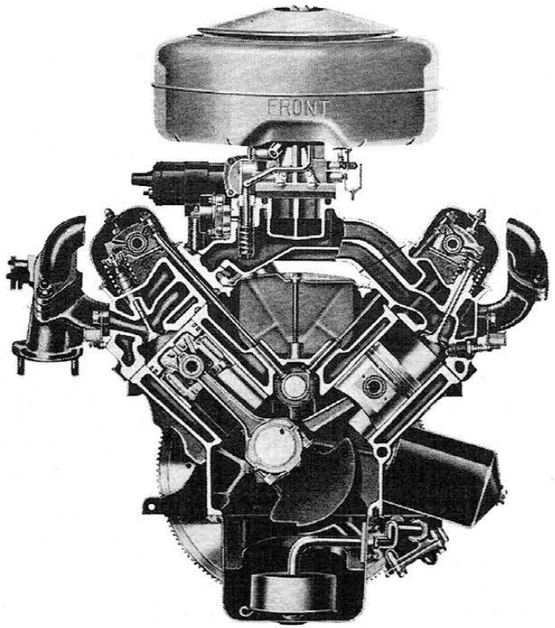
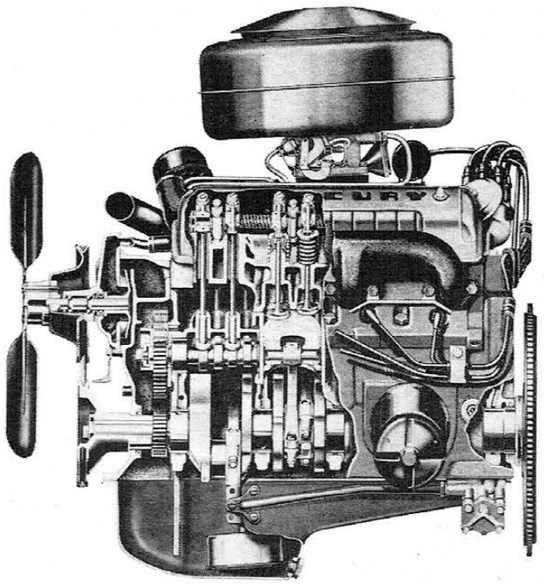
'54 ENGINE ANALYSIS



One of two new engines for '54 is the 161-hp Mercury V-8 with overhead valves. View above is front cross-section

Side cross-section view of Merc engine shows valve layout and the eight-counterweight crankshaft for good balance



HERE'S A COMPLETE RUNDOWN, MAKE BY MAKE, AND A LOOK AT ALL THE POWER POTENTIALS

BY ROGER HUNTINGTON

THERE'S good news tonight for the horsepower hounds! The conservative who hoped Detroit's little horsepower race was petering out last year when some of the big builders held the line on horsepower ratings is running for cover today. A quick look at the 1954 engine specs suggests that the slide rule boys have barely reached the quarter post in their dash for the elusive horses. Chrysler is up 55 hp over '53, and several others have raised their ratings 20 hp or more. All the luxury cars now advertise over 200 horses; most medium-priced models are in the 175-hp range where the luxury jobs were three years ago; low-priced cars run up to 130 hp, just about where the Olds Rocket started back in '49.

That, in a nutshell, is the overall 1954 picture in the engine field.

In regard to design trends, there's surprisingly little that's really new. The trend in basic layout has been unchanged for five years, and is obviously here to stay—that is, a V-8 cylinder layout with pushrod-operated overhead valves, five main bearings, and a stroke shorter than the bore. General Motors led off with this setup in 1949 with the famous "high-compression" Cadillac and Olds engines. (Remember?) Chrysler, Dodge, DeSoto, Lincoln, Studebaker, and Buick followed right along. Ford and Mercury are the latest to get on the stick with their new '54 engines . . . and others will follow next year.

The brutal fact is, you can't very well improve on this basic layout for modern road power. Overhead valves assure good volumetric efficiency and power output as well as giving a basic combustion chamber that can be readily adapted to 10 and 12:1 compressions in the future. In addition, not only do you get a very *rigid* lower end that will stay put a long time under the pounding of high cylinder pressures, but the short stroke radically reduces the friction losses. Assuming equal number of cylinders, an engine with 3¼-inch stroke will have about 28 per cent less friction loss than one with a 4½-inch stroke—and at a steady 60 mph on the road this would save you an average of 20 cents *per hour* in gasoline! Many auto enthusiasts underestimate the effect of stroke/bore ratio on engine efficiency.

Aside from this continuation of the basic layout trend, one other old souping trick is getting some new tinsel: *Breathing*. This has been the big gun behind the horsepower race so far, and it continues to serve well. The power (or torque) that an engine can produce at a given rpm is proportional to the weight of fuel-air mixture it can pump through—or "breathe"—with open throttles. The weapons here have been dual carburetion, four-barrel carbs, huge air cleaners, outside air scoops, big valves, opened-up ports, wild cam timing, and dual exhausts. We see even more of this for '55.

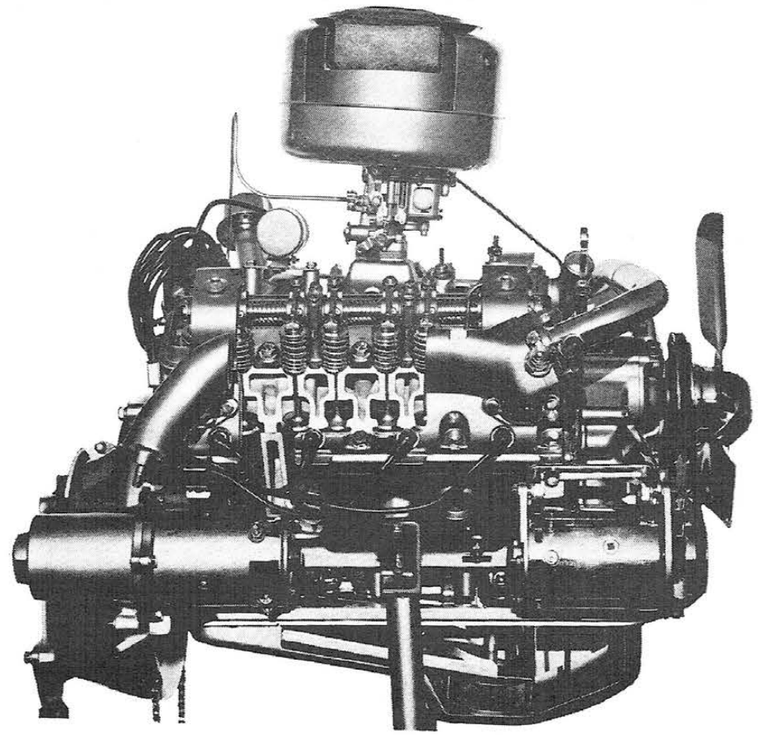
But do I detect the seed of a new trend along this line? I refer to the boys who are "going bigger" on their new models. Oldsmobile has increased the bore by one-eighth of an inch, the Ford 6 goes .060 over, and Packard is up a full 10 per cent in cubic inches. What gives? Three years ago I thought the last thing the drawing-board guys would play with would be piston displacement, simply because it's pretty apt to cost mpg at cruising speeds. But more inches are an easy way to add hp, especially if the dividends from four-barrel carbs and big ports are leveling off! Another important factor in the picture is undoubtedly the need for more low-speed torque. Notice that they have gone back from a standard 3.08 to a 3.23:1 axle on the heavier Pontiac 8's; on the other hand, the Olds 88 drops from 3.23 to 3.08:1 for '54—and adds 20 cubic inches! You haven't seen the last of this business yet. The day of the 400-cubic inch passenger car engine is again in sight.

THE TREND in compression ratio continues to edge up. Engineers agree that most of our present ohv combustion chamber designs could level off at around 10:1 compression ratio on a 96-octane (research rating) fuel. This has recently become available at a slight cost premium at filling stations in some parts of the country. The average octane rating for premium is still 90-92, but the presence of the super-octane stuff in commercial quantities promises that the *average* will rise in the near future. In other words, our compression ratio ceiling has quite suddenly become 10:1 instead of 8.5:1, and we can look for ratios to continue their climb.

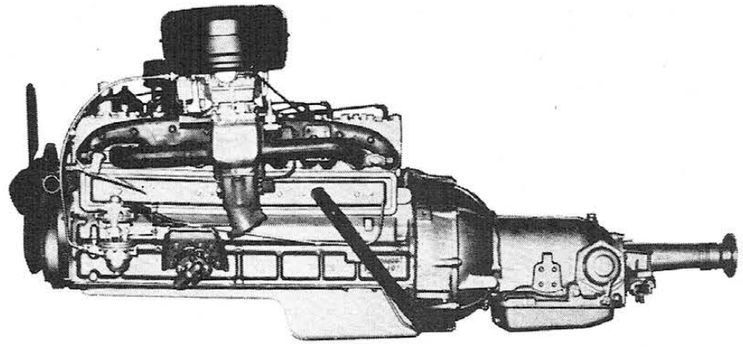
Now let's have a look at each of the various 1954 engine models, see what changes have been made over '53, and keep an eye out for soup-up possibilities:

BUICK 40—Looks like the age of the V-8 is *really* here. After 23 years of brain-busting development on the in-line 8 layout, Buick engineers finally turned their back on the old way and put new short-stroke V-8's in all their cars. The new engine for the Special series is designed on the same lines as the big job introduced last year, but with bore and stroke reduced to 3⅝ x 3.2 inches (264 cubic inches). The "Dynaflow" version with 8.1:1 compression and two-barrel carb develops 150 hp, while the standard 7.5:1 job rates 143. The new engine, with its very short stroke, high compression, and compact combustion chamber should give much better gas mileage than the old straight-8. For the soup-up boys it will probably be neglected in favor of the cubic inches offered by the big Buick V-8, especially as there is very little difference in weight and size.

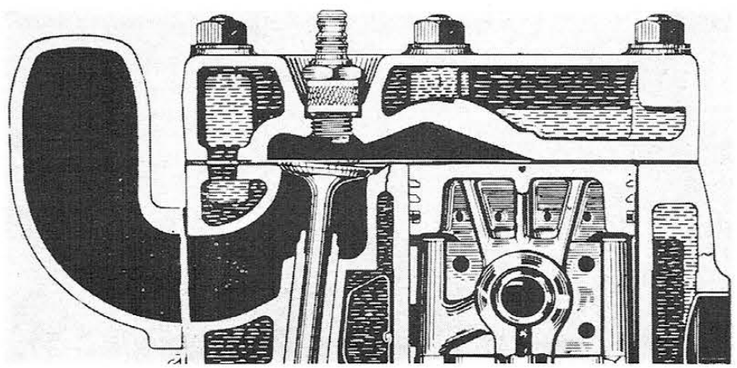
BUICK 50, 60, 70—Lower domes on the combustion chambers and pistons of the big 322-cubic inch model have resulted in better combustion control and an increase of 12 hp in the advertised ratings. Generally, the Buick V-8 engine has been shunned by the soupers; the particular valve location severely limits the total diameter of inlet and exhaust valves, so that breathing, even with considerable head reworking, is limited. A torturous path for the exhaust porting hurts, too. The engine has great merit from the standpoints of rigidity, weight,

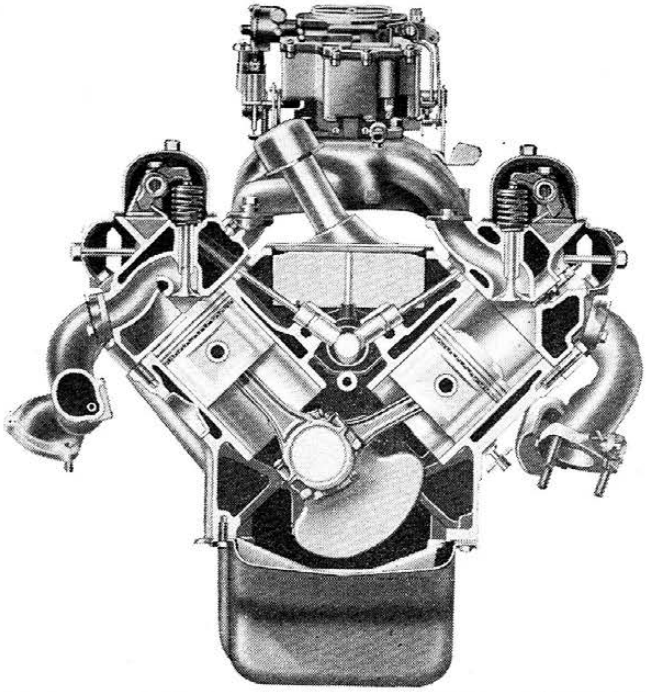


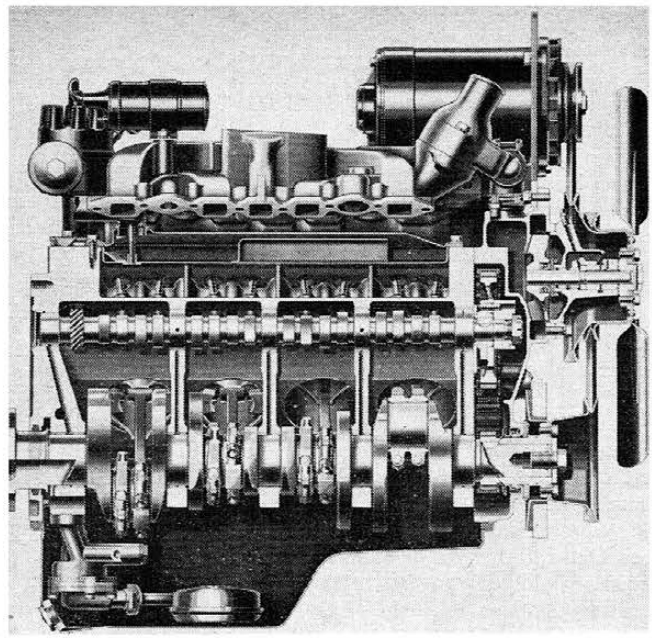
Ford's new 130-hp ohv V-8 is basically the same as the Mercury. Main features are deep block, shorter stroke and less friction during operation, plus overhead valves



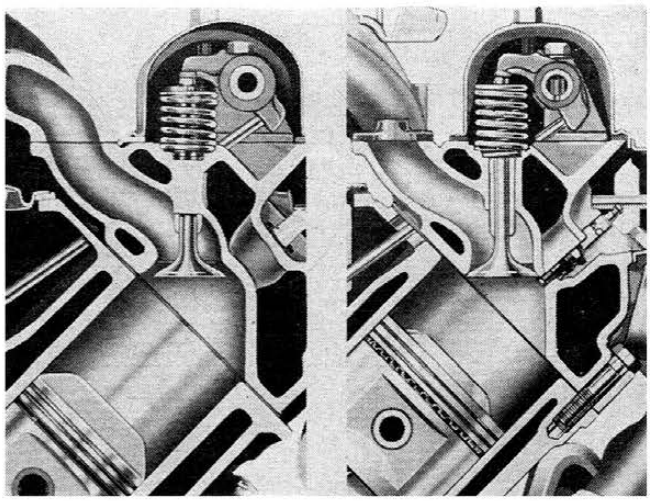
Packard has boosted compression up to 8.7-to-1 in its 212-hp straight eight. Section view at bottom shows aluminum head and redesigned combustion chamber



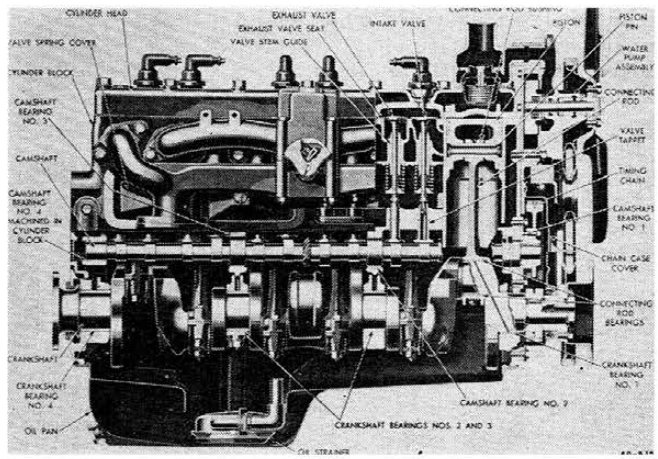




Sectional sideview of DeSoto V-8, also seen below at left. Hot cam and extra carbs will give plenty of snappy hp



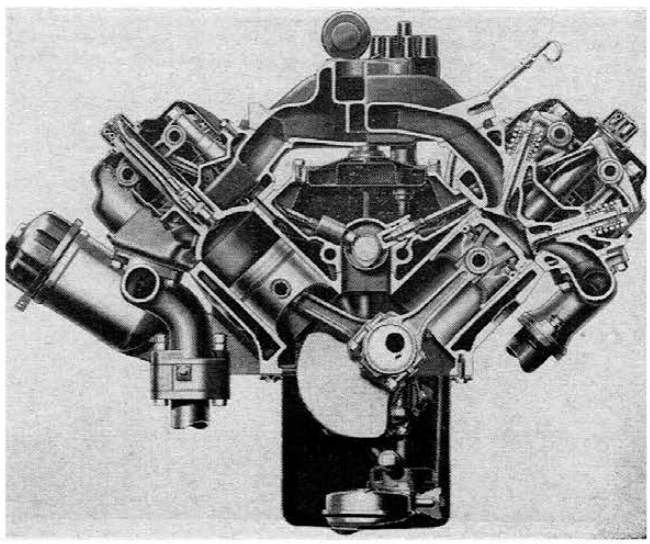
Layout of Buick's combustion chamber for '54 (right) is compared with '53 (left), while at top is section view of V-8. Engine comes in 322 and 264 cubic inch sizes. Big plant in the smaller Century chassis promises terrific performance

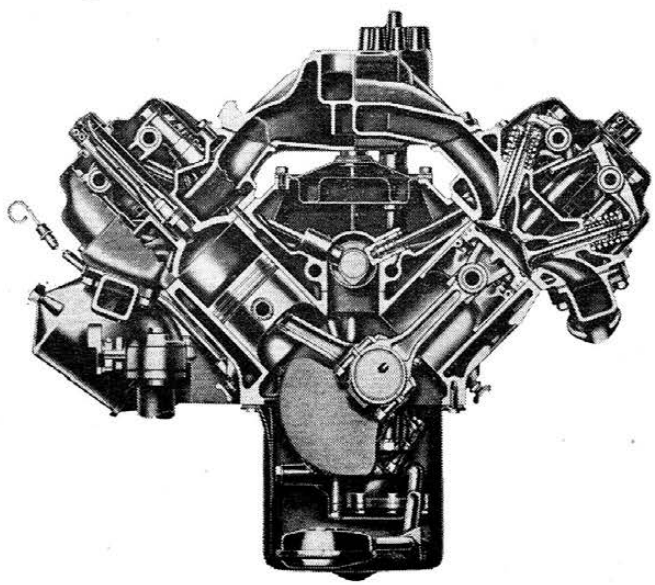


Six-cylinder DeSoto engine is shown here in detail. Heads, duals and hot cams will make this sturdy unit jump

DeSoto shown in cutaway, has good modification possibilities like Chrysler engine. Stock hp is up to 170 for '54 models

Little brother of DeSoto is similar Dodge V-8 which owns lots of U.S. stock car records set at the Bonneville Salt Flats





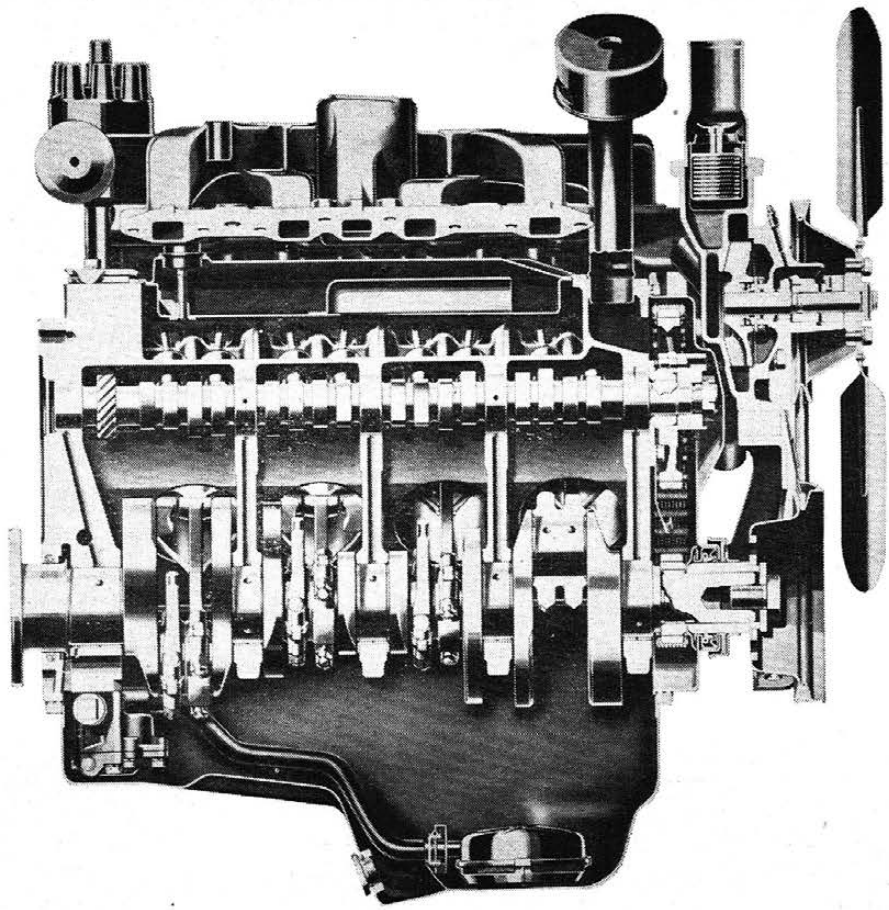
and friction, but the backyard modifiers are still floored by the breathing problem. Souping up to now has been pretty much confined to dual four-barrel carbs and a hot cam.

CADILLAC—The major changes on the '54 Cadillac engine have little effect on performance—that is, a new chrome top ring, removal of the expander behind the oil ring, new starting motor, new distributor drive, new fuel pump, and new radiator. The power and torque boost for '54 is largely the result of higher valve lift (and possibly a bit hotter timing); this puts the advertised peak to 230 hp at 4400 rpm and torque to 332 lbs.-ft. Soup-up potentialities on the Cadillac engine are limited by the restricted valve area and porting . . . probably 280-300 hp on pump gas would be the upper limit for a smooth road engine. There's no room for larger valves, but "dual-quad" carburetion, a light head mill, cleaned-out ports, and a three-quarter cam (preferably a roller-tappet setup) will give a substantial boost in an already-brilliant performance picture. The Cadillac bug who wants to go all out, regardless of cost, can bore and stroke to 390 cubic inches, but the racing-type pistons necessary here will be noisy, fast wearing, and oil consumption will be rough.

CHEVROLET—The standard engine becomes essentially the Powerglide model of '53, but without the hydraulic lifters; an increase to 7.5:1 compression, high-lift cam, and improved carburetion raise the rating to 115 hp. The Powerglide has been boosted to 125 hp by improved carburetion and manifolding and a new cam using the highest lift in the industry (.400). There's plenty of speed equipment on the market for the Chevrolet, and 160-170 hp is entirely possible and practical for a road job. The new aluminum pistons, 1.88 intake valves, insert bearings and pressure lubrication give a much better base to start on than you had two or three years ago. Porting, a head mill of .055 (8:1), dual carburetion, and a three-quarter cam will do the rest.

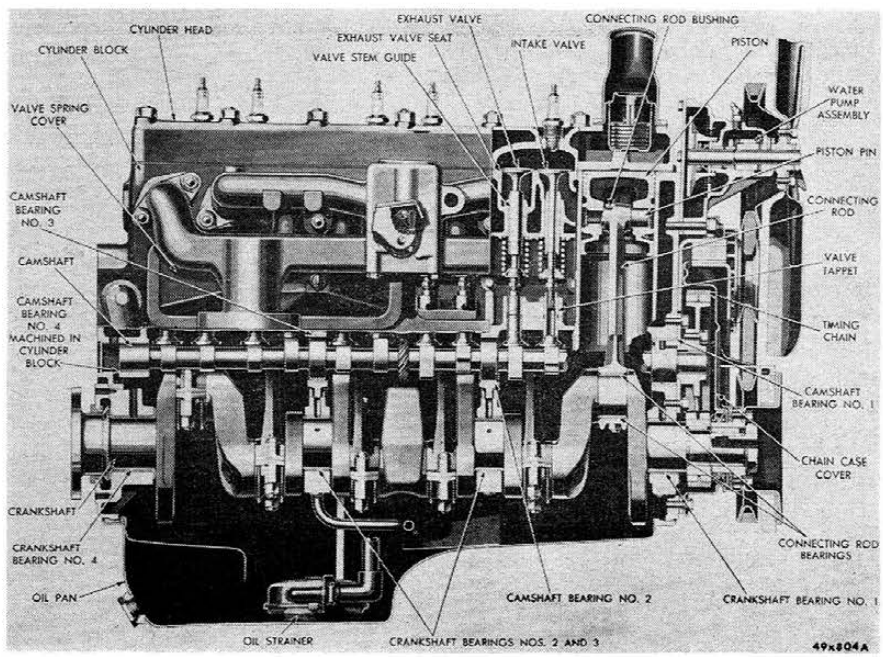
CHRYSLER 6—No significant changes over '53. High-compression aluminum heads, dual manifolds, and special cams are available for this engine; better than 175 hp has been measured.

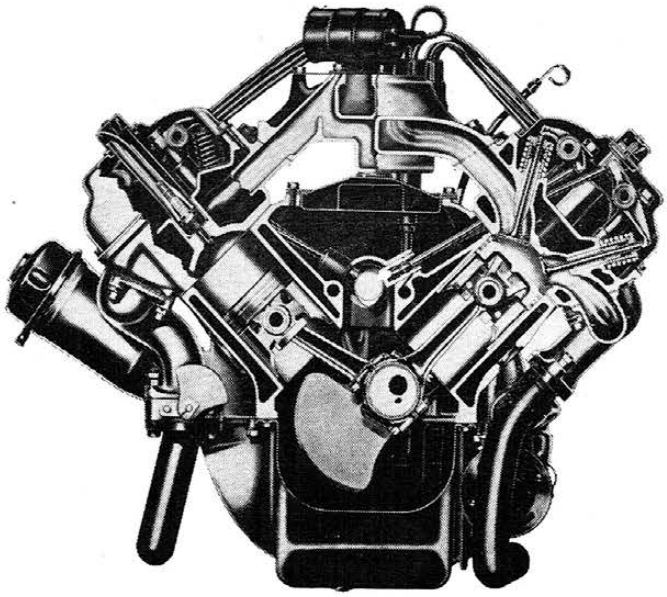
CHRYSLER V-8—Here's the hottest iron available for road power in America today at a reasonable price. Extensive changes on the '54 models to improve breathing have given what amounts to a "three-quarter race" engine in stock form! For the New Yorker line, intake valves and ports have been increased one-eighth of an inch in diameter, while the exhaust side has been opened up a full one-fourth of an inch; these changes alone boost the hp rating from 180 to 195. For the more expensive Chrysler lines, in addition to the increase in valve diameter, a big four-barrel carburetor has been adopted, plus opened-out intake manifold,



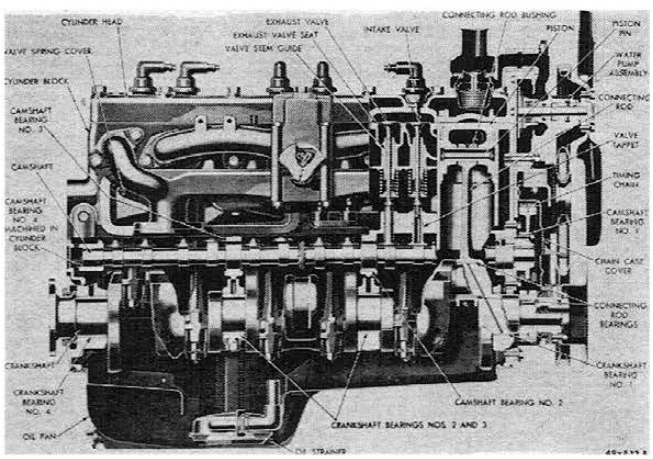
This sectional sideview of the Dodge V-8, see bottom of opposite page, shows additional details in arrangement of crank, cam and ports. Design is essentially the same as other Chrysler V-8s which are unsurpassed in the passenger car field

The Dodge six-cylinder engine has had stock horsepower boosted by seven to 110 for 1954. This can be jacked up another 20 with moderate modifications through use of available special equipment. Engine has seen long service and is reliable



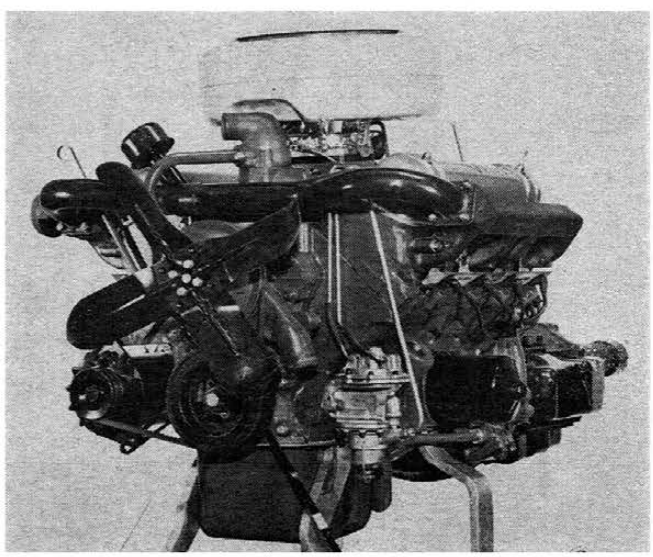


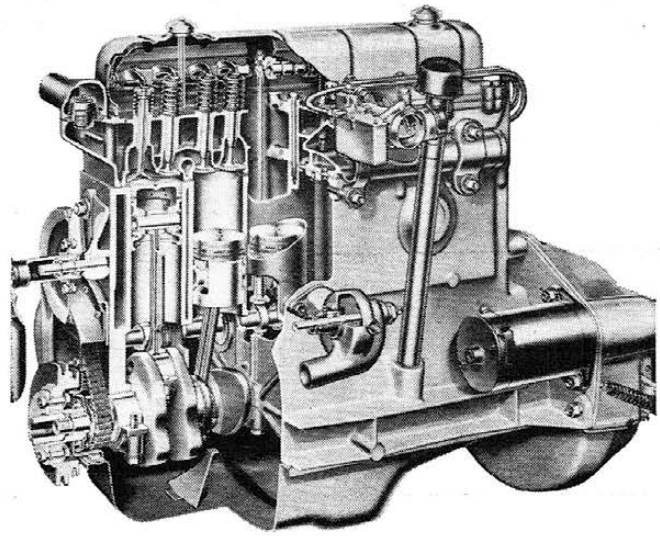
Hottest stocker of the '54 crop is this excellent Chrysler 235-hp V-8, which carries an enviable reputation for power



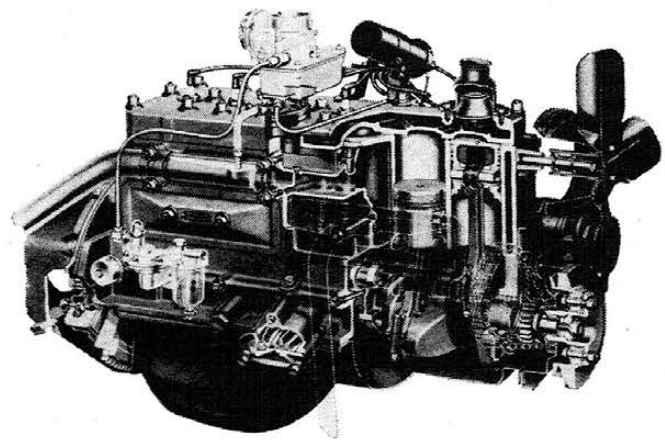
Basic engine of six cylinders in Chrysler line is this six which now comes in one series of the company's models for '54

Lincoln engine is high on popularity list in both stock and modified form. Power output for '54 remains at 205 horses



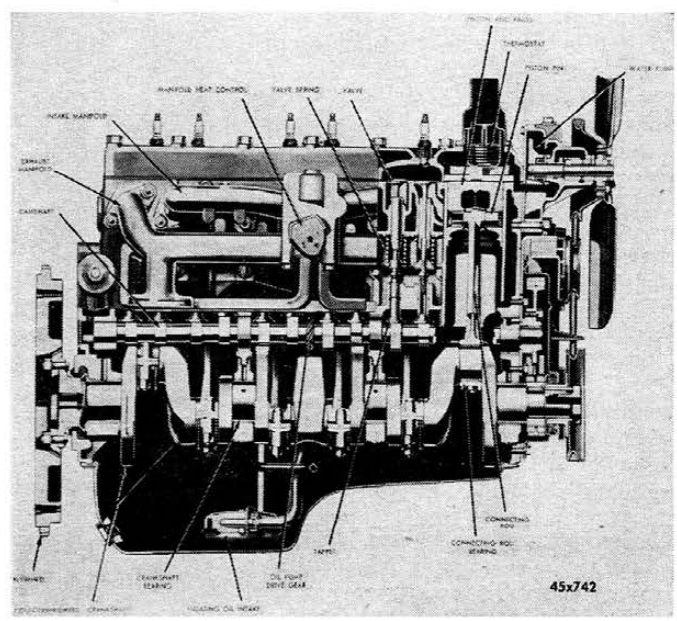


Nash Ambassador has 7.6-to-1 compression ratio and hotter cam for 1954 to bring the horsepower up to 130 from 120



Small car in the Nash line is the Rambler and this is a sectional view of its engine, unchanged from '53. Rambler series now includes a four-door for the economy automobile

Plymouth engine has only improved intake valves and larger oil pump for 1954. However, with available speed equipment, it can be upped to 135 hp with reasonable ease



larger air cleaner, and a dual exhaust system. This puts the peak to 235 hp at 4400 rpm; maximum torque—a hefty 330 lbs.-ft.—comes in at 60-70 mph on the road! Further souping is practical. A second four-barrel carb (with special manifold), polished ports, and heads milled .060 for 8.3:1 compression will give you about 35 more horses. (The Chrysler combustion chamber doesn't like high compression ratios like some others, so go easy on milling.) Most effective gimmick from a standpoint of hp per dollar is a roller-tappet cam; if properly set up you can readily go over 300 hp on pump gas. That *should* do it!

DESOTO 6—No changes over '53. Souping picture about the same as the Chrysler 6.

DESOTO V-8—Only change here is an increase in compression ratio from 7.1 to 7.5:1, which raises the power rating from 160 to 170 hp. It was felt that a $65 quad carb would not be necessary this year . . . all of which makes one wonder about '55! Soup-up potentialities here are about the same as on the Chrysler V-8. Porting and head milling are relatively less effective percentagewise than extra carburetion and a hot cam. The latter changes—that is, two four-barrel carbs and a roller-tappet road cam—will give over 210 hp on pump gas without resulting in a lower-end performance you can't live with. Head milling should be limited to .070 (about 8.5:1 ratio) for the road.

DODGE 6—An increase in compression from 7.0 to 7.25:1 has raised the hp rating from 103 to 110 (at 3600 rpm). Souping is as on the Chrysler-DeSoto 6 basic engine, and similar equipment is available; the engine should soup to over 130 hp with stock cam.

DODGE V-8—Like the DeSoto, compression is raised to 7.5:1 on the '54 Dodge Royal and Coronet models, which gives 10 hp more at the peak (150 hp) and a slight boost in torque. From the souping standpoint, the engine is equivalent to the DeSoto V-8.

FORD 6—A .060 increase in bore and a .2-ratio boost in compression (to 7.2:1) raise the rating of the new Ford 6 from 101 to 115 hp. Several dual manifolds and reworked exchange heads are available for this engine and, along with a three-quarter cam, should be good for at least 150 hp. Potentialities of the Ford 6 engine for a heavy road car are limited by small displacement, but it's a light engine and is quite popular for "specials."

FORD V-8—After 22 years Ford's got a new V-8 . . . and she's a beaut. Generally it's designed on the same lines as the ohv Lincoln engine introduced in '52. An interesting angle is that piston displacement is the same as the old V-8—239 cubic inches—but bore and stroke are now 3.50 x 3.10, to give a really compact, rigid, low-friction layout. Power output, with 7.2:1 compression and two-barrel carb, is a healthy 130 hp at 4200 rpm; maximum torque is 214 lbs.-ft.—up nine per cent over the flat-head V-8. Some other interesting features are: A cast crankshaft with counterweighting at the center main; 240 degrees of support around the mains; valves running directly in the cylinder heads without separate guides; provision for free valve rotation; solid lifters; Siamesed intake ports on the heads placed one *above* the other (rather than side-by-side), which results in more equal lengths of manifold legs and better mixture distribution. For ideas on souping the new Ford engine see Barney Navarro's fine article in the Feb. '54 issue of MOTOR LIFE. Close to 200 hp should be possible on 239 cubic inches if you work it right.

HUDSON JET—No changes for '54. Very little "souping future" here.

HUDSON WASP—On their three larger engine models Hudson has come up with an out-and-out hot rod "relief job" on the blocks, gone to hot long-dwell cam timings, and raised compression. Peak horsepower and acceleration in the 50-70 mph range are substantially improved. The standard Wasp, with 7:1 cast iron head, has hp raised from 112 to 126; an optional 7.5:1 aluminum head gives 129 hp. Dual carburetion not available, and souping possibilities very limited by cubic inches.

HUDSON SUPER WASP—The above changes with a 7.5:1 aluminum head raise the '54 rating from 127 to 143 hp; Twin H-Power (Hudson's dual carburetion system) puts it 149 hp. Special heads and manifolds are available for this engine, but they wouldn't add a lot of stuff over the corresponding factory equipment. A reground cam would be the best bet, and should make 175 hp possible.

HUDSON HORNET — After three years of conservative power ratings for the Hornet, Hudson finally gets a toe in the horsepower race! The new block relief, cam, and 7.5:1 aluminum head have raised the rating of the standard engine from 145 to 160 hp. Optional Twin H-Power raises this to 170. The souping situation here is the same as on the Super Wasp, though 200 hp is in sight with a good cam on the 308-cubic inch Hornet.

KAISER—No announcement for '54 as of press time. Probably no changes.

LINCOLN—No changes have been made for '54 that affect performance, and the hp rating remains at 205 hp at 4200 rpm. An interesting development is the redesign of the four-barrel carb so that the secondary barrels are opened according to manifold vacuum instead of throttle position. Also, the mechanical auxiliary spark advance operated through the throttle, a feature for '53, has been dropped in favor of a more sensitive all-vacuum deal. Hydraulic lifter action has been improved

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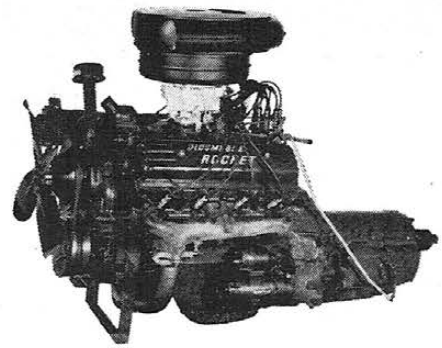
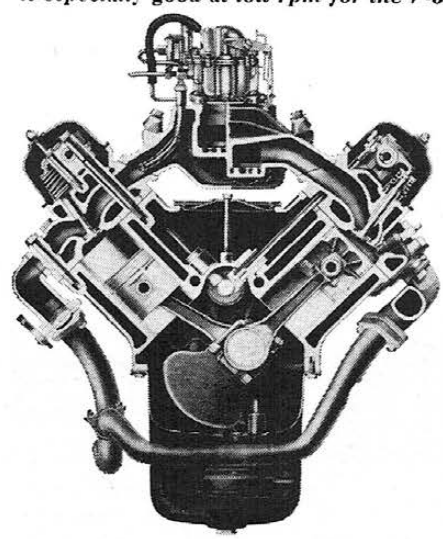
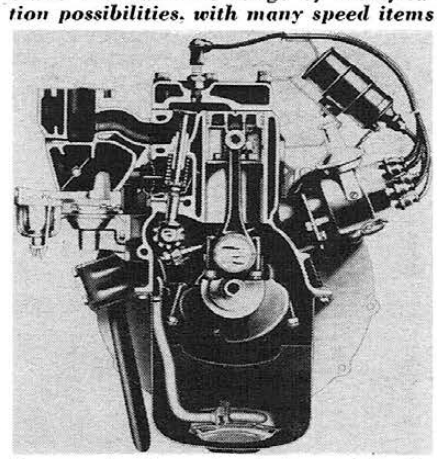


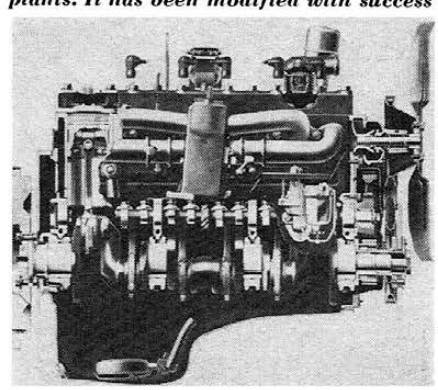
One of the hot favorites in any form is the Oldsmobile Rocket engine. Torque is especially good at low rpm for the V-8



Stude V-8 has wide range of modification possibilities, with many speed items



Front and side sectional views of Studebaker Champion engine above and below reveal basic design of one of smallest plants. It has been modified with success



ENGINE ANALYSIS

(*Continued from page 31*)

to prevent sloppy cold running. The Lincoln engine is an excellent soup-up bet. The huge 2-inch intake valves and large free-flow porting give a good base to build on. A little port polishing, a .050 head mill (for 8.5:1 compression), a dual quad manifold, and a hot cam should put things close to 300 hp. (In case you modify the cam setup, use Ford F8 truck lifters and pushrods to get decent high-speed valve action.)

MERCURY—The new '54 Mercury ohv V-8 is the same basic engine as the Ford except for one-eighth of an inch larger bore and a displacement of 256 cubic inches (same as the old Merc, incidentally). Horsepower rating is 161 at 4400 rpm. Extra features of the new Merc as compared with the Ford are: a four-barrel carburetor; 7.5:1 compression; larger intake valves; full-flow oil filter. The soup-up situation here is the same, and see the previously mentioned article for the dope.

NASH RAMBLER—No significant changes for '54.

NASH STATESMAN—Detroit is having to dig pretty deep in the hot rodders' bag of tricks to keep the old long-stroke engines in the hp race! Nash has gone a step further for '54 by putting a new 8.5:1 aluminum head in conjunction with dual carburetors (single-barrel) on the small Statesman engine; this raises the rating from 100 to 110 hp. For further soup you can regrind the cam.

NASH AMBASSADOR—An increase to 7.6:1 compression ratio and a new camshaft put the standard Ambassador rating from 120 to 130 hp. The optional "LeMans Dual Jetfire" engine is unchanged, continuing with aluminum 8.0:1 head, dual side-draft carbs, and 140 hp. Best souping bet here is a hotter cam . . . and I might say that this basic Nash engine has been converted into some pretty potent and reliable racing mills.

OLDSMOBILE—A one-eighth of an inch increase in bore (to 324 cubic inches), a new cam, and an increase to 8.25:1 in compression ratio put the rated peak of the new '54 Olds Rocket engine to a hefty 185 hp. The extra inches give this baby probably more punch in the 1000-2000 rpm range than anything in the business. Souping-wise, the situation is about equivalent to Cadillac, except there is room for a bit larger valves. Some disagree as to whether you should concentrate on larger intakes or exhausts. One thing is sure: For the ultimate in performance regardless of cost, get the very maximum possible in valve area that the combustion chamber permits. Careful porting will help on the Rocket, too. In general, a .020 mill (for 8.7:1 ratio), porting, dual quad carbs, and a good roller cam should give an easy 250 hp in a practical road conversion.

PACKARD—The basic 15-year-old Packard straight-8 block is really getting squeezed in the horsepower race! They all but drew blood last year when they put an 8.0:1 head and four-barrel carb on the big 327-cubic incher. For '54 they've blown up the displacement to a hefty 359 cubic inches and added a new 8.7:1 aluminum head to raise the rating from 180 to 212 hp! The new inches are said to give a real belt in the 40-70 mph range. If you're interested in further stuff with the big Packard, probably a reground cam would be the best bet . . . and then get out of the way!

PLYMOUTH—Only engine changes are tougher alloy intake valves and a larger oil pump; no change in rating. Special aluminum heads and dual manifolds are available for the reliable little Plymouth engine and, along with a three-quarter regrind on the cam, should be good for 135 hp or so.

PONTIAC 6—No significant changes for '54.

PONTIAC 8—A larger carburetor and improved manifold have raised the rating of the standard 6.8:1 compression engine from 118 to 122 hp; the Hydra-Matic version with 7.7:1 compression is now up to 127 hp. Some special speed equipment can be bought for the Pontiac 8. The basic engine, in fact, *has* been reworked to over 200 hp.

STUDEBAKER CHAMP—Compression is increased to 7.5:1 for '54, but hp rating remains the same. Strangely enough, there's a lot of speed equipment available for this tiny engine, and it used to be quite popular; a top speed of 95 mph from the Champ is entirely possible. But even this is little better than some of the latest low-priced stock jobs . . . and another good engine falls victim to cubic inches and overhead valves!

STUDEBAKER V-8—Standard compression ratio has been raised from 7.0 to 7.5:1 for '54, but hp rating remains at 120. With the flock of speed equipment on the market for the Stude V-8 today, 180-200 hp on pump gas is no trick. In addition, the engine is terribly rugged and will take a real flogging on the road, drag strip, or even in track racing. One limitation, unlike some of the other new ohv V-8's, valve and port sizes are not too generous and a complete reworking of the cylinder heads is indicated on any decent soup-up job (or, of course, these can be bought outright). If you're doing a "full" job on the Stude V-8, keep in mind the possibility of boring three-sixteenths of an inch over (to 259 cubic inches) for more low-speed punch; good road pistons in this oversize are available.

WILLYS 4—No '54 announcement as

of press time. No changes likely, and soup-up possibilities here are a bit dim.

WILLYS 6—No '54 announcement as of press time. No changes likely. This engine offers some souping possibilities, but she's a problem because the intake manifold is cast as part of the head. About all you can do for dual carburetion is to cut right through into the manifold, braze on plates to seal off the water jacket, and mount your carbs on an outside plate that is fastened with screws. From here, the usual head mill (not over .050 in this case), porting, and reground cam is in order. And since the stock exhaust valves are much smaller than need be, late Ford exhaust valves are often fitted. Over 130 hp is in sight with some smart work.

HUDSON ROAD TEST

(*Continued from page 47*)

EXTERIOR

In body styling, the most obvious change on the Hudson is in the rear fender line, which has been raised and lengthened to give the car a longer, more streamlined look. The comment of the MOTOR LIFE staff photographer, who has put countless cars on film, was interesting: "It sure looks sexy," he said.

Contour of the hood, which could stand strengthening, has been rounded. Other modifications are chiefly in trim and grille decorative touches.

INTERIOR

Entry into the Hudson Hornet is easy, with doors opening at an 80-degree angle. Alterations in the interior for the '54 are few. There still are numerous lights for the convenience of passengers: two in back, two in front and one overhead. The back of the front seat continues to carry the almost extinct robe rope. Arm rests, both front and rear, are not located in the most comfortable positions. It's interesting to note that, despite the low location of the floorboards between the frame, the tunnel for the driveshaft is an insignificant hump.

The Hornet probably has the distinction of having the flashiest steering wheel insignia in the business. As for the dash, instrument grouping is good, although reflections are numerous. Top of the dash, however, has a good non-reflecting surface for greater eye ease.

GENERAL

It's easy to say a great many good things about the Hudson Hornet. The most important of these are the performance and handling qualities, which have been adequately commented upon. But another vital characteristic is its ruggedness, a factor that has been conclusively demonstrated in dirt track competition. The road crew discovered this, too, for few cars emerge from the violent maneuvers the test drivers use in top condition. When the Hornet was returned to the factory, it still was in perfect tune.