Hot Rodding the Early Olds

Inexpensive to buy and hop up, the 1949-1956 Oldsmobile produces excellent performance when given the modern touch — a touch that applies to many older ohv V8's

By LeRoi Smith

A very special year for hot rodders was 1949. It marked the beginning of the modern overhead valve V8 engine in American cars, ushering in an era of powerplant development unequalled in the history of Detroit cars.

Before the introduction of the radically new Cadillac and Oldsmobile ohv's, the hop-up enthusiast had been restricted to an abysmally narrow selection of engines — the Ford flathead V8, Chevrolet and GMC ohv sixes, occasional straight eights, and the perennial Models T and A.

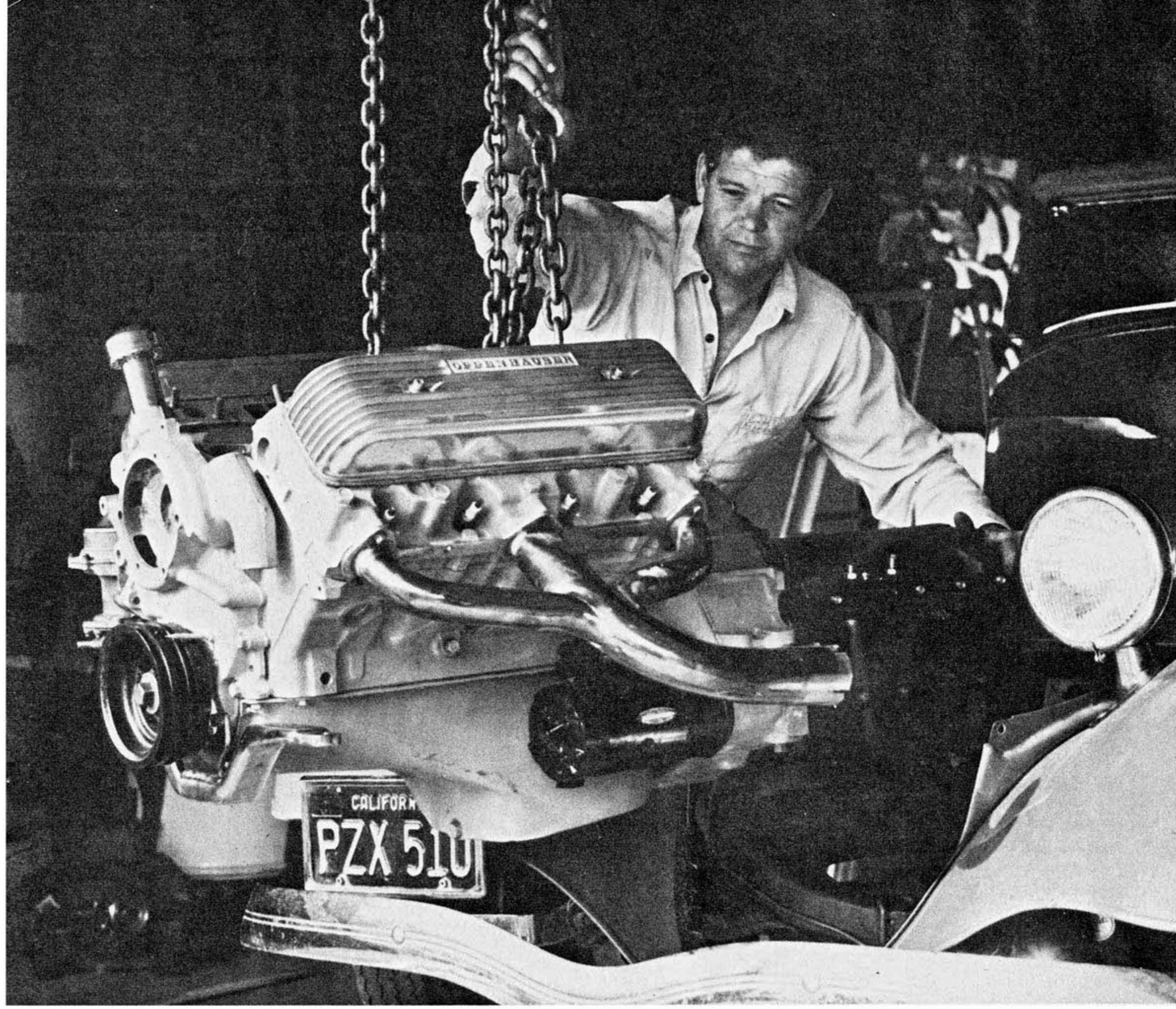
No modern engine escapes the inquiring experiments of the performance artist. In order of current popularity the engines line up this way: Chevrolet, Chrysler, Ford, Oldsmobile, Pontiac and Buick. However, in order of continued popularity since the advent of the modern American ohv V8, the list reads differently — Oldsmobile, Chevrolet, Chrysler, Pontiac, Ford and Buick. Time exposure and sheer mass of numbers have kept Olds out front in spite of several years' absence from serious performance engine production.

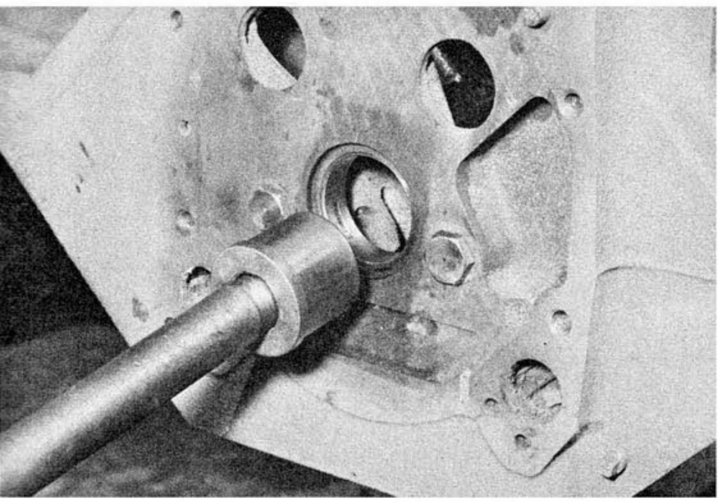
Recognizing the power of the hot rodder influence, Oldsmobile directors came back strong in 1965 with their 442 car, fully equipped and fighting mad with 400 cubic inches. Like the new 396 Chevrolet, the Olds engine fairly reeks of performance potential, a potential many experts are now investigating. Tony Nancy is so excited over the possibilities he has dropped the Chrysler Hemi in favor of the new wedge head.

But all this is really only frosting on the cake. The real substance of the matter is the long-term command of the basic 1949 Olds design in hot rodding. As exceptional as recently introduced engines are, the average rodder seldom owns one for personal ingenuity. The big new mill might well be in his family car, but for his mechanical hobby he most often considers the tried and true Chevy or Olds. And, if the consideration is for brute strength, huge cubic inch potential, tremendous torque, and (above all) total cost — why, then, the Olds just has to receive the nod.

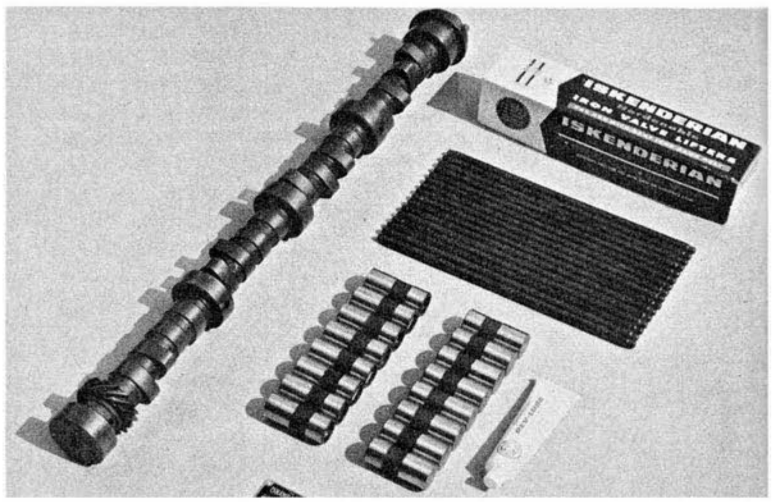
On the present hot rod market, the Oldsmobile is assigned popularity by year model: 1959-1963, 1957-1958, 1949-1954, 1955-1956. Naturally, continuing factory development accounts for the to-be-expected popularity listing. Note, however, that the 1949-1954 engine does not fall last, a factor largely due to early block use in all-out drag cars.

Back in 1963, the factory announced that over five million of these rugged powerhouses had been built, all based on that initial design. Through the years the stock cubic inch displacement has risen from an original 303 through 324, 371, 394, and now is over 400. It is readily apparent, then, that with such an overwhelming number of units scattered throughout the nation's junkyards, the all-important cost factor is low. Very low. In addition, the extreme ruggedness of the block and crankshaft make it ideal for

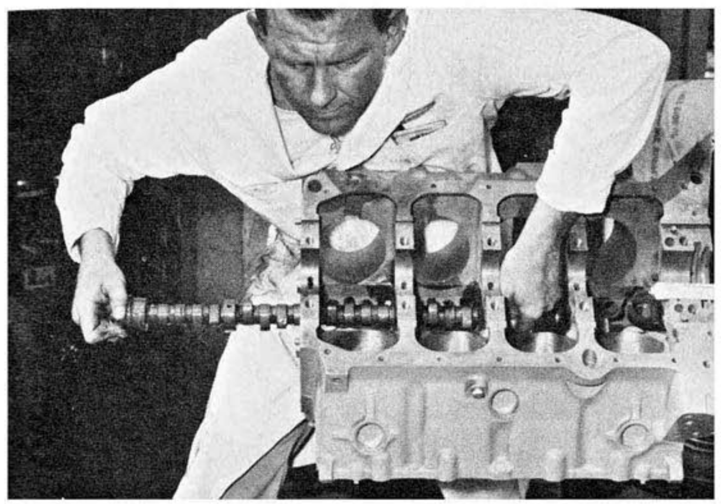




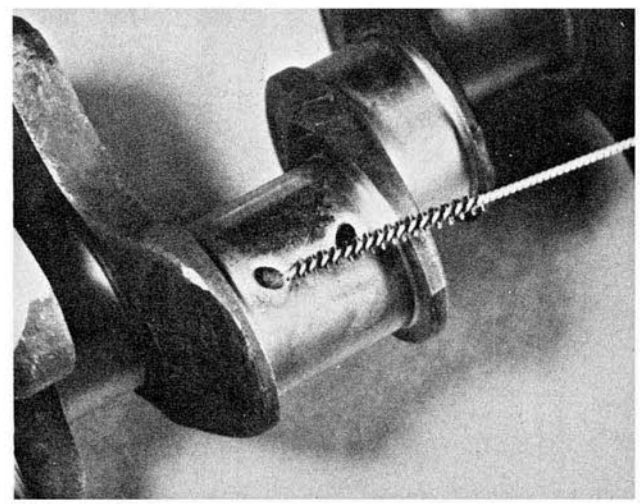
After the block is thoroughly cleaned and inspected, cylinders should be bored and honed if necessary, and the block cleaned again before new cam bearings are installed.



For street use, the new hydraulic cam grinds from major speed shops are more than adequate: Always use the entire kit whenever possible.



Lubricate the cam bearings and cam journals/lobes before starting assembly. Carefully insert cam into block — don't nick bearings with sharp edges of cam lobes.



After crankshaft is inspected for flaws and micro-polished oil openings for bearings are radiused for increased oil flow.

big strokes and bores, with Nitromethane fuel and supercharging willing partners.

Through the years, adaptability has been a guiding light for Olds engineers, making it possible for a tremendous amount of parts interchangeability — late heads on early blocks, high-lift modern cams to replace mild early versions, etc. This factor, in itself, has been the subject of considerable attention during the years. By and large, however, the average hot rodder wanting an engine for normal street use and only on occasional fling at the drags has chosen the 1949-1956 design. With the multitude of speed equipment parts available for the early Olds, all at a very attractive price, it's not unusual that this engine should find its way into so many rodding uses.

This particular article is directed specifically at these early engines. Not from a parts interchangeability angle (a very real necessity if serious competition horsepower is required), but rather from the aspect of modernizing the basic early product with currently available speed parts and ideas.

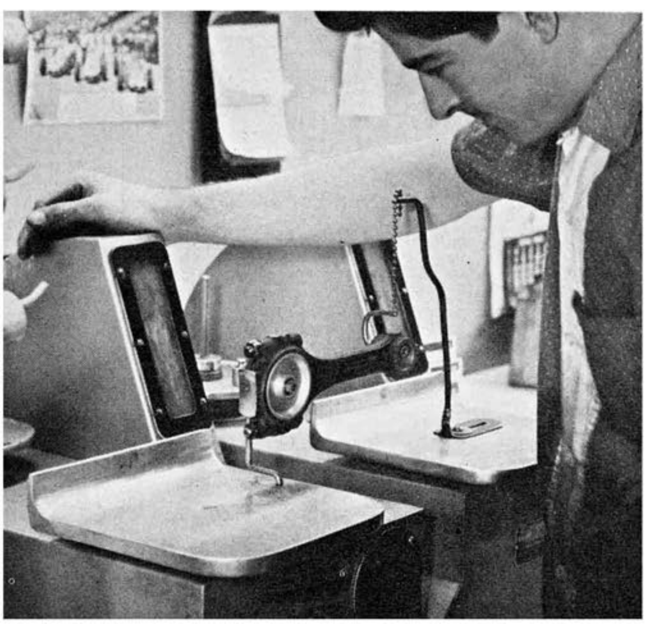
For the past several years, I've been using an Olds powered '34 Ford phaeton as an everyday work car, with weekend roadster club tours thrown in for exercise. Like so many similar conversions, width clearance is at a bare minimum, and the fan pulley bolts are less than a quarter-inch from the radiator fins. Nevertheless, with the generator remounted above the left valve cover, everything tucks snugly into the tight Ford engine compartment. Also, like so many other conversions, this 700-pound engine has been performing yeoman duty for thousands of miles. The only hop-up equipment it has seen since 1949 is an early Nicson dual quad manifold, tubing exhaust headers, and a mild Isky 3/4 grind camshaft. In this condition, the engine produced an honest 160 horsepower, quite comparable to factory figures for the 324-cubic-inch '55 model.

As a writer working closely with engine builders, I never cease to be amazed at the rapid progress and ultimate success enjoyed by the racing Olds builders; success culminated not so long ago when the Safford-Gaide-

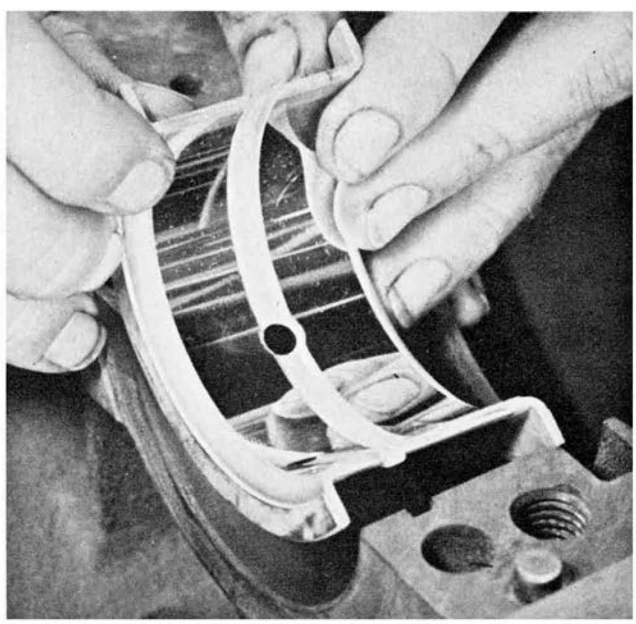
Small holes are drilled in piston pin boss from bottom up to increase the amount of oil at piston/pin area.

Early ohv engines were not balanced as well as current crop, so matching piston weight is vital.

Pins should be miked at both ends and middle to detect any taper; use only quality pins.



Rods must be inspected and replaced if defective. They must be matched for weight, and small ends balanced to within one gram.



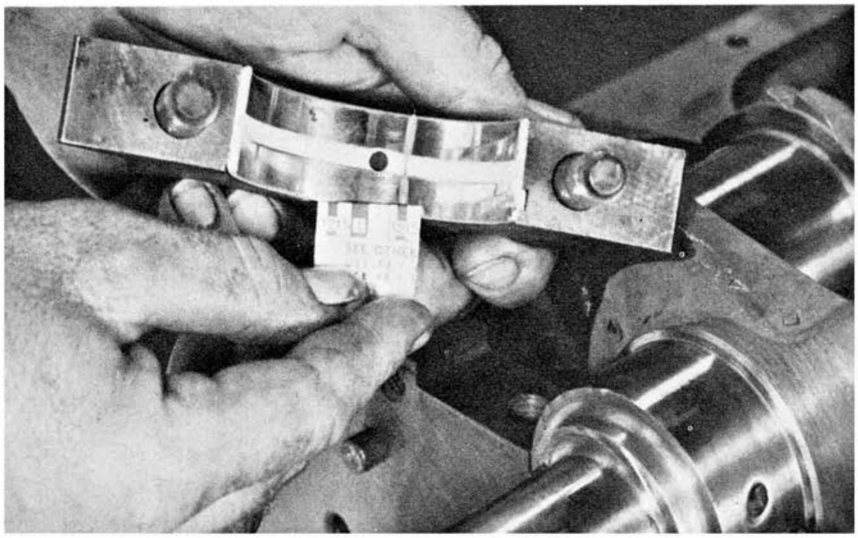
Bearings are installed with care, making sure the locating slots in block and rod match up perfectly. Lube before assembly.

Ratican dragster guzzled 90 percent Nitro to crank 195.64 mph in 7.92 seconds, a record at the time.

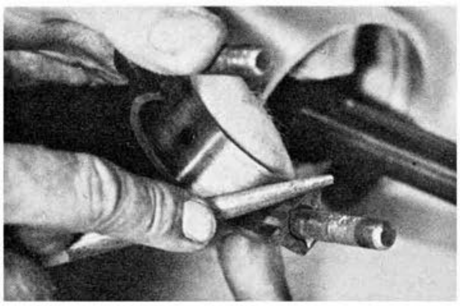
But back to the street. Huge gobs of horsepower, like the 1100 or so required for the above performance, are wasted on the street. What the touring needed was something producing around 240 horsepower and 350 lbs/ft torque at 2400-2600 rpm. The stock '49 engine had 135 hp with 263 lbs/ft at 1800 rpm.

Fellow roadster owner Sam Conrad had just completed an early block, late head Olds for his '29, but the addition of a huge bore and long stroke (480 inches!) made the engine too powerful for ordinary traffic.

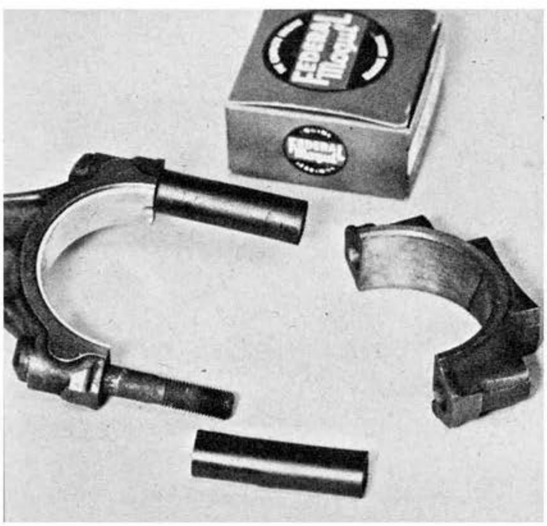
With the tired engine in a rental trailer and the requirements in mind,



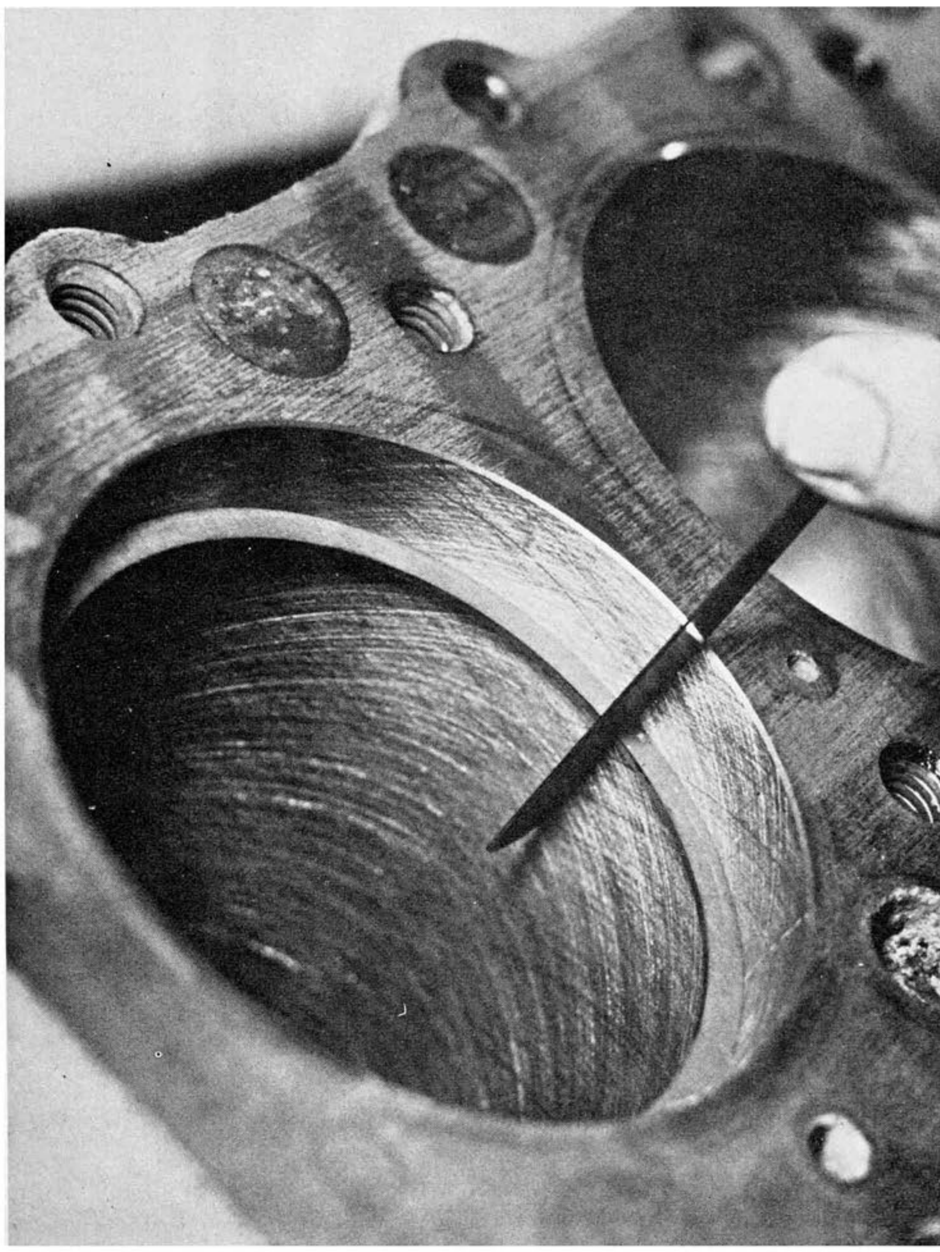
Plastigage may or may not be used, but it is vital that bearing clearances be constant throughout the engine. They may be increased slightly for street/strip.



Using a fine file, remove the small burrs from edge of the rods and main bearing caps.



Rod bearings should be a snug fit. Hose slipped over studs will keep threads from damaging crank journal during assembly.



Before rings are placed on pistons, they should be checked for end clearance in bore.

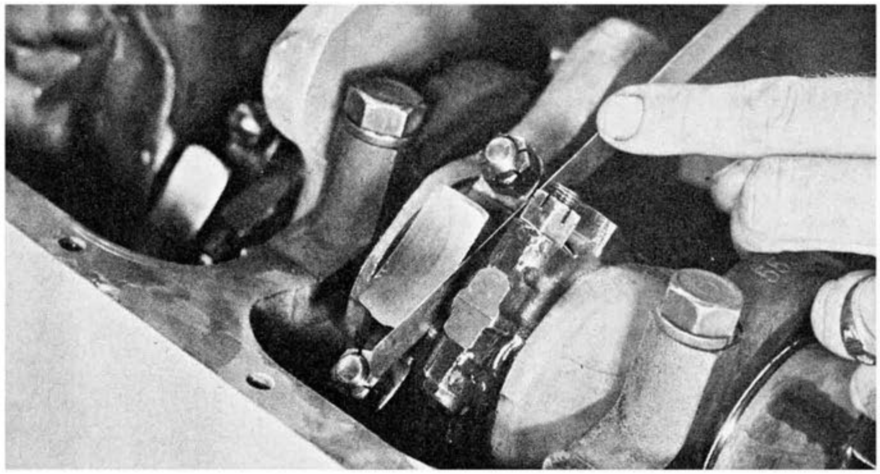
I called on Clem Tebow at C-T Automotive in North Hollywood, Calif. Having cut his teeth on these earliest ohv's, Tebow knew all the answers.

After initial disassembly (all the component parts being separated into individual marked boxes), the crankshaft, rods, pan, engine block, and heads were dropped into the hot tank for a thorough boil-out. The crankshaft was first out of the tank and after a good warm-water flush it was Magnifluxed to detect any cracks around the main or rod journals. No cracks were found, so the shaft was centered in the crank grinding machine and checked for straightness (no more than .005-inch runout allowable). All bearing journals were miked, the resultant wear from years of hard, continuous labor showing that the shaft was slightly scored and would need turning to .010-inch undersize.

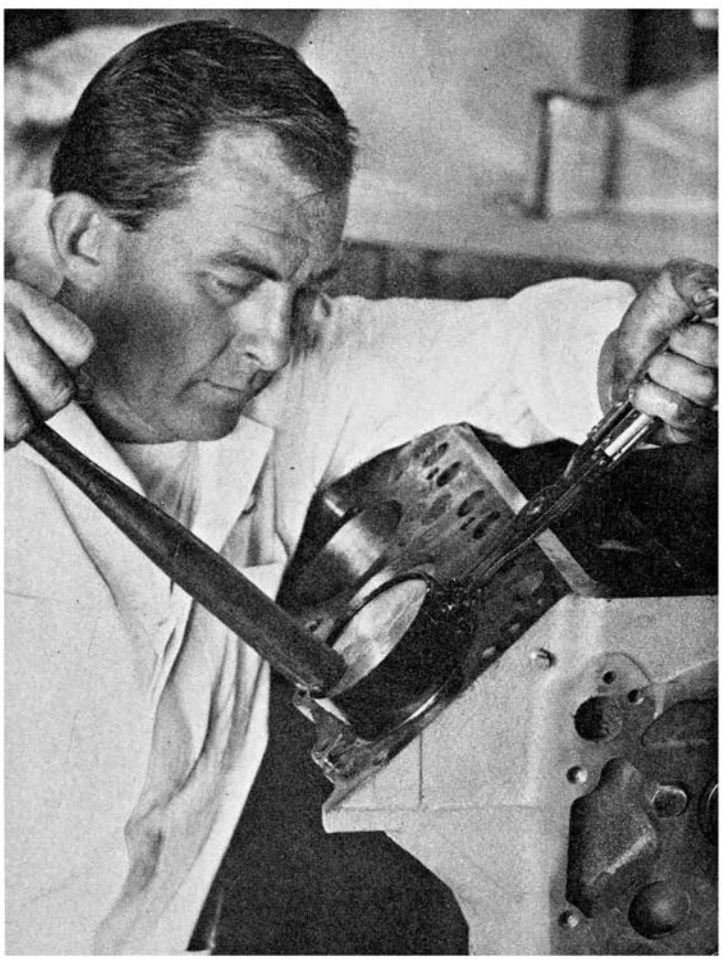
It is a common belief that cranks cannot be turned more than .010-inch for competition use, but the standard maximum of .030-inch holds true for both street or strip if the competiton engine is not laboring on the ragged edge of destruction.

Grooved main bearings are available for the Olds, so grooving the crankshaft was not necessary. If these bearings had not been available, the main bearing journals would have been grooved 1/8-inch, a racing engine practice that ensures oil flow to the rods. This groove, whether in bearing or crank, is a reservoir; without it, oil under pressure enters the crankshaft oil galleys only when the main journal galley hole aligns with the block (bearing) hole — a sort of instant timed injection.

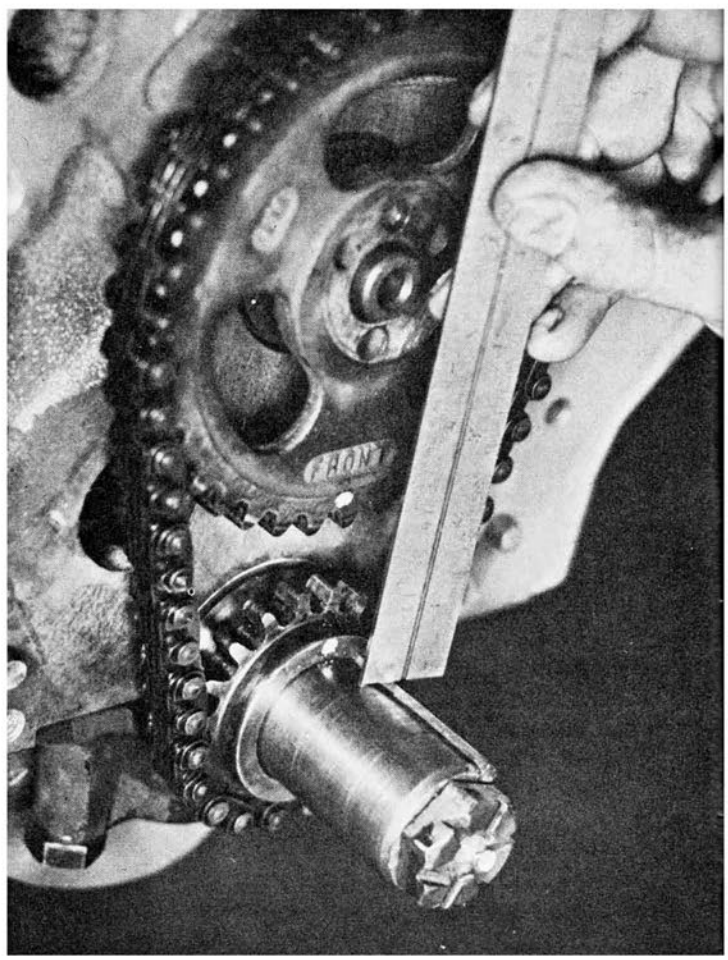
Had the engine been intended for some really heavy-duty use, the crankshaft rod journals would have



After rods caps are slightly tightened, check the end play between rods and also at main bearing thrust surface. End play for clearance must be adequate when engine is running at higher power settings.



Assembled piston/rod is lowered into bore, rings squeezed carefully, and piston tapped into place.



Use new timing gear and chain; align timing marks exactly during initial construction.

been radiused, a practice for racing cranks wherein a fillet weld circles each journal side. The fillet is ground to curve smoothly from the journal face into the support cheek, providing an extra margin of vital strength where a competition crankshaft is likely to break. Before being sent into the balance shop, the crank was micro-polished to get each bearing surface as smooth as possible, and all oil hole outlets were chamfered to remove sharp edges.

While the crankshaft was being prepared, Tebow had ace piston/rod man Joe Gomez hard at it. The cleaned rods were first visually checked for any apparent damage, such as cracks, nicks in bearing and pin bores, etc. If there is doubt as to a rod, or if factory rods are to be used in highly stressed engines, Magniflux inspection is desirable.

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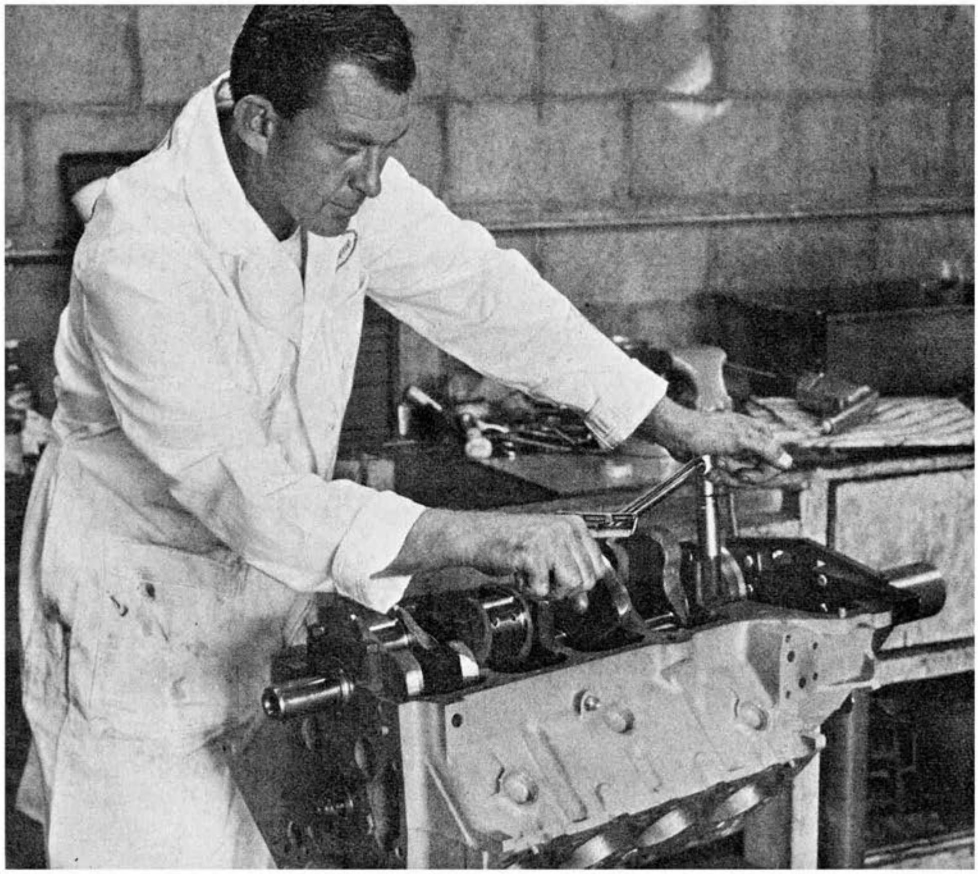
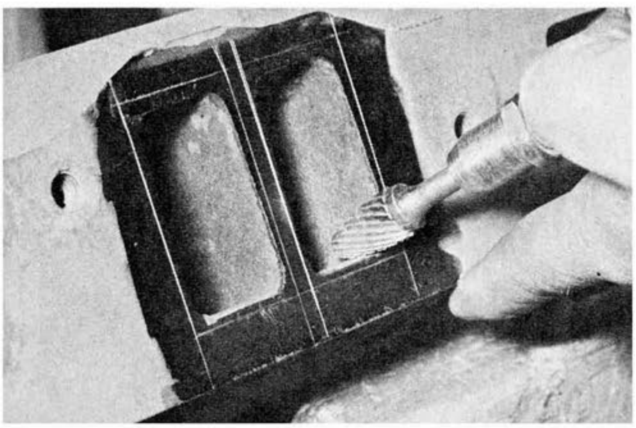
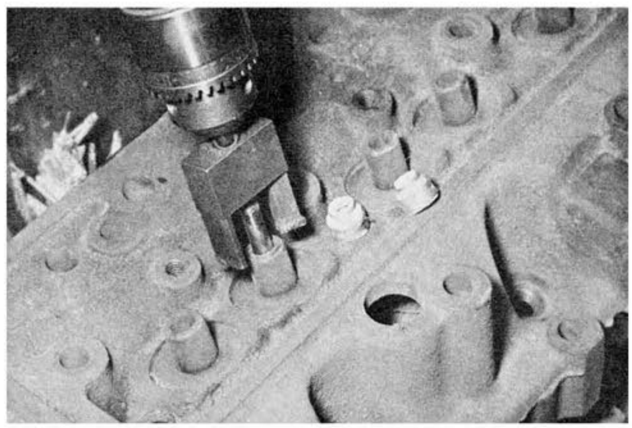


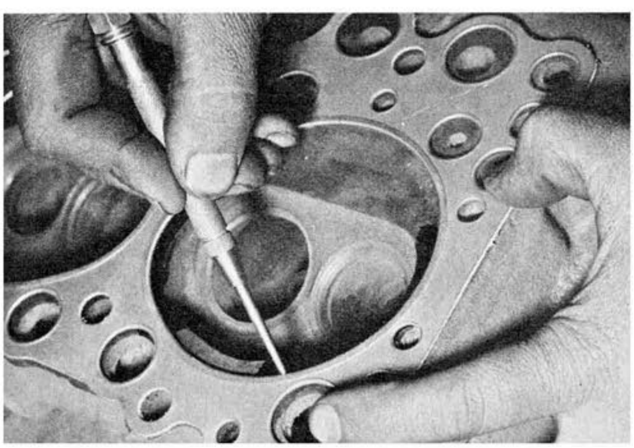
Torque down main and rod bearing caps to the factory settings; rotate the assembly.



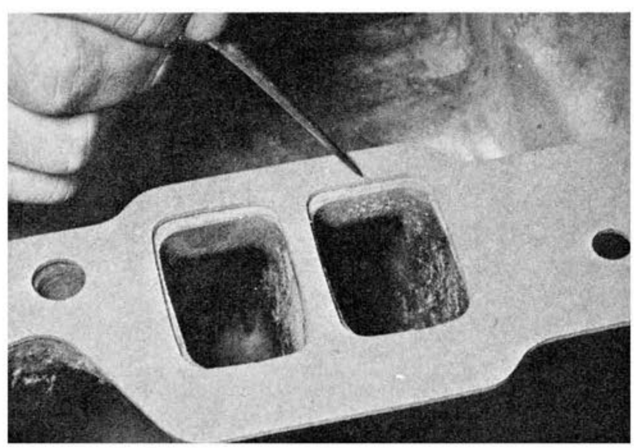
Heads of early Olds engines need to be opened in the port area as shown here.



Install Perfect Circle nylon valve stem seals, since oil may run down around stems on highly modified engines.



Using stock gasket, mark outline of combustion chamber around valve area. Grind metal away so valves aren't shrouded.



Ports in the intake manifold should be opened up to match the heads, especially in '49-'53 engines with stock heads.

HOT RODDING THE EARLY OLDS

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Center-to-center distance from pin bore to bearing bore was checked, a procedure that occasionally finds a misfit. Next, the rod was placed on an alignment machine to determine if it had been bent or twisted. If the rod is deformed ever so slightly, it must be straightened, usually manually with a long leverage bar.

Using a piston pin that was to be included in final assembly, the original rod bushings were tested for a firm push fit. Normally, new bushings will be required and are honed to pin size plus clearance. Gomez passes along this handy trick for lubricating pins in non-bushed and non-drilled rods. A .125-inch hole is drilled from the top of the rod into the pin bore, allowing oil to seep in during engine operation.

The rod big end bore is checked, and if found out-of-round more than .0015, the rod is reconditioned. This is an important operation, and should not be overlooked in even the mildest re-build.

Finally, with bearings temporarily in place, appropriate rods and matching caps are fitted to the finished crankshaft. Both rods are pushed apart and the separation (which is equal to total side clearance) is measured. The edge of the rod big end is machined if additional clearance is needed, a total clearance of .015-inch minimum for street engines. Racing engines would start at .030 for steel rods, with an additional .010 added to that for aluminum rods. Insufficient rod side clearance is the prime cause of many engine bottom-end failures.

With the rods finished, attention was turned to the pistons. The most obvious route to increased horsepower is via increased cubic inches. Working within the original plans for a flexible street engine, it was decided to leave the stock stroke at three and 7/16-inch, but bore would be enlarged .187-inch. This would bring the displacement out to the '55-'56 reading of 324.3 inches, an increase of 20 cubes.

Special 10 1/2:1 compression Jahns cast aluminum pistons were ordered (the block should always be bored to match the pistons on hand, not vice versa), each piston featuring three Grant rings and a solid skirt. Reason for selecting a cast piston was simple economics. For ordinary street use and an occasional blast at the drags, a cast piston is more than equal to the job (in fact, cast pistons have been successfully used in all-out racing engines, but there is little margin for error). A semi-forged piston (a casting that is final shaped by pressure) costs about twice as much, and a true forging (piston formed by stamping solid billet) costs even more.

The seemingly mild compression ratio, mild when compared to race engine practices, proves most feasible for street use. A maximum ratio of 12:1 could be considered, but ignition timing, valve timing, and gasoline octane become a headache at such high ratios. Of course, compression could have been raised by milling the heads and then stock '55-'56 pistons could have been used. This will be covered under head work.

All pistons were miked to make sure they were identical, then the pin bore was honed to a firm hand push pin fit. This fit will equal approximately .0006-inch (for street; racing would be .001-inch maximum. The piston skirt was then knurlized to the final cylinder bore diameter, about .008-inch over piston size. The knurlizing process forms little pyramids of aluminum in patterns and helps to keep the piston from rocking in the bore. Piston rock is quite pronounced in solid skirt designs, since the three rings are above the pin, allowing the limited expansion skirt to slap back and forth. Knurlizing is set at bore size, since the tiny pyramid peaks will quickly wear off, allowing the skirt to seek its own proper working clearance. An added advantage of the process is increased skirt-to-wall oiling, as oil will tend to be pocketed between the pyramids.

Another Gomez oiling trick is to drill a .125-inch hole from the bottom of each piston pin boss to the pin bore. Oil splashing around during engine operation will work up through these holes and help lube the pins. Finally, each ring land was checked with the appropriate piston ring. The groove must not be too small, lest the ring should seize, nor too big, thereby allowing the rings to rock and eventually fail. These land clearances are dictated by the piston and ring manufacturers.

The piston/rod assembly was hustled off to be balanced, where Ditronic's Bob Milliken takes over during this phase of precision engine construction. As an aside, it is interesting to note that most balance shops hold the same exacting tolerances on all jobs, racing or street.

First step of a balance begins with the crankshaft. Bob emphasized that most late model ohv's are very closely balanced at factory, an obvious requirement for a high speed, top performing stocker. The early engines, however, like my Olds, didn't receive such forethought. Installed on the Stewart-Warner balancer, the crankshaft was spun to check for both static and dynamic balance. Whether for street or strip, both these areas must be within .250 ounce/inch tolerance.

To correct an unstable condition, material is drilled from the heavy counterweight. A static imbalance would be caused if too much weight were on one side of the crank centerline, which results in a hop. If the shaft is too heavy on the bottom of the centerline in front and too heavy above the centerline at the rear, a wobble will develop producing dynamic imbalance.

The '49-'56 Olds crank is balanced by itself, then the flywheel is added and balanced, and finally the pressure plate gets the same treatment. Both the plate and the flywheel are indexed so that they can be aligned correctly on the crank flange during subsequent re-building.

All rods are balanced to each other, with no more than one gram weight difference acceptable. In addition, big and little end weights are matched up, again with the same one gram maximum deviation. Should a particular rod prove heavy, material is removed from the stubs on either end. This is a straight grinding operation, the grinding direction following the grain perpendicular to the bores.

The piston and pin is balanced as a unit, each unit being balanced against the others by weight only, with the one gram tolerance again observed. This is one additional reason why only good quality products should be used in engine rebuilding, even for stock mills. Bad piston pins can vary as much as 12-14 grams, making final balance virtually impossible. Good pins will be very close in weight.

Piston weight matching can be somewhat accomplished by putting a heavy pin in a light piston, etc., but the final matching comes by drilling ever so slightly on the beefy, inside portion of the piston pin boss. With all the balancing accomplished in the prescribed manner, work was started on the early Olds cylinder block.

After the hot tank chemicals were hosed off with fresh water, the entire block was inspected for flaws. Cracks in the cylinder walls or water jacket would mean repair or replacement. Next, all machined surfaces were checked for warpage by running a straight edge slowly across each area. Most blocks will check out ok, but bad ones do occur, the remedy for such misfortune being a surface milling cut (not grinding, as grinding will leave too smooth a finish making good gasket seating difficult). Areas to check include head deck, valley cover, timing gear cover, pan, and bellhousing.

Assured the block was in good shape, mechanic Marvin Rawley checked the crankshaft main bearing bore. Had it been untrue, the main caps would have been torqued in place (minus bearings) and the block align bored. Using the new pistons as guides, the block was bored to piston diameter, then the holes taken out an additional .008-inch with a 210 grit hone. The hone is used for this final clearance cut as a boring bar leaves a fractured metal surface on the bore walls, best removed by the normal cross-hatch honing procedure.

Piston-to-wall clearance is in direct proportion to cylinder bore: the bigger the bore, the more the clearance. Were this engine to be used for much racing, clearance would be increased at least .002, or to .010-inch minimum. The type of rings to be used will determine the hone grit, 210 being fine for iron rings, 180 proving adequate for chrome rings.

The cam bearings were removed and the cam bore checked for alignment (usually ok). Each bearing bore was also checked for diameter, as it is imperative the cam bearings do not rotate, thus sealing off the vital oiling passages. After this final check, all block oil passages were cleaned with a long small o.d. brush and the entire block washed thoroughly with water and clean solvent.

Short-block assembly started by dropping Federal Mogul babbit bearings in the main caps and block. Copper lead bearings would be necessary for racing. With the main caps installed, the bearing i.d. was checked with a micrometer. The bearing surfaces were then liberally coated with assembly lube (a matter of preference. I use either STP or HRM mixed half and half with Torco 30-weight oil). With the main caps set aside, the crankshaft was carefully lowered into position, rotated slowly to make sure it was solidly in place, and then the main caps installed and torqued to specifications. These readings are 110 pounds for all but the rear main cap, which gets 160 pounds.

At this point, the crankshaft should spin freely in the bearings. If it does not, something drastically is wrong, such as misaligned crank bore, bent crank, wrong size bearings, etc.

Piston rings should be individually checked in the bores, each ring being parallel with, and about one inch below, the head surface. End gap for the Olds was set between .015 and .017-inch. For racing, this would have equalled approximately .006-inch per 1-inch of bore, or about .025, since more clearance is needed in a hard charging powerhouse.

Each ring was then carefully installed on the pistons, the open gaps rotated 90 degrees from each other to preclude combustion gases from racing downward through lined-up gaps. F-M 1555SB rod bearings were slipped in place, making sure the top half of the bearing had its oil hole aligned with the hole in the rod. The '49 is the only engine with rifle drilled rods for pin lubrication, all subsequent Oldsmobiles use F-M 1555SA (street) or CPA (heavy-duty).

After coating the entire piston with assembly lubrication, a ring squeezer was carefully tightened in place and the rod lowered into the cylinder. It is important that '49-'56 rods be installed correctly. In the right bank, cylinders 2, 4, 6, and 8, the two small bosses cast into the rod just above the bearing bore face the front of the engine. They face to the rear in the left bank.

With the crankshaft throw for that particular cylinder at the bottom of its travel, the ring squeezer was held firmly against the head surface and the piston tapped into the cylinder with gentle blows from a hammer handle. After the last ring was inside the bore, the rod big end was guided onto the crankshaft, taking care not to burr the journal or bearing. The rod caps were then installed and torqued to 35 pounds.

The oil pump was inspected, cleaned, and fitted with a new pickup screen. To ensure there would be no dry pump surfaces during initial cranking, the pump was hand primed before being bolted in place. To increase the oil pressure operating level, a heavy-duty pressure relief valve spring was substituted. A stock spring should never be stretched in an attempt to gain the important 5-15 pounds increase.

Better valve timing constituting a major part of any engine hop-up, serious consideration was given a good design for this particular engine. A flexible engine for all-around driving means a cam pattern with broad torque characteristics. In addition, hydraulic lifters were preferable over flat tappets for simple maintenance reasons (you don't have to constantly adjust them) and noise.

Chatting with Ed Iskenderian we found he had a choice of three hydraulic grinds for the early Olds, degrees ranging from 262, 282, and 302. The 262 grind has a total of .420-inch lift using stock 1.8 rocker arms, torque coming in from 2500-2700 rpm. Both the 282 and 302 have .429 lift with 1.5 rockers, the 282 torque starting at 3000 and the 302 coming in at 3500 rpm. For this engine, the 302 was much too strong. The 262 would be good under normal city conditions, but with much freeway and open highway driving in Southern California, the 282 appeared the compromise.

As delivered, the Isky cam kit consisted of the cam, pushrods, heavy-duty hydraulic lifters, springs, retainers, and a tube of rev-lube. The lifters are no different than stock items in appearance, but they'll spin to 6500 rpm before pumping up. The stock lifters start losing out above 4200! Incidentally, the Chevrolet hydraulic lifter can be used in the early Olds engine, allowing an rpm top of 7500, if the Isky non-adjustable rockers and adjustable pushrods are fitted.

Rev-lube was smeared on the cam bearing journals and the "bump stick" gently slid into place, being careful not to burr the cam bearings with a lobe edge. The lifters were also coated and dropped in position.

Next to the valve timing, the heads are the most important single path to performance in the early Oldsmobile. Especially the '49-'53 version. As originally produced, the heads had 7 1/2:1 compression, 1 x 1 1/2-inch intake ports, 1 1/8-inch exhaust outlets, restricted valve throats, and intake/exhaust valve sizes of 1 3/4 — 1 7/16 inches, respectively. The '54 through '56 designs gained much of their performance by increasing valve lift from .366 to .403-inch, raising compression to 8 1/2:1, and enlarging both intake and exhaust ports slightly.

As mentioned earlier, the Olds heads can be milled to raise the c.r., but there are limits. The '49-'50 heads can take a safe .125 cut, but succeeding models should be limited to .090-inch. If the heads are milled, heat treated flat washers equal to the cut must be used between the head and rocker arm stands. Washers should also be used under the head bolts to preclude the bolts bottoming in their holes.

After thorough cleaning, the heads were checked for warpage and cracks, then sent to Joe Mondello for porting. Although not really necessary for non-competition '57 or later heads, porting is quite relevant to power in the early designs. The intake openings were enlarged almost 3/16-inch, which gives a size almost identical to available big port gaskets. Intake flow was improved by straightening the passage as much as possible from the intake opening to the valve throat base, and the throat area itself was opened up to the inside diameter of the valve seats. The exhaust passages were cleaned up and polished.

With a couple of old valves in place to protect the valve seats, the combustion chambers were modified. First, using a head gasket as a pattern, the shrouded areas around the outer edges of both valves were ground away to allow better breathing. After that, the entire combustion chamber was ground and polished to a mirror finish, all sharp edges (such as around the spark plug hole) being smoothed to reduce detonation problems.

Stock '57 Olds exhaust valves were installed — selected because they're bigger (one and 9/16-inch heads) and will fit. The original 45-degree seat angle was retained, with seat width ground to 1/32-inch for intakes and 1/16-inch for the exhausts. To provide better control of oil around the valve stems, Perfect Circle Teflon seals were used. Finally, the valve springs were checked for tension (110 pounds are sufficient for street use, but this tension varies according to cam, tappet and manufacturer) and the coils depressed to make sure there was at least .030-inch clearance before bind. A cleaned and inspected rocker arm assembly completed this phase.

The head bolts were torqued first to 50 pounds, using the prescribed factory rotation, then to 60 pounds, and finally set at 70 pounds. After the engine ran some time, the bolts were retorqued. The adjustable rocker arms that had been used in the original hop-up were retained.

The cam and crankshaft gears were next in place, each being carefully aligned with the factory timing marks before the new timing chain was positioned. A check of the final valve timing found the cam to be actually retarded one degree from specs, not enough to bother our driving.

The dual-quad manifold used in the original hop-up was something less than ideal. A check of the head mating surface revealed slight warping, and several of the taped bolt holes were sloppy. A clean-up cut was taken to true the mating surfaces and Helicoils inserted in the badly worn carb stud holes. Using a big port gasket that exactly matched the head, the manifold ports were enlarged to match. Finally, the eight carburetor holes, designed years ago for small bore carburetors, were enlarged to one and 11/16 to match the later model Rochestors.

Ignition was simply turned over to a Mallory Rev-Pol. Although this engine had a set of special tubing headers made in the dark ages, past dynomometer tests have revealed little horsepower gain by replacing the stock cast iron headers on a mild performance Olds.

Buttoned up and tuned, the modernized Olds cranked out 242 horsepower, close enough to the original plan. Following a strict parts swap technique, the '49-'51 engine can gain 47 horsepower just by using reworked heads, 1952 rocker arms, a good distributor or magneto, and a single four-barrel carburetor.. Engines up to '57 can get the same increase, but they need to use the '49-'51 camshaft.

Was all the effort worthwhile? You bet! The early Olds has always been an excellent swap for pre-'49 cars, as it will cool adequately even in traffic and without a fan. The wide torque range and lasting ruggedness make it perfect for dual-purpose use, and best of all, it's inexpensive to build-up, as there is so much good used speed equipment around.

Off with its head!