# DESIGN AND DEVELOPMENT OF THE 265 V8

ALTHOUGH outstanding success is seldom a complete accident, many times it is the result of a happy combination of circumstances. The 265 V8 could well be termed one of those products which came of being at the right time and with the right idea.

Chevrolet was ready for a big step forward in engine design; its manufacturing facilities were oriented toward a certain type of production; the buying public was in the mood for more performance from its automobiles and the company's engineering staff was primed with a briefcase full of original thoughts. During a less successful period of automobile merchandising, or if GM's overall program had been pointed in another direction, the chances are that such a neatly packaged, thoroughly potent engine of this size would not have gotten off the drawing board. Fortunately for the performance enthusiast, the full scope of the Chevrolet Engineering Department's talent was reinforced by all the resources of General Motors, the GM production study group and GM research. The end product was a powerplant which, although laid down specifically for passenger car use, could hardly have been better for our purposes if we hot rodders had ordered it custom made.

To understand *why* it has been so adaptable to the needs of the performance enthusiast, and to gain a thorough insight into the *how* of various modifications, a good basic knowledge of the manner in which the original 265 was conceived and the way it was (and still is) manufactured is necessary. Thanks to much information from papers delivered by R. F. Sanders, formerly Chief Experimental Engineer of Chevrolet, before the Society of Automotive Engineers, we are able to trace the exact development of the basic V8 and its essential qualities. Careful attention to details given here will prevent the less experienced modifier from making mistakes which can nullify the sound principles on which the 265-283-327 Series is based.

Chevrolet did not start cold with the 265, nor was it snatched like Venus from the surf or found like Moses in the rushes. The 265 was a development of several years of study. During this period of time Chevy's engineering people made continuous studies of competitive V8 engines, both within the GM line and outside it. They gathered reports on performance, economy, wear, parts replacement demand and lifetime expectancy of all V8's in the field. Correlating the data with what was anticipated to be Chevrolet's needs, they first developed a 231-cubic-inch V8 of somewhat the same configuration as the 265 but more conventional in many aspects.

This small engine, although an advance over the 235-cubic-inch Six, was not deemed hefty enough for the power increases that would be demanded of it during its production life . . . which, if the Six was a criterion, could stretch many years into the future. A 245-cubic-inch displacement engine was discussed, but when studies progressed, it was discovered that a 260- or 265-inch mill could be developed within the same general block size with no penalty in weight. The added inches would insure higher torque which was advantageous for Chevy's Powerglide transmission, recently introduced and becoming almost a standard piece of equipment.

## THE CYLINDER BLOCK

The first step in engine design, after settling generally on what the power output should be, is to place it within certain size limits. And, here is where the hot rodder lucked out, as far as Chevy is concerned, because Sanders and the engineering staff were determined to whittle the V8 down to a nub.

After bore size had been resolved at 3.75 inches, the piston stroke necessary to give 260 inches of displacement was calculated to be 2.93 inches, but "to round it off," as Sanders says, "we decided to adopt an even three-inch stroke." This resulted in a 265-cubic inch swept volume and gave a .8-to-1 stroke-to-bore ratio, well over square.

Then the search for ways to compact the engine was begun. Anything which could be sliced off the top or bottom of the block, or from the bores, would mean less weight, less heavy iron to cool and, thus, less water (at eight pounds per gallon) to cool it.

The length of the engine was determined by the length of the crankshaft, which in turn, is dependent on the width of the main bearings, rod bearings, crank arms, bulkheads and so on. The size of the bearings is based, naturally, on the loads which must be carried, loads imposed by power developed at the top end, with a margin for safety. Having computed these requirements, and shaved all the non-essentials, the finished crankshaft design required a block only 21¾ inches long!

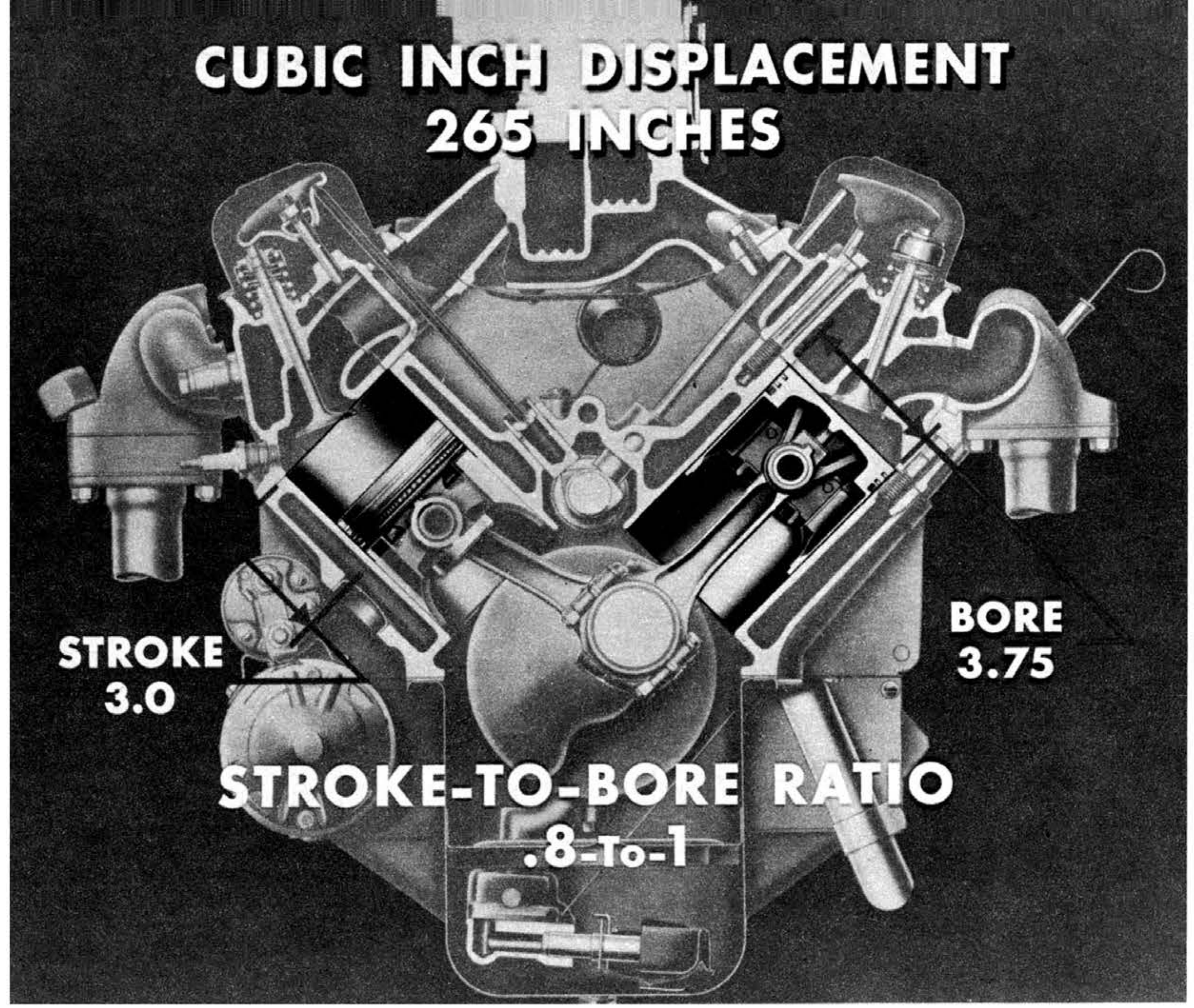
Although some manufacturers adhere to the principle of dropping the block well below the centerline of the crankshaft, Chevy's engineers felt that because of its short length and because of its extremely short couples, the block could be adequate even though it is low in profile. As a consequence, the 265 block measures only nine inches from bottom to top! This allows only a ⅛-inch drop below crank center, made necessary to locate the main bearing caps in a broached longitudinal slot. There is little ribbing in the block, but by spreading the bolt centers and providing a deep section at the back, added stiffness is given to support the transmission, without adding excess weight.

Full water jacketing was provided within the 21-inch length by centering the cylinder bores on 4.4 inches.

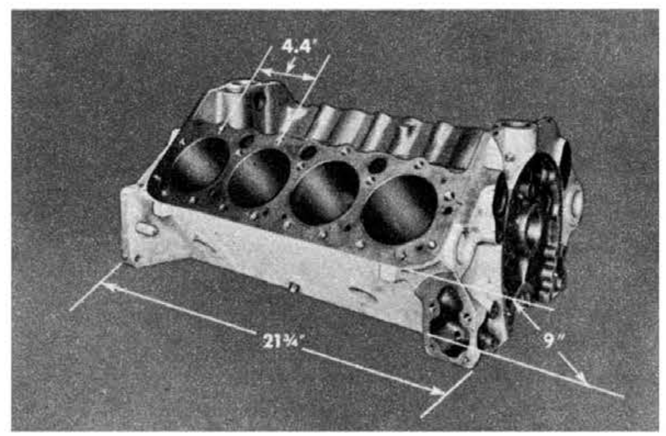
The cylinder block was designed for high precision in the foundry casting process which, if maintained, can eliminate costly repetitive or complicated machining at later stages. Of importance to modifiers is the knowledge that much of the precision control is exercised on coring, since core shifts, resulting in thick-and-thin cylinder walls, are detrimental both to good performance and to overboring.

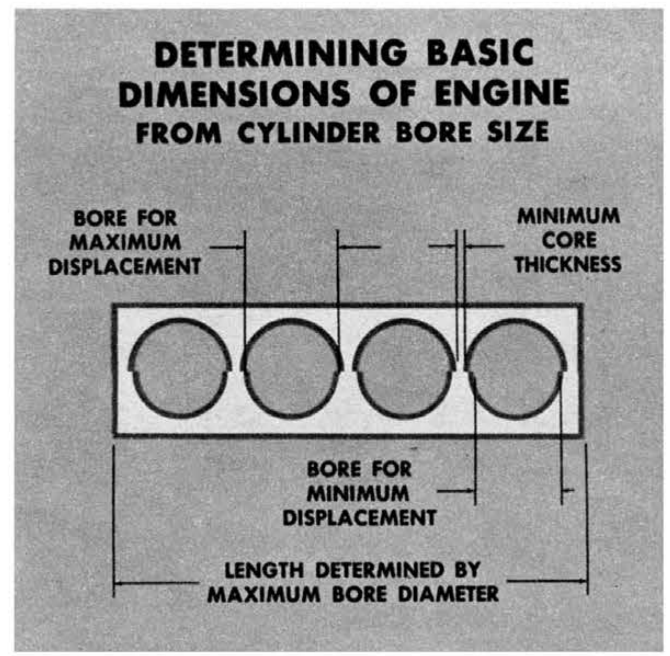
The first aim of the designers was to eliminate as many cores as possible. "Stack up" of tolerances, that is, the adding of one permissible tolerance to another until the overall miscues combine to make one gross, irretrievable error, is a distinct problem where assembly of a number of units is involved. Each core can vary slightly, of course, and when assembled, the fewer the cores the closer the overall dimensions will be to the ideal. Sand thicknesses can be controlled

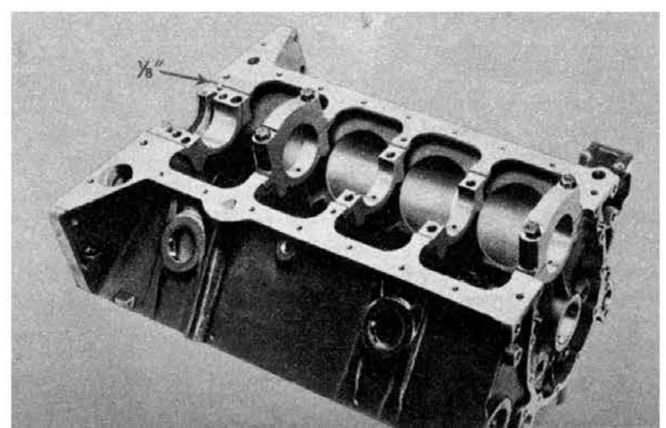




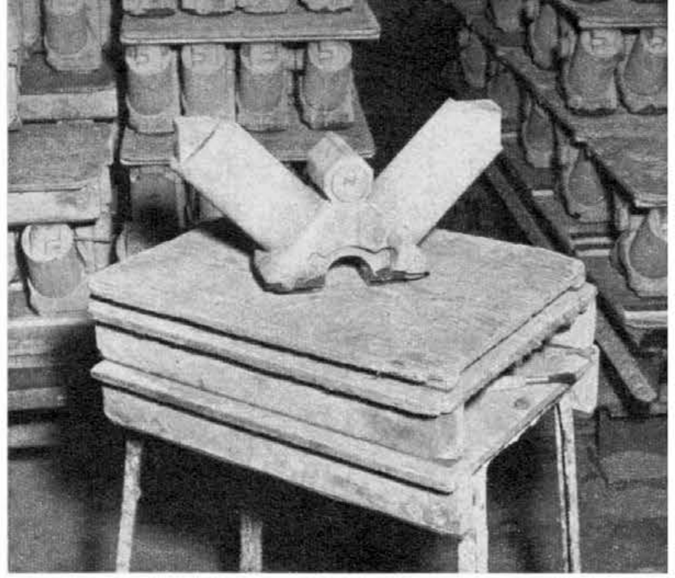

Over-square design (greater bore than stroke) contributed to 265's success as high performance mill with low piston speed.




UPPER LEFT: Compactness of block is illustrated by dimensions.
ABOVE: Factors which go into determining basic block size.
LEFT: Block casting extends only ⅛ inch below crank centerline.



**Cylinder cores in wet sand are shaped up in pairs across Vee.**

more accurately and the end product is a higher precision product, lighter in weight and lower in cost. And, while it may seem to be merely a production goal, even the "lower in cost" advantage is of distinct importance to those of us who work with Chevy engines for fun or profit.

Uniquely, the V8's cylinder barrel cores are formed in pairs, like a V2. One left hand and one right hand barrel are integral with a section of the crank chamber core. Four of these are set on a slab to form a cylinder block inner core. Two one-piece jacket cores are set over the Vee cores and held in position by the end cores, which form the front and rear of the block . . . the contours of the timing chain case and the clutch housing, in other words.

After baking to harden the damp sand from which cores are made, the assembly is lowered into a "drag mold" which determines the external configuration, and the pour of molten iron is made. By using only nine major cores and three minor ones, the Chevy block emerges with far more likelihood of being on the money than in the case of other V8 blocks, some of which use as many as 22 cores for the same job. Again, lightness is one of the results, as well as precision.

## THE CLUTCH HOUSING

Bolted directly to the block, the clutch housing extends over the flywheel and supports the starter. The three-bolt starter mount was developed to eliminate excess weight from mounting surfaces and pads and the housing itself weighs nine pounds less than that of the Six.

## THE CYLINDER HEAD

In line with the overall effort to save weight, the head design was worked over until it could be made to accomplish its major objectives within a minimum size. That this attention paid off can be judged from the fact that each of the heads tips the scales at only 37½ pounds. Together, they weigh just five pounds more than the single head on the Chevy Six.

A head is formed by a rather complex casting core assembly and most components of this type are designed to be machined on the combustion chamber surfaces to take care of tolerances. However, the 265 Series heads feature strictly a cast chamber, allowing the volume to be placed exactly where desired and not limited by machining possibilities, cutter sizes, etc. Each head has a water outlet at the inner face on each end making them interchangeable from left to right banks.

A stud pattern in the shape of a non-equilateral pentagon surrounds each combustion chamber and secures the head to the block. Using five small bolts, rather than a more conventional four larger ones, lessens torque requirements on the nuts, spread out the stresses, contributes to better gasket sealing and reduces the possibilities of warpage.

Chevy V8 heads are cast "upside down." The core assembly is inverted in the drag mold, which forms the combustion chamber, and the result is a localized harder iron around the valve seat area because of the "curing" which takes place under the added weight.

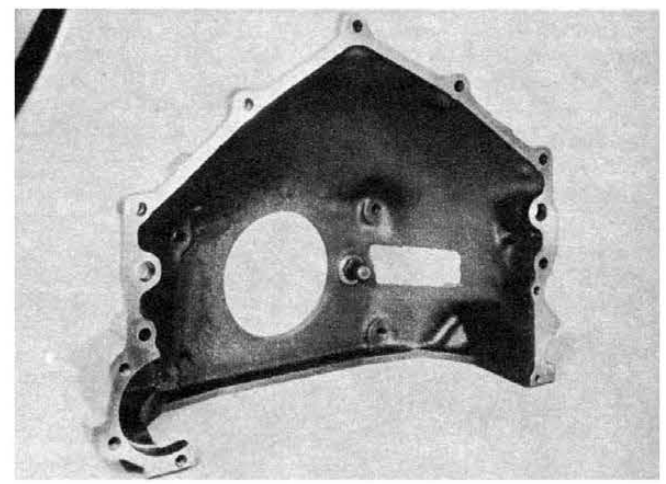
The combustion chamber design, certainly one of the greatest contributions to the engine's success, is a high-turbulence wedge type. It was selected because of this shape's combustion smoothness and control over pressure rise in the chamber. In it a high volume of the fuel-air charge is exposed to burning early in the power cycle and then goes out into a thin quench area. As can be seen in the accompanying diagrams, the wedge is extremely pronounced and the quench area large and restricted. Deck height (clearance over the piston at top dead center) in the original 265 was only .045 inch over 23% of the piston area.

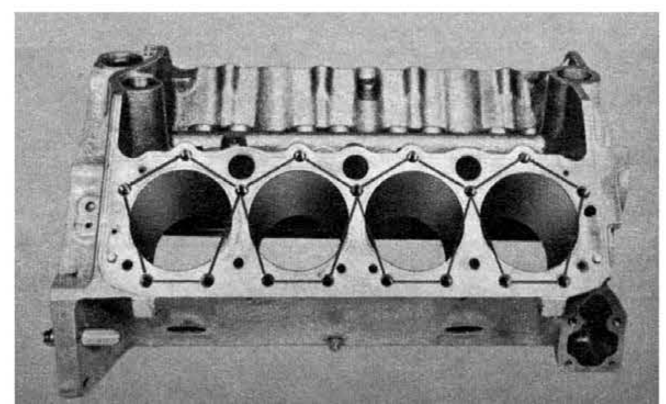
Among the advantages of this combustion chamber are that a flat-top piston can be used. A flat-top, as opposed to a pent-roof or domed type, of the same diameter, has the smallest surface exposed to the flame of combustion. Thus, heat can be dissipated more rapidly and, under the extremes of compression and high speed operation in competition a piston is less likely to burn or melt.

The original compression ratio of 8-to-1 in the 265 was selected on the basis of experiments made by GM Research at the time it was in the design stage which showed that Powerglide-equipped cars required a gasoline with an octane rating of from 85 to 90 after 5,000 to 25,000 miles of operation and conventional transmission equipped cars needed 88 to 93 octane to prevent detonation after the accumulation of carbon deposits engendered by such length of service. More recently, of course, higher octanes are generally available and compression ratios have risen to take advantage of them.

**Cores are assembled in sets on drag mold before casting.**

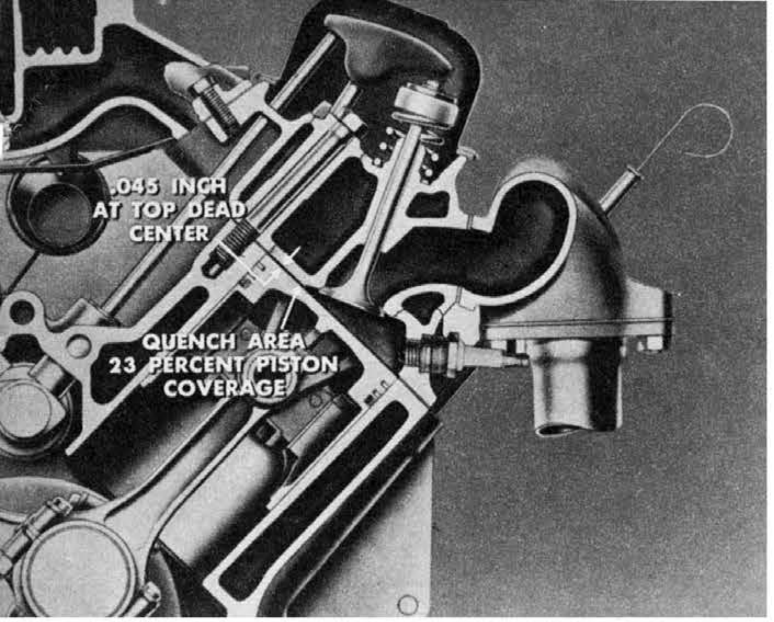

**Small number of separate foundry cores used in Chev V8 (right) helps keep tolerances close, production costs down. RIGHT: Bell housing adds to stiffness of block. BELOW: Five head studs in pattern around cylinder instead of conventional four, aids head-block sealing.**



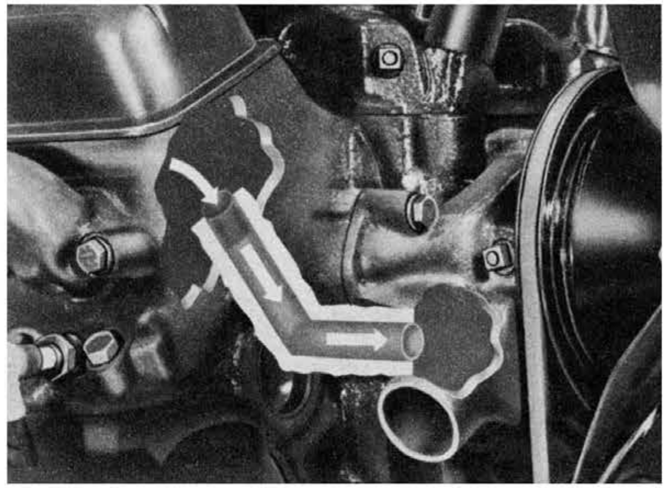


The only milling done in the combustion chamber is that required for the valve seats. Since these are all in line, this is also a quick, relatively inexpensive process under factory conditions.

Exhaust manifold location is another well thought out item on the V8. By bringing them up high, the manifolds are clear of steering gear and other accessories and heat is better dissipated without being absorbed by the block. Notice that the short exhaust passages in the head are nearly vertical, a highly desirable placement and configuration for efficiency. Also they are water jacketed, both top and bottom, which takes a great burden of heat-transfer away from valve seats, stems, guides and the offside of the head. By keeping the ports short in length, the water jacket area around the exhaust is small and the coolant does not have to take up a load of heat to no purpose. To the hot rodder, this means that the modified engine, developing far more heat than the passenger car powerplant, is still less likely to suffer from cooling problems.




**Part of Chevy's secret of success lies in shape of combustion chamber and upswept port, which is near vertical.**



**Water circulates in head to prevent local hot spots, though overall temp. may be too low to allow thermostat to open.**

## COOLING

Chevrolet's consideration of this problem did not end with the head. Full circumference and full-length water jacketing for each cylinder bore provides for an equalized flow of coolant around the block. It is circulated by a single pump with one inlet and two outlets at a rate of 48 gallons per minute at 4,400 rpm. Although the V8 displaced 30 cubic inches more than the Six and delivered considerably more horsepower, it was found that a smaller radiator could be employed because of the efficient heat dissipation of the light block. Only 357 square inches of radiator were required, compared with the 385 square inch frontal area of the six cylinder model.

A drilled by-pass from pump to head through the block is provided for circulation when the coolant is below a temperature sufficient to cause the thermostat to open and allow water to flow through the radiator.

## THE CRANKSHAFT

After a study of both alloy iron and forged steel as possibilities, a drop forged steel was selected as material for the short, stiff, five-main crank. This material has a higher specific gravity (greater weight for a given size) and a higher modulus of elasticity. In addition, the GM facilities are oriented toward forging where some other manufacturers are strong on casting techniques.

The crank was designed with counter-weights having an outside diameter of only three inches and so disposed that their vectors minimized shaft bending. With a three-inch stroke, this is simpler than with a long stroke engine, but, the V8 shaft is notably compact and so well arranged that its torsional vibration characteristics are exceptional. Even without a vibration dampener, or harmonic balancer, the shaft demonstrated that no durability problems caused by vibration would be encountered. However, a balancer of the rubber-shear type was added to eliminate a "rumble" audible at 2700 rpm in a car. Full use was also made of new forging techniques with less draft, which permitted smaller cheek clearances than with castings.

Altogether, the design and manufacturing processes made it possible to fabricate a crankshaft which matched the block in compactness and strength. The shaft requires only a small sump, permits short rods and weighs a mere 47 pounds. (The Six, which is inherently balanced, maintains a crank scaling 79 pounds) Thus, it helps to make possible one of the smallest and lightest commercial V8 engines of its displacement in the world.

It will be of interest to hot rodders to know that Chevrolet production lines include precision balancing stations at numerous points. Each of the rotating and reciprocating components is balanced individually. Then, when they are brought together as an engine assembly, the whole works is balanced to within one-half inch/ounce. This is accomplished by a rather ingenious machine which motors the engine, picks up the out of balance condition, stops at the correct point and drills the front and rear crank counterweights removing sufficient metal to bring the entire reciprocating mass into balance.

## THE MAIN BEARINGS

All mains in the 265 are of the same diameter, 2.2983 inches, and four are of the same width, .702 inches. The rear main, which takes the thrust, is 1.160 inches in width. The insert bearings are grooved only in the upper half, although common practice would find them fully grooved.

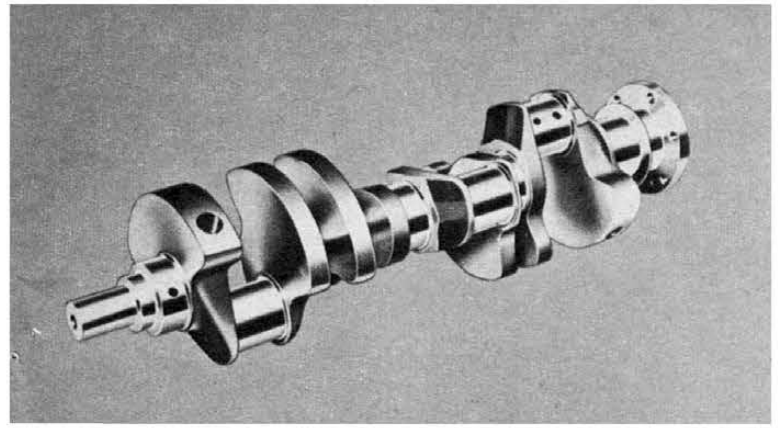
The reason for this, not fully understood by all of the brotherhood, will be apparent when the chart of main bearing pressures is consulted. In a short-stroke high-compression V8 engine, the maximum main bearing loads are carried by the lower half of the bearings under most conditions. "By reducing the oil film loads, through omission of the oil groove in the lower half, capacity of the mains is increased approximately 100%," says R. F. Sanders. This improves durability and lessens wear. A comparison of grooved and ungrooved bearing pressures at 4,000 rpm in the same engine revealed that mean pressures could be dropped approximately 200 pounds per square inch on some bearings and maximum pressures as much as 675 psi on others. Tests clearly demonstrated that the grooveless bearings suffered no lack of lubricant and with the same oil film thickness would carry twice the load. Bearing clearances are .0008-.0034 inch.

## THE CONNECTING RODS

The standard test procedure at Chevy requires a connecting rod to withstand ten million cycles on a hydraulic fatigue testing machine. The forged connecting rods for the 265 V8 were run up to 18 million cycles under 2,400 pounds of tension and 7,000 pounds of compression.

This is the equivalent of a 10% overload at 4,500 rpm in tension, a 10% overload at 8-to-1 compression and between five and ten thousand miles in driving distance. No rod failures were encountered in testing and relatively few have been observed under field conditions.





**Stiff crankshaft resulted from designers' determination to build small mill within displacement limits dictated by hp need.**

Thanks to the connecting rod's short length, 5.70 inches from center to center, structural rigidity was maintained while weight was kept down to only 19 ounces. The ratio of length to stroke is 1.9-to-1, a fair comparison with an all-out competition engine, the Meyer-Drake which has a ratio of 1.71-to-1.

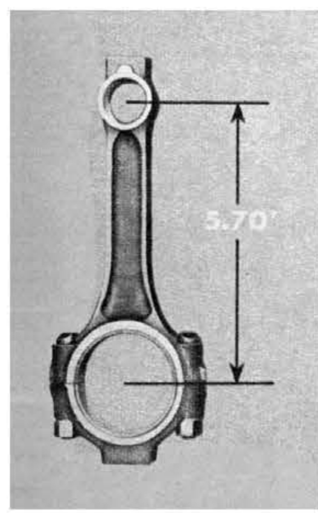
Big end bearings are two inches in diameter (properly 1.9995 inches). Shaft clearance is .0007-.0028 inch; side clearance (for two rods) .008-.014 inch. The file hard chromium steel wrist pins are pressed into the small end under two to three thousand pounds of pressure.

## THE PISTONS AND RINGS

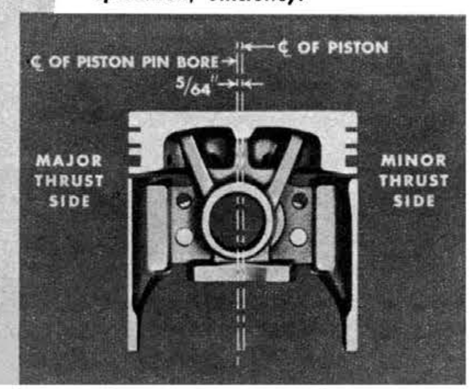
The 265 began with a bore determination of 3.75 inches, some 3/16 inch larger than the existing Six, so it might be expected that the pistons would be at least as heavy as those of that faithful model, but they actually weigh .1 ounce less. These are not the ultimate in lightness because they have a steel strut surrounded by aluminum . . . and have relatively long "tails" to reduce deflection and cushion the load transfer from major to minor thrust sides. For passenger car use they are good. Cam ground offset 5/64 inch toward the major thrust side, the pistons are quite free from piston slap and exhibit creditable wear characteristics. The aluminum is tin plated for mating with the cast iron block and three piston rings are used. Piston-bore clearance is .0005-.0011 inch.

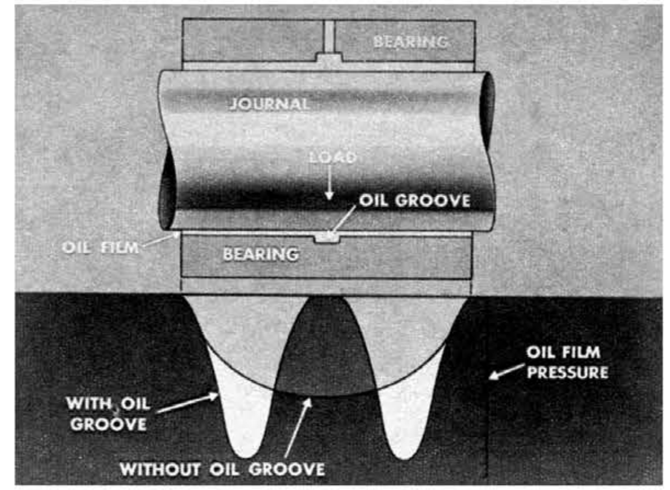
The two compression rings are thick-wall iron alloy, 5/64 inch wide with taper face and inside bevel. The top ring is chrome plated. The oil ring caused some problems during early tests of the 265 but was modified before being introduced in the automobile. According to Sanders, the burning of oil, caused by pulling lubricant up past the oil control ring, is directly correlated with bore size and compression ratio in the modern V8. When decelerating, or on a long downgrade, against compression, this condition is extremely noticeable. Lab tests showed that with 18 inches of manifold vacuum, oil consumption was a quart per 1,600 miles. With 25 inches of vacuum it jumped to a quart per 200 miles.

This revelation caused a search for an improved ring design. Initially, the middle ring was loaded to provide a more positive sealing action, but production and replacement problems made it impractical. Then, through cooperative experiments with ring manufacturers, a new type of expander was developed for the oil ring which took care of the problem. This expander, simple in design but highly efficacious, provided the necessary upward and outward thrust required for oil control under the high vacuum conditions.




**Short center-to-center dimension of connecting rod increases strength. Offset of .0781 inch to major thrust side of piston contributes to quiet operation, efficiency.**




**Pressure peaks, valleys show improvement in bearing lubrication when conventional oil groove is eliminated from insert.**

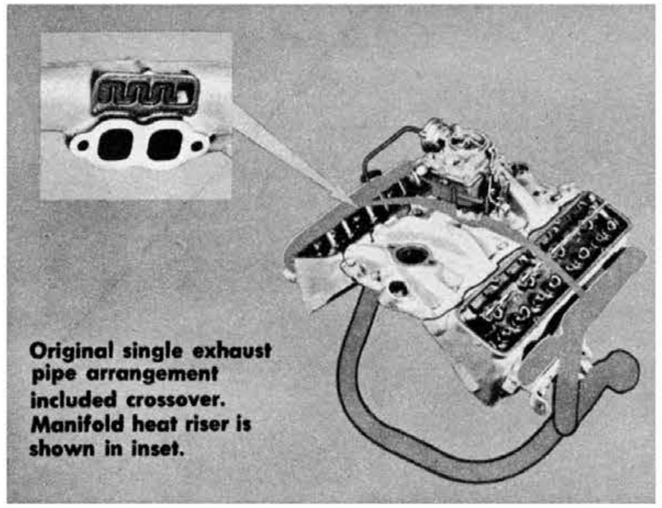
**Chart reveals findings of experiments during 265 development. Lower pressure at rear main is noteworthy point to modifier.**

**MAIN BEARING PRESSURES POUNDS PER SQ. IN. AT 4000 RPM**

| | WITH GROOVE | | WITHOUT GROOVE | |
|---|---|---|---|---|
| | MAXIMUM PRESSURE | MEAN PRESSURE | MAXIMUM PRESSURE | MEAN PRESSURE |
| FRONT MAIN BEARING | 2929 | 671 | 2414 | 517 |
| FRONT INTERMEDIATE MAIN BEARING | 3402 | 1022 | 2792 | 842 |
| CENTER MAIN BEARING | 3096 | 1010 | 2559 | 833 |
| REAR INTERMEDIATE MAIN BEARING | 3820 | 1140 | 3141 | 939 |
| REAR MAIN BEARING | 1261 | 275 | 1125 | 246 |

## THE INTAKE MANIFOLD

The 265 engine's original single-carburetor manifold must be praised for its simplicity, light weight and multi-purpose effectiveness. A number of parts, normally separate, were combined into the one casting to give the V8 much of its



Original single exhaust pipe arrangement included crossover. Manifold heat riser is shown in inset.

neat outward appearance and to, again, keep weight down. Although many rodders immediately fly into action to discard the factory manifold from any engine and replace it with a proprietary make, the Chevy induction system (and particularly the later optional dual and triple manifold) deserves close attention.

In the 265 Series, the manifold not only serves to distribute the fuel charge, but in its low-profile configuration it provides for a number of items:

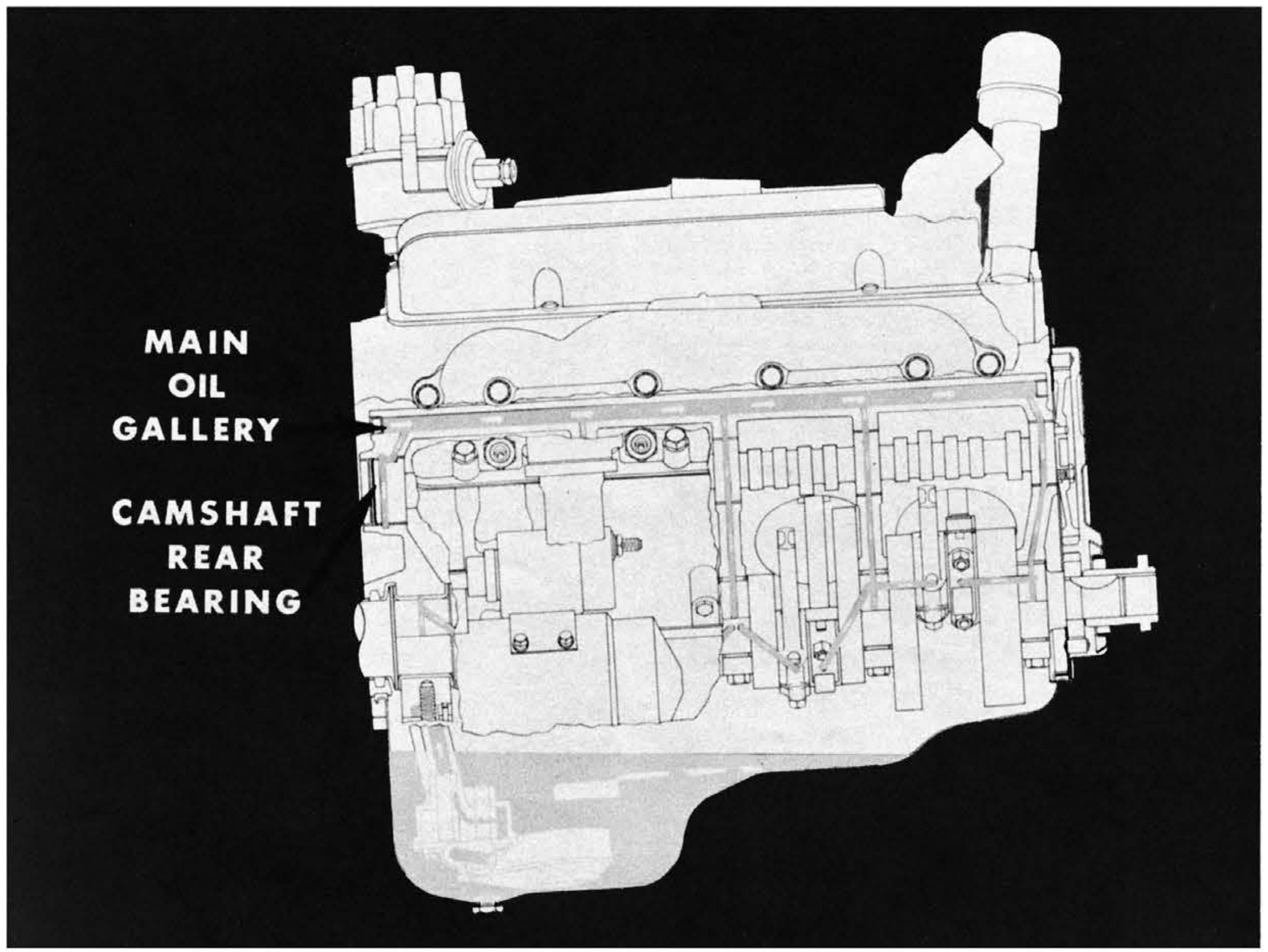
1. Hot water heater take off,
2. Exhaust heat crossover,
3. Distributor mounting,
4. Oil filter,
5. Thermostat housing,
6. Water outlet to radiator,
7. Water temperatures,
8. Cam valley cover.

Because of its construction, it adds rigidity to the engine and quiets the noise from the tappets. Since it is sealed to the block via a molded rubber gasket, no air can pass under the distribution channels of the carburetor. This prevents poor-running-caused chilling of the mixture during winter operation. The exhaust heat crossover under the carburetor riser, which is often blocked off by modifiers, also serves this purpose and eliminates carburetor icing under certain weather conditions. The crossover is brought from one port only in each cylinder head, to eliminate valve seat distortion and to give a more pulsating flow of gases. Two holes in the carburetor flange are drilled down into the crossover and are indexed with a cored passage in the carburetor throttle body which passes under the idle jets.

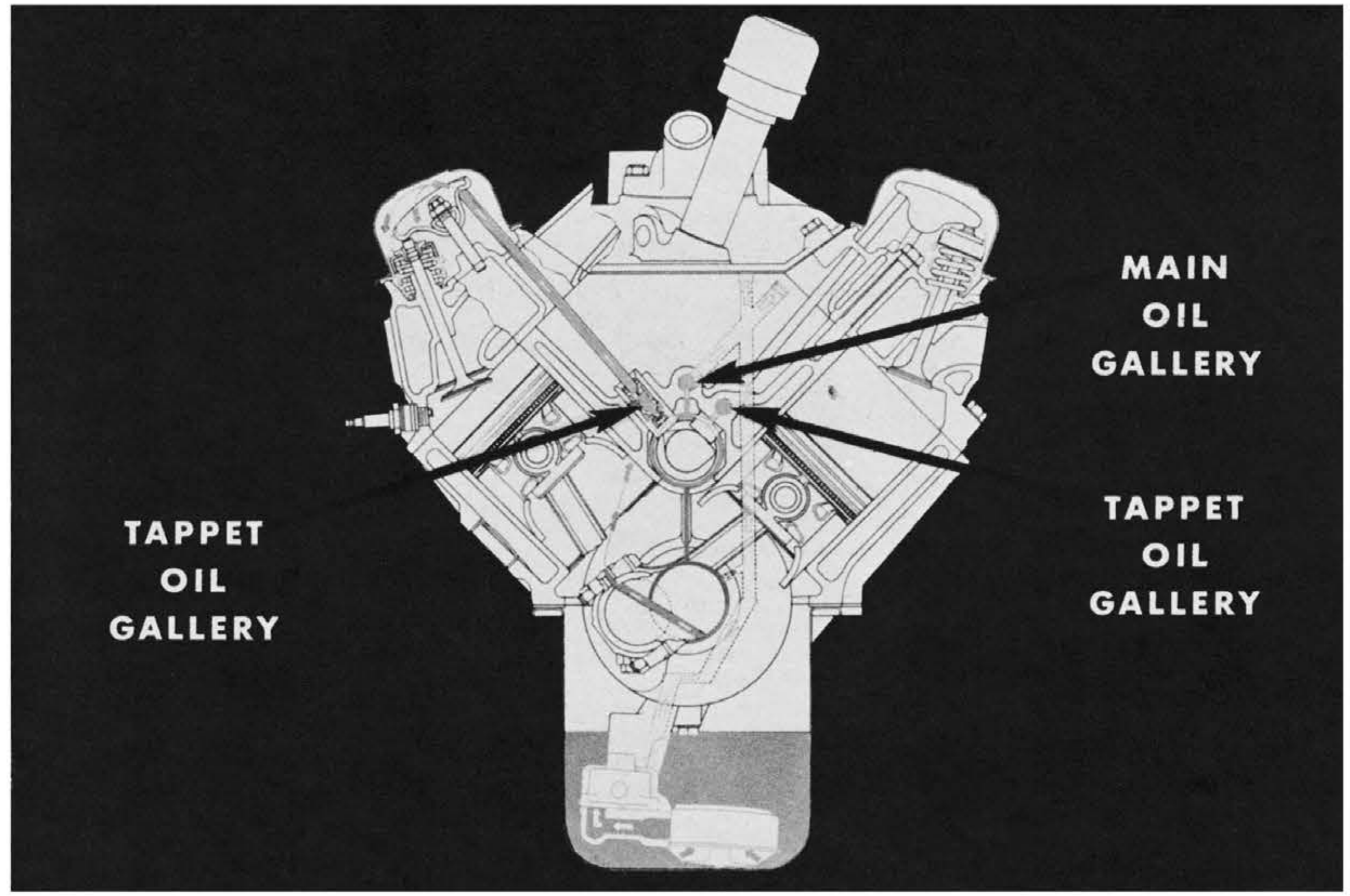
## THE EXHAUST SYSTEM

Aside from its high location, the exhaust manifolding is conventional V8 practice with a cross under tube and a single rearward pipe on the original 265. Optional equipment and

**Main oil gallery runs length of block in Vee of two banks. Bottom end of engine is pressurized by holes in bearing support webs.**






**Tappet oil galleries are supplied from main gallery by metering slot in rear cam bearing. Holes in rod caps lube cylinder walls.**

various changes have conspired to obsolete the basic arrangement, but it is well to observe that the hot air chamber for the automatic choke is a part of the cast manifold right above the center pair of ports.

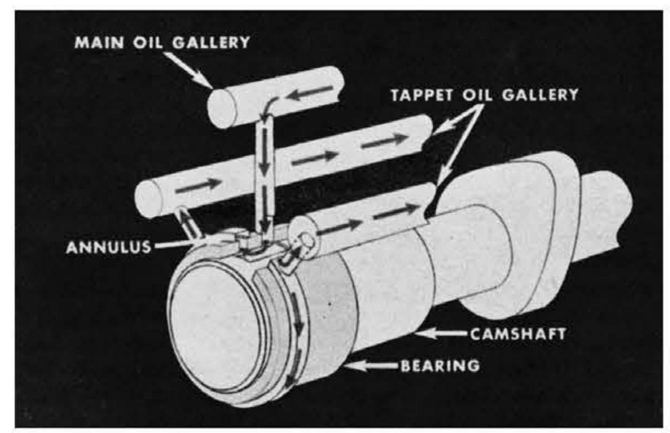
## THE LUBRICATION SYSTEM

One of the advantages of the Chevrolet V8 which was immediately recognized by competition-minded individuals was that it has a fine lubrication system assuring a full flow of oil to all vital areas, yet has no external piping, nor high pressure to spots which call for difficult sealing methods. In short, it promised to be a "clean" engine, not prone to squirt lubricant from its pores when pressures were upped to meet higher output requirements.

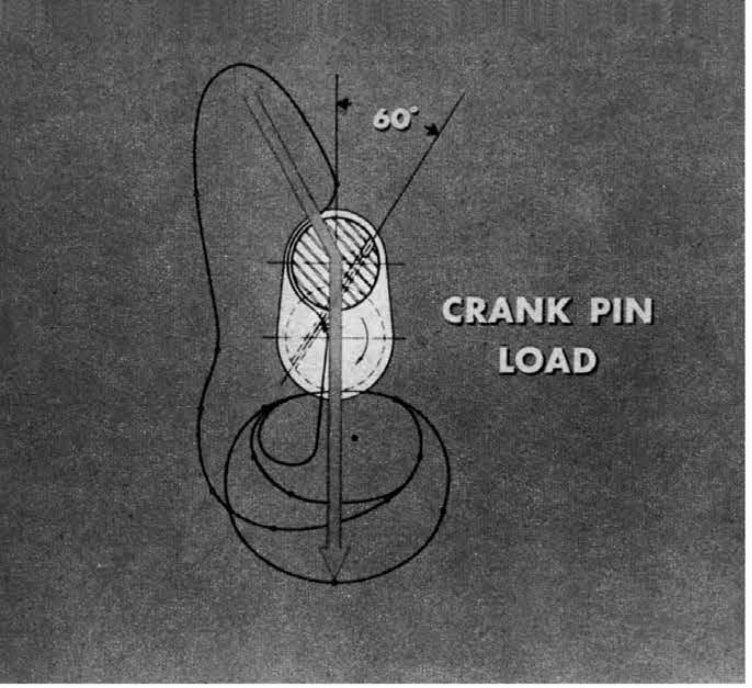
All oil passages are drilled in the block and there is no high pressure in the heads. The block passages are short, with no sharp angular intersections. In production, this means fewer chips and broken drills. In modifying, it is reassurance that passages are less likely to be restricted or blocked by detritus and improves the odds that you will get a block which is clean internally from the start. Two of the passages which are drilled the length of the block are through the tappet chambers, the other, the main gallery, is directly above the cam on the engine's centerline.

Intersecting the main gallery are vertically drilled passages in the bulkheads, through the camshaft opening and through the bottom section of the bulkheads to the main bearings. Each of the bosses in the block provided for cam bearings has a machined annulus (groove) which is covered when the bearing is installed. Oil under pressure from the main gallery moves down through the drilled hole in the bulkhead and into the annulus under the cam bearing shells. Some of the oil is forced from the annulus into the cam bearings through a small hole near the bottom of the bearing. The remainder continues downward to the main bearings and lubricates through a hole in the insert, grooved as previously described. It flows into the drilled crank, as the holes match during the rotation of that component, and thence to the rod journals and the rods.

This oil is, of course, under full pump pressure. To provide for reduced pressure and metered flow to the tappets, a simple but effective method was devised. A drilled hole from the main gallery lines up with a small hole in the rear cam bearing, keeping high pressure on this bearing at all times. This bearing insert has a similar hole directly to the rear of the first hole and lined up with an annulus machined in the block. From this annulus, two passages are drilled, one




**Metering flat on cam was changed in 1957 to up oil delivery.**




**Lubrication to con rods from drilled crankpin is good because oil hole leads position of peak load by 60° and flow is easy.**

to each of the tappet galleries. A metering slot or "flat" is milled on the cam journal and, during each rotation, the flow from the front hole is able to reach the rear hole via this slot during that time when both holes are uncovered.

This arrangement, it might be noted, was used only in the 1955 and 1956 engines, being modified in 1957. Camshafts from later engines cannot be used in the early blocks since they do not have the metering slot. It will also be noted that the metering slot on cams for hydraulic tappet equipped engines is larger, permitting more flow at higher pressure.

From the tappets, lubricant flows up the hollow pushrods to the rocker arms and valve stems and returns to the sump via leak down passages in the head.

The crankshaft delivery hole in the rod journals leads the top center position of the crank by 60° which provides ample lubrication at the right time and position of the stroke. The load is almost removed from the bearing at this position and a maximum flow of cooling oil results. Another development of Engineering was the arrangement of the "squirt" oil holes in the connecting rod bearing caps at the split line so that the right hand bank of rods lubricates the left bank cylinder walls and vice-versa. This is of definite advantage during cold starts, contributing to the life and efficiency of the engine. A stroboscopic study of an engine under operating conditions was made to determine what method could best be used. So, visual proof of its effectiveness was at hand before the engine was put into production.

A conventional oil pump, located on the rear main bearing cap, has its input in a floating screened pickup near the back of the sump and is driven by an extension shaft from the rear of the cam. Normal oil pressure on the 265 was 30 psi controlled by a spring-loaded relief valve in the pump. A partial flow filter was first specified, later a full flow filter became optional and is to be found on most cars.

## THE VALVE TRAIN

The most striking innovation of the 265 to those of us who were active in the automotive field at the time of its introduction was the complete absence of a rocker shaft. Although credited to the Pontiac Division, the development of the individual stamped rocker arm premise received the widest attention in relation to the new Chevy V8.



The rocker arms are stamped from 1010 steel, carbonitrided and case hardened to a depth of from .010 to .020 inches, then surface treated. These arms float on studs which are pressed into the head and have threads on the upper end. Each arm is assembled over a valve stem and pushrod and is retained by a fulcrum ball and lock nut. Rocker ratio is 1.455-to-1.

Pushrods are made from 5/16-inch welded steel tubing which has been formed and coined on the ends to a hemispherical shape. A small opening in each end is provided for oil flow from the tappets.

Valve adjustment is made by simply running the nut up or down on the threaded portion of the stud, whether mechanical or hydraulic lifters are used, while checking the stem-to-rocker clearance with a feeler gauge. Lash adjustment can be made with the engine running as easily as static.

The cam specified for the original engine with mechanical lifters had the following timing:

| In. Opens | In. Closes | Ex. Opens | Ex. Closes |
|---|---|---|---|
| 12°BTC | 54°ABC | 52°BBC | 20°ATC |

With hydraulic tappets, this cam timing was used:

| In. Opens | In. Closes | Ex. Opens | Ex. Closes |
|---|---|---|---|
| 18°BTC | 54°ABC | 52°BBC | 20°ATC |

Lift at the valves is .336 inch and .343 inch for intake and exhaust, respectively, with the solid tappet cam; .324 inch on both intake and exhaust with the hydraulic lifter model.

The nickel-chromium steel intake valve of 1.72-inch diameter rest on 46° seats in the head under nominal spring pressure of 71 to 79 pounds closed. Open the springs exert 145 to 155 pounds pressure. Exhaust valves are slightly smaller at 1.5 inches and are made from chromium-nickle-molybdenum steel. Spring pressures are the same as for the intake.

## THE IGNITION SYSTEM

Although the 12 volt electrical system of the 1955 and later Chevrolets caused engine swappers a few problems, the higher voltage is a prime necessity for high compression. For example, the secondary voltage available from a six volt system was found barely sufficient to fire spark plugs with .035 inch gap at 60 mph in the V8. Under conditions of use when the gaps had grown to .050 inch, they would blow out at roughly 40 mph. On the other hand, with 12 volts available in the primary, plug gaps can grow to as much as .060 inch and still fire satisfactorily.

Distribution from the coil is handled by a Delco-Remy unit with single points and 14 mm AC 44-5 plugs are standard for the passenger car engine.

## WEIGHT AND PERFORMANCE

"Taking unnecessary weight out of an automobile is the same as putting horsepower in," says Sanders, and this certainly proved to be true in the case of the 265-327 Series engines which weight only 531 pounds. Their compactness and lightness made them highly desirable for hot rodding, although at first it was difficult to realize exactly how so much weight had been saved. A comparison with the familiar Chevy Six told the story, however, and a glance at the weight chart will reveal where the poundage was excised. By comparison with the flathead Ford or Mercury, heretofore the most popular engine with hot rodders, the new ohv Chevy came off extremely well and became a natural substitute for those powerplants in roadsters and customs.

The output of the initial 265 with a single two-barrel 2GC Rochester carburetor and the mild valve timing as noted above (measured on the dynamometer with water pump, no fan and generator not charging and corrected to SAE standards), was 162 bhp at 4,400 rpm with 257 ft./lb. of torque at 2,200 rpm.

With a single four-barrel Carter WCFB carburetor and dual exhaust manifolds, 180 bhp and 260 lb. ft. of torque was realized. Horsepower climbed to 195 with the optional factory camshaft and this engine was still smooth, reliable and well suited to street use.

This was only the beginning, of course, both for the factory and for modifiers, but in its weakest stock form the 265 was still impressive for weight and displacement versus horsepower and torque. Internal friction was low, with only 40.6 horsepower consumed, and BMEP high at 146 pounds per square inch. A specific fuel consumption of .498 pounds per horsepower indicated excellent economy and efficiency.

Careful attention to detail and a determination to achieve a maximum power package in a minimum space paid off handsomely for Chevrolet . . . and for a generation of hot rodders who have used the V8 engine in its many variations to set new records on drag strips, road courses, the salt flats and oval tracks. ■

### WEIGHTS

| | V-8 | 6 |
|---|---|---|
| BLOCK ASSEMBLY | 147 | 163 |
| CYLINDER HEADS (PER ENGINE) | 77 | 72 |
| CRANKSHAFT | 47 | 79 |
| CONNECTING ROD, PISTON, RINGS (PER ENGINE) | 21 | 22 |
| INTAKE MANIFOLD | 34 | 13 |
| EXHAUST MANIFOLDS (PER ENGINE) | 17 | 16 |
| VALVE ACTUATING MECHANISM | 18 | 25 |
| TOTAL ENGINE | 531 | 572 |

**Weight reduction efforts of 265 designers were highly successful. Note comparison with in-line Six which preceded it.**

**Cutaway of original 1955 V8 discloses essential features which are still utilized in 1963 version, now up to 327 cubic inches.**