UNIQUE V6

Buick V6 made spectacular entry into ranks of low-priced cars at start of '62 season.

WHEN you experience your first ride in a Buick Special powered by the fantastic little V6 engine, you wonder how so many problems previously associated with this type powerplant could have been solved so quickly and efficiently. Its smooth, lively performance is much more than one would normally expect from a six. But a closer study of the developement and production story tells us why this compact little mill has been so successful from every standpoint.

The possibility of a V6 for regular passenger car production has been kicked around and experimented with for years inside the industry. But the problems—mostly in cost—have always been a stumbling block. So when word leaked out that Buick was planning and experimenting with just such an engine —and an unprecedented 90-degree V6 at that—the skepticism ran hot and heavy.

There was, first of all, the problem of balance and smoothness, both hard-to-achieve necessities that had been overcome in the past but with costs so

Despite shorter, cast-iron block, V6 is able to borrow parts shown from aluminum V8.

high that they canceled any possibility of regular production. Past experience showed that perfect balance and smoothness was possible from a V6 through the use of an auxiliary counterweight shaft rotating opposite to the crankshaft, at twice crank speed. It worked, but it was costly and complicated.

That was one of the major problems that faced engineers when they began exploring the possibility of a V6 for the Buick Special. Still, when they weighed the advantages to be gained with a V6, they soon discovered that they more than compensated for the problems involved, and the search began for new ways of solving those problems. As it turned out, the odds had already been favorably stacked. Initial engineering began about 11 months before the engine was made available to the public, and the final decision to build it came only six months before actual production began. Development of an all-new engine in that short a time was unheard of before the V6.

For the most part, the V6 is a cast-

iron version of Buick's aluminum V8 engine with the two rear cylinders eliminated, and this is a big reason why Buick was able to get the V6 into production so quickly. Many of the V8's vital components are interchangeable with the V6. Both engines have the same attaching points, use the same valves, rockers, rocker stands, valve springs, timing chains, flywheel housings, oil and water pumps, generators and starters. The entire aluminum front cover from the V8 in fact, bolts right up to the V6.

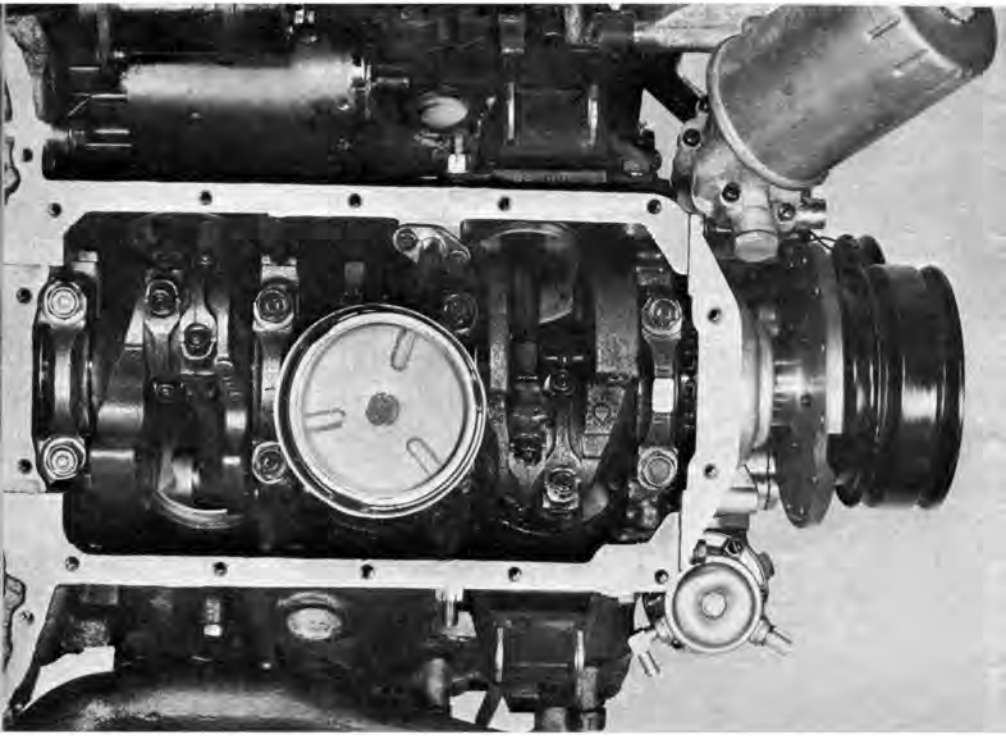
To further facilitate production of the V6, the same manufacturing facilities used for the V8 also machine the V6, with very little retooling required. Hand assemblies are virtually simple since so many components are identical.

The 90-degree V6 block does not incorporate some of the more advanced "thin wall" casting methods recently developed. There wasn't that much time. Core distortion was reduced appreciably, however, by eliminating some of the core pieces used in the block and head assemblies, leaving fewer joints to distort. Still, the block itself weighs only 105 pounds and the fully assembled engine weighs only about 50 pounds more than the aluminum V8.

Like the V8, the V6 has a "Y" block design, where the block skirt extends down below the crankshaft center line for added support to the main bearings. Each block is precision machined and electronically checked after final boring.

Specificationwise, the V6 has a 3.625 x 3.20 bore and stroke for a total displacement of 198 cubic inches. Bore spacing, 4.240 inches from cylinder to

Novel three-throw crankshaft is cast Pearlitic malleable iron, has four main bearings.



cylinder is the same as the V8. Maximum horsepower is achieved at 4600 rpm, as with the V8, and is rated at 135–20 less horses than the standard V8. Torque is 15 lb/ft less (205 lb/ft total), at 2400 rpm.

The Pearlitic malleable cast-iron crankshaft uses the same Durex main bearings as the V8, with the same .0005 — .0021 recommended clearances. Main bearing journal diameter, crankpin journal diameter and crankshaft end play also are identical, although end thrust is taken by number two bearing instead of number three.

Primary unbalance in the V6 was handled in much the same manner as in the V8, by placing counterweights properly on the crank. The secondary unbalance, which is caused by parallel forces acting in opposite horizontal directions, was isolated in the design of soft motor mounts which actually soak up vibration. Sweet and simple, this method eliminated the costly procedure of an auxiliary counter-weight shaft used previously to smooth out the V6.

The three-throw crankshaft itself has four main bearings and is designed to give more freedom in the size and placement of counterweights, which is another reason why the V6 is exceptionally smooth. The throws are 120 degrees apart.

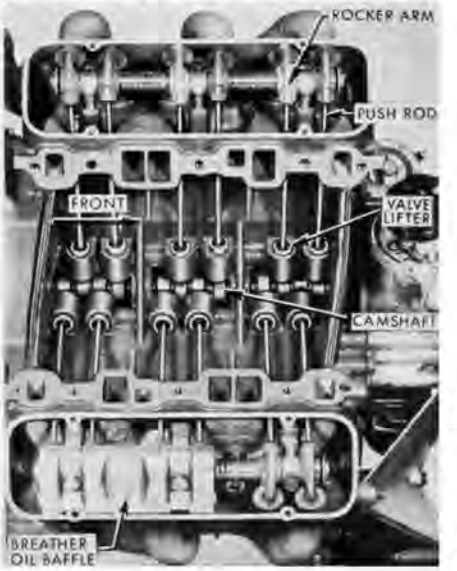
Connecting rods for the V6 are cast of the same Pearlitic malleable iron as the crankshaft which is really a switch from rods of forged steel used in the V8 and by nearly all other manufacturers. They are cheaper to produce than forged steel and appear to be just as durable. Clearance limits and end play are the same as with the V8 but the V6 rods weigh more (19.616 oz.) and are slightly longer, 5.860 inches as compared to 5.660 inches.

Piston are of the same dish-type, divorced skirt design as the V8 and are a cast aluminum alloy. The V6 slug is bigger, however, due to the difference in bore, and therefore weighs nearly two ounces more than the stock V8 piston. Top skirt clearances are the same although the V6 has slightly less bottom skirt clearance. The only difference in piston pins is their length, .090 inch longer for the V6.

There isn't a great deal of difference in the cylinder heads, either, except that those of the V8 are fully machined and the V6's are not. The combustion chambers are semi-hemispherical as in the V8, and the spark plug holes are located almost dead center in the cylinders. Standard compression ratio, with the dished pistons, is 8.8-to-1.

The V6 has ample intake port area in the heads but is hurting somewhat in the valve department. This is due to the fact that V8 valves, guides, pushrods, rocker arms and other valve components are used which means that the V6 has considerably less nominal valve area per cubic inch. The V6 has six intakes to feed its 198-cubic-inches while the V8 has eight to feed only

Entire valve train, with exception of cam, rocker shafts, is repeated from little V8.



17 more cubic inches.

There is some gratification, however, in the fact that the larger bore has left plenty of room for bigger valves, and this undoubtedly will be one of the first areas considered by enthusiasts with modification in mind. It is quite reasonable to assume, too, that future V6 engines from Buick will incorporate bigger gates. We should point out, however, that even with this valve restriction, the V6 is quite capable of running with the V8 and other competitors, at least on the low end. Its snappy performance is almost unbelievable.

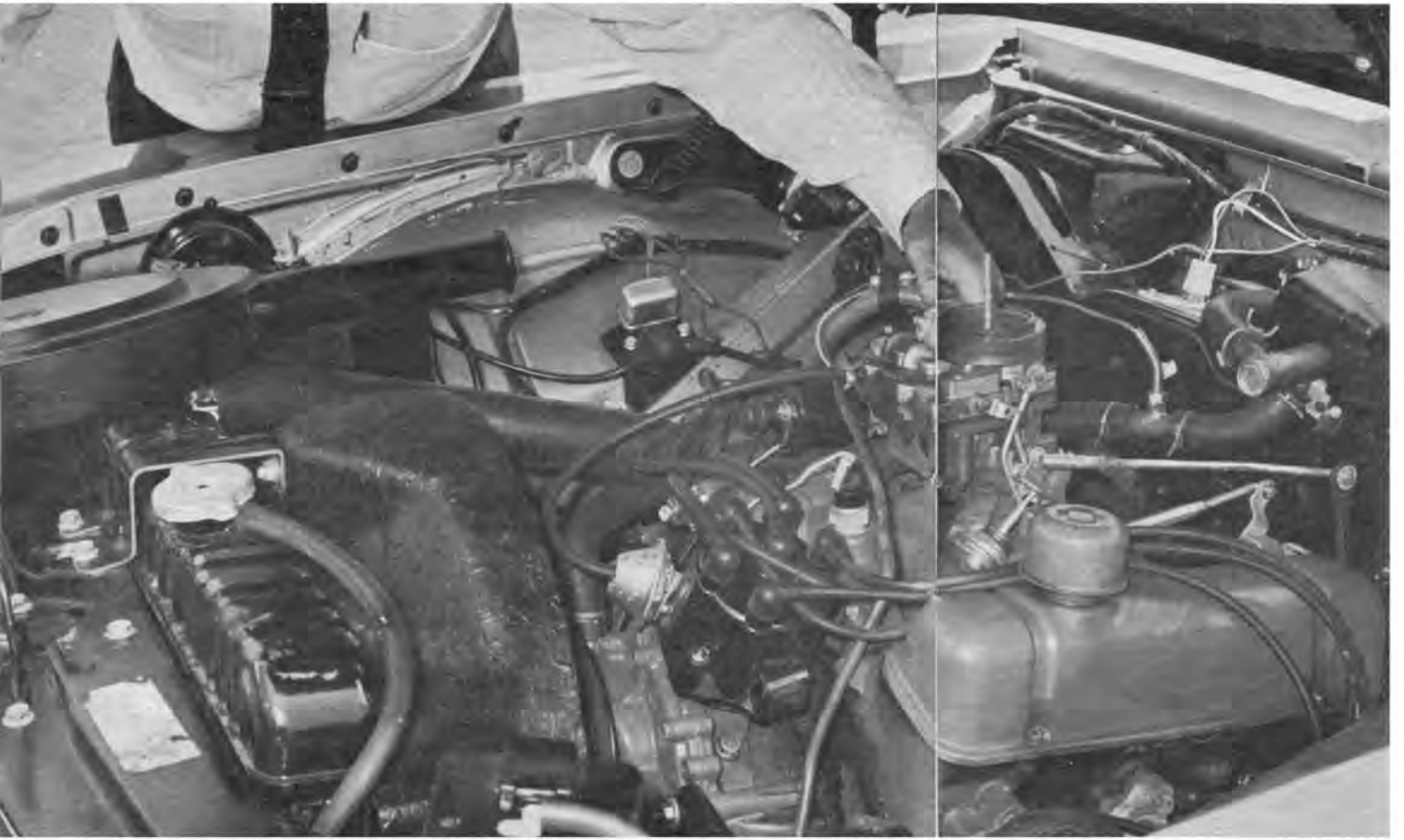
Some compensation for the relatively small valve area has been given by a stronger camshaft with a duration of 280 degrees and a 56 degree overlap. The cam is cast iron and has four bearings. Hydraulic lifters and valve springs from the V8 also are incorporated into the V6.

Manifolding for the V6 complements the overall engine design. The exhausts are clean, free flowing which fit into a single reverse flow muffler. The intake manifold is a simple "log" type that is both light and inexpensive. Simple but effective design here was made possible by the firing order of the V6 (1-6-5-4-3-2) back and forth across the V, which provides evenly spaced intervals of 240 degrees crankshaft rotation from intake suction impulses of the three cylinders on each bank. With a two-barrel Rochester carburetor, each bank draws from one barrel without the need of complex 180-degree passages such as those used with the V8 manifold. This also provides fairly long passages of equal length that give somewhat of a ram effect in the high speed range.

A slightly different ignition system is used on the V6. The Delco-Remy distributor begins its centrifugal advance at 450 rpm like the V8 but reaches its maximum of 26 degrees at 4200 rpm. The same 7.5 degrees of initial advance at 1050 rpm is used for the basic setting, with the vacuum line disconnected.

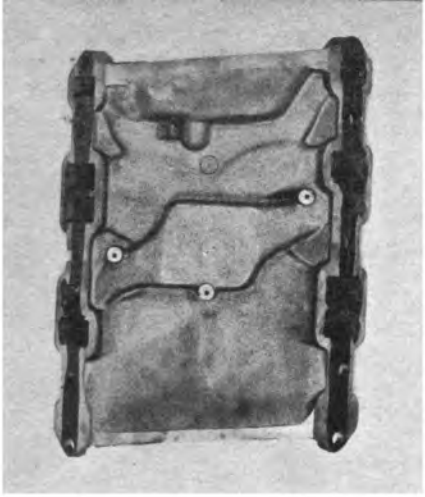
While the V6 was primarily designed as an economy engine, its potential has made it increasingly popular with enthusiasts everywhere. It lends itself well to most any type installation, especially where engine room is at a premium, and snaps right up to some of the best gearboxes, such as the Warner T-85 heavy-duty three-speed and the T-10 four-speed.

Probably the most eloquent testimony to Buick's success in producing a quiet, smooth running V6 came at the press preview, when automotive editors were busy raising hoods to see if they were driving V8's or V6's. Buick's general sales manager Roland S. Withers reduced this to the expression "This engine doesn't know it's not an eight!" ■



Intake manifold (above, left) is arranged for V6's unique 240-degree firing order.

Developing V6 helped Buick win *Motor Trend*'s "Car of the Year" award in '62.



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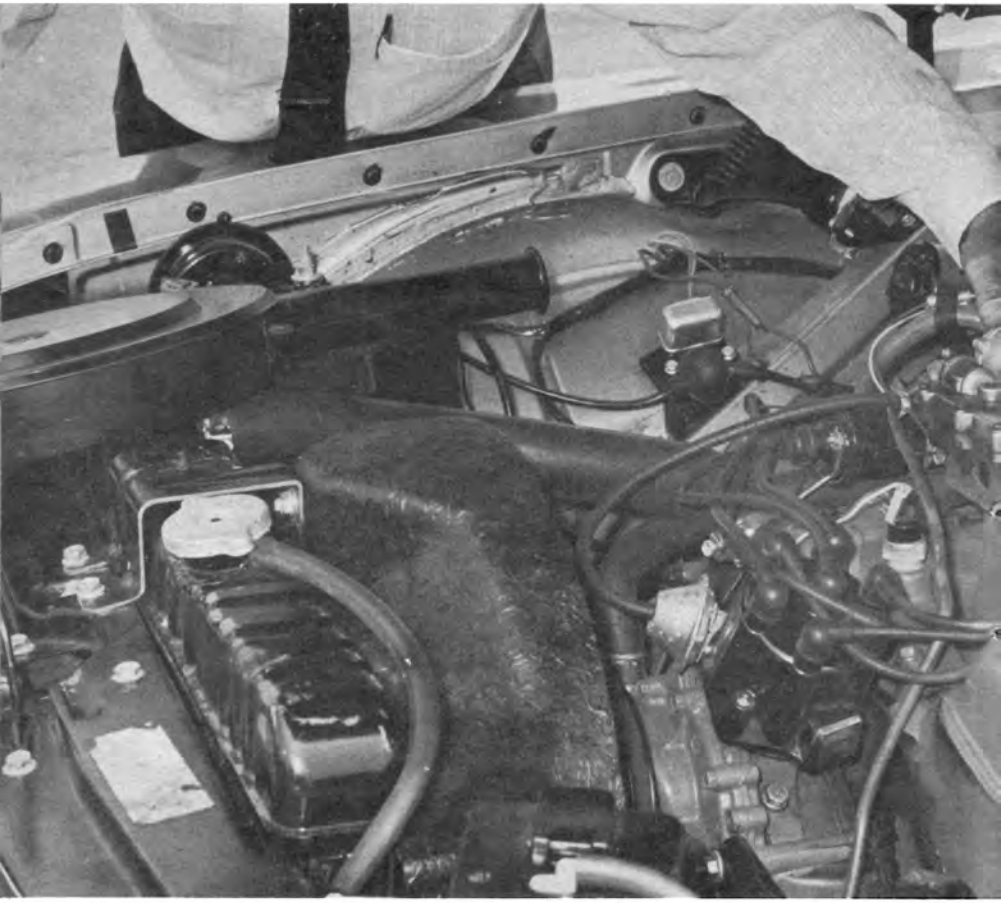

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