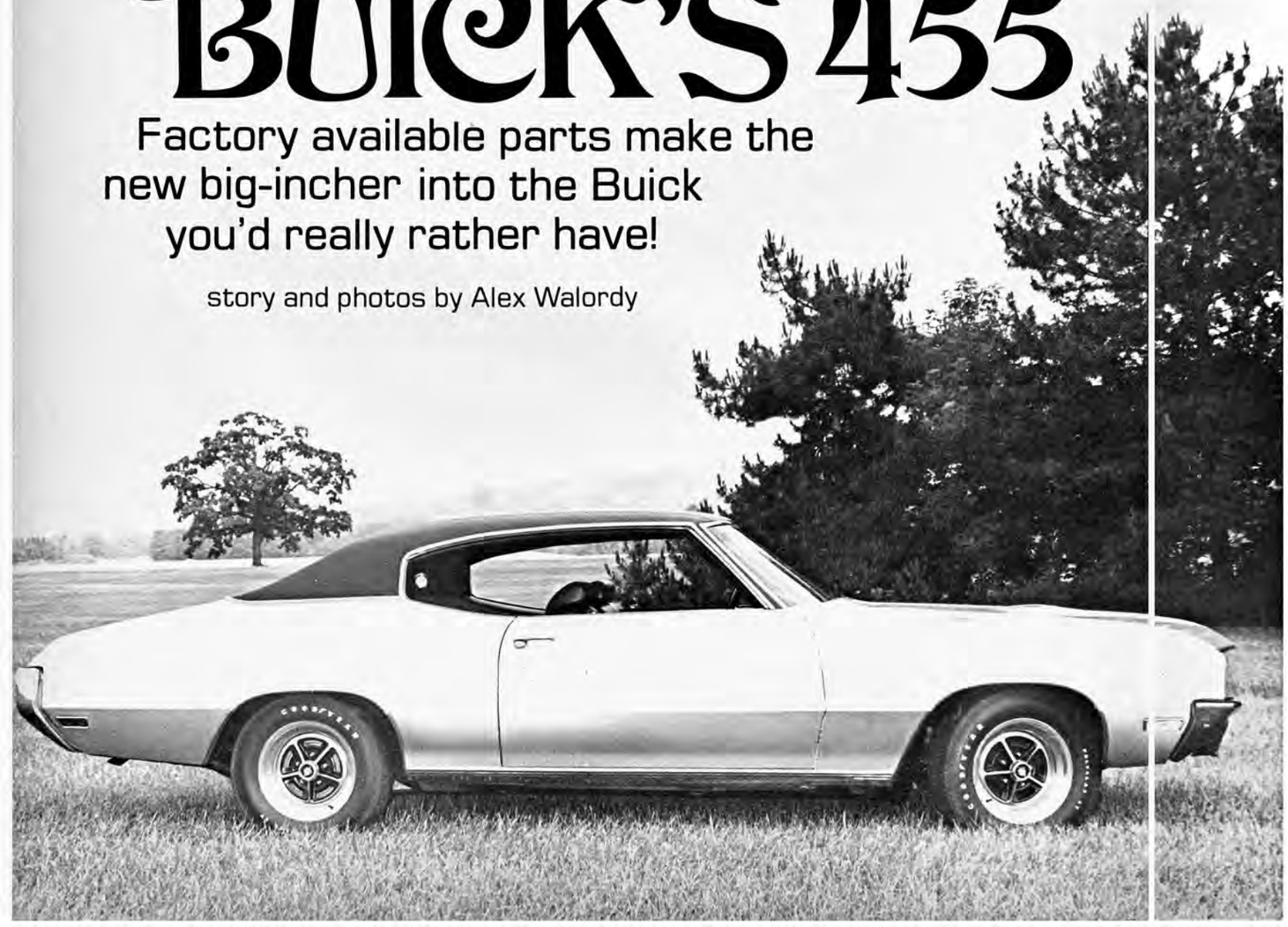
STAGIN' BUICK'S 455

Factory available parts make the new big-incher into the Buick you'd really rather have!

story and photos by Alex Walordy

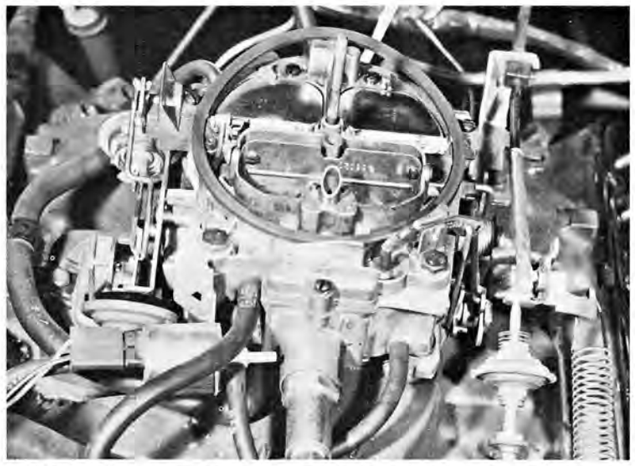


MODEL YEAR 1970 will be remembered as the year when Buick turned over a new leaf, dropped the hammer, smoked the tires and turned on the win lights. Mind you, Buick always had performance for their Riviera's, Electra 225's and such, but the drag racer went elsewhere to get his performance pieces. The 1970 GS455 changes all that, in no uncertain terms. In Stage I trim it is primarily a street machine, cammed accordingly, and ready to accept automatics, air conditioning, and all the extras. In Stage II form it's ready to go racing. We are not about to guess at the classes, because shipping weight is 3600 pounds, but you can order enough equipment to swing the scales over to the 4300 mark. However, a GS455 weighing the full 4300 pounds can crank out at 14.7 and 94 mph. This, as a standard of comparison, is a .75 second improvement over similarly equipped 400 cubic inch engines in the same GS. Then, too, there is a fellow named Tony Branson in Burlington, North Carolina, whose Buick tips the scales at 3600 pounds and carries the front wheels for the first 50 feet off the line.

You see some pretty drastic things happened to Buick's new missile. For one thing, it acquired a much more streamlined looking body shell, and the accent is on tripping the clocks faster. The old sweep-down line is gone, replaced by the "We are going places in a hurry" look. The new two-piece grille is tougher and from there your eyes take you to two little intake scoops on top of the hood. They are small enough to make Andy Granatelli's turbine legal for Indy, but distinctly functional. Don't let the size of the scoop fool you; they lead to a giant air cleaner with two big snorkel inlets. It's marked GS455, and that's not just a fancy advertising number. The old 400 cubic inch engine gave way to the bigger 455. Only it wasn't done by increasing the stroke; instead, the new block carries a bigger bore and provides you with distinctly over-square cylinder dimensions. Bore and stroke is 4.31 by 3.90. The compression has been dropped slightly to a modest 10.1 and the horsepower rating is 350 at 4600 rpm, all very unassuming and would lend itself to a good classification. The big advantage, however, is that the increased bore size gave the GS455 a chance to take full advantage of last year's bigger valve and so the new power increased far more than you'd expect from just 54 cubic inches.

Part of the secret is in the head. There is some wide open breathing space carved out around the valves and the valves themselves on the Stage I are pretty big, 2⅛ on the intakes and 1¾ on the exhausts. The intakes, incidentally, benefit from a well-studied entry and the large sweeping radius. The intake valves now have a flat underhead section instead of the tuliped one previously used and the work and study invested in previous Stage I and Stage II valve train pieces is beginning to pay off. For one thing, the new Buick combustion chambers are now brought out to the limits of the increased bore size, with no stops in the way. This, in turn, enabled the big engine to recover full power from the valves and the open combustion chambers. Buick's flow research labs evaluated a number of cylinder head changes without gaining any significant improvement, proving that the new heads are not going to be the limiting factor, at least not with stock exhaust manifolds.

ABOVE—The new stabilizer bar at the rear, plus the added control in the shocks brings remarkable handling improvement. Gears range from 3.64 to 4.33.



ABOVE—When you are souping the GS 455, use the richer metering rods, part number 7034822 and add a separate fuel filter to replace the one that's in the carburetor. BELOW—This monumental air cleaner has two snorkels which attach to the hood, plus vacuum operated valves that control hot air coming up from the exhaust manifold "stoves." The plastic reservoir at the extreme left is new and for filling the radiator. Saves burned flesh.

We know what you are thinking, and, yes, it can absolutely be done. The new 1970 Stage I cylinder heads will bolt on to any 1967 thru 1969 400 or 430 cubic inch engines. The Buick engineers tell us that this requires several additional bolt-on parts, plus a little grinding. For one thing, you'll need the new Buick service gasket, # 1384092. This is a composition gasket with a crimped-over edge that acts almost the same way as an "O" ring and insures higher sealing pressure around the combustion chambers. Among other advantages, this gasket blocks off the oil supply to the head and is also bigger to accommodate the new combustion chamber size. If you install the new heads on an older engine, use the gasket as a template for marking the block so that it can be chamfered accordingly. This will improve the breathing around the valves, but you'll have to be careful not to cut into the ring travel area.

Buick's new rocker arm assembly is a pretty drastic departure from the forged aluminum rockers used in the past. The new rockers are of a bathtub design with higher walls than before and some useful stiffening ribs. Since they are open at the top, there is ample room for trapping oil between the rocker and the shaft, hence less wear. All of the previous rocker stands and locating sp ings are gone, replaced by new pressed-in plastic buttons. These fit right into the open center area of the rocker and keep it from moving sideways. The shaft itself is nitrided and hardened to a depth of .010 to .020 inches. Where last year's oiling system included passages routed through the heads, the Buick's 1970 answer is to meter the oil at the lifters and feed it through the pushrods. This explains the need for using the new rocker arm setup as well as the lifters and pushrods if you switch to the new heads that no longer incorporate oil passages. The new tubular pushrods have a 3/8 inch o.d. and welded steel balls at the end, to make them compatible to the standard GM lifters. Another interesting valve train change is that the valve seals on the exhaust side have been eliminated. Instead, the exhaust valve stem has a step which acts as a scraper, moves in and out of the guide and prevents the valves from drying out.

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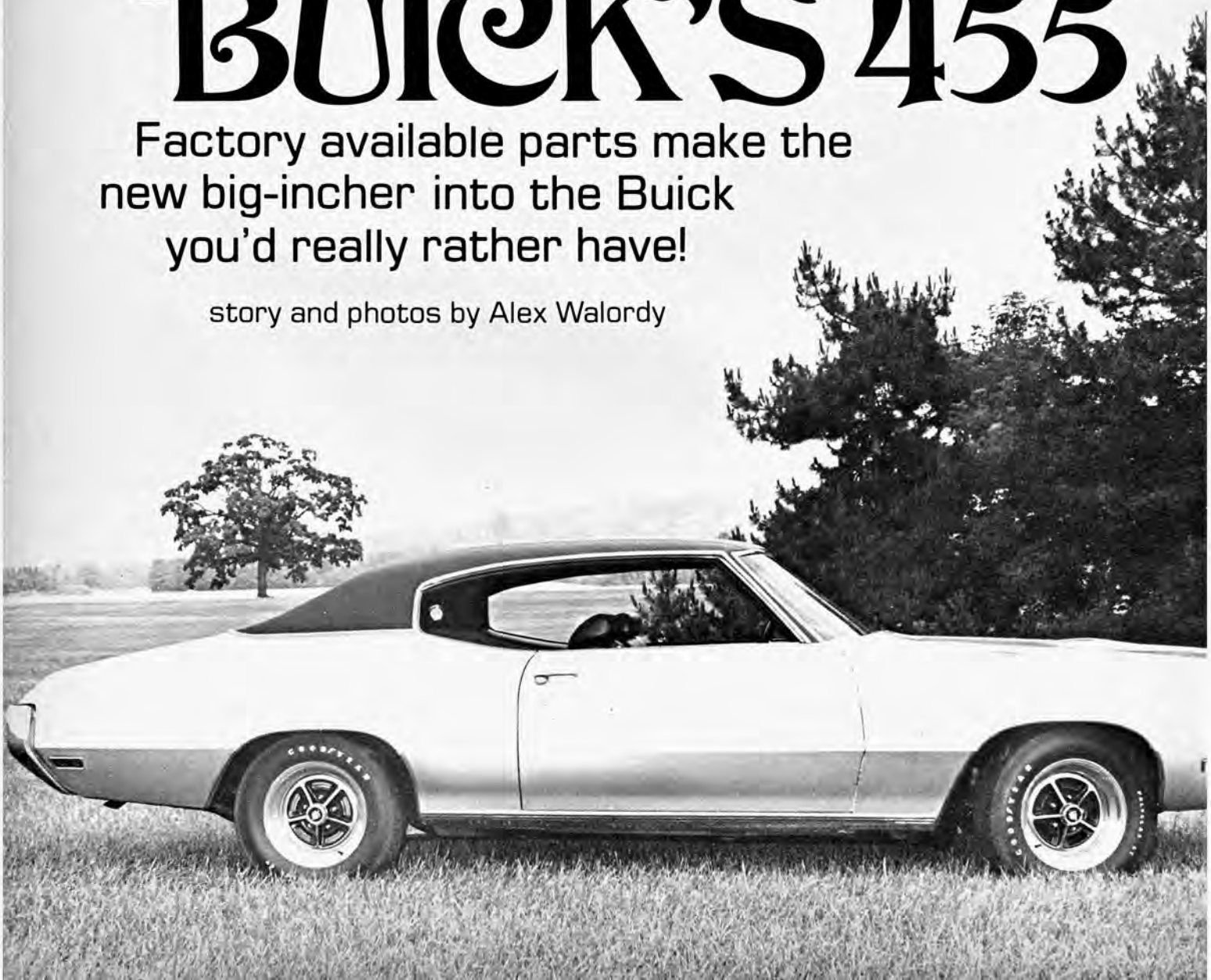

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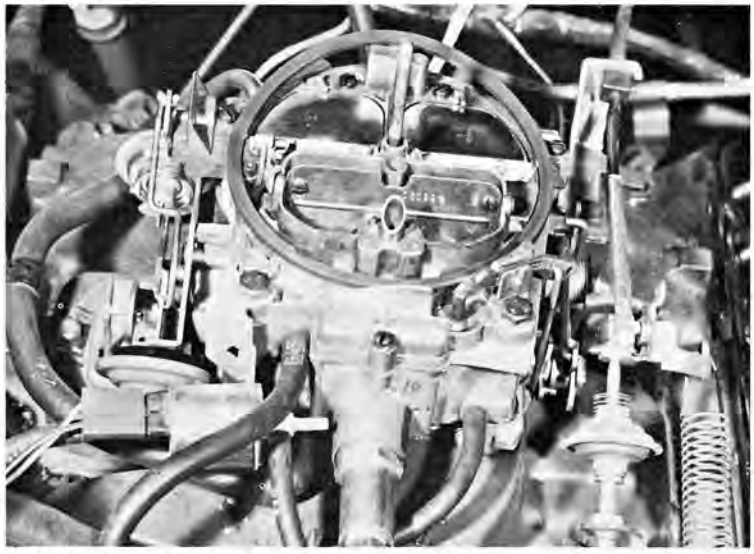

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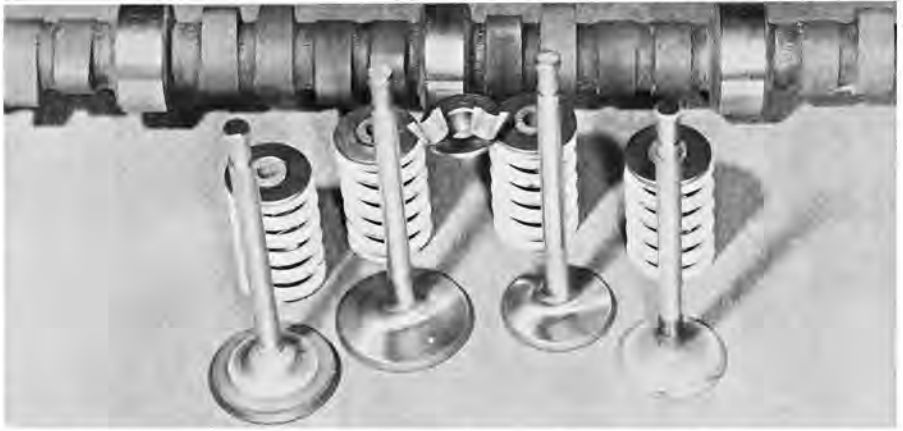
To cope with the extra power, the new 455 block has received a set of taller main bearing caps, retained by correspondingly longer bolts. Naturally, the longer the bolt the better it will hold its tension. Another point along the same lines was to provide a bigger head for those main bearing cap bolts. This keeps them from eating into their seats and again helps keep the bolt tension. In other words, you torque them down and they stay torqued. So far, the engine is released with cast, all-aluminum pistons that are fitted with a full skirt, and give good results on noise and durability. However, a number of Buick racers have used the forged Mickey Thompson pistons. The new compression ratio on GS455 engines had been purposely lowered to 10:1, because of emission control requirements. However, in building a modified production engine, for instance, you can get back up to the previously used 11:1 compression of Stage II engine, and this is definitely worth extra horsepower.

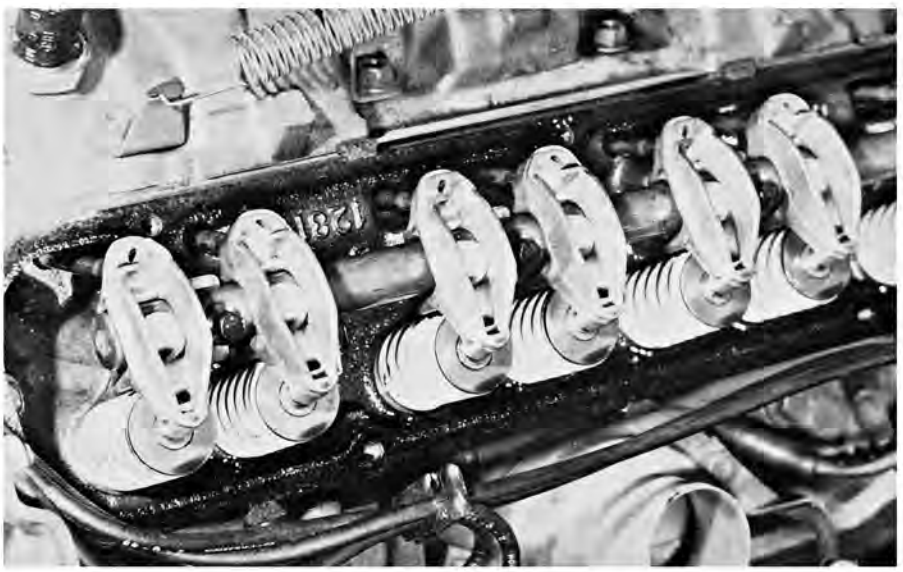
Where racers would see a rod failure and simply let it go at that, Buick engineers did a considerable amount of further checking and came up with answers that can help any GS400 or 455 owner who goes for all out performance. They traced down drag race failures to insufficient oil pressure which would starve the bearing. Then, after the bearing failed, it would take the rod with it rather than the other way around. A number of drastic steps were suggested to remedy the oil problem. For one thing, the pressure relief spring in the pump should be changed from 40 pounds to 60 pounds. You need at least 60 psi, at 6000 rpm, and 90 psi at 8000. If you run 10W30 oil, the pump simply cannot keep up the pressure, so for racing use straight viscosity 40 or 50 weight racing oil. Next came a production change, in form of a larger pickup tube. The flange at the pump remains the same but the pipe size has increased.

Buick's service department has released some specific changes along those lines, designed for extreme high rpm operation. This includes redrilling the right side lifter oil gallery and increasing its size from .4375 to .5156 inches—important because this gallery also feeds the mains. The drilling extends to a depth of 11 inches from the front of the block face. Next, the front of the new oil gallery is plugged with Part #1343370. The oil suction gallery is drilled out with a half-inch drill to a depth of $1^{27}/_{32}$ inches from where the pickup flange is located. Finally, you should use a 5/8 i.d. suction pipe which is free of tight bends. Another caution point is to make sure that the gasket and joint are air tight so that you don't pull in air bubbles with the oil. With these changes, the rpm limit is considerably higher, and so is the power potential. Even in stock form, the shifts are made at 5200 and valve float doesn't set in until 6200 on a showroom type GS455.

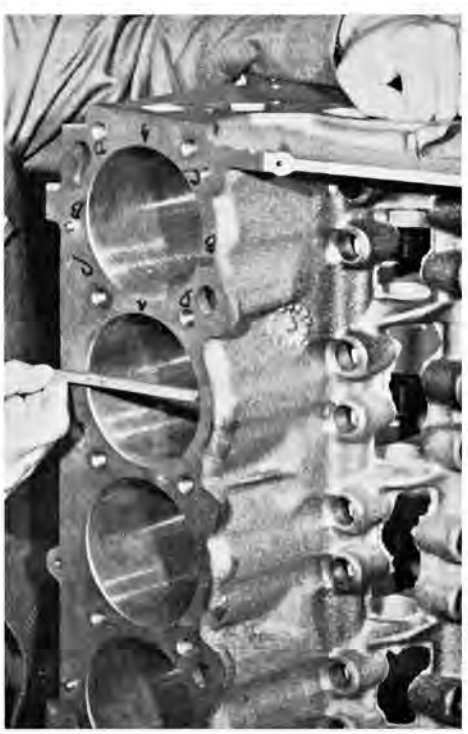
Other oiling modifications include a set of special oversized connecting rod bearings which offer an extra .001 inches of clearance for increased oil flow. The part

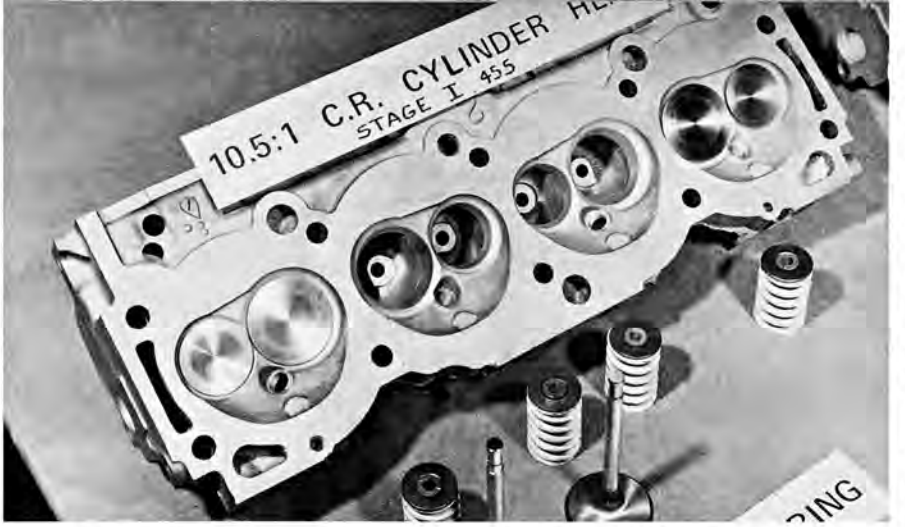


ABOVE—The new intake valves (center left) have a flatter swirl-polished undersection. They measure 2⅛". The exhausts are big, too, and total 1¾". BELOW—In the new heads, the oil is metered to the rocker arms by the lifters and the pushrods. A Stage II camshaft is available with #1385557. Better use it for strip only, though.



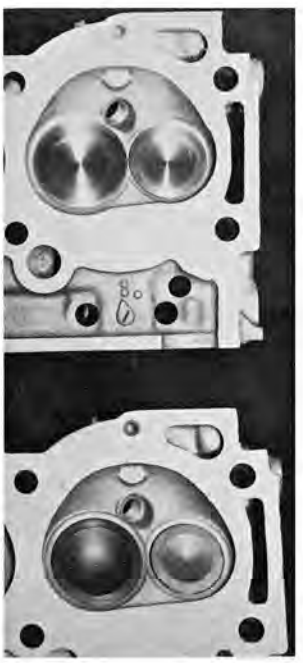
BELOW LEFT—The old forged rocker arms, together with all the springs and spacers, have been replaced with new "bath-tub" type rockers which are located by nylon bushings. The new rocker shaft is nitrided for surface harness. These new valve train parts allow engine revs to 6200 with the Stage II stuff. Good, eh? BELOW RIGHT—A Buick technician shows off the new big block. Its big bore and stroke ratio allows more room around the valves and thus better breathing characteristics.

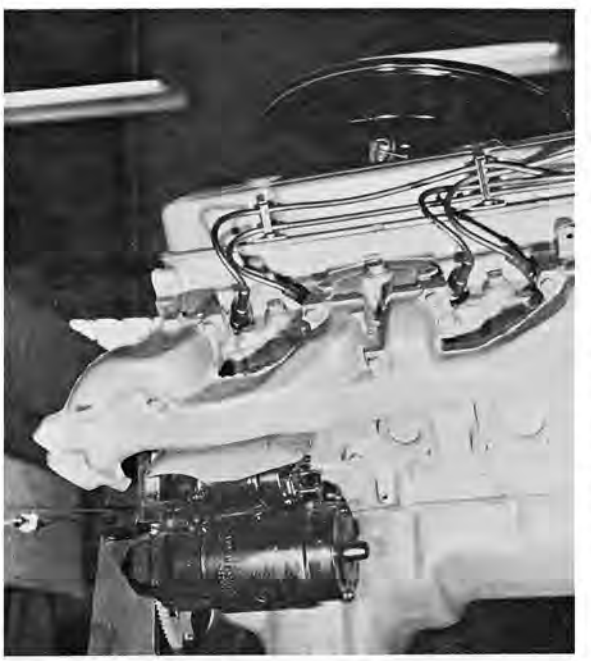




ABOVE—The new 455 cylinder heads afford an advertised 10.5 to 1 compression ratio. Those who are seriously interested in race work could probably make them realize a ratio nearer 11.0. BELOW—The GS has shift points now at 5500. Mod kits can be had for street/strip including instructions on modifying the transfer plates and optional accumulator valve spring.

BELOW LEFT—The latest head castings for the '70's (top) have a fully machined area around the intake valve and more breathing room around the exhaust than the heads used on the old 400 engine. BELOW RIGHT—Even the stock GS 455 exhaust manifold is quite free-flowing, but the best results come in the form of headers with 2½ inch pipes and stacks of 36 to 40 inch length. If you do keep the cast jobs, you can remove the exhaust stoves and then tape up the air cleaner to make the best use of the cool air supply.





number of those is 5468713. On the other hand, the main bearing clearance has been tightened to a maximum of .0015, roughly a thousandth less than most people use to gain extra oil pressure.

The timing of the new engine is set up with a different curve, bringing the full advance by 4200 rpm. Total spark advance is set at a maximum of 28 degrees. If anything, the distributor is calibrated for premium or super premium fuel. Buick continues with the small tapered seat 14 millimeter plugs which they were the first to introduce. The ones in the GS455 have a 40 TS heat range.

A series of changes in the GS455 Rochester carb were made mostly to meet emission control requirements. This includes an extra vacuum diaphragm to bring the choke off a little sooner. Richer secondary metering rods #7034822 will help. The '69 Stage I heavy duty fuel pump is now released for all GS455 base and Stage I cars. As a further precaution, especially on older machines, you can replace the little filter inside the carburetor with a separate outside fuel filter to eliminate a potential source of restriction. For banzai runs there is nothing that turns on the Stage I like a set of big headers with 2¼ inch stacks of 40 inch length. Incidentally, for '70 Buick is going to rely on hot air from exhaust manifold stoves rather than on exhaust heat under the manifold to insure an even fuel distribution in cold weather. For drag racing you can readily ditch the exhaust stoves and tape up the air cleaner so as to make best use of a cool air supply.

You may not classify it as a performance improvement, but there is an interesting change in Buick's cooling system. An overflow tank with its own separate filler cap catches any coolant thrown off by the radiator when the engine is hot and returns it as soon as the engine cools down. Since the tank is made out of a translucent plastic, you can see the coolant level, and don't have to take a chance of blistering your fingers while checking after a hot run.

Buick's Turbohydramatic is a pretty sharp piece of machinery in its own right, and in a GS455 version it has received some welcome extra touches. You get a higher stall speed converter and 52 to 5500 rpm shifts which happen faster and harder. A welcome addition to getting launched again after slowing for a light is a higher 3 to 1 downshift, which now occurs at 35 mph. If you are alongside another car at that speed and floor the accelerator, you'll leave in first and lose him in a cloud of dust, for rolling start drag races. Going beyond this, the Buick service department has come up with some neat transmission packages, one for the road and the other for competition. This includes special flat steel clutch plates, different springs for the accumulator valves and a modified governor assembly. If you want to go all out, they also provide you with a well-defined sketch that tells you exactly what holes to drill and plug in the separator plate to speed up the shift.

All the GS455 cars in Stage I trim are

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STAGIN' BUICK'S 455

released with 3.64 positraction axles as standard equipment but optional ratios are readily available, up to and including a 4.30. While the standard GS455 comes through with finned brake drums, the new single piston Delco disc brakes sound like a much better deal. They offer very little drag, plus excellent stopping action. To go with them, there is a new tandem power booster with two diaphragms that gives you 30 percent more action for the money and comes through complete with a proportioning valve that tailors the pressure to the rear brakes.

The new GS455 is more than a souped-up bored-out version of last year's car; it is also one of the hottest handling machines that GM offers. In fact, we were getting through the corners of the test course at the GM's Milford Proving Ground at five miles an hour faster than on any other GM machine, of the 442–GTO-SS category. A number of things contributed to this. For one thing, Buick added a new rear stabilizer bar which improves the tire loading and keeps the car flatter. This alone could account for the much improved response to a little extra throttle while rounding a corner. Whatever changes Buick made to their heavy duty shocks, spring rates and stabilizer bars, they definitely came up with the right combination.

Another boost to good handling came from the use of big low profile G60-15 rubber mounted on 7 inch rims. Those new super wide belted tires provide 9 tread rows as against last year's 7 and improved the traction by a noticeable amount. One of the test drivers at the proving ground told us that on a particularly rough section of the course which chews up F78 tires as though they were going out of style, the G60's wind up with four times the mileage.

Incidentally, if you wish to get specific Buick drag racing information, you can write to Mr. G. Sawatzki, of the Service Department, Buick Motor Division, Flint, Michigan, and ask for their performance bulletins. With the series of improvements that range from the top of their scoops to the bottom of the tires, it looks as though Buick has the makings of a total winner for the start of 1970, and you might as well get in on the ground floor. ■

CUSTOM AUTO SHOWS

'69 & '70

White Plains, N.Y. – October 24, 25 and 26, Westchester County Center.

Allentown, Pa. – November 7, 8, 9, Agricultural Hall, Allentown Fairgrounds.

Philadelphia, Pa. – November 14, 15 and 16, Spectrum.

Norfolk, Va. – November 28, 29 and 30, Auditorium.

Winston-Salem, N.C. – December 5, 6 and 7, Convention Center.

Raleigh, N.C. – January 9, 10 and 11, Dorton Arena, State Fairgrounds.

Albany, N.Y. – January 30, 31 and February 1, New Scotland Avenue Arena.

Worcester, Mass. – February 13, 14 and 15, Memorial Auditorium.

Baltimore, Md. – February 19, 20, 21 and 22, Civic Center.

For information concerning any or all of the above shows, contact William C. or Alice Ann Holz, 2170 West Ridge Drive, Lancaster, Pa. 17603. Phone 717–872-5802 or 872-2316.