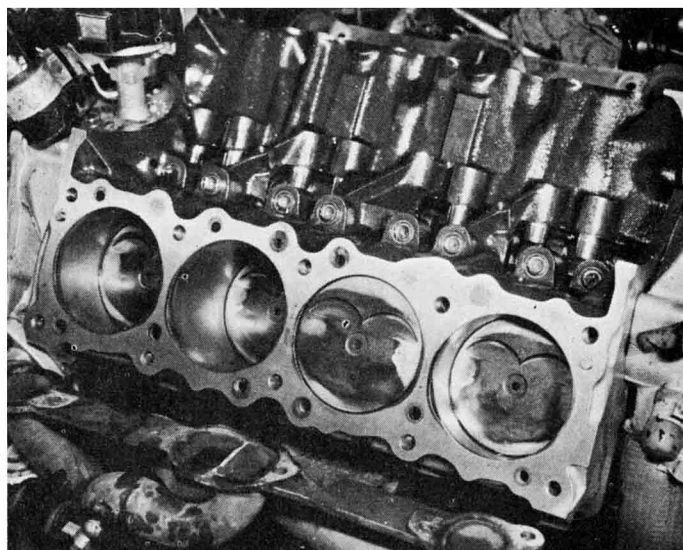


Above left, new 400 headers will fit all past 389's. Right, better top-end punch is achieved by blocking heat riser passages.



Left, Sid Warren shows the latest in headers for the GTO. Above, to take new 400 pistons, old 389 is punched out .060 over.

WANT MORE GO FROM YOUR 389 GTO? YOU CAN INCORPORATE PONTIAC'S LATEST BREATHING INNOVATIONS INTO YOUR EARLIER TIGER. HERE'S HOW TO

ADD KICK TO THE KING

THE NEW PONTIAC GTO boasts 400 cubes, and 389 owners are getting worried. You might say that 11 cubic inches isn't much, but it isn't just a matter of a few extra cubes. Better breathing allows the new engine to pull as much power from a single four-barrel as the old 389 did with tri-power, and it also produces more low-end torque.

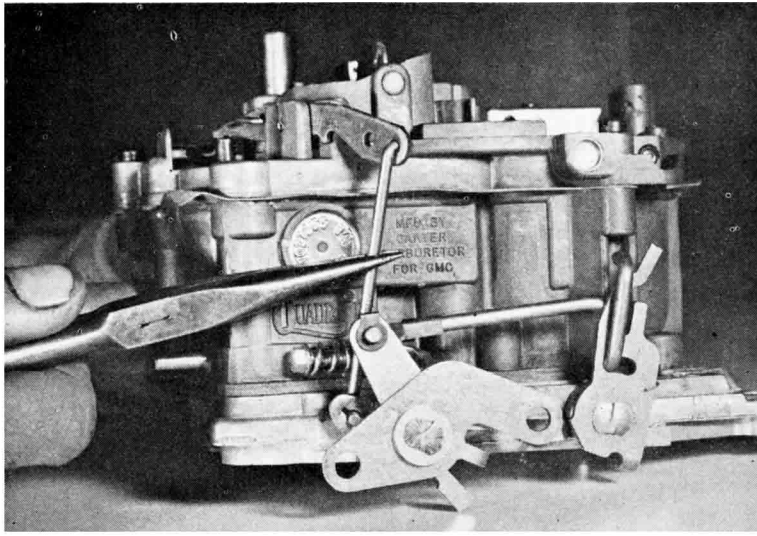
Now that we've made things sound really bad for you owners of older GTO's, we'll let you in on an over-the-counter prescription, involving readily available parts that can fill your 389 with enough new muscle to keep up with the '67 Tigers.

Unfortunately, there is a problem. The cross-breed is not what you would call legal at any drag strip that abides

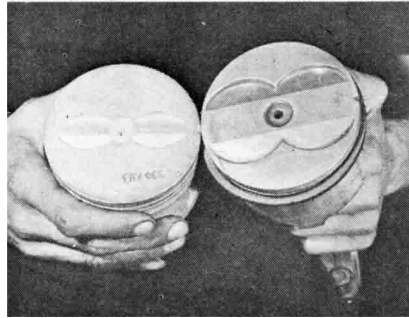
carefully by all the rules. And so you have the choice of either running second best or racing what "ya brung." We asked some strip managers about this and the more alert ones had the answer short and sweet: "As soon as a few cars show up equipped that way, we'll add a new class!" So you could be building a roaring tiger for the drag strip, as well as a super hot street number.

The secret weapon in getting all this power out is a new set of heads with bigger valves and revised combustion chambers. And we mean bigger valves, not just a negligible increase. For instance, the intake valve size has shot up from 1.92 to 2.11 inches, while the exhaust valves have increased from 1.64 to 1.77 inches.

BY ALEX WALORDY



Performance can be improved by moving accelerator rod to outer hole.



Right, stock 389 slugs must be notched to conform to 400-type heads.

400 guts can be added to the 389

In fact, some owners of 421 racing machinery dating back from the good old Pontiac days, are seriously thinking of switching to the new engine.

Pontiac didn't just stuff bigger valves into that same old combustion chamber. Instead, they brought the valves right out in the open so that they could do some good. A large scallop alongside the intake not only provides freer breathing, but also induces a swirling action into the mixture. Gaining the extra room for the valves involved bringing the entire combustion chamber closer to the center line of the cylinder boards. Naturally, you get more space along the diameter of the cylinder bore than off to one side of it. In the 389 heads, the valves were tipped at a 20-degree angle, but now with the combustion chambers moved toward the intake side, they are tipped at 14 degrees. The combustion chamber moved .502 inches toward the center of the engine, and the spread between the valve stems is now 1.92 inches instead of 1.82 inches.

Fortunately, Pontiac has continued its expensive practice of fully machin-

ing the combustion chambers. This results not only in very smooth surfaces, but also in accurate volume and compression ratio control. While the mating surfaces of the cylinder heads at the intake and exhaust manifolds have not changed, the port shapes have been improved to cope with the increased gas flow. For instance, the ledges in the exhaust ports have gone, and the roof of the intake port is contoured differently.

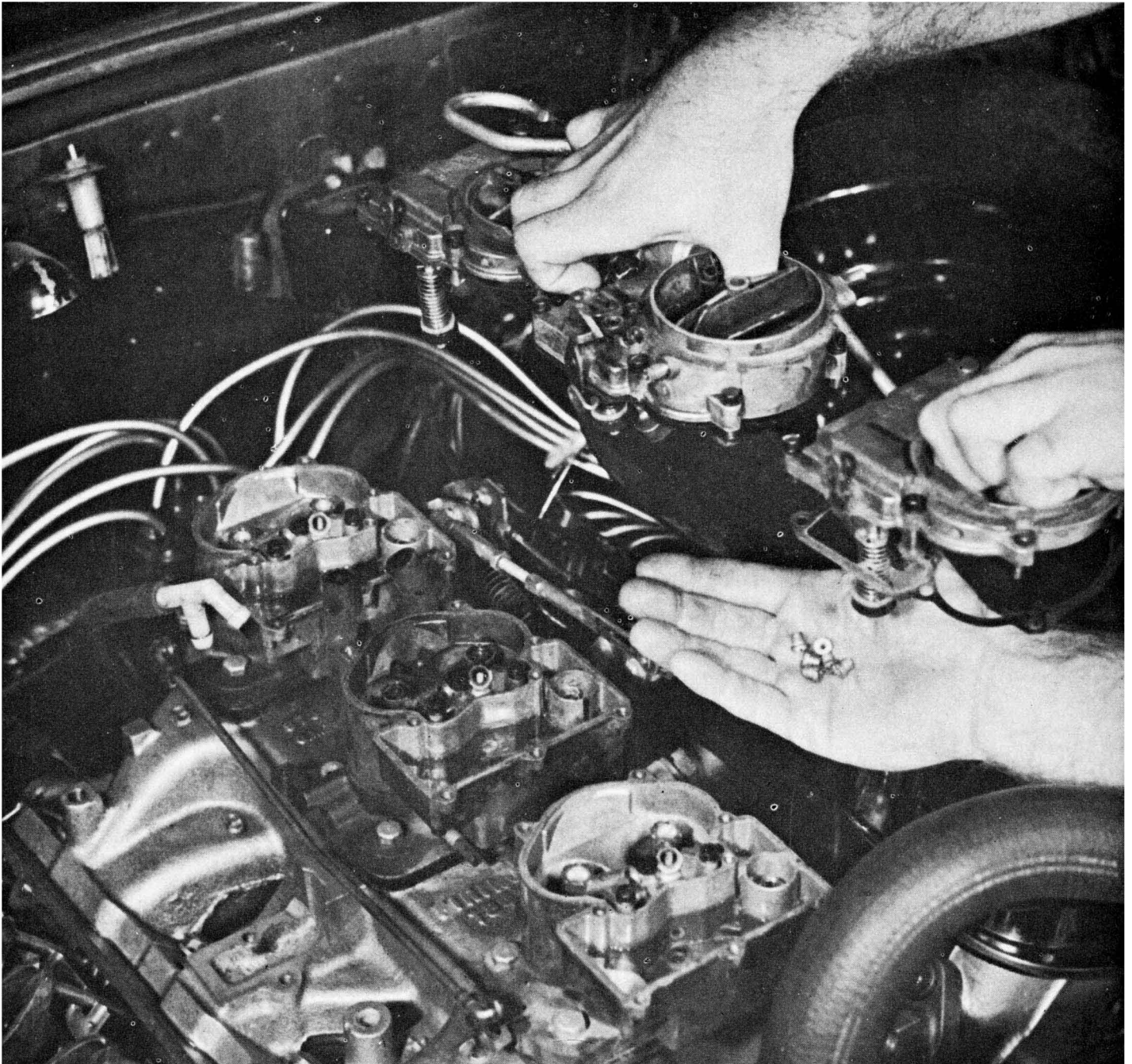
These changes did not go unnoticed at Ace Wilson's Royal Pontiac. Milt Chornack, who heads Ace Wilson's performance department, swung into high gear and decided to experiment with the new heads to see how fierce a racing machine he could create by mating 1967 parts with those of a '66 GTO.

Milt and his chief mechanic, Sid Warren, promptly established that the new heads fit a 389 on a bolt-on basis—but with one hitch. The valves in the 400 heads meet the pistons at a different location and so the old eyebrows scalloped in a 389 GTO piston for clearance purposes are too close to the center of the piston and do little good. Several fixes are available. The most expensive one would probably be removing the old pistons and sending them over to a machine shop for remilling. People who have been around race engines for a while would transform a pair of valves into cutters and use the new heads as a ready-made jig to mark up the pistons. This involves removing the heads eight times or more, but saves the price of a set of pistons.

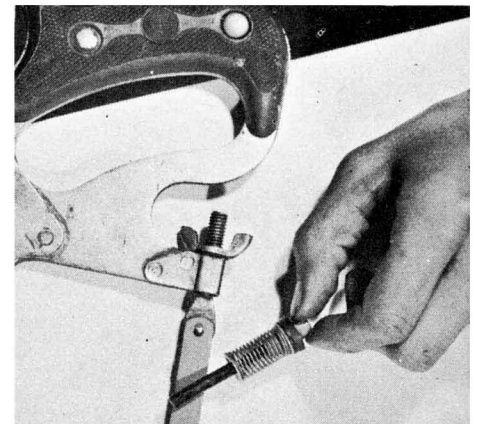
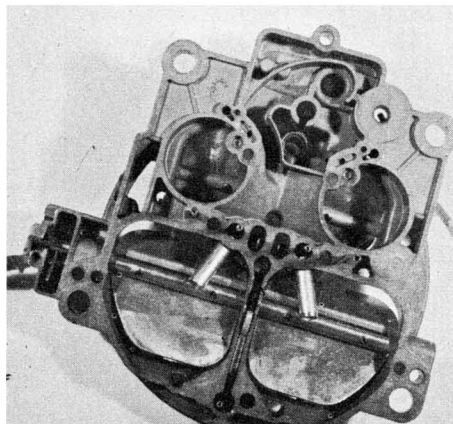
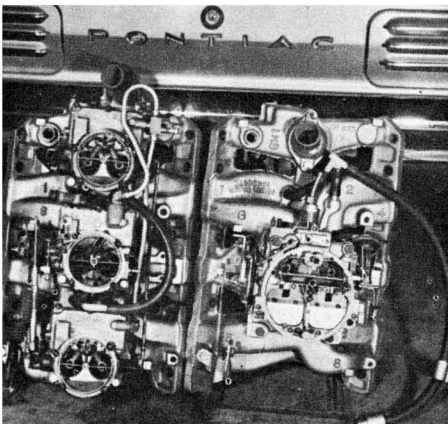
Sid Warren, who has raced GTO's for years, had different ideas on this subject. A '64 or '65 GTO that has seen a couple of seasons of active performance is probably ready for the boring bar—so why not trim the cylinder .060 oversize and install a set of the new 400-cubic-inch GTO pistons? At the same time, the top edges of the bores can be scalloped out slightly for improved breathing at the sides of the valves, and new rings can be installed, transforming the old mill into a new fire-breather.

A stock Pontiac 400-cube ring set has a moly-filled top compression ring and chrome plated rails on the oil ring. Also, the top ring is of the "reversed twist" caper face design which provides better oil control under high vacuum conditions. Of course, if you want to go all out, a good set of forged pistons made by Forgedtrue, J.E., or Vanolia, will turn the trick even better with rings of your choice.

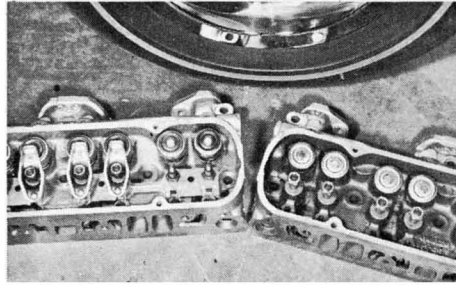
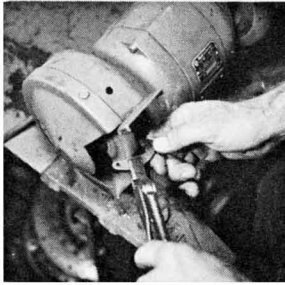
The change in pistons will undoubtedly involve a change in engine balance. If you are building an engine



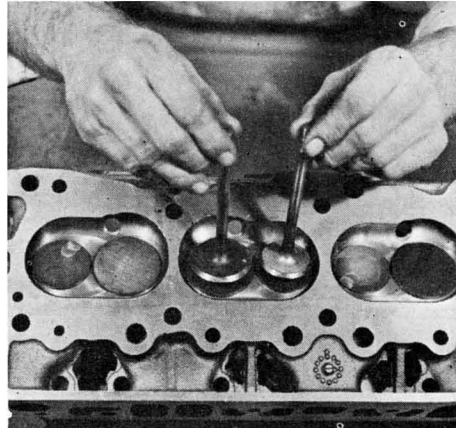
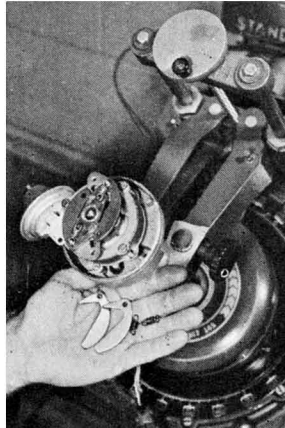
Above, the discontinued tri-carb setup will bolt right on new 400 engine. Jet changes are made according to the type of cam used.



Left, the old three-two-barrel option will provide better top end than new '67 four-barrel Quadrajets. The quad, however, will give better low-end zap. Center, tension on the secondary air valve spring may be adjusted with screwdriver for maximum low-end delivery, but too much gas will cause bogging. Right, accelerator pump rod may be shortened to supply more fuel.



Left, modified distributor bob weights and stiffer springs give quick full-advance. Right, the new better-breathing head is at the left.



Left, these are the custom bob weights and springs used by Royal. Right, new intake and exhaust valves are 10-percent larger than in 1966.

over-the-counter parts do the job

for normal street use and will retain the hydraulic lifters, you might get away without balancing, but for a competition engine, a balancing job would improve smoothness and durability.

You'll find that the new heads bring with them some very welcome valve train changes. Gone are the press-in rocker arm studs and the narrow slotted holes broached in the head to guide the push rods. Instead, there is an ultra-modern set of screw-in studs, together with removable case-hardened steel plates to locate the push rods. Unlike old racing guide plates where the push rod rubbed against the narrow edge of a slot, these have turned-up lips which provide a much wider contact area, hence longer wear life.

The new heads come with a stiffer valve spring and a flat wound spring damper. The valve spring number applies to previous GTO's as well, and carries part number 9785720. The closed pressure is 108 pounds at 1.586 inches while the open pressure is 251 pounds at 1.173 inches. The figures will be useful to you in setting up the correct valve spring height with shims. There is a new "black" retainer to go with the stiffer spring that is supposed to be considerably stronger than the previous one.

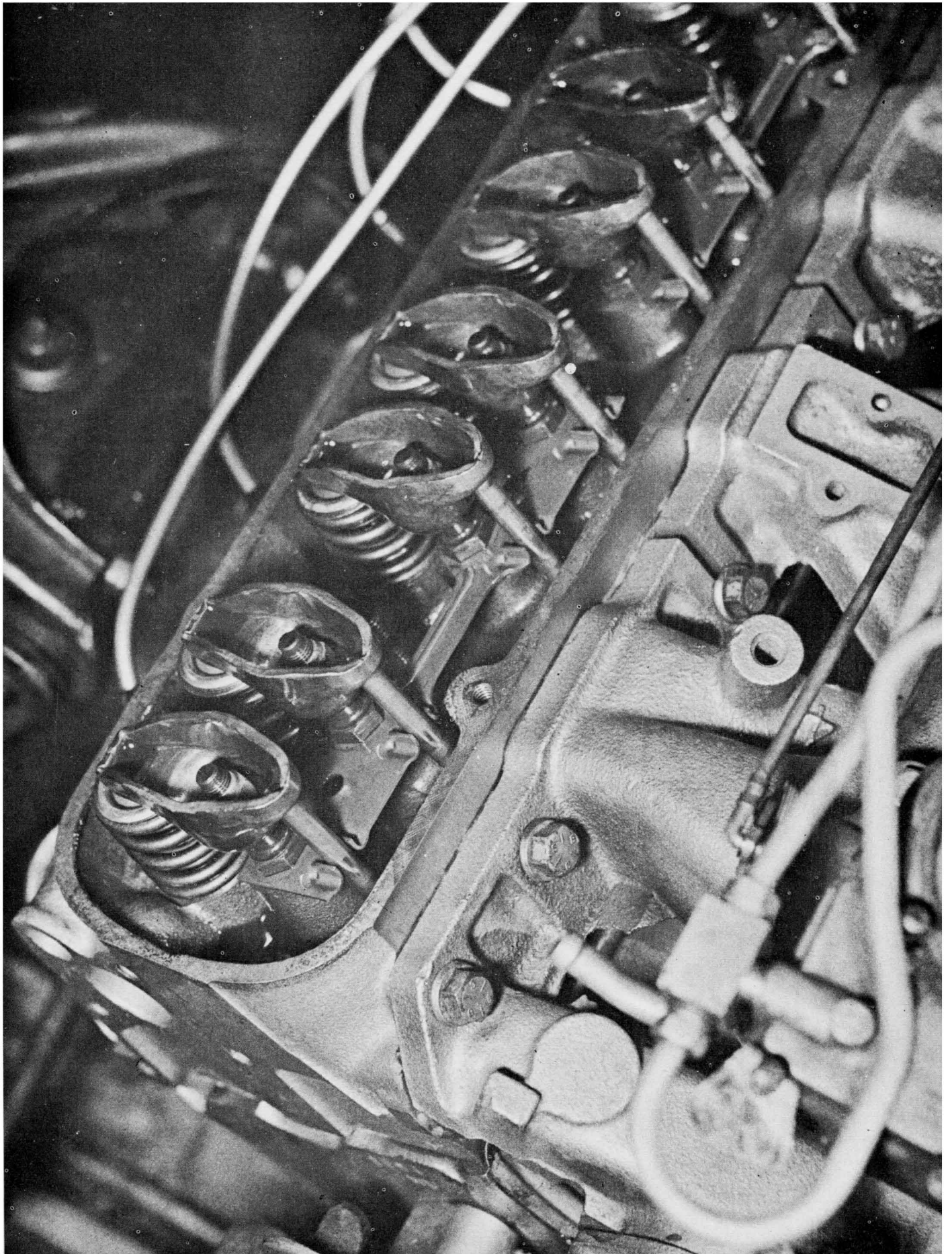
The same fiber-locked washers that were used on older GTO's for lashing out the hydraulic lifters will also work on the new engine. The alternative is a Mickey Thompson-type lock nut with an Allen lock screw in the center. While you have the engine open, look into the possibilities of the new 400-cubic-inch cam (number 9785744). It has an intake duration of 301 degrees and an exhaust duration of 313 degrees. Intake opens at 38 degrees and closes at 83 while the exhaust opens at 95 degrees and closes at 38. There are also a number of proprietary cams to fit almost everyone's desires or ambitions. Crane Engineering has some very strong hydraulic lifter cams and springs. Since you are not building an engine that would exactly pass for legal, why stop short at a cam?

To go with these changes, you will unfortunately, have to spring for a set of 1967 push rods since the one required for the 400 head are .3- to .4-inch longer than the stock ones used on the old 389's. The new heads use umbrella seals as well as PC teflon seals on the intake valves. It wouldn't be a bad idea to install a set of PC seals on the exhausts while you are at it. One nice feature of the new 1967 valves is that they are chrome plated on the stems for longer wear. Like the boys at Pontiac say: "When we go, we go all the way, in style."

With all the new breathing capacity that the engine has acquired, it would be a crime to retain the old cast-iron headers. For top power, there are full race Belanger headers with long sweeping stacks of even length and a long collector that smoothes out the torque curve. Sid Warren and Milt Chornack ran them to good advantage all of last year, and plan to continue to do so in 1967.

Not to be outdone by the sharp speed boys, Pontiac Engineering has released a new set of cast iron headers for the GTO, and takes considerable pride in pointing out that they will fit all past GTO's. The new headers are quite elaborate—with long dividing partitions between the stacks and smooth sweeping curves. They are reasonably priced bolt-on items, and are quite durable, being made of cast iron rather than thin wall tubing. On the minus side, they do add a few pounds to the front end weight.

Carburetion for 1967 is a bit controversial, because the three-two-barrels have been banished by corporate edict. We can't really believe that a single Quadrajets manifold is as good as one with a set of three two's, so if you have a 1966 or earlier manifold, by all means keep it—especially if you have (Continued on page 68)



New cylinder heads bolt on earlier models, however, revised valve locations require that relief notches be cut in the 389 pistons.

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beefier 9 3/4-inch Sure-Grip ring gear rear with special Dana #60 axles. This is the only rear which should be used if drag racing is planned. The smaller automatic rear with 8.75-inch fixtures will not hold up on the track if the car is fitted with slicks. We also noticed that the four-speed 440 cars were fitted with dual-point ignition systems, slip fans and oil sumps with windage trays built in to prevent the oil from being churned up (foamed) by crank rotation at high rpm. Goodies or no goodies, it's just about impossible to beat that Torqueflite with a four-speed mixmaster. Besides, the four-speeder weighs approximately

100 pounds more than the dial-a-win unit. So who needs it?

In the final analysis we rate the 440 GTX as a formidable competitor. Its only weak points were the lack of factory-installed good gears, an idiot light in place of a functional gauge, a 150 mph speedometer with normal high speed cruising range numerals too close together, and out-of-sight markers from 120 to 150 out in the clear. There was also an obvious lack of quality control and careful dealer preparation. The car's performance was flawless with acceleration from a standing start to 60 mph in the mid 6's and a top end of 125-plus mph. Plymouth may be a few years late with the supercar bit, but they sure came up with the right combination.

GTO continued

taken the trouble to convert it for use with progressive mechanical linkage. If, on the other hand, you'd like to try the new single four-barrel Rochester Quadrajet, you'll find that it is quite flexible, and probably the fastest way out of the hold or away from the starting point.

Dick Housey (yes, the same Dick Housey that campaigned another make and has now been converted to a full standing GTO man) gave us several good tips on setting up the Quadrajet for strip performance. The spring action of the air valve on the secondaries is adjustable. It should be set so that the engine gets its air as fast as possible, but without falling flat on its face when you floor the throttle. More accelerator pump shot can help with problems in getting out of the gate.

Sid Warren now has an extensive program under way to see what changes are needed in the power jets, needles, and secondary needles to bring forth maximum drag strip performance. The results were not ready at this writing, but since Sid had one of the fastest GTO's around last year, he is likely to have a repeat performance this year. Sid will be a good man to keep in touch with at Royal Pontiac.

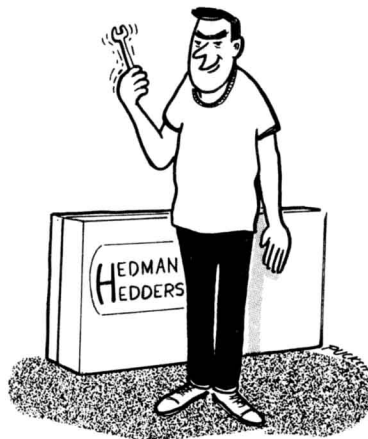
Milt Chornack gave us quite a few hints on sprucing up the ignition department to best advantage. He prefers Champion J63 Y's for street use. He has also used a UJ10 Y to good advantage. The wiring was changed from a radio suppressor type to one with a wire core. Milt also ups the initial advance, and simultaneously cuts down on the amount of centrifugal advance in the distributor. To insure a snappier response, the advance in the distributor is made to come in

(Continued on page 75)



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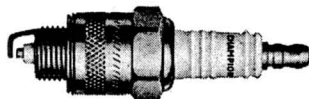
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much earlier. The figures will vary with the cam and carburetion used.

Milt Chornack is now working out a special version of a Bobcat package to include all of these changes, and Ace Wilson's Hot Tigers should be the terror of the strips when he gets through with them.

MINNICK continued

for all to see as Jim is the current NHRA AA/GD record holder with a low elapsed time of 8.07 seconds and a best top end of 189.80 mph. However, Minnick has run his hemihonker up to 196 mph using his little engine for power. The so-called *little* engine checks out at stock cubes and while posting the top mph figure, its best et trails at 8.26 seconds. The big engine boasts a half-inch "long-arm" assembly and checks out at 497 "big ones."

The Minnick pit crew consists of Jim and his wife, Gloria. Larry Simpson pitches in with prep work during the summer months and Harold Hut-ton helps with some of the machine work in Nitro. In addition to knowing her way around the pits and providing assistance, Gloria is Jim's good luck charm. He has only gone to the track

without her twice and it was on the first of these occasions that Minnick joined the "upside down" club.

NHRA points competition (which determines who gets to go to Tulsa for the big one) occupies almost one-third of Minnick's racing schedule. The remainder is split almost equally between match races and "big-bucks" meets. Jim races only once per week (except for the big meets, of course) and usually tries to stay within a 12-hour driving radius of Charleston. However, he has made some exceptions to the self-imposed 600-mile limit for championship meets.

Because of the way the "Nitro Gasser" has come along financially, Gloria has given up her position as driver-education instructor in favor of handling the books and the phones for both the speed shop and the dragster.

Even though he has the record at 8.07, Minnick is not completely satisfied. Earlier in the year he declared that he wanted to get the class record with an unheard of 7-second run. Most "in" racers and spectators are making book in Minnick's favor and I'm sure it won't be long before some of the top competitors in this class start switching to new Dodge hemi power.

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