

CRISP SHAPE and special grille distinguishes front of Buick's Supercar series, GS 400.

1967 AT GENERAL MOTORS

A Year for Subtle Variations

FOR GENERAL MOTORS, the 1967 model year is one of subtle variation upon its 1966 cars. Costly though it may have been, restyling of GM's traditional car lines largely has been unobtrusive. The New is concentrated in Chevrolet's entry into the Mustang market, the Camaro, first

version of a clutch of copies utilizing the latest Fisher F body shell. Yet to be announced, Cadillac cars are expected to include an adaptation of the Fisher E body (Toronado/Riviera) with front-wheel drive as an additional incentive, is an entry under the New column. This car, unlike the

existing pair, will be a notchback hardtop to continue the Cadillac styling theme. Full details will appear in the November *CAR LIFE*. Also in the New category are the two new big engines from Buick, thoroughly detailed in last month's *CL* Engines from Pontiac and Chevrolet



SPECIAL TRIM and rear panel treatment identify the GS 400, now a separate series based upon the standard-sized Special.



WIDE OVAL tires on special steel wheels place extra rubber on the road to improve GS 400's handling qualities. Louvered vents in front quarter are simulated.



ELECTRA 225 displays crisper lines and a unique grille. Elongated S curve creased along side panels is most distinctive styling feature of new Buicks.

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have received some alterations to give those divisions powerplant improvements about which to talk. Resistance to front wheel disc brakes, apparent among corporate engineers over the past few years, finally has collapsed enough to permit the adoption of these brakes as optional equipment for most of this year's lines. The corporation's 3-speed automatic transmission is more widely available among the smaller cars.

By far the most conversational in-

terest will center around GM's response to the cliché of automotive safety design.

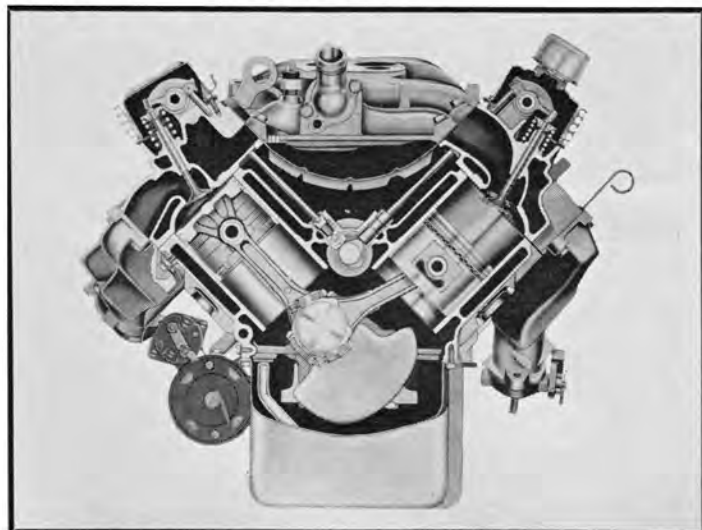
Nonetheless, the original 17 "safety standards" imposed under previously enacted authority by General Services Administration will be found on all GM cars. These include at least two items requiring rather basic design work—collapsing steering columns and split brake systems—which the earlier timing of the GSA proposals allowed. The former, supplied by Saginaw Steering Division for all corporation cars as well as those of Chrysler and American Motors, is designed to break away from its instrument panel mount and telescope accordion-fashion away from the driver in the event of an impact. A special steering shaft, a col-

lapsible column shroud, and the break-away mount insure the controlled collapse rate.

Split brakes, more commonly referred to as "dual brakes," provide separate hydraulic circuits to operate front and rear brakes. Each circuit is controlled from a separate reservoir in a tandem chambered master cylinder. It is demanded by GSA as a means of retaining some measure of braking ability in the event one set of brakes fail. The system includes a warning light on the instrument panel to warn of the failure or of low fluid level in one of the circuits.

Four-way flashers, which simultaneously blink all turn signal lights as a warning to other motorists, are standard on all GM cars. This provision is

COMPACT LAYOUT of block and bi-level intake manifold are evident in this cutaway of Buick's 400-cu. in. engine. Main difference for 430 is bore width.



DOMED PISTON crown from earlier pent-roof engine contrasts with the scooped-out crown of the new.





OLDSMOBILE TORONADO shows smoothed-over front edge where "eyebrows" were plucked from over headlight panel. One of the more interesting changes is the availability of optional front wheel disc brakes.

controlled by a small pull knob located just behind the steering wheel on the side of the new column. The turn signal itself, moreover, incorporates a lane-changing warning. A mid-point semi-detent for the signal lever permits the appropriate flashers to operate as long as light finger pressure is held; releasing the lever cancels the signal without the need to twist the steering wheel.

Door locks which operate from push buttons atop the window sill no longer can be overridden by the door handle. To unlock GM's doors, it is necessary to pull the lock button back up. All knobs, including those on steering column shift levers, have been made larger in diameter and lower in height. In some cases, flush-mounted

thumb wheels replace them altogether. Though it would seem that the ease of operation of such controls might have been hampered, such changes were dictated by the safety crusaders.

Seat back latches, which must be unfastened by passengers in the back seat before they can get out, make their appearance on most folding back type of seats in 2-door models. They are supposed to reduce the chance of injury in a sudden stop. Front and rear seat belts (complete with retractors in front) are standard while the attachment points for front seat shoulder belts have been added into all '67s. Other safety devices, by now as firmly entrenched as are engines in all cars, are the padded dashboards, padded sun visors, thick laminated



REPLACEMENT for the Dynamic 88 line is a 4-model line called Delmont 88. Either 330- or 425-cu. in. engines are installed.



HOOD LOUVERS and a spectacular grille highlight styling changes for Olds' Supercar, the Cutlass 4-4-2.

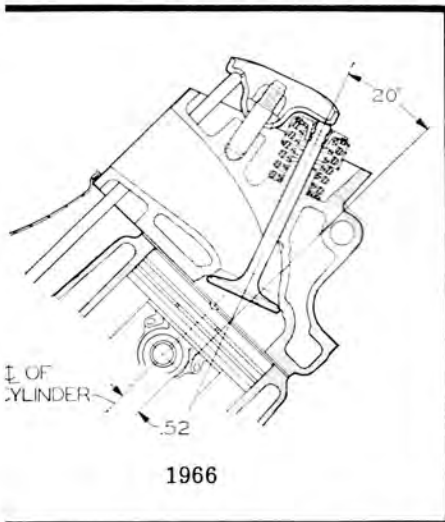
windshield, non-glare windshield wipers, outside rearview mirror, back-up lights and uniform (PRNDL) shift quadrants.

By divisional lines, the 1967 panorama from General Motors is:

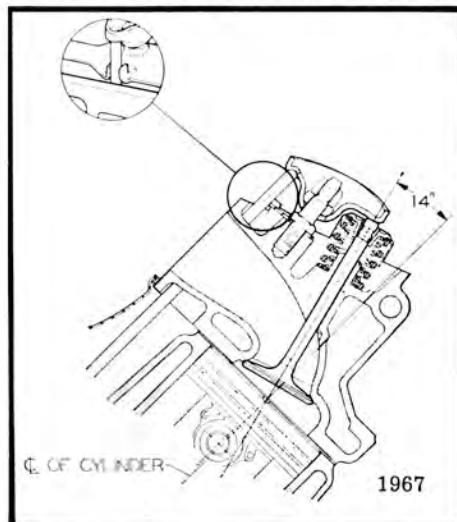
BUICK's big-bore engines comprise a new power package for 1967, the major change in this General Motors division's products. The recent 401- and 425-cu. in. engines, ultimate stretchings of a 14-year-old "pent-roof" design that started life at 322 cu. in., are discontinued. In their place is a block displacing either 400 or 430 cu. in. depending on bore, of more modern inspiration and much healthier aspiration (*CL*, Sept. '66).

The cars, however, are little changed

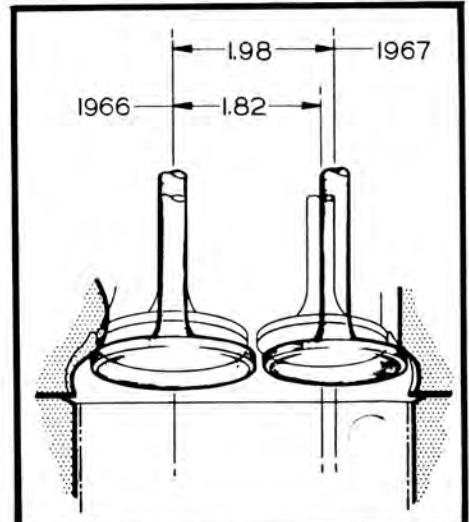
REDESIGNED CYLINDER heads are fitted to Pontiac Division's 400- and 428-cu. in. engines, providing a center of combustion directly over the centerline of the cylinder for greater efficiency. In making the change, valve stem angle was reduced to 14° and a new guide for the pushrods (insert) was incorporated. Wider spacing between intake and exhaust valves has been accomplished to better accommodate the somewhat larger valve diameters.



1966



1967





RETRIMMED FRONT of Pontiac's GTO announces an engine of 400 cu. in., an enlargement of the earlier 389.



TAIL AND stop lights for the GTO are formed as vents in banks of two at either side.

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in appearance throughout the division's seven series, though there have been subtle styling revisions. Riviera only has very minor trim changes with slightly more re-trimming evident among all the A-body Special series (where plastic and die-cast grilles are being tried). Among the larger series, styling reflects somewhat more crispness, front and rear. A shallow S-curve is creased into the flanks, sweeping upward and forward from rear wheel openings to just above the front wheel cutouts. The most striking summary of Buick's restyling appears in the 2-door coupes, where a slope-back roof makes a new statement by echoing that S-curve.

Along with the new engines, the

emphasis has been on mechanical components for the new model year. Highlighting these developments is the appearance of front wheel disc brakes, a long-awaited feature which only just snares top billing away from extensive redesign of all Buick brake systems. Discs are optional throughout the standard sized A-body lines and for Riviera and Wildcat lines.

In addition, the former Skylark GS performance option, which becomes a separate 3-model Supercar series called GS 400, shares with the station wagon new front finned aluminum brake drums for standard brakes. Thicker and more fade resistant lining material together with the improved heat dissipation of these 9.5-in. x 2.5-in. drums result in better brake effectiveness for the standard all-drum configuration. Similarly, new front drums with twice as many cooling fins as before are used on Wildcat, Electra 225 and Riviera models. These drums have 0.5 in. added to the inboard

shroud to reach further into the airstream. The improved linings are used with these, too.

Additional mechanical changes include a realignment of engine/transmission availability. Of primary interest, the 3-speed automatic transmission will be available in the GS 400 and the station wagon for the first time, though the 2-speed automatic will continue for the rest of the Special lines. Except for LeSabre, all large Buicks will be equipped with the 3-speed automatic transmission only (no manual transmissions offered), but there will be a choice between floor or column shift lever location.

All Buick engine mounts, as part of the new engine package, are constructed of laminated rubber sandwiches around a steel plate.

In the area of ride control, several subtle changes in shock absorber valving and spring rates have been made for the new model year. The large Buicks all have as an option the

PRE-HEAT air intake system for Olds V-8s eliminates carburetor icing.



PONTIAC finds a new place for tach: Outside under a hood pod.



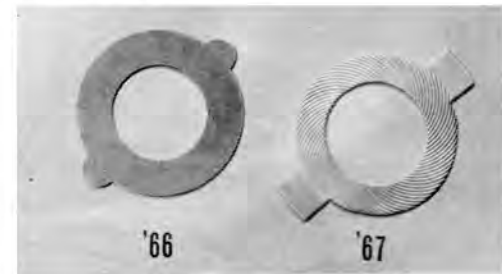
TIC-TOC-Tach, combining clock with tachometer, is Oldsmobile's method of dealing with instruments.



TOUGHER, larger limited-slip differential is built by Olds.



OLD AND new friction discs from Olds' differentials show one area of improvement.





LARGER PONTIACS, such as this Grand Prix, show the most startling styling changes for GM cars. Windshield wipers park under lip of hood.



DISTINCTIVE TRIM plus a 428-cu. in. engine are features of the Catalina 2 Plus 2 hardtop.

automatic load leveling device which has been available (and continues) on the wagon.

Reviewing the previously reported engine story, the division has five displacement sizes with six outputs, all newly designated by Buick's own hyphenated 4-figure code. Carryover engines are the 225-2, the V-6 with 2-barrel carburetor; 300-2, the smallest V-8 with 2-barrel; 340-2 and 340-4, the 340-cu. in. V-8 equipped with either 2- or 4-barrel carburetor. New engines are the 400-4, 340-bhp "semi wedge" version exclusive for the GS 400, and the 430-4, the Quadrajet-equipped standard powerplant developing 360 bhp which is in all Wildcats, Electras and Rivas. Although the new engines have the same bore spacing as before, completely new tooling has been required because bore staggering has been reversed. Both share a 3.90-in. stroke, but the cylinder bore of the larger is increased from 4.04 to 4.187 in. The important

changes, however, are in the breathing provisions: Intake passages are 11% larger, exhaust ports have 80% more area and, of course, valve diameters are 0.125 in. greater. Distributor and other engine accessories are all front-mounted for easier service accessibility.

CHEVROLET Division's major effort for the 1967 model year obviously has been concentrated into the launching of the Camaro (see Page 34). However, the world's largest manufacturer and seller of automobiles has not entirely neglected the remainder of its product line. As have others, Chevrolet has concentrated development in three specific areas: Safety, styling and design refinement. It is one of those quiet, evolutionary years for Chevrolet products other than Camaro.

Perhaps the most interesting development relates to the Camaro. This is the 350-cu. in. V-8 engine which the

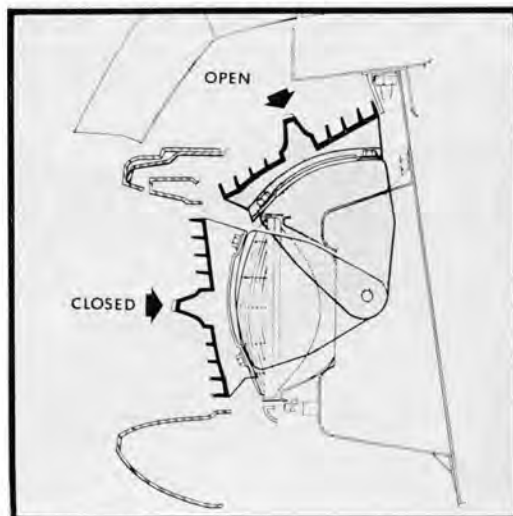
Camaro will use exclusively, at least in the early part of the 1967 model season. While it may seem a new engine, because of its "new" displacement, in truth it is a further sophistication of the ubiquitous 283-327 V-8 family. The larger displacement is achieved by putting a longer stroke (by 0.23 in.) crankshaft in the same block. The bore remains the same as do most other specifications.

The 350, which is rated at 295 bhp, and the 327/275-bhp engines will share virtually all but the reciprocating components. Heads, valves, camshaft, etc., are all the same. The cam that goes in both engines has been warmed up slightly, over the 327/275 cam used in '66. Duration and overlap have been increased, the valves opening sooner and closing later. Chevrolet lists the cam at 310/320° where it had been 300/300°. Carburetion for both is a single Rochester Quadrajet, with 1.38-in. primaries and 2.25-in. secondaries. Compression for the 350 is 10.25:1

COLLAPSING STEERING column used on all GM cars for 1967 is designed to telescope upon impact. Small knob under shift lever is flasher light switch.



HEADLIGHT covers for Grand Prix pivot up and back to uncover lamps.



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where it is 10:1 for the 327. The torque rating for the 350 is 380 lb.-ft. at 3200 rpm; that for the 327 remains at 355 lb.-ft.

Several other engine lineup changes have been made for '67. Corvair engines have been reduced to two with only the 95- and 110-bhp versions remaining—the turbocharger and 4-carburetor options have been dropped. The big Chevrolet's 250-cu. in. in-line Six is now available as an option in Chevy II, Chevelle and Camaro. A triple-carburetor arrangement fuels the Corvette's top two 427-cu. in. V-8s. This set-up utilizes three Holley 2-barrel units which have primaries of 1.50 in. and secondaries of 1.75 in. Horsepower ratings of these two models have been increased accordingly.

Big Chevrolets have undergone some chassis refinement; the rear axle control arm layout has been modified to give a better geometry. The body-mounting system has softer biscuits and cushions for lessened noise and vibration. Steering linkage has been revised, to provide easier effort and better wheel response throughout the turning range.

Noteworthy in the Chevelle lineup for '67 is the addition of a 3-speed automatic option, though it can only be had with the 396-cu. in. engines. A new luxury series, "Concours," has been added.

All Chevrolets except the Corvair will have a disc brake option in '67, in

keeping with the GM corporate policy.

Styling refinement for '67 takes the shape of a new line. Camaro, and face-lifts for Chevelle, Chevy II and Chevrolet. The Corvair was left pretty much untouched except for the reduction in models offered (the Corsa series was dropped). More distinction for the SS series in each line has been achieved with simulated hood scoops, blanked-out rear ends and grilles and husky V-8 engines. The Chevy II has a grille change, the Chevelle has more curves and has lost its boxy look, while the Chevrolet has even more curvaceousness and a new 2-door hardtop fast-back roofline.

OLDSMOBILE'S 1967 model year cars seem to have been more influenced by engineers than stylists. Improvements across the division's lineup are mainly workables. For example, 1967 Olds cars for the first time ride on Olds-produced rear axles, not those purchased from another GM division. Engineering and production departments have produced three standard rear axles and two limited-slip units. Use of gears larger than those employed in previous axles, engineers report, reduces stress levels by 40%.

Engineering is evident in that all Olds V-8s can be fitted with an optional carburetor pre-heat air intake system labeled "Climatic Combustion Control." The system mixes underhood air and exhaust exchanger-heated air in degrees required for an intake flow regulated at 100° F. Mixture control is accomplished inside the air cleaner as a bimetal sensor regulates an inlet diaphragm which controls flow volume of exchanger-heated air. The device is designed to speed engine warmup, im-

prove fuel economy, increase intake air filtering efficiency and eliminate carburetor icing.

In keeping with Olds 1967 engineering thinking, the top-of-the-line Toronado shows little exterior change, but emerges with a number of under-the-skin refinements. Outside, El Toro has lost his eyebrows. Retracting headlight covers are now flush-mounted. There are front fender cornering lamps and revised taillights. A restyled grille and wheel discs are part of the face-lift.

The inside Toronado story is different. The car is 35 lb. lighter than it was in its debut year. The ride has been softened, mainly through changes in frame and body mountings, shock absorber valving pressure revisions and reduction in torsion bar stock diameter. The front-wheel drive joints, which combine constant velocity universal action with axial slip motion, are new, replacing the ball-socket Rzepa joints. As with other Oldsmobiles, the Toronado receives dual braking circuits and a disc brake option. Front and rear brake line pressure proportioning has been added. Only the 425-cu. in./385-bhp engine and 3-speed Turbo Hydra-Matic transmission are available with the Toronado.

The luxury-line, 126-in. wheelbase 98s again are powered by 425-cu. in./365-bhp engines, with only the Turbo Hydra-Matic transmission. Five inches of sheetmetal have been moved from rear trunk deck to hood length to produce a so-called "Toronado look," which is furthered by "swagings" over the wheel cutouts. Knife-edge front fenders, side-by-side headlights and W-shaped forward metal are 98 styling features.

The mid-range 88 cars, on the 123-

Disc Brakes Optional for All GM Cars

BRAKES HAVE gotten considerable improvement for GM's 1967 model-year. Front disc brakes are optional on every car but the Corvair and Corvette; the Corvair is said not to need them and the Corvette already has a 4-wheel disc system as standard equipment. Too, refinements of existing systems should give greater customer satisfaction.

The Corvette's front discs are the model for the rest of the GM lines. All other divisions use components similar, if not identical, to those in the Chevrolet/Delco Morraine-developed sports car system. Disc diameters vary from model to

model (11.2 to 11.8 in.), their specification dependent upon wheel diameter, but all are radially vented double surfaced rotors. All use the 4-piston caliper, with pads riveted rather than bonded to the shoes. These calipers have 2.062-in. spring-loaded pistons which keep the pads in light but constant contact with the rotor. A delay valve puts the rear drum brakes into action a fraction of a second earlier than the fronts.

All GM disc systems will be used with self-adjusting duo-servo rear drums to preserve current parking brake machinery and because rear axle design does not yet allow for mounting of discs. Also, all GM disc/drum options will include an integral-type vacuum booster. Oldsmobile is specifying a special tandem booster with a pair of 8-in. diaphragms. Big Olds and Toronado disc brake packages also contain a proportioning valve to reduce premature lock-up of rear wheels. ■

FRONT WHEEL brake discs are vented design with 4-piston calipers.



in. wheelbase, also feature the W-forward, sharp-fendered styling of the 98 line, and have gone through some name-changing flummery. The newly christened Delmont 88 series replaces the previous Jetstar series. The Delta 88 series is retained, with the hardtop and convertible models as Delta Custom offerings, the Starfire variant no longer being offered. A 3-speed manual transmission is standard across the line, with Turbo Hydra-Matic as the automatic option. The Delmont receives the 330-cu. in./250-bhp engine, while the other 88s are given the 425-cu. in./300-bhp powerplant.

Fewer reflections of the "Toronado look" are seen in the Olds 115-in. wheelbase F-85 line. The sharp fenders and wheel cutout swagings are there, but are minimized and somehow cleaner of line. The forward W shape is absent for a simpler straight-across presentation. Mechanically, the lowest-priced line offers the most excitement, both for those who would turn a quick quarter-mile and those who enjoy the long, fast freeway cruise. Base power in the F-85 line is the borrowed-from-Chevrolet 250-cu. in. Six of 155 bhp, but horsepower quickly rises in the Cutlass, Cutlass Supreme and 4-4-2 variants. Respectively, V-8 cu. in./bhp combinations are 330/250-260 and 400/320-350. Transmission availability includes 3- and 4-speed manuals and 2-speed automatic. This year, for the first time, the 4-4-2 is available with the Turbo Hydra-Matic 3-speed unit. Another Cutlass Supreme variation is the "turnpike cruising option." This also uses a 400-cu. in. engine, but with 2-barrel carburetion and 2.41:1 rear axle for high road speeds at relatively low rpm.

PONTIAC Motor Division's chief offerings for 1967 include piston displacement increases along with redesigned heads and valve gear for its larger V-8 engines, and a horsepower increase for one of its yearling sohc Six engines.

The enlargement of the V-8s was done with boring tools alone. The Six-strengthening was done with a camshaft timing change. Basic cylinder block structures remain identical to those produced for 1966 cars.

The previous 389-cu. in. V-8 becomes 400 cu. in. with a bore increase from 4.063 to 4.126 in., while stroke remains at 3.75 in. Likewise, the former, familiar 421-cu. in. powerplant becomes a 428 with reboring from 4.094 to 4.122 in., with stroke remaining at 4.00 in. Within Pontiac's proliferated V-8 series, only the 326-cu. in. base engine continues unchanged.

The 1966 model year 389 and 421 engines carried intake and exhaust valves of 1.92- and 1.64-in. head diameter, respectively. New diameters for these components are 2.11 and 1.77 in. Camshaft timing remains identical to that offered in 1966.

Where the 389 engine was offered in five states of tune, the 400 is available in eight stages of performance—the range is from 255 bhp and 397 lb.-ft. of torque to 360 bhp and 438 lb.-ft. of torque. The 421 engine was delivered in three configurations; the 428 is offered only in 360- and 376-bhp ratings, with torque delivery at 472 and 462 lb.-ft., respectively.

Pontiac's 2-barrel-carburetted sohc Six is offered in 165-bhp tune, as it was in 1966, but the 4-barrel version is up-rated to 215 bhp for 1967, from the 1966 figure of 207 bhp. The 4-bar-

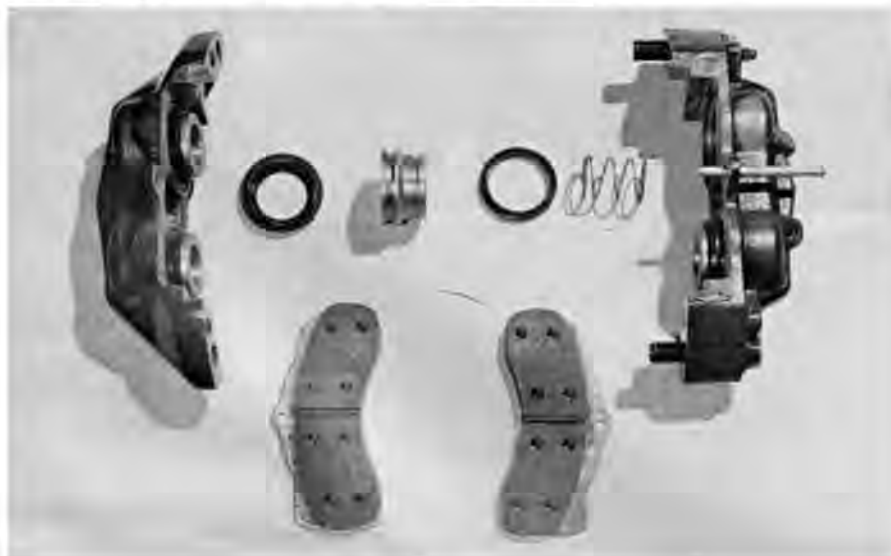
rel engine's torque peak is raised from 228 to 240 lb.-ft. at 3800 rpm. Apparently, bhp and torque increases are accomplished by retardation of the valve timing cycle by 6°; 1966 intake opening and closing, and exhaust opening and closing, in degrees were 20-44, 58-6, whereas 1967 specifications show 14-50, 52-12. Duration and overlap remain at 244° and 26°, respectively.

Wheelbase dimensions throughout the Pontiac lineup are unchanged for 1967, remaining at 115 in. for Tempest-LeMans-GTO, 121 for Catalina-Grand Prix and 124 in. for the Executive-Bonneville. The Star Chief variant has been dropped.

Measurements of changes in sheet-metal styling are in tenths of inches. Face-lifting seems simply for model year identification. Tempest, Tempest Custom and LeMans cars carry grilles of molded plastic in vertical array—four bars, space, four bars and so on across the semi-oval forward openings which lately have characterized Pontiac products. The GTO, however, is given a special wire mesh grille treatment to announce its special 400-cu. in. engine—with which the 3-speed Turbo Hydra-Matic transmission is now available.

Among 1967 Pontiac innovations are steel fuel lines to forestall melting and possible spread of flames in case of an underhood fire, use of fusible links in electrical systems, a fuel gauge transmitter unit that mounts vertically in the fuel tank for better accuracy and fewer fluctuations of the dashboard indicator needle, and an optional hood-mounted tachometer. Pontiac also uses fiber optics to transmit lightbeams from a one-bulb source to a number of instruments. ■

LINING MATERIAL is riveted to backing plates in GM system to combat squeal caused by high frequency oscillation. Piston and seals also are shown.



TANDEM VACUUM booster is used by Olds; Buick increased the size of its booster.

