EXTRA-DUTY DIESELS

OLDSMOBILE'S OIL BURNERS TAKE TO THE RACETRACKS

By Al Kirschenbaum

Since 1978, the 5.7-liter (350-cubic-inch) diesel V8 has been available in assembly-line Oldsmobiles. The engine shares dimensions and some features with its gasoline-fired small-block counterpart. The 350-cubic-inch Rocket diesel engine was also offered as a standard production option in other GM models built after 1978. In 1979, the 260-cubic-inch diesel made its debut. However, as with the gasoline engine, most small-block performance packages are still based on the 350-cubic-inch block.

The diesel's nearly bulletproof OE design incorporates ¾-inch-thick main bearing webs, 455-cubic-inch main bearing caps, extra cast iron in all stressed areas and substantially modified pistons, rods, crankshaft and cylinder heads. There's a definite penalty paid in weight for using most of these components, but savvy engine builders know where to trim the castings' extra beef and where to leave it. Many of the combinations detailed herein use only preferred, high-quality diesel hardware.

Considering all the years of research, development and extra-duty use the competition's hardware has been subjected to, you might assume that the unlikely combination of Oldsmobile diesel and aftermarket components would be too unproven to be anything near competitive. But there's more to Olds "oil-burner science" than you'd expect.

Unusual and successful powerplant schemes are often inspired by individual racing association's technical guidelines. For example, Dave Smith's 700-plus-horsepower, 403-cubic-inch, nitrous oxide-injected, carbureted Olds diesel-based powerplant was built to conform to the American Hot Rod Association's Pro Stock rules. The guidelines of the National Association for Stock Car Auto Racing (NASCAR) also make a place for 350-Olds diesel pieces.

In addition, there are various competition categories for diesel-based powerplants in tractor pulling, drag racing's modified classes, roadcourse contests, circle track competition and boat racing. Few of these specialized combinations have seen extensive testing or real-world use, but a growing number of competent racers have enough confidence in diesel pieces to develop entire racing campaigns around them.

DIESELS AT THE DRAGS:

DAVE SMITH'S SMALL-BLOCK OLDS PRO STOCK ROCKET

Unlike most of America's high-performance specialty shops, Dave Smith's Precisioned Speed in Anaheim, California, makes Oldsmobile engines the rule rather than the exception. Dave's extensive engine-building expertise with Rocket V8s of all sizes and shapes has been proven at racetracks across the nation.

When other Pro Stock drag racers used whatever equipment gave them a horsepower or weight-break advantage, Smith stuck with Rocket power: As one of the first drag racers to test the limits of a small-block Olds motor, he dramatically demonstrated the carbureted V8's unlimited-style performance potential.

As a result of GM's "corporate" engine policy, the availability of the structurally superior diesel engine blocks, the Olds/Batten cylinder heads and the AHRA's nitrous-oxide Pro Stock racing plan, Smith was able to assemble an aerodynamically advantageous late-model AHRA Pro Stocker with an all-Oldsmobile motor and engineer a World Championship!

With the science of nitrous-oxide-fed

Smith campaigned this Pro Stock 1984 Olds Ciera with the 403-cubic-inch diesel-block, nitrous-fed, eight-barrel small-block last season on the AHRA circuit. This year, Dave has fitted his Willie Rells-built Rocketship with a new 500-cube Olds DRCE for an all-out assault in NHRA Pro Stock competition.

Fed by a pair of Holley Dominator carbs on a Precisioned Speed intake manifold, and directly injected with NOS nitrous-oxide, Smith's small-block-based 403 Olds Rocket has run a best-ever e.t. of 7.67 at 179-plus mph.

unlimited race engines still in its infancy, Smith's small-block Olds/diesel combination has yet to evolve up to its full potential. This year, Dave has been concentrating his Pro Stock efforts on the new Oldsmobile drag race competition engine (DRCE) that emerged at the tail end of last season. The season before last, however, Dave and Mike Thermos, of Nitrous Oxide Systems, refined a combination motor that rewarded them with seven-second quarter-mile clockings at speeds just under 180 mph. In addition, Smith has assembled a complete line of high-performance off-road Olds parts that he markets through Precisioned Speed.

GRAND NATIONAL DIESEL:

ANDY MANNARINO'S NASCAR ROCKET

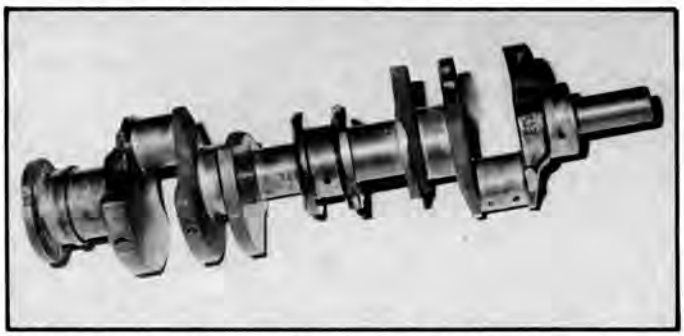
After having spent considerable time piloting Oldsmobile V8 engines in sanctioned drag-racing competition, Pro Stock campaigner Andy Mannarino has recently turned his R&D attention to the high banks of NASCAR. In Michigan, Olds engineer Dave Maurer has invested decades in the development of high-performance Rocket V8s. Together, Dave at Olds Engineering in Lansing, and Andy's Total Engineering in Detroit, have come up with a fresh approach to Grand National race motors.

By producing a competitive combination of hardware that's comprised almost entirely of current factory production diesel parts, they've demonstrated the extra-duty capabilities of Olds OE parts. After all, if a cast-iron crank and stock connecting rods can survive for hundreds of miles at wide-open throttle, there's little doubt as to their durability on the street.

There's still quite a bit to be learned about this highly-stressed combination of factory and aftermarket parts, but early evaluations have been more than optimistic. A full season of running is needed to provide enough data to adequately evaluate these "racing diesel" pieces. From where we sit, though, the combination already looks pretty interesting. Why not take a peek, and learn for yourself?

Precisioned Speed treated a well-worn 1980 diesel casting to a .065-inch overbore for a final 4.125-inch cylinder size. The cast-iron two-bolt maincaps were replaced with a set of Precisioned's four-bolt 1020 billet steel caps, retained by a combination of bolts and studs. Dave revised the block's internal lube passages to put more oil where it's needed, and treated the entire casting to all the standard blueprinting operations to bring it up to race specifications. Precisioned Speed also supplied a dry-sump oil pan that works in conjunction with a Davkar oil pump.

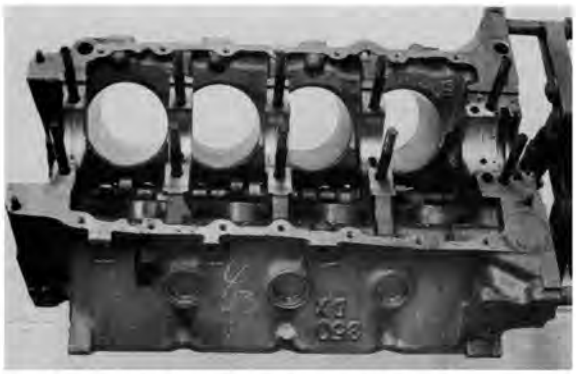
Forged-alloy Howard rods measure 6.250 inches and carry 13:1 Ross pistons on .927-inch, taper-bore Ross wrist pins. Speed-Pro rings include a 1/16-inch moly top, a 1/16-inch ductile iron second and a 1/16-inch stainless steel oil control set. According to Smith, the piston's relatively flat dome profile aids flame travel and promotes power production.



To obtain his desired bore/stroke combination, Smith's shop final-machined this 3.750-inch-stroke steel crank. The crank originated as a semi-finished shaft from National. In addition to traditional blueprinting procedures, Dave built in dependability by cross-drilling the journals, knife-edging the counterweights and applying a Tufftriding surface-hardening finish.

Using raw, unfinished alloy castings of the Olds/Batten cylinder head, Precisioned Speed assembles their seven-second Rocket parts with 2.200-inch titanium intake valves and 1.710-inch stainless steel exhausts. The entire exhaust sides of the heads are machined and welded to raise the ports and improve their already excellent flow characteristics. Adapter plates on the outlet side help prevent waste gas reversion as well as accommodating 2½-inch primary pipe headers. O-rings on the deck surfaces help contain the extra internal pressures generated by nitrous-oxide combustion.

Total's solution to reciprocating bottom-end durability includes cut-down crankshaft counterweights, full cross-drilling with blended feed holes at all journals, quality undercut radii where the journals meet the cheeks, a trued rear flange and a Tufftrided surface treatment. Clevite 77 main inserts are fitted with .004-inch clearance.



Total Engineering's production diesel block casting retains its two-bolt main bearing caps and depends on quality machining and sturdy stock construction for overall strength. Oiling improvements include restricted (.020-inch) tappet feeds and redrilled and rotated (180 degrees) cam bearings. Clevite 77 main bearing insert sets are juggled to provide partially and fully grooved crankshaft lubrication configurations. Half-inch studs replace the diesel's stock maincap hardware.

Using semi-finished SAE 1140 steel stock diesel connecting rods (right), Total machines and bushes the unfinished forgings' small ends to accept .990-inch-diameter, .100-inch-wall Childs & Albert piston pins. Adaptation also includes polished beams, OE clamping hardware, additional pin oiling holes and the rounded cap finishing seen here.

Extensively lightened, durable forged-alloy pistons from Venolia carry Sealed Power rings (.043-inch moly tops, 1/16-inch cast-iron seconds and a 3/16-inch low-tension oil control set). Double Spirolox pin retainers are fitted with a maximum of .001-inch clearance and the skirt-to-bore dimension is a relatively loose .0095-inch. With the 4.090-inch-diameter pistons, +.020-inch above the decks, 52cc combustion chambers and the .060-inch Fel-Pro "blue" head gaskets, Total's GN small-block runs a 12.8:1 compression ratio.

The positioning dowels in the block's deck surface are relocated to accept Olds/Batten cylinder heads. Cylinder wall finish performs "exceptionally" with the moly-filled top piston rings. The wall's finishing crosshatch treatment is just rough enough to retain some oil.

In a major departure from standard diesel hardware plans, Andy wisely relies on the proven performance of Olds/Batten aluminum cylinder heads. The lightweight small-block castings, extensively prepared by Larry Olson at EPD, carry 2.10-inch intake and 1.620-inch Manley exhaust valves. The valve springs and retainers are part of a Competition Cams camshaft kit.

Although few cast nodular iron crankshafts have been used in performance powerplants, this 3.385-inch-stroke Olds diesel shaft appears more than up to its Grand National tasks. With 3-inch-diameter main bearing journals and generous counterweighting compensating for its heavy OE pistons and rods, a stock cast diesel shaft tips the scales at a hefty 58 pounds—10 pounds more than a small-block gas motor crank.

EXTRA-DUTY DIESELS

C.J. BATTEN BUILDS A 356-CUBIC-INCH SUPERSPEEDWAY SMALL-BLOCK

We've filled quite a few pages here touting the mechanical merits of the Olds small-block. As we've already shown, there are about as many ways of putting the power to the pavement as there are putting it on paper. To help make this transition from tablet to tarmac more tangible, we're taking a closer look at how C.J. Batten's Romulus, Michigan, engineering works uses some of the latest parts and processes to assemble a 600-plus horsepower Grand National small-block Rocket.

As noted Oldsmobile engine experts, the Batten crew has researched and developed Rocket engine combinations for a variety of competition applications, some of which are out there right now setting race records across the nation. The shop is still in the middle of its Grand National Olds small-block program, and indications are that what they've turned up thus far will make you stop and think about the so-called "standard small-block approach" to racing that America has taken in years past.

Although there have been previous attempts made in racing with a competition-mode small-block Olds, this is one of the first extensive efforts involving the diesel block, the Olds/Batten cylinder heads, and the very latest crankshaft forging from Oldsmobile. Aside from the features referred to above and the standard operations involved in the inspection and preparation of a race engine, there are some specific tactics involved.

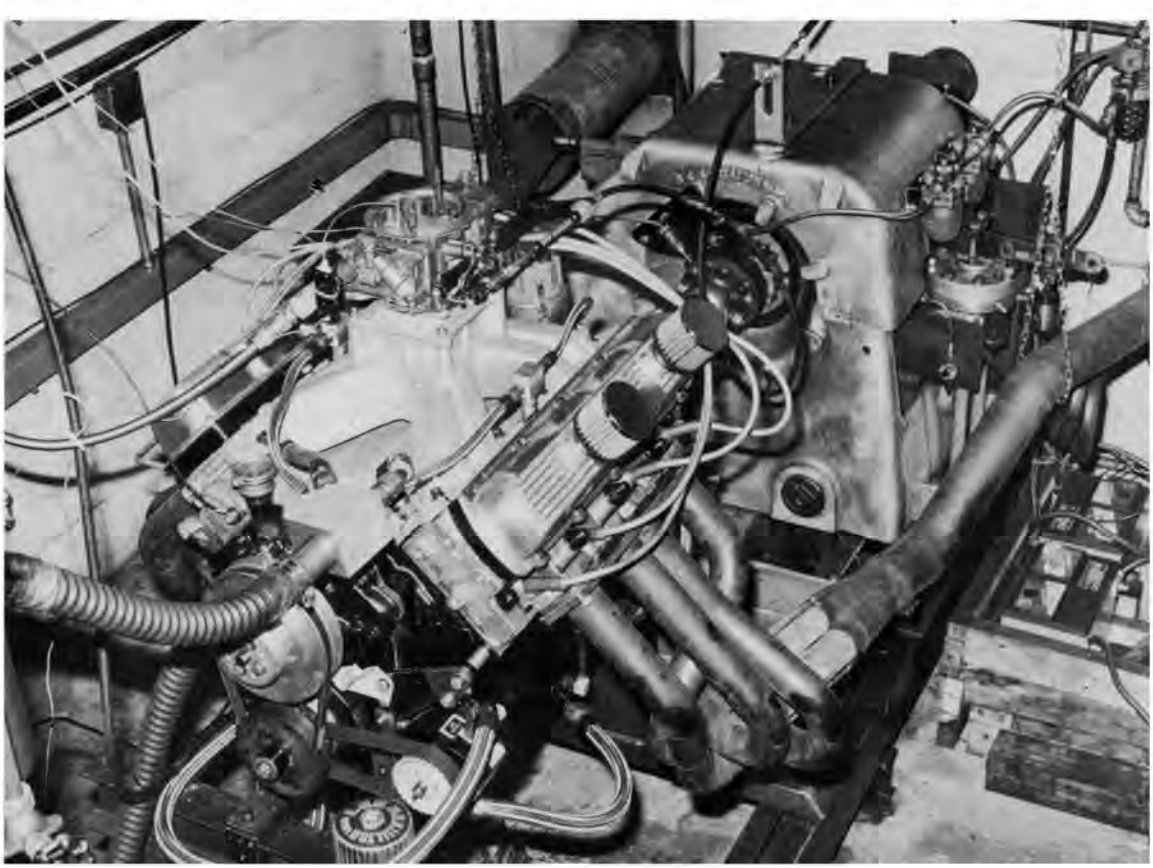
350 DIESEL BLOCK

Based around the same 350-cubic-inch Oldsmobile diesel engine block we reviewed in the other competition applications here, Batten's "NASCAR 356" is Rocket power at its best. This particular 356-cubic-inch combination (4.093-inch bore, 3.386-inch stroke) has evolved from the shop's past efforts with the short-stroke Olds V8 and it reflects these merits in its output and durability performances.

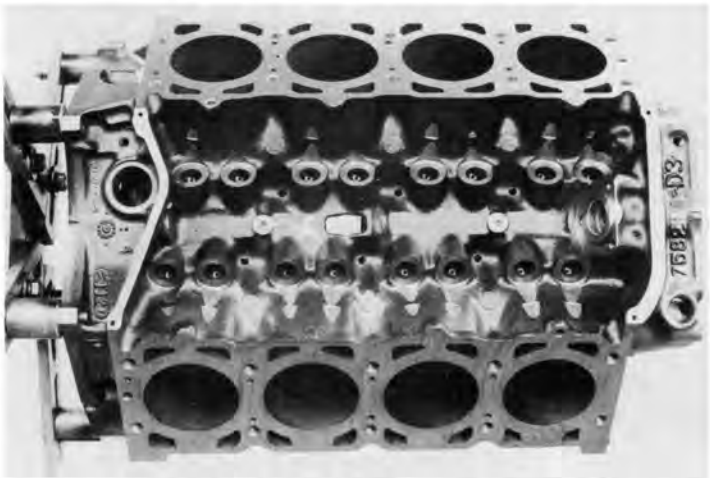
CRANKSHAFT

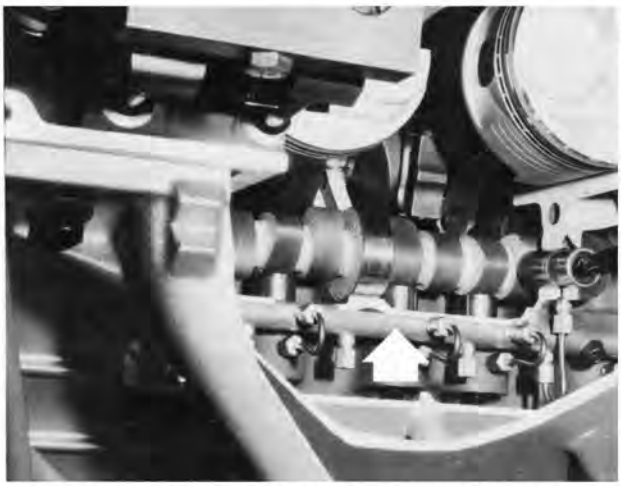
Until the recent release of Oldsmobile's new forged-steel, high-performance crankshaft (part No. 22525923), the diesel engine block was difficult to

The quantity and quality of the oil flow in a production engine is considerably different from what's needed for competition. To redirect the 350 diesel's lubrication paths to where it's needed most, and away from where it's wanted the least, oil flow to the driver's-side main longitudinal gallery is blocked. To accomplish this, the crossover passage at the front of the block is slightly enlarged (through the upper half of the No. 1 main bearing journal, arrow), threaded, and sealed shut with an Allen plug. Properly fitted, the threaded plug will also fill the block cavity produced by the three intersecting oil channels and help to support the front main's top insert.



Fully assembled and dressed for Grand National duty, the potent short-stroke Olds motor is a natural for the high banks. Equipped with a single 830cfm Holley carb, Olds/Batten cylinder heads, a wet-sump oil system and dynamometer test headers, this small-block NASCAR Rocket has matched and exceeded the power output levels of comparably configured Chevrolets. Durability evaluations under load have been equally successful.



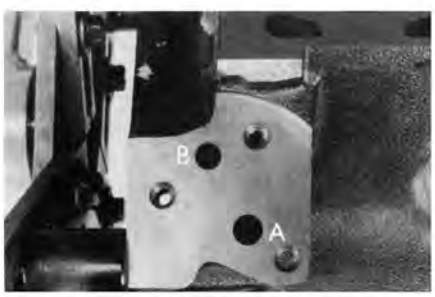


DAVE WALLACE PHOTO

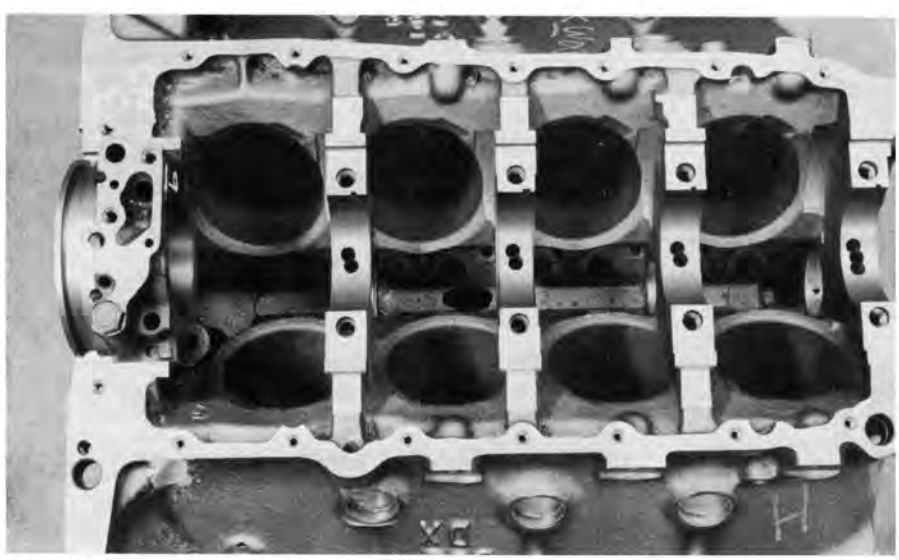
To lube the driver's-side solid valve lifters, a special tube manifold is plumbed to pick up pressure at a fitting installed in the right-side main gallery between the rear pair of lifter bosses. From that point, oil flows into a log manifold (partially visible in this cut-away view) which, in turn, feeds the opposite-side lifters through a series of small tubes and pressure fittings. Their connections at bosses are located so that oil flow is blocked by each lifter body only when the lifter is sitting on the cam's base circle. This way, oil flows only when it's needed most, while vital volume and pressure won't bleed off through the holes. Flow is further controlled by the .070-inch size of the manifold's feeder tubes.

Provided in small-block diesel castings only, the unused injector pump boss becomes a "communication" passage (arrow) that balances internal pressures between the crankcase and the upper regions of the engine. Gasoline small-blocks used in high-rpm competition applications are also advised to provide a similar passage for the same purposes.

To help maintain the integrity of the block's lube channel that's normally tapped into for an oil pressure reference, the intersecting hole (arrow) that's fitted in production with a standard cap plug is tapped (⅛-27 pipe thread) and screw-in plugged. Pressure readings are usually taken at the connection located directly above this opening and oil has been known to bleed off around a stock-style plug and affect the instrument reading as well as the flow volume. Because the installed timing case cover obstructs this plug from view, the more positive threaded seal is suggested. Also visible here is the opposite side of the diesel block's communication hole and the three oil passages intersecting at the front main journal.



When an external belt-drive competition oil pump is used in place of the internal production-type unit, the lower passage (A) at the oil filter adapter pad is tapped and plugged, while the upper hole (B) is tapped (½-inch pipe thread) for a -10 (maximum) braided feed from the pump's pressure side. Some diesel blocks have a locating dowel hole in their bellhousing face that may be too close to this oil passage. For added structural comfort and to prevent a breakthrough during machining, the depth of this opening is reduced with epoxy filler.

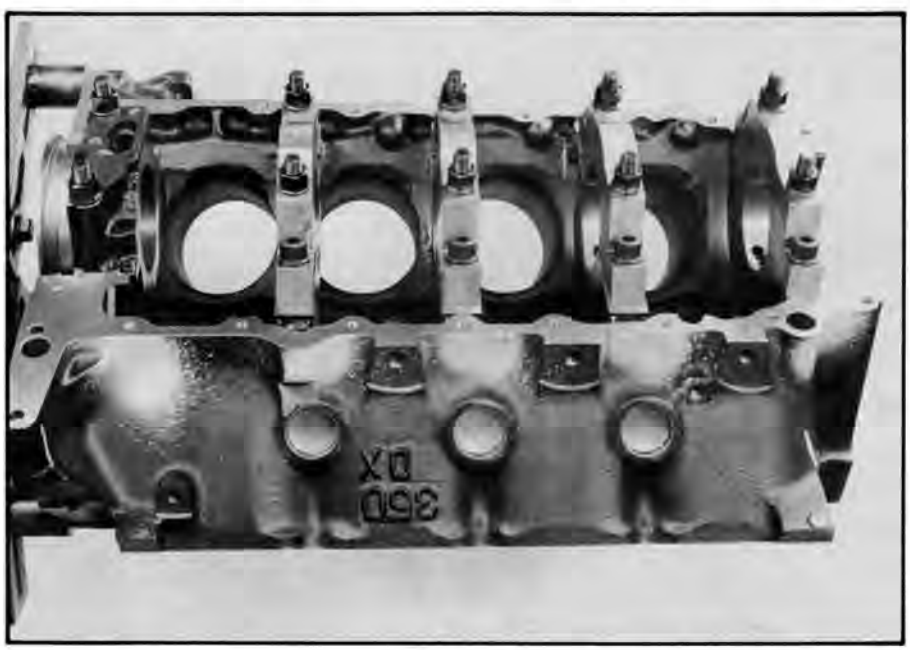


Viewed from below, the diesel block's extra-duty nature is evident. New, or "green" units are artificially aged before machining. The casting's structural features are reviewed elsewhere in **Oldsmobile In Action.**

Although perfectly acceptable in a street motor, Olds' traditional rope-style rear main oil seal is not the one to use in a competition assembly. Instead, a "polyacrylic" seal designed for a big-block Ford (429-460 cubic inches) is employed. Available from a number of aftermarket sources (including Fel-Pro #40032 and Mr. Gasket #1965) this two-piece unit is offset-installed so that the seal's butted ends are positioned away from the maincap parting line. Small dabs of silastic sealer are used at the butt ends and a very thin layer is also applied behind each seal half when it's installed with the indicated (by a colored mark) face positioned toward the rear.

consider for Grand National performance duty. The casting's 3-inch main journal size limited practical crank choices to expensive billets, long-stroke big-block shafts and the OE cast diesel pieces. Another possible, though more complicated, approach involved using an early small-journal (2.50-inch mains and 2.10-inch rods) forging with a dowelled, keyed, pinned or notched spacer behind each main insert.

Fortunately, the new Olds forged-in-place (no-twist) 4340 chromemoly steel shaft totally eliminates the question of which crank to use. Available in the low price range of $100 (!), the stress-relieved Olds units come from either GM Parts Division or from Moldex as either raw or semi-finished forgings. Material on the unfinished cranks allows a maximum machined main journal diameter of 3 inches and a maximum of 2.250-inch-diameter rod journals. With final crankthrow possibilities ranging between 3.00 and 4.00 inches, this crank makes a number of short-stroke, high-output, diesel block-based combinations infinitely more practical.



To help support the lower end, "four-bolt" maincaps are fitted at the diesel block's front four journals. (Insufficient main bulkhead material makes this impractical in non-diesel 350 blocks.) Clamped in position by a pair of high-strength 2½-inch-long studs (installed hand-tight in the block) and high-strength cap screws, Batten offers this special steel maincap setup for the 3-inch-diameter diesel journals. Tightening torque is 90 foot-pounds on the stud nuts and 80 foot-pounds on the outboard cap screws.

OILING

There's no doubt about the approach to successful small-block oiling in a Grand National application—it calls for a no-nonsense dry-sump system. But because it's practically impossible to study the behavior of liquid and aerated oil in an engine that's pulling a couple of tons at 200 mph through high-banked turns at 7000-plus rpm for a few hours, the details of an ideal dry-sump system are difficult to determine.

In practical terms, a functional dry-sump lubrication system does more than just reduce a car's ground clearance. Its basic functions are to house the engine's oil supply in an external storage/de-aerating container and to quickly direct and collect oil away from moving engine parts and feed it back to the container. When it comes to real-world practice, however, even the "basic" low-profile pan theory proves tough to work with.

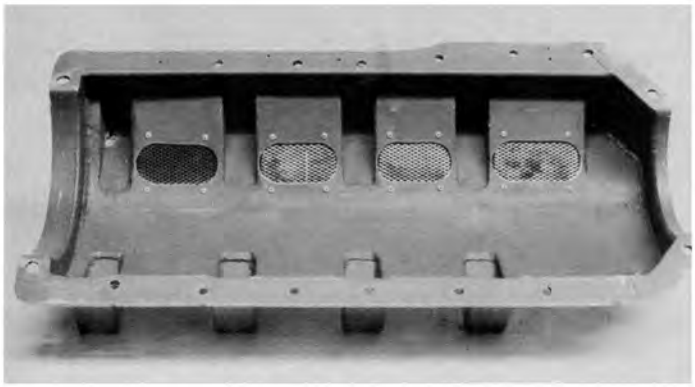
OLDS/BATTEN CYLINDER HEADS

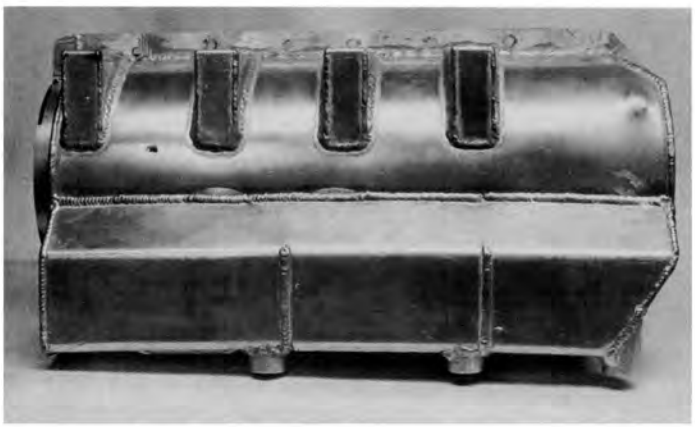
Released in the late-Seventies, high-performance Olds/Batten cylinder head castings in both iron and alloy are available for all of the division's Rocket V8s. Except for larger ports in the lightweight versions, the castings are virtually identical. The iron heads can be modified to the same extent that the alloy castings can, but their deliberately smaller out-of-the-box unmodified ports are better suited to less than maximum-output applications.

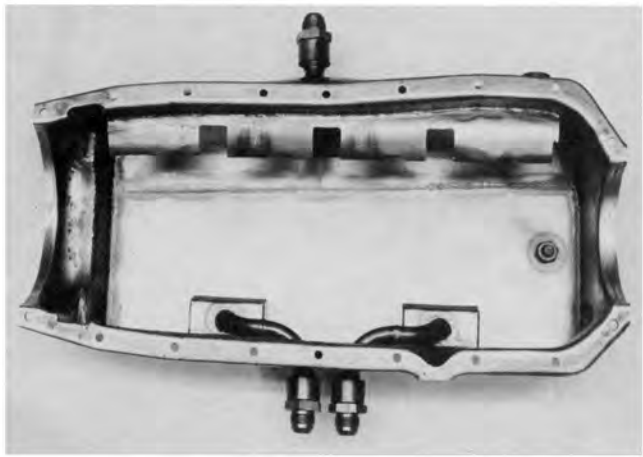
As anticipated, the extra-duty Olds/Batten iron heads are also considerably heavier than their lightweight production iron counterparts. All castings also retain the OE mounting bosses for an alternator, an air conditioning compressor and other equipment, but the attaching holes must be drilled and tapped. To properly illustrate some of the performance heads' more advantageous features, they're being reviewed again here. (The Olds/Batten cylinder heads are also covered in the extensive small-block V8 review of *Oldsmobile In Action.)*

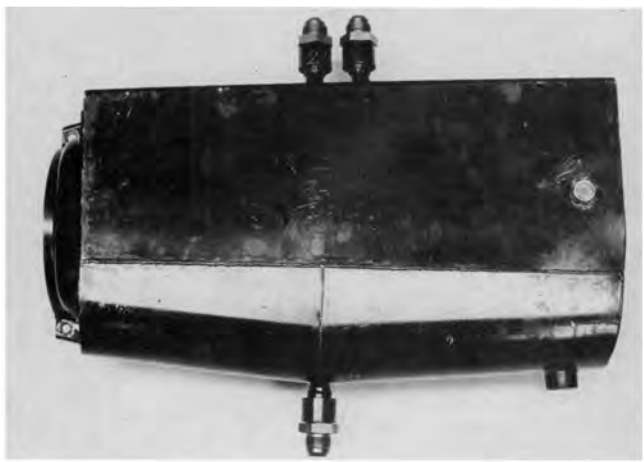
INTAKE FACE

On the inlet side, the manifold bolt pattern is altered to allow for more generous ports and passages. Only four manifold-to-head fasteners are employed with these castings and the angle of the

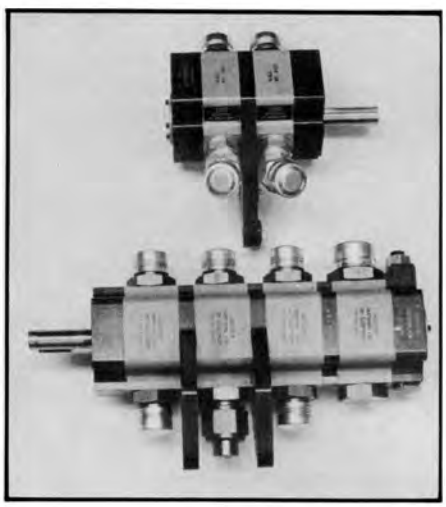




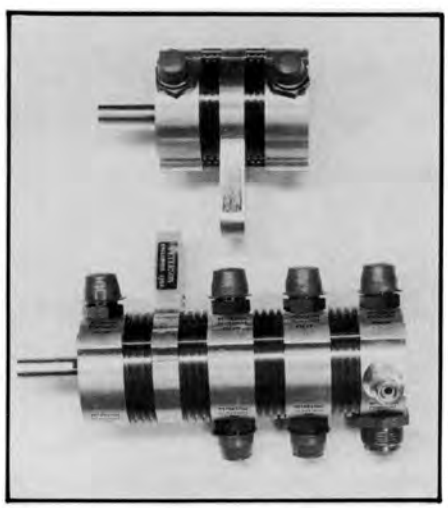




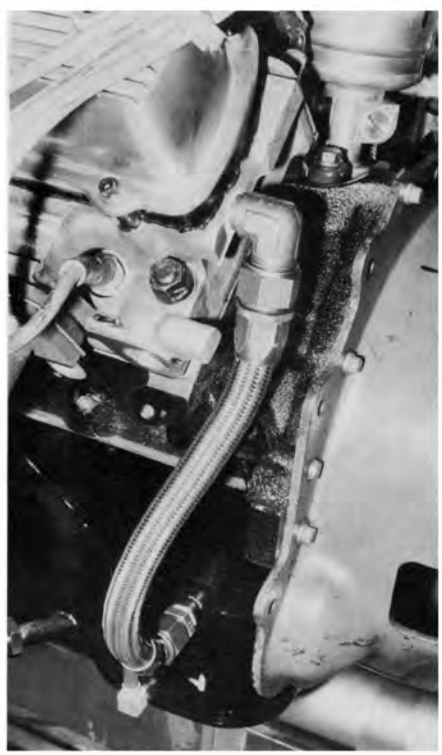
Regardless of how efficient the scavenge pumps operate, they can't keep the pan empty without sufficient inlet capacity. These are just two of the many pan/pick-up configurations being evaluated during the NASCAR 356's development.



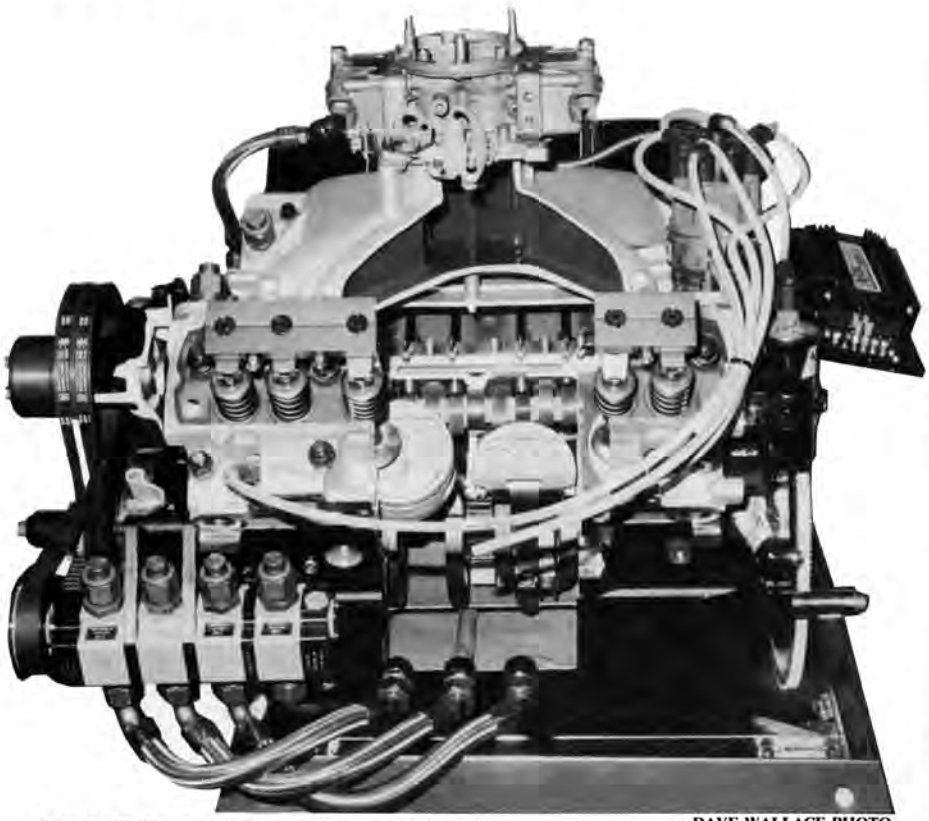
Multiple-stage Weaver dry-sump pumps employ spur-type gears and are belt-driven off the crank snout. With three scavenge sections and one pressure section, this four-stage unit is commonly found on various contemporary pressure-scavenged small-blocks. Plumbing is via -12 scavenge lines and -16 pressure lines.



Similar in operation to many production oil pumps, the gyrotor, or G-rotor-type gear pump is represented by this multi-stage, belt-driven unit from Peterson. Design features such as the ability to deal with foreign matter, to absorb less power per unit of capacity and to be responsive to efficient manifolding, are expected to be evaluated further. Until the release of these latest pieces, large-surface-area G-rotor pumps were prone to pressure losses when hot.



Olds/Batten competition heads have ½-inch provisions at each end to accept drainback plumbing.



DAVE WALLACE PHOTO

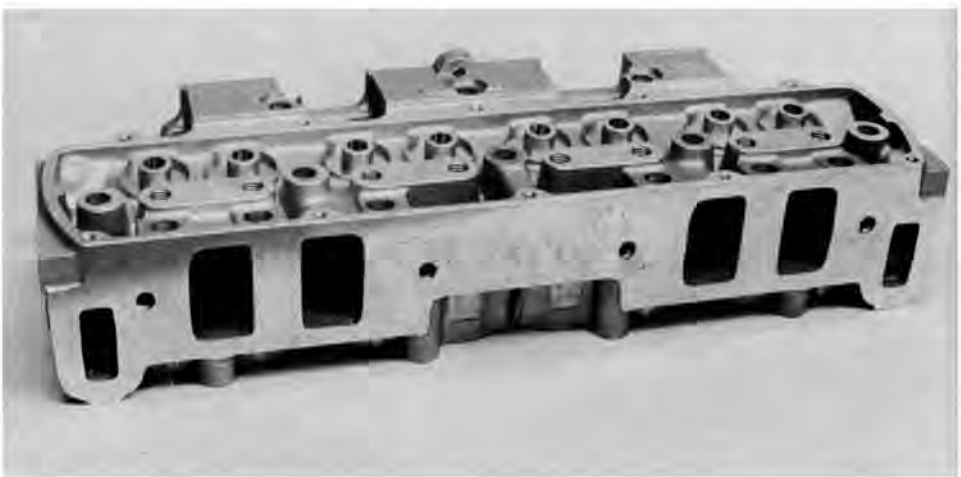
Built by Batten for display by Oldsmobile, this cut-away small-block Rocket reveals many of the extra-duty internal touches that it takes to race the superspeedways.

holes has also been revised to reduce the load on the assembled pieces.

To allow more room for these heads' larger ports and passages, internal water jacketing has been extensively revised. Under certain circumstances, however, higher temperatures than anticipated have been encountered at the center of these heads. To compensate for this condition, revised plumbing arrangements and an updated version of the Edelbrock Victor intake manifold have been developed. Specifically, water is directed through a gallery running along the top of the new Victor manifold to an opening at the center of the head's intake face, where it connects directly with internal jacketing. The opening required in the head with the new manifold is much smaller than the arrangement made to work with an earlier Edelbrock Victor casting.

Because the Olds/Batten castings provide such generous sections for porting work, some of the pushrods' paths fall on a course with the intake ports. The engine's final valve and rockertrain geometry determines this operating range of travel, so the heads' pushrod tubes are installed only after a thorough pre-assembly check. Once a pushrod tube is properly positioned, it's epoxied in place and the port wall is blended around it. In a stock Olds head, the intake ports are extensively restricted by the OE pushrod provisions.

The Olds/Batten intake port floor has a much flatter, even radius approaching the valve, while the OE casting has a raised section around an adjacent water jacket. The high-performance head's intake port mouth is raised 1 inch, and although the size of the opening is similar to a stocker, the Batten port maintains this uniform cross section along the entire length of the inlet passage. The more restrictive OE intake channels neck-down radically inside. Also visible on the intake face is the noticeable lack of an intake manifold exhaust heat passage.

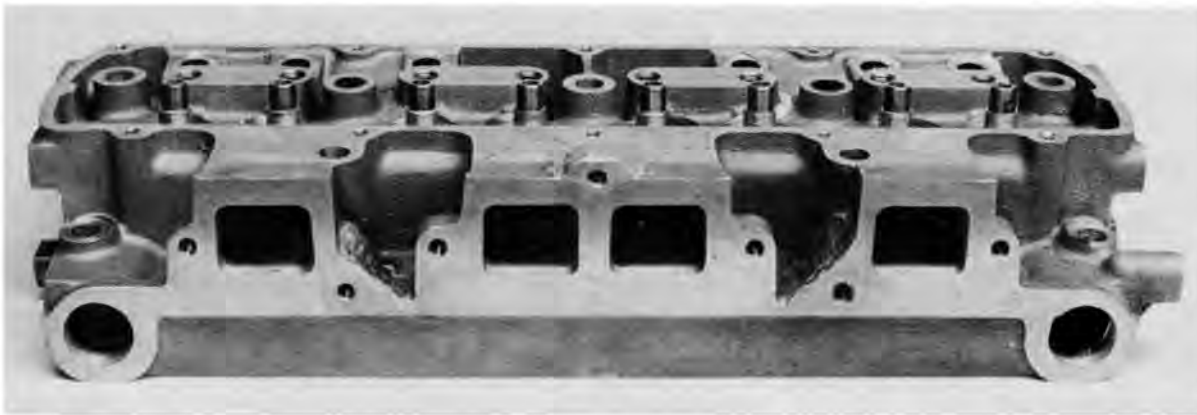


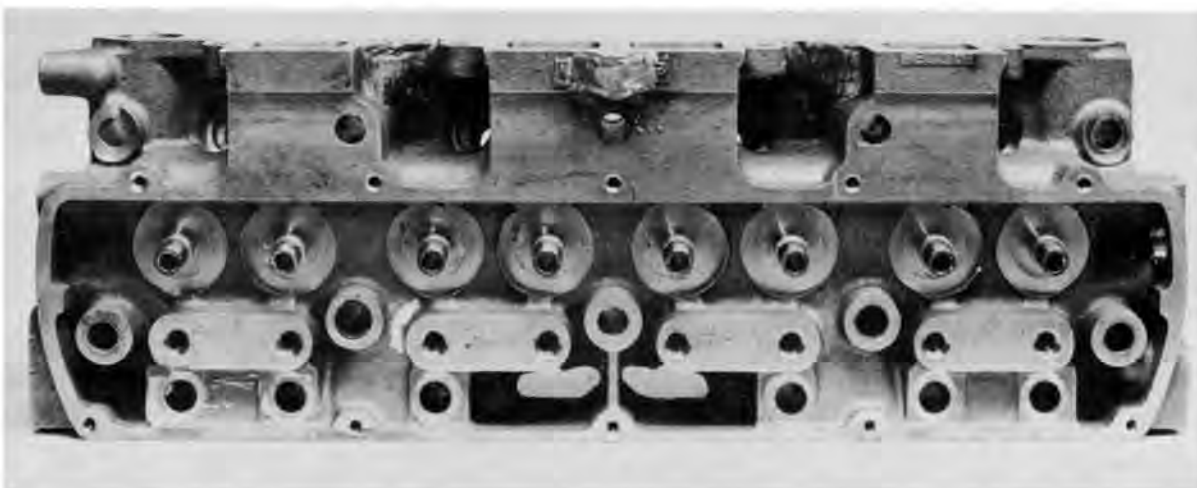
EXHAUST FACE

The heads' high-flow exhaust ports are located about 1 inch higher than stock, resulting in a more favorable port floor radius (right) . This feature produces a straight path from manifold runner to valve through consistently contoured passages. Although the port sizes appear equal, these stock passages also narrow drastically to clear water jacketing and head bolts, especially at the two center ports. The stock heads incorporate Oldsmobile's limiting siamesed center exhaust ports, while the competition castings' center passages are obviously well-separated. There's also a considerable amount of material surrounding the ports to allow extensive shaping and sizing modifications.

The bolt patterns on some of the heads illustrated are configured to mate with a variety of dyno room headers, but the production pattern accepts either stock-style manifolds or headers. Early versions of the Olds/Batten castings were made without a top center exhaust manifold bolt boss on the head's outlet face. To accommodate this seventh connection on earlier heads, a section was built up with weld, then drilled and tapped. This boss now comes cast-in on all later versions of the heads.

Large-tube and/or exotic manifolding must either be custom-built or attached to these heads with adapter plates. Batten's NASCAR combination uses headers with 2⅛-inch-diameter, 37-inch-long primary pipes with a balance tube connecting each bank's collectors.





TOP SURFACE

At the top of the head (above), revised water jacketing allows thicker structural sections to provide the rocker studs, spring seats and fastener pads with stronger load-bearing platforms. The performance head has large head bolt holes so that either size bolts (7/16-inch and ½-inch) can be used.

The heads have been cast with enough material in the valve guide bosses to offset the guides themselves between .050- and .200-inch to allow for larger valves. GN heads are generally prepared with .100-inch exhaust offsets while large-valve drag race heads are prepared with .150–.200-inch exhaust offsets, depending on the specific size of the valve. The intake valve's location is seldom moved. Installing larger valves also calls for combustion chamber alterations to unshroud relocated valves. To keep oil out of the guides, Teflon seals are run on both the intake and the exhaust bosses.

The very latest run of Olds/Batten castings have more material in the vertical "bridge" or bulkhead (between the intake face and the center head bolt boss) between the two center ports to accommodate the new coolant passage to the intake manifold. Early heads use a pipe or tube installed here to carry the water. The latest castings also have more generous sections for porting work and a cast-in (rather than welded-up) boss for the top center exhaust manifold bolt.

With only two small cast passages for topside oil to drain back down to the oil pan, ½-inch openings for external drainback plumbing are provided at each end of the cylinder heads. Located low to help promote flow, the return lines connect directly to the oil pan or to a separate pump stage. Unused drainback holes are blocked with plugs.

HEAD GASKETS

The best head gasket to use in a high-performance Olds engine assembly is Fel-Pro's "PermaTorque/Blue" unit. Available for this block/head combination under Fel-Pro part No. 1019, the gasket has a number of advantageous features. Aside from the blue Teflon coating that helps seal deck and head surface imperfections, these units also incorporate a stainless steel-wrapped wire ring combustion seal. Gasket surfaces are wiped with acetone prior to installation and no sealer is used. Fel-Pro also offers a complete line of high-performance gaskets and seals for the Olds NASCAR 356.

VALVE MACHINING

As indicated in the small-block V8 tech section, every engine builder has a preferred approach to preparing valve seats. C.J. Batten's shop outlined their Grand National 356 approach and offer the following guidelines:

Intake:

15 degrees, blended to infinity
30 degrees, .040(+/-)-inch wide
45 degrees, .060(+/-)-inch wide (depending on bore size)
55 degrees, .060-inch wide
65 degrees, blended to infinity

Exhaust:

25 degrees, blended to infinity
35 degrees, .030–.040-inch wide
45 degrees, .050-inch wide
55 degrees, .060-inch wide (maximum)
70 degrees, blended to infinity

PISTONS

Although Diamond pistons are used in

some of Batten's GN assemblies, Forgedtrues are also extensively employed. These forged Diamond slugs have specific dome designs and they're tapered for wall clearance above the top rings. Pin oiling is provided through the bottom ring land. The piston dome on the left is fully machined while the matching dome on the right is completely hand-finished.

Clearances built-in by Batten include .060–.065-inch piston-to-head, and .090-inch minimum piston-to-intake valve (this number can be slightly less on the exhaust side). Although piston dome thickness has been run as tight as .170-inch, a minimum of .200-inch is recommended for high-output durability applications. To prevent scuffing under cold-start conditions, the Diamond's skirt-to-wall clearance is set at .0075-inch. These units' domes and skirts are also glass-beaded to aid oil retention. The Forgedtrues use more aggressive external ribbing to help hold oil.

While Oldsmobile is still in the process of designing and producing their own high-performance pieces, Batten's NASCAR 356 uses 4340 steel Crower rods. With .990-inch-diameter pin provisions, oiling is provided by Crower through a hole located in the 12-o'clock position in the rod. Similar openings have been tried simultaneously in the 4- and 8-o'clock positions without a loss of structural integrity. Each set of Crower rods comes with a special 12-point, thin-wall rod bolt socket that's designed to clear the ribs on the rod caps when they're tightened with 60 foot-pounds of torque. In floating GN form, piston pin clearance in the rod is set between .0006–.0008-inch.

RINGS

To seal on the finely finished cylinder walls, Speed Pro rings are used with a .043-inch moly-filled top, a 1/16-inch cast-iron second and a custom-tensioned expander ring designed for a bigger bore.

CONNECTING RODS

Oldsmobile engineers are presently preparing a high-performance factory connecting rod that's scheduled for release sometime this coming summer. Finite element analysis is being used to design a minimum-weight rod with maximum strength. Forged from chromemoly steel, the 6-inch beams will be offered in finished and semi-finished form. Designers expect the factory pieces to be as strong, if not stronger, than aftermarket rods. And like the new Olds crankshaft, these factory rods should be considerably less costly to the consumer.

A Batten Anti-Walk kit is fitted to control longitudinal camshaft thrust. This system allows the larger Torrington roller thrust bearing and its races to sit flush against the remachined face surrounding the cam boss at the front of the block by supplying a front camshaft bearing with a .040-inch-step cut in its forward edge. The circular machined pad that carries this bearing pack is enlarged slightly and machined to a depth that locates each cam lobe rearward, .070-inch off the centerline of the lifters. This offsets the lifters on the lobes and aids the tappets' wear-limiting rotation. A special cam bolt is also trimmed to form a shoulder for the smaller roller bearing and races which, in turn, locate a thrust button against the inside of the timing case cover. After a pre-assembly check determines the clearance between the installed cam bolt and the inside of the case cover, the soft thrust button is trimmed to fit with zero clearance.

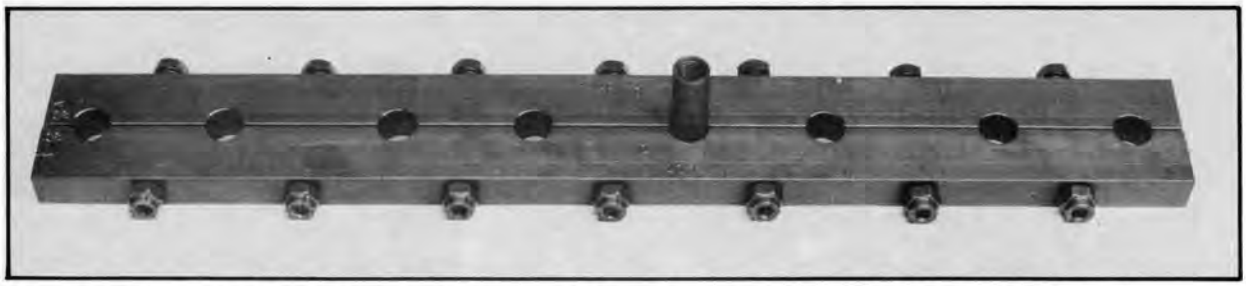
PISTON PINS

Specially prepared, extra-thick .180-inch-wall, .990-inch-diameter, 2.930-inch-long pins are used in either piston. With extreme durability foremost in mind, a mild internal taper is the only concession made to weight in this structurally critical area. Designed to float in their bosses with .0006–.0008-inch clearance, the pins are retained by dual Spirolox. Pin end-play can be as loose as .006-inch, but zero clearance in a full-floating assembly is also acceptable.

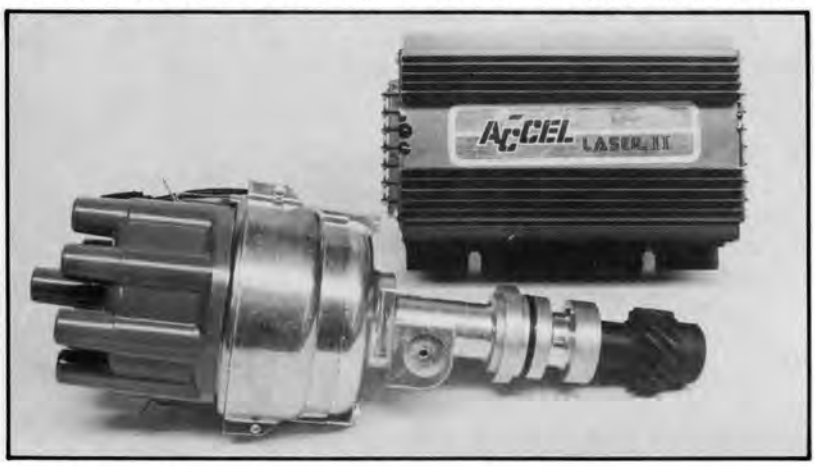
CAMSHAFT

Batten's present camshaft choice is a flat-tappet grind (no more mushrooms for NASCAR) with 108-degree lobe centers from Competition Cams. Various grinds have been tried and, measured at .050-inch lift, they range between 280–290 degrees duration on intake and exhaust. Measured at .050-inch, lift is .410-inch, which works out to .600-inch effective lift at the valve. Indications are that these engines respond to "a little more intake lobe."

For this GN application, the Batten heads carry K-Motion's K800 valve springs, consisting of inner and outer coils wound without a damper. Retainers are 10-degree titanium units with matching hardened valve locks from Batten.

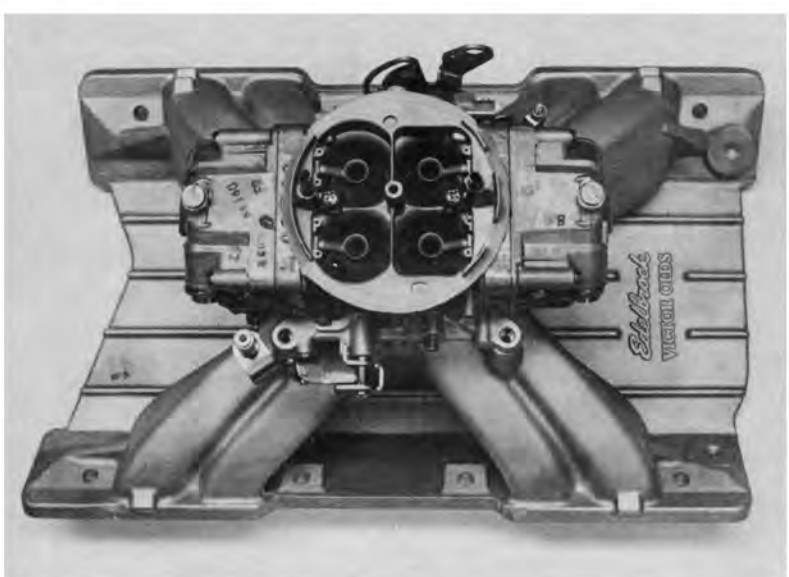


To provide minimum rocker stud deflection, this girdle from Ridgeway incorporates a special offset for the Grand National 356 cylinder heads. Designed for easier access to rockers, springs and valve tips, these latest stud girdles also include Ridgeway's special slip-fit adjusting nuts with positive stops. It would have been appropriate, at this point, to top everything off with a pair of Batten's new cast-alloy valve covers, but they were too new to be available for the dyno sessions. The distinctively ribbed covers can be seen in the small-block V8 coverage elsewhere in **Oldsmobile In Action.**



Batten's Grand National ignition plan includes an Accel Lazer II control module and a matching distributor with a mechanical tach drive take-off. Secondary ignition connections are via Accel's solid-core 8mm cables, while fire is supplied by a #14108 chrome Accel coil. An O-ring on the distributor housing eliminates the standard-style flat distributor-to-block gasket. Total timing is run at 38 degrees, which is all in by 2500 rpm. This system may soon be available directly from Oldsmobile.

Designed for efficient, low-drag performance with a minimum of weight, this brand-new aluminum-bodied water pump is now available for all Oldsmobile V8s under GM part No. 22526206.



Edelbrock's Victor casting is currently the only four-barrel intake manifold manufactured specifically for use with the high-performance Olds/Batten cylinder heads. (A single-quad top is available for Precisioned Speed's drag race-style tunnel-ram manifold, which is also made specially for use with Olds/Batten cylinder heads.) Batten's NASCAR combination includes an 830cfm Holley with 1 1/16-inch throttle bores.

To fit a high-volume Carter NASCAR fuel pump to the Olds diesel block, a small portion of the machined flat above the fuel pump boss is trimmed back and a new top bolt hole is drilled and tapped to match the pump flange. The pumps are available through Batten under part No. 350DX FP.