Mercury Goes Racing

preparation at the one-Stroppe hop-up center

BY BOB PENDERGAST

THE RADIO on the bench was playing bossa nova and, despite the jazz latino, the motions of the immaculately clad men in white coveralls weren't hurried. In fact, the atmosphere was one of "If we don't hurry, we'll just make it."

The apparent need for haste was the calendar, indicating that few days remained between then and the Daytona 500, while the interval preceding the 500-miler at Riverside could better be measured in hours.

Yet the task of race preparation on the '63 Mercury Marauder fastback coupes to be driven by Parnelli Jones and Troy Ruttman was being performed with a meticulous care that brooked no compromise. The men in white performed their work with the confidence born of experience, for they were the crew of specialists comprising the "associates" portion of Bill Stroppe & Associates.

Located in Long Beach, Calif., this firm has made its reputation in competition preparation, and the men involved include: Vern Houle, a transmission and engine specialist with Stroppe for 14 years; Cecil Bowman and Byron Froelich, engine men and economy run navigators; Louis Unser Jr., chassis man and "West Coast Representative" of the Unser family of Pikes Peak fame; Jay Lightfoot, engine and chassis component balancing specialist formerly with the late, great Clay Smith; Dwight Clayton, custom chassis component fabrication; Ralph McLaughlin, custom chassis fabrication component welding; Al Loya, metal and paint; and Don Rice, operations manager and project controller.

Spearheading this aggregation of formidable talent is Bill Stroppe. A native of Long Beach, Bill became associated with Ford Motor Company products 'way back when he was still attending Polytechnic High School.

Joining with the legendary Clay Smith in '46, Bill began to prepare midget and sprint race cars as well as stock cars and racing boats for all the leading competition events in the Western Hemisphere. The performance and reliability of a Smith/Stroppe-prepared car attracted the upper crust of racing, both car owners and drivers. J. C. Agajanian entrusted the preparation of his cars to the duo, while the drivers included Johnny Mantz, Chuck Stevenson and Troy Ruttman.

Stroppe, incidentally, is no slouch behind the wheel himself, having learned the trade through the hot-rod-through-sports-car route. During the '53 West Coast road racing season he won eight out of 11 major races driving a Kurtis-Kraft sports car powered by an engine built by (of course) Ford.

Although Bill Stroppe had long been aware of Ford (he used Ford products in building up the hot rod he ran on Muroc Dry Lake when he was 19), it wasn't until 1948 that Ford discovered Bill Stroppe.

The introduction was rather dramatic. Bill and Clay Smith brought their 225 (cu. in.) class hydroplane to Detroit to compete in the Henry Ford Memorial Regatta. Although racing in a higher class, Stroppe drove the craft to victory in all three heats and, to add insult to injury, beat the best time of a Gold Cup class boat around this same course by 2.5 min.

In addition to being spectacularly fast, the fact that the boat was named after its Mercury-dealer owner and powered by a Ford engine brought Stroppe and Smith to the attention of the Ford family and officials of the Ford Motor Company. Lest they forget, Stroppe prepared and drove a Mercury to both a class and overall sweepstakes win in the 1950 Mobilgas Economy Run, and repeated his class win in '51.

In 1952 Stroppe was on the Clay Smith crew for the J. C. Agajanian car which Troy Ruttman drove to victory at Indianapolis that year. It was in the pits on Memorial Day that Bill and Clay told Benson Ford that Lincoln could win the Mexican Road Race. He took them at their word and they responded by preparing the cars that finished the Carrera Pan-Americana first, second, third and fourth both in '52 and '53.

Bill had to carry on alone for the '54 race after Clay's death in a racing accident. The performance of the Lincolns was, as usual, tops. They finished first and second in the last running of the border-to-border classic.

That same year Bill himself scored a major competition accomplishment when he became high-point man of the California Sports Car Club, from behind the wheel of his Mercury-powered special. But in 1955 Stroppe buckled down to business and fielded Mercury stock cars, winning several major West Coast events. In '56 Stroppe & Associates branched out to become a firm active on a national basis, running Mercurys on both NASCAR and USAC circuits. Wins included the Elkhart Lake Road Race, two out of three at Milwaukee, Pomona and another road race, the Paramount Ranch course in Hollywood.

Both Stroppe and Mercury continued their winning ways in 1957. A Stroppe-prepared Mercury convertible won the NASCAR race at Daytona, with wins also at Trenton, then back out West at Pomona and Vallejo.

Due to the chilly attitude toward competition that prevailed during the next three years, Stroppe & Associates worked on other special projects, and increased their reputation for versatility in the process. In 1959 they reenacted the 1909 Ford run from New York to Seattle. Then, 1960 was the year of the "little bird," when Stroppe and Associates introduced the Falcon through "Experience Run USA" and in the process covered every mile of federally-numbered highway in the country. In 1961 Stroppe handled high-performance activities for Autolite, the Ford subsidiary.

STROPPE CREW works late, getting first of team cars ready for racing.

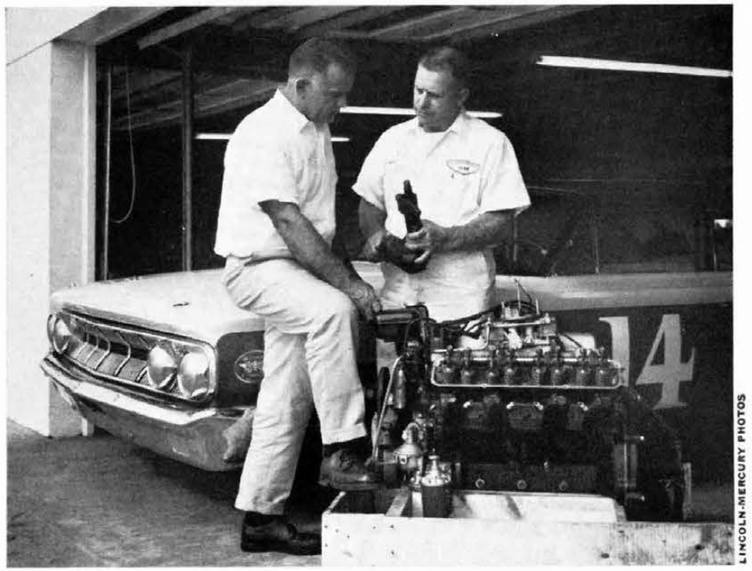
Never one to dodge a challenge, Stroppe's fancy was captured by the adventurous aspects of Chevrolet's major truck promotion trip into Baja California, Mexico. He and his crew prepared the vehicles and managed the trip, which double-page ads across the country later hailed as a tangible demonstration of what they called the "new reliables."

Ford's formal repudiation of the AMA ban on competition activities brought his alma mater once again into harness, and in the fall of '62 Stroppe announced that he would field Mercury cars on both the NASCAR and USAC circuits.

The model of Mercury used for racing in '63 is the Marauder fastback coupe with all available competition options. The task of preparing these cars is not one of modifying them for racing, as the layman might expect, but one of incorporating the changes first of all dictated by the necessity for driver safety and, secondarily, those required to individualize the car for the specific type of competition in which it ▶

THUNDERING INTO the sunset at Riverside Raceway, new Mercury stocker driven by Troy Ruttman strives toward its third-place finish.

BILL MOTTA



BILL STROPPE (left), engine specialist Vern Houle and the basic product.

LINCOLN-MERCURY PHOTOS

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is to be used at that time.

Both NASCAR and USAC demand some changes in all the stock cars raced under their sanction, since safe, sane racing requires some features that no car manufacturer would ever make a production-line option. Other changes not demanded, but allowed, by the rules of the racing associations are those concerned with making the drivers and spectators safer by strengthening the car.

Take a look at a Mercury as it goes through Bill Stroppe & Associates' shop to be readied for racing. First of all, the car is completely stripped to the frame; the frame is then clamped in a jig made for this purpose and all welds reinforced. Why? Because even if you lived to be a hundred and drove the same '63 Mercury the rest of your life, you'd fail to duplicate the twisting and bending strains put on the frame and suspension components by just one season of stock car racing. While in this same jig, brackets and supports for different shock absorbers are added, as well as bearing supports on the lower side of each front frame horn for the front stabilizer bar.

The stabilizer bar is thus relocated to make room adjacent to its former location for a transverse torsion bar. A similar installation is made at the rear of the frame. These two bars enable the crew to individualize the front and rear spring rates to tailor them for the specific track on which the car is to be run at that time. Because this in effect provides the car with an adjustable spring rate, and shock absorber action must be proportionate to that of the springs, the aforementioned supplementary shock mounting brackets are required. The starting point on these individualized suspension systems is the stock, high-performance Mercury "non anti-harsh" springing, which is an optional alternate to the standard anti-harsh springing.

By permitting this type of suspension tailoring, the racing associations are taking a long step toward safety. At the same time, competition remains fair because every car entered is allowed an equal amount of freedom of preparation in this direction. At the same time, Mercury, by offering the non anti-harsh suspension as an option, is making available to highway drivers the nucleus, at least, of a racing suspension.

Before removing the frame from the jig, the crew at Stroppe's welds on the driver's protective roll bar mounts. Here again we have an example of an item the public doesn't want that is required for sensible racing. Although some enlightened wearers of safety belts among our horde of highway drivers would like to see roll bars become standard equipment, the type required by racing could never be a production item. Why? Because after all the cross-bracing is in place, you no longer have a passenger car interior, but, instead, a cage for the driver—and that's as it should be with stockers lapping Daytona at 150 plus.

The roll bar structure itself is of ⅛-in. wall steel tubing. Before it is installed the frame sub-assembly must be completed by the addition of reinforced upper and lower A-arms. These carry ball joints that are a stock part listed as a heavy-duty option.

The exhaust header outlets are part of the frame revamping procedure, since having the frame contribute to the rigidity of this non-standard exhaust system is the best possible insurance against a most common race car failure, *headerdropoffitis*.

In another room at the Stroppe facility the rear axle is being strengthened while the frame alterations are in progress. Once again to cope with strains only competition can provide, the changes result in the unit becoming a full-floating type, with large-diameter tubular axles supported at their outer ends by ball bearings in such a way that in the event of axle breakage the car will not lose a wheel.

Although offered as a production-line installed option by Mercury, a limited-slip (self-locking) differential is not permitted, so here's one place where the performance-conscious highway driver can be one-up on the NASCAR drivers. However, the rules do allow external stiffening of the rear axle housing to help offset the strains encountered when sliding around a corner with all the thrust being taken by the outside wheel. So a bridge-like truss is welded onto the lower side of the axle housings before installation in the Stroppe-prepared Mercurys.

Racing rules have also outlawed air scoops and pressure cooling, both of these being conspicuous modifications on the Smith-Stroppe Lincolns. However, any available brake lining may be used and the drums and backing plates may have ventilating holes. Stroppe-prepared Mercurys used the sintered-metallic lining option in conjunction with a Lincoln drum having a radial cooling lip designed to transmit heat from the drum out of the wheel-shrouded area into the airstream. These drums are liberally drilled except for the contact area, and the backing plates are suitably "Swiss-cheesed" as well.

Assembly of the chassis now takes place and, with the frame sitting on blocks, the protective roll bar structure is welded on, the torsion bars installed, and, after installation of the reinforced A-arms and rear end, their linkage may be hooked up and the shock absorbers (Autolite) installed. The steering mechanism used is the high-performance fast-ratio option and, after it and the oversized gas tank (capacity limited by the rules of the racing association concerned) are installed, the body is put on.

Body changes for racing include replacement of all upholstered paneling with fireproof material and does not, contrary to popular opinion, include replacement of steel with aluminum or fiberglass—that little caper is outlawed by both NASCAR and USAC for '63. Legitimate changes (more for safety than performance) include replacing all lenses with sheet metal. The stock instrument panel is replaced by a simple, featureless plate carrying the following gauges: oil temperature, water temperature, oil pressure, fuel pressure, fuel level and tachometer.

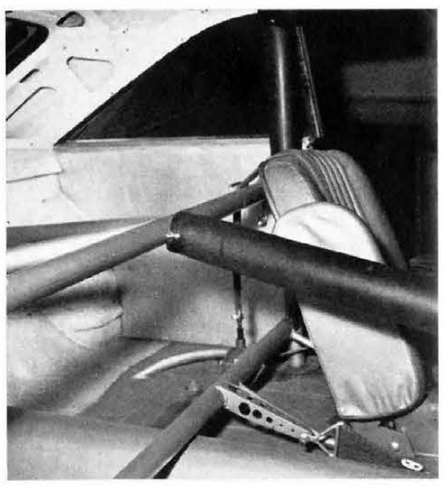
With the body on the frame, all the equipment using the body shell as a mounting may be installed, including the electrical system. Naturally this is much simplified, compared with that of a road car, since no lighting equipment or accessories of any kind are required. Among the firewall-mounted gear is the special dual-piston master cylinder assembly. Though providing nothing toward more effective braking, this unit does give the hydraulic portion of the braking system a fail-safe factor. In effect it makes the front and rear brakes independent of each other, so if a failure occurs brakes will be lost from one end of the car only.

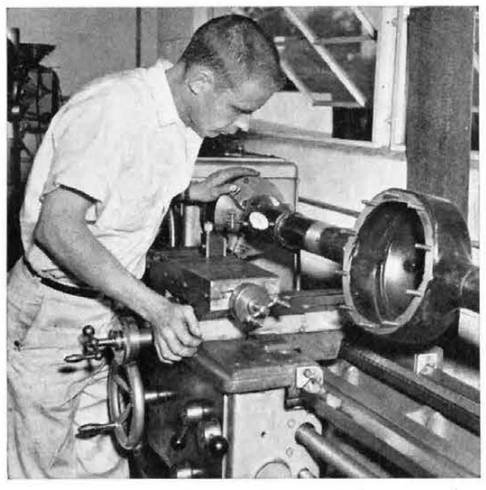
Not listed by Mercury as an option, but permitted by the racing associations for safety reasons, is the addition of an engine oil cooler. Although the safety factor in using an oil cooler may seem obscure, look at it this way: Hot oil has a lower film strength than cool oil. As the temperature of lubricating oil approaches its flash point its film strength becomes something like the square root of zero. When the oil becomes hot enough so its film strength decreases below that exerted in bearing pressure, the bearings develop metal-to-metal contact; mechanical relief is just seconds away, when the engine will suddenly cease to rotate.

Now, picture yourself in the middle of an over-100 mph bend when this happens. Think of the surprised look on the faces of your friends as the back wheels stop turning and they see you leave the course upside down and backward, still at about 90. This is known in racing parlance as a "lock-up," and its effects have to be seen to be appreciated.

An oil cooler can go a long way toward preventing a lock-up, and even an everyday engine failure can scatter enough oil on the track to scare everyone concerned. So it is a safety measure, as well as increasing the cars' abilities to go the distance, and of course Stroppe installs one of them on every competition-bound Mercury that leaves his shop. It mounts up front alongside the radiator, where it receives ambient temperature ram air.

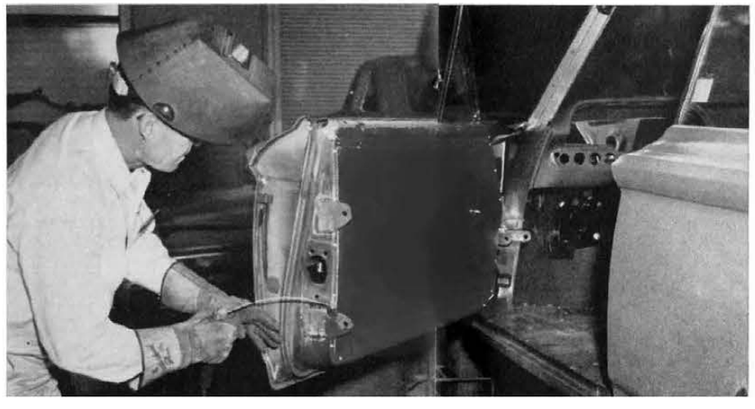
It's easier to install the engine and transmission as a single unit if the car is up off the floor somewhat so the wheels come last. The transmission used is the optional Borg-Warner 4-speed unit, and the engine is the now- ▶

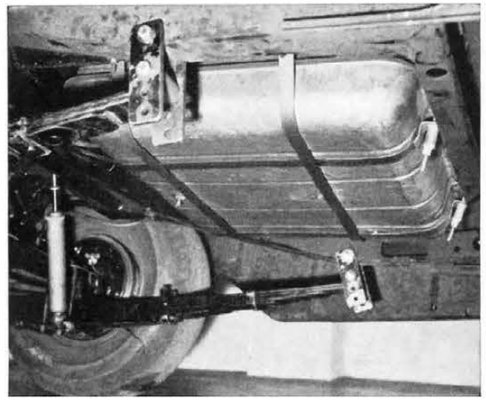




ROLL CAGE inside cockpit is constructed of 1.75 in. Shelby tubing; rubber wrapping protects driver. Below: tabs for door-bolts are welded in place.

SPECIAL JIGS guide Stroppe's torch, hold frame in alignment during construction. Above right: Louis Unser turns differential housing in lathe after welding on safety hubs. Below: Extra straps criss-cross fuel tank to provide additional support.





BODY SHOP scene: all cars are stripped, rebuilt and repainted to racing specifications.

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famous Ford High Performance 427.

It is at this stage of competition preparation that things begin to get exciting, so imagine our surprise when we witnessed Vern, Cecil and Byron prying open a crate from Dearborn, Mich. (the contents proved to be a new 427 engine) and without further ado installing same in Parnelli Jones' Mercury. Sensing our disappointment, Stroppe explained that, like the Chevrolet 409 and the Dodge/Plymouth 413, the Mercury 427 is a "factory racing engine" and, although offered as a production-line installed option, differs in some ways from the standard engine.

An outgrowth of Ford's research and resulting experience with the 1962 Ford 406, the '63 Mercury 427 is indeed its "kissin' cousin." The stroke is the same, while the bore is 0.200 in. larger. Actual cubic inch displacement is 426.5; the 427 name identifies it with the displacement limit of that figure adopted by NASCAR and USAC. At any rate, the 427 is a big engine, especially when one realizes that its basic design is an outgrowth of 1958's 332 engine.

While growing by nearly 100 cu. in., this precocious 5-year-old design acquired sophistication. Today it is not only bigger, but even more powerful in relation to its size and has a truly phenomenal longevity potential under prolonged high-output conditions. How did it get that way? Compare the 1963 Mercury 427 with the 332 and 352-cu. in. engines built since '58, from which it was derived.

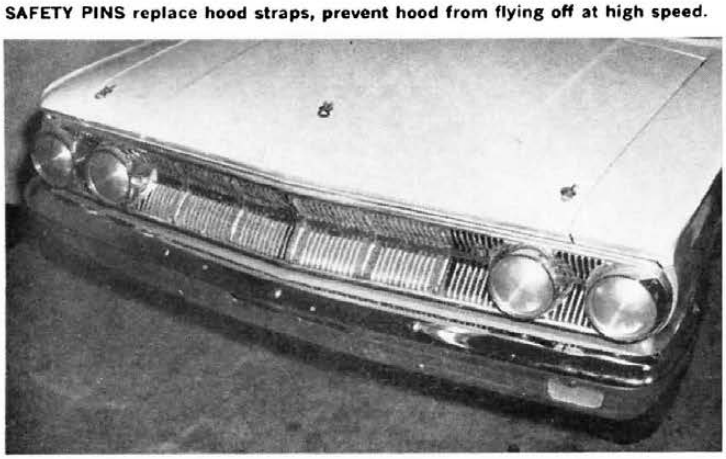
Aside from its extension in bore and stroke, the 427 differs structurally. The bare block (with main bearing caps) weighs only 180 lb. Not depending upon sheer bulk to gain rigidity, the Ford engineers have done some clever things with this design. Most obvious of these is the "cross-bolting" of the main bearing caps. This (which we will go into shortly) and provision for a different method of regulating engine oil pressure necessitated using an entirely different set of patterns for these blocks, so, since they had to make new patterns anyway, the engineers increased the beef of the main bearing webs over what the normal 332, 352 and 390 engines had been using. Because the block cast from these patterns is used only for this high-performance option, it truly is just what Stroppe called it: a factory racing engine.

The block castings go from the foundry to inspection, where they are checked for cracks by the dye-penetrant method. Cracks which not only would not leak either oil or water, but wouldn't give any trouble in 100,000 miles of passenger car service, still are considered sufficient reason for rejecting a 427 block as defective!

Besides the added thickness of the main bearing webs, the 427 blocks gain strength from the fact that their webs are ribbed for additional rigidity. But to provide a completely rigid assembly to insure "no strain" crankshaft rotation under prolonged racing conditions, the main bearing caps had to be made equally rigid. The solution turned out to be "cross-bolting," wherein caps No. 2, 3 and 4 are located not only by their vertical cap screws but also by ⅜-in. diameter horizontal cap screws threaded in through special bosses found only on these blocks.

The special provision for oil pressure regulation in these blocks not found in 332, 352 and 390 engines was pioneered on the Ford 406 high performance option, as was cross-bolting. Although theory tells us that a fluid under pressure within a closed system should have equal pressure throughout that system, volume can be another story. The 1962 Ford 406 and the 1963 427 engines have the oil pressure-regulating relief valve located not in the oil pump itself, which is customary practice, but at the opposite end of the system. Thus, all engine parts are assured of receiving a plentiful supply of oil at the specified working pressure. To protect the pump itself

SAFETY PINS replace hood straps, prevent hood from flying off at high speed.



STEEL STRAPS on back window prevent "popping out."

TROY RUTTMAN tries out his new mount, finds it a well-prepared racing car.

against damage during extreme cold-weather starts, a secondary relief valve set to release at a much higher pressure is incorporated.

Within this ultra-stiff block and main cap assembly rotates a cast nodular-iron crankshaft that has main bearing journal and crankpin diameters identical to those of the 332, 352 and 390 engines but has heavier counterweights to compensate for the stronger connecting rods used in the 427 engines. In addition, the 427 shafts are grooved at each main-bearing journal to increase the volume of oil that may flow to the crankpins. Main bearings for these engines are heavy-duty copper-lead alloy and both the upper and lower halves of the main-bearing inserts are grooved to furnish a continuous supply of oil to the crankpins, while the standard bearings are grooved only in the upper half, thus furnishing an intermittent flow that is adequate for normal use.

Unlike the other manufacturers' optional high-performance engines, the 427 uses pistons cast of autothermic aluminum. GM and Chrysler Corporation offerings use forged pistons, but the low heat-rejection characteristic inherent in the basic Ford design apparently has made this difference possible.

The camshaft in the 427 engine is designed to be used with mechanical tappets and provides a valve action profile (after passing the action through 1.76:1 rocker arms) compatible with the carburetion allowed by racing association rules. A single 4-barrel carburetor is all that is permitted, but the Holley unit used is rated at 600 cu. ft./min. air-flow capacity.

This impressive instrument is mounted on an aluminum intake manifold and is cut off from exhaust heat by use of special intake manifold to cylinder head gaskets which do not have an opening to register with the heat riser passage in the cylinder heads. Compression ratio of these heads is approximately 12:1 and the intake ports are 18% and the exhaust ports 16% larger than production 390-cu. in. heads. Intake valves are the same size, but the exhaust valves are approximately 1/16-in. larger than normal. For ordinary highway use these engines come equipped with single valve springs; for ultra high-speed work inner springs have been made available.

Head gaskets used on 427 engines are special in that they utilize the O-ring principle. An O-ring is a piece of material that, under pressure, forms a circumferential seal along a predetermined line. The 427 head gaskets are each one-piece embossed steel, but, instead of sealing off the holes where water passes through from block to head, the water is allowed to flow around between the head and the block for additional cooling. A cool gasket is less likely to blow during high-output conditions than a hot one. To keep the water from going where it wasn't wanted, openings for head cap screws, oil passages and the cylinders were sealed around their edges by O-rings. Pushrods on these engines do not pass through the head gaskets so they presented no problem.

Ignition distributors on 427 engines have a rigidly mounted breaker plate, eliminating vacuum advance, a device of value only under cruise conditions. Mounted on this plate are two sets of points, one to open the primary circuit through the coil, to cause secondary voltage to flow to the plugs, and the other set to close the circuit, to allow the primary windings of the coil time to build up another charge. By using two sets of points, the "dwell" or saturation time of the coil's primary circuit is increased and a hotter spark results. Transistorized ignition is an available option. Current is carried to the Autolite plugs by secondary wire having a steel conductor, rather than the carbon type, since radio reception within these cars isn't a factor.

Beautifully designed cast iron exhaust headers come on these engines. On the left bank, the first and third cylinders are joined, and the second and fourth. The two resulting branches are then blended into each other, leading back to a 2.25-in. (inside dia.) outlet flange. On the right bank, cylinders 1-2 and 3-4 are paired. This pairing eliminates interference between the exhaust gases of adjacent cylinders which fire one right after the other. These headers, properly ducted without further restriction to the outside of the car, are worth 30 installed horsepower.

Although it was a disappointment to us not to see mysterious "speed secrets" being lavished upon the Marauder's engines by the Stroppe crew, after Bill finished briefing us on the way the engines are when they arrive from Dearborn we could see why such things have become a thing of the past. Preparation, not modification, is the name of the game nowadays and, in line with this, we weren't the least bit surprised to see some of Bill's crew disassembling 4-speed transmissions so the gears could be sent out for magnafluxing tests before reassembling and installation in the cars.

Then the 427 engine is dropped in, after which the strengthened wide-rim wheels and racing tires are mounted and the car is rolled off to another part of the shop for the final touches.

In addition to the remaining wiring, hydraulic, fuel and linkage work, the fit of the bucket seat to the particular "piloto" of this car is done at this time. After all, what's the sense of having the hottest car on the track if you can't reach the pedals? ■