



MOST CONTROVERSIAL INDY 500

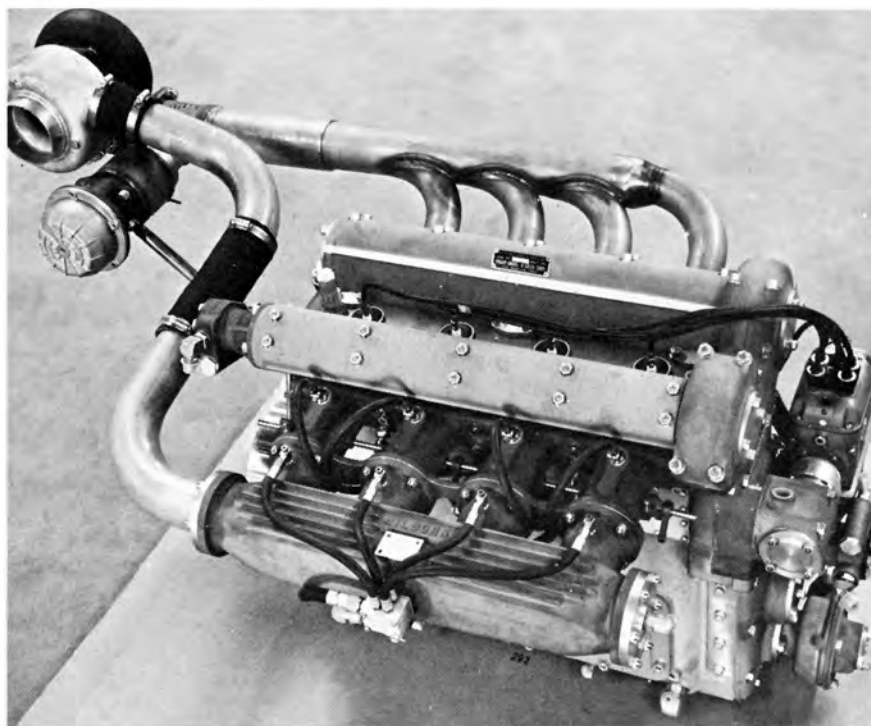
TURBO-CHARGED CHEVY JOINS FORD AND STOCK BLOCK ENGINES AS MAJOR CHALLENGERS TO THE REIGN OF THE MIGHTY OFFY. CAN STP MAKE THE PASSENGER CAR PLYMOUTH 318 ENGINE RACE-READY BY MEMORIAL DAY?

By Jack Scagnetti

A dramatic behind-the-scenes story unfolds each year before the drivers get behind the wheel of their cars for the Indianapolis 500-mile race. It's the story of hard-working dedicated designers, engineers and mechanics who prepare cars and engines for sponsors who meet heavy expenditures in labor and materials and must post a \$1000 entry fee by April 15. During late winter and early spring the planning and preparation of the race cars hit the critical stage. Everyone involved is faced with the thought: "Do we have the right combination?"

What is the winning combination for the 1969 Indy 500 at the Indianapolis Motor Speedway on Memorial Day? Undoubtedly the most favored engine is the turbo-charged Offenhauser, usually referred to as the turbo-Offy. Last year 16 of the 33 cars that qualified for the starting grid were powered by a turbo-Offy engine. Nine of the 11 cars finishing the grueling 200 laps around the 2.5-mile oval were using the turbo-Offy. And it was a turbo-Offy that powered winner Bobby Unser's car.

Time trials the weekends of May 17-18 and May 24-25 determine the 33 qualifiers to start the race behind the Camaro pace car. Last year's fastest qualifying time was 171 mph; slowest was 161 mph. What it will take



Four-cylinder in-line double-overhead-cam turbo-charged Offenhauser engine develops 625 hp at 8500 rpm on methanol fuel. New model, as built by Drake Engineering & Sales, is 159 cubic inches, just below 161.703 maximum at Indy for turbo OHC engines this year.

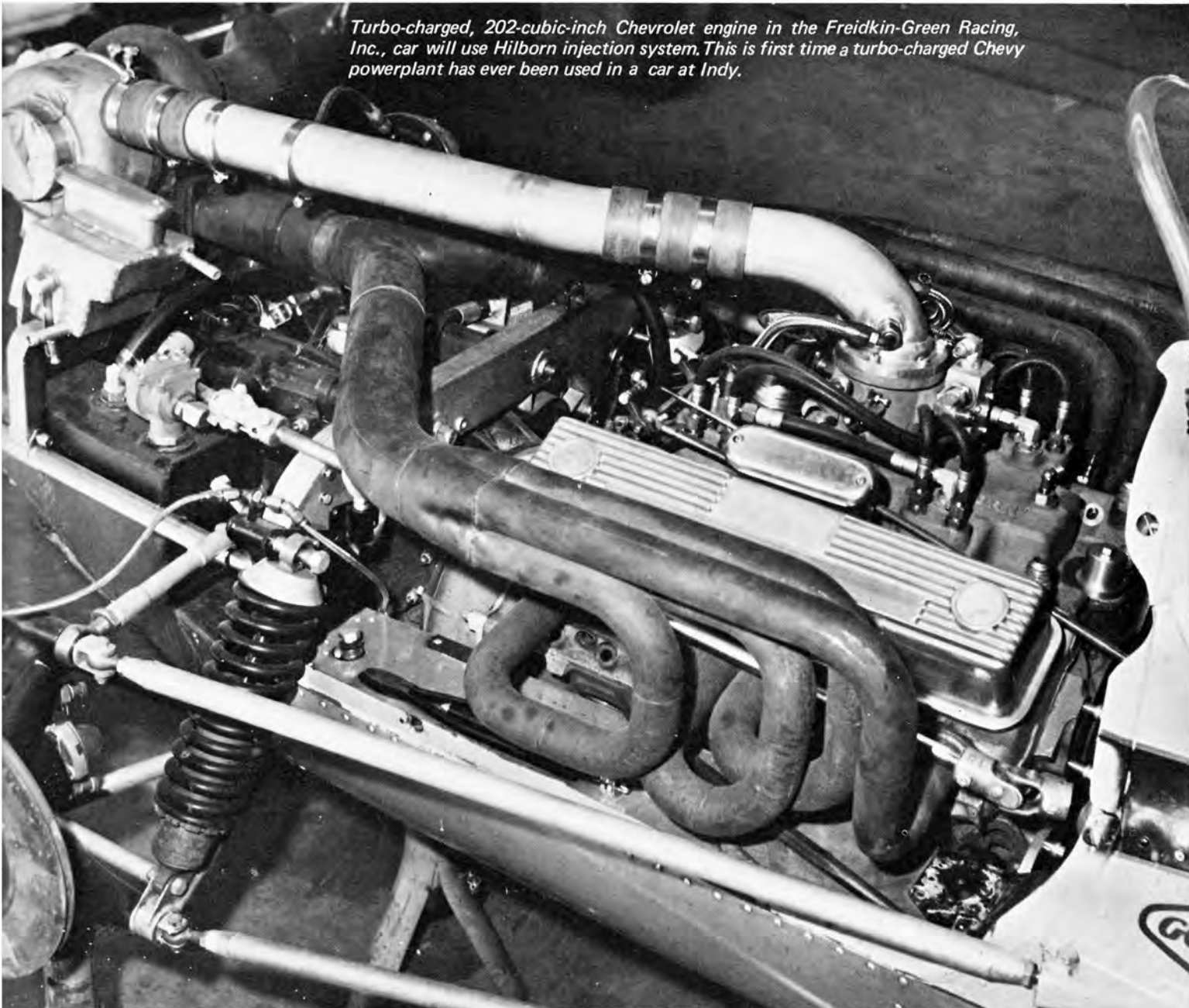
this year is anyone's guess, but don't be surprised at a pole position qualifying speed over 175 mph!

An interesting array of engines this year will challenge the Offy, the most successful engine in the 53-year history of the Indy. Among those taking up the battle are a turbo-charged Chevrolet, turbo-Ford, stock-block Plymouth 318-cubic-inch passenger car engine, stock-block 320-inch pushrod Ford, modified 319-inch Chevy stock-block, a 254-inch Brabham Repco, a small-inlet turbine, and a 200-inch modified Rambler six-cylinder with a new type of injection system. The name of the game is not only horsepower but—just as important—reliability and durability.

Andy Granatelli, president of STP, whose turbine-powered race car created so much controversy last year, is again attracting a lot of pre-race attention because of his attempt to use a stock-block Plymouth 318 passenger car engine in the STP entry. "It's a hot



Offenhauser engine components ready to be assembled for use in an Indy race car. Cylinder block is aluminum with water side plate. Valve tappets and cam cover, cam housing and two cams are in center, while American Borg & Beck three-plate clutch for flywheel is shown with crankcase at right.



Turbo-charged, 202-cubic-inch Chevrolet engine in the Freidkin-Green Racing, Inc., car will use Hilborn injection system. This is first time a turbo-charged Chevy powerplant has ever been used in a car at Indy.

rodding project," says Andy, himself a pioneer hot rodder. "We'll try to get up to 525 to 550 horsepower in hopping up an engine designed for passenger car use and never before used in racing. If it just qualifies, we'll be accomplishing something. At least we can say, we're not 'me, too.' Chrysler, the best engineering firm in the auto industry, has had a lot of experience with it—five million have been built. In time it could prove to be the best stock-block racing engine."

Plans call for the engine to be fed with a sophisticated fuel injection system (experiments have been going on with both Hilborn and Bosch types) and will use a dry sump lubrication system and a gear-driven camshaft and accessory drive. Racing modifications include tuned exhaust headers and a crankshaft made of a high stress alloy material used in racing. The crankshaft will be of the standard passenger car configuration. So is the four-speed Plymouth transmission. Several engines are being worked on to try to come up with the right combination. Keith Black, a nationally known Southern California racing engine builder, is spearheading the project. Standard cast iron type heads are being tried and Chrysler is also working with Harry Weslake to develop aluminum heads. The racing version of stock 318 has a bore of 4.00 inches with a 3.18-inch stroke. The camshaft will be by Racer Brown. Pistons are forged aluminum.

The STP race car, which uses four-wheel drive, has a new body-chassis concept that Granatelli calls a "super-wedge" design. It has an adjustable spoiler, replaceable at different heights and angles. "We won't have time to conduct wind tunnel tests," Granatelli admitted, "We are operating very close to deadline on this project—much too close for comfort, as we only started in February."

Some say STP is operating so close to deadline that when time trials begin he may be forced to even consider



Components of Plymouth's stock block V-8 passenger car engine, 318 cubic inches, are displayed at STP headquarters for magazine writers. STP is experimenting with both Hilborn and Bosch injection systems.



Displacement of Gurney Eagle Ford engine has been increased to 320 inches, maximum for American stock block powerplants under new Indy rules. Rear end is Hewland unit.



Tom Drake, son of Dale Drake of Drake Engineering, makers of the Offy engine, prepares to assemble an Indy engine.



Wedge shape design of Gurney Eagle features a wider, lowered car with better weight distribution.

another engine. If so, what? The logical choice, insiders say, would be a turbo-Offy. Pete Hutchinson, Plymouth engineer in charge of development of the 318, admitted "We won't know the power or reliability of the engine until the car is running." STP's driver Art Pollard said: "Judging from how well Dan Gurney did with a stock-block engine last year, we'll be competitive," referring to Gurney's second-place finish.

Granatelli later announced that he had also signed Mario Andretti,

Graham Hill and Jochen Rindt to his STP Racing Team and will have four new STP-Lotus wedge-shaped cars with four-wheel drive and powered by turbocharged Ford V-8 racing engines.

Gurney will likely run the stock-block pushrod engine with Gurney Eagle cylinder heads again this year. Displacement has been increased from 305 cubic inches to 320. "This engine has proved to be very reliable in my last five races," said Gurney. He said he will also have a choice of a turbo-charged Ford. Gurney's Eagle

car has undergone some design changes. The car is wider and lower and has better weight distribution. Gurney's All-American Racers' shop also did major renovation on driver Ronnie Bucknum's Ford-powered Eagle car and some changes on Unser's Eagle.

Ford, which had nine un-super-charged engines and four turbo-charged powerplants in last year's 33-car starting field, is reported to have a more reliable turbo-charged engine this year. A. J. Foyt, three-time Indy winner, has entered a turbo-charged Ford. Other drivers likely to rely on Ford power include Bucknum, Dennis Hulme, Carl Williams, Roger McClusky, Jim Malloy, Al Unser, Jim McElreath, Cale Yarborough, Johnny Rutherford, George Snider and Lee Roy Yarbrough.

Jerry Grant, who qualified with an Eagle Ford last year, has been named driver of one of the four cars built by Eisert Racing Enterprises that will be powered by an eight-cylinder 202-cubic-inch Chevrolet engine with a turbo-charger and a Hilborn injection system—the first such Chevy ever tried at Indy. "It works lovely," said Jerry Eisert after the turbo-Chevy ran tests at Riverside and Phoenix. "We're getting a little over 700 horsepower." The engine is putting out 450 lbs-ft of torque at 6800 rpm and will run at 7200 rpm in the race. Eisert built cars for his own colors and also for Freidkin-Green Racing, Inc., of San

Six-cylinder 200-cubic-inch Navarro-Potter engine with turbo-charger has been installed in car Rodger Ward drove to second place in '64 Indy "500" with a Ford engine. Halibrand wheels and brakes are used; tires will be wider when running at Indy.



Barney Navarro, whose hot rodding activities go back to the dry lakes racing days, checks the injection system he designed for use with the AiResearch turbo-charger unit on race car he's entered at Indy.



"It's a super wedge design," says Andy Granatelli, president of STP, as Wally Parks (center), president of the NHRA, and driver Art Pollard (right) look over the body "tub" of the STP racer under construction.



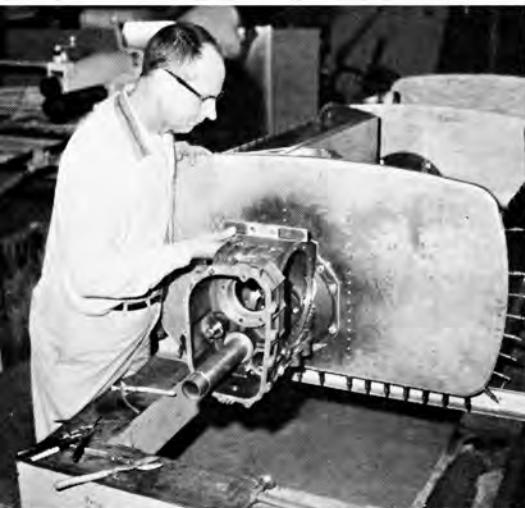
Aerodynamic wedge shape design to create negative lift is shown on the full monocoque chassis of car built by Eisert Racing Enterprises for owner Lindsey Hopkins and driver Wally Dallenbach. Spoiler has four-inch angle. Car has five-speed Hewland gear box.



Stu Hilborn of Fuel Injection Engineering checks an Offy engine being prepared at his shop for Indy. Hilborn system has been on winning Indy race car past 17 years.



Eddie Kuzma, builder of race cars for A. J. Foyt, is shown with body-chassis of car being constructed for Indy. Bulkhead is steel, body skin is .063 aluminum and roll bar is one-inch chrome moly with 1/8-inch wall thickness.



Quinn Epperly inspects Hewland gear box at rear of car under construction for Darwin Maxon and to be driven by rookie driver George Benson. Engine will be mounted mid-ship.



Halibrand rear end gets adjustment from race car builder A. J. Watson before being installed in car to be driven by Mike Mosley. Offenhauser engine, in background, will power car entered by Leader Card Racers.



Important behind-the-scenes men are Leo Goossen (left), chief designer-engineer for Drake Engineering, makers of the famed Offy engine, and Dale Drake, founder of the firm.

Diego and Seattle. Two cars will be entered, with Pete Revson the other probable driver.

Compared with the Indy car project of STP, a company that does over \$43 million in sales, are a couple of car-building tasks—which appear as “backyard operations”—by two veteran hot rodders who have to rely mostly on their knowledge of racing without the financial backing of a giant corporation. Barney Navarro, whose racing experience goes back to the Southern California dry lakes

racing days, is going to try for the second year to qualify his car with a six-cylinder turbo-charged Rambler engine using his own fuel injection system. Navarro reports horsepower of 625 to 640 at 7000 rpm with the modified Navarro-Potter 200-cubic-inch engine. He has made some improvements on problems that plagued him earlier on his fuel injection system, which he says is “more sophisticated.” The car Navarro is running with Les Scott as the driver, was built by veteran builder A. J. Watson and finished second in 1964 with Rodger Ward behind the wheel using Ford power. Said Navarro: “This car has rugged construction and the suspension should hold up better, particularly with the new wider tires being used this year” (tire widths have been increased to 14 inches by new USAC rules).

The other veteran hot rodder using

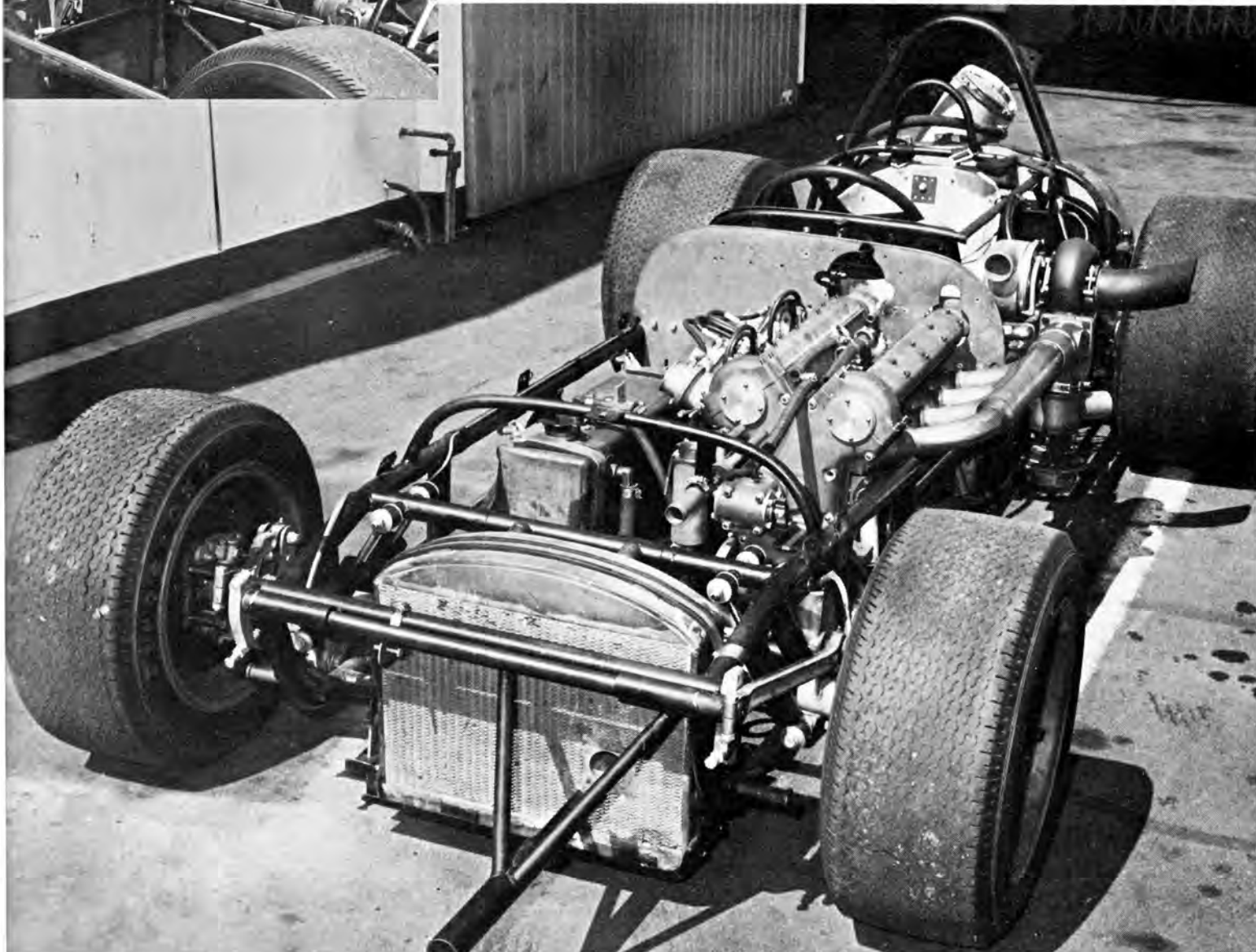
some ingenuity is Joe Hunt, whose magneto has for years been standard equipment on Offy engines at Indy. Hunt, who is running a roadster that the late Al Herman qualified with in 1960, has had a turbo-Offy engine installed in front. “Big tires cancel out any advantage of a rear engine,” says Hunt, a TWA pilot-engineer on a 707 Jet. Hunt had praise for the cool vented brakes he has designed for use with Airheart discs. As a front-engined roadster, Hunt’s car is noteworthy as recalling the older days of Indy but all engineering concepts are modern, including a wedge-shape nose. Greg Weld, former USAC sprint champion, will drive for Hunt.

Another car which will have a turbo-Offy in front of the driver is the Maxson Special entered by Darwin Maxson and driven by rookie George Benson, a dirt track racer. Car builder

Continued on next page

Joe Hunt with his front-engine turbo-Offy-powered roadster, minus the body. A. J. Watson originally built chassis for car in which Al Herman qualified in 1960.

“Wider tires cancel out any advantage of a rear engine,” says Joe Hunt in explaining why he’s using front-engine roadster design. New rules permit tires 14 inches wide in rear.





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Quinn Epperly says it is actually a midship-mounted design and will give the driver a "better feel of the road." Epperly has been building Indy cars for 22 years.

As we went to press, among the new turbo-charged Offy engines ordered were those for Benson, Bobby Unser, Gordon Johncock, Lloyd Ruby, Bill Vukovich, Gary Bettenhausen, Wally Dallenbach, Sam Sessions, Mike Mosley, Mel Kenyon and Jim Hurtubise. The turbo-charged Offy costs \$20,500. Leo Goossen, chief designer-engineer at Dale Drake Engineering, which builds the Offy engine, commented: "There's been an extraordinary amount of orders for parts, too, indicating that some of the older Offies are being used again. Drake has reduced the Offy's displacement to 159 cubic inches, just under the 161.703-cubic-inch limit in this year's rules. The four-cylinder in-line double-overhead-cam Offy has a bore of 4.030 and a stroke of 3.125 inches. Horsepower is 625 at 8500 rpm on methanol fuel. An AiResearch turbo-charger with 17-lb. boost is used with a Hilborn fuel injection system.

The Offy, which has dominated so many Indy races for years, was first built in 1921 by Goossen, Harry Miller and Dale Drake. Louie Meyer, the famed three-time "500" winner who has been in charge of Ford's Indy engine development since 1965, joined with Drake in the engine development in 1946. What makes the Offy such a great racing engine? With nearly a half-century of experience with it, Goossen explained: "It's rugged and reliable... it has fewer parts than a V-8, is easier to work on compared to a Ford and is even less expensive."

Adams Aircraft Sales has entered a car powered by an Allison turboshaft unit with an inlet annulus area of not more than 11,999 square inches to comply with 1969 USAC regulations.

Inventor William P. Lear dropped his plans late in February to enter a steam-powered car because he said more development time was needed for the engine.

Supercharged American stock block engines have a maximum displacement of 203.4 cubic inches this year, while non-supercharged are limited to 320.355 cubic inches. Displacement of non-supercharged overhead camshaft units was left unchanged at 256.284 cubic inches.

Joining the list of stock block engines are a couple of Chevrolets with 318 cubic inches, one driven by rookie Max Dudley, a former sprint car and sports car driver, and the other entered by Frank Curtis, who has yet to choose a driver.

So Indy '69 is shaping up as one of the best in years. If it tops the fantastic last-minute failures of the gallant STP turbines in the last two 500s, it'll be some race! We'll be there to cover the action, so stay tuned for a behind-the-scenes look at what really went on at Indy. One thing's for sure: it'll be wild!