Drag Test

427 FAIRLANE

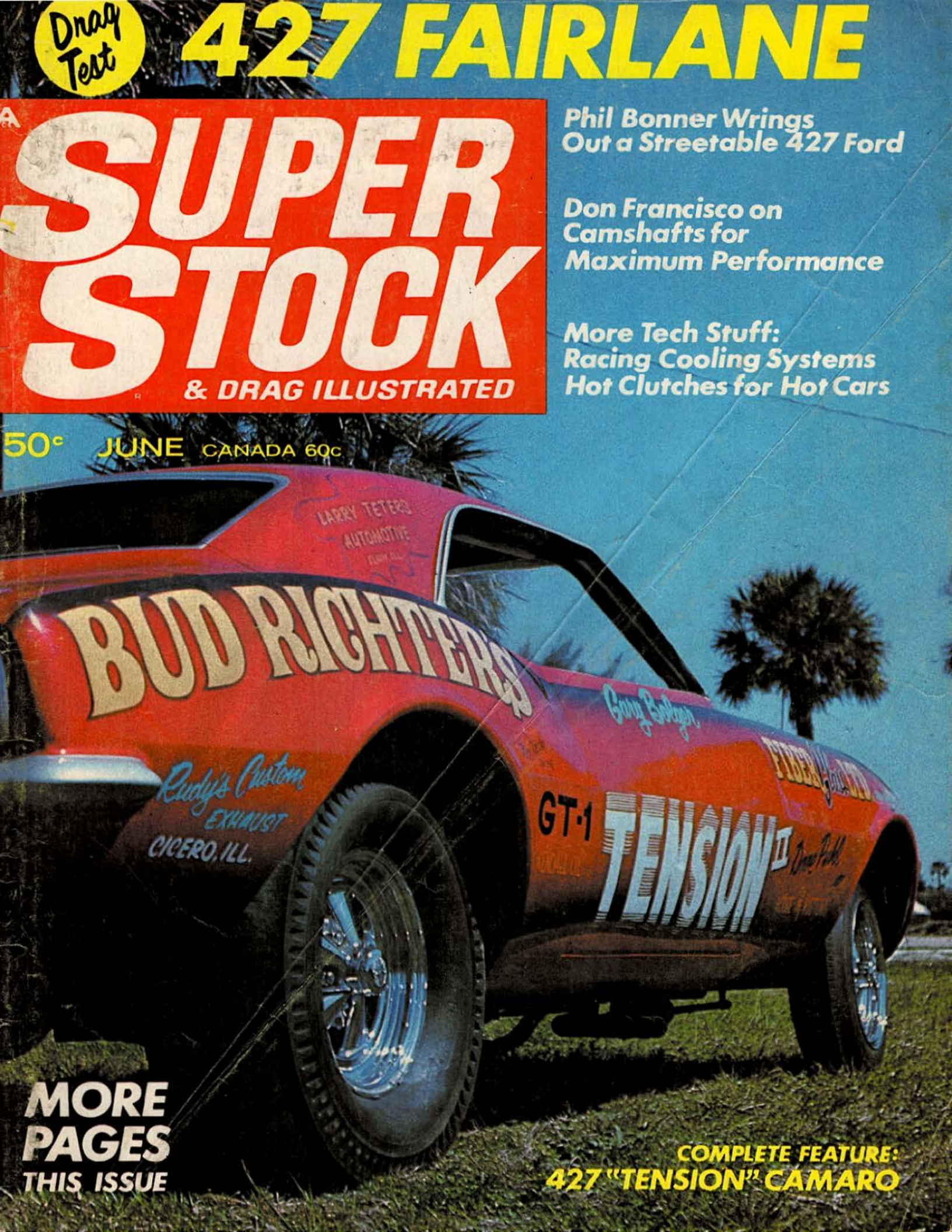
SUPER STOCK & DRAG ILLUSTRATED

Phil Bonner Wrings Out a Streetable 427 Ford

Don Francisco on Camshafts for Maximum Performance

More Tech Stuff: Racing Cooling Systems Hot Clutches for Hot Cars

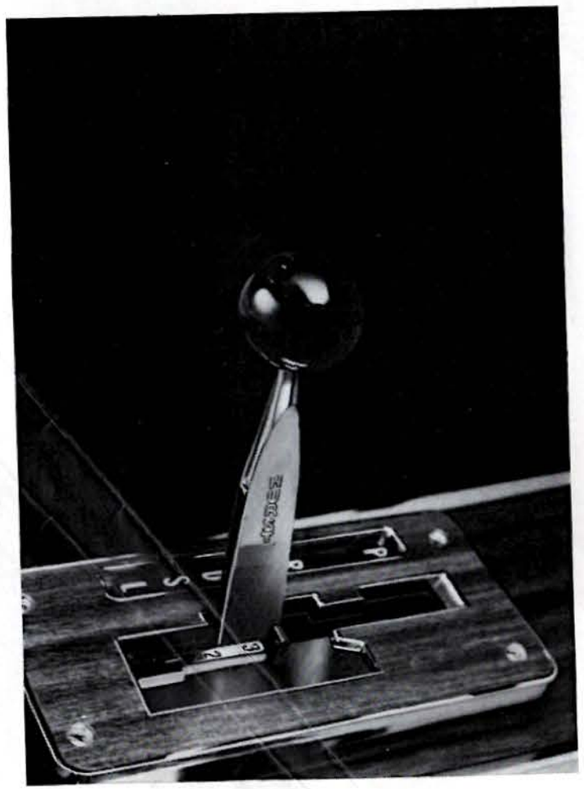
50c JUNE CANADA 60c



MORE PAGES THIS ISSUE

COMPLETE FEATURE: 427 "TENSION" CAMARO

If your "His & Hers" isn't a Hurst



it's a lot more hers than his.

Without the Hurst name on it, it's an automatic with a gimmick. An imposter that promises manual control but keeps you guessing through the automatic gears. Hurst's Dual Gate control, on the other hand, is authentic. It's strictly automatic on the left side and as precise as a fully synchronized manual control on the right.

The big difference—the thing that separates Dual Gate from the gimmicks—is Hurst's positive latching mechanism and Neutral lock-out. It takes the guesswork out of gear-changing, going up or down. There's no possibility of missing a gear. No chance of overshifting into Neutral and maybe blowing an engine.

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There are Dual Gate kits for Turbo-Hydros, Torque-flites and Cruise-O-Matics; for bench or bucket seat models, with or without consoles. Even if you're not a mechanical genius, you can pull out the imposter and replace it with the real thing in about an hour. Let us know what you drive and we'll tell you exactly what kit to get. Hurst Performance Products, Warminster, Pa. 18974.

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JUNE 23, 24, 25

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SUPER STOCK AND DRAG ILLUSTRATED

PUBLISHED MONTHLY **JUNE 1967** **VOLUME 3, NUMBER 8**

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Editor JIM DAVIS

Associate Editor ..... JIM McCRAW
Photo Director ..... LESLIE LOVETT
California Editor ..... JIM EDMUNDS
Production Director ..... RAY PARSONS
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Technical Editor ..... BILL JENKINS
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features

technical

departments

COVER

Cover Car for June is Bud Richter's beautiful Camaro. Bud's Chicago-based rig was captured on film in scenic Daytona Beach, Fla. (See page 30)

Ektachrome by Jim Davis

SHOWSTOPPER

Arnie Beswick, one of drag racing's most popular stars, is the subject of this month's centerspread. Arnie's GTO is caught in a typical run.

Ektachrome by Jim Kelly

EASTERN PUBLISHING CO., INC., ADVERTISING OFFICES: New York, Paul Haluza, 104 E. 40th St., N.Y., N.Y. 10016. Phone 212—986-4636. **Michigan,** Paul Haluza, Jr., 286 Penobscot Bldg., Detroit, Mich. 48226. Phone 313—962-1449. **Ohio,** Taylor G. Nelson, 3452 Lynnfield Rd., Shaker Hghts., Ohio 44122. Phone 216—752-7291. **Midwest,** James E. Ford, 3434 Brisbane Rd., Indianapolis, Ind. 46208. Phone 317—291-6154. **Los Angeles,** H. James Thacker, 3175 W. 6th St., Los Angeles, Calif. 90005. Phone 213—382-7344. **San Francisco,** Mike Mennell, 681 Market St., San Francisco, Calif. 94105. Phone 415—781-1061. **EASTERN RETAIL SALES REP.:** Chuck Friedman, 8 Richland Lane, Camp Hill, Pa.

Application for second class mailing permit pending at Alexandria, Virginia.

from the editor

This month we have no axes to grind, no one to chastise, no great crusades to start. We'd just like to tell you about an upcoming drag meet that has got to be the biggest and best meet ever thrown for stock cars and funny cars. We're talking about the Third Annual Super Stock Nationals, sponsored by our favorite drag mag, *Super Stock & Drag Illustrated*.

This year there'll be more of everything. More cars, more classes, more of the biggest names in the sport, more motels and restaurants to sleep in and eat in, and, perhaps best of all, more MONEY.

June 23, 24, and 25 at Cecil County Dragoway are the dates and the place. If you're there as a spectator, you'll see everybody from Allen to Yother (we couldn't think of any hotshoes whose name begins with "Z" right off. You'll see Ford, Chevies, Plymouths, Comets, GTO's, 4-4-2's, and a whole stable of fast animals such as Barracudas, Cougars, Mustangs, Stingrays, Falcons, "Kingfish," and "Bats."

If you come to the meet as a competitor, you'll be eligible for a part of the more than $40,000 in long green that awaits class winners, runners-up, *third* place, and *fourth* place, as well as eliminators. There will be money up each day

The manufacturers in the hot rod industry have posted prizes valued at $22,000, less than ten per cent of which is merchandise.

George Hurst, one of the most generous men in the speed equipment industry, is giving away $3,000 in noncontingent cash, $2,000 to Super Stock Eliminator, $1,000 to Stock Eliminator.

Cam grinder Harvey Crane is giving away $100 in contingent cash to winners in classes where cam changes are legal. That's $100 to every winner in every such class, every day.

We could go on and on about the money and merchandise that awaits competitors at the Super Stock Nationals, but it would take far more space than we have.

So, in our opinion, there's only one place to be from June 23-25 if you want to see the best in stock and funny car drags. That's the Super Stock Nationals. See you there! ■

CALIFORNIA NEWSLETTER

WILL 1967 be the year of the blown funny car? Some say it is bound to happen. Let's take a quick glance at some of the facts that lead us toward this belief.

The first and biggest factor that may start the blown trend off are the new tires. With the extra horsepower of the blown motor, there is only one reason why these cars haven't proved to be the equivalent of some of the stronger unblown funny stockers, and that is the tires. If you can't get the extra power to the ground, then you are not gaining anything by using a blower. The injected cars have been able to glue in to the track surface and use every bit of power possible and put it where it counts, to the ground! This is the big factor behind the low, low eight second runs that these cars have recorded.

But something new has been added to the tire business from Goodyear, and the blown ranks may break the unblown cars' grip on the field with these new tires. When the blown cars reach the glued-in effect that their counterparts have attained, watch out!

One other interesting feature of many of the 1967 blown match race cars is in the weight department. The "lighter the better" outlook has been built into many of the new cars. For instance, Bill Taylor's new "Kingfish" Barracuda built by Jay Howell tips the scales at 1950 lbs., while Steve Bovan's blown Camaro weighs only 1900 lbs. These light weights compare with the unblown cars and will most assuredly be a top end advantage, if they get the traction to begin with. To quote Don Nicholson, "These blown cars will be tough with the new tires." One thing's for sure, it is going to be an interesting summer in the match race field!

WEST COAST TOURERS

The east will be invaded by the largest crop of West Coast funny cars ever to leave sunny California during the warm months when match races are plentiful. During the past years, only a few dared to invade the home of the match race cars, but 1967 will be a different story.

Among some of the early birds are Tom Sturm, Tom Grove, Stone, Woods, and Cook, the Flying Dutchman, Steve Bovan, Cecil Yother, and Jack Chrisman. Before summer arrives, more than 20 will hit the road in search of riches. If they don't find the gold, they will have quite a memorable journey!

ABOVE—California Editor Jim Edmunds has been on tour with "Dyno Don" Nicholson for the past few weeks, following Don to Atlanta for the hometown unveiling of "Eliminator II" and a few runs at the Atlanta quarter. TOP—Fran Hernandez, Lincoln-Mercury Division's biggest drag racing buff, looks over the new Comet and asks Dyno for some technical info on the car, which later lost its nosepiece.

DATELINES

Long Beach, Calif. . . . "Wild" Bill Shrewsberry seems to be quite a busy driver of late. Bill has not only been behind the wheel of the L. A. Dart, but also has been doing the driving of the Bat Car. When questioned which he likes the best, Bill replied, "I would much rather be up in the air!"

ABOVE—The SOHC-powered Comet has lots of the stuff it takes to get the wheels up, and the '67 version looks even better than the original, with a bright red paint job and silver stripe. BELOW—When the '67 Comet came down with a broken nose, the '66 was brought out against Mr. Norm's Charger for a match race at Green Valley Raceway. Norm (r.) clowns.

Pasadena, Calif. . . . Steve Bovan dipped into the eight second bracket the second week out in his new blown Camaro. Bovan is still sticking with straight alcohol.

Covina, Calif. . . . Gas Ronda's new mount is nearing completion by Exhibition Engineering of Van Nuys. Ronda may run both cars during the '67 season using his old 'Stang as a back up car.

Tulare, Calif. . . . If you happen to see a brightly painted orange and white truck on the highway, keep in mind that the "California Flash," Butch Leal, has once again returned to the drag racing circle. Leal's new rig has to be one of the prettiest yet with the completely enclosed truck hiding the similarly painted Barracuda.

PONTIAC PEN PAL

Dear Sir,

I have finally gotten around to complimenting you on two items.

First, although a little late, the 2nd Annual Super Stock Nationals that was held last August on Long Island.

I traveled 350 miles to see this meet, and I am convinced that it was worth every mile of it just to see Arnie Beswick put that "obsolete" Tempest through the lights in 8.48 seconds at 170 mph.

Second, I would like to compliment you on the *bee-yoo-ti-ful* centerspread photo of the Dick Lewis GTO. I have never heard anything about this car until I saw it in your great magazine (as usual). Also, the article on Beswick's new Pontiac was the first news we have heard about the car and we were very happy to see it. This car is going to have its job cut out trying to outdo the old Tempest. What do you think?

Also, could you tell me if Arnie is campaigning both cars, or is the old one being sold, stored, or what?

Bradley Ladd
E. Braintree, Mass.

P.S. Although we will have to travel 800 miles this year, we will be in Maryland for the 3rd Annual Super Stock Nationals in June.

As far as we know, Brad, Arnie will run both cars this year. The old car is just too fast to retire. See you in June.—Ed.

"CARS, SI, CARTOONS, NO!"

Dear Sir,

I am an avid follower of the sport of drag racing and, like many others, I buy my share of magazines. There are a few which I consider to be leaders in the field that others imitate and I buy them every month. SS&DI is one of these.

I just finished reading your February issue and I felt that I should write to you and state a complaint. I can overlook an occasional misprint (page 55) or a picture that is printed backwards (page 32) but my complaint concerns content. You have a 2-page section entitled "Out 2 Lunch" by Chuck Altizer. There are some things that I find amusing in this section. I realize that you have a large and varied reading public and some may enjoy it. However, personally, I fail to see the need for two additional pages (52-53) devoted to cartoons. It appears to me that it was used merely as a filler. There are sufficient cartoon and car joke magazines on the market for those interested. Surely, you could have filled these two pages with something more substantial regarding stock-type drag machinery.

I am sure that this will be corrected in the future—if you want to remain the leader in the field that you are. *The* magazine for the whole sport, *Hot Rod*, has no unprofessional and uneducational space-takers on its pages and I expect the same policy from you.

Thank you for listening to my remarks and thank you for many enjoyable issues.

Daniel Molesky
Louisville, Ky.

We're sorry about that, Dan, and it won't happen again, at least not for quite a while. By the way, didja ever hear of a guy named "Stroker McGurk?"—Ed.

2 FUNNIES IN FULTON

Dear Sir,

Keep up the great work on funny car coverage. How about more Match Race Madness and how about an article on Gay's new Firebird. As a Pontiac and GM fan I guess he will be one of the strongest machines going this year. Also, why don't you have more articles on some of the lesser-known funny cars. We have two high-8-second funny cars in our town, a Chevy II and a Satellite and I'm sure your many readers would like to see some new faces and cars in your magazine.

Before closing, I would like to ask how the "Back-Up Pickup" steers, from the back or from the front?

Jim Hogg
Fulton, Ky.

There'll be more of everything from now on. Starting with this issue, we've added 8 more pages to SS&DI. Also, we are now preparing a series on some of the lesser-known competitors in drag racing, maybe even the two hotshoes from Fulton, Ky. The "Back-Up Pickup" is steered via the rear wheels.—Ed.

2+2=15's

Dear Sir,

I subscribe to your magazine and it's the best, no doubt, but I have one question. The road and drag tests on the Dodge R/T in your

Continued on following page

January and March issues were great as well as your article on setting up the GTO in your February issue. Tests like these are a big help to us fellows who don't have the time to drag test our cars but still like a car with a little more spice than it would have in stock condition. The only problem is that you as yet haven't tested one of the hottest numbers out of Detroit yet, this being the 390" Mustang 2+2. All of the magazines are raving about this car and its performance as a super personal car. Why don't you and your fine crew get the junp on the competitors and run a series of articles on setting up this car for the street and strip.

I would like to see this car set up first without the aid of a dragging rear end axle ratio as I think that most of your readers with this type of car do drive their cars on the street most of the time.

Let's see what you can come up with. Thanks for your time.

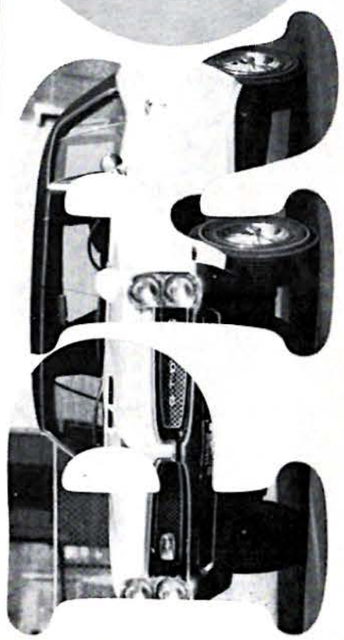
J. E. Dillon
Philadelphia, Pa.

We have not tested, and will not test a 390 Mustang because we don't

Continued on page 72

NEW PHOTO DIRECTOR

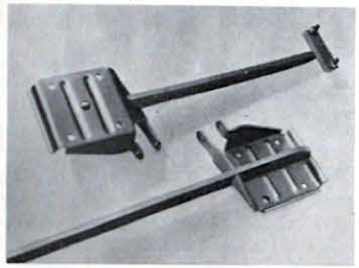
SS&DI is famous for its photo coverage of national drag events and the best cars in the country. And now we have Leslie Lovett to supervise photo operations. Leslie has covered many Nationals events for NHRA and National Dragster, was chief photographer for Southwest Raceway in Tulsa, Okla., and did freelance photography for many of drag racing's publications and racing parts manufacturers.



HOT NEW ITEMS

SCHIEFER INTRODUCES NEW DIAPHRAGM CLUTCH ASSEMBLIES

A new design, dubbed Super "Rev-Lok," by its manufacturers, the Schiefer Mfg. Co., is now available for drag racing applications. The diaphragm clutch is reported to produce constant, uniform pressures, increased torque holding capacity with no increase in pedal pressures, and zero chatter and linkage deflection. The clutch may be used on the street, and is guaranteed for life. For additional information, contact
SCHIEFER MANUFACTURING CO.
508 Monterey Pass Rd.
Monterey Park, Calif. 91754



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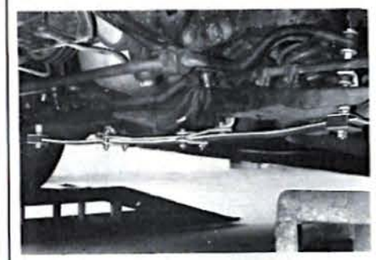
HOT NEW ITEMS



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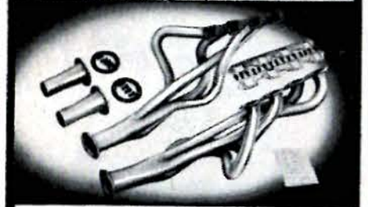

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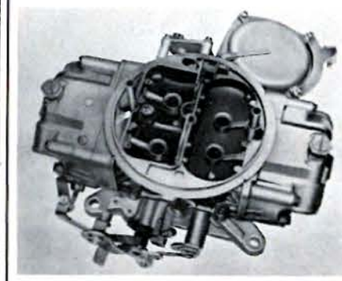
HOT NEW ITEMS



NEW 3-BARREL CARB AND MANIFOLD FOR CHEVY

Edelbrock Equipment Co. and Holley Carburetor Co. cooperated on this project. It's a 3-bbl. carburetor, offered with a specially chambered manifold, slotted to accept the wide butterfly. The manifolds and carbs are available for 283-327-350 Chevies, and will produce a 30 h.p. increase over normal 4-bbls. For more information, write:
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4921 W. Jefferson Blvd.
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Another entry into the "mag" wheel field is the "Magflite" model by Keystone Rims, Inc. The wheel has an aluminum center, which is seal-welded to the steel rim. It is guaranteed to run both tube and tubeless tires. Each wheel comes with chromed hub cover and lugs, priced at $38.95. For details, write to:
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700 E. Bonita Ave.
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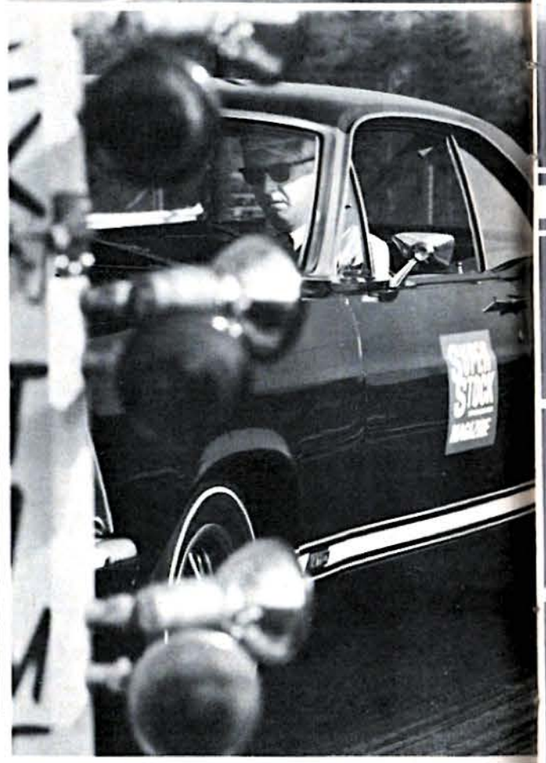
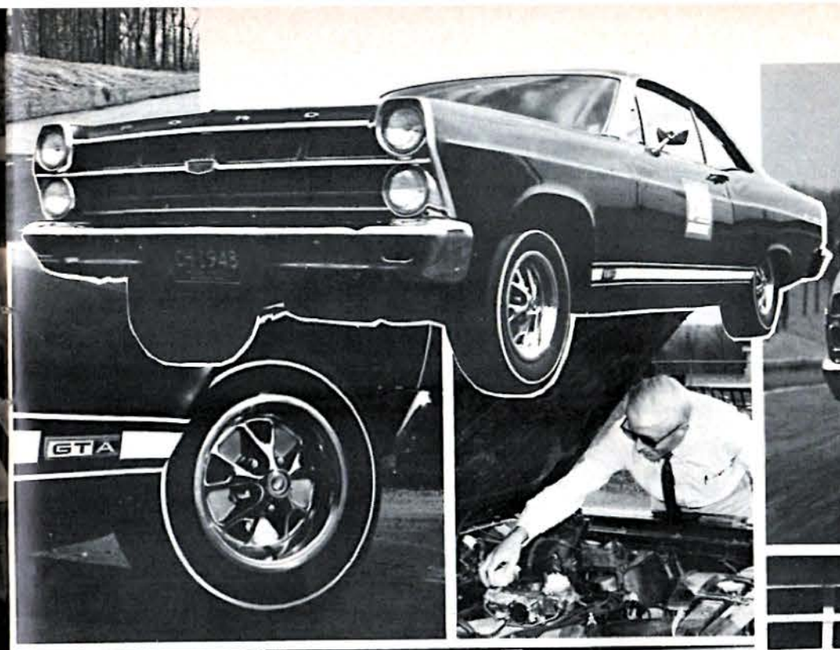
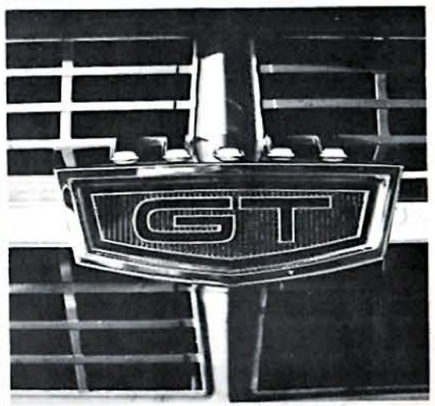






photos by Leslie Lovett

HOT! 427 FAIRLANE (THE MIND BOGGLES!)

by Jim McCraw

WE CAN'T SAY for sure, but we have a feeling that, if a nationwide poll of car buyers were taken to determine what kind of car would sell best, it would come out something like this: A car that was long, low, sleek, and beautiful, that would also park in a motorcycle-size parking space; a car that would accelerate from 0-150 in about ten seconds but still idle smoothly at 450 rpm's and get 30 miles on a gallon of regular gas; a car that would be easily set up for the drags and still be capable of winning the Le Mans 24-hour race off the showroom floor; and a car that would pump out 600 hp and have room enough in the engine compartment for air conditioning, power steering and brake pumps, and positive crankcase ventilation. All of this in one car, and all of this for under $3500.

Well, friends, it just can't be done. But the folks in Motor City aren't just sitting around, they're in there tryin', and little by little, they're getting closer.

One company in particular, Ford Motor Co., cooked up an intermediate that qualifies pretty closely to the ideal set forth above. It's a '67 Fairlane. It looks great. It's small(er). It rides like a boulevard machine. It gets respectable gas mileage. It's got a 427 cu. in. engine. Power steering. Power disc brakes. And it really hauls.

OK, OK. Now that you're breathing hard and can't wait to run down to Henry's nearest dealership, we'll let you in on a secret. You couldn't buy it at any price.

The Fairlane tested by SS&DI's stalwart staffers is a prototype, and will not be mass-produced until the '68 model year. We first heard about the project back in February at the NASCAR drags in Daytona. We invited Paul Preuss, of Ford's public relations department, to share our nice, warm car one night when the thermometer was redlined at 28 degrees. Once Paul got warmed up, and we started talking cars, he laid out the whole story for us, and we decided we just had to see and drive the big little car.

So, a few weeks later, we picked the dark green car up at Koons Ford, in Seven Corners, Va., just a few miles up the road. From the

very first minute with the car, we knew that the FoMoCo engineers had a winner.

The engine is a single-four-barrel 427 wedge with hydraulic valve lifters, and was built in the Ford Experimental Garage with off-the-shelf Ford parts, in an effort to cut costs. The only modification made to the block was drilling the galleys here and there in the tappet bores, resulting in increased oil pressure.

The cam used is the GT 390 model, with 390 pushrods and non-adjustable rocker arms. The hydraulic lifters used in the prototype are C14B truck lifters, and they work quite well, as you'll see later.

The camshaft carries an intake duration of 270 degrees, with 290 degrees on exhaust. Intake opens at 18 degrees BTC, closes at 72 degrees ABC. Exhaust opens at 82 degrees BBC, and closes at 28 degrees ATC. Other pertinent cam specifications are its .480-in. lift and 46 degree overlap. It makes for a 600 rpm idle, not too much noise, and bags of torque at all ranges.

On the lower end, there's a production cast crankshaft with 8 shiny 406 connecting rods. Back on top, we find hi-riser solid exhaust valves, medium-rise intake valves, and a production machined head, all of which can be classed as high-performance goodies.

That single quad we mentioned a little while ago is a 785 cfm Holley, slightly warmed over by Ford's Bill Holbrook, who built the prototype. Ignition system was taken right out of the 390 GT/A parts bin. It is a single-point unit, with both centrifugal and vacuum advance mechanisms operating.

Gobs and gobs of gone gases are ushered out by a set of RPO Fairlane headers, replete with an operating manifold heater, into large diameter exhausts.

Oh, yes. We forgot. It's got an automatic transmission, too. To be more specific, a C-6 Selectshift Cruise-O-Matic. To be even more specific, it's a '67 police transmission with the '66 GT/A governor (5400 rpm) and a 12-in. GT/A converter. Factory hot rod builder Holbrook tells us that the production models will probably use a different converter setup with more stall built in.

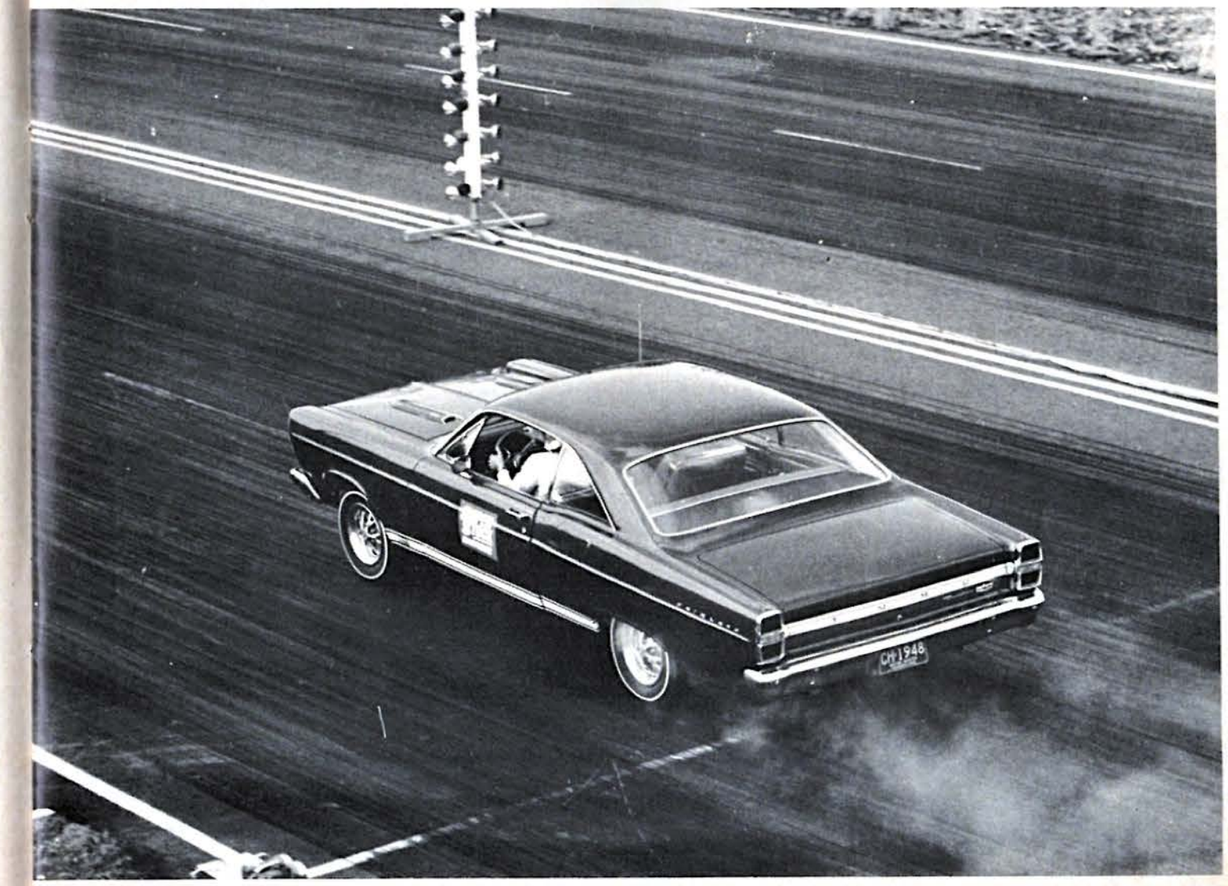
RIGHT—Just before Atlanta Phil staged, photog Leslie Lovett jumped in and grabbed this interior shot of the Fairlane. BELOW—The Ford is just about to enter traps, for a speed of 101 mph, et of 13.99. BOTTOM—Still coming, the car showed no signs of high-speed skittishness, felt strong all the way. BOTTOM RIGHT—Smile on Bonner's face shows his approval of car.

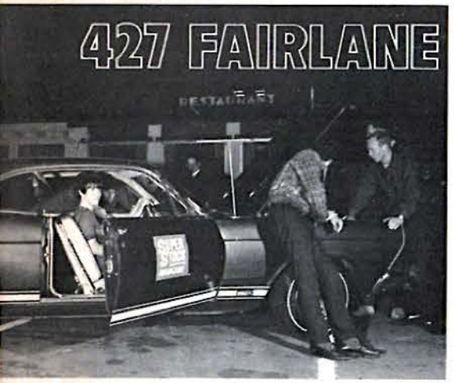
The rear end uses a 9-in. ring gear and 3.70:1 ratio, with 28-spline axles. Holbrook stated that, if they hold up under abuse, the 28's will go into the production models, but he thinks that 31-spline models will replace the 28's for added insurance. The differential is an ordinary clutch-locking unit.

The rest of the car is all standard '67 stuff, including, as we said earlier, power steering and brakes, bucket seats, console, and stereo tape player, as well as the standard safety equipment.

It's been a long time since we've been so turned on about a street-driveable automobile. Once you're seat-belted and shoulder-harnessed, and the radio's been zeroed in on a good Top Forty station, you just

LEFT—Phil's first remark after the maiden run was "What'd it turn, what'd it turn?" For a guy who's used to the 8's, he seemed pleased that the Fairlane cracked the 14's first time out. BELOW—On the second run of the test, Bonner tried bringing it off floored. The Firestone wide-ovals really burned, and the et suffered.





put it in Drive and *drive*. Around town, the 1-2 shift comes along at about 3000 rpm, and the 2-3 likewise. And there can be no doubt about shifting. It's quick, strong, and precise, every time, due to the modifications and changes made to the converter and governor.

And although the 427 is but 30 lb. heavier than the 390 it replaces, we have a feeling that the car would be a horror to drive without that nice power steering.

The suspension is standard GT/A heavy duty, and it does its work well. Perhaps too well for the cobblestone streets in our neck of the woods. But on the highway at double the speed limit, it's great.

The combination disc and drum brakes cannot be faulted. They are smooth and efficient on the street, and on the strip, after two dozen runs in rapid succession, they still had lots left over for the trip home.

By now, you should be getting the impression that we dig that car.

For the drag test portion of SS&DI's Fairlane report, we asked one of the world's best known Ford drivers, Phil Bonner, to come up from Atlanta and work the pedals for us. When we told what we had lined up for him, he caught the first available flight.

Drag test day was cloudy and cool, with a 54 degree temperature and humidity in the 80 per cent bracket. Good ol' Capitol Raceway was just drying out in the wake of one of those all-of-a-sudden early Spring rains, but the strip surface was good and dry. A preliminary weight check showed a trim 3700 lbs. with an almost-full tank, spare, and jack.

TOP OF PAGE, LEFT—The Fairlane looked externally like an ordinary 390 GT/A, but it sounded lots healthier than a 390 should sound. When a parked car draws crowds, it's something special. TOP RIGHT—Once Phil Bonner called it quits, the rest of the SS&DI staff decided to quarter-mile the car, but it was too hot to perform well. ABOVE—Interior has padded dash, visors, and steering hub, seat belts, shoulder harnesses, and positive locks.

We had neither tools, equipment, spare parts, or time, because of threatening weather, to do any tuning whatsoever, so Phil just started, staged, and went.

Before we tell you what happened, let us reveal that the car has been run repeatedly on Ford's own drag strip and high-speed test track for a couple of months now, shows 4450 miles on the odometer, and hasn't been tuned since it was built. It had four of those fine Firestone F70-14 Super Sport wide ovals on it at normal inflation pressures. And the engine was cold. There was a 15 mph headwind that lasted all day, too.

Now, where were we. We were at the starting line, with Phil Bonner leaving the car in Drive, and coming off the line at idle, no torquing. Shifts occurred at 5800 rpm. The results of that run are the best in the history of SS&DI's series of drag tests from a street engine: 13.98 seconds at 101.58 mph.

Phil Bonner himself thought it was a fluke, so he tried it again right away, with a slight variation. This time he came out with the pedal on the floor, and the Fairlane really smoked 'em. Considering all the wasted time involved in wheelspin, an et of 14.14 at 100.55 mph isn't bad. Another quickie run, back to the easy take-off technique, showed a 14.11 at 100.22 mph. Phil wanted to get back into the magic 13's, so he went right back, got a 14.19 at 99 mph. We began to get the idea that the car was a little hot, so it was shut down for about 20 minutes and packed in ice.

The ice did the trick. Phil, still using the soft technique, and still leaving the transmission in Drive, racked up a 13.99 at 101.80 mph. The next run, shifting manually produced a 14.31 at 100.33, considerably off the pace, so Atlanta Phil went right back to "stab and steer" tactics: 14.12-100.67; 14.09-100.33; 14.11-100.33; and 14.16-100.11. At this point, the transmission began to falter due to superheated fluid, and the engine was really too hot to produce. These factors, combined with a nasty-looking cloud bank moving in on us, made us call it a day.

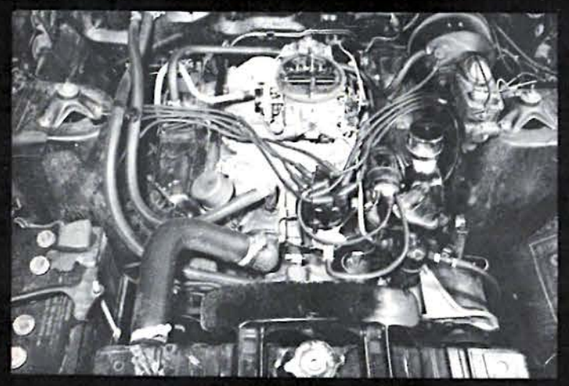
It's become a tradition, at the end of an SS&DI drag test, to make a kind of loose prediction about the subject car's potential on the drag strip. Since Phil Bonner had had more time with the car than the rest of our team, we asked him to do the honors.

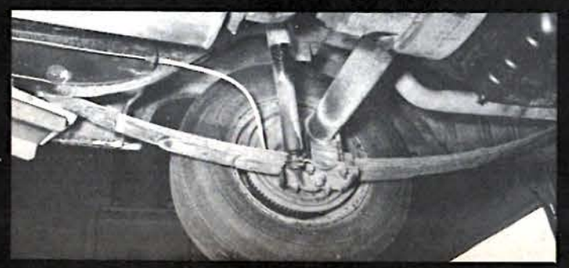
"It's really strong," he said. "With a set of 7-inch tires, and a decent tune, it should be in the twelves easily. With no options, a suspension job, and some weight taken out of it, it should go 12.8's and better at about 108 mph."

We've given you a rough idea of what to expect from Ford in 1968. As it stands now, Project 427 Fairlane is still subject to change. The car may or may not be offered with a 4-speed, which would alter the picture considerably. It may be equipped with a 3-2v setup and/or fiberglass body parts. But whatever it will be, we guarantee it to be one of the best street and strip packages ever offered. ■

FORD FAIRLANE GT/A

Body Style	2-dr. hardtop
Wheelbase	116 in.
Track	58 in. front and rear
Overall length	197.0 in.
Overall width	74.0 in.
Overall height	54.0 in.
Turning circle	41.5 ft. (manual steering)
Engine	427 cu. in. w/4-bbl.
Transmission	Police C-6 Cruise-O-Matic
Brakes	Front discs, rear drums
Front suspension	independent coil springs
Rear suspension	1-piece rear axle w/leaf springs
True weight	3700 lb.

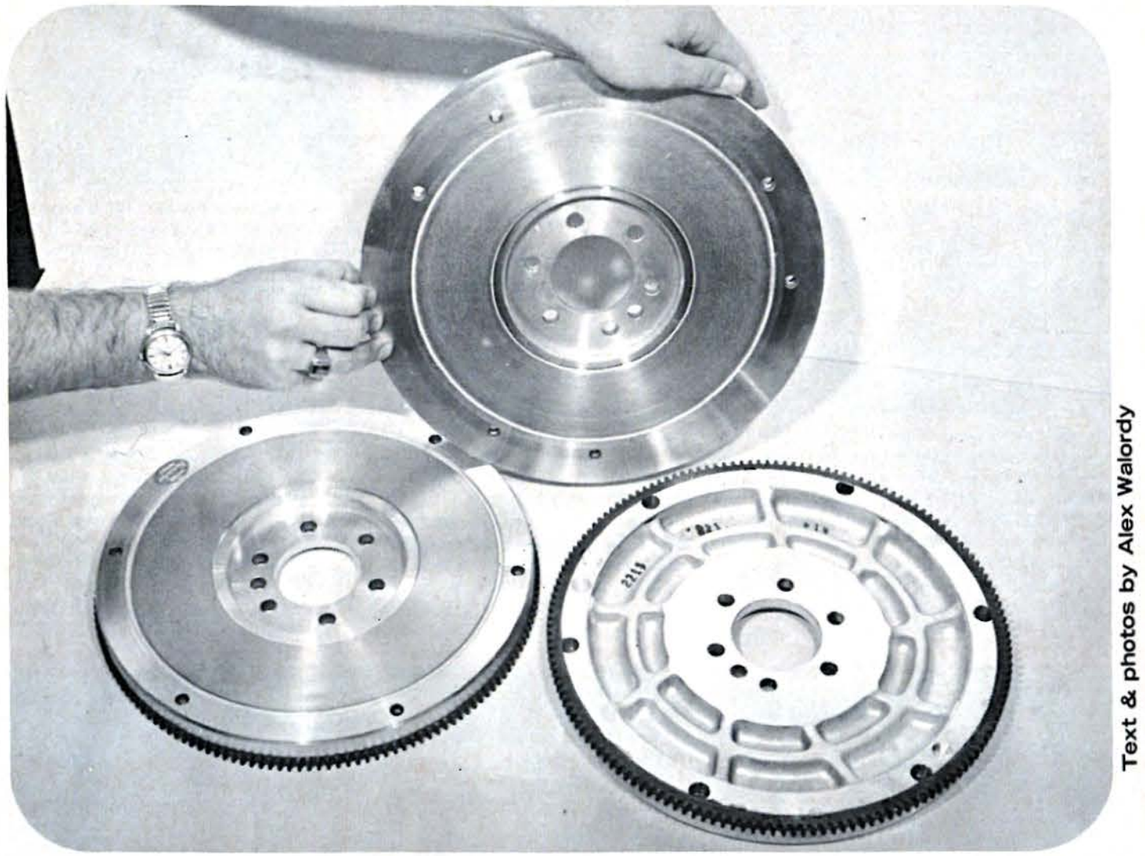




ABOVE LEFT—The prototype 427 engine is the same size on the outside as a 390, and neither engine leaves much room in the compartment for spark plug changing, though everything else can be reached fairly easily. Carb is a 785 cfm Holley 4-bbl., and ignition is single-point 390 unit. ABOVE—The front suspension is all 390 GT/A heavy duty, with disc brakes and a power steering unit thrown in. Those neat tires are Firestone F70-14 wide ovals, and they really held the road in the corners. LEFT—Rear end is a stock GT/A item, carrying a 3.70 ratio with a beefy 9-in. ring gear. This ratio allows shifts at 5800 rpm and trap rpm of 5600. Other items of note at the rear of the Fairlane project car: 4-leaf spring, heavy shocks, flared and finned brake drums for fast cooling and fade-resistance.

Tech Report

ALL ABOUT CLUTCHES



Text & photos by Alex Walordy

A CLUTCH IS there for more than just disconnecting the power so the trans can be shifted. Its primary purpose is to allow the engine to rev up to a higher point on its torque curve so there's enough power for the car to get off the starting line. In a street machine, the clutch must provide a good smooth cushioned engagement, equal in quality to the takeoff that you get from an automatic with a torque converter.

By controlling the slippage as the clutch engages, the driver is able to apply power gradually. He can also pop the clutch and smoke out, at which time the rear tires begin to act as a clutch and slip against the pavement. You have heard experienced drag racers say "This tire has too much bite for my car and I'm bogging the engine." This is quite true, for once you have popped the clutch and the engagement is completed, you still need some slippage to match high engine rpm with low car speed.

Take a peek into the clutch housing and you'll find that a pressure plate assembly, complete with a steel cover, is bolted to the flywheel. Springs inside the pressure plate cover push on a heavy pressure ring. This clamps the clutch disc between the flywheel and the pressure plate, forcing the entire assembly to turn as a unit.

Protruding from the center of the pressure plate cover are three release fingers. When you press down on the clutch pedal, linkage sets in motion a throwout fork and applies a throwout bearing against these fingers. The fingers in turn retract the pressure plate and release the pressure that clamps the clutch disc against the flywheel. The power flow is now interrupted. As soon as you release the clutch pedal again, the throwout bearing backs away from the release fingers and allows the clutch to re-engage.

The clutch shaft, or transmission input shaft has a series of splines, on which rides the hub of the clutch disc. Thus, the clutch disc can slide forward or back, but always remains mounted on the splines and must turn with the trans input shaft. The front of the clutch has a machined nose which rides on a pilot bearing, and the rear of the input shaft is supported by the front transmission bearing. This, in a nutshell, completes the clutch assembly.

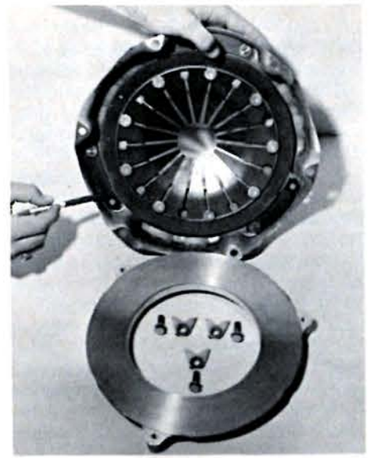
In a stock passenger car, the flywheel and the pressure plate are made of a high grade cast iron, and once spun up to sufficient speeds, they have a nasty habit of bursting. Also, cast iron parts are heavy, which hurts acceleration. But it has little effect on top speed.

For racing purposes, you are much better off with a flywheel and pressure plate that are designed for the job and will not burst.

Paul Schiefer, the biggest name in racing clutches today, gave us countless tips and hints on how to make clutches live longer and how to pick the right one for your particular application. Schiefer's specialties, of course, are forged aluminum flywheels and forged pressure plate rings, both made of 6061 T-6 aluminum alloy. The 'wheel is forged in four separate operations, and is so strong that one testing company spun a 13½-in. Schiefer wheel up to 28,000 rpm before it let go.

Aluminum cannot resist scoring and wear as well as cast iron and therefore needs a protective coating that will withstand repeated clutch engagements. Schiefer developed a special metal spraying procedure which applies a .050-in. coating of steel and copper to the aluminum. The copper and aluminum help carry away heat and the steel provides excellent gripping power. In operation, this coating checks slightly and this further increases the gripping power between the flywheel and the pressure plate, and the clutch facings.

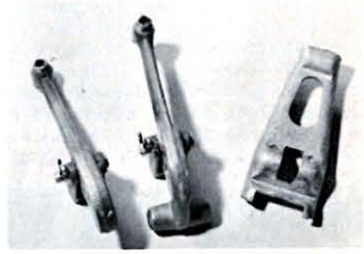
There are several types of pressure plates in common use. Most popular is the one made by Long. You can recognize it by its nine springs, three between each pair of release levers. Most of the Long clutches nave a small bob weight at the end of each lever. Centrifugal force forces the bob weights outward, increasing the pressure against the clutch plate. This enables the clutch to handle higher torque with less spring and pedal pressure.



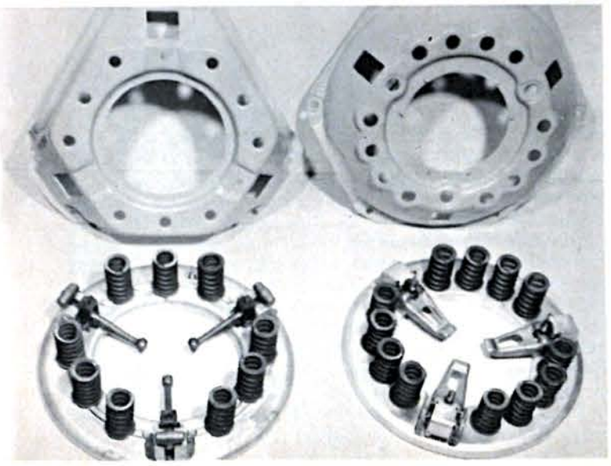
ABOVE—The Schiefer Rev-Lok clutch setup uses a diaphragm spring to apply even pressure all over the cover. Three straps relay engine torque to the pressure plate from the cover assembly.

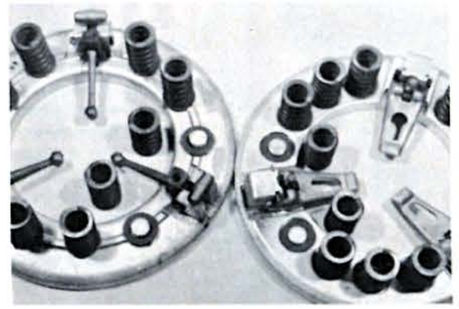
While this works very well, when you have a three-speed out on a highway it can be a mixed blessing when it comes to throwing fast shifts, simply because the bob weights increase the pressure on a pressure plate with the square of the rpm. When you now try to disengage the clutch, you must not only push harder on the pedal, but all the linkage is subjected to considerable additional strain and deflections. As a result, the fingers bend and there isn't enough clutch release travel. The clutch drags and you miss a shift.

Schiefer solves this problem by installing a different type of release lever where necessary, without the bob weights, and the shifts again become butter smooth. The Long units that Schiefer builds are not merely rebuilts. They are, for all practical purposes, a new type of clutch. For instance, Schiefer makes his own stampings of 11 guage steel



ABOVE—Fast shifts can be had by using a Long lever without weight or a B&B lever to reduce the centrifugal locking action. BELOW—Long release levers are bolted to the cover, pins stick out.





LEFT—The 9-spring clutch (l.) is a Long model, while the 12-spring unit is a Borg & Beck design. The B&B clutch was made for use in Chevrolets and other General Motors cars. ABOVE—Schiefer makes his own forged aluminum pressure plate rings and countersinks the spring seats to make room for heat-resistant washers. This way, heat won't affect the springs.

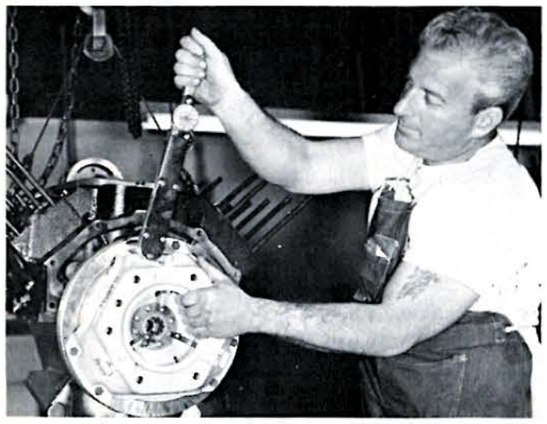
instead of 12 guage as used on the Longs and provides more metal in the cover bolt areas which allows him to replace 5/16 bolts with 3/8 ones at the points where the cover is bolted to the flywheel. The pressure plate ring itself is forged, just like the flywheel, and made of the same stern stuff. A heavier pressure plate cross section than in the stock clutch helps resist distortion due to the stiffer clutch springs. Another very popular plate is the Borg and Beck.

Unlike the Long's nine springs, the B&B has 12 springs and its release fingers are made of stamped steel rather than forged. This plate is slightly smaller in diameter than the Long and is used on a number of GM cars, particularly Chevy. Unfortunately a stock GM bell housing does not allow enough room for the installation of a Long pressure plate. On the other hand, many of the replacement scatter shields *will* accommodate a Long. Since the Borg and Beck does not use bob weights, it is quite suitable for fast shifts.

A number of cars use a diaphragm pressure plate. Here, a single large diaphragm spring replaces not only the coil springs but also the release fingers. The plate is retained against the diaphragm by three clips and the torque input from the pressure plate cover is transmitted by three flexible straps to the pressure plate ring. In the spring-type clutch covers such as the Long and B&B, the pressure plate ring bosses protrude through the cutouts in the cover and act as driving lugs.

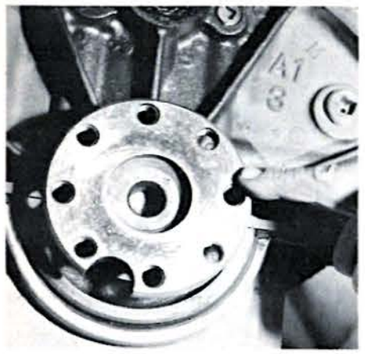
the cone tends to reverse its shape somewhat like the metal on top of a tin can clicks in and out. This cuts down the release pressure but makes it more sensitive to excessive disengagement travel than most spring clutches. The extra travel contributes in a large way to the clutch hanging open. In a conventional finger release clutch, this travel can result in bent parts and weakened springs. This means that the stops at the pedal should be adjusted to limit the travel to whatever is specified for the pressure plate.

When adjusting any clutch, make sure that the throwout bearing is clear of the release fingers, with the clutch fully engaged and the pedal up. You cannot go by the free travel of the pedal, because this can often



CLUTCHES

ABOVE LEFT—Engine builder Ed Pink, a guy who builds 'em by the book, puts the finishing touches on a clutch installation with a torque wrench. This is a twin-disc installation, with sintered iron discs. ABOVE RIGHT—Clutch manufacturers use many kinds of construction and finishing techniques on their products, depending on their end uses. Schiefer racing clutches are specially coated for long wear and good adhesion. Steel and copper wire are fed to a special gun that sprays molten metal on the pressure plate surface. The resulting surface will withstand many high-rpm shifts.



ABOVE—There's always a lot to do before the job can even be started. Before installing a flywheel, be sure to true up the crankshaft flange so that the flywheel will run true. Check for nicks and burrs on the flange, check runout with a dial gage.

The diaphragm has several advantages, such as simplicity and low release pressures. It also maintains the rated pressure through a substantial portion of the clutch disc wear while the spring-type looses pressure with disc wear. The pressure is applied equally, all around the pressure ring, instead of at localized spring areas.

On the minus side, the stock diaphragm tends to hang open at high rpm in the middle of a shift and just won't re-engage. This is due to the action of centrifugal force on the center fingers of the diaphragm spring. Schiefer corrects this problem by using a different spring and a different fulcrum (pivot) ring location.

A diaphragm spring is shaped like a cone. When fully depressed, be caused by sloppy linkage. Usually, there is a small spring that ties the throwout fork to the remainder of the linkage. To check for free play at the throwout fork, disconnect the spring and you can feel if the bearing is able to back away from the release fingers or from the center of the diaphragm spring.

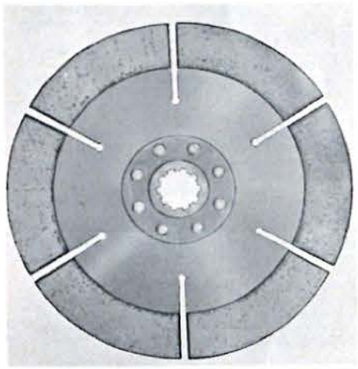
With any semi-centrifugal clutch, such as the Long, with the bob weights, you have to allow spare clearance between the bearing and the release fingers. Otherwise, as the weights go into action, the fingers will continuously ride against the bearing. Keep in mind that any motion at the weights is multiplied by four or five times due to the leverage in the release fingers, so you need at least 1/4 to 3/8 of an inch clearance at the throw-

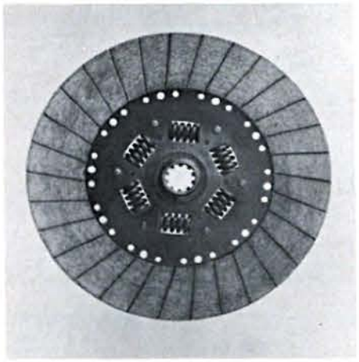
out bearing.

If a clutch will not release adequately, you'll grind gears, wear out synchros, and miss shifts. If you find slippage, try increasing the free play at the pedal. If you already have good free play, further adjustments will not help.

Worn clutch linkage can pose a problem because it is inconsistent. You can either replace the worn parts with new ones, or have the holes welded shut and redrilled. Or, you can spot weld pivot points and file them into shape.

Installing a new clutch and flywheel does not involve any special mechanical genius, but there are a number of items to watch for. For instance, the steel bolts that retain the flywheel are made of special high grade steel. If you use bolts





LEFT—Solid hub disc with a bonded sintered iron facing is used mostly on fuelie cars and is too harsh for street use. BELOW LEFT—A conventional spring hub cuts down on initial shock loads and cuts chatter. This one mates with bonded facing and solid disc.

out of your scrap bin to replace them, they are bound to fail, so don't use them. You will be better off with new original equipment bolts or high grade replacements such as Schiefer sells with his clutches. The flywheel flange, as well as the end of the crank, must be clean and free of nicks and burrs that would pop the 'wheel and make it run out of true. The threads on a flywheel bolt should be coated with Loctite or a similar compound before installing to keep them in place.

When the clutch is replaced, it pays to replace the pilot and throwout bearings, if they show any signs of wear. A bad pilot bearing won't align the clutch shaft properly, and a defective throwout bearing will wear out the release fingers or the diaphragm. These parts are far more expensive than the bearings, too.

When you install the clutch, first check the markings on the clutch plate to see which portion of it must face forward. Any finger prints and grease on the clutch facing or the mating faces will burn into the friction material causing chatter and slippage, so keep your fingerprints off.

The clutch and pressure plates are held up with one hand, while you install the cover-to-flywheel bolts. Never use lock washers or star washers under the cover bolts, because both break easily and lose tension. Use either flat washers or serrated washers such as Schiefer provides with his clutches.

An old clutch shaft of the same type as you have in your transmission will do a very nice job of aligning and centering the clutch plate with respect to the pilot bearing. This will save much unnecessary struggling with the transmission during installation. Never let the transmission hang by the clutch shaft while you are struggling to get it up there, simply because the extra weight and the long leverage is enough to bend a clutch plate and force it out of shape. One man can handle most current transmissions by sliding under the car on a creeper and pulling the trans first across his chest and then straight up and in. This will work on almost anything except the old overdrives in a cramped location.

If you have had the engine and clutch assembly balanced, always mark the pressure plate and flywheel with a couple of punch marks so that you can reinstall them in the same position. If the bolt holes in the pressure plate cover are loose, you can stake them with a flat punch, making them slightly smaller. As the bolt pulls in, it re-sizes the hole and gives perfect alignment. Never tighten cover bolts all the way, but rather pull them in evenly all around. It takes a little extra turning of the flywheel, but prevents the cover from getting sprung out of shape. The capscrews, incidentally, should be torqued, and the recommended torque values that Schiefer gives are 35 ft.-lb. for 5/16 bolts, 40 ft.-lb. for 3/8 bolts and 70 ft.-lb. 7/16 flywheel bolts. Half inch flywheel bolts call for 90 ft.-lb.

You have quite a choice and variety in selecting a clutch plate for your particular application. The one used most commonly for street use has a spring hub and riveted facings with a high grade molded material. The spring hub cushions the initial shock loading and helps damp out some types of gear noises and vibration. Mounting the facings on a set of slightly curved spring sections helps cushion the engagement and makes it more suitable for street use. This street-type clutch is fairly heavy, and does impose an additional load on the synchronizer blocker rings.

The next step up the line is a clutch disc with a spring hub but bonded facings. Since the facings are bonded to a flat disc, they have a much more rugged support base than a riveted facing and stand up longer under hard use. On the other hand, they do not have any cushioning action and so the clutch operates in a much rougher fashion; great for clutch-poppers, but not much for smooth starts.

For all-out dragging, you can use a solid hub, which is much lighter than a spring hub, and this will speed up the shifts, especially when used with bonded facings. It is definitely not a plate for street use.

Tops among heavy duty clutches is the Schiefer twin disc. Here, two plates, with a floater plate between, are used to relay the engine torque. Since two discs double the number of engagement surfaces when used with the floater plate, twice the amount of torque can be transmitted with the same pressure plate spring loading. This is particularly important for a big fuel dragster, or a direct-drive funny car. However, two discs, even though they have solid hubs, impose a considerable drag and inertia action on the blocker rings and are generally considered unsuitable. FoMoCo does use a twin-disc clutch of their own design, and the drivers generally either slip shift or replace blocker rings every time the transmission is down, but then, twin discs are big league. ■

awards

Third Annual Super Stock NATIONALS

Sponsored by SUPER STOCK MAGAZINE

SUPER ELIMINATOR
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Mickey Thompson Equipment Co. ..... $500.00 (Contingent – Pistons & Rods)
Cragar Industries ..... $200.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $100.00 (Contingent)
The Pennzoil Company ..... $250.00 (Contingent)
Valvoline Oil ..... $250.00 (Contingent)
The Kendall Refining Co. ..... $250.00 (Contingent)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Doug's Headers ..... $300.00 (Contingent)
Buco Products ..... $100.00 (Contingent)
Super Stock Magazine ..... $750.00 (Cash Awards)

SUPER ELIMINATOR (Runnerup)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Super Stock Magazine ..... $400.00 (Cash Award)

SUPER STOCK ELIMINATOR
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Casler Tire Company ..... $300.00 (Contingent)
Hooker Header Company ..... $300.00 (Contingent)
Mickey Thompson Equipment Co. ..... $300.00 (Contingent – Tires)
Mickey Thompson Equipment Co. ..... $300.00 (Contingent – Headers)
Trenton Speed Shop ..... $ 50.00 (Service Certificate)
Cragar ..... $200.00 (Contingent – Wheels)
The Pennzoil Company ..... $250.00 (Contingent)
Valvoline Oil ..... $250.00 (Contingent)
The Kendall Refining Co. ..... $250.00 (Contingent)

Schiefer Manufacturing Co. ..... $92.00 (Mdse) (Schiefer Rev-Lok)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Doug's Headers ..... $300.00 (Contingent)
Hurst Perf. Products ..... $2000.00 (Non-Contingent)
Buco Products ..... $100.00 (Contingent)
Edelbrock Equipment Co. ..... $100.00 (Mdse) (1 Single Quad Hi-Riser Manifold)

SUPER STOCK ELIMINATOR (Runnerup)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Edelbrock Equipment Co. ..... $100.00 (Mdse) (1 Single Quad Hi-Riser Manifold)
Super Stock Magazine $200.00

STOCK ELIMINATOR
Casler Tire Company ..... $200.00 (Contingent)
Hooker Header Company ..... $200.00 (Contingent)
Mickey Thompson Equipment Co. ..... $200.00 (Contingent – Tires)
Mickey Thompson Equipment Co. ..... $200.00 (Contingent – Headers)

Trenton Speed Shop ..... $ 50.00 (Service Certificate)
Hank's Speed Shop ..... $ 50.00 (Merchandise Certificate)
Cragar ..... $200.00 (Contingent – Wheels)
The Pennzoil Company ..... $250.00 (Contingent)
Valvoline Oil ..... $250.00 (Contingent)
The Kendall Refining Co. ..... $250.00 (Contingent)
Schiefer Manufacturing Co. ..... $92.00 (Mdse) (Schiefer Rev-Lok)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Hurst Perf. Products ..... $1000.00 (Non-Contingent)
Buco Products ..... $100.00 (Contingent)

STOCK ELIMINATOR (Runnerup)
Air Lift Company..Retail Value to $59.50 (Mdse) (Air Lift Kit)
Super Stock Magazine $100.00

FRIDAY, JUNE 23, 1967

UNLIMITED CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
Semi-Final Losers
Super Stock Magazine ..... $ 75.00 (Cash Award)

2000-lb, (Fuel) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

2400-lb. (Fuel) CLASS WINNER
(Cash Award)
SEMI-FINAL LOSERS
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

2400-lb, (Gas) CLASS WINNERS
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

2700-lb, (Gas) CLASS WINNERS
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $350.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

3000-lb, (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Super Stock Magazine ..... $350.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

SS/A CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
SS/B CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
SS/C CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)

SS/D CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
SS/E CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
SS/AA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Honest Charlie Speed Shop. ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
SS/BA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Honest Charlie Speed Shop. ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
SS/CA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Honest Charlie Speed Shop. ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
SS/DA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
SS/EA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
A/S CLASS WINNER
To be announced
B/S CLASS WINNER
To be announced
C/S CLASS WINNER
Cyclone Automotive Products. ..... $53.50 (Mdse) (1 Set "Traction Grabber" Traction Bars)
D/S CLASS WINNER
Cyclone Automotive Products. ..... $53.50 (Mdse) (1 Set "Traction Grabber" Traction Bars)
E/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
F/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
G/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)

H/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
I/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
J/S CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)
K/S CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)
L/S CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)
M/S CLASS WINNER
To be announced
N/S CLASS WINNER
To be announced
A/SA CLASS WINNER
To be announced
B/SA CLASS WINNER
To be announced
C/SA CLASS WINNER
Cyclone Automotive Products. ..... $53.50 (Mdse) (1 Set "Traction Grabber" Traction Bars)
D/SA CLASS WINNER
To be announced
E/SA CLASS WINNER
To be announced
F/SA CLASS WINNER
To be announced
G/SA CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)
H/SA CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)
I/SA CLASS WINNER
Buco Products ..... $36.75 (Mdse) (1 Buco Sptsman Helmet)

SATURDAY, JUNE 24, 1967

UNLIMITED CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc. ..... $50.00 (Mdse) (Merchandise Certificate)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
Semi-Final Losers
Super Stock Magazine ..... $100.00 (Cash Award)

2000-lb. (Fuel) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc. ..... $50.00 (Mdse) (Merchandise Certificate)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
Semi-Final Losers
Super Stock Magazine ..... $100.00 (Cash Award)

2400-lb. (Fuel) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc ..... $50.00 (Mdse)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)
Semi-Final Losers
Super Stock Magazine ..... $ 75.00 (Cash Award)

2400-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc. ..... $50.00 (Mdse) (Merchandise Certificate)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $200.00 (Cash Award)

2700-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc. ..... $50.00 (Mdse) (Merchandise Certificate)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

3000-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
A & A Engineering, Inc. ..... $50.00 (Mdse) (Merchandise Certificate)
Doug's Headers..Retail Value to $175.00 (Mdse) or $100.00 (1 Set of Headers or Cash if running Doug's)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNERUP
Simpson Drag Chutes/Safety Equipment ..... $15.95 (Mdse) (Simpson Race Bag)
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

SS/A CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Hooker Header Company ..... $150.00 (Mdse) (1 Set of Headers)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Honest Charlie Speed Shop ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/B CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Mickey Thompson Equip. Co. ..... $150.00 (Mdse) (1 Set of Headers)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Honest Charlie Speed Shop ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/C CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Mickey Thompson Equip. Co. ..... $150.00 (Mdse) (1 Set of Headers)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Honest Charlie Speed Shop ..... $100.00 (Mdse) (Contingent – Merchandise Certificate)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/D CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Schiefer Manufacturing Co. ..... $92.00 (Mdse) (Schiefer Rev-Lok)
Ed Iskenderain Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/E CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Schiefer Manufacturing Co. ..... $92.00 (Mdse) (Schiefer Rev-Lok)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/AA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Mickey Thompson Equip. Co. ..... $150.00 (Mdse) (1 Set of Headers)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/BA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Hooker Header Company ..... $150.00 (Mdse) (1 Set of Headers)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/CA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/DA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1-Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

SS/EA CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Ed Iskenderian Racing Cams ..... $95.00 (Mdse) (1 Z-50 Hi-Rev Cam)
Super Stock Magazine ..... $ 50.00 (Cash Award)

A/S CLASS WINNER
Cyclone Automotive Products ..... Retail Value to $157.50 (Mdse) (1 Set Competition 4-Tube Headers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

B/S CLASS WINNER
Cyclone Automotive Products ..... Retail Value to $157.50 (Mdse) (1 Set Competition 4-Tube Headers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

C/S CLASS WINNER
Mickey Thompson Equipment Co.. Retail Value to $35.00 (Mdse) (1 Set Valve Covers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

D/S CLASS WINNER
Casler Tire Company ..... $59.90 (Mdse) (1 Set Racing Tires)
Super Stock Magazine ..... $ 25.00 (Cash Award)

E/S CLASS WINNER
Mickey Thompson Equipment Co.. Retail Value to $35.00 (Mdse) (1 Set Valve Covers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

F/S CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

G/S CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

H/S CLASS WINNER
Hank's Speed Shop ..... $25.00 (Mdse) (Merchandise Certificate)
Super Stock Magazine ..... $ 25.00 (Cash Award)

I/S CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

J/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
Super Stock Magazine ..... $ 25.00 (Cash Award)

K/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
Super Stock Magazine ..... $ 25.00 (Cash Award)

L/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
Super Stock Magazine ..... $ 25.00 (Cash Awards)

M/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
Super Stock Magazine ..... $ 25.00 (Cash Awards)

N/S CLASS WINNER
Schiefer Manufacturing Co. ..... $30.00 (Mdse) (1 Schiefer Bonded Clutch Disc)
Super Stock Magazine ..... $ 25.00 (Cash Award)

A/SA CLASS WINNER
Cyclone Automotive Products ..... Retail Value to $157.50 (Mdse) (1 Set Competition 4-Tube Headers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

B/SA CLASS WINNER
Mickey Thompson Equipment Co.. Retail Value to $35.00 (Mdse) (1 Set Valve Covers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

C/SA CLASS WINNER
Casler Tire Company ..... $59.90 (Mdse) (1 Set Racing Tires)
Super Stock Magazine ..... $ 25.00 (Cash Award)

D/SA CLASS WINNER
Mickey Thompson Equipment Co.. Retail Value to $35.00 (Mdse) (1 Set Valve Covers)
Super Stock Magazine ..... $ 25.00 (Cash Awards)

E/SA CLASS WINNER
Mickey Thompson Equipment Co.. Retail Value to $35.00 (Mdse) (1 Set Valve Covers)
Super Stock Magazine ..... $ 25.00 (Cash Award)

F/SA CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

G/SA CLASS WINNER
Hank's Speed Shop ..... $25.00 (Mdse) (Merchandise Certificate)
Super Stock Magazine ..... $ 25.00 (Cash Award)

H/SA CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

I/SA CLASS WINNER
Super Stock Magazine ..... $ 25.00 (Cash Award)

SUNDAY, JUNE 25, 1967

UNLIMITED CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Anderson Industries, Inc. ..... $25.00 (Mdse) (NASCAR approved Fiberglass Seat w/Stand)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNER-UP
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $100.00 (Cash Award)

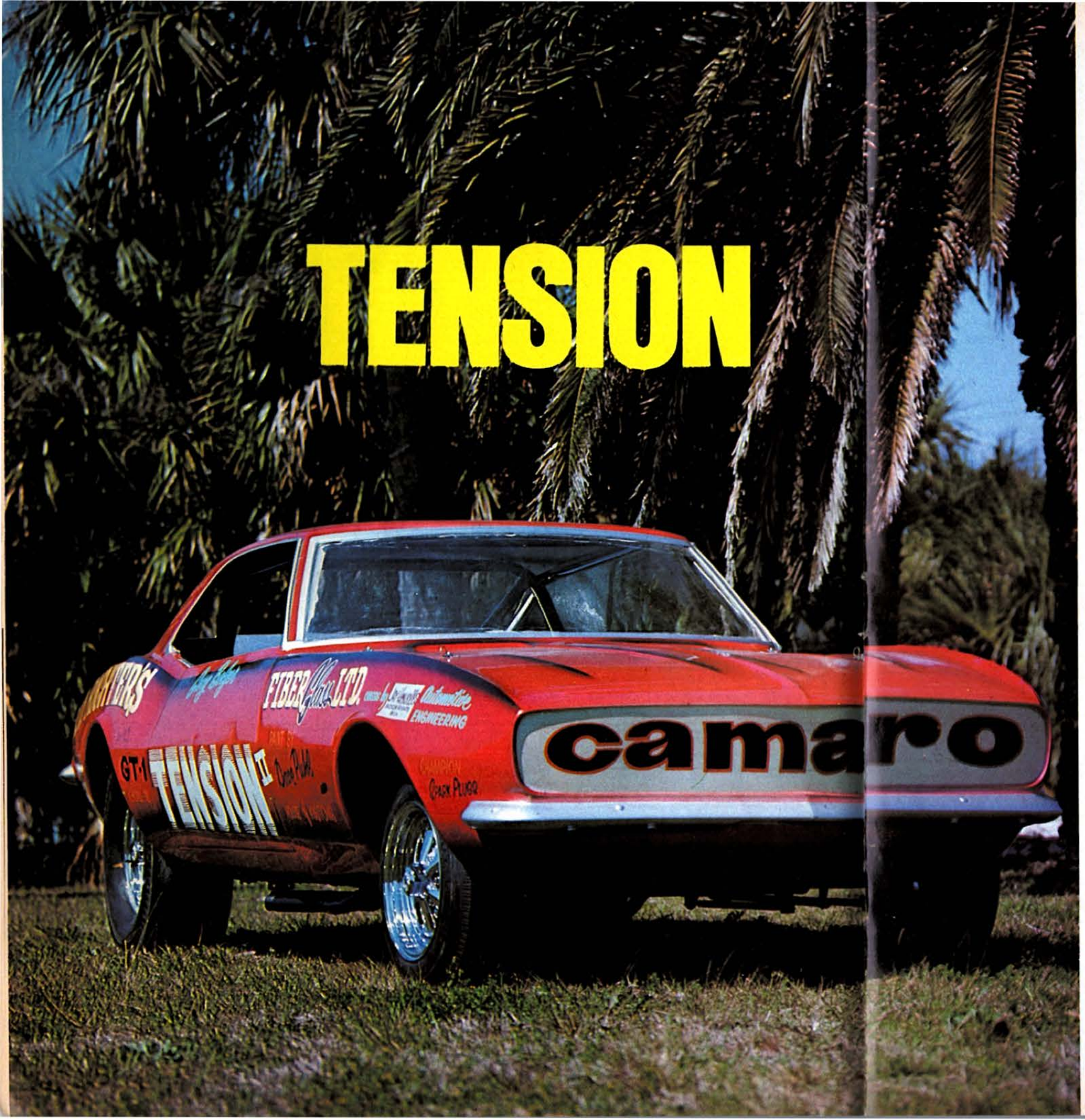
2000-lb. (Fuel) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Anderson Industries, Inc. ..... $25.00 (Mdse) (NASCAR approved Fiberglass Seat w/Stand)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNER-UP
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

2400-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Anderson Industries, Inc. ..... $25.00 (Mdse) (NASCAR approved Fiberglass Seat w/Stand)
Super Stock Magazine ..... $500.00 (Cash Award)
RUNNER-UP
Super Stock Magazine ..... $200.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

2700-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Anderson Industries, Inc. ..... $25.00 (Mdse) (NASCAR approved Fiberglass Seat w/Stand)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNER-UP
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

3000-lb. (Gas) CLASS WINNER
Crane Engineering Co., Inc. ..... $100.00 (Contingent)
Simpson Drag Chutes/Safety Equipment ..... $ 25.00 (Contingent)
Anderson Industries, Inc. ..... $25.00 (Mdse) (NASCAR approved Fiberglass Seat w/Stand)
Super Stock Magazine ..... $400.00 (Cash Award)
RUNNER-UP
Super Stock Magazine ..... $150.00 (Cash Award)
SEMI-FINAL LOSERS
Super Stock Magazine ..... $ 75.00 (Cash Award)

TENSION



Tense? Nervous? Who wouldn't be, looking into the face of this wild, beautiful beast? The "Tension's" just beginning . . .

by Jim McCraw

CHEVROLET introduced its Camaro in the autumn of last year, offering a 396 cu. in. engine as the top power package. A few dealers around the country reasoned that, since the 396 and 427 in. engines are externally the same size, they could offer 427 Camaros as dealer-built options. And still another group saw immediately the Camaro's possibilities as a funny car, with the 427, fiberglass body, and all.

One of the first funny Camaros to hit the drag strip was that of Bud Richter, a young Algonquin, Ill., mechanic who's been racing Chevies of all shapes and sizes for over seven years now. Starting out with a tri-carb 348-engined '58 Chevy, Bud progressed to a '64 Z-11 Chevelle, a '65 Chevy II with a 489 cu. in. Z-11, and a '66 Chevy II 427. This last stormer had a best-ever et of 9.20 on fuel.

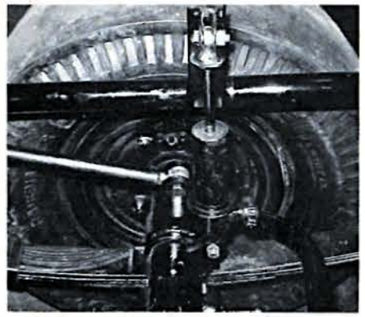
So, when the Camaro was introduced, Richter got together with Jay Howell at Howell's Madison Heights, Mich., chassis shop, and plans were laid for a new edition of "Tension II."

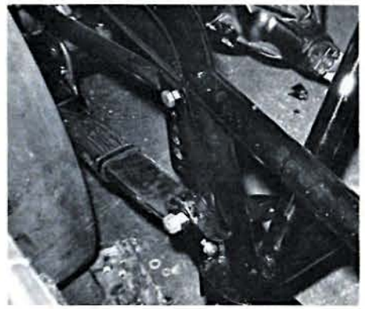
The main tubes of the Camaro's chassis are of 1.75-in. chrome moly steel, built to a wheelbase of 120 in., just about a foot longer than stock. Front and rear tread measure 56 in., slightly narrower than stock. That will be the last time the word "stock" will be used until we get around to the engine, since just about everything else has been changed around for the better.

Front suspension consists of a straight tube axle by Howell, Monroe spring shock units, radius rods, and '51 Anglia spindles. At the rear is a very neat, very strong setup that should withstand lots and lots of banzai runs without complaining. The suspension is built around a hefty Pontiac positive traction rear, with a pair of 4-leaf springs to hold it in place. These are aided by a pair of English-made adjustable shocks, running from the top of the housing to their forward mounts are a set of short, beefy control bars. Forward attaching points for these are adjustable, with five bolt holes to choose from. From the trans, a 24½-in. Old driveshaft spins back to the ring and pinion, carrying a ratio of 3.64 to 1.

Steering is via a Corvair unit, and stopping is accomplished by Olds rear brakes, metallic-lined, and a 14-ft. Simpson crossform 'chute. Front skins are 5.40x15 Firestones, and the rears are 10.50x15 M&H slicks. All four tires are wrapped around Cragar mags.

photos by Jim Davis



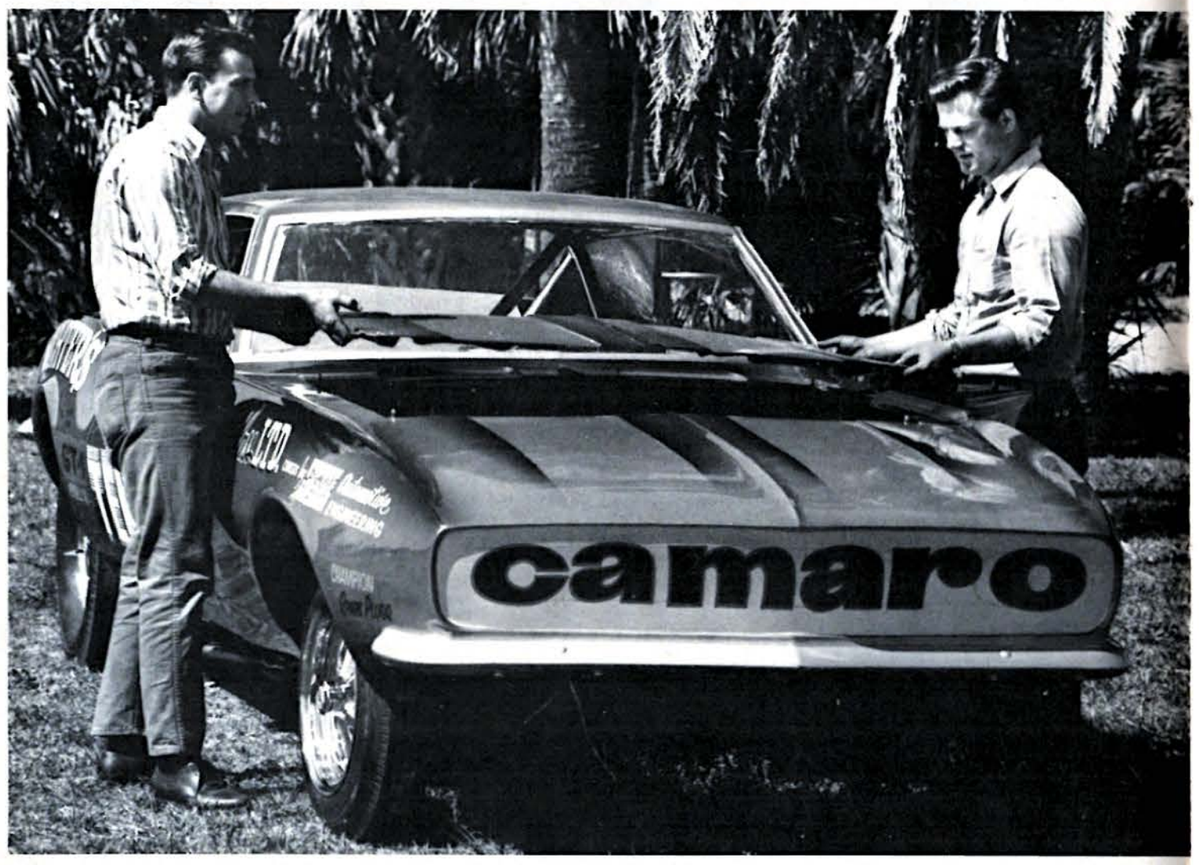


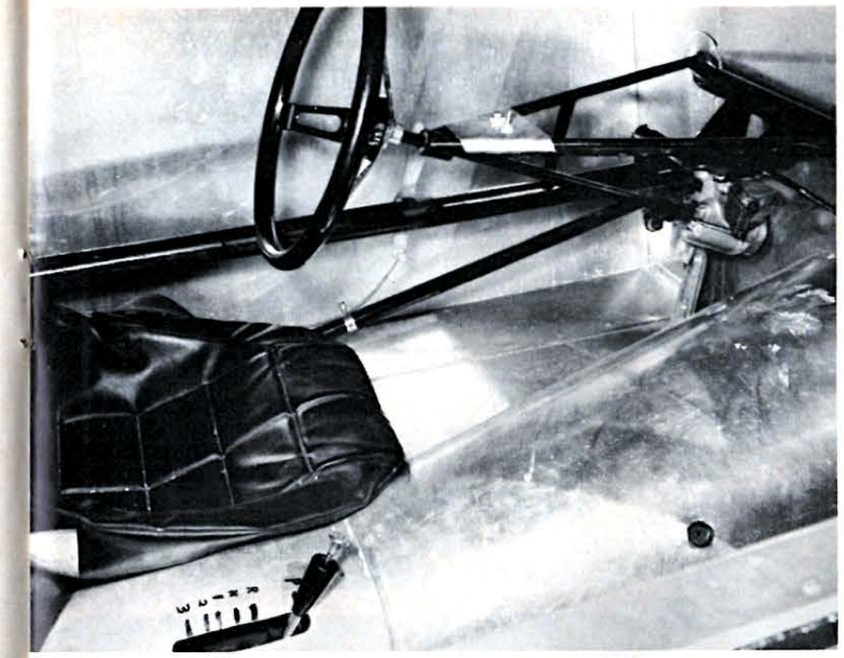
ABOVE LEFT—Rear suspension consists of leaf springs, vertical adjustable shocks, and adjustable traction bars. Tube member runs from side to side of axle housing in the rear. ABOVE—Another view of the rear end assembly, showing the reinforcing member, and the forward mounting plate for the short, stiff traction bars. LEFT—Springs and traction bars move in the same axis. Note the numerous reinforcing tubes and gusset plates in this portion of the tube frame. BELOW—"Tension II's" driver, Gary Bolger (l.), and owner/builder Bud Richter remove the 'glass hood panel to have a look at the engine.

TENSION

The Camaro body was duplicated in plastic by Fiberglass Ltd., in Hillside, Ill. The front end was redesigned for the longer wheelbase, with an aluminum panel replacing the grille, and a liftoff section for access to the engine compartment. The car runs with solid doors and no side or rear windows.

This has created a problem, however. It seems that when the car is going down the strip, air is forced around the windshield, into the cockpit, and exits through the rear window opening. Richter reports that the rush of air through the backlight creates such a vacuum that the body has begun to rip, but he says the problem can and will be licked by placing a shaped aluminum panel under the window.

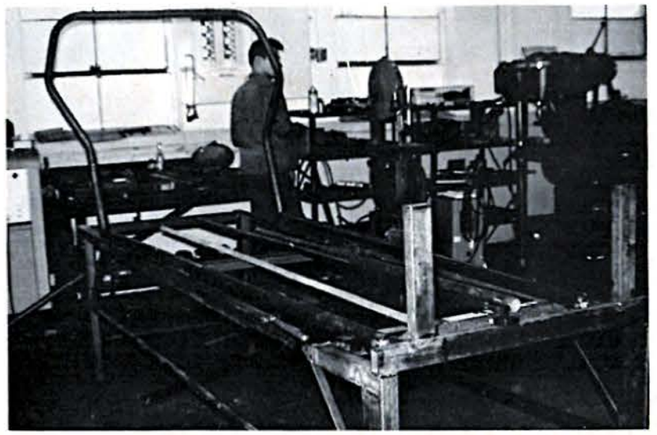


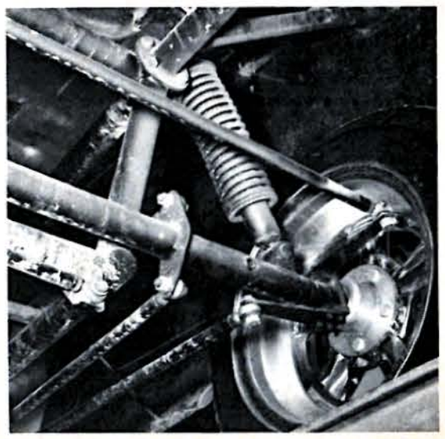


The cockpit is designed for business, with no frills or fancy stuff. It contains the required roll cage, one upholstered bucket seat, one gas (fuel?) pedal, one brake pedal, connected to a Girling master cylinder, one chute release, and one steering wheel. The car is driven by ear, since no instruments of any kind are used. Although it's kinda stark, the interior is nevertheless pleasing to the eye, being finished off in flat and rolled aluminum sheet so that no ragged edges show anywhere.

The paint job on "Tension II" is nothing short of fantastic. Bright orange fades off in varying shades to black scallops at the edges, and the lettering by Ken Kruse was executed in gold, black, blue, white, and orange. The colors were applied by Dave Puhl's House of Customs in Palatine, Ill.

ABOVE LEFT—It may not be plush, but it's pretty to look at and it gets the job done. The Corvair steering unit's supports hold the mag switch and the starter button, while the 'chute release rides on the frame tube, and the shifter sits close by the driver's right hand. Shift pattern has been altered for safety reasons. LEFT—Bud, Gary, and friend ready the car to come off its trailer. Paint job and appearance in general are plenty boss. BELOW LEFT—This is what "Tension" looked like with only 3 frame tubes in place at Jay Howell's chassis factory, in Madison Heights, Mich. BELOW—Get yourself some flat stock, some tubing, and some fittings, and you, too can have a light front end. Front suspension uses Monroe coil/shocks, radius rods, and a straight tube axle.





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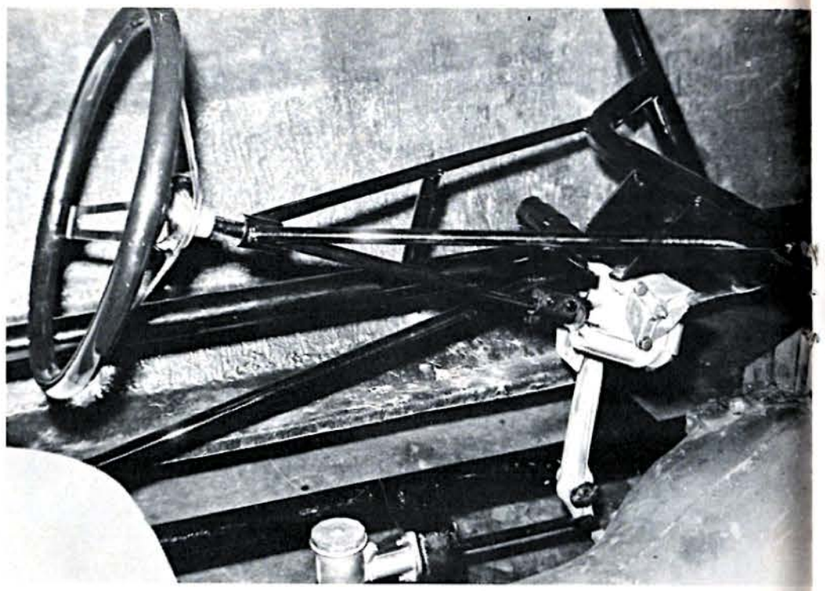
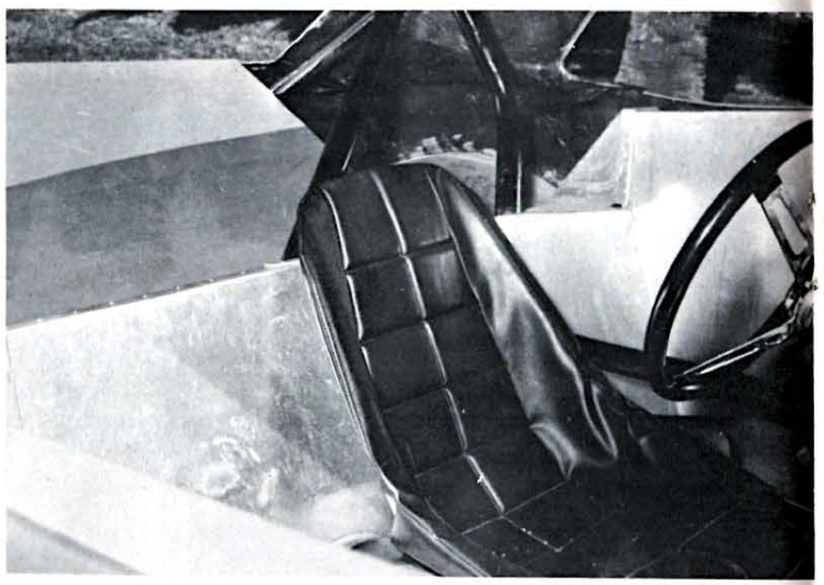




ABOVE—Gary and Bud pack up the chute, and a problem develops. Just as the picture was snapped, the pack came unglued, accounting for the retaining strap being straight up in the air, and the fellas trying to keep the 'chute from unfurling. ABOVE RIGHT—Construction shot shows the steering sub-assembly, Girling master cylinder, and the forward portion of the Richter-modified Chevy Turbo-Hydramatic. As with the rest of the car, the cockpit area is heavily braced. RIGHT—The driver's seat is surrounded by a hefty roll cage for protection and lots of aluminum sheet for beauty's sake. The only operating window in the car is the plastic windshield.

The 427 stovebolt that powers "Tension" is very near stock. Internal modifications made by builder Larry Teter include ⅛-in. larger valves, and stock 12.5:1 pistons cut down to give a compression ratio of 11.8:1. The induction system used is a Hilborn injection setup, and ignition is provided by a Prestolite transistor unit. Exhaust headers were made up by Rudy's Custom Exhaust in Cicero, Ill. Bud uses Champion spark plugs exclusively, as well as Kendall GT-1 motor oil. The car burns a 95% mixture of nitro and alcohol.

While the car was being built, Richter shopped around for the missing link in the drive train: a good, reliable transmission that would handle the load without breaking, and one that had as few wear-prone parts as possible. He chose a '67 Chevy Turbo Hydramatic, modified it himself, and added a Pontiac cable shifter mechanism. As shown in an accompanying picture, the shift pattern runs Park, Reverse, Neutral, First, Second, and Third, reading front to back. This way, Richter says, there's little chance of hitting a bad gear during a run.

"Tension II" weighs in at just 1900 lb., making it an unblown, unlimited funny car of the "on-the-ground" variety. Engine and drive line setup were engineered to keep the Camaro's front tires on the ground to avoid race-losing wheelies.

With only three runs on the car at this writing, the car has posted a 10.50 et with a speed of 140 mph. Richter and his driver, Gary Bolger, are looking forward to consistent low-8-second times and speeds in the 170-mph bracket, once the car's handling and aerodynamic problems are ironed out. ■

CLINIC CORNER
SUPER STOCK

AS YOU MAY HAVE already guessed, we at SS&DI are very pleased about the success and popularity of the Sox & Martin and Dick Landy clinic programs that are now going on around the country.

So pleased are we that SS&DI will carry this page of clinic news notes every month until the teams' tours are completed. We'll do our best to follow the teams around the country and keep you posted on the latest developments.

For those of you who tuned in late, maybe a review would be in order. Here's how it works:

Ronnie Sox and Buddy Martin, and Dick Landy and his crew, will be going around the country with two cars each, a 440 wedge and a 426 street hemi. The pros will drive the hemi against spectators in the 440, giving them a handicap start. If the 440 driver beats Ronnie or Dick, he will get a prize and trophy worthy of the deed. If he doesn't, he'll still get a prize.

RONNIE SOX

The teams will also compete against members of the press and local disc jockeys, again with the handicap. Where there are more than one of these gentlemen, they will all drive the wedge car for low et, and the quickest driver gets to run against the pros for the title of "Pop Stock Eliminator."

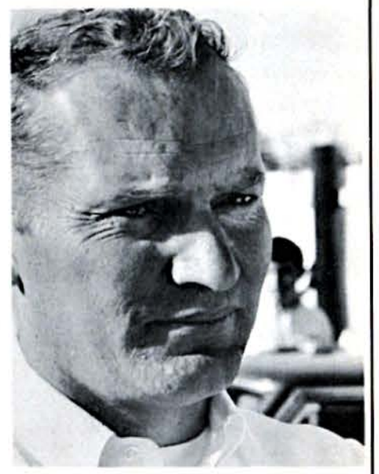
In the three days prior to local weekend drags, the teams will appear at Chrysler-Plymouth and Dodge dealerships, showing racing movies, engine setup slide shows, answering tech questions, and displaying optional equipment for their cars. This way, young fellows just starting out can get answers to their problems from guys who really know what they're talking about.

DICK LANDY

Both S&M and Landy bowed at the NHRA Winternationals in Pomona, Calif., and both teams dashed back to their respective garages to finish up some detail work on their cars.

Sox and Martin debuted in the East at Massey Motors, in Daytona Beach, during Speed Week, and the crowds there were big. From there, Ronnie and Buddy and their boss wrench, Jake King, went to Virginia, then to New York City for a week at the International Automobile Show. After seeing crowds in the tens of thousands at New York, the team headed south again, to Maryland, Georgia, and home to North Carolina.

From time to time, Sox & Martin will leave the clinic trail to get back into drag racing. They'll be going to Bristol, Tenn., for the NHRA Spring meet, and to Indy for the Nationals, with a lot of other big meets thrown in, such as the Super Stock Nationals. The rest of their schedule, through July, follows:



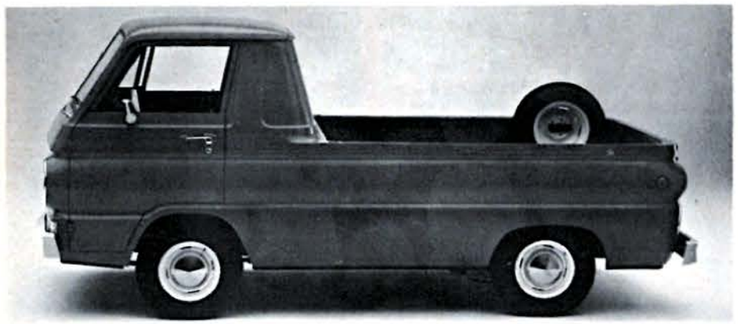
BUDDY MARTIN

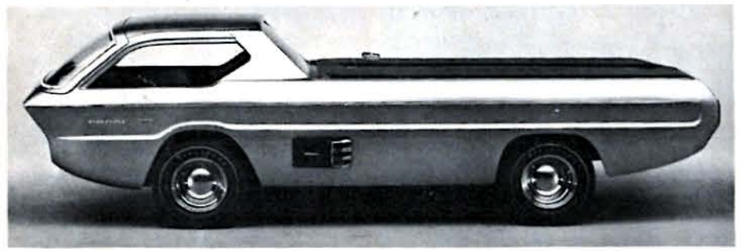
May 20	Detroit, Mich.
28	Suffolk, Va.
June 3	York, Pa.
8-11	Bristol, Tenn.
18	Perkasie, Pa.
25	Cecil County, Md.
July 2	Great Meadows, N. J.
8-9	Atco, N. J.
16	Richmond, Va.
23	Maple Grove, Pa.
30	Hartford, Conn.

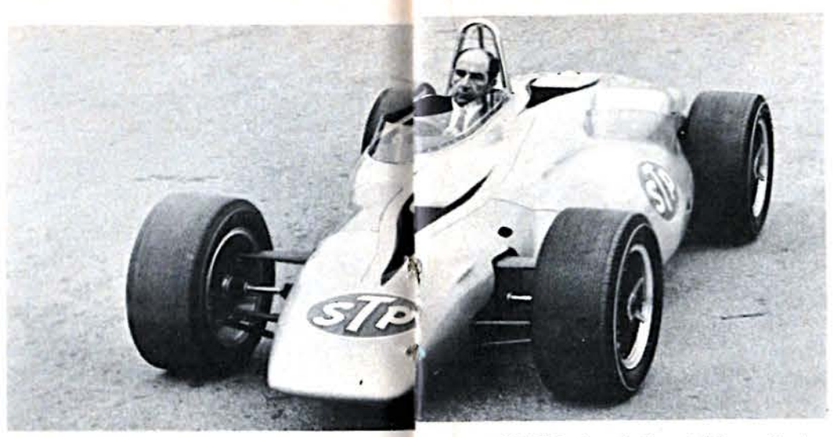
Next month: More on Dick Landy's West Coast tour. ■

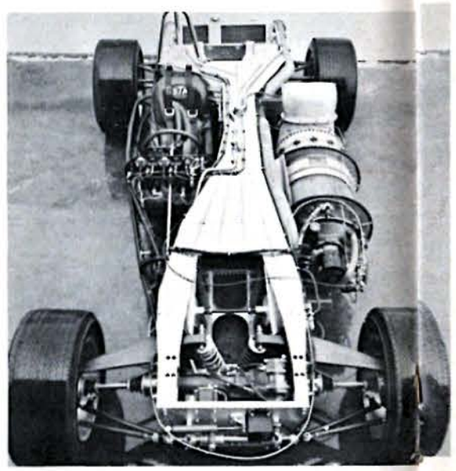
THIS 'N THAT

Drag notes from around the nation

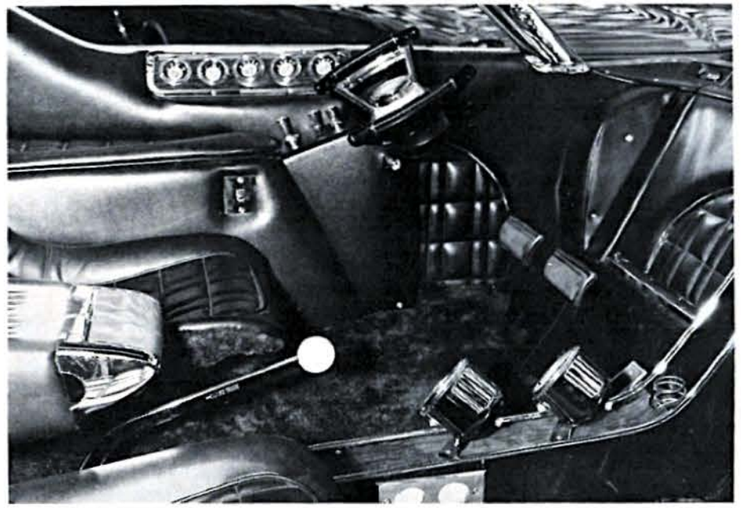








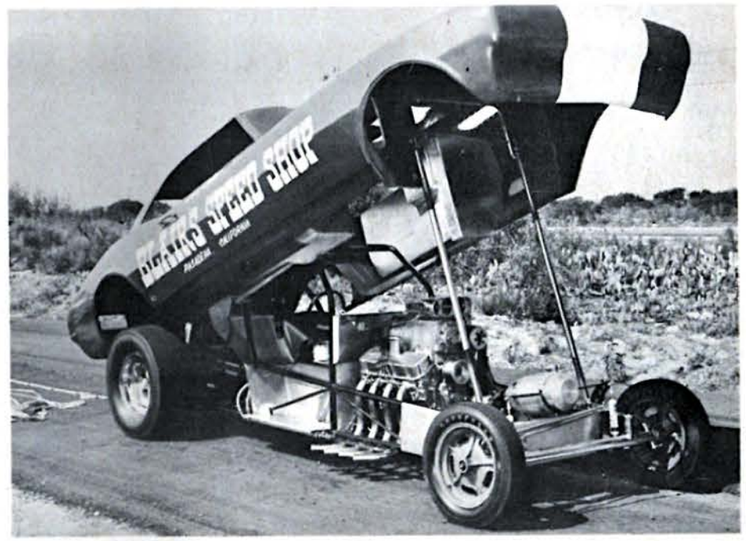
ABOVE—Joseph Granatelli, president of Paxton Products-STP, takes the STP turbine car out for a ride on the streets of Santa Monica, Calif. The car uses a Pratt & Whitney free turbine engine, developing 550 shaft hp at 6230 rpm. Maximum torque is 1000 ft.-lb. at stall. The complete engine assembly weighs only 260 lb. The drive line of this unusual car, which is to be entered in the Indianapolis 500, consists of a constant-mesh gearbox, and an adapted Ferguson 4-wheel drive system with twin driveshafts and limited slip drive. RIGHT—Under the skin of the STP racer is an aluminum frame, which is said to be the most complex aluminum structure ever built of its size. The backbone frame is made of 7178-T6 alloy, riveted and stressed, and has a torsional stiffness of 30,000 ft.-lb. per degree.

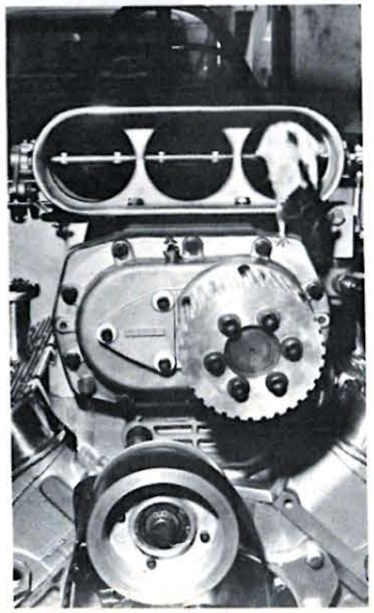


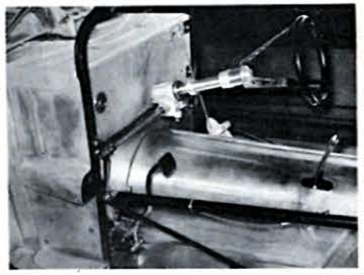
TOP OF PAGE—This is the "before" picture of a Dodge A-100 pickup truck as it was delivered to Detroit's Alexander Brothers. CENTER—The finished product of 2000 hours' labor is this low slung Dodge Deora custom, two feet longer and two feet lower than stock. The stock 6-cylinder engine was moved back 15 in., right to the middle of the bed, for cabin room. ABOVE—This front door really is one. Door is center-hinged, and window is hinged at top for easy entry into the plush cabin. The cut-down steering wheel connects to steering box via a bicycle chain enclosed in the swinging arm. While this truck is a showpiece, it has almost everything needed to drive on the street, including engine and transmission.

ABOVE—The passenger compartment of Deora is even better than the outside. The twin vinyl-covered bucket seats are backed with mouton fur, as are the floors. The reversed Hurst shifter leads back to a stock 3-speed transmission, and the instrument panel contains oil pressure, water pressure, alternator, fuel, and vacuum gages. The larger instruments on the console are a tach and accompanying speedometer. Absence of steering column provides lots of extra leg room.

ABOVE—Mercury's gone road racing! A team of specially prepared Cougars will compete in the major American road races of the Trans-American series, with Ed Leslie (top), Parnelli Jones (center), and Dan Gurney doing the driving. Gurney is captain.







TOP OF PAGE—When Steve Bovan sent along his entry blank for the Super Stock Nationals to SS&DI, he also sent us some pictures of his flyin' Camaro, running out of Blair's Speed Shop, in Pasadena, Calif. This one shows Steve coming off the line at Irwindale Raceway. CENTER, ABOVE—Not to be outdone by other racers, Bovan has gone the flip-top route for '67. The inside looks as good as the outside. ABOVE—A place for everything, and everything in its place. The superclean interior of Bovan's car is fully paneled, and shows some fine engineering. LEFT—Power for the Camaro comes from a blown, injected 427 Chevy with lotsa muscle.

SUPER STOCK SHOWSTOPPER!

ARNIE BESWICK

CAMS

. . . and how to get Maximum Performance

Technical Article by
DON FRANCISCO

TOP OF PAGE—The benefits of a proper cam installation job are sure to show up on a dyno. Here, NASCAR and road race engine builder Bud Moore makes some carburetion adjustments while the cammed Ford engine spins out maximum horses on Bud's shop dyno.

Behind every winning car, there's a winning cam—here's how the pro's do it

ONE OF THE most important parts in a high-performance engine, and probably the part that is most frequently taken for granted, is the camshaft. A man building an engine or blueprinting one will check every dimension of every part in it except the camshaft. When the time comes for the camshaft's installation, it is slipped into place, its drive sprockets and chain, or gears, are installed, and it is forgotten. There are engine builders who are exceptions to this, however, and they are the ones who usually take home the trophies. They are the ones who realize that just as they don't take anything else in their engine for granted, they cannot, and must not take the camshaft for granted.

An engine that has four, six, or eight, or whatever number of cylinders is nothing more than a group of single-cylinder engines in a common cylinder block. If it is to develop the maximum power of which it is potentially capable, every factor that has an influence on the power output of each of its cylinders must be correct. This means that every valve in the engine must have the correct timing so it will open and close at the correct times in relation to the positions of the pistons in the cylinders. Valve timing is controlled by the camshaft and its phasing with the crankshaft.

Perhaps the primary reason camshafts are so readily taken for granted is that they are, in theory at least, a piece of precision equipment. As such, it is easy to assume they are correct in all details. However, a camshaft that is absolutely perfect mechanically is as rare as any other absolutely perfect part in an engine or any other machine or mechanism, and those that are imperfect, to the point of being unusable if their condition were known, far outnumber those whose actual measurements fall within the tolerances that enable them to do their job satisfactorily.

The only way an engine builder can determine whether a camshaft was machined within usable tolerances is by actually checking the specifications of each of its cams while it is in his engine. Then, if it is usable, he must phase it to the crankshaft correctly so the valve opening and closing times in relation to piston positions will be correct. This brings us to another reason camshafts are so readily taken for granted, which is that the man assembling the engine doesn't know how to check them. But before going into that, we'll run through a few camshaft basics.

A camshaft is a steel or cast-iron shaft that has a "cam" for each valve in the engine. It has bearing journals that rotate in bearings in the cylinder block or, if the engine is of the overhead camshaft type, in suitable supports on top of the cylinder head. Each cam has a "base circle" and a "lobe." The lobe consists of two "clearance ramps," two "flanks," and a "nose." In hot rod language the base circle is usually the cam's "heel" but because "base circle" is the more descriptive of the two terms, and the one used by engineers, it is used in this article. A "valve lifter," also commonly referred to as a "tappet" or "cam follower," rides on the cam to convert the cam's rotary motion to reciprocating, or up-and-down, motion for the valve.

A cam's base circle is its area on which the valve lifter rests when the valve the cam controls is closed. It is concentric with the center of the camshaft, which makes it concentric with the center of the shaft's journals. If the base circle continued all the way around the shaft, a valve lifter resting on it would not move as the shaft rotated in its bearings. Adding a lobe to the base circle changes it to a cam.

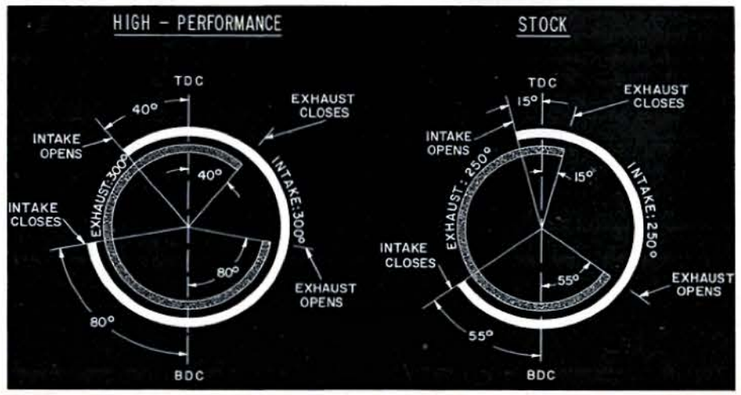
A lobe's nose is the part of the lobe that is under the lifter when the valve the lobe opens is full-open. A flank and a clearance ramp connect each side of the nose to the base circle. The flanks control the rapid lifter and valve movement in relation to crankshaft rotation as the valve opens and closes. The clearance ramp on the side of the lobe that opens the valve takes up the valve's "lash" gradually and transfers the lifter from the base circle to the flank by lifting it much more slowly in relation to crankshaft rotation than does the flank. The ramp on the side of the lobe that controls the valve's closing lowers the valve and the lifter much more slowly than the flank as the valve closes. This gradual moving of the lifter during the transition from the base circle to the flank and vice versa is necessary for sufficiently quiet valve actuating mechanism operation and to minimize the possibility of damage to the mechanism and the valves.

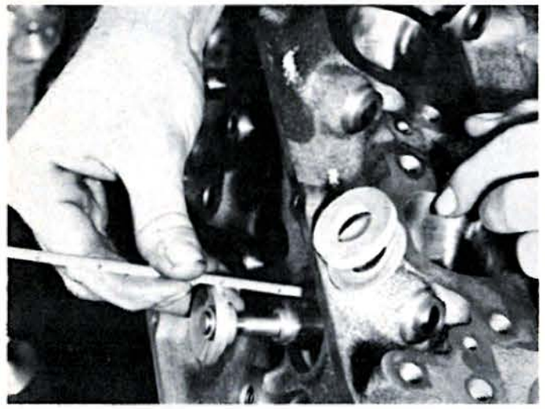
Valve lash is the clearance that must exist between a valve's actuating members that are between the cam and the tip of the valve's stem when the valve's lifter is on the cam's base circle. Its purpose is to guarantee that the valves will be able to close when they are supposed to be closed. Correct closing is necessary for efficient sealing between a valve's head and its seat in the cylinder head and to enable the valve head to stay in its normal temperature operating range by enabling excess heat in it to travel to the cylinder head, which is cooled by the coolant in the engine. A valve that doesn't close will allow compression and combustion pressures to be lost from the cylinder. Also, it can be destroyed by the excessive heat from the burning mixture that flows past it during power strokes, which it will be unable to dissipate to the cylinder head.

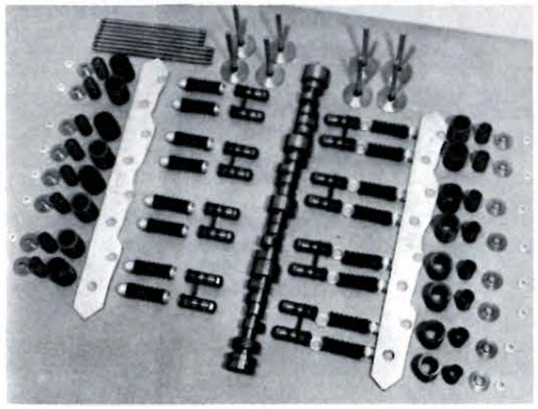
Valve lash also has an influence on the valves' opening and closing times in relation to piston position in the cylinders. Less lash than it should be will cause opening times to be earlier than they should be and closing times to be later, and more lash than it should be will cause opening times to be later than they should be and closing times earlier.

Lash measurements are made between the tip of a valve's stem and the rocker arm or other member that moves the valve. It is adjusted by various means, depending on the engine, when the lifters are on their cam's base circle. As it varies as the valves and their actuating mechanism and the engine's cylinder block and head expand and contract because of temperature

Reprinted from 1967 Crane Engineering Co. Catalog







ABOVE—Every one of the valve springs should be assembled to the same height for maximum engine efficiency. Here a technician measures height of one spring assembly before adding shims. Spring seat cutting requires a special tool. BELOW—The correct phasing of the camshaft to the crankshaft is also important to obtaining maximum power from a given engine. The cam can be put in stock phase, and it can be either retarded or advanced from stock phase by machining the cam gear to receive special offset bushings or "cam keys." The gear must be machined according to instructions to get the best results.

CAMS

changes, it must be adjusted when the engine is either hot or cold, as we specified, and to the clearances we specified. For nearly all engines, lash for exhaust valves is *greater* than for intakes because the exhausts run hotter and, therefore, expand more.

Cams on shafts for different engines will vary in shape and size but the important thing about them is that, within a very small tolerance, all those on a shaft for intake valves have the same shape and all those for exhaust valves have the same shape. But don't assume all the cams on a shaft are correct. Keep in mind that each of them, although it is on a shaft with fifteen or so others, was ground individually and can, therefore, have been ground incorrectly although the others are within tolerance. It's not at all unusual for cams of the same type on camshafts ground by some companies to vary so much in shape that they are far outside the acceptable tolerance.

The reason cams can vary in shape even though they are ground on the same machine with the same "master cam," which is the part of the machine that determines the shape of the cam being ground, is that the action of a cam grinder is controlled by a spring rather than by a positive means. The spring holds a follower, which controls the motion of the part of the machine that supports the camshaft, against the master cam as the master rotates. If the machine's operator feeds the grinding wheel against the cam being ground at too rapid a rate, the follower can be forced away from the master and the shape of the cam being ground won't conform to the master as it should.

The only way to guarantee a cam will conform to the shape determined by the master cam is to let it "spark out," which means it is allowed to rotate after the grinding wheel has been adjusted to its final position until the wheel stops grinding. This indicates that all the material that should have been ground from the cam has been ground away.

In addition to being the correct shape, cams must be in their correct relationship to each other on the shaft. The intake cam for each cylinder must follow the exhaust cam for the same cylinder by the correct number of degrees of camshaft rotation, and the cams for one cylinder must follow or lead those of another cylinder by the correct number of degrees. Errors in cam location can be made by the grinding machine operator.

So valve opening and closing events will occur in correct relationships to the positions of the pistons in their cylinders, the camshaft must be phased correctly with the pistons. As piston position is difficult to determine directly, it is determined by crankshaft position. This is possible because the connecting rod that links a piston to the crankshaft causes one to move the other. In other words, rotational movement of the crankshaft causes the piston to move up and down in its cylinder at a definite, although not constant, rate per degree of crankshaft rotation, and vice versa.

Valve opening and closing times are determined by the number of degrees of crankshaft rotation they occur before or after the piston's top dead center or bottom dead center positions. A piston is at top dead center (abbreviated TDC) when it is at its highest point in its cylinder where rotation of the crankshaft in either direction will cause it to move down the cylinder, and at bottom dead center (BDC) when it is at its lowest point, where rotation of the crankshaft in either direction will cause it to move up the cylinder.

Intake valves open before the piston reaches TDC (BTDC) on the exhaust stroke and close after the piston passes BDC (ABDC) on the intake stroke. Exhaust valves open before the piston reaches BDC (BBDC) on the power stroke and close after the piston passes TDC (ATDC) on the exhaust stroke.

There are four reasons a camshaft can be out of phase with its crankshaft: the keyway in the crankshaft for the sprocket or gear that drives the camshaft is incorrectly located in relation to the shaft's crankpins, the keyway in the crankshaft sprocket or gear is incorrectly located in relation to the sprocket or gear teeth, the keyway or dowel hole in the camshaft sprocket or gear is incorrectly located in relation to the sprocket or gear teeth, and the camshaft's cams are incorrectly located on the shaft in relation to the shaft's keyway or dowel for the sprocket or gear.

Of the factors that affect camshaft phasing, the only one over which the man who grinds the cams has any control is the cams' location in relation to the shaft's keyway or dowel. This keyway or dowel is used to locate the shaft in the grinder so it and the cams will be in their correct relationship. However, if one or more of the other three possible errors in the camshaft drive exists when the shaft is in an engine, the shaft will be out of phase with the crankshaft. It is the job of the engine builder to find and correct this condition.

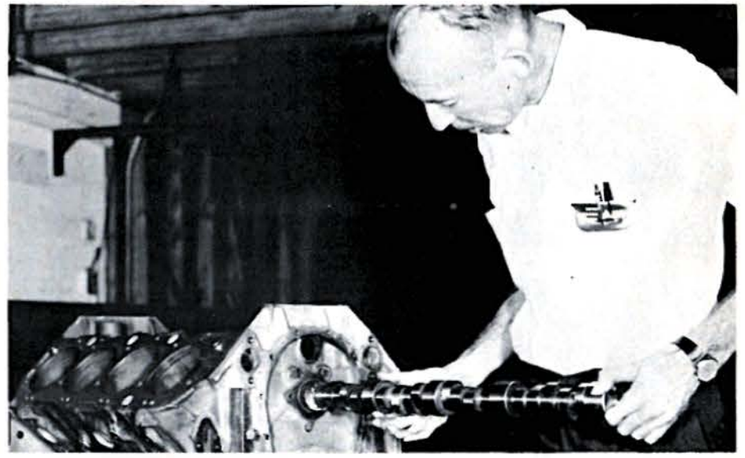
The number of crankshaft degrees of rotation between the time a valve opens and it closes is its "open duration," or simply its "duration." To compute duration, for instance for an intake valve, add the number of degrees before TDC the valve opens, the 180 degrees during which the piston moves through its intake stroke, and the number of degrees after BDC at which the valve closes. For an exhaust valve, add the number of degrees before BDC the valve opens, the 180 degrees during which the piston moves through its exhaust stroke, and the number of degrees after TDC at which the valve closes.

Both valves are open a certain amount when the piston is at the top of its cylinder at the end of its exhaust stroke. This period in the valve timing is called "overlap."

When the durations and phasing of a camshaft in a conventional overhead valve engine are being checked, we suggest that the lift used for determining the valve opening and closing times for the check be measured at the valve lifter rather than at the valve. The rocker arms become involved when lift at the valve is used and this inserts an unreliable factor into the checking procedure because the ratio of most rocker arms usually varies from arm to arm. As an arm's ratio determines the amount the valve it controls moves in relation to a specific amount of lifter movement, any variation in the ratios of arms used for the check would cause the lift for different valves to vary for a given crankshaft position even though the lift at all the lifters was as specified.

As we are concerned only with the accuracy of the procedure used to check the camshaft, which can be guaranteed by measuring lift at the lifters, we can disregard the variations in actual rocker arm ratios; however, the engine builder, who is concerned with accuracy throughout the engine, should consider the rocker arms because they can cause variations in timing from valve to valve just as an inaccurately ground camshaft would.

BELOW—The cam itself should be installed into the block slowly and carefully, and should not be left hanging. New cam bearings should always accompany a new cam, and both should be lubed.

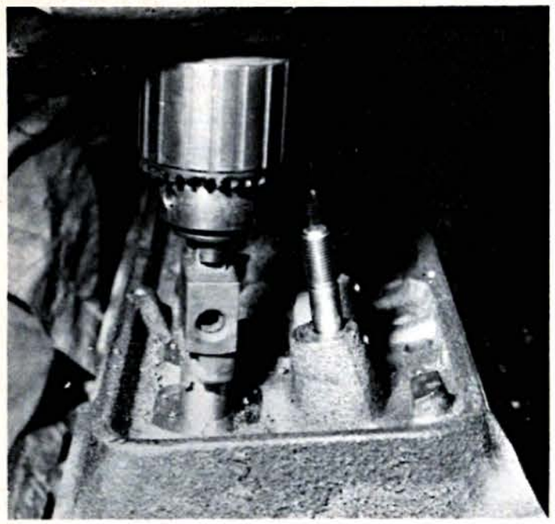


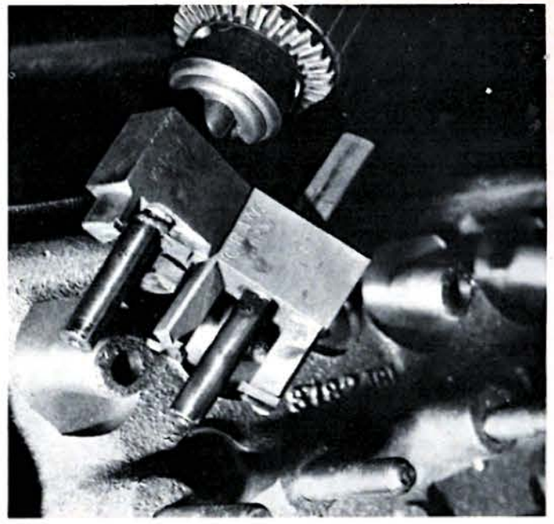
. . . a mechanically perfect cam is as rare as any other perfect part in any mechanism . . .

Equipment needed to check camshaft accuracy and phasing includes a degree wheel or equivalent, a suitable pointer for the degree wheel, and a dial indicator.

A degree wheel enables crankshaft rotation to be measured in degrees. A suitable substitute is a crankshaft pulley-damper assembly or flywheel on which the outer circumference has been graduated in degrees.

Degree wheels are available in many sizes and types. One made of metal and approximately eight inches in diameter is adequate. Because the wheel's outer circumference is divided into degrees, diameter is important. The larger the wheel, the greater the distance between the degree marks and the easier the marks are to read. The wheels are designed to be attached to the crankshaft, usually to the shaft's snout, so they can be ro-





ABOVE LEFT—Although the camshaft itself is nestled deep between the banks of cylinders, its associated components can be found in other places, and each of these places, in turn, require special attention. Here, the valve spring seat on the cylinder head is machined for inside clearance and for proper spring height. ABOVE RIGHT—The tool on the bottom is the spring seat cutter, and the one on top is a cutter for the valve guide boss. The boss cutter permits the installation and use of Perfect Circle valve stem seals, which keep oil from straying outside of the engine.

CAMS

tated to adjust them during their installation and then locked in place. A wheel that slips over the snout is better than one that is secured by a cap screw in the snout's end.

Degree marks on wheels are numbered or identified in different ways. On some the zero, 90, 180 and 270 degree marks are numbered; on others the zero and 180 degree marks are labeled as TDC and BDC, respectively, and the marks midway between them are identified as 90 degrees, etc.

The degree wheel's pointer, preferably cut from flat stock or fabricated from strap iron, should have two mounting holes so it can't move after it has been bolted to the cylinder block.

If the checking is to be done correctly, the dial indicator used must have adequate measuring range to enable it to measure the full distance the cams lift the valve lifters. Some fellows try to use an indicator without this capability but to do so they have to rotate the crankshaft in the direction opposite its normal rotation as well as in the normal direction during the checks and this can lead to errors in the results obtained. An indicator with a range of .500-inch is adequate for just about all the camshafts an engine builder will ever encounter.

Installation of the degree wheel involves positioning it on the crankshaft so its zero degree or TDC mark is in line with its pointer when the piston in cylinder number one is at top dead center in its cylinder. This adjustment is critical. If it isn't accurate, none of the timing checks can possibly be accurate.

Because a piston moves so little in relation to crankshaft rotation when it is close to TDC, finding TDC for adjusting the degree wheel by feel or with a dial indicator while rocking the crankshaft is practically impossible. A more accurate way is with the positive stop method. This requires a device that can be bolted to the top of the cylinder block so part of it extends into the cylinder approximately ½-inch. If the cylinder head is on the engine, the stop can be a bolt that is screwed into the shell of an old spark plug. The shell is screwed into the cylinder's spark plug opening so it tightens against the plug seat in the head.

Before installing the piston stop, rotate the crankshaft to place the piston in its approximate TDC position, with both of the cylinder's valve lifters on their cam's base circle, install the degree wheel and its pointer, adjust the wheel so its TDC mark aligns with the pointer, and lock the wheel to the crankshaft.

With the degree wheel in place, rotate the crankshaft opposite its normal direction to lower the piston enough to enable the piston stop to be installed, install the stop, rotate the shaft in its normal direction to bring the piston up against the stop, and make a temporary mark on the degree wheel in line with the pointer. Rotate the shaft opposite its normal direction to again bring the piston up against the stop and make another mark on the degree wheel in line with the pointer. Remove the piston stop and rotate the crankshaft to place the point on the degree wheel that is exactly midway between the marks in line with the pointer. The piston will now be at precisely top center and the pointer should be near the wheel's TDC mark. Without disturbing the crankshaft, loosen the degree wheel, adjust it so its TDC mark aligns exactly with the pointer, and lock it in place.

To check the degree wheel adjustment, install the piston stop

. . . the camshaft must be installed in the right relationship to the crank to work properly . . .

again and repeat the previous procedure. If the adjustment is correct, the number of degrees at which the piston contacts the stop before and after TDC will be identical.

After the degree wheel has been adjusted, relocation of it or its pointer, on purpose or by accident, will destroy the adjustment and make subsequent crankshaft and piston positioning inaccurate.

The dial indicator must be solidly supported on the cylinder head, after the rocker arms have been removed, or on the cylinder block if the head hasn't been installed. Its plunger must be aligned as closely as possible with the vertical center line through the lifter whose move-

BELOW—Cam manufacturers offer solid, hydraulic, and roller lifters as part of the complete kit. The lifters are made to be compatible with the metals used in the cam itself.

ment it is measuring. If the plunger forms an angle with the lifter, the indicator's readings won't be correct.

If an extension must be used with the indicator, use a pushrod of the type that will be used with the lifter. A pushrod of the correct type will fit the socket in the lifter correctly, which is essential to accurate indicator readings. If necessary, shorten the pushrod to the required length. A pushrod used as an extension, whether it has been shortened or not, must have a depression in the center of its upper end for the end of the indicator's plunger. The plunger will hold the pushrod in place.

The lifters used for the check must be the same ones that will be used with the camshaft. This is important because the shape of the lifters' area that contacts the cam has an influence on the valve timing the cam will provide. A flat lifter on a roller cam, or vice versa, will give timing figures altogether different from those obtained with the correct lifter. Also, be sure the lifters move freely in their bores in the cylinder block throughout their full range of movement. A lifter that sticks in its bore won't remain with the cam as it should when it is on the closing side of the cam's lobe. On this side of the lobe, only gravity and the pressure of the dial indicator's plunger make the lifter follow the cam. A lifter that doesn't move freely in its bore probably won't move onto the cam's base circle as it should, as indicated by the indicator's not returning to zero when the base circle is under the lifter.

A means of rotating the crankshaft that won't interfere with the degree wheel must be provided. Don't, under any circumstance, rotate the shaft with a cap screw in the end of the shaft's snout if this cap screw supports the degree wheel. No matter how tight the cap screw may be, there is always the chance it will rotate in relation to the shaft. This would throw the degree wheel out of alignment with its pointer and make the checks inaccurate. Sometimes the shaft can be rotated by its flywheel or by a pair of cap screws in its flywheel flange and a suitable bar or length of pipe. The longer the lever used, the easier and more smoothly the shaft can be moved and the more accurate the checks can be.

During the checks, always rotate the crankshaft in its normal direction of rotation. This will place the chain or gears that drive the camshaft in the same relationship they will be in when the engine is running. If the crankshaft is rotated opposite its normal direction, slack in a chain or lash between gear teeth will cause errors in the timing figures.

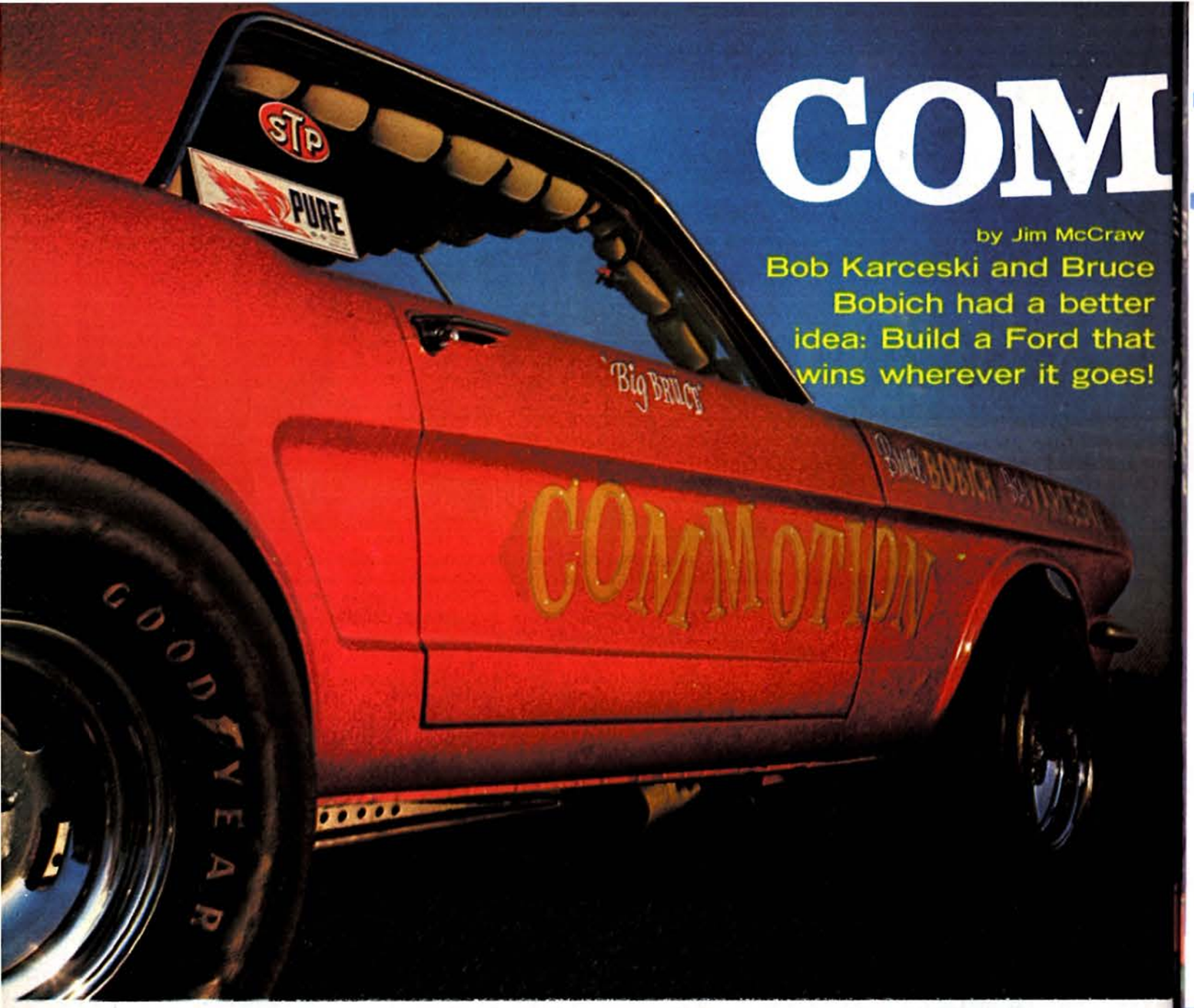
When the degree wheel and its pointer and the dial indicator are in place, and a means of rotating the crankshaft has been provided, rotate the crankshaft until the cam's base circle is under the lifter and adjust the indicator so its hand is in line with the dial's zero. Rotate the crankshaft to lift and lower the valve lifter at least ten times to be sure the indicator always returns to zero when the lifter is on the base circle. If the indicator doesn't return to zero each time it should, the lifter is not contacting the base circle as it should because it is sticking in its bore or because of some other reason, or something is wrong with the indicator installation. Find the trouble and correct it before proceeding.

Movement of the indicator's hand while the base circle is rotating under the lifter is an indication the base circle isn't concentric with the center of the camshaft's bearing journals, as it should be. A variation in base circle concentricity, which is "base circle runout," up to one thousandth of an inch won't cause any trouble and is acceptable but if the runout is more than this the camshaft should be returned to the manufacturer because it was ground incorrectly. When an acceptable runout exists, adjust the indicator so the runout is divided equally on both sides of zero. In other words, you'll be using the middle of the runout for zero.

A concentric base circle is very important to engine performance. If the base circle isn't concentric, correct valve lash will be practically impossible to obtain. As valve lash has an influence on actual valve opening and closing times, lash that is incorrect for any reason will change the valve timing from what it should be.

Hydraulic lifters, which are self-adjusting and are used on some hi-performance camshafts, cannot function correctly on a base circle that has runout. If the runout is such that the part of the base circle that is nearest the cam's opening side lifts the lifter higher than the part nearest the cam's closing side, it will cause the lifter to "pump up" at a lower engine speed than it normally would. When a hydraulic lifter pumps up, it becomes longer than it should be and holds its valve open when the valve should be closed, *causing the engine to misfire and run very rough. Only when engine RPM is reduced, will the lifters leak down to their proper height* and allow the engine to perform normally.

Don Francisco has spent these pages talking about camshaft basics, and checking procedures used in cam installation. Next month will be no different: more basics, more checking procedures. He'll talk about duration checks, valve float, offset bushings, valve-to-piston clearance, and proper spring installation. Don't miss Part Two of Don Francisco's complete cam story!



COMMOTION

by Jim McCraw

Bob Karceski and Bruce Bobich had a better idea: Build a Ford that wins wherever it goes!

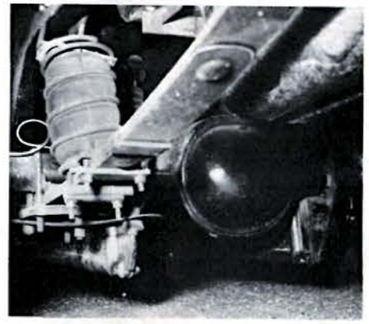
photos by Jim Davis

THERE ARE literally thousands of "show-and-go" automobiles all across the country. Most of the cars that enter competition, whether it be on an auditorium floor or a drag strip, must settle for a compromise: lots of go trophies and a couple of show awards, or vice versa. There are a few that can be successful at either endeavor. "Commotion" is one of the few.

The Mustang is owned and maintained by two young Chicagoans, Bob Karceski and Bruce Bobich, and it's their third project. The little horse was preceded by an "outlaw stocker" '56 Ford, and a '59 Ford B/Gasser.

In its present form, Commotion is completely flexible. It can run under NHRA, AHRA, and NASCAR rules, in B/XS, FX/US, and S/US 2, respectively. In addition to sanctioned class competition, the car can be and has been a successful heads-up match racer in the Chicago area.

The gilding on the lily is the fact that Bruce and Bob have walked off with two "Best Funny Car" awards in Chicago's International Show Car Association shows, and the car was a featured display in the Dick Clark Young World's Fair in the Windy City. By this time you can see what we mean when we say that "Commotion" is one of the few. But if you're still not convinced, let us add that the car is but .04 seconds off the NHRA B/XS record, and .13 slower than the NASCAR S/US 2 record, with a best et of 10.28 at 138.28 mph.



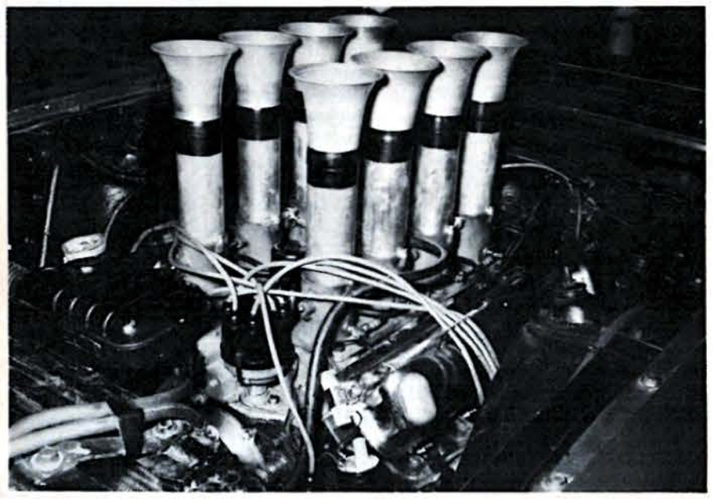
LEFT—Dazzling optical effects of a metal-flake finish are readily apparent here. Deep red paint is accented by golden yellow lettering job, as well as the Astro mag wheels. Goodyear skins protrude beyond wheel wells, provide plenty of traction for "Commotion's" low-10-second runs. RIGHT—Nowadays, it's the rear suspension that's become the area for experimentation by carbuilders, since engines and tires have been upgraded by the manufacturers. Builders Karceski and Bobich have covered all the bases, using a coil spring, leaf spring, air bags, and long, long, traction bars to keep the power on the ground.

In the center of all the go power is a .020-over 427 Ford wedge engine. Compression is created by a set of M/T 13.5:1 pistons with Ramco rings, riding on Thompson boxed aluminum rods, and connected to a stock Ford 7000 T crank. Valves are 2.2 in. intakes, and 1.70 in. exhausts, controlled by dual springs and actuated by a Racer Brown 56R roller cam and kit. The induction system consists of a Ford manifold mounting Hilborn injectors which pass pump gas to the big wedge. The mixture is ignited by a reworked Ford distributor which has been curved and uses double points springs. The exhaust system employs individual tubes 2⅛ in. in diameter, and was built by Joe Arrigo. Heads are Ford 7000 T hi-risers.

In addition to the 427, the team of Bobich and Karceski keeps on hand and occasionally uses a "monster" 427 which is stroked out to 462 inches and carries equipment similar to the "small" engine.

While the trend in gearboxes is shifting toward Clutch-Flites, hydros, and Ford C-6 Cruise-O-Matics in funny cars and match racers, Bob and Bruce chose a Ford T-C 4-speed "crash box." This is the transmission used behind Henry's SOHC racers, carries special alloy gears. It is controlled by a Hurst shifter.

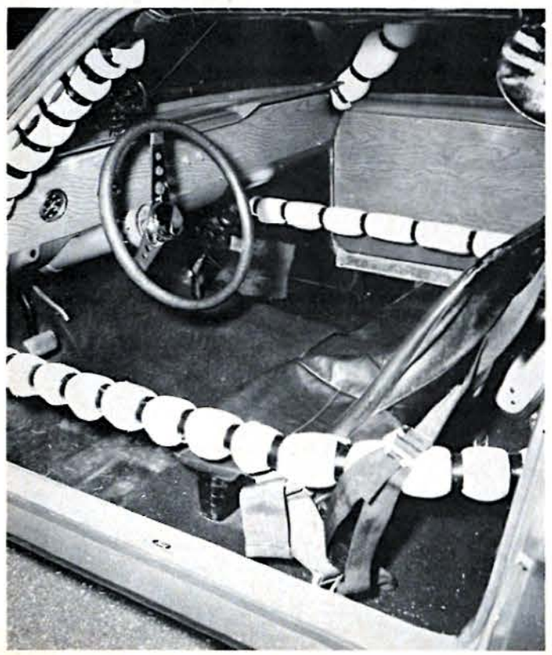
The body beautiful is carried on a stock Mustang frame, reinforced with ¼-in. plate at stress points. The wheelbase is shortened to 103 in., with the rear wheels moved forward. Front tread is 51 in., and the rear measurement is 45 in.



LEFT—Yes, friends, it's a wedge. The 427 in. Ford is fitted with Hilborn injectors, M/T rods and pistons, Racer Brown 56R roller cam, 13½:1 compression. Ignition is modified Ford. ABOVE—Tail end shot reveals clipped-in plexiglass windows, 'glass trunk lid, and a long list of credits.

COMMOTION

ABOVE—"Commotion" snaps off the mark in a match race at one of Chicagoland's many area strips. The car has competed in all of the Midwestern states and recently trekked to the NASCAR Winter Championships in Florida. Look under that rolled front pan and you'll see Holman & Moody suspension parts and a 9-quart extended oil pan. A little further back sit a pair of drilled-out traction bars. BELOW LEFT—Posh'n'pretty will do as a quick description of the Mustang's interior. Doors, covered in wood grain material, are absolutely empty of window control mechanisms, as all windows were replaced by sheets of plexiglass. Dash area is also wood-grained, and it's almost as empty as the doors, carrying only a tach, oil pressure, and water temperature gages. To comply with association rules, all members of the roll cage were covered with foam padding. BELOW RIGHT—Bob Karceski (l.) and Bruce Bobich put the finishing touches on a between-runs plug change. The injected wedge is surrounded by stock Ford engine compartment sheet metal. Car weighs 2800 lb.



The entire front suspension is made up of Holman & Moody racing components, and features extended ball joints and radius rods, 90-10 shocks. Rear suspension is via leaf springs, clamped and fitted with air bags and a super-boss set of home-made traction bars. Rear shocks are super-duty Autolites.

Front skins are Goodyears, 6.70 x15, and the rears are Goodyear 10.50x15 slicks. All tires are carried on Astro Supreme mags.

The driveline is completed by a short 38-in. driveshaft, running back to a nodular steel rear casing and 31-spline axles. Rear ratio is 4.57:1.

Now, about that body. It's basically a '66 Mustang, with a complete fiberglass front end and doors. Grille and headlights have been replaced by wire mesh. The 'glass hood, replete with bubble, has been further altered to get injector stacks out into the open. Body modifications include wheel well and side scoop mods and molded front and rear panels. Front and rear windows have been replaced by ⅛-in. molded plexiglass, secured by clips. The side windows are something special. Vent windows, main windows, and rear windows, along with their operating hardware, have been eliminated. A single sheet of shaped plexiglass does the job, with a bonus of good looks and light weight.

Now, when you open one of those 'glass doors to see what's inside, you're in for a treat. This 10-second machine carries a custom interior, including wood grain door panels and dash, padded roll cage, wall-to-wall black pile carpeting, leather-covered bucket seat, Covico 'flaked wheel, and Arrow instruments.

Getting back to the exterior, it's . . . well, it's . . . red! Bright, shiny metalflake red, 20 coats, with golden yellow lettering. The paint, like the bodywork, was done by Joe Arrigo and Tom Jordan in their Stickney, Ill., shop.

And how does the whole package perform? Last year, with carburetors and gasoline, "Commotion" took FX/US at the AHRA Nationals in Gary, Ind., ran against such cars as Sox & Martin's 'Cuda, Mr. Norm, Chicagoland Dodge, Lee Smith, and many others, picked up lots of local class trophies, a share of eliminator wins, and plenty of show trophies. This year, with injectors and gasoline, "Big Bruce," "Fast Bob," and "Commotion" are looking for National championships and records. And we think they just might do it, too. ■

chassis building

George Britting gets down to the basics of building in this exclusive SS&DI interview

DID YOU EVER stop to think about all the yards and yards of tubing, hundreds of pieces of hardware, and the many, many welds that are hiding under the fancy 'flake and lettering of today's match racing machinery? Why is it put there in the first place, and what does it do for the car?

To answer these questions from a professional's standpoint, we contacted George Britting, of Britting Engineering, of Azusa, Calif., to get the real lowdown from one who knows. Britting has been building race car chassis and components for quite some time now, ranging from a 200-mph dragster to an 8-second match race stocker. One of his customers is Charlie Allen, whose Atlantic Dodge car is one of the top West Coast matchers, running consistently in the 8's.

We asked George several questions pertaining to the current trends in chassis, and here are a few of his comments.

SS&DI: Basically, what is the chassis made of, and why?

Britting: The chassis can be made of two types of material, either round tubing of 1½ in. diameter, with a minimum wall thickness of .065 or 2x3x⅛ in. rectangular steel tubing. The round tubing requires supporting tubing for added chassis strength, while the rectangular type doesn't. For illustration, we'll use rectangular tubing, so the reader may understand the principle more easily.

SS&DI: Can you give us some idea of what the chassis' functions are in a race car?

Britting: The chassis actually gives support to the many components of the car, keeping them in a prescribed area and providing proper alignment.

SS&DI: What about the front end? What is it set up to do?

Britting: First of all, the front springs may be of three types: torsion bar, coils, and semi-elliptical springs. Any one of them will work just as well as the other. In the case of the elliptical springs, we mount the spring with the solid bearing to the front of the chassis, while the shackled end connects to the rear. This is done to give more stability to the chassis. Then comes the axle, which is usually made of ½-in. wall, 1⅞ in. diameter, either straight or dropped. If you use a straight axle it should be mounted above the spring to keep the chassis low. The spindle can vary, but the ones we use are 1962 Ford Econoline units. We cut down the flanged section and the tie arm mount and weld our own tie rod arm, which is about 6 in. long, to the top of the spindle.

SS&DI: How do you determine the angle at which the arm should be when it extends from the spindle?

Britting: Simple. Pull a string from the centerline of the rear end, above the third member, to the center of the spindle and the hole will fall on the string line, pointing toward the center of the rear end.

SS&DI: What does all this give you?

IN THE EARLY DAYS of hot-rodding and drag racing, the job of building a competition car was largely a "do-it-yourself" operation. The methods and "trick stuff" that are now standard operating procedure and common knowledge were once closely guarded "speed secrets" that cost a lot of time and money to learn.

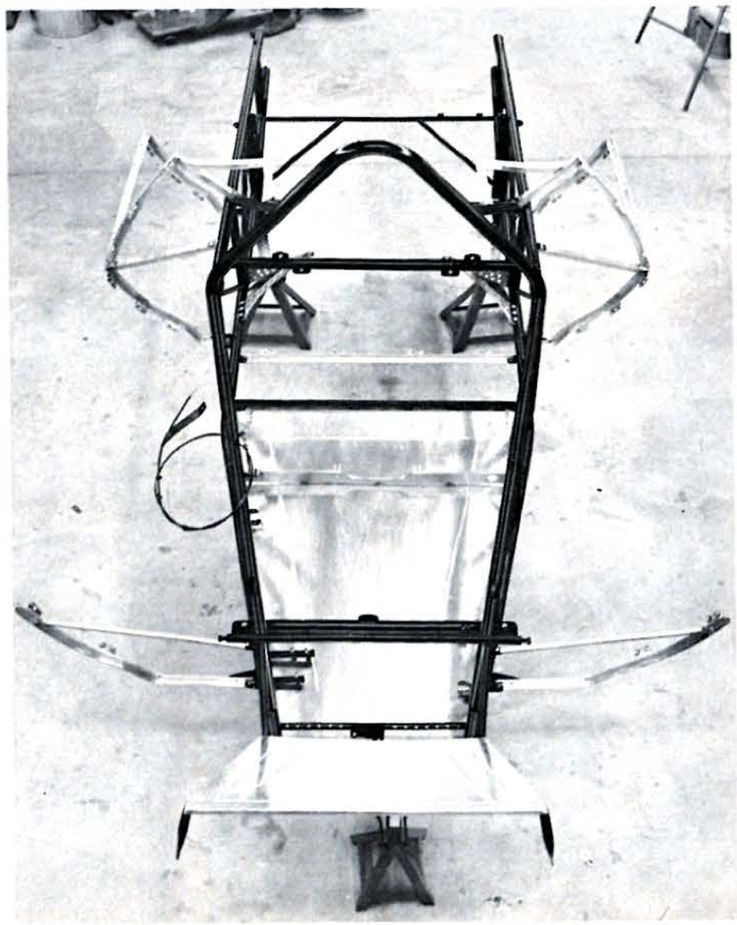
Once the sport got rolling, many machine shops on both coasts became specialty houses, or speed shops as we know them today.

In 1957, the hammer dropped. The Automobile Manufacturers Association decreed a ban on factory support of any form of racing.

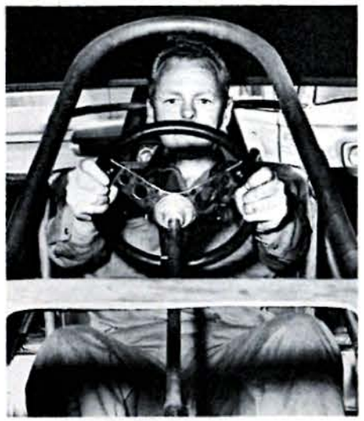
A lot of cars have been built since then. Three of the Big Four manufacturers are back in racing, providing mass-produced 400-plus horsepower engines and all kinds of optional speed goodies.

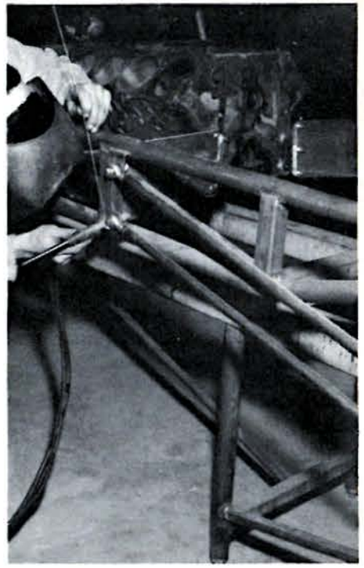
And for the increasing number of racers who look for the ultimate in stock-bodied performance, the funny car racers, a whole new industry was born. Superlight and superstrong race car chassis are now available from shops all over the country. To find out the what and the why of a brand new industry, California Editor Jim Edmunds asked George Britting, of Britting Engineering, in Azusa, Calif. ■

by Jim Edmunds

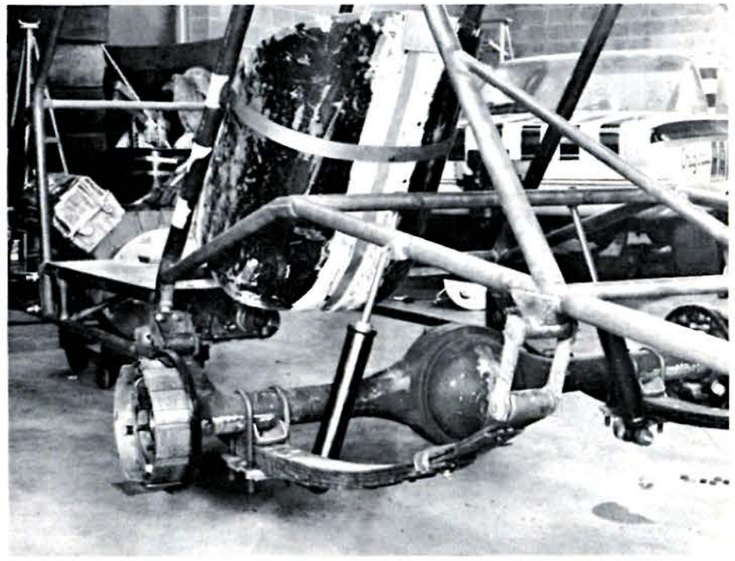


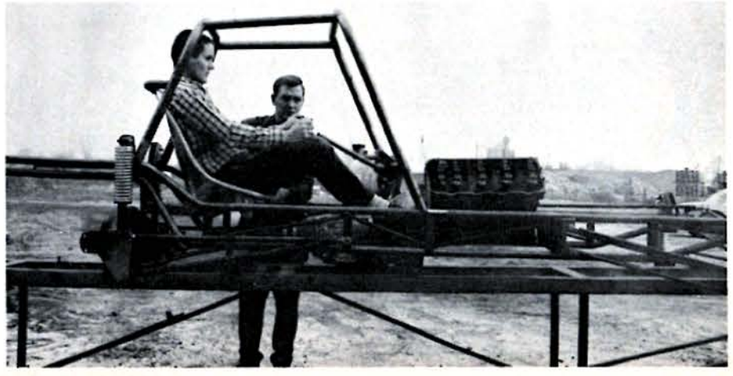
RIGHT—Not long ago, this beautiful funny car chassis was just a mass of tubing and sheet metal in a supplier's warehouse. The talents of men like George Britting, Ron and Gene Logghe, Woody Gilmore, and Jay Howell make chassis building an art for experts.





ABOVE—George Britting checks out the view from the bridge of a Dodge Charger funny. Cage protects driver in the event of a roll, and cut out area provides working room. RIGHT—Chassis technician uses heliarc welder on radius rod mounting bracket to provide strongest joint possible.





ABOVE RIGHT—Woody Gilmore's treatment of a leaf spring suspension for funny cars uses fairly long, clamped springs and hefty shocks. Rear shackle mount is placed at the junction of three tubes. RIGHT—A close examination of the heads on the dummy block will tell you that this frame is for an SOHC Merc funny car. Don Nicholson's chassis builder, Gene Logghe, checks out the seat and steering position.

Britting: This will give you proper turning of the front wheels. There also would be stops put in the axle so the wheels won't flop over when they are turned. In a left turn, the left wheel should not exceed a 45° angle from the axle, the same applying to the right wheel. Axle caster should be 20° while the camber remains negative. The tie rod should be mounted to the bottom of the arm, while the drag link runs from the bellcrank to the top of the arm. The bellcrank is used to pull straight on the spindle so there isn't any extra friction in the steering.

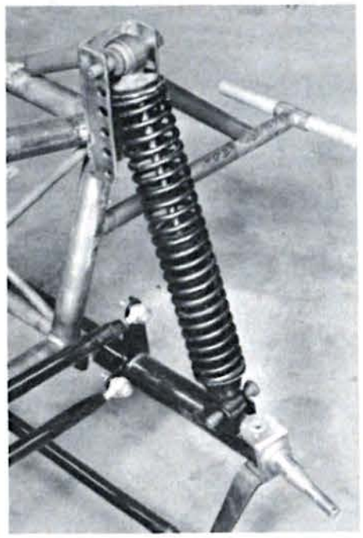
SS&DI: Where do you mount the front shocks?

Britting: They should be mounted outboard on the axle as far as the spindle will allow without interference. This allows lateral stability in the chassis. The shocks should also lean toward the chassis at about 30° to the upper mount on the chassis. This gives the axle help in a wheelstand. It won't bend quite as easily on impact.

SS&DI: What about the rear end? Is there any special way to suspend it?

Britting: Yes, there are two ways to handle it. One is with coil-over-shock units, the other is ordinary coils. These are more readily available,

chassis building



TOP OF PAGE, LEFT—Master welder Britting puts the finishing touches on a steering spindle flange before it's attached to the front axle assembly. LEFT—Finished front end shows Britting's treatment of coil-shock mounting, behind axle, with a sturdy top mount. ABOVE LEFT—Race Car Engineering's front end treatment is similar, using a longer spring and mounting it atop the axle. RCE has also built in six adjusting holes for spring height. ABOVE RIGHT—Another steering/suspension assembly, this time by Logghe Stamping Co. Unit fits behind axle and carries adjusting holes in mount plate.

KEEPING the CUBES COOL

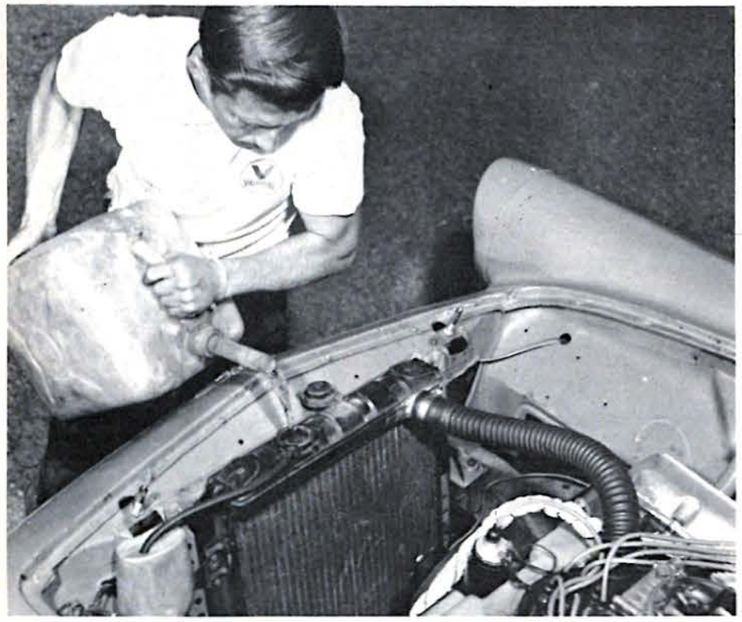
Building a rod or a race car? Or do you drive a two or three year old car on the street? Chances are you've had cooling system problems, or you can expect to. Here's your chance to read up on the inside info!

ONLY A THIRD or so of the heat generated in the engine will produce useful tire-smoking power. Another third of the heat derived from burning fuel is going out the headers. That will leave a remaining third to be disposed of by way of the cooling system. Picture one gallon of gas out of every three going into heat that must be carried away by the radiator. That is more than enough heat to keep your house warm right through the coldest winter days. No wonder cooling systems can pose problems, whether you run stockers, gassers or funny cars.

On paper, nothing is simpler than a cooling system. Just surround the cylinders and combustion chambers in the engine with a water jacket, and provide a water pump which will circulate the coolant through the engine and out, through the upper hose to the radiator. The coolant can then lose most of its excess heat content while passing through the finned tubes of a radiator. It then returns through another hose back to the inlet of the water pump.

Next we begin to add a few refinements. There is a considerable volume of coolant in the radiator and a lot of fin area, which would make it difficult to get an engine up to a normal operating temperature, right from a cold start. The problem is solved with a thermostat that is closed when the engine is cold. The pump then merely recirculates the coolant within the block instead of routing it to the radiator. There is a small bypass that enables the coolant to course from the pump, around the thermostat and back to the engine. Without this, coolant out of the pump would just be pushing against a closed thermostat and there would be no circulation within the block or head. When the engine warms up, the thermostat opens and normal circulation is restored.

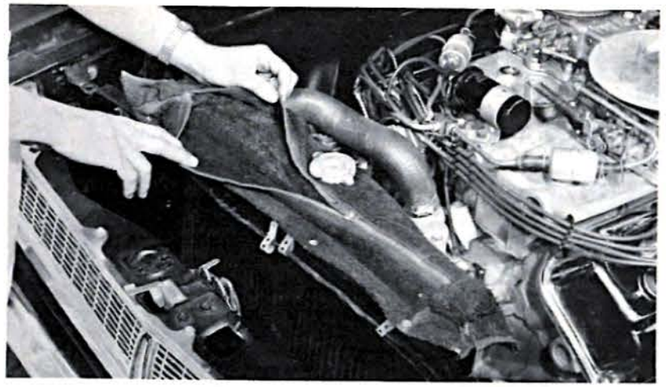
If you use your car for both street and strip, the thermostat should definitely *not* be removed. It will help with warmup, and make the car more driveable around town. Apart from allowing the heater to get into operation more quickly, it also helps the engine to live longer. With a warmed-up engine, water condensation on the cylinder walls and resultant corrosion and wear are sharply reduced. Since water is one direct combustion product

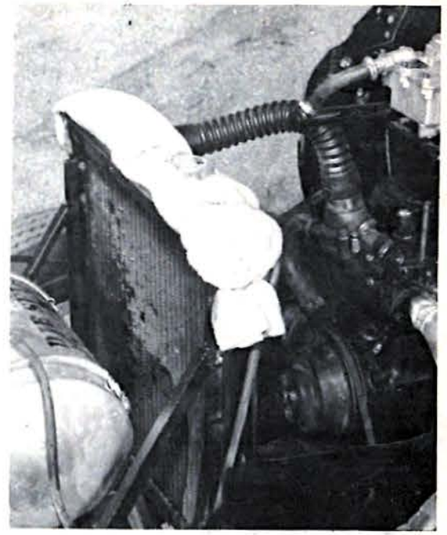


ABOVE—Winternationals winner Bill Coon races a 427 SOHC-powered '57 Thunderbird, and since he has plenty of room in the front, runs a full radiator. Bill uses a modified unit from a 6-cylinder Comet, with an Army canteen used to catch overflow. He keeps plenty of water on hand in large, lightweight plastic jugs for between-runs cooldown. ABOVE RIGHT—This is not an overflow can, but rather an expansion tank. It catches overflow when heat expands it, and after pressure is lowered during cooling, the water is returned into the system.

when gasoline is burned, keeping this water from cooling off and getting on cylinder walls is important. Also, the added heat helps the oil to reach normal temperature, at which time it can drive off water and fuel that condensed in the oil during cold starts, through evaporation. The oil stays cleaner, less sludge accumulates, and its lubricating qualities certainly improve when not contaminated.

The thermostat is designed not to impede the coolant flow when open, and just removing it to cure an overheating problem in a street machine is not the answer. You can check a suspected thermostat by heating it in a pot of water on your kitchen stove. It should open fully within a few degrees of its





ABOVE—The Fenner Tubbs Plymouth is fitted with a zippered canvas bag that holds ice. When the ice melts, it passes through the fiber and trickles down across the entire radiator face. Then the water evaporates and carries off heat from the radiator. ABOVE RIGHT—Another idea for efficient cooling is hosing down the radiator face and keeping a towel on the top tank to hold water, release it during a run. This gasser runs without a fan, so other methods are needed. BELOW—Hood modifications, where allowed, will help. Holes in rear let hot air get out.

rated temperature, and close back down when cooling off.

Another small but extremely important part of the cooling system is the radiator pressure cap. At atmospheric pressure, plain water boils at 212° F. However, if the pressure is raised, the water will not boil till a higher temperature is reached. The safety margin is very welcome on an already overloaded modern cooling system. Obviously, when the coolant warms up, it expands. Any air trapped in the cooling system also warms up and expands. This pressure in the system will rise. The pressure cap contains this pressure up to its rated value. Beyond that, it acts like a safety valve on a boiler and pops off its seat, allowing excess pressure to vent out. It also provides an audible hum while doing that and warns you of overheating problems.

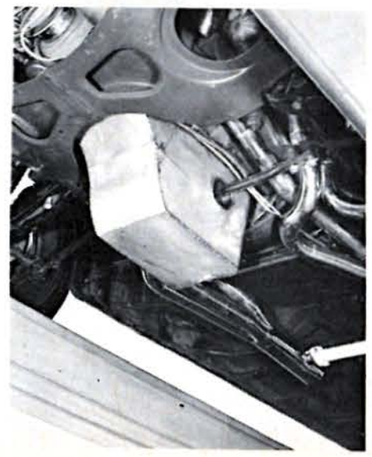
The pressure cap also has a small vacuum valve. When coolant temperatures drop, the coolant contracts, and makes more room within the system. To prevent a vacuum from forming (it could collapse the radiator tanks) a small valve in the pressure cap opens and allows air to enter. As soon as pressure begins to build up this valve slams shut.

When the radiator always needs a refill, but there are no obvious leaks, one of the first points to check is the pressure cap. If the cap is not seating properly, some of the coolant will be escaping through the overflow valve. Also, if the cap isn't seating, the pressure will not build up, and so the coolant will boil at a lower temperature, and here, too, a coolant loss will occur. There are many test instruments for checking pressure caps, but the fastest cheapest field test is to replace it with one of the proper pressure rating.

If you are building a funny car or a gasser and are setting up your own cooling system, it pays to make provisions for a pressure cap. This holds true even if a simple water tank will be used at the rear. Going to a higher pressure cap, as from a 7 to a 13 psi cap can help if the car is plagued with boiling problems when running eliminations. Keep in mind that older style radiators often can't take the higher pressures.

If a car has overheated and steamed up, the first thing people do is to shut off the engine and open the pressure cap. They are not only wrong on both counts, but they also get a scalding hot bath in the process. As long as the engine and water pump are running, coolant will be circulated and there won't be any localized overheating and steam pockets forming in the

BELOW—Water is not the only cooling medium in an engine. Any modification that will help oil to circulate and keep cool will make a healthier engine. Deep oil pans allow the use of more oil, and will also keep bearing temperatures from rising to the danger point and blowing an engine.



block. The moment the engine is stopped, the water around the hottest areas such as the exhaust ports comes to a quick boil and the steam pocket now tries to drive away the surrounding coolant. If at that time you happen to pop the radiator cap, the result is a geyser of boiling water that rises like a jet propelled fountain.

Unless there is a specific problem such as fan belt failure, where you have no choice but to shut down, keep the engine running and douse the outside of the radiator with a water spray. This will immediately bring down the coolant temperature. Also, turn on the car heater full blast, if there is one. This provides an added outlet for the heat. With the engine still running, care-

KEEPING the CUBES COOL

fully loosen the cap a portion of a turn, so that it will vent pressure, but don't remove it till the pressure has escaped. Then remove the cap and slowly add water.

If coolant is added fast, there is a good chance of cracking a set of heads. Cold water hitting hot metal can produce severe thermal stresses and usually the first thing you know, the heads are cracked and leaking water. If the car is too overheated, shut down and park it with the hood open. Leave the cap alone till the engine cools down and the pressure drops. Keep in mind that removing the cap immediately drops the pressure and the coolant, which is well above the 212 mark, simply flash boils with disastrous results.

If you're like most of the hot-rodders, you have supertuned an engine, added a hot cam, and are able to pull more horsepower out of it than the car maker ever thought possible. Naturally, the amount of heat rejected has also increased and that marginal stock cooling system isn't up to the job. What can you do? Quite a few things, as a matter of fact, and we'll begin with some of the precautions that can be taken while building the engine itself. When a cylinder head or a block is cast at the foundry, the water cooling passages are formed by cores. After the iron has flowed into the spaces around the cores, the sand forming the core is shaken out of the finished part fhrough core holes, or what are frequently misnamed "freeze plugs." Unfortunately, the cores must be held in place by wires and chaplets (small metal stands). Also, some metal flows into the gaps between adjacent cores and forms flash that sticks out into the water passages. As a result, there are obstructions in the block and the heads that impede the smooth flow of coolant.

If while building the engine you take the time and clear out all this mess with a hammer and a long punch, cooling will be much improved. Removing the "freeze plugs" makes it possible to reach into the space at the base of the cylinders and clean out any sediments and mud that forms during the life of the engine. A similar job should be done with the cylinder head. If you acquire a small pencil light and hold it right next to the punch while chipping, you will be able to see better.

The cylinder head gasket is the weak point of any cooling system, especially if you have gone to higher compression, or bored the block and reduced width of the bridge between adjacent cylinder bores. The biggest cause of cylinder head gasket failure are warped blocks or head decks.

When you disassemble an engine, don't just throw the old gasket away. Check it carefully for signs of leakage. Little carbon streaks that cross between the cylinders or lead out away from the cylinders tell of leakage and so do areas that are overcompressed or not seating. Metal around the cylinder head bolts in the block will often pull up above the rest of the block surface due to bolt tension. Cylinder heads are prone to warping with either a belly or a bow in the center.

Having the head and block surfaced should cure all these problems. Only sometimes it creates new ones. If the head is not set up right by the machine shop, it will be cut more on one end than on the other, changing the cc's in the combustion chambers. Excessive decking of the cylinder head weakens the area in contact with the gasket and poses problems. Which shop will do the job well in your area is something you find out the hard way.

Many shops have no facilities for decking the block and you must then dress up the decks with a hand filing, using a large flat mill file and then check with a straight edge. Cross filing that is, filing first in one direction and then another, helps bring out high spots. If you don't know how to file, you are likely to do more harm than good by removing too much metal at the edges.

When a new gasket is installed, spray it with aluminum paint, make sure that all surfaces are completely clean and button up the job fast before dirt has a chance of settling in. Another major point in preventing head gasket failures is to torque the head bolts in the prescribed sequence, from the center out in small increments. In other words, if you tighten some of the head bolts to the full torque right from the start then you will never get even tensions on all the bolts. It is better to work up 10 ft.-lb. at a time in the early steps and finish up with increments of 5. After the engine has been warmed up once for a half hour or so, retorque the heads all over again.

Radiator hoses age, swell up inside and tend to develop problems. Surprisingly enough, hose connections can leak in as well as out. A substantial amount of air can be sucked in to the inlet side of the pump by a faulty hose connection, completely upsetting the pumping capacity of the pump. So it pays to install new hoses and new clamps and to apply sealer to the inside of the hose. Use a sealer that will not dry out and that remains pliable.

Spring wire type hose clamps may be a fine manufacturing convenience but they pinch the hose and cause early failure compared to flat band-type hose clamps. When you install a hose clamp, point the tightening screw so that it will be easily reached at a later date for disassembly.

Since the hose on the intake side of the pump is subjected to suction, it may develop a tendency to collapse. Thus at engine idle it looks fine but at higher engine speeds pump suction caves in the hose and throttles it off the pump inlet. You can sometimes spot this action while gunning the engine and it should certainly be suspected if the engine develops high speed cooling problems.

The pump can sometimes do too good a job, especially at high speed. It is designed to pump a certain volume of coolant in the normal speed range of the car and so at higher speeds it becomes too efficient and pumps too much. The next thing you know, considerable vacuum has developed on the inlet side of the pump and so the coolant flash boils because of the low pressure. This means that it boils at much below the normal 212° F. boiling point and the pump is now delivering vapor bubbles instead of a steady stream of water. No wonder the engine overheats. This type of happening is called "pump cavitation."

If you examine the inside of an aluminum pump that has run under cavitation conditions, it will look as though it had served as the target range for a bunch of BB guns, with little pock marks bunched together. Cavitation erosion can eventually go right through the walls in a pump. Since cavitation is a problem on passenger machinery as well as on race cars, there has been a general shift from aluminum to cast iron water pumps. The point is

KEEPING the CUBES COOL

that cast iron resists errosion far better than aluminum.

If you run the pump at consistent high speeds there are several remedies for excess pump action. One is to cut back every second vane in the pump. Another is to add a by-pass hose between the block outlet and the pump inlet. This redirects additional coolant to the inlet side of the pump and reduces the pressure drop and cavitation. You can also drill small holes through the impeller near the center, which has a similar effect of directing additional coolant to the inlet and reducing the pressure drop.

If you run a gasser or a similar high speed machinery, there is a temptation of eliminating as much weight as possible and running with just the water in the block. Many people get away with it, others feel a lot safer in adding a small electric pump and an auxiliary water tank. This helps circulate the water right through the engine and eliminates hot spots.

"Big Daddy" Don Garlits runs one in his Dodge-powered rail and countless Anglia's are also outfitted this way. Keeping the coolant in circulation helps the engine last through tire burning and back-to-back round robin runs during eliminations.

The radiator has a series of tubes and fins of substantial surface area that allows the heat to dissipate to the outside air. Unfortunately, the radiator has been caught in a squeeze between cost and low hood lines. As a result, the upper tank of the radiator is quite low and often does not have enough height to allow entrained air bubbles to separate from the liquid. These air bubbles take away from the useful volume of liquid circulating through the engine and cooling system. Some passenger cars just live with the problem. Others have either taller tanks or baffles within the tank that allow the coolant to flow out before going to the radiator tube.

When switching engines, and going to a larger displacement you generally need a bigger radiator or a radiator with thicker core. As a rule, it is much more effective to increase the radiator surface area than to go to a thicker core. Air enters the core at normal outside temperature (ambient) and progressively picks up heat. The more heat it picks up, the less effective it becomes in picking up additional heat. The thicker the core, the further the air will have to travel through it and the hotter it will become. Thus it picks up less heat from the last row of tubes than it does from the first one and therefore becomes less efficient.

Radiators are easily modified by any competent radiator shop and it is no problem to add or move hose connections. While they are at it, a radiator shop can, if need be, add taller upper tanks or baffle the tank where the coolant enters it, so that there is less mixing between the air and the coolant.

Expansion tanks such as the ones used on a Corvette are extremely useful in preventing coolant losses and reducing air and coolant mixing. The tank is away from the main flow of coolant, and carries its own pressure cap. When coolant expands, the excess volume flows into the expansion tank. On the other hand, when the engine cools off and the coolant shrinks back to its former volume, pressure in the expansion tank chases it back into the system. Be sure to provide a

Continued on page 70

AGENT 1320 has sent along the wildest report we've seen in some time, but it does seem to be true. Art Arfons is planning to set a new world speed record with a jet dragster. What's so wild about that? The record Arfons plans to go after is the WATER speed record! Arfons has been planning the attempt for a couple of years now, and he has the car . . . pardon, the boat . . . all ready to test. He's converted one of his old quarter mile jets with big pontoons. But the really wild thing, says Agent 1320, is that once he gets it up to a nice speed of about 200 miles per, he plans to either raise the pontoons or lower the tires (our super spy didn't get that part too straight) and RUN IT OVER THE WATER ON THE TIRES! Arfons calls the record attempt vehicle the "Green Monster Cyclops." Agent 1320 says Mrs. Arfons refers to it as the "Green Submarine."

AGENT 1320 Reports

* * *

There is a report in Detroit that Ford will not build any more of their 427 cube single overhead cam engines. So they may not take over the dragstrips as much as it looked like after Connie Kalitta's fantastic string of victories this winter. The engines cost a real bundle to build, and even though Ford doesn't exactly give them away, 13 says he figures they still lose money on every one they sell. While the news may have saddened some racers who hoped to get one of the fantastic Fords, our man in Motown says that the folks at Chrysler have done a valiant job (pardon his pun) in hiding their sorrow at the report.

* * *

The Ramchargers have a new sponsor after all these years. No longer will that poetic name, Hodges Dodges, be emblazoned on the side of their candy-apple-striped machines. New sponsor is Detroit's Gratiot Auto Supply, which is backing both the rail and the new Dart funny car.

* * *

Speaking of Darts, Agent 1320 reports sadly that the Don Garlits' Dart will run no more. Don said that he couldn't get any competition to run against, and so that fast black roadster has been trailered.

* * *

Ronnie Sox and Buddy Martin are passing out cigars. Seems their two Plymouths have had a baby. It's a '67 Barracuda, red, white, and blue, powered by a 383 and carrying a 4-speed. Agent 1320 says Ronnie and Buddy will give the 'Cuda away as the grand prize at the end of their Supercar Clinic season. It'll be fully race-prepared and blueprinted when the lucky winner picks it up.

* * *

Ohio George Montgomery is reported to be building a new Mustang funny car. Other recent Ford funnies being built are those of Gas Ronda and Hubert Platt. All will have overhead cam Fords for power, so they must have got their orders in before the factory decided to cut off production.

* * *

Old drag cars never die, they just get campaigned by some new driver who hasn't had a chance to make it big yet. The Ford Fairlane that was driven by Darrell Droke in 1965 and by Jerry Harvey in '66 will be campaigned this year, under the sponsorship of Paul Harvey Ford, by Eddie Schmidt of Michigan. Eddie shouldn't have any trouble finding a place to get good bookings and appearance money—at least at his home town drag strip. It's owned and operated by his dad, Harry Schmidt, at Ubly, Michigan.

* * *

Agent 1320 says his big interest in drag racing this year will be concentrated in A/Stock class. That's where Shirley Shahan will be campaigning her '67 Dodge Coronet.

* * *

Chevrolet has been moving more and more back into the high performance area lately, with the latest move being a special super-hot option for the Corvette. This option is not recommended for street use, according to the bulletin sent to dealers and costs over 5 thousand cabbage leaves. It has a version of the 427 cubic inch mill that is rated at over 485 pony power, although the figure isn't published. (Agent 1320 got the horsepower figure out of a GM representative by torturing him. Our man kept reciting the Mustang Pledge, over and over.) This new setup is a complete package, with heavy-duty 4-speed transmission, heavy duty suspension and brakes like anchors from the Queen Mary. Agent 1320 says he thinks GM will probably name his model the Ralph Nader Special.

* * *

It's crash time! Dyno Don Nicholson tried out his brand new '67 Comet at Atlanta Speed Shop Dragway and had the front end collapse just after clearing the traps. The chute was out so everything was AOK except severe damage resulted to the front of the car. And a week later Phil Bonner lost a rear wheel on his Mustang at 171 mph and went on the roof. Phil's ok but the car is a total. So it's back to the drawing board.

* * *

Here's a serious note from our man for all of you guys who might be building an injected car. Don't hold the injector tubes in place with pop rivets. Weld 'em on! A couple of well-known teams have had a lot of engine trouble lately that came from pop rivets worked loose and a few got swallowed down the stacks and into the engine innards. That can be expensive eating.

* * *

Here's good news for any of you who might have a Volvo you would like to race. Volvo has put up a nice little kitty of $10,000 which will be paid out at the end of the season to drivers who have scored the most points (under a Volvo point system) driving a Volvo in competition. The big NHRA drag events, and some AHRA events, count for points. You don't have to be a big winner to be eligible for point money at the end of the season. Of course, the more you win the more points you'll pile up—and the more money you can win. Better see your Volvo dealer for details.

* * *

Royal Pontiac is experimenting with putting three side draft Weber carbs on a Pontiac overhead cam six, plus Corvette-type dual side exhausts. The setup will be for a special Royal Firebird.

* * *

Back East, the word is very very strong, says Agent Double-O Drag, that long-time Chevrolet man Dave Strickler, of York, Pa., will park his super-long funny Corvette, and slip behind the wheel of a '66 Comet. The Comet will be the one campaigned so successfully last year by Ohioan Ed Schartman. Agent says he'll know for sure real soon.

* * *

You should see what the editors of SUPER STOCK have to put up with when Agent 1320 gets really swinging on a report. Although it is our policy to protect our readers by re-writing his stuff (you couldn't stand the shock of reading his idea of humor) we think it will be good for your character to read one of his reports right as it came from his candy-apple-red Crayola.

"Chrysler Corp. sure wasn't fueling when they told their drivers "Don't you fuel around none with that nitro and stuff." One of their drivers thought he could fuel them and tipped the can, and now he has to buy his parts retail. Boy does he feel fuelish. He should have stuck to gas." ■

TeKorner with Bill Jenkins

BLOWER WON'T BLOW

Dear Bill,

I own a '62 Olds Jetfire F-85. This car's engine is equipped with an AiResearch turbocharger. My problem is that I'm not getting any boost from the turbocharging unit. I have rebuilt the turbofluid metering unit, thinking this might help, but to no avail. The local Olds dealer can give me no help, so any help at all would be appreciated.

Larry E. McWhorter
Greenville, Miss.

Since any modification to the exhaust system is legal beyond the cylinder heads, I would suggest that you keep the exhaust as hot as possible up to the blower, play around with the waste gate adjustments and the nozzle exposure to the exhaust turbine.

OLDS NUMBER-CAR

Dear Bill,

I'm building an all-out strip machine for NHRA B/MP. The car is a '65 Olds 4-4-2 with a Hurst shifter and a 3.90 rear. The following modifications will be made over the snowy season:

1. A .030-in. bore.
2. Forgedtrue pistons.
3. Dual Quadra-Jets on an Offy manifold.
4. A Crane (ZIP 526 or 528) cam and kit.
5. Ported, polished, and milled heads with 2.15-in. intake valves and 1.75 exhausts.
6. M/T aluminum rockers.
7. Traction bars and Air Lifts.

I have a few questions for you to answer:

1. Are 13:1 pistons too much com-

(Continued on following page)

TeKorner with Bill Jenkins

pression for the big block? If so, what would be best?

2. What make and series spark plugs should I use? How much lead and how much gap?

3. Do .055-in. intake and .085-in. exhaust sound OK for the valve seats?

4. How much should the heads be milled?

Wayne Robinson
Rochester, N.Y.

Statements 1 and 2 are OK. 3. You'd better figure on AFB's since they are easier to set up. 4. This cam may be too much. Considering the lifter diameter, a roller might be better. 5. Increase the intake size only enough to allow flaring the valve pocket up to about a .075-.090 wide seat and exhaust as much as you can without offsetting the guides. 6 & 7 OK.

Now for your questions. 1. You'd better stop at 12.5:1. 2. J66Y Champion, .030 gap, 36-38° total. 3. They're fine, but backwards. 4. The amount of milling can only be determined by compression ratio requirements after cc's of piston dome are determined.

GOT THE SHAKES

Dear Bill,

I have a '60 Pontiac Catalina convertible, with a stock 389 2-bbl. and Jetaway Hydramatic.

I installed a 3-2 manifold and carbs. The car shakes at idle and in gear, but it does have lots more pickup. I

have converted to a 4-speed.

Can you give me any tips to correct the idling for smoothing it out? How about clearing up valve float, which now occurs at 4000 rpm?

Pete Wagner
Chicago, Ill.

It sounds like you have a vacuum leak at some point. Look for: 1. A forgotten accessory hole in the manifold or carburetors. 2. A leaking gasket. 3. End carburetor throttles not completely closed at idle. Installing a set of valve springs, including the inner springs that go with the 3-2 setup, at the correct tension specifications, should give you at least 5600 rpm at the 318 hp specs, and 6200 rpm at the 348 hp specs.

GIDDY-UP, DOGGONE IT!

Dear Bill,

I have a '67 Chevelle, 325-396. I have noticed in my car and some others that there is a hesitation before the secondaries cut in. This is on a

Quadra-Jet. Would an electric fuel pump help, and is it legal to use? Would I fall into the new B/SS or stay B/S?

Gerald Woolston
Lakeville, N.Y.

Put the accelerator pump rod in the other hole in the arm and then bend the rod so the arm just lifts off the top of the plunger rod with the throttle all the way closed. Then readjust the fuel bowl vent to be open about 1/16 in. at idle. Raise the secondary metering rods so they barely come out of the jets at wide open air valve setting.

Run a stock '65-'66 425-hp passenger air cleaner, unmodified. You would run SS/E or B/S depending on conditions, manifold, cam, etc.

IMPALA OOMPH!

Dear Bill,

I have a '65 Impala, 300-327, 4-speed. After installing a '64-'65 fuel injection cam, a set of M/T headers, and a 4.11 rear end, I have some questions. Where to set timing? What is meant by total lead? What jets in the Carter C-series? Dwell? Plugs and gap?

Can I and should I grind my intake manifold out as you have done on your car? Any other suggestions?

Mike Coker
Havana, Ill.

Run 40° timing. Use .104 primary, .071 secondary jets, 31-33° dwell, J12Y Champion plugs, .032 gap. Considerable benefit in cutting out the manifold or replacing it with a larger aluminum manifold and still cutting out the center.

TeKorner with Bill Jenkins

ABOUT THAT PULLEY . . .

Dear Bill,

We recently rebuilt the engine in a '60 Buick, being very careful to do everything necessary, and do it right, so the engine would run properly when reinstalled. When it was put together, there was a steering wheel vibration. We checked over everything outside, and tore it down again. We discovered a loose crank pulley.

We installed a new factory pulley, as the local dealer recommended, but the vibration was still there. We've checked everything else in and out of the engine twice. Have you any ideas?

Harold Boxley
Lamar, Colo.

The situation you describe is a recurrent Buick problem. It's a loose harmonic balancer.

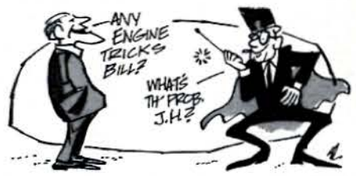
If the balancer came loose once, I'm afraid that the front end of the crankshaft has become worn and will not correctly retain the new balancer. It will be necessary to weld up and remachine the nose of the crank or replace the crankshaft. If you replace the 'shaft or any of the reciprocating parts, it would be a good idea to have the assembly re-balanced.

GRUMPY'S TOY III?

Dear Bill,

I am planning a Chevy II for street and strip, probably in Modified Production. What major problems will I encounter in putting a 327 in this car? Are engine mounts used on the '66 applicable on either '62 or '63? What front springs and stiffer rear springs can be used for both street and strip? Will big-car rears fit into the Chevy II carrier and, if so, are the axles strong enough? I plan on using a 4-speed with 4.11 positraction rear. To be on top of the class in B/MP, should I leave the engine at 327 cubes or bore it out? I will be running 375-hp heads and cam which worked out fine on a 283 I currently run. Are there any other suspension or engine tricks you can suggest for this car? Do you feel that one Holley is better than 2-4 bbls? What about new model headers for the older Chevy II?

John Habbe
Scarsdale, N. Y.



No major problems for the engine installation as all mounts are the same and front springs are almost all identical. Do not use stiff front springs. Use some '66 Nova SS heavy duty rear springs and spring stiffener traction bars.

I would suggest using a '57 Olds-Pontiac rear axle as the Chev setup will not be strong enough for sustained use.

You will have to run 5.14 or 5.38 gears, depending on tire size, to be competitive. 4.88 is the lowest you can get for the '65-'67 12-bolt Chev rear, which is stock in the late model cars and equally acceptable as the Olds-Pontiac. The single Holley is preferred over the 2-4, but not as good as 2 Holleys on a ram manifold. ■

KEEPING the CUBES COOL

venting and filling arrangement if the expansion tank is not the highest point in the cooling system.

If you run into a heating problem, where the engine consistently runs too hot, first try to locate a possible source of coolant from leakage at the pump, hoses or radiator cap. Next, use a can of radiator flush or have the radiator boiled out. Excess use of radiator sealers will inevitably bring cooling problems which radiator flush alone will not cure.

If you suspect cylinder head gasket leakage have someone run the engine and apply a load to it either with the automatic or with the clutch while holding the brakes. Watch for signs of bubbling at the radiator. This will usually show up only when the engine is under load. For obvious reasons, this test has to be kept really short so that you don't burn up pieces. Many gas stations have pressure type testers that will detect head gasket failures or pressure cap leaks.

Check the fan belt tightness and inspect the radiator for signs of oil leakage into the coolant. Also take a glance at the dip stick and

"Gee, everybody has a favorite number and this happens to be mine!"

see if water is getting into the oil. These steps should locate the trouble.

If you ran into your cooling system problems after modifying the engine extensively or after chopping out some sheet metal, you can try the following remedies. Check that the air is directed to the radiator and cannot short circuit it. If you have removed sheet metal and baffles in an effort to lighten the car and air is no longer funneled to the radiator, overheating will result. You may also have to go to a larger size radiator, and for this your best bet is to consult with a radiator shop. If the overheating occurs primarily at low speed and in traffic, install a bigger fan, a limited-slip fan, or a fan with more pitch or a bigger radiator. Some radiator applications intended for drag strip use in performance models are marginal. On some cars, the engine compartment acts as one big air trap and air can enter from the radiator but not leave; this is the reason for the cut outs in the inside fender sheet on some of the Fomoco racing machinery. The cure is to provide some venting by increasing the air escape area or by raising the rear of the hood to give hot air a chance to escape.

When the overheating occurs only at top speed, think in terms of pump problems and cavitation. If faced with excessive coolant loss that cannot be traced to leaks or cured by a new radiator cap, an expansion tank will definitely help.

Most racing machinery operates with straight water because water has a greater heat carrying capacity than permanent anti-freeze. If you live in cold climes, use ethylene glycol. Do not use alcohol since it has too low a boiling point. Ethylene glycol will raise the boiling point of the water, which is helpful in reducing coolant loss under some marginal conditions and is essential for air conditioned cars (for those who like dragging in comfort).

Ethylene glycol is not compatible with bearings and moving engine parts. If it gets into the oil and cooks, it will leave a varnish-like film which inevitably causes failure. This is not the fault of the anti-freeze, which, after all, was never intended as a lubricant. The only cure is to avoid head gasket leaks. ■

"You know that big tree, way down at the end of the shut off area? Well, it's not there any more!"

see how this car, which has repeatedly tested in the 15-second bracket, can be called a high performance car.—Ed.

FIREBIRD FEEDBACK

Dear Sir,

I have recently received your magazine, which, as always, was very well written except for one article. The article I am referring to is on the Pontiac Firebird 400.

Now this car really gets me. I have read all the articles on the Firebird 400 that have been written so far, and they have completely different performance results. Yours happened to do the quarter in 14.03 seconds, which is very quick, but another magazine only managed to do the quarter in 16.20 seconds. Both cars were equipped with almost exactly the same thing. Now this made me wonder why two magazines turned times that are two seconds apart.

I have finally reached the conclusion that Pontiac Motor Division supplied you with a "loaded car" that must have been dyno tuned. Since you tested this car before introduction, it must have been a special handbuilt car just for magazine testing. But when you come down to the cold facts, the potential of this car after being slapped together on the assembly line would be about 15.50, which is roughly equivalent to the 390 Mustang and 383 Barracuda.

I just wish that the manufacturers would supply a show room car right out of the dealer's for precise testing, because only then could we get the true facts.

Jim Bielecki
Dearborn Hgts. Mich.

First, let us assure you that the car wasn't special at all. But it was equipped with the close-ratio 4-speed and 3.90 rear, and had no heavy, power-robbing options. Most of the other test Firebirds were automatic, with power options, 3.08 rears, etc. All that makes a big difference in performance.—Ed.

FORD FANS, UNITE

Dear Sir,

Please add three more names to the list of "24 Ford Lovers" (Blowin' Smoke, March 1967). We tend to disagree with your staff. Cut down on the GM and MoPar articles and give us Ford lovers a break.

We are looking forward to the results of the 427 Fairlane drag test. Keep those Ford articles rolling in. Keep up the good work on a great magazine.

Doug Cranstoun
Jack Danka
Tom Ponting
Trenton, N.J.

Dear Sir,

In regard to John Eime's letter in your March '67 issue about equal coverage. I made the following survey over the 1966 issues. On the cover there have been six GM products, five FoMoCo's, and one Chrysler product. In your 51 articles, I found 21 about Chrysler products, 20 for the GM people, and a skimpy 10 for Ford. Putting these two areas together I find that GM has had 26, Chrysler has had 22, and Ford has had only 15. Ford has only 23%.

. . . As you can tell by now, I am a Ford man and will always be. I hope this letter doesn't hurt anyone's feelings around the SS&DI office as I still think yours is the best of the funny car magazines. Please withhold my name as there are some GM fans in my area that are bigger than I am.

Name Withheld

Ford lovers, take note. Elsewhere in this issue you will find a 427 Fairlane test, and a color feature on a fine, fine NASCAR Mustang. —Ed.

NASCAR Grand Stocker ACTION

News Notes on NASCAR's Ultra Stock Circuit

THEY SAID it couldn't be done . . . putting automatic transmissions in those Fords.

But now it's been accomplished successfully and could result in one of the big changes in Eastern super stock racing this season.

It was generally agreed that the automatic transmission just would not hold up in the hot Fords running the NASCAR Grand Stock circuit.

So, while Dodges and Plymouths were running with automatics last year the Fords were sticking with the sticks.

Not that the results were bad—the FoMoCos finished in a dead heat with the Mopars (260-260) in the battle for the Manufacturers' Championship.

But, still there were those—including Frank LeSueur, who heads the Grand Stock circuit—who felt certain that the automatics would stand the pressure of competition.

Finally, the switch was made in Al Joniec's Mustang. Nothing could have been a greater test. Joniec's Bat Car had more bad luck on the circuit last season than Joker or Mad Hatter ever could have dreamed up.

From the early results this year, though, it's definitely a different Bat Car—a quick mover which, if it continues to hold together, could make Joniec the "man to beat" for the circuit championship.

"He (Joniec) went by me like a bullet in the traps at Atco," said Tom Sneden, the Dodge "Bounty Hunter" driver, after one of this year's early meets. Al's been running in the 9.8's and about 147 mph on gas. But the big thing is that he's holding together.

Now Bondy Long's Mustang, driven by Carson Hyman, has been switched to an automatic transmission and more may follow.

Incidentally, don't let Hyman's early troubles this year fool you . . . He'll be tough . . . In the Winter Championships at DeLand, Fla., Hyman still was on carbs . . . Wait 'til he gets the injectors working right . . . Hyman has two cars . . . the new S/US1 overhead cam Mustang and his U/S4 job.

Richmond and Suffolk dragways probably have more "graduates" on the Grand Stock circuit than any other strips . . . Such drivers as Melvin Yow, the Grand Stock champion; Tom Sneden, Dan Smoker, Sam Kennedy, Billy McDuell, Sam Auxier, Chick DeNinno, Pee Wee Wallace and many others cut their teeth and et's at the two Virginia strips before hitting the national trail . . .

* * *

Now, Dan Weis, promoter at Richmond, has gone one step beyond. He's given his own brother to the circuit . . . Joe Weis will follow the Grand Stock trail, campaigning a street hemi Dart in Ultra Stock 4 (2800 lb.) class . . . Weis drove a fuel-burning Chevy II at his brother's strip before deciding to hit the circuit as a full-time career.

* * *

Pee Wee Wallace has given up his fuel and will swing a Barracuda into the big S/US1 (2400 lb.) gas competition . . . Tom Smith, of Clinton, Md., another fuel convert, will campaign with gas in a 'Cuda.

* * *

Yow, as we head to press, still is unsettled as to what ride he'll take . . . but he'll have one . . . Sam Pannuty is swinging into super stock action with one of Jere Stahl's cars.

* * *

Dave Koffel and Gale Mortimer, who had the right answers in their Maloney Plymouth—the Flintstone Flyer—last year, still are trying to work out the problems in their new 'Cuda.

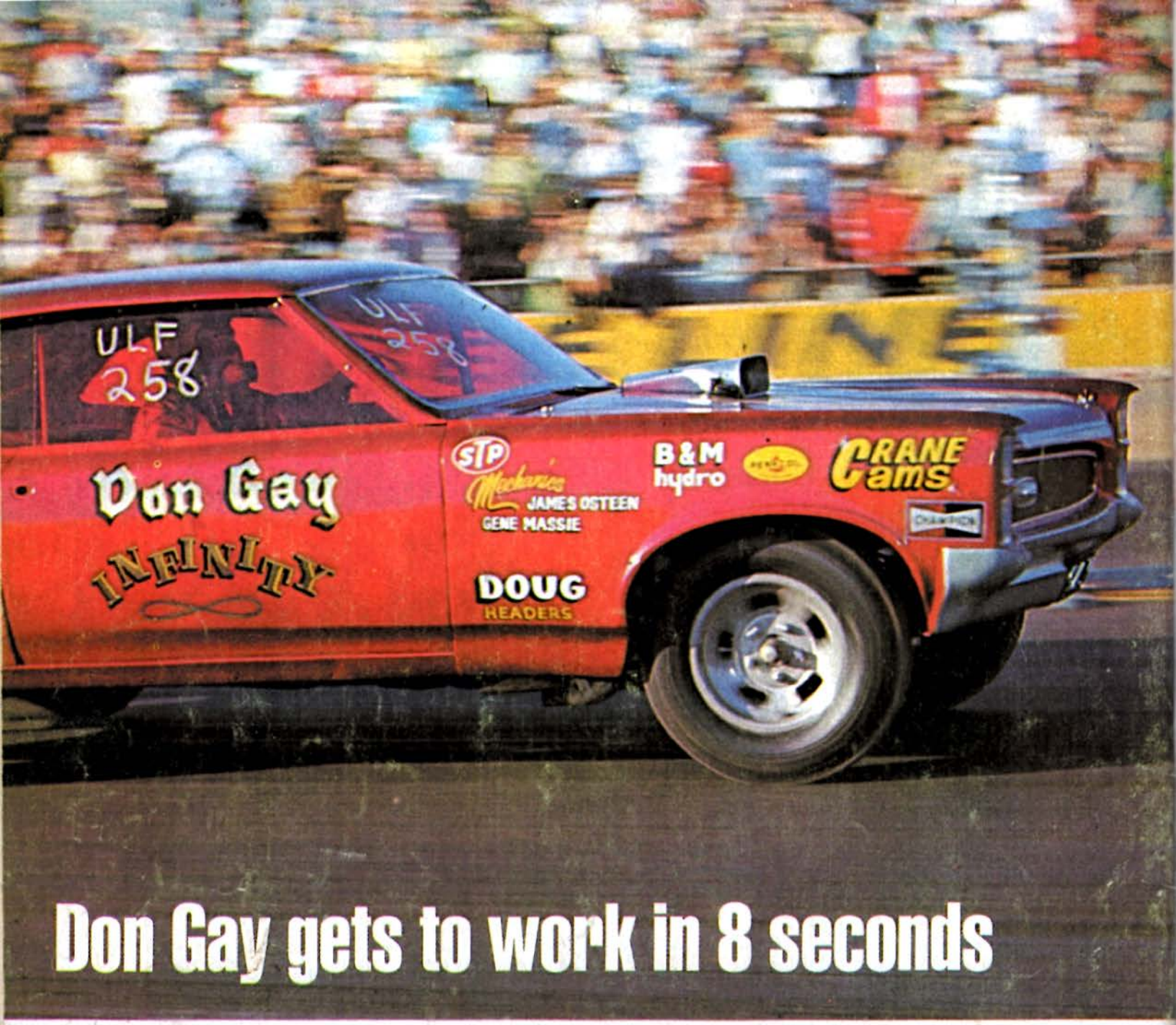
* * *

While Sneden has moved into the new Bob Banning '67 Dodge (one of the best-looking cars ever), Dave Reitz has taken over as pilot of the '65 model . . .

* * *

And Ringgold, Ga. is outdoing itself again . . . The town, which is hardly big enough for a traffic light, has two top runners in ultra stocks this year—Robert Nance in a S/US2 Valiant and James Lake in a S/US1 Cuda. The pair are the biggest news to come out of Ringgold since Linda Vaughn. ■

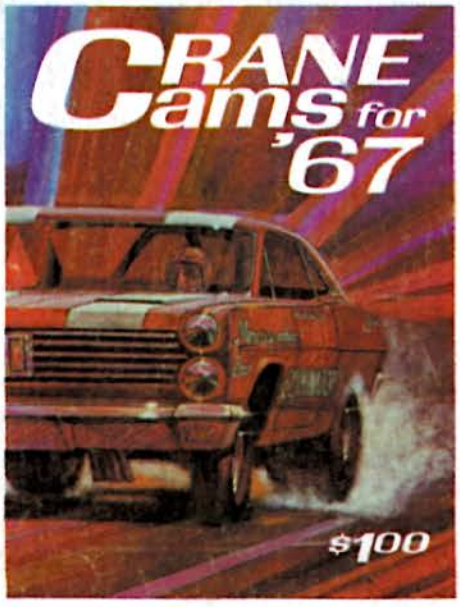
ADVERTISING INDEX



Don Gay gets to work in 8 seconds

. . . . and he hates to be late.

Think the freeway's tough? Try pushing a massive, brawny machine a quarter of a mile in eight seconds every day. It's a little hard on the go-department, to say the least; and that's why Don Gay and literally hundreds of professionals use and swear by CRANE Cams (and that doesn't count the over 18,000 other CRANE customers). There are too many other things for a racing champion to worry about to take time sweating over a cam; he just buys the best and forgets about it. And, as if last year's line-up wasn't enough, CRANE Engineering has published an all-new, up-to-the-second catalog for 1967. It's packed with 60 pages of info, how-to, and pics. And it's all wrapped up in the wildest cover you've ever seen. Get it now—no winner would be without one!



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