wringing out the 4-4-2 OLDS

Here's the latest entry in the "Help Stamp Out The GTO" campaign!

BY ALEX WALORDY

CARS ROAD TEST

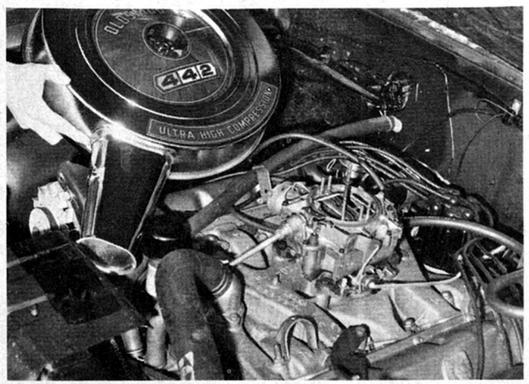
THERE are strong winds of change blowing from Lansing, winds that resemble the roar of a high performance car passing someone as though he were standing still. To be specific, Olds, in the past a standby at the drag strip with various Rocket engines, gradually drifted off into the strictly passenger field. Now they are back in high performance and after driving their new 442 we must admit that the result is quite appealing to say the least. One of the neatest features of the car is that it can be bought not only in luxury Cutlass trim, but also in a more sedate but still appealing sleeper package such as the F85.

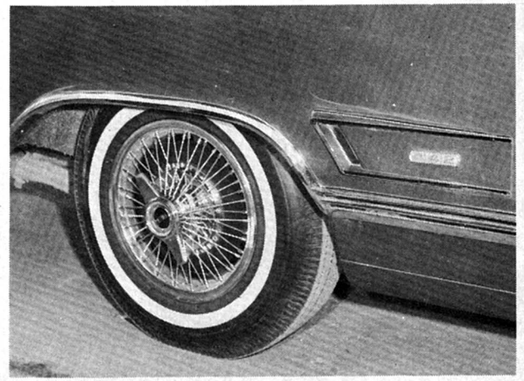
Jump into the bucket seat of a Cutlass and you'll find that the car retains the Olds flavor of luxury. Only it combines a 400 cubic inch engine with a 3,400 pound package and can probably be trimmed to well below that if you really want to campaign. It is an unusual car in that you can cruise in fourth at 20 mph without it bucking or missing, or you can do seventy in second without having the valves pop out of the heads. In other words, the Olds 442 is a true, no-nonsense street automobile.

Things get even more interesting as you take it out on a Michigan back road full of square corners and find that it corners flat. Then you corner it harder and find that after you finally reach rear end breakaway, you can stay in a slide or recover instantly. Since the Cutlass-F85 family has three other members that corner well, but not quite that well, let's look at the suspension features.

Cars without stabilizer bars generally show the need for one. Cars equipped with a front stabilizer bar do much better.

Photo above is "smoking proof" that the new 4-4-2 is ripe for A/Stock competition. Thanks to a new stabilizer bar, the 4-4-2 recovers immediately from a power skid. Performance package is available in jazzy Cutlass or standard F85 trim.





Beefy 400 cube mill sports a large four-barrel and a top notch porting layout. It should be a strong contender in Stock competition. Wire wheel disc and performance tires hide the oversize 9½-inch finned drum brakes from view.

A stabilizer is, in effect, a torsion bar that comes into action during cornering, but doesn't add to the wheel rates when both wheels are in jounce or rebound. If you add to the spring rate, the car becomes stiff and unpleasant, but corners flat, giving the driver a greater feeling of security. When you add a hefty stabilizer bar at the front, you retain the flat cornering, but with the front taking a substantial portion of the roll couple, considerable understeer is inevitable. With Oldsmobile's design, using both a front and a rear stabilizer bar, the front and rear roll couples can be very accurately proportioned to retain just a touch of understeer for good road stability. The understeer does, however, remain light enough so that the car feels nimble and responsive. What's more, the front to rear wheel rates can be matched more freely to retain a pitch-free ride.

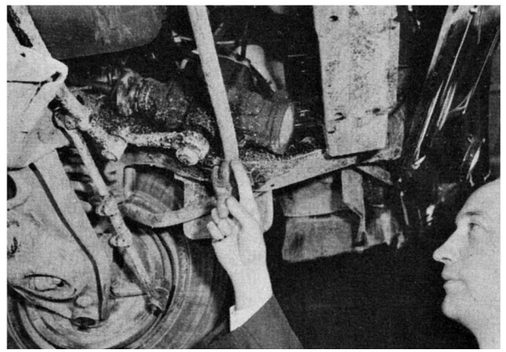
When Olds first introduced their 330 cubic inch engine, we couldn't help but remark that bigger things were in store. The reasoning was simple: here was an engine that retained many of the basic dimensions of the 394, such as bore center-to-center distance, cam to crank spacing, etc. It was therefore capable of growing, and grow it did, to 425 cubic inches in '64. The 425 continued in full production, but GM apparently imposed a limit on all of its divisions to 400 cubic inches on its intermediate sized cars, and so Olds did effectively reduce the bore by .125 inches and brought the displacement to the required limits. Fortunately, to save on production costs, they didn't change the water passage cores. Actually they only increased the cylinder wall thickness by .0625, hardly enough to matter. The boon, of course, is that you are as close to 425 cubes as the nearest boring bar, and with a standard .060 oversize beyond that, you could really get 437.5 cubes. Not a bad potential for a 3,500 pound car!

Let us expand a little further on the drag capabilities of this engine. It has a set of saucer-shaped combustion chambers with completely unshrouded valves, courtesy of an Olds engineer by the name of Gill Burrell who decided that wedge chambers were just far from the ultimate in design. At first, he was in quest of a faster burn chamber that would improve combustion efficiency and fuel economy. He found that by making a more open chamber with a nearly central plug location, the rate of burn was indeed increased. Simultaneously, the dyno needle began to point up some unexpected power gains. Further investigation showed that these were directly attributable to better breathing. The improvement was subsequently carried over to both the 330, the 425 and the current 400 engine.

The valve size is roughly comparable to that of any competitive engine: two inches across the valve head on intakes, and 1.670 inches on exhausts. However, with the basic unshrouding, these valves should be competitive with those of even larger-valved high performance units. One potential avenue of improvement is that with a larger bore, the head can be opened up even more for improved flow. It would be difficult to squeeze more valve size into these heads, since the valve heads already come close to each other. Offset guides would offer only a fractional improvement, if any, in valve size increase.

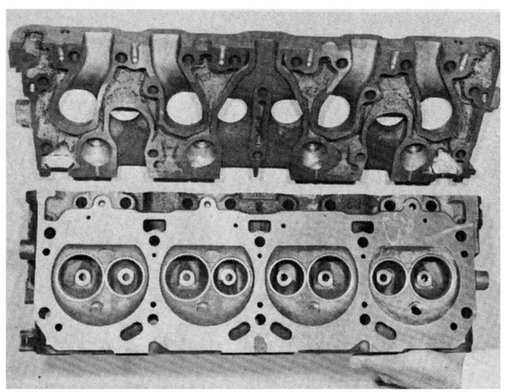
Olds has another major breathing plus in its favor because of the new and highly effective intake port layout. Normally, intake ports are doubled up in pairs, and squeezed in between a pair of closely spaced pushrods. The only alternative is a set of offset rocker arms, which come in rights and lefts, at a substantial cost increase, and even they do not provide full relief. Oldsmobile solved the problem in elegant fashion by inverting the traditional intake and exhaust valve positions in the two end cylinders. Now, only one port passes (*Continued on page* 75)

Bucket seat interior is extremely neat. Tach location, behind the stick, hinders performance driving.

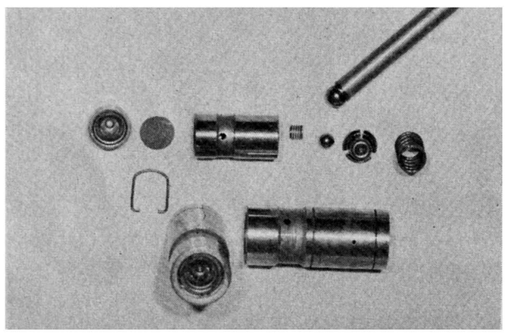


Link-type stabilizer bar, HD shocks and springs insure front end stability. There's room for tube headers!

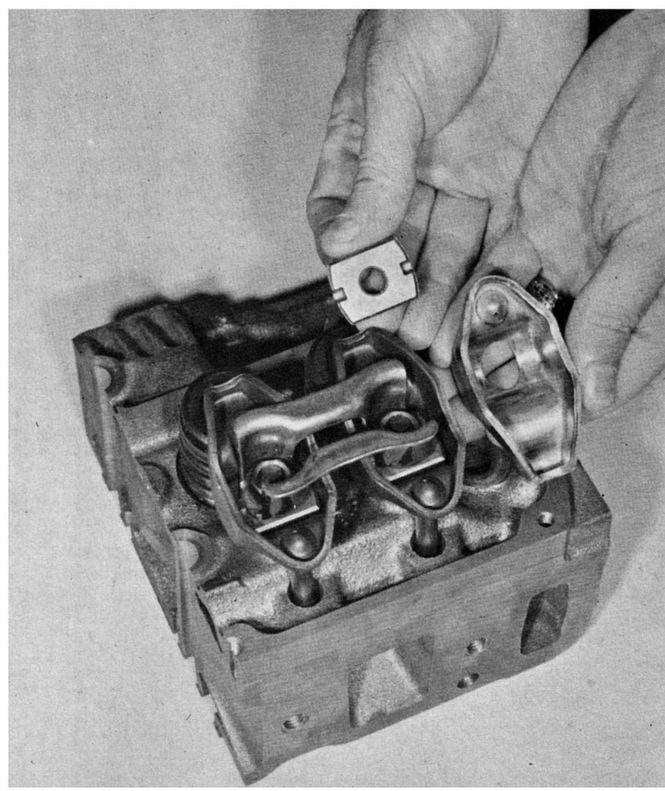
Rear stabilizer bar is bolted directly to the lower control arms. Limited slip rear houses 3.55 to 1 gears.



Shallow saucer-shaped chambers offer wide open unshrouded breathing areas all around the valves.



Improved hydrtulic lifters have cage retainers and springs to control pump-up, ball check action.



New rocker arm layout utilizes half barrel-shaped pivots which reduce friction. Stamped retainers are used.

the running as Tom Hoover eliminated Ongais. Arizonian Dean Turk lost a blower belt right in the lights but still managed to beat Californian Frank Cannon.

Tension mounted as the final go brought the crowd up to, and nearly over, the fences as Tom Hoover and Dean Turk awaited the green light. The light flashed and Hoover managed to get a slight jump on Turk. At the finish, Turk closed the gap but the win light was in Hoover's lane, leaving him the winner. The crowd applauded and cheered, with local fans sighing at Arizona's last try for a champion, having to settle for a close second.

AHRA President Jim Tice next presented Hoover with the keys to a new 1965 Mustang, one of several merchandise and cash awards that added to the nearly $10,000 total winnings. Tom Hoover, a real credit to drag racing, was a new champion. Tom's elimination times were 7.80, 7.87, 7.76 and 7.75, in that order.

The event was televised via closed circuit to 42 Eastern snowbound cities, in contrast to the 75 degree temperature and sunshine.

Upsets of many top names and previous champions were numerous and the American Hot Rod Association's Winternationals drew to a close with "the race to be remembered," as fans witnessed the greatest exhibition of speed by top ranking drivers and machines from all over the U.S.

4-4-2 OLDS, continued

between any pair of push rods. What's more, the port sections show minimal and very gradual changes in section. Rocker arms are straight, (no rights or lefts).

An interesting change has taken place in the rocker layout—a switch to stamped steel rockers that does away with the traditional ball sockets, and the push rods rubbing against broached holes in the heads. Apart from the fact that broached holes cost money, they also pose metallurgy and surface wear problems that can be hard to live with. Here too, Gill Burrell came through with one of those little improvements that lift an engine out of the commonplace. The ball sockets were replaced with a pivot shaped like a half barrel. This provided considerable increase in bearing area, and an equivalent reduction in friction and wear. The straight sides of the barrel prevent the rocker from tilting, and it is also restrained by steel stampings that engage two rocker studs at a time and have small fingers that retain the pivots. The pushrod holes are bored round, and have ample running clearance with the rods. Exit another problem.

The release cam is hydraulic, and obviously designed for street use. Duration is 278 degrees on intakes and 282 on exhaust, with a 52 degree overlap and lifts of .431 and .433 respectively. The valve spring pressures are nowhere near a peak, with 180 to 194 pounds open, so cam life will be good. There is certainly ample room for additional cam if you want to switch from street to drag, almost a certainty with a hot engine such as the new Olds mill. An interesting cam swap possibility exists since the Starfire cam has a .040 inch higher lift. To avoid altering the valve train geometry, you can either shorten the push rods or install the starfire valves. Whatever you do, don't grind off the welded hardened tips.

In the drive line department you have a choice of three transmissions: a three speed all synchro unit, a four speed and an automatic. The clutch is an 11-inch heavy duty unit with a 2,450 pound pressure plate and a diaphragm spring. You'll find the close ratio four-speed matched with a 3.55 rear to be a very comfortable combination, and staying out of a 3.90 rear avoids a first gear that runs out of breath uncomfortably close to the peak of second gear. Unfortunately, the automatic is not of Oldsmobile's latest release, or it too would be highly useful in a performance package.

The power steering car is fitted with a 3.5 turn lock-to-lock unit representing a 17:1 over-all ratio—an improvement in steering speed and a helpful safety item. Our only comment is that the gradual speeding-up of steering ratios is long overdue among all makers, and much *too* gradual. A major compensating factor is the remarkably tight feel of the car. You tug at the steering, and the car responds quickly and positively. Part of the answer is that spring rates are a good 50 percent higher than those of the Cutlass which in its own right is no slouch in the handling department. The shock valving is a little lighter than the GTO on initial control. Incidentally, we hear that GTO owners have been very happy with Olds' rear stabilizer bar installations on their own cars.

The new Olds 442 represents a very tempting package for anyone who likes a blend of performance and luxury. It will certainly threaten the position of every performance car in and around its class. A number of knowledgeable individual owners are

considering it for the drag strip, and the 442 certainly can't miss collecting its share of trophies.

DRAGWAGEN, continued

retically, then, Wayne had to have all the weight possible on the rear wheel to get the best possible traction. But it was obvious that some weight would have to be left at the front to keep from looping. The answer was the 9 foot wheelbase that makes the front end weight more effective, as a 100 pound front load would be as effective a counterweight as 200 pounds with a normal wheelbase.

The wheelbase of the Drag-Wayne was calculated to keep the front wheel from lifting short of 1.5G acceleration, and that is well beyond any British record. (G is gravitational acceleration of 32 ft./sec./sec. or that of anything falling towards earth in a vacuum.) To further discourage the front end from lifting, the center of gravity was kept as low as possible, and this also helped in retaining a small frontal area. A streamlined shell was felt to be desirable to cut down air drag, but it was decided to get all the other engineering problems ironed out before tackling the aerodynamics.

With the basic idea in his mind, Wayne started drawing plans for the model. It was evident that if both driver and engine were ahead of the rear wheel, the 85 percent rearward weight distribution he wanted could only be achieved with an unrealistically long wheelbase. It was therefore decided to put the driver behind the rear wheel, as mounting the engine at the rear would have been too complicated. With the driver so far from the front wheel, it was obvious that hub-center steering would be needed.

Back home, the serious work began. Mild-steel tubing was used along with some ¼-inch steel plate to make the chassis. An AJS motorcycle 4-speed gearbox was installed with a final drive ratio of 3.35 to 1.

The next problem was the engine, and the selection of a Volkswagen raised some eyebrows. The Volkswagen is a great little air-cooled engine, but it was designed for long life at a relatively low power output, not for producing short bursts of high horsepower. The supercharger people were particularly discouraging, as they felt that really hotting up a VW was insane. Clive was told that a boost pressure of 5 psi was as much as the engine could stand.

Undaunted, Wayne stuck with the VW engine, using a Shorrock supercharger of 1,420 ccs to provide 15 psi boost. The smoother intake system impulses of a four cylinder engine *would be a great advantage over the* standard single or twin cylinder motorcycle engine, and Wayne also wanted an engine with a short stroke and large piston area.

The next problem was to sleeve the 1,192 cc VW engine down to 1,000 cc. Clive intended to run in the motorcycle class, and that was the maximum engine size permitted. Pistons from a 350 cc Royal Enfield were called into use, and the capacity came out at 980 cc.

To put some reliability into the engine, as it would be stressed well beyond the maker's recommendations, the con rods and crankshaft were polished and shot-peened. Then the unit was electronically balanced, and improvements made to the lubrication system.

To improve engine breathing, an Iñendarian camshaft was fitted, along with single-coil valvespring. A 2-inch bore SU carburetor was mounted on the blower, and fuel is fed from a one-gallon plastic bottle at 3 psi. The bottle is pressurized from the two top frame members, which are pumped up through a Schrader valve to 50 psi. A regulator valve maintains a steady 3 psi on the bottle.

The ignition also had to be modified, as preliminary tests revealed that the spark broke at full throttle. A Bosch 12-volt coil was fitted, and energy was supplied by a 12-volt battery, thus eliminating the generator-starter arrangement. To start the machine, a special portable electric starter motor is used such as is common on American Indianapolis type racing cars.

The standard VW gearbox was done away with, and a 24-tooth sprocket was mounted on the back face of the flywheel. Final drive is also by chain, and the clutch is a beefed-up motorcycle unit. The rear wheel is from a road racing Norton, and the hub and rim are both of magnesium alloy to cut down weight. The rear tire is a 4.00 x 16 taken from a sidecar racer. The front wheel is also from a racing Norton, and has a 2.75 x 18 tire.

The rear suspension is from a Norton motorcycle with standard Girling shock units. The front suspension is the same as the rear, except it has home-made arms for the hub-center steering.

Since Wayne is working with a machine that is unique, the plotting of acceleration curves on graph paper has provided him with the story of just how he is progressing. He is able, with the above mentioned two instruments, to calculate the effect of gear ratio changes, different RPM