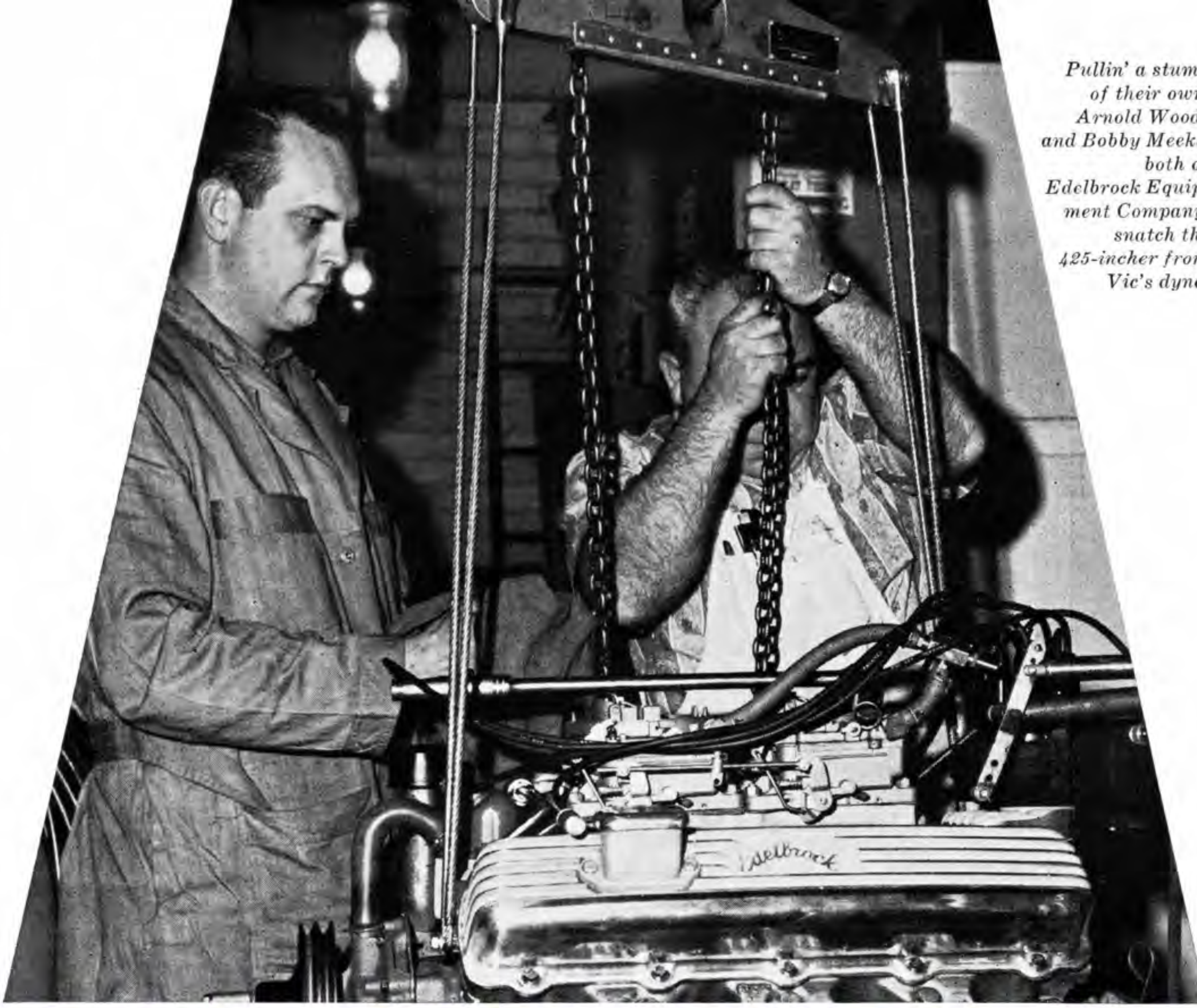


Pullin' a stump of their own, Arnold Woods and Bobby Meeks, both of Edelbrock Equipment Company, snatch the 425-incher from Vic's dyno.

OLDS' STUMP PULLER

A combination of carbs, cams and inches can turn this 425-cube bear into a welcome addition to GM's line of "flexible" engines

by Jim McFarland

Traditionally, tree stump pulling is a job for torque-makin' tractor-type equipment, but if you'll stretch your imagination a little, you can see how this concept can be applied to boat engines (SK pleasure boats in particular); relatively low rpm requirements, the need for an ample supply of torque, and a reasonably flat torque curve spread over a span of about 2500 rpm. For a 425-incher that tips the scales at near 600 pounds (off the dyno and on the weight-checker), this largest of Olds engines may be just the stack of engineered cast iron and carburetion you've been looking for where both boat and hot car applications are concerned. Admittedly, it will not equal the rpm of its little Chevy cousin, nor will it "horsepower" all the water out of a fluid-coupled dynamometer, but the tests run with the engine bolted into Vic Edelbrock's dyno equipment revealed the '65 version of Olds' big-incher to be suitable for a number of applications where low- to mid-range torque is of prime importance, the most notable of which may be in the field of sport boating. The results from the dyno are spread out for you in the paragraphs that follow. Be our guest.

Basis for the 425 inches of displacement is a 4.125-inch bore and a 3.975-inch stroke. From this pile of inches comes an assortment of cubic power. Four variations of this engine provide horsepower limits of 300 to 375 with intermediate ratings of 310 and 365, peak power being developed at 4400 for the low-power pair and 4800 for the more muscular duo. Torque ranges from 430 to 470 pounds-feet and matches the engines as follow: 430 @ 2400 rpm for the 300 hp engine, 450 @ 2400 rpm for the 310 hp unit, and 470 @ 3200 rpm for both the 365 and 375 selections. While we are still spoutin' specs, and prior to getting down to brass tacks with the actual dyno work, here is some information

RECORDED DYNAMOMETER RESULTS*

Engine RPM	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13
3000	222	220	222	195	208	212	202	205	205	205	205	215	205
3500	260	262	265	240	250	255	260	260	260	260	265	265	258
4000	275	284	295	265	280	285	295	300	300	300	305	312	298
4500	297	300	318	295	312	315	340	345	350	350	355	355	345
5000	305	310	325	312	335	330	370	395	395	400	398	395	398
5500				320	355	340	382	402	405	410	400	400	405
6000				315	350	340	385	400	400	405	397	395	402
6500							380	390	399	400	390	385	398

*Horsepower readings shown here are uncorrected for atmospheric and dyno gearbox losses. If you choose to alter the figures shown, consider increases of 2% for atmospheric and 5% for gearbox corrections.

Table of results reveals the muscle of big Olds in the rpm range of 3500-6000. Only the more significant of the tests are discussed in the story, since some of the alterations were minor in nature.

Here you can see 10-inch extensions (no paint) that clamped on an additional 5 horses. Pipes dumped into 11-inch collectors and "clover-leaf" transition pieces.

on materials, weights, clearances and other data germane to an understanding of this basic engine.

Head volumes should be set at a 75cc capacity in all the 425 heads. Corresponding deck clearance should be .002-inch with volumes in the dished-top pistons of 6.01cc (310 and 365 engines) and 3.4cc (375 engine). Head gasket thickness runs .023-.027. Pistons are alloyed aluminum with a stock weight of 23.46 ounces. Clearance with the stock units is .0010-.0025 and .0010-0015 (skirt clearance, top to bottom). Pins (1019 SAE steel) run .9803-.9807 diameter, are pressed into the rods (.0008-.0016) and slip into the pistons with a fit of .0003-.0005. Both stock top rings (compression) are cast, taper-face chrome-plated units with an end-gap of .013-.023. Oil rings are fabricated from spring steel, utilize a chrome-plated spacer, are double-railed and carry no expanders. End-gaps on the rails range from .015- to .055-inch and should be set at .285 for spacers. (We'll have more to say on this ring situation a bit deeper into the story.)

Rods (1140 SAE) weigh in at 31.08 ounces in stock trim, measure 6.996-7.000 inches (pin to journal, center-to-center), and fit the crankpins with a clearance that'll squeeze a strip of Plastigage to between .0005 and .0026 inches. End clearance measures out to .002-.013 with two rods installed on a crankpin. Crankshaft end play is .004-.008 (thrust on the number three main) with bearing clearance of .0005-.0021 on all mains but number five, which should be set at .002-.0034. While we are spec-checkin' the lower end of the engine, it might be wise to mention that oil pressure is a scant 25 psi minimum at 1000 rpm. More on this later.

Rummaging around among the valve and valve component specifications, you'll discover intake seats are 30° (as are intake valve face angles) and that exhaust seats are set at 45° with a 1° interference angle on the valve faces (46°). Valve springs are wound from steel wire, employ the conventional GH counterwound harmonic dampers, have a 76-84-pound seat pressure (@ 1.67 inches) and an open pressure of 180-194 pounds (@ 1.27 inches). Rocker arms (bearing resemblance to those found in small block Chevy V8's) operate with 1.6:1 ratios over the hydraulic lifter cams used in the 425. One of these shafts provides duration of 278° and 282° while the other delivers 286° and 280° (intake and exhaust, respectively). If you conclude that the earlier exhaust closing (with respect to intake closing) is principally responsible for the boost in torque of the 375 hp engine over the 310, you are correct. Both cams are interchangeable among the various '65 425's, and lifts are in the vicinity of .430-inch (at the valve) for each 'shaft.

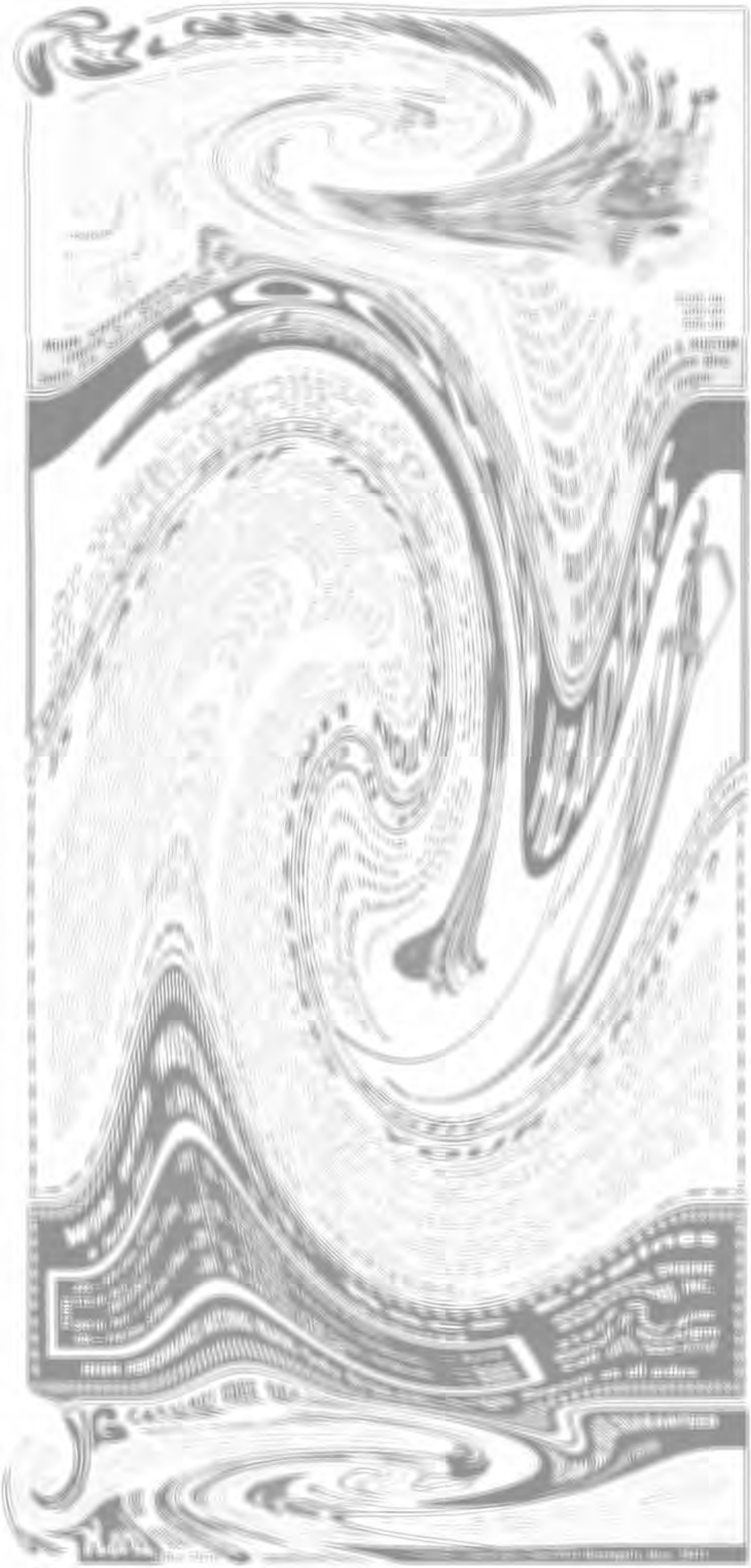
Distributor selection is generally reduced to one of two units: distributor numbers 1111042 and 111151. Specifications on the 1111042 appear as follows: Centrifugal advance begins with 2° @ 650 engine rpm and is "out of soap" with 24° @ 4000, vacuum advance initiates with 0° @ 10 inches Hg (mercury) and runs out with 21.5° @ 22 inches Hg, point gap is set at .016-inch with a dwell of 26°-32° and a factory-specified fixed lead of 5° on the crankshaft damper. The other igniter (#111151) looks like this: Centrifugal is 2° @ 1200 engine rpm and 20° @ 4200, vacuum is 0° @ 10 inches Hg and 20.5° @ 22, the same dwell and gap as the #1111042 and 7.5° on the crank. If you choose to run a cam grind other than stock, we advise some alteration of distributor advance characteristics in order to tailor the ignition's performance to the needs of the cam you select. Although a change to a Schiefer magneto was made early in Vic's testing program, it was believed that the stock igniter could have been made to perform more adequately than it did. As in many instances when the performance side of the bread becomes the side you butter, a centrifugal advance (no vacuum) of 12°-14° would give you more low rpm throttle response and not provide over-advance in the upper engine speed ranges. And now, in the event you thought we'd forgotten, here are the findings from the dyno.

With a "weather" eye on the projected abuse of the dyno life that faced the engine, Vic felt it would be advisable to loosen clearances slightly more than stock. This he accomplished with totals of .0025-inch on each rod, .0035 on all mains, and .007 piston clearance (bottom of skirt). The advance was set at 27° (total) with the 1111042 distributor. Following a few short ring-seat runs, a ¼-inch spacer was placed behind the oil pump relief spring, but pressure remained at a disturbing 25-30 psi, hot and winding. However, bearing and cylinder inspection at the conclusion of the tests revealed no appreciable wear with these pressures and the usual harshness of the dyno beating. (Olds has a high performance pump available now.) Tests followed, and since we are including a summary of the work in tabled form, we'll discuss only the more significant of the phases.

Test #1 – With a load of premium gasoline, and its break-in time in the background, the stock engine developed a maximum of 305 hp at 5100 rpm. At this point, valve float was encountered. You'll note from the charted results that the output reading at 3000 rpm was 222 hp. This fact will gain in significance as we unfold the test results, showing you what happens to engine performance as total valve duration is increased. The 286° (intake), 280° (exhaust) stick was in the engine at this time.

Test #3 – Following the addition of 31-inch-long, 1⅞-inch o.d. Hedman individual tube exhaust extractors (310 hp @ 5000 – Test #2), an Edelbrock 0-65 dual quad intake manifold with 3720-SA Carters (stock jetting) replaced the stock cast iron 4-bbl/4MC Rochester Quadrajet combination. Timing remained at the 27° total and, as in Test #1, valve float was evident at 5100 rpm. Peak power was 325 hp @ 5000 rpm.

(Continued on page 128)



OLDS' STUMP PULLER

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Test #4 – For purposes of comparison, the exhaust system was back to stock. An Iskenderian hydraulic cam (#302) and kit (lifters, push rods, springs and keepers) were installed with spring seat pressures of 120 pounds. This cam sports a timing event of 41°-81° (intake) and 81°-41° (exhaust) with a lift at the valve of .500-inch. A Schiefer mag was also dropped into the block (36° total advance), and although clean dyno readings were obtainable to 6000 rpm, output indicated a curious decrease over Test #3. A compression check would probably have revealed a decline in cylinder pressure, since the oil vapor blowing past the breathers indicated that substantial push was escaping the ring seal. As stated, the dyno figures were reflecting this situation. The stock AC 44S plugs were beginning to roughen up the performance (especially after several full-load runs), so in went a set of Autolite A-12's.

Test #6 – Following the re-installation of the Hedman headers and the bumping of the total advance to 35° (350 hp @ 6000 rpm – Test #5), an Engle hydraulic 'shaft (#323) replaced the Isky 302. The remainder of the valve train remained as per the Isky kit. Timing on the Engle was 32°-72° (intake), 72°-32° (exhaust) with lift at the valve of .440-inch. Dyno readings were again down somewhat, and ring blow-by was growing worse. It was felt that results were losing validity, since much of the muscle being developed was shoving its collective way right past the rings. The engine was removed from the dyno cradle and subjected to a complete re-ring. A change to Pontiac lifters had improved the oil and pressure loss situation to a measurable extent but not sufficient to warrant continued testing. During tear-down, however, it was discovered that *all* bearings were in excellent shape, so the 25 psi oil pressure had been adequate.

Test #7 – With a fresh set of rings (Perfect Circle 2-in-1), a ring-seating cylinder hone job, and a solid-lifter Isky 550 cam and kit (.520 lift, 330° duration), the engine was snugged back into the dyno. Now you can get out your marking pencil. Peak output was 380 hp @ 6500 rpm with a substantial gain at each reading level beginning at 3500 rpm.

Test #8 – Timing remained at 35° (total), and a pair of 3705 Carters replaced the 3720-SA jugs. This humped the power curve even higher in the range of 4000-5500 rpm and tacked an additional 10 hp onto the 380 peak of

Test #7. Jetting was as follows: .1065 primaries, .086 secondaries. An additional 9 hp (Test #9) came at the 6500 rpm peak by changing the secondaries to .0785, but before you grab the needle box, you might observe how little this altered the readings in the lower range of rpm. Lengthening the Hedman tubes by 10 inches (Test #10) improved mid-range performance by as much as 5 hp at 5000 rpm, but no more.

The remaining tests (#11, 12 and 13) only involved switching camshafts and delivering the readings listed on the "scorecard" (a Racer Brown ST-12 in #11, an Engle HL-26 in #12, and an Isky 505 in #13). A set of '66 425 heads were used in conjunction with the Isky 505 in Test #13. Slight variations were evident, but overall performance pointed up the inherent torque characteristics of this engine. In retrospect, however, there are a few points worth remembering.

At no time during the program was the "stock" output bettered in the range of engine speed up to 3000 rpm. In a garden-variety evaluation, this means you would find little difference up to 3000 rpm between stock or performance versions of the 425. This you can expect since the longer-timed camshafts enable a sizable volume of mixture (hence cylinder pressure, hence power) to escape through the exhaust valving. However, at higher crankshaft speeds, these same camshafts allow better engine breathing and, consequently, more efficient utilization of the other related pieces of performance equipment (manifold, carburetion, ignition, etc.). You can note from the fact that there was a 1500 rpm/94 hp gain achieved during the course of testing.

One final word. Dynamometer testing provides data for *comparison*. Such programs are valuable for judging the comparative effects of a variety of engine modifications. Beyond this, performance must be evaluated under the rigors of live application, in a car or in that SK boat we've been plugging since the outset of the story. Olds: 425 inches of 'mobility. ■ ■

"I think I'm gonna like this track!"