

**W**OULD YOU GIVE \$60 for an improvement of 0.5 sec. in elapsed time and 4 mph in quarter-mile trap speed? That's what the Royal Pontiac dealership in Royal Oak, Mich., offers its customers in its "Bobcat" tune-up package. Mechanic Chuck Brumfield can do the job in half a day on any late-model Pontiac equipped with 4-barrel or Tri-Power carburetion. Actually, it's a clever, simple "screwdriver tune-up" that anybody can do.

Ace Wilson Jr., live-wire proprietor of Royal Pontiac, has long been an enthusiastic sponsor of one or more Super/Stocks on the midwest drag strips. He firmly believes that superior performance can sell cars to the youth market. But he does a lot more than just field a Super/Stock and then sit back and wait for business to come in the door. Wilson merchandises performance. He offers better-than-average performance to any power-pack Pontiac buyer who wants it. He sells it in a package, just like bucket seats,

Tri-Power carburetion or aluminum wheels, and it includes distinctive looks to accent the custom performance.

The Bobcat trim package has silver-gray accent paint inside the front grille indentation (outlining the grille-work), striped in above and below the standard chrome side strip (with the body color used along the center of the chrome strip), and in an oval motif on the rear of the body, just above the bumper. Then this silver is stripped in around the side windows, replacing the usual optional chrome molding. The big chrome taillight housings are partially masked out with the body color and silver, to tone them down and give a more refined look. Inside, the standard steering wheel and 4-speed shift knob are replaced with white items (the Pontiac replacement steering wheel is white because it harmonizes with any color.) And finally, for positive identification, it has embossed aluminum "Royal Bobcat" emblems adhesive-bonded to the rear

deck lid, to each quarter panel of the body and onto the glove door inside. Furthermore, every Bobcat is ordered through from the factory with heavy-duty springs and shock absorbers, heavy-duty front anti-roll bar, high-capacity radiator, extra-output batteries and Delcotron alternators, Safe-T-Track differential (about 75% of the buyers specify the 3.90:1 rear end gears for street driving) and the Borg-Warner 4-speed transmission.

The special trim package costs \$60, plus the cost of the optional equipment from the factory. For another \$25 there's a dress-up for the optional aluminum wheels. The body color is used on the inner part of the wheel, with the natural aluminum retained on the outside edges of the ribs. Special knock-off type hubcaps, with embossed aluminum "Pontiac" emblems are used. To prevent the paint from blistering from brake heat (the aluminum wheel and brake drum are cast integral) a special acid rinse is used, with a heavy primer under the main coat and clear lacquer as a finish surface.

Back to the engine: the Bobcat tune-up package was developed by old-time Detroit performance enthusiast, Frank Rediker. Essentially, it consists of alterations to the spark advance curve, carburetor jetting, blocking off the intake manifold heat risers, and setting up the hydraulic valve gear to prevent pump-up at high rpm. There are minor variations in the procedure, depending on engine model. Rediker has worked out the spark advance curves and jetting characteristics for the various engine-transmission-axle gear combinations by careful experiments over a period of years.

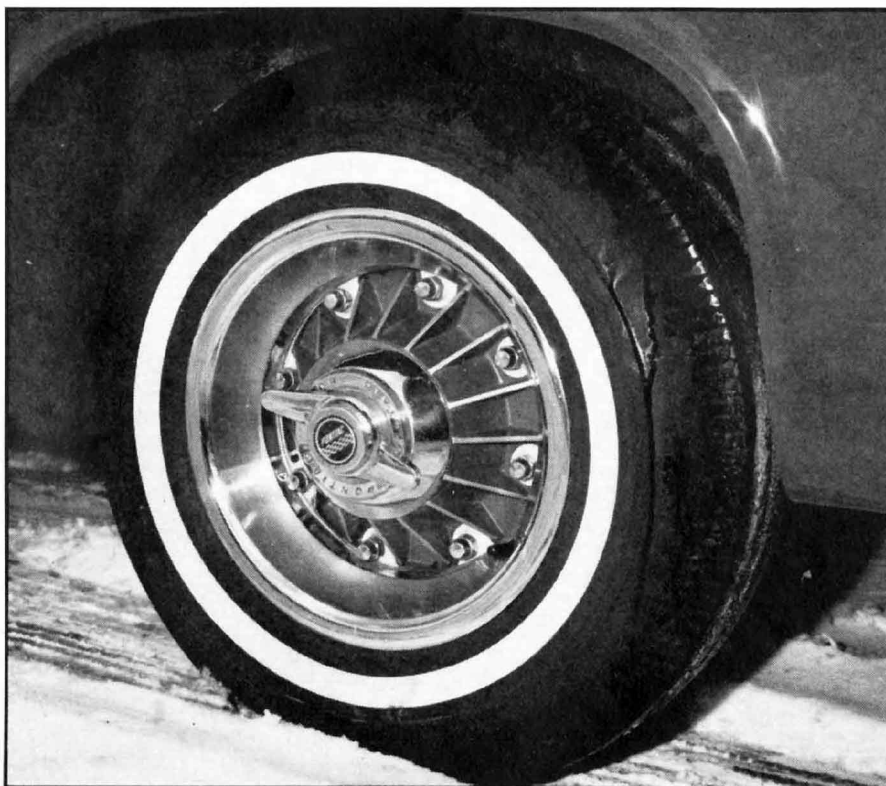
For the 421-HO Tri-Power engine Frank replaces the standard return springs for the spark advance weights in the distributor with special Mallory springs, color-coded for a rated tension of 34 oz. (Mallory supplies dozens of different advance curves in its custom distributors and the centrifugal weight springs can be used in many other types.) These springs are considerably softer than the standard springs, letting the spark advance much faster at low rpm. We checked the distributor with both sets of springs on a Sun test machine and got the following advance curves (expressed in distributor degrees and rpm):

| RPM  | STOCK | MODIFIED |
|------|-------|----------|
| 500  | 0°    | 0°       |
| 1000 | 4     | 7½       |
| 1500 | 5½    | 9        |
| 2000 | 6     | 11       |
| 2500 | 6½    | 12½      |

In addition, the point dwell was set up from the stock 30° to about 35°.

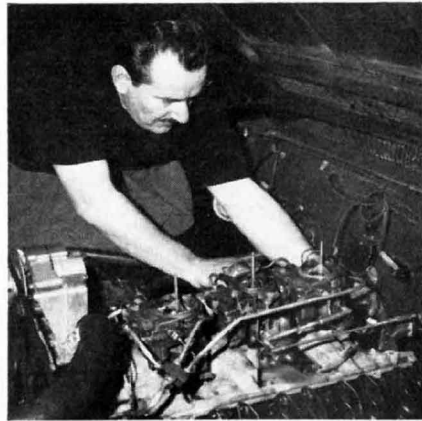
**SPECIAL PAINT** on optional aluminum wheels costs \$25 extra.

**THE SCREWDRIVER TUNE-UP**  
*judicious tuning transforms the Royal Bobcat into a Woodward Tiger!*  
 BY ROGER HUNTINGTON





DISTRIBUTOR advance is altered.



FRANK REDIKER developed package.



LARGER JETS, needles are installed.

The initial spark setting varies some with the car, transmission and engine. When mechanic Chuck Brumfield sets up a Bobcat he usually advances the initial spark setting from the recommended 5-6° to about 16°. Then he takes the car out on a short road test. The critical detonation point is at wide-open throttle at about 2000 rpm in second gear. They like to set the spark to get a little sprinkling of knock at this point (with super-premium gas). Generally, an initial setting of 16° will do it with the fast-rate advance curves in the distributor. On our test car, a 1963 Catalina 2-door hardtop, there wasn't a whisper of detonation with 16°. It took 18° to get what Brumfield felt was optimum combustion.

These big Pontiac engines seem to thrive on a lot of spark advance. The stock advance curves and initial advance settings don't begin to probe the potential, especially with high-quality anti-knock fuels like 260 and 270 Sunoco. (Royal generally uses 270 when setting up a car.) The vacuum advance is also disconnected on the Bobcats. Frank Rediker says there's enough lag in these mechanisms to sometimes give a second of severe detonation when you punch it hard when

cruising along on high vacuum advance. Royal feels this can be unnecessarily rough on the engine, what with the aggressive drivers who usually buy Bobcats. Normally, cutting out the vacuum advance will reduce gas mileage; but with all the initial and centrifugal advance tuned into these things, it doesn't make much difference.

Another standard practice for Bobcats is to replace the stock AC-44S spark plugs (gapped 0.032) with Champion J-12Y plugs, gapped at 0.025. They feel the Champion plug lasts longer under hard driving conditions, and the smaller gap gives cleaner firing at high rpm. They also install the plugs without gaskets. This assists cooling, and sinking the plug that much farther into the hole cuts 1 cc off the combustion chamber volume, giving that much more compression!

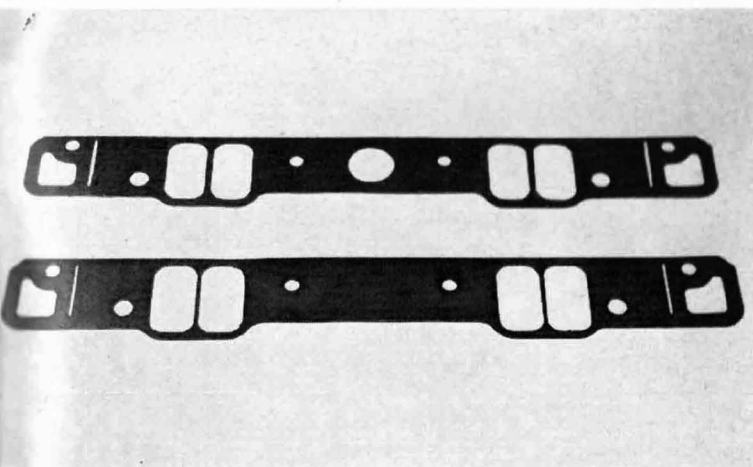
Carburetion is richened considerably. After experimenting with a wide variety of jet sizes on the new 421-HO engine, Rediker found there was nothing better than using the standard jets from the 2-barrel economy engines—and using these same jets in all three Rochester carburetors on the 421 Tri-Power. The main jet package is

Part No. 7008669. These are used with the larger No. 7012253 float needle and seat assemblies. Actually, the main jets are drilled out 0.001 in. (to 0.070) on the latest Bobcat setups. This size wasn't available in standard jets and the engine seemed more responsive with the extra area—so Royal just drills them out.

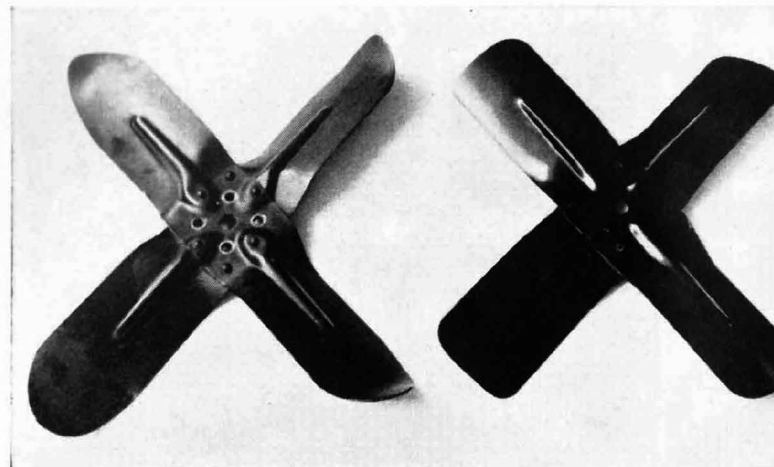
The standard Tri-Power jets give more richness on the end carburetors than on the center (which feeds all the gas about 90% of the time). This gives decent gas mileage and adequate mixture richness at full throttle. But the Royal doesn't feel the customer gets really hot throttle response when he whips open the end carburetors—if the center one is cruising lean just the instant before. The jet change actually leans down the end carburetors but considerably richens up the center unit. The overall mixture richness at full throttle is not a lot different but the response is 100% better.

Throttle response can be further helped by replacing the stock vacuum throttle linkage with the factory progressive mechanical linkage. The vacuum system opens both end carburetors by diaphragm action when the throttles on the center unit reach about

SPECIAL GASKET (below) cuts manifold heat for 4% more bhp.



LOW PITCH fan (right) takes 7 bhp less at 5000 rpm.



# THE SCREWDRIVER TUNE-UP

2/3rds open. But there's a big lag in the action and then the torque surges strongly when the end throttles flop all the way open. The dealer-installed progressive linkage is much more satisfactory (though too much of a headache to adjust on the factory assembly line). However, it adds \$40 to the price.

Another vital factor in the standard Bobcat tune-up package is the use of the special factory intake manifold gaskets (No. 989820) to block the exhaust heat riser passages. The exhaust heat valves often let a great deal of heat into the intake manifold, which expands the air and reduces the weight of air drawn into the cylinders on each intake stroke—reducing both horsepower and torque. On the other hand, the heat is needed to vaporize the liquid fuel and get good throttle response. With blocked heat risers and standard carburetor jetting, the Bobcat might lose response. But with the rich jetting of the center carburetor on the Bobcat setup, response isn't hurt a bit—and power and torque are improved 3-4%.

Another item here: On normal Pontiac engines the heat tubes to the automatic choke get their heat from the intake manifold exhaust crossover passage. When the risers are blocked the choke naturally won't shut off. Fortunately, the choke really isn't needed with the richened jetting of the center carburetor, so Royal disconnects it. Starting up a cold engine is no problem—a couple of pushes on the throttle do the priming, even in zero weather.

The stock 421-HO engine turns to 5400-5700 rpm before the hydraulic lifters pump up. Normally, 5500 is a good shift point for all-out acceleration, although it can be too close to the critical pump-up point for safety. So Royal extends this peak to at least 6000 rpm with a simple rocker arm adjustment that takes advantage of the unique ball-joint stud mounting. It's simply a matter of adjusting the rockers upward on the studs until the plungers in the lifters are opened out to the ends of their travel. Just open up the adjustment until the lifters start clicking—then back in one turn of the nut. For all practical purposes this makes solid lifters—but there's a secret to making this adjustment stick. The stock stud nuts don't catch enough of the thread at the all-out setting to hold for a long period of time; they keep loosening up. The Royal mechanics use special fiber-sleeve lock nuts on the studs; they claim the nuts stay put for thousands of miles of everyday driving.

The Bobcat engine package is finished off with Pontiac's optional low-pitch fan (Part No. 528637). This is said to consume about 7 bhp less than the standard fan at 5000 rpm—and what it lacks in cooling at low speeds is made up in the high-capacity radiator used in the heavy-duty package. Finally, the buyer can specify chrome, low-restriction air cleaners for his Tri-Power installation, for an extra \$15. These are the Badger 1775-TE paper filters with replaceable elements.

What does it do on the road? We ran before-and-after tests on two successive days on the same car to get a conclusive measure of the effect of the simple changes. As mentioned, the car had the 421-HO engine—with 3.90 rear end gears and close-ratio Borg-Warner 4-speed (2.20 low gear). A Hurst floor shift linkage had been dealer-installed. The test car weighed 4040 lb. with half a tank of gas. This may seem a little high for a Catalina coupe; however, it had a deluxe interior, bucket seats, etc. Gross test weight was 4380 lb. with driver and passenger. Here's what it did:

|                        | STOCK | BOBCAT |
|------------------------|-------|--------|
| 0-30 mph, sec.....     | 3.0   | 2.8    |
| 0-60 mph .....         | 6.9   | 6.3    |
| Quarter-mile et .....  | 15.5  | 15.0   |
| Speed at end, mph..... | 91    | 95     |

It's easy to feel the difference in the car. Throttle response is entirely different with the Bobcat. It produces instant acceleration—anywhere in the rpm range. The wild spark advance does a lot for low-end torque, too, even as low as 1200 rpm. With the stock setup, we had to burn off the starting line to keep the engine from bogging slightly. With the Bobcat treatment we could lug off, with hardly a whisper of

wheelspin, and just let the brute torque take over.

We ran a series of checks with the accelerometer, against the calibrated speedometer readings, to pinpoint the true horsepower and torque curves. The peak figures for each are:

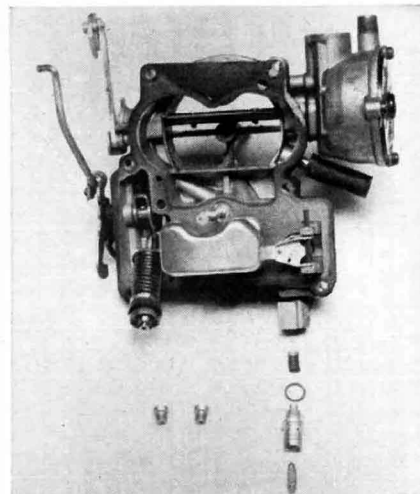
|                                 | STOCK          | BOBCAT |
|---------------------------------|----------------|--------|
| Horsepower... 310 @ 4700 rpm    | 335 @ 5000 rpm |        |
| Torque, lb.-ft.. 415 @ 3400 rpm | 445 @ 3600 rpm |        |

Advertised ratings for this engine are 370 bhp at 5200 rpm and 460 lb.-ft. torque at 3800. These figures, of course, are taken under ideal conditions on a dynamometer.

The Bobcat was a joy to drive. The engine was extremely quiet under all conditions; it idled smoothly at 800 rpm, started quickly and would pull smoothly from 1500 rpm. It obviously has a hot, long-duration cam because, when pulling at full throttle, the torque can be felt to surge in gradually and reach a peak between 3000 and 4000 rpm. Royal doesn't recommend going above 5500 rpm with the 421 hydraulic-lifter engine, even with the Bobcat rocker changes. Power falls off rapidly at 5500.

The heavy-duty suspension used with the Bobcat package gives a pretty good ride on the street and a very stable, comfortable ride at highway speed. Cornering, of course, is much improved over the soft stock suspension. It also helps traction off the line by controlling body lurch. The 3.90 rear end gears are very responsive on the street: High gear at 20 or 30 mph will pin the passenger right back in his seat and the higher rpm increases engine braking when the throttle is closed, giving a more flexible car in city traffic. But the 3.90 gears are a headache on the open road—we wouldn't have them in our own car. We'd order 3.23 gears, and then use a 4-speed for low-speed acceleration. With the 3.90 gears, shifts are rarely necessary; and, after all, that's what the 4-speed is for. ■

CENTER carburetor disassembled.



PAPER AIR filters are used.

