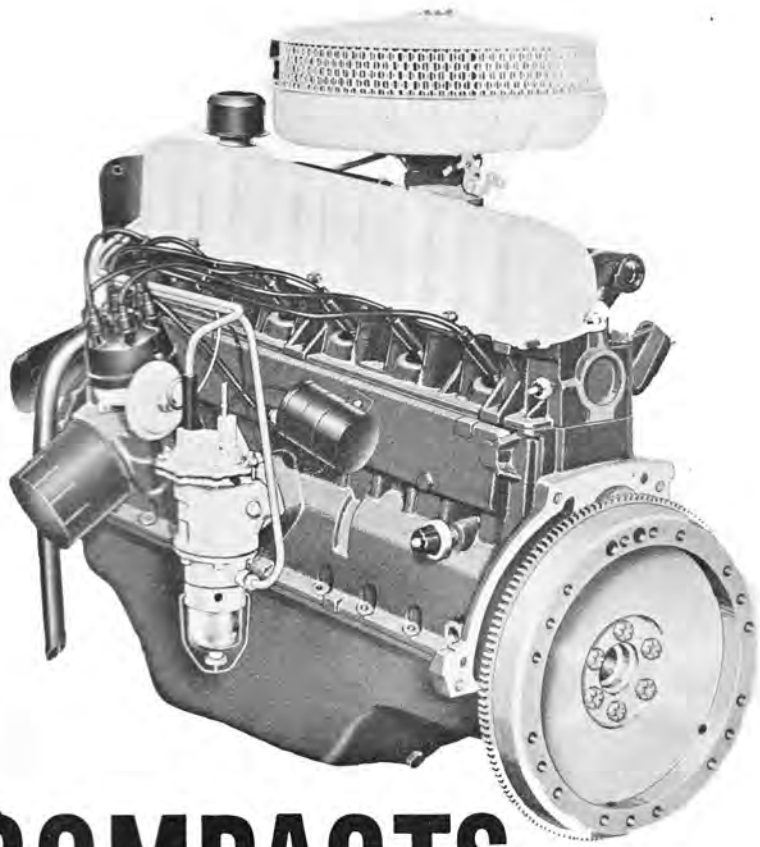
The power potential of these small packages is great. For those who want higher output, a specialist plans . . .

SOUP-UPS FOR THE COMPACTS

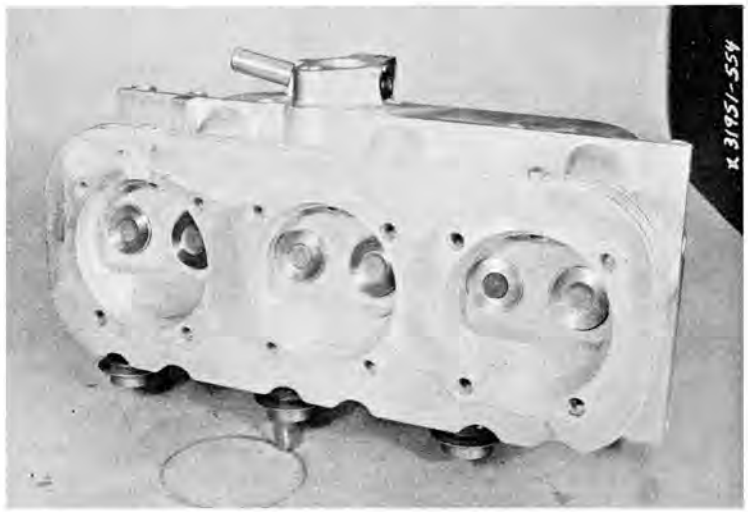


The Falcon mill has a rugged bottom end. Better breathing and a reworked valve train can boost the power fifty percent.

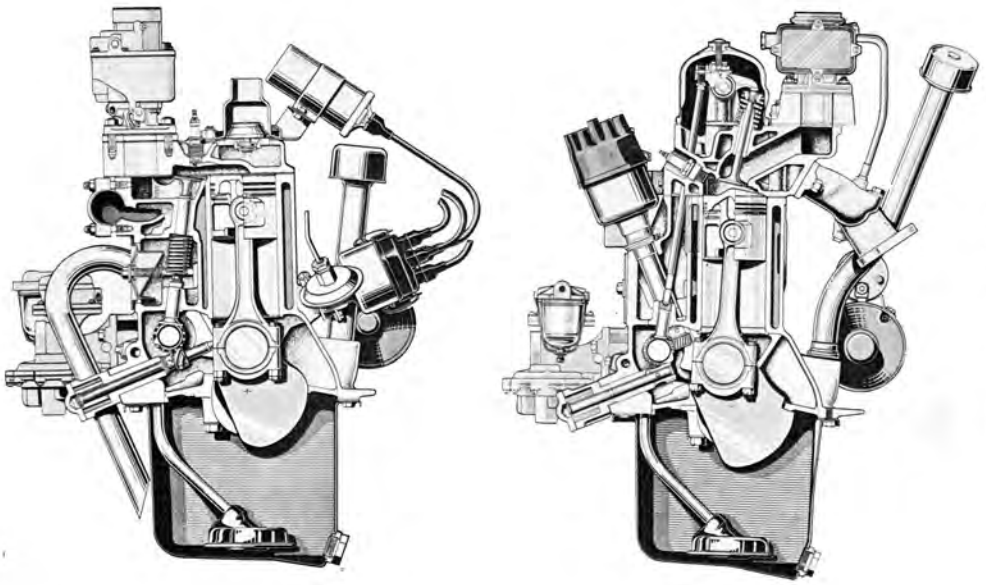
by Alex Walordy

OFFICIAL Detroit feels that the compacts are economy cars. They explain this volubly to any visiting editor or technical writer. However, come Sebring or Daytona time, a few select engineers with experience that predates AMA's "No Racing" ban work feverishly on souping compacts. Public Relations men plead ignorance, and explain that a few local Florida dealers are just having fun. Somehow, shortly before the NASCAR deadline, amended specification sheets are filed which certify as stock a number of optional items. Power packages appear out of nowhere in the hands of a few name drivers, people who know how to use speed to good advantage. Much official ink flows about a power kit, and then silence falls again—until the next race . . .

The point is that compacts do make good racing material. They

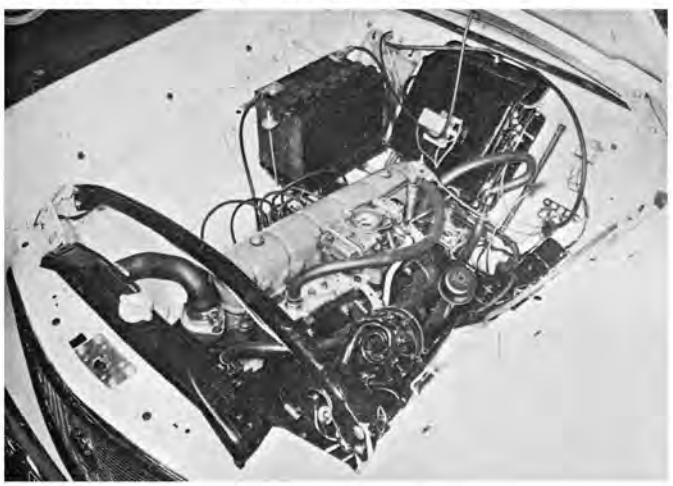


Valves are spaced quite far apart in the Corvair to allow maximum cooling space between intake and exhaust ports. Installing larger valves would be very difficult.

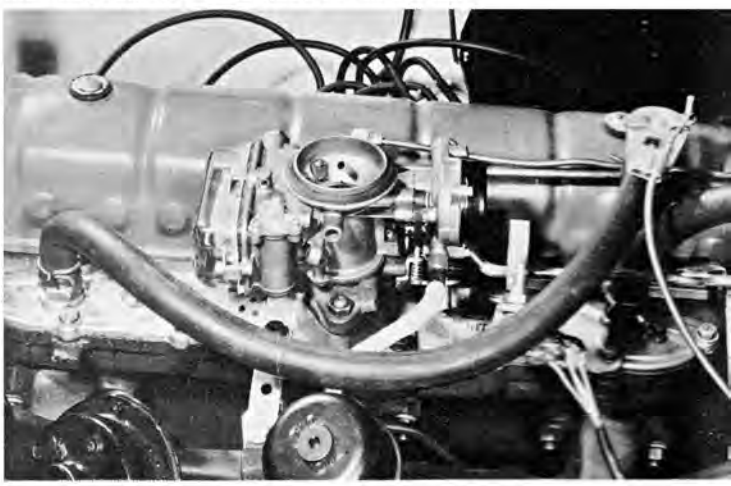


The Rambler American can benefit from a healthy power boost—from 90 to 126 horsepower—by means of a "bolt-on" change to the Rambler ohv six. The contoured piston head design in the ohv (right) offers good combustion control through the addition of squish area.

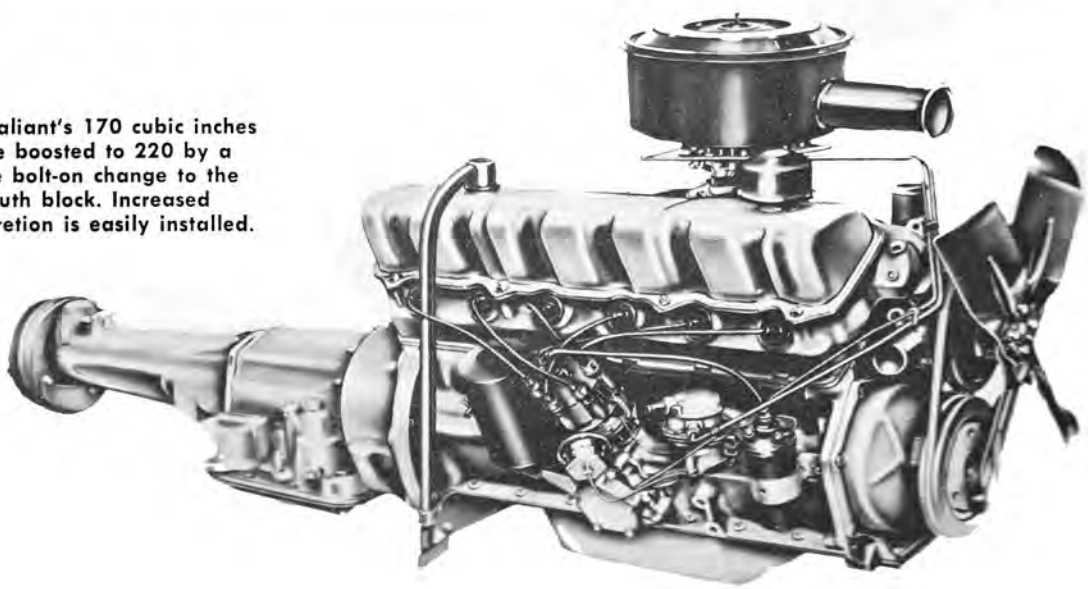
The conversion to the ohv mill calls for moving the battery to right rear, a '60 American cross member, and other changes.



Manifold changes for improving breathing are difficult to achieve in the case of the six, because of the integrally-cast water-jacketed manifold.



The Valiant's 170 cubic inches can be boosted to 220 by a simple bolt-on change to the Plymouth block. Increased carburetion is easily installed.



A Live Axle for a Lively Kart

(Continued from page 56)

SOUP-UPS FOR THE COMPACTS

(*Continued from page* 59)

designed to prevent a built-in source of failure.

Changes in engines invariably entail new engine and transmission mounts. Brackets of sufficient strength can easily be welded directly to a chassis. The lighter sheet metal sections used in unit bodies require fish-plating which distributes the stress over a larger area. To prevent buckling of flat sections you can weld gussets, ribs or angles. Keep in mind that shapes and contours are your best methods in retaining strength in a unit body. Generally, your treatment of changes in a unit body when making a new engine installation will spell the difference between success and failure.

Weight distribution, traction, and handling are intimately tied to each other. If the weight distribution of your compact is unbalanced by a swap, traction and handling will suffer. For instance, a Corvair is not a likely candidate for swaps because it is tail-heavy, even in stock form. On the other hand, it will do little good to shoehorn a heavy mill into a Falcon if you cannot improve traction. The engine should be placed as far back as possible. Items such as the battery can be moved to the rear, increasing traction and adding room in the engine compartment.

The drive trains of the compacts are generally designed for lower horsepower stock engines. Your best bet is to use a transmission which matches up to the engine. Surprisingly enough, the compacts are sufficiently wide to use stock passenger car axles. For instance, the '59 Ford rear axle is only a few tenths of an inch wider than the one in the Falcon and is virtually a bolt-on installation. Changes in wheels and brakes are, however, mandatory. In the case of the Falcon, Zephyr wheels and brakes form a readymade conversion kit. A larger axle involves bigger brakes. Unless you are prepared to compensate with a conversion to larger brakes at the front, the action of the rear brakes should be reduced by installing smaller wheel cylinders or harder lining with a lower coefficient of friction.

We have grouped under individual headings the most likely souping and swapping possibilities for each of the compacts. Souping follows the traditional pattern of seeking more rpm, better breathing and improved mechanical reliability.

CORVAIR

The Corvair is certainly the most unorthodox of the compact engines. It has many interesting possibilities, but in stock form carries some built-in breathing limitations. Intake and exhaust passages were spaced out to the limit for maximum air circulation and cooling. The intake and exhaust valves are at the extreme ends of the combustion chamber, somewhat pocketed, and certainly do not allow room for increasing valve diameters. The manifold is cast integrally with the head, a production method which eliminates flanges, saves weight and insures good heat transfer for running during warmup. Unfortunately, integrally-cast manifolds are the bane of the speed merchant, because they are difficult to rework or alter.

There are several ways of brightening the Corvair's power picture. The most basic and effective means would be a cylinder head redesigned for improved breathing. The guiding genius of Chevrolet's speed department, Mr. Duntov, was reputed to be working with a number of modified cylinder heads, but so far nothing has been released to the public at large. Next most direct approach is to install a blower. Cursory inspection indicates that there is room for one, though a separate belt drive will have to be provided (the understatement of the year).

An unblown version would benefit from the installation of an extra pair of carburetors, located symmetrically with respect to the stock ones. Note that the carbs dump between adjacent cylinders, rather than directly into the center one, to insure better fuel distribution. The carburetors you add should also discharge between adjacent cylinders. It would not be too difficult to weld a pair of extra stacks to the intake manifolds or machine a pair of adapters and use them in conjunction with a pair of U-bolts passing around the underside of the manifold. A dual exhaust system would also help in uncorking the engine, and would avoid having both manifolds dumping into a common header.

Increasing the engine rpm to match the improved breathing capacity calls for changes in the cam and valve-train sections. In their new power package, rated at 95 hp at 4800 rpm, as opposed to the 80-hp, 4400-rpm stock engine, the valve spring pressures are moderately higher, lift is increased and the cam is a bit livelier. Numerous other grinds are available for the Corvair through the customary speed shop sources.

Eliminating the hydraulic valve lifters would be a major improvement. As the valve lifters of the Corvair are the same as those of the 283, the change should be entirely feasible. Word of caution: the Corvair rocker arm oil supply is delivered through a metered hole in the lifter. The replacement lifters must deliver a similar amount of oil. If need be, the metering holes in the new lifters must be altered accordingly.

Centrifugal and vacuum advance curves must be retailored to fit the engine modifications. Additional carburetors usually call for leaning out the power and acceleration pump systems. Two rear axle ratios are available for the Corvair: 3.55:1 and an optional 3.89:1. With the gain in rpm, you would undoubtedly benefit from the lower ratio. An optional all-synchromesh four-speed box is available on all Corvairs. Our experience with the three-speed Corvair indicates that many benefits will be derived from the extra gear.

LARK

The Lark is available with a number of power options, including the Hawk V8. If you own the economy-type six-cylinder Lark, the only way to get more power is to convert to a V8. Unfortunately, the 289-cubic inch engine is not available as a Lark option. However, the 259, which is basically the same mill with a shorter stroke, will provide ample power. Soup-up equipment includes the McCulloch (Paxton) blower, which was stock on the Golden Hawks in '57 and '58. The engine is rugged, and will withstand a great deal of abuse. If you plan to do some souping up, use the trimetal bearings, made for the 289. Other swaps are readily feasible for more cubic inches.

The factory offers several carburetor modifications, saving the more potent ones for the Hawk. Chances are that you will eventually pick a different carburetor arrangement if you are intent on top end performance.

The Lark is available with Hawk brakes, a desirable addition if you plan to make use of the higher speed potential. A Hawk V8 engine weighs considerably more than the six, with most of the additional load resting on the front wheels. Anything you can do to help traction, from Traction-Masters to moving weight to the rear, will help. Even a stock Lark is a powerful car, with a performance that will satisfy most. A little extra effort transforms it into a real sleeper.

FALCON

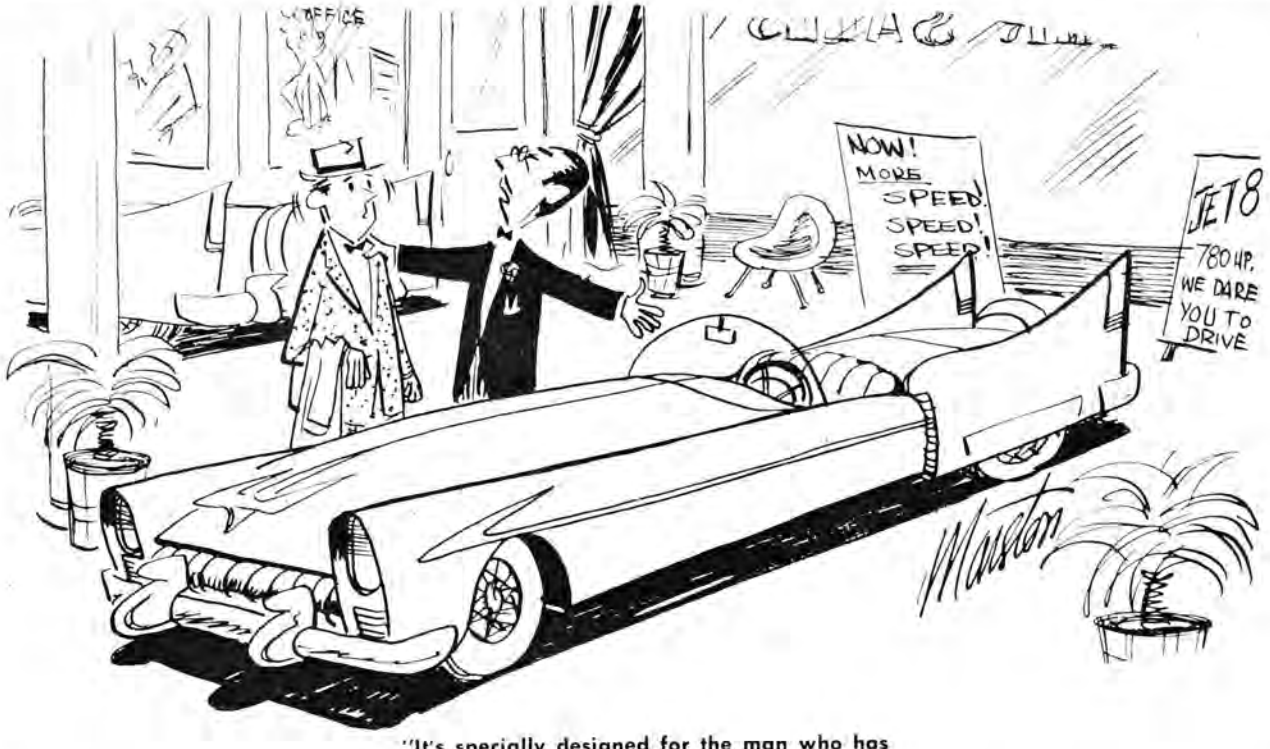
The Falcon engine is top-notch soup-up material, because of its extremely rugged block and lower end. It is a new engine, designed from scratch, and using the most modern casting methods for the block. Though the engine weighs less than 350 pounds, complete, it has been pushed to 126 hp at 6,000 rpm on the dyno. Falcons have revved over prolonged periods at 7,000 rpm without running into difficulties from either valves or lower end.

Unlimbering the Falcon is essentially a matter of breathing. Like the Corvair, it has a cast-in manifold which does not help matters a bit. The mildest and least expensive path to improved breathing is to replace the Falcon carb with a Holley from a six-cylinder Ford. Bill Stroppe and Associates have evolved a simple way of tacking three carburetors onto the Falcon manifold by means of an aluminum adapter. After the adapter is installed, it is used as a guide in boring out two extra holes in the Falcon "log." Rubber "O" rings do the sealing, and the machining needed has been kept at a minimum. This manifold will more than likely be marketed by Bill Stroppe.

Several experimental Falcons have also been in the works both at Stroppe's and at Holman and Moody, where the manifold log has been cut off altogether, and the ports carefully cleaned out. Fuel injectors were fitted to spray into the ports. A blown Falcon has also been rumored. The valve size can safely be increased by ⅛ inch.

Valve spring pressure has to be increased to overcome early valve float. A lighter pushrod and valve lifter, together with a steel valve spring retainer to replace the heavier rotating cap on the stock Falcon, are also mandatory for speed. Several hot camshafts are available through Holman and Moody, Bill Stroppe, and undoubtedly others.

Stroppe's Falcon uses a centrifugal advance distributor made by Auto-



"It's specially designed for the man who has nothing to fear but fear itself."

lite. Mallory also supplies a complete distributor with a tailored advance curve, and will soon have a magneto available for the Falcon. The exhaust manifold is fairly ample, but headers would probably show some improvement at the top end.

The hottest swap for the Falcon, to date, has been Andy Hotton's 312-cubic inch V8 Ford, complete with a T-Bird transmission, no changes in the steering, and fairly simple adapters for the engine mounts. A new cross member is needed at the transmission, and the spring towers must be reshaped to provide side clearance for the engine.

RAMBLER

American Motors, long in the lead of compact car design, has sensed the need for power options in combination with modest outside dimensions. For instance, the American, with its hundred-inch wheelbase and under 2500-pound weight, is now being offered with a six-cylinder ohv engine of the same type that is used in the larger Rambler. 127-hp at 4200 is available for '58, '59 and '60 Americans, and also on the older Ramblers through '57 by a simple engine swap.

The battery must be moved from the left front to the right rear. The engine bolts onto the transmission without any need for adapters. Heavy duty clutches are optional. A slight depression must be made in the heater box to facilitate removal of the valve cover. The new exhaust pipe is on the lefthand side, which calls for a little reworking. The old cross member behind the top of the radiator must be replaced by a tubular one which is stock on the '60 American, to make room for the thermostat housing. Practically a bolt-on. . . .

If your heart is set on more horsepower for the American, you are in for quite a job. We have seen a 283 Chevy in an early Rambler, but the installation involved cutting considerable sheet metal, and failures eventually occurred. On the other hand, a workmanlike job of reworking the spring towers might result in an acceptable amount of room, together with the required strength.

The V8-powered Rebel with a stick shift will undoubtedly provide some sizzling times. Rebel engines are available in 250- and 327-cubic inch sizes, the latter producing 250 hp at 4700 rpm.

Unfortunately, soup-up equipment is virtually unavailable on these engines, and they will not fit in the

American. Swaps for heavier mills than the Corvette will only aggravate traction and weight distribution problems, unless you are willing to sacrifice a little legroom and move the engine to the rear, as far as feasible.

VALIANT

We can best introduce the Valiant's six-cylinder engine by saying that it creamed the opposition in Daytona, and made a lot of public relations people quite shy about power packs. The stock mill puts out 101 horsepower at 4400 rpm, which does not even represent two-thirds of its potential. On the other hand, the Hyper Pack gives 145 hp at 5200, as described in the latest AMA specs, filed just in time for NASCAR's approval. This too does not denote the utmost in power, but it comes closer to revealing the engine's capabilities.

A study of the cylinder head indicates that the valve size can be increased slightly, even though this was not done in the factory version that ran at Daytona. Twelve individual ports, one from each intake and exhaust, together with bolt-on type manifolds immediately set one to thinking in terms of fabricating headers and intake manifolding. Three small duals, each set up to feed an individual port, would be a logical arrangement for peak power. The inclined engine allows ample room for an exotic manifold design.

A set of three singles feeding into a common log as on the Falcon, or two carbs each feeding three cylinders, would also be acceptable solutions. The latter system is preferred by some tuners because it does away with some undesirable pulsations in the intake manifold. The Valiant Hyper Pack uses a single four-barrel Carter AFB carburetor together with a redesigned long branch manifold.

Before you hasten to rush out and purchase this system, even if available, please take careful note of the fact that the peak torque on the stock Valiant comes in at 2400 rpm, with 155 pound-feet. On the other hand, the Hyper Pack develops 153 pound-feet at 4200, which means that low end torque is virtually nonexistent. This doesn't exactly constitute a street type of conversion.

The ignition system on the Hyper Pack dispenses with vacuum advance setup, and introduces a set of dual points. The total advance remains nearly the same, but the shape of the advance curve is more gradual. The fact that compression was raised from 8.5 to 10.5 can easily account for this. On the HP, copper high-tension wires replace the carbon ones used in the normal version. Plug gaps were reduced from .035 to .015 or .020. Autolite's AG-203 plugs are used.

Moving to the lower end, we find that trimetal bearings are optional, to replace the lead babbitt ones. This change is always a wise move for improved durability, and also protects the shaft in the event of bearing failure. The valve train is changed from the cam up, with lift increased from .375 to .430 inches and considerably higher rate valve springs. Valve sizes remain stock. Again in the interest of good breathing, the exhaust headers are reworked to a dual system which then merges into a single muffler. Pipe sizes range from 2 inches at the outlets to 2.5 inches in the main sections. The tailpipe is of 2-inch diameter, as compared to 1.5 inches in the stock version.

Obviously, Chrysler people wound their engines much tighter than the official 5200 rpm, because the fan drive ratio was reduced, and the fan diameter cut from 16 to 14 inches. The alternator drive ratio was also cut from 2.25:1 down to 1.43:1. Keeping the change of ratios in mind, it would be safe to hazard a 7,000 rpm windout speed.

A 50-percent power increase in engine output invariably calls for modifications in the drive line and suspension. 1775 pounds at the pressure plate, and a facing area of 100.0 square inches, marks a considerable departure from the stock 1200 pound clutch with 71.8-square inch facings. Three ratios are available for Valiant axle: 3.23, 3.55 and 3.90, all useful in specific applications.

Wheel rims were widened from 13 x 4.53 to 13 x 5.5 to increase cornering power. Brakes are available with full metallic and cerametallic options. Master cylinder bore is considerably larger on the latter two brakes and pedal travel is increased. A finned aluminum drum with a cast iron liner is another option. As you see, the Valiant changes have been extremely thoroughgoing, and indicate that the Chrysler Corporation has made a determined effort to keep their compact in the winner's circle. Optional spring rates are listed and undoubtedly so are revalved shocks.

The listing of a part is not tantamount to its being available, but the elaborate changes on the Valiant are certainly an indication of what it takes to back up engine modifications in competition. Looks like the Compacts are here to stay, complete with a good power race in the offing. ♦ ♦

"... and an exclusive safety device for steep hills ..."