

410 HP

SHORT RAM FOR

DODGE-PLYMOUTH

by Ray Brock

For the past couple of years, Dodge and Plymouth standard production automobiles have been hotter than comparable models released by other manufacturers. Now to those of you who attend an occasional drag meet or some other type of stock car racing event, this probably sounds like a silly statement, but, just examine the facts. By standard production, we mean the type of automobile built for the average public, not the high performance model with multiple carburetion, wild camshaft, noisy tappets and the like.

Consider the '62 Dodge and Plymouth with their standard production V8 of

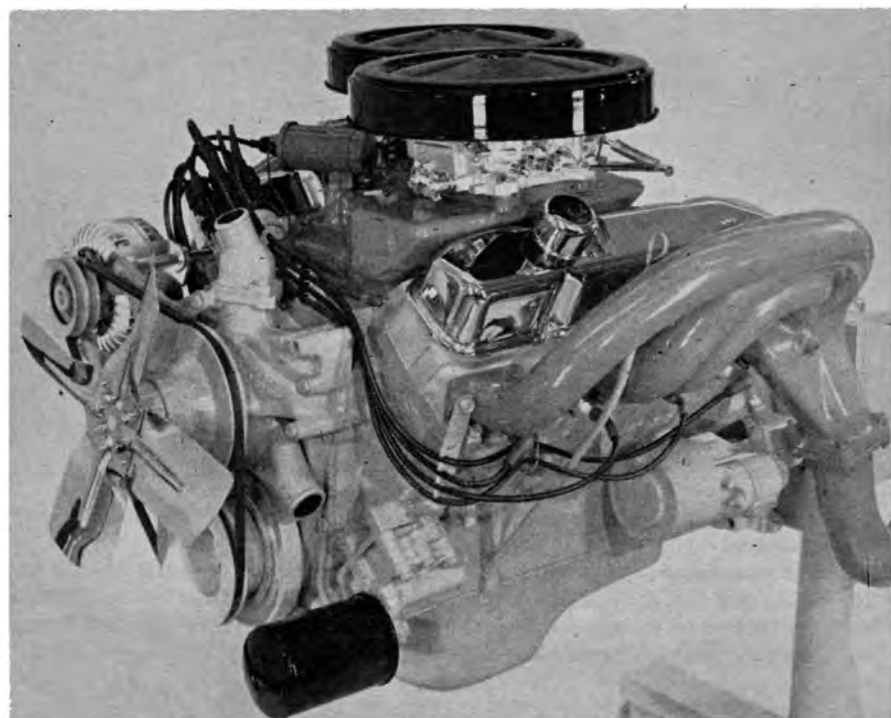
361 cubic inches displacement, a single four-barrel carburetor, hydraulic lifters, 9:1 compression and 305 horsepower. This quiet, smooth idling engine, with stick or automatic transmission, is more than an even match for the Chevys, Fords or even the Pontiacs when they are in their standard production versions with hydraulic lifters, etc. Unfortunately, for Dodge and Plymouth, these other companies each have an optional high performance engine or two which make their cars go like bombs on the drag strips while the two Chrysler products didn't have anything to match, up to now, that is.

From what we have just seen during a trip to Chrysler's Central Engineering department in Detroit, there should be an abrupt change in the kind of impression Dodge and Plymouths make on the drag strips starting just about the time this magazine hits the newsstands. Scheduled for the production line shortly before May 1st, two all-new high horsepower, 413 cubic inch V8's are going to make the boys driving the other brands in the hot stock classes wonder just what hit them. One engine has 11:1 compression, 410 hp at 5400 rpm and 460 lbs/ft of torque at 4400 rpm. The other has 13.5:1 compression, 420 hp at 5400 and 470 lbs/ft torque.

Not only will new high performance engines be offered, the rest of the automobile is going to be tailored to fit and just as delivered from the dealer, Dodge or Plymouth cars with this package should be fantastic in the quarter-mile. To make sure that no stones were left unturned in their efforts to build the kind of a car which would really appeal to the performance enthusiast, Chrysler selected one of their engineers, Tom Hoover, to coordinate the Product Planning and Engineering sides of the project. Tom is one of a group of young engineers from Central Engineering who organized a club called the Ramchargers a few years ago and they have campaigned quite successfully at drag strips in the Detroit area with a variety of cars constructed after working hours.

The engines for this new package are descendants of the 413-inch B series V8 that has been used in Chrysler, Imperial and as an occasional option in Dodge and Plymouth cars since 1959. Chrysler calls this the "raised block" engine while the 361- and 383-inch engines use a lower block. As the name implies, the 413 blocks are higher on each bank to accommodate the longer stroke. Back in

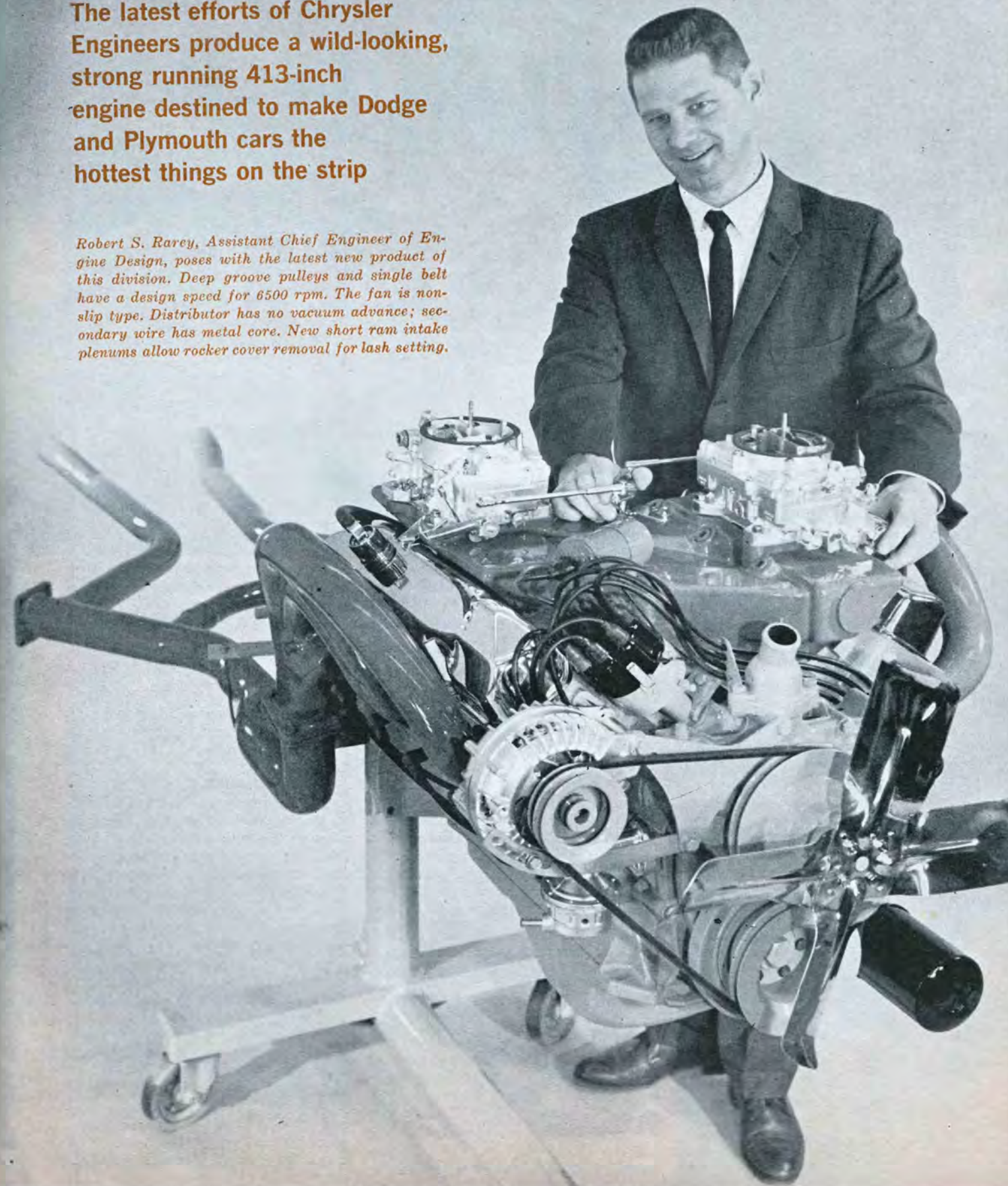
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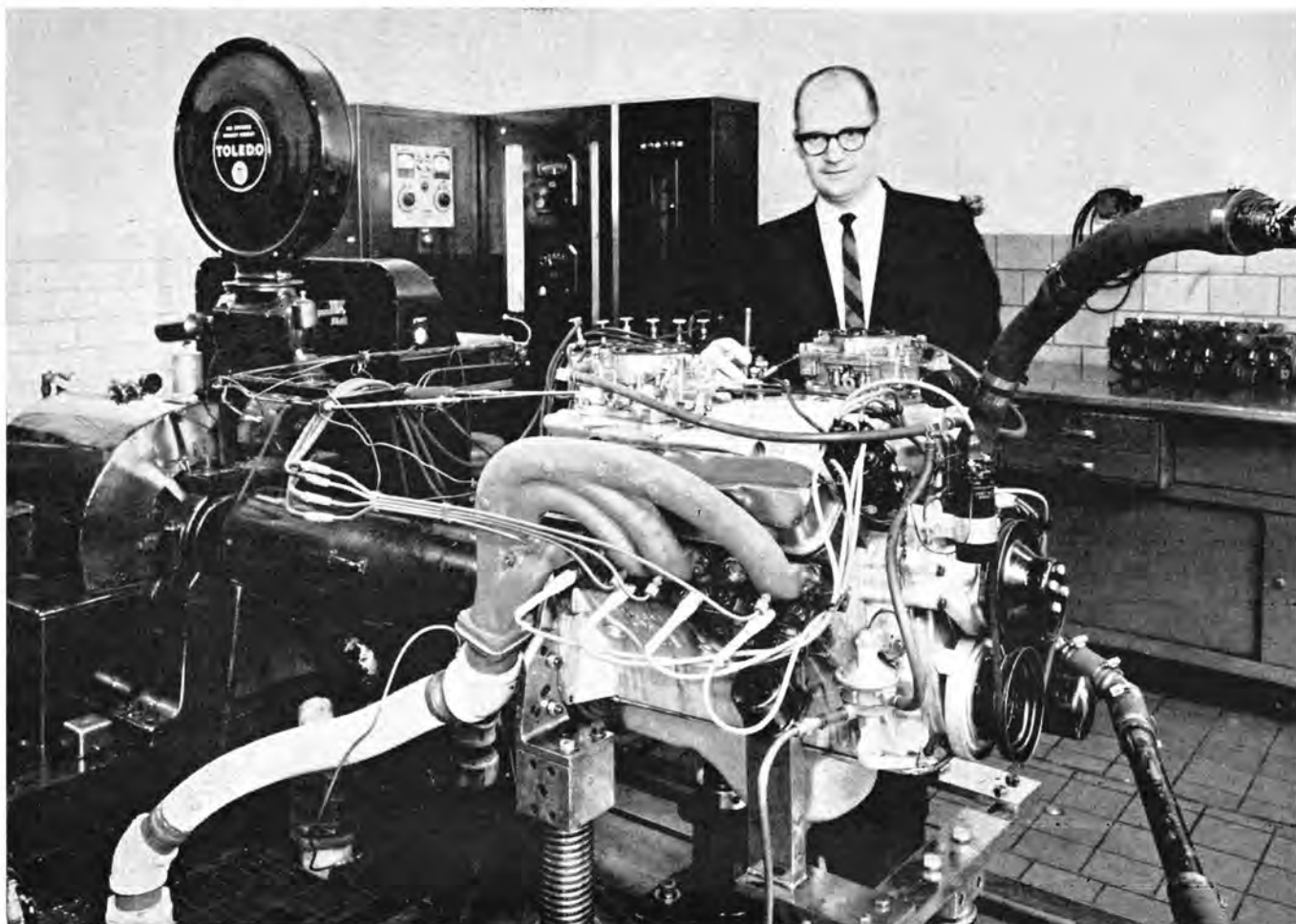


Although the production cast iron headers will not be polished and painted prettily like these, they will be identical in design and efficient in gas flow. Last cylinder on this side has separate passage since it fires 90° after third cylinder.

The latest efforts of Chrysler Engineers produce a wild-looking, strong running 413-inch engine destined to make Dodge and Plymouth cars the hottest things on the strip

Robert S. Rarey, Assistant Chief Engineer of Engine Design, poses with the latest new product of this division. Deep groove pulleys and single belt have a design speed for 6500 rpm. The fan is non-slip type. Distributor has no vacuum advance; secondary wire has metal core. New short ram intake plenums allow rocker cover removal for lash setting.





Project Coordinator Tom Hoover points out feature on the workhorse engine in dynamometer test cell. All phases of the new 413-inch V8 were checked carefully to determine value. Individual tubes into each exhaust port sample air/fuel ratio; ceramics on plug wires protect them from manifold heat during sustained runs.

410 HP RAM for DODGE-PLYMOUTH continued

1959-'60, Chrysler also made a "raised block" 383-inch engine which was used in the small Chryslers but all of the later 383's engines are made with the low block.

This 413-inch V8 which we will discuss in detail is similar to the standard V8 used in '62 Chrysler automobiles but there are many important changes. To simplify matters and avoid confusion, we will refer to the present 413 Chrysler V8 as the standard engine and the

new high performance 413's as heavy-duty or H-D engines. Bore and stroke are the same for both, 4.1875 bore and 3.750 stroke.

ENGINE BLOCK

The block for the H-D 413 is the same as the standard engine block except for a couple of details. First, the main bearing caps are individually checked for hardness to ensure maximum strength. Secondly, the top of each cylinder bore must be notched for exhaust valve clearance. These notches are not very large but are needed to provide clearance for a larger diameter exhaust valve. Except for these two differences, the block is identical to standard 413's.

CRANKSHAFT

Continuing as we would when assembling an engine, the crankshaft is next in line and it is a special item for the H-D 413. It is a forged steel crankshaft with 2.750-inch main bearing journals and 2.375-inch rod journals. Up to this point it's the same as the standard 413 crank but the H-D crank has shot-peened fillets between journals and

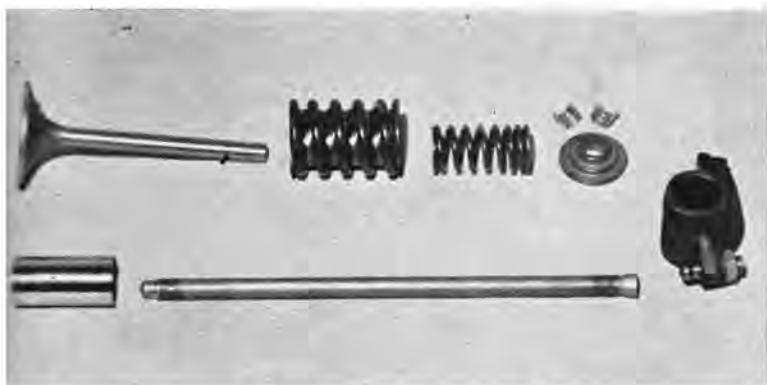


UPPER LEFT — Standard 413 piston, left, is casting while the new 11:1 and 13.5:1 pistons are forgings, right, with raised tops, "eyebrows" for valve clearance. New pistons have no pin offset.

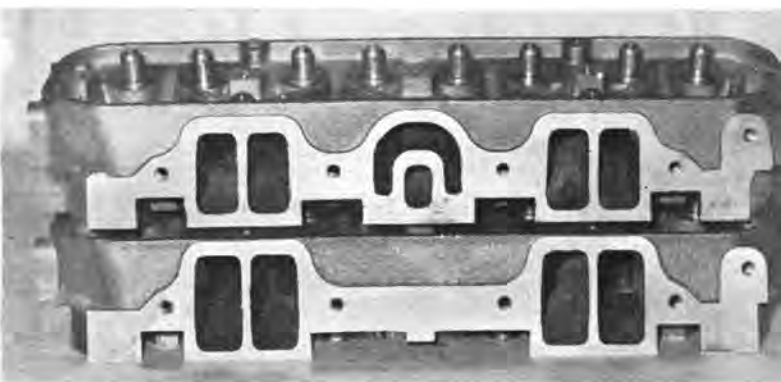
LEFT — Larger exhaust valves used with new engine will not clear edges of bores so a notch is needed, arrows, in each cylinder. New heads will fit all B engines if they are notched like this.



Photos by Chrysler Corporation, Ray Brock



LEFT—Valve train for the new engine has been proven stable at 6500 rpm, consists of: Flat side lifter with extra clearance, tubular pushrod, cast adjustable rocker arm, steel retainer washer with single bead locks, dual springs and new valves. RIGHT—From left: Standard 413 exhaust, H-D exhaust, H-D intake, standard 413 intake. New H-D exhaust is $\frac{1}{4}$ -inch larger and has better contour under head. H-D intake is same size but has much deeper tulip and improved flow contouring.



LEFT—Exhaust ports on the new cylinder head, bottom, are 25% larger than standard 413 head. These larger ports, larger exhaust valves and large capacity exhaust headers should be an important improvement in the new engine. RIGHT—Seen from the intake side, new cylinder head, bottom, does not have heat crossover passage, the intake ports are visibly much larger. With new short ram intake manifold, this combination should be the best in the industry.

cheeks, plus the main journals have been given an extra .0005 (half-thousandths) clearance and all journals are flame hardened. Shot-peening greatly reduces the possibility of cracks starting in the critical fillet areas and the flame hardened journals are to make them compatible with the new bearing material.

BEARINGS

Copper-lead bearing inserts are used for the H-D 413; the standard 413 uses steel-backed babbitt inserts. These heavy-duty bearings are the same as those used in 413-inch Dodge truck engines and are of the tri-metal design. A steel back, .039-.049 inches thick, is covered with a copper-lead alloy, .013-.023 inches thick, then a layer of lead-tin is plated on to a thickness of .0009-.0011 inches. The thin layer of lead-tin (babbitt) acts as the bearing surface and is backed up by the copper-lead alloy which supports a heavier load than the babbitt and is a very good bearing material in its own right. The lower half of the main inserts are

grooved for increased lubrication to the rod journals.

Tri-metal bearings are capable of operating under much more load than the conventional babbitt type without failing but the copper-lead alloy is very hard and has poor imbeddibility. Babbitt inserts will absorb dirt or other minute foreign particles that the oil carries to a bearing but the copper-lead insert will not readily "soak up" the dirt. If a conventional unhardened crank journal is used, foreign material will score the journal and often cause failure. With the hardened 413 H-D journals, any dirt is forced into the copper-lead alloy and the crank is not damaged. Clearance limits for the main bearings in the H-D engine are .001 to .0015 more than in the standard 413 engine.

Both the H-D crankshaft and the copper-lead inserts will fit in the standard 413 engine but the bearings must not be used without the hardened crankshaft. Needless to say, extra care must be taken and both oil and filter changed frequently to keep foreign particles

from the engine. This is especially important with any high performance engine.

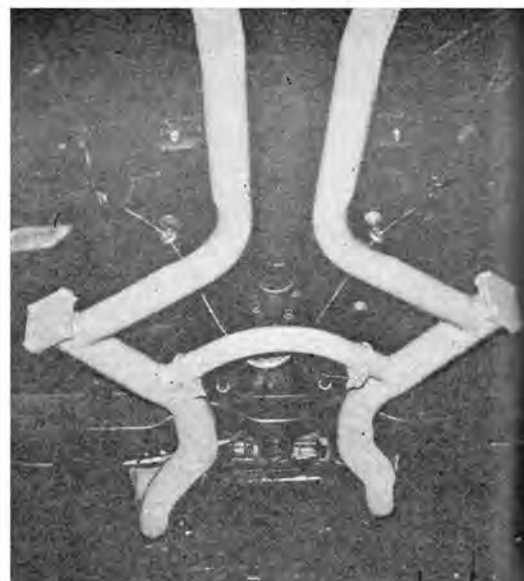
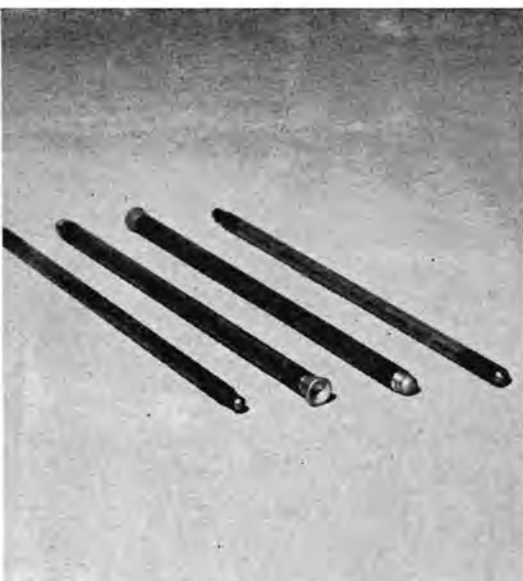
CONNECTING RODS

Standard 413 connecting rods are used but each is Magnafluxed to eliminate the possibility of fractures. These forged steel rods use the H-D copper-lead inserts in their big ends and the small end is honed for a .0007-.0014 interference fit with the piston pin. Rod insert clearance limits are .001-.0025 inches.

PISTONS AND RINGS

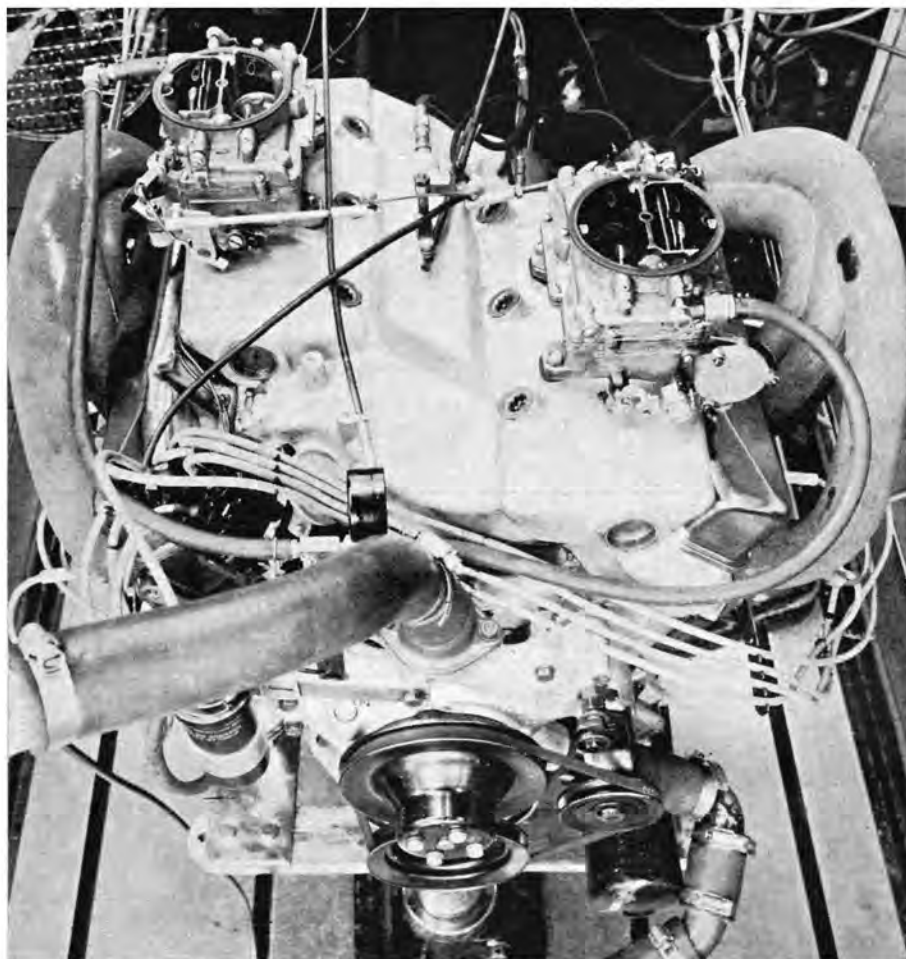
Pistons for the H-D 413 are forged aluminum. There will be two different compression ratios offered with the new high performance V8; 11:1 and 13.5:1. The 11:1 piston will have thermal control through a double trans slot design and will be cam ground. This piston will be fitted with a .003-.005 inches skirt clearance and will be a fairly quiet operating piston even when cold. The 13.5:1 piston is also cam ground but has no thermal control and will be

(Continued on following page)



LEFT — New pushrods, center, are $\frac{3}{8}$ -inch tube with .083 wall and tip inserts. Standard pushrods are solid $\frac{5}{16}$ -inch. CENTER — Standard 413 rockers, left, are stamped steel. New H-D versions are cast, have adjusting screw and locknut. RIGHT — This is the factory installed exhaust system that will be fitted to Dodge and Plymouths with 410, 420 hp engines.

410 HP RAM for DODGE-PLYMOUTH continued



New short ram cast aluminum intake manifold has large plenum chambers on each side with 15-inch long tapered passages to cylinders on opposite side of engine. A balance chamber also connects two plenums. Carter four-barrels are mounted sideways from normal application but this does not disturb operation. To remove the manifold, the three plugs in each plenum must be removed so a long Allen wrench can be used to loosen the socket head screws that fasten the manifold to the cylinder heads. New manifold acts as tappet chamber cover too.

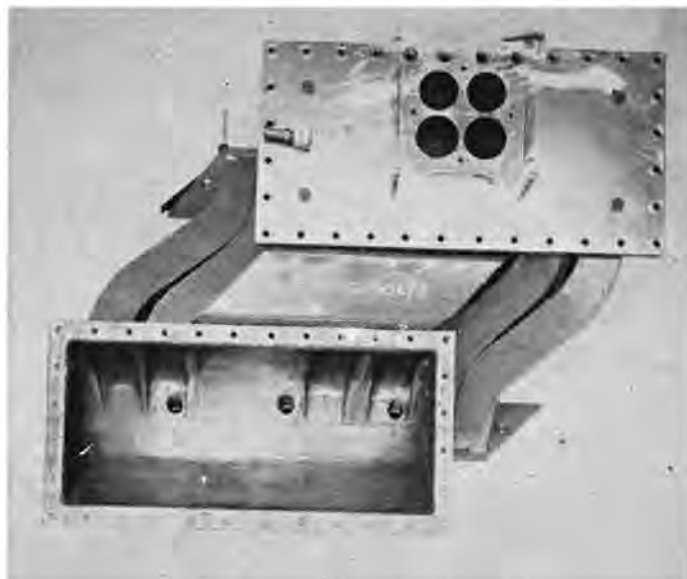
fitted with .010-inch or more clearance so will be noisy, especially when cold.

Both of these pistons will have a raised top to extend into the combustion chamber of the cylinder heads for compression requirements. Naturally, the 13.5:1 pistons will have a much larger pop-up section than the 11:1 pistons. Both styles will have "eyebrows" in their tops for intake and exhaust valve clearance. There will be no pin offset so the pistons are the same for all cylinders.

The 11:1 compression ratio will be for regular H-D 413 production engines and although the higher compression engines can be ordered through dealers, their release will be carefully controlled for the highest octane gasoline available must be used at all times and wide open throttle operation must be limited to 15 seconds duration. In other words, this engine is strictly for the $\frac{1}{4}$ -mile and not for every day street operation.

Oversized pistons will also be available through parts departments in .005, .020 and .050 sizes. They will balance to the same limits as the production pistons and the .050 oversize permits up to .010 clearance with the engine still falling within the .060 oversize bore many racing organizations permit.

Ring sets used with these pistons are also of a special design. Since the engineers realize that many of these engines will be run minus air cleaners on drag strips throughout the country, the top compression ring is special high strength alloy with a heavy chrome plated outer diameter to resist abrasives pulled into the cylinders. The second compression ring is standard cast iron and the oil ring is of a new one-piece design. This



LEFT—New oil pan needed for 413 engine in Dodge-Plymouth chassis, left, has extra baffle, deeper four-quart oil sump. **RIGHT**—Fabricated steel manifold used in development program for the new short ram had removable top plates on plenums so carburetor placement could be changed. Note the hidden hold-down screw location in the plenum without plate.

one-piece oil ring is of low-friction design and although its oil control will be adequate for special H-D application, oil consumption will be above normal.

CYLINDER HEADS

Here is one of the big differences between the standard 413 and the H-D 413 engines. An all new head casting is used for the new engine with 25% larger intake and exhaust ports, larger exhaust valve openings, beefed deck structure and the heat crossover passage has been eliminated. 25% more area in the ports than the standard 413 will certainly deliver a lot more intake charge and carry away more exhaust gases than before. The opening for the exhaust valve is $\frac{1}{4}$ -inch larger than standard and although the intake opening is the same as before, the area directly under the valve has been improved substantially.

Elimination of the heat crossover passage means that there will be no exhaust heat to the intake charge, ensuring maximum intake efficiency for high performance operation. The beefed deck in the head is principally in the area around the top half of the cylinder bores where there has been some indication of head gasket leakage in the past if very high compression ratios were used. The extra material in this area promises to eliminate any future blown head gaskets. On the subject of gaskets, the H-D 413 will come equipped with stainless steel gaskets. They look just like the regular gaskets but instead of the mild steel used for standard gaskets, stainless is used for maximum strength.

VALVE TRAIN

To take full advantage of the new, larger ports in the cylinder heads, the

valves have also been changed. The intake valve remains the same size as before with a head diameter of 2.080 inches but its underside contour has been changed and the head "tuliped" deeply. The new contour beneath the valve gives a much more gradual change in intake flow through the valve opening than before and the deeper tulip of the valve head is to remove excess weight.

Exhaust valves are 1.88 inches in diameter, $\frac{1}{4}$ -inch larger than in the standard 413. Its underside contour is not as noticeably changed as on the intake but it too has an improved shape to assist exhaust gas flow. Both intake and exhaust valves now have a single wide bead lock on the end of the stem instead of the standard 2 bead intake lock and 4 bead exhaust lock. The multiple groove locks were designed to assist low speed valve rotation but since rotation is assured at high engine speeds, stronger single beads locks were selected.

For those of you who might be interested, the new cylinder head and valve package will fit any of the B series Chrysler Corporation engines but the top of the block must be notched for the larger exhaust valves. Also, the larger exhaust valve can be fitted into any of the older B heads but here too, the block will have to be notched for clearance.

Dual valve springs will be fitted to both intake and exhaust valves on the H-D engine. The outer spring also uses a flat wound steel damper to eliminate harmonics. Both springs will be manufactured by the latest methods which include a heat-set period of compression

at high temperature to minimize load loss during operation. Specifications call for the outer spring to have 95 pounds pressure at the installed length of 1.86 inches and an open pressure of 261 pounds at 1.36 inches. This does not include the damper. The inner spring should check 30 pounds at 1.56 inches installed length and 77 pounds at 1.13 inches. Pressures can vary $\pm 4\%$.

Machined steel retainer washers and the aforementioned single bead stem locks hold the springs in place. These retainers have carefully controlled radii on the underside to prevent breakage. With the dual spring installation, oil seals can't be used as on standard 413's.

A new style rocker arm is used on the H-D 413. Standard 413 engines use hydraulic lifters and stamped steel non-adjustable rocker arms on all models except a couple of the Chrysler 300 engines. These 300 engines which used an adjustable rocker arm together with a solid lifter camshaft borrowed cast malleable iron rockers with self-locking adjusting screws from Chrysler Marine engines. The new H-D rocker arms are similar to the Marine rockers but instead of the self-locking screw, use a $\frac{3}{8}$ N.F. slot head screw with a thin locknut which jams against a machined seat on the rocker. The new rocker arm will also be used in late '62 Marine engines.

Pushrods for the H-D 413 are $\frac{3}{8}$ -inch diameter steel tubing with .083-inch wall thickness and hardened inserts in each end. Standard 413's use a $\frac{5}{16}$ -inch solid steel pushrod. The H-D pushrods are similar to those used in the 300-H solid lifter engine but are .040-inch longer to compensate for the difference

(Continued on page 102)

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410 HP for DODGE-PLYMOUTH

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in camshaft timing and smaller base circle diameter on the cam lobe used in the H-D engine.

Lifters used in the H-D 413 engine are of the flat side design and are of a special material compatible to the camshaft. These lifters have .001-inch less diameter than standard 413 lifter specifications call for to make sure that they do not drag or hang up at high speeds causing valve float.

At the time we were in Detroit gathering information for this article, the production camshaft design had not been finalized. An exhaustive series of dynamometer tests had not yet been completed but the engineers in charge of the program were quite pleased with the results they had shown with a 300° duration camshaft. This cam is quite similar to that used in the optional short ram 405 horsepower Chrysler 300 engine this year but acceleration ramps were altered slightly and clearances were not the same. Assuming the test program reveals the 300° camshaft to have the best overall characteristics for production, it will have .495-inch lift at the valve, intake opening 33° BTC, closing at 87° ABC; exhaust opening 78° BBC, closing 42° ATC. This gives 75° overlap and duration is 300° for both intake and exhaust. The final cam design should be very close to the above figures. Valve lash will be .026 for intakes, .032 for exhausts, hot.

With the camshaft we have just described, plus all of the other components needed to operate the valves, a test fixture has shown the valve gear to be stable at 6500 rpm. This was the design rpm for this engine and no attempt was made to exceed this speed but chances are that the valve gear is stable at even higher rpms.

INTAKE SYSTEM

When the decision was made to answer the demands of the public for a high performance engine for Dodge and Plymouth cars, one of the items the engineers definitely wanted was a short ram intake manifold. The short ram manifold used in the past was actually a modification of the 30-inch long ram manifolds which criss-crossed branches with the carburetor and plenum for each bank of cylinders located outboard of the rocker arm covers on the opposite bank of cylinders. This effective but cumbersome layout would not fit in the engine compartment of the unit construction '62 Dodge-Plymouth cars so was ruled out. The only solution was to use a conventional runner type intake manifold with the carburetors over the center of the engine or figure out a way to built new short ram manifolds which would fit beneath the hood.

(Continued on page 104)

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410 HP for DODGE-PLYMOUTH continued

The latter path was chosen because Chrysler engineers knew that the ram manifold was far superior to conventional runner type manifolding. As long as they were designing a new short ram manifold, the boys decided to make it compact so that rocker covers could be removed and hot valve lash set without disturbing the intake manifold. This was impossible with the old system. New short ram manifolds were made up in sheet metal and 15-inch long branches, from plenum to valve, gave the desired results. These branches taper down slightly between plenum and head port. Several sheet metal manifolds were made before the desired results showed up. The size of the ram branches, the area and shape of the plenum chambers, the size of the balance tube and even the location of the carburetor on the plenum were all critical problems that had to be worked out. Removable plates over the top of the sheet metal plenums permitted the engineers to change plates and mount carburetors at several positions.

When the ideal design was finally proven on the dyno and in a test car, patterns were then made from the sheet metal versions and the casting of new aluminum short ram manifolds began. Unlike the standard 413 engine which uses a thin stamped steel pan to form the engine top cover and intake manifold gasket with a separate manifold, the new short ram manifold acts as the tappet chamber cover too.

Two Carter aluminum four-barrel carburetors similar to those used on previous Chrysler ram manifolds top the new short ram manifold for the H-D 413. They have 1.44-inch primary and 1.69-inch secondary throttle bores and are both fitted with mechanical chokes operated from a cable control at the instrument panel. A pair of large-diameter, non-silenced flat air cleaners top these carburetors with replaceable paper filter cartridges. The base plate of these cleaners has a contoured lead-in flange around the top of the carburetor air horn that directs air flow cleanly into the carburetor. Factory carburetor jetting will be for maximum power so will not need to be changed for drag strip operation.

The final link in this improved intake system is a high capacity fuel pump with three valves for maximum flow and a higher pressure spring to deliver 8-10 pounds pressure. In-line filters will be used ahead of each carburetor. In case you have a Chrysler product with the B series engine and are wondering if the new intake system will work on your engine, the answer is no for the "short block" 361- and 383-inch engines and yes for the raised block 383- or 413-

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NORTH HOLLYWOOD, CALIF. TRIangle 7-0347

inch engines. But, on these raised-block engines, the passages in the new manifold will be too big for the older style cylinder heads and porting the older heads to match is practically impossible. You'd need the new heads to make a good fit and also to get full benefit of the carburetion.

EXHAUST SYSTEM

Exhaust manifolds for the new H-D engine are as exotic in appearance as they are effective. They are "tuned" to separate exhaust impulses that might cause restriction. In the '62 Dodge and Plymouth unitized bodies, room between engine and inner fender panels is limited, and especially so on the right side of the car because the engine is offset and mounts an inch to the right of the centerline. This presented quite a problem on exhaust manifold routing plus the location of spark plugs also entered into the picture. Chrysler solved this problem by routing the manifold branches up and over the top of the exhaust ports. This sweeping design not only aids exhaust gas flow but also makes plug changing quite simple. Of necessity, the right side manifold hugs the engine closer than the left and the mounting nuts must be loosened slightly and the manifold tilted out to remove the right rocker cover. The left rocker cover can be pulled off without disturbing the exhaust manifold.

These sweeping cast iron manifolds or headers have passages with nearly 2 inches inside diameter from each exhaust port and where the branches join just ahead of the outlet flange, the header inside diameter is three inches. A three-inch exhaust head pipe bolts to a four-bolt flange on each header and drops down beneath the car, then back where it turns out at about a 45° angle toward the side of the car. These 3-inch pipes are capped by a four-bolt square cover which can be removed for competition. Just ahead of the header outlet on each of these exhaust pipes, 2-inch pipes branch off to large capacity New Yorker style mufflers and 2-inch tailpipes. A balance tube between the head pipes provides noise abatement chamber for street use.

This all boils down to the most complete exhaust system ever built on a factory assembly line. In street trim, the large head pipes, dual large capacity mufflers and 2-inch tail pipes are very efficient yet quiet. For strip use, just uncap the header outlets and the car is ready to run. These header outlets are tucked up under the car snugly so that they have good road clearance. The outlet is about 18 inches from the side of the car so they are not readily visible, yet can easily be reached. The outlet is angled slightly away from the underpan of the car, yet will not kick excessive dust.

(Continued on following page)

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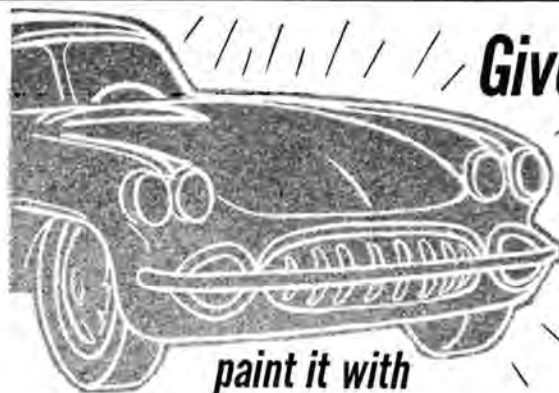
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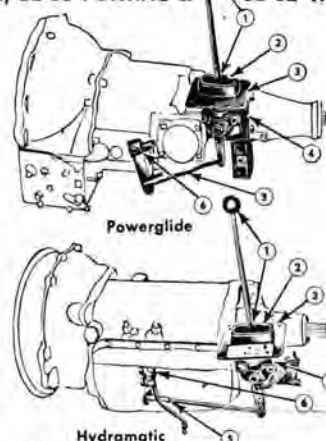
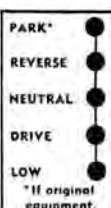
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FALCON	60-62 Auto. Trans.	229
FORD	51-56 Fordomatic	230
	57-58 Fordomatic	231
	59-60 Fordomatic	232
	61-62 Fordomatic	233
	61-62 Cruisomatic	234
	61-62 Cruisomatic	239
MERCURY	51-56 Mercromatic	230
	57-58 Mercromatic	231
	59-60 Mercromatic	232
	61-62 Mercromatic	233
	61-62 Mercromatic	234
	61-62 Cruisomatic	239
OLDSMOBILE	46-50 Hydra. SR*	240
	1951 Hydra. SR*	241
	52-53 Hydra. DR*	242
	1955 Hydra. DR*	243
	1956 98 Hydra. DR*	244
	1956 88 Hydra. DR*	244
	57-62 Jet-A-Way (See Note Below)	246
PONTIAC	52-54 Hydra. DR*	242
	55-56 Hydra. DR*	243
THUNDERBIRD	58-62 Auto. Trans.	240
	*SR—Single Range	
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All numbers, per kit \$29.95

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410 HP for DODGE-PLYMOUTH continued

IGNITION

A dual-point fully centrifugal distributor is used for the H-D 413 engine. No vacuum advance mechanism is used. Here too, we do not have the final specifications but it will probably have a maximum of 22° crankshaft advance in the mechanical weights and use an initial setting of about 10° for average driving and 12° or 13° for the strip. Chrysler's past experience has shown that the best power setting should not exceed 34° total advance.

Champion J9-Y spark plugs will be original equipment in these engines and they should work very well under all conditions, street or strip. For the 13.5:1 compression engine, a colder plug will certainly have to be used for the strip, probably about a Champion J-63T or J-4J. Should the 11:1 engine show any tendency to foul plugs in street driving, J-12Y's could be used but replaced with the J-9Y's for strip runs.

LUBRICATION

A new oil pan is used for the H-D 413 engine since the standard 413 pan will not fit in the '62 Dodge-Plymouth chassis. The new pan has a 4-quart capacity, a deeper sump and anti-slosh baffles. The standard 413 pan has a baffle only to restrict oil from sloshing out of the sump on fast stops but the new pan also has an extra baffle to hold oil in the sump on rapid acceleration. With this redesigned oil pan, a new pickup tube is required from the oil pump and it is fixed near the bottom of the sump.

Chrysler recommends SAE 30 weight heavy-duty oil for this engine. The oil pump has a pressure output of 55 pounds at higher engine speeds which supplies all parts of the engine with plenty of lubrication. 413 engines have proven trouble-free in the lubrication department since they were introduced.

ENGINE COOLING

All cars equipped with the H-D 413 engine will have the same radiator used for the 361-inch engine. This radiator has proven more than ample in the past. The water pump will use a hard plastic impeller which is smaller than standard and has less high rpm power drag. A fan with four blades, 18 inches in diameter and with 1 1/2-inch blade pitch will be standard but Chrysler recommends installation of the 16-inch Valiant fan should temperature conditions permit. Idle speed of the high performance engine will be between 800 and 1000 rpm so even with the small pump impeller and small fan, ample cooling air should be drawn through the radiator for street cooling.

Water pump, crankshaft and alternator pulleys are all of the deep groove variety to eliminate tossing belts at

high engine speeds. The pulley sheaves are $\frac{1}{2}$ -inch wide and the fan belt will be $\frac{3}{8}$ -inch. A smaller than standard crankshaft pulley is also used to limit belt speeds to their design specifications. With the smaller crank pulley, the belt design speed is reached at 6500 rpm and that's the design speed of the engine.

ENGINE ASSEMBLY

With all of these special engine parts, assembly must also be carefully controlled. Instead of building these engines in the regular passenger car engine plant, Chrysler's Marine and Industrial Division will build them. This division is well acquainted with special engine applications and the build-up line moves at a much slower pace than the regular production line. Special care is taken with all phases of the assembly and when the M & I division sells these engines to Dodge or Plymouth, they are precision items.

The Marine and Industrial division will also handle sales of the engine components needed in these new H-D 413 engines. All of the pieces we've described in this article will be available through Chrysler's M & I outlets throughout the country and one of the sales executives told us that any and all of these parts would be readily available, not just as replacement items but for anybody interested in building up top-flight Chrysler B engines. More about this at a later date.

CLUTCH AND TRANSMISSION

The H-D 413 engine will be available in '62 Dodge or Plymouth cars of all models except station wagons. It will also be available with standard three-speed transmissions or Torqueflite automatic. The clutch used with the standard transmission is a new heavy-duty item with a $10\frac{1}{2}$ -inch pearlitic malleable iron pressure plate, and a new high burst-speed disc. This pressure plate will have heavy spring pressure but not excessive pedal pressure. A new torque shaft between the body and engine is also used to resist the heavier spring loads.

In the transmission department, Chrysler looked very closely into the need for a four-speed transmission but then decided that they did not need it. A new heavy-duty T-85 Borg-Warner three-speed was chosen instead with ratios of 2.10 in low, 1.44 in second, direct in high. With this three-speed, acceleration times were equal to or superior to a four-speed with closer gear spread since an extra shift is needed with the four-speed. A floor-mounted shifter unit is fitted to the T-85 transmission. The bell housing is aluminum and in case you might be interested, the bell housing will also accept the Borg-Warner four-speed box if a pair of holes are

(Continued on following page)

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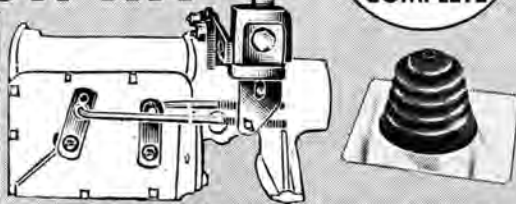
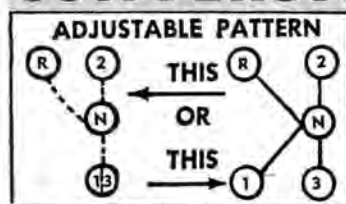
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39-56 Dodge **\$32.95**

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Please do not send currency or stamps.

410 HP for DODGE-PLYMOUTH continued

drilled and tapped for the bottom mounting bolts. There are bosses in the proper location for new holes.

In the automatic transmission department, Chrysler has a big jump on the rest of the industry. Neither Chevrolet or Ford offer an automatic behind their high performance engines and although Pontiac does, we hear that life expectancy is nothing to shout about when they are abused weekly at the drags. The three-speed Chrysler Torqueflite which was redesigned and lightened considerably for '62 is an excellent unit in standard form but for use with the new 413 engine, has been beefed up to where it should be in a class all by itself. Special friction materials for the front clutch and kickdown band plus different kickdown servo return springs, kickdown lever and governor assembly give the Torqueflite fantastic life expectancy. Dynamometer tests have shown these beefed units to be capable of delivering several thousand full-throttle 1-2-3 upshifts. All this in a efficient package which complete with torque converter weighs no more than a standard three-speed with clutch assembly and flywheel. Ratios for the Torqueflite are 2.45 in first, 1.45 in second, direct in high and although there are converter losses with an automatic transmission, we believe that the torque multiplication and smoother starting possibilities offset these losses and should make a Dodge or Plymouth with automatic every bit as rapid as the stick models. This is our own personal opinion, not Chrysler's.

DRIVESHAFT AND REAR AXLE

Heavy-duty driveshafts will be fitted to cars using the new engines. They will be selected for minimum runout and close balance and a high speed cemented U-joint boot will be used at the front.

Standard rear axle ratio for the 410 and 420 hp 413's will be 3.9:1 whether the car has stick or automatic transmission. Higher or lower ratios from 2.93 to 4.89 will be available through MoPar parts dealers. Chrysler's limited-

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CHEV-265 & 283. Up to 13:1. Includes pins. Super pistons \$41.90 for most O.H.V. engines. Rings included. Chev. V-8 stroker kit \$295.00. Full price. Catalog 25c P.H. G.I. 88705.

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HOT ROD MAGAZINE

slip Sure-Grip Differential will also be fitted to the 3.90 production rear axle. The pinion snubber which brackets above the U-joint on the pinion shaft in the rear axle has also been beefed for the extra torque of the new engine. The bracket is stronger and the bumper thicker.

Police car rear springs and shock absorbers will be fitted to these cars for resistance to rear wheel hop and spring wrap-up. Optional rear springs and shock absorbers of even stronger proportions are also available through MoPar. New Yorker station wagon wheels can be purchased through MoPar and they have a 6½-inch wide rim which is ideal for 9.00 or 9.50 x 14-inch tires.

That's the package you will be able to order from your local Dodge or Plymouth dealer about the first of May. You can see that the Chrysler engineers have tailored this package to meet the demands of drag enthusiasts throughout the country and although a sharp owner will be able to add the little extra touch that adds to top speed and cuts down elapsed time, these cars will be ready to compete when they roll off the assembly line. By late summer, when the '62 NHRA Nationals roll around in Indianapolis, we predict that Dodges and Plymouths will be favored to fight it out for stock honors.

As for the price of the new 413 packages, here's a pleasant surprise. Rounded off to the nearest dollar, the following prices are extra above the standard six-cylindrical Dodges or Plymouths: 410 hp, 11:1 V8 with standard transmission, \$545; 410 hp with automatic, \$615; 420 hp, 13.5:1 with standard transmission, \$612; 420 hp with automatic, \$682. Just one last comment, the dragster boys have been drifting away from Chrysler products since the hemispherical engine was dropped in '58 but after noting how the Dragmaster boys cleaned house at the Winternationals with the "old" B engine parts, wonder how they'll do with the new heads, etc? We think there's going to be a resurgence toward Chrysler engines in the competition classes throughout the country. Care to bet against it?



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