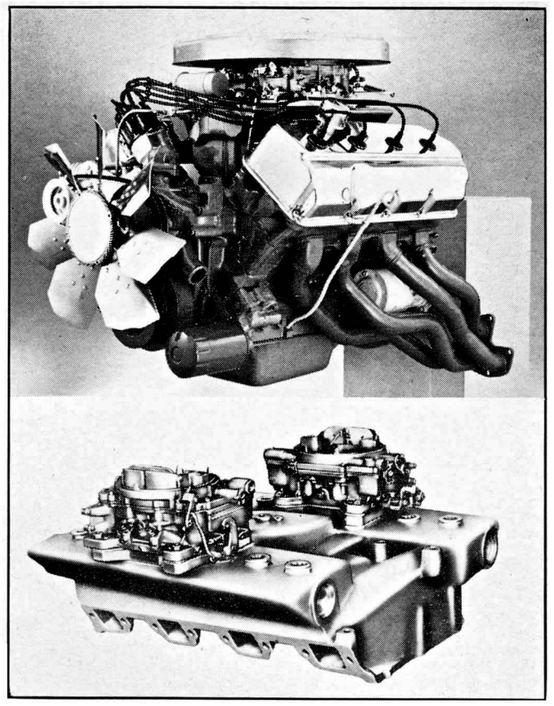
KING KONG RIDES AGAIN

BY JAN P. NORBYE

Chrysler shakes Ford's hegemony in racing with a hemispherical-head powerplant —it will run NASCAR and drag racing too!



For installation in dragsters, the new Chrysler V-8 comes with twin four-barrel carburetors and a choice of compression ratio.

A casual observer at Daytona last February might have been puzzled by the sight of several Ford engineers nervously hiding their heads and hands under the hoods while whispering mysteriously to each other about a character named King Kong. To the initiated there was no mystery—King Kong is a nickname for the Chrysler V-8 used in the Plymouth Super-Commando stock cars that ran away from the Fords at Daytona and established four new records in the process.

The cars would need about 525 bhp to do this, as the "427" Fords are known to put out well over 500 bhp. However, Chrysler claims only 405 bhp for King Kong while Ford admits to 427—exactly one bhp per cu in. There's really no point in going on with this sort of "cheating" and we hope the manufacturers will give out more realistic power figures when the cars meet for their next race.

King Kong is basically the high-performance 426-cu in Chrysler engine with new cylinder heads reviving the hemispherical combustion chamber used on all production Chrysler V-8s from 1951 through 1954 (and on the Chrysler 300 Series through 1958). It was supplanted, first by the polyspherical combustion chamber with staggered valves inclined at a narrow angle, more recently by the wedge-type chamber which completely dominates the American automotive industry today.

It's true of any combustion chamber that the flame front advances from the spark plug through the explosive charge. Knocking occurs when the combustion process leads to a rise in temperature and pressure in a portion of the charge to the extent that it detonates before the flame front has reached it. Knocking is not only detrimental to performance but also very harmful to the engine, usually resulting in the piston crowns being burned through.

In a wedge-type combustion chamber the "end gas" (as we shall call this detonation-prone portion of the charge) is cooled in a high-turbulence squish area, where the metal of the head and piston masses will absorb the excess heat. This is, in fact, nothing more than an overhead-valve application of the theories on side valve cylinder head design put forth in 1922 by Sir Harry Ricardo (and a feature of every subsequent side valve engine).

The hemispherical combustion chamber, on the other hand, allows the flame front to travel faster, and most designs have central plug location, further aiding to achieve a shorter duration of the combustion process. This is particularly advantageous at high crankshaft speeds, and on full-throttle operation at any speed. Hemispherical combustion chambers reduce the octane requirement and will operate reliably on higher compression ratios than wedge-type designs, in spite of their higher pressure rise rate and higher peak pressure. Equally important for a high-performance engine is the inherently higher volumetric efficiency of the hemispherical head.

It was in 1946 that Chrysler became interested in the hemispherical combustion chamber. Chrysler engineers examined all sorts of high-performance engines, many with double overhead camshafts, and spent a lot of time talking to the hot-rodders. The initial version of the Chrysler V-8 ran on the test bench in 1949 and replaced the side-valve in-line eight in the 1951 models.

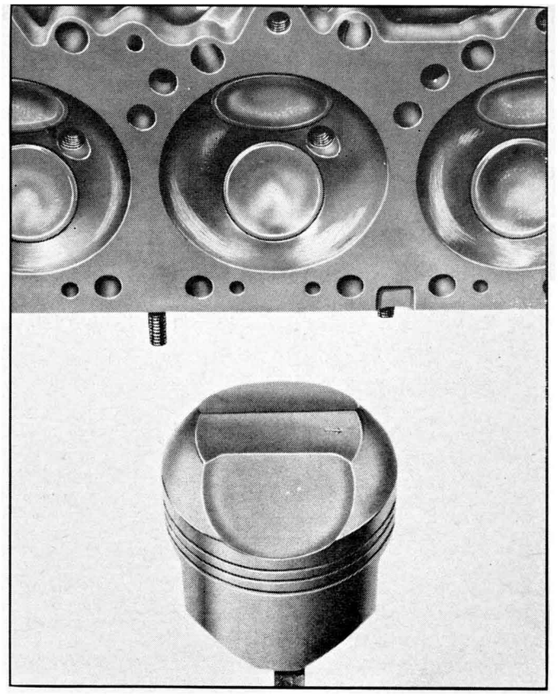
The potential of the 1951 production engine was obvious to Briggs Cunningham, who chose it in preference to the Cadillac V-8 he had been using in his special cars up to then. After the success of the Cunningham C-3, the favorable reception of the K-310 Chrysler, and the impressive demonstration of a special version of the Chrysler engine in a Kurtis-Kraft chassis at Indianapolis, Bob Rodger designed the Chrysler "300" around it.

Today's King Kong, as used in the Dodge Hemi-Charger and the Plymouth Super Commando, is a development of the production V-8 with certain influence from the Indianapolis engine. The Indy version differed from the production engine in having a gear-driven camshaft, roller tappets, Hilborn fuel injection, a Scintilla Vertex magneto, and a 13.0 to one compression ratio, apart from the dimensional differences (which consisted mainly in smaller cylinders and larger valves).

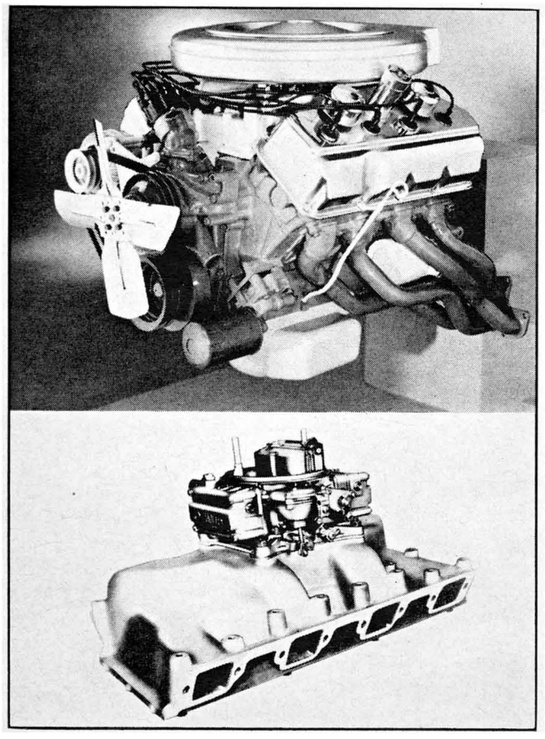
The 331 cu in-production engine developed 180 bhp at 4000 rpm with a single two-barrel carburetor and a 7.5 to one compression ratio. The 271-cu in Indianapolis engine gave off 372 bhp at 5800 rpm on methanol.

King Kong, with his 426 cu in running on premium gasoline, develops 405 (according to Chrysler) bhp at 5600 rpm, with a maximum torque of 465 lbs-ft on a 12.5 to one compression ratio. This is the circuit-racing version; two other versions have been made available to drag racers: one with an 11.0 to one compression ratio and a power output of 415 bhp at 6000 rpm and another with a 12.5 to one compression ratio and a power output of 425 bhp at 6000 rpm. Both dragster units differ visibly from the circuit-racing engine in having twin four-barrel carburetors, a ram-tuned induction system and stack exhausts, while the road version is fitted with a single four-barrel carburetor, a two-level intake manifold, and an exhaust system with twin tail pipes.

Valve area in the King Kong is just tremendous. The block shares its 4.25-in bore and 3.75-in stroke with the squish-head version of the 426-cu in V-8, so the intake valve diameter is a colossal 2.25 in; the exhaust valve head measures 1.94 in across.



Hemispherical combustion chamber gives good plug location, big valves and an included valve angle of 62°. Head is cast iron.



Circuit-racing version of King Kong has a single four-barrel carburetor and many reinforcements not required in dragster.

In comparison, the hemispherical-head Indianapolis engine had valve diameters of 1.94 in for the intake and 1.75 in for the exhaust, with a bore and stroke of 3.81 x 2.97 in. And the squish-head "426" has a 2.08-in diameter intake valve head and a 1.88-in diameter exhaust valve head.

King Kong's valve gear can only be described as a "heavy-duty" type. A chain-driven high-lift camshaft operates fairly long pushrods to both banks. There are two rocker shafts per bank, with wide and carefully sculptured forged steel rocker arms. The rocker shafts are carried on top of the cylinder heads on five V-shaped malleable iron brackets and secured by five center bolts in the cylinder head. Valve springs are similar to those used on the "426" all along, but valve stems are thinner than standard to reduce valve train inertia.

The bottom end is well suited to take care of the extremely high bmeps on top. The five-bearing crankshaft has shot-peened fillets and an eight-hole flange design to ensure maximum torque-transfer capacity.

While the drag engines use an ordinary SAE-1046 carbon steel crankshaft, the road-racing engine has an SAE-4340 high-tensile alloy steel crankshaft. The trimetal main and crankpin bearings are inherited from the squish-head "426," with the mains anchored in a block of tin-alloy cast iron. The crankcase walls on the road-racing unit are reinforced in the area of the main bearing webs. All except the two end bearings receive additional support from a pair of horizontal cross-bolts holding the bearing caps firmly in place. The connecting rods are greatly reinforced in comparison with earlier types. The bearing centers are farther

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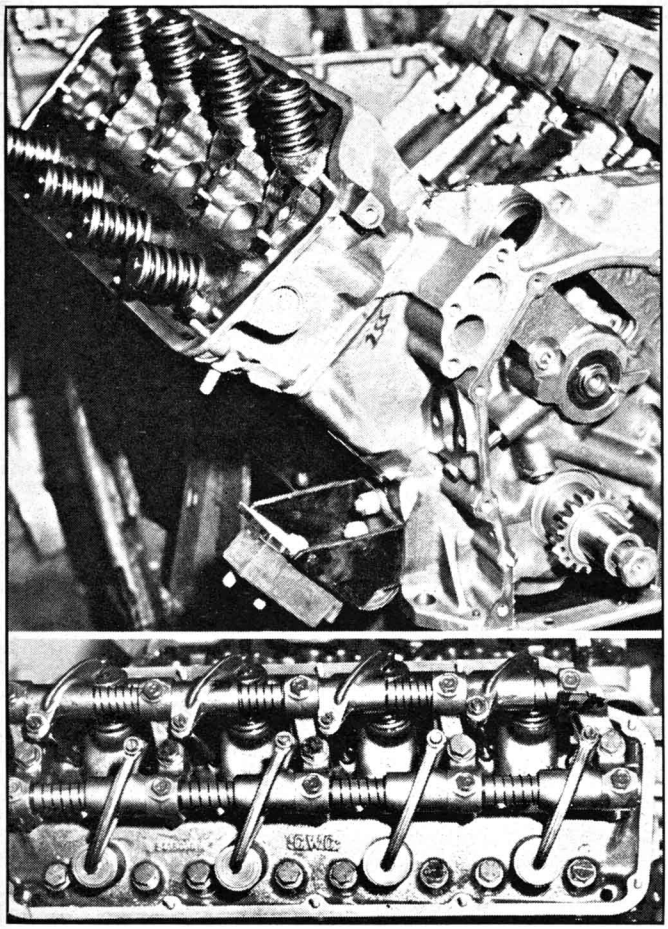


Two rocker shafts per bank provide firm mounting for the hefty rocker arms. Valve springs are inherited from previous "426" V-8.

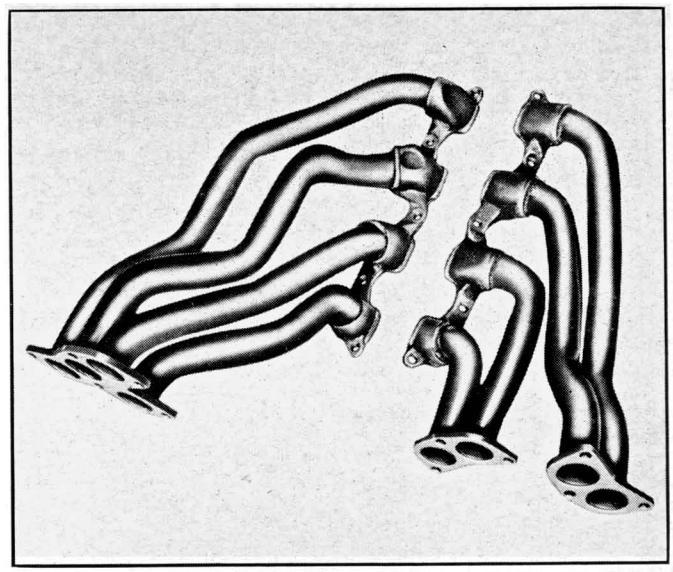
apart, and the fully floating wrist pins are retained by lock rings.

The circuit-racing engine breathes through a single four-barrel Holley carburetor with vacuum-operated secondary throttle valves and a cable-operated manual choke. The dragster units both have two four-barrel Carter AFB carburetors combined under a single air cleaner. All King Kong engines get their cool, clean air via a rear-entry filter fed by a plenum chamber at the base of the windshield (enlarged from earlier models to accommodate the increased air flow of the hemispherical-head engines).

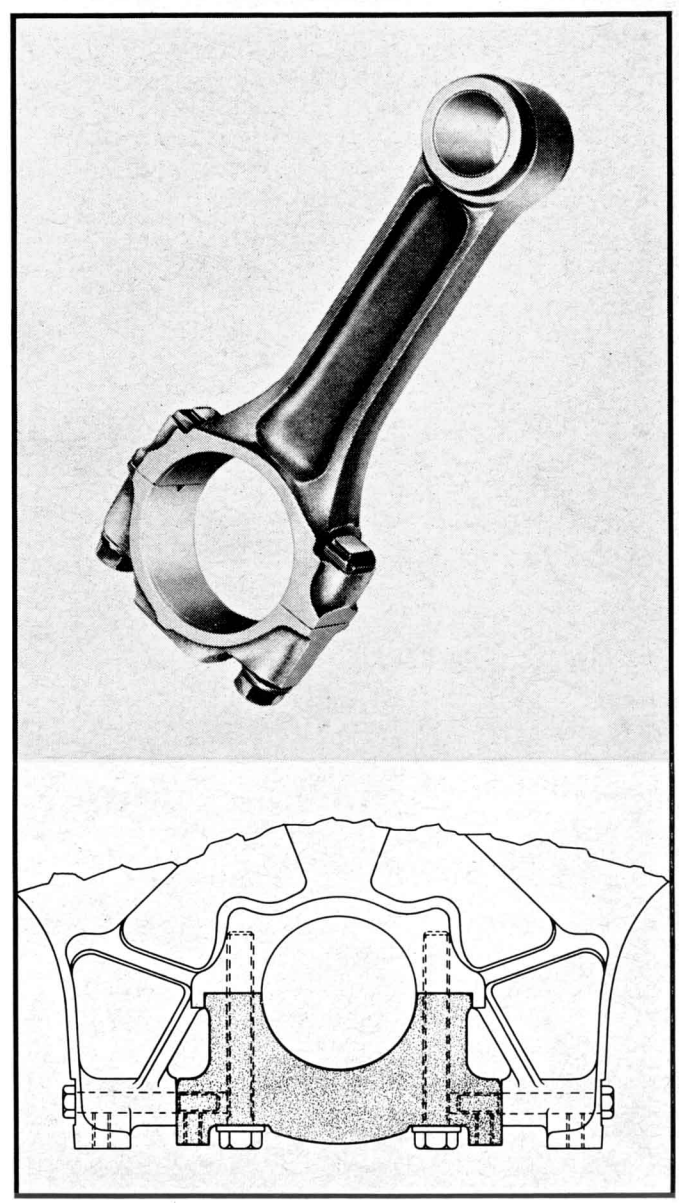
Transmissions for the Dodge Hemi-Charger and Plymouth Super Commando are either (1) a new extra-heavy-duty TorqueFlite three-speed automatic, or (2) the new Chrysler-built four-speed all-synchro manually controlled gearbox. The clutch used with the manual transmission has a 10½-in pearlitic malleable iron pressure-plate and a clutch disc with a very high burst-speed.

The differences between the drag and circuit racing versions of Chrysler's hemispherical-head V-8 serve to emphasize the severity of road racing stresses as higher than any other form of automobile competition. King Kong, as seen at Daytona, has a number of safety—or durability—factors that are totally uncalled for over the quarter-mile drag. But just those design features may be needed on future production engines.

We've seen several examples of how Ford's program of Total Performance demonstrations have effected design improvements. Now watch King Kong do the same for Chrysler. **C/D**



Exhaust system for circuit-racing car (left) provides twin tail pipes. Dragster headers (right) are mated in pairs to stacks.



Beefy connecting rod has increased center-to-center distance, and crankcase is cross-bolted to keep main bearing caps put.