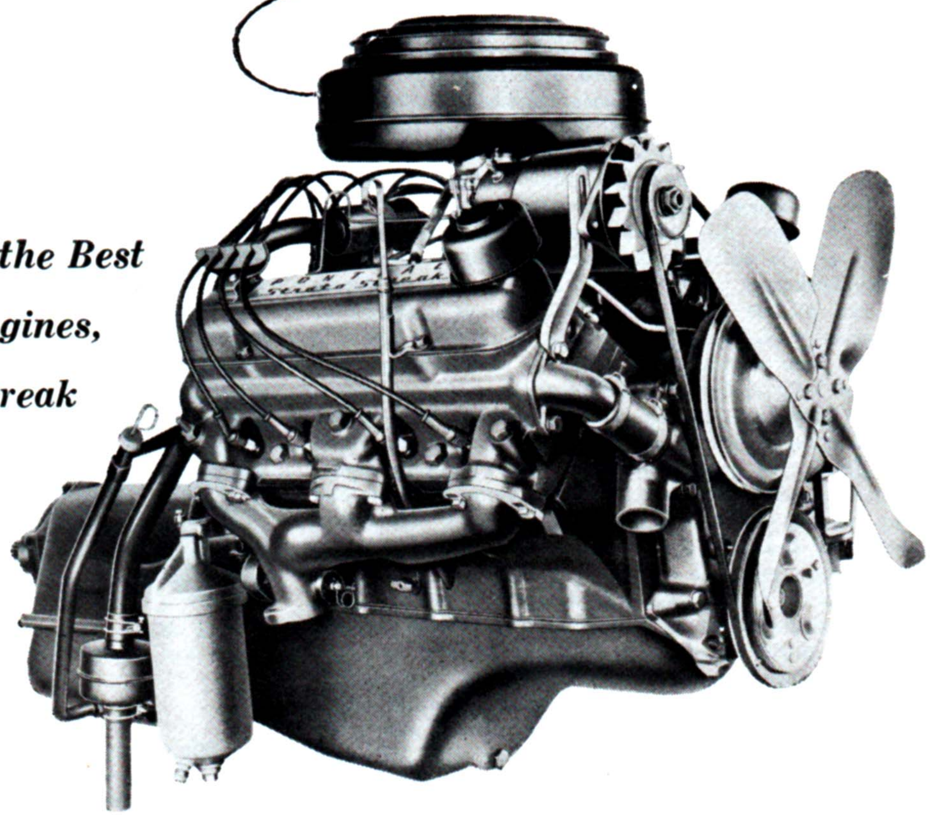
the new Pontiac V-8



Combining the Best of Other GM Engines, the 180 hp Strato-Streak Offers Power and Reliability

Motor Life Staff Report

WHEN Pontiac engineers announced their new ohv V-8 engine, recently, it was heralded as an engine with a raft of engineering "firsts." Discounting a certain portion of announced "firsts" as attributable to factory enthusiasm, there are enough firsts to make the engine a perfect blend of proven power and new ohv V-8 engineering economy.

Among the new features are such items as a reverse-flow gusher cooling system, a quad-gallery lubrication system, a harmonic balancer, ball-pivot rocker arms and a new offset cylinder bank arrangement.

Since the straight eight, Pontiac standby for many years, has been relegated to the past, it was obvious that Pontiac engineers had to come up with a new engine which was equally reliable. This year all Pontiac cars, the Chieftain and Star Chief series, will be powered by the new Pontiac nomination; an engine which MOTOR *Life*'s test staff feels should more than replace the straight eight.

Called the Strato-Streak, the engine is large and powerful. It boasts a displacement of 287.2 cubic inches with a bore and stroke of 3¾" × 3¼" and a compression ratio of 8 to 1.

One of the more unusual design features of the new engine is its use of offset banks. This, alone, is not new, for offset cylinder banks are standard in the industry, necessitated by the placement of the rod ends on the crankshaft journals. Normally, the left cylinder bank is forward of the right bank. Pontiac has reversed the procedure. Their arrangement, the right bank forward of the left, permits location of the distributor on the right of the engine so that the force of the crankshaft gearing on the distributor gear is upward. As a consequence, distributor installation is simplified and the assembly is provided with excellent lubrication.

In addition, this arrangement has allowed Pontiac engineers to locate the fuel pump on the left of the engine opposite its exhaust system.

Combustion chamber design in the engine has many qualities of the 1954 Oldsmobile design. Of proven quality, the Pontiac chamber is wedge-shaped with a sizeable quench area on the inboard or upper end. Since a quench area is necessary to "chill" the fuel-air mixture to avoid any tendency toward pre-ignition, Pontiac's design should prove trouble-free.

(Continued on page 54)

SPECIFICATIONS

Pontiac Overhead Valve V-8 Engine

ENGINE:

Valve arrangement	90 degrees V-8, overhead
Bore and stroke	3¾x3¼
Displacement	287.2 cubic inches
Compression ratio	8.0:1
Maximum hp @ engine rpm	180 @ 4600
Maximum torque @ engine rpm	264 @ 2400

CRANKSHAFT:

Type and material	Drop forged steel
Balanced	Harmonic balancer

BEARINGS:

No. and type	5, replaceable
Material	Durex, steel backed
Crankshaft end thrust taken by	No. 4 bearing

CONNECTING RODS

Type	SAE 1335 Modified steel
Bearings	Durex, steel backed removable type

PISTONS:

Type	Cam ground slipper type with steel struts
Surface coating	Tin plated
Material	Aluminum alloy

PISTON RINGS

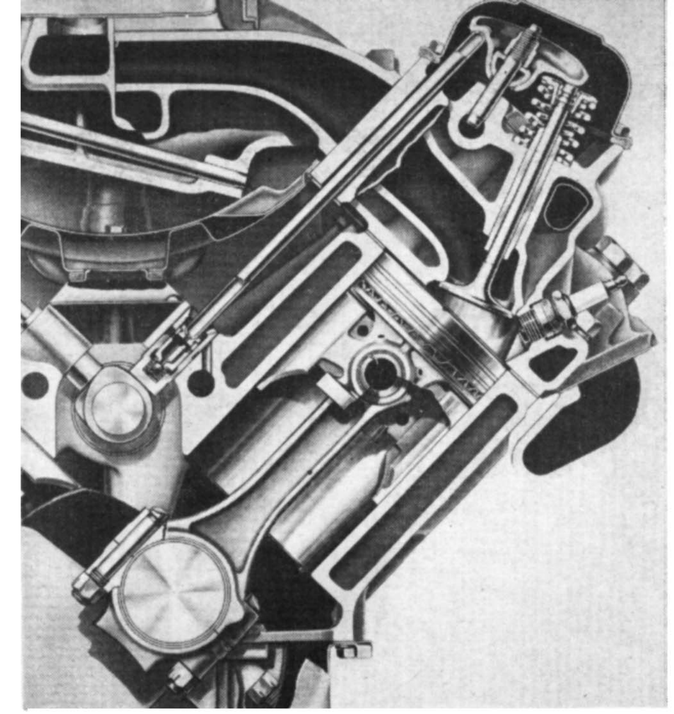
Number per piston	Three
Type per piston	Two compression, one oil ring
Location	Above piston pin
Surface coating	Chrome & Lubrite
Width of rings	Compression rings: .015 and .012 Oil ring: .015

VALVES:

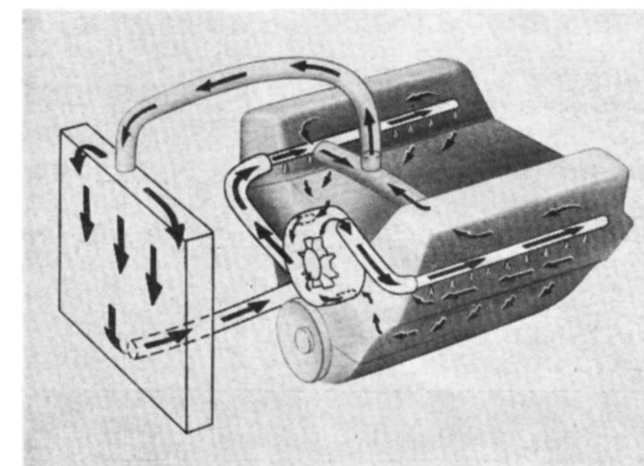
Location	Overhead, ball pivot
Material	Steel (intake) and Silicon chromium steel (exhaust)
Length and stem diameter	Intake 1.78 in. diameter x 5.25 in. length Exhaust 1.50 in. diameter x 5.23 in. length
Seat angle	30° intake; 45° exhaust
Head diameter	Intake 1.78 in.; exhaust 1.50 in.

FUEL AND EXHAUST SYSTEM:

Carburetor	Carter WGD-2207 or Rochester 7006100 dual throat, downdraft
Air cleaner	Heavy-duty oil bath
Fuel pump	Mechanical diaphragm
Filters	Sintered bronze
Manifold heat control	Thermostatic

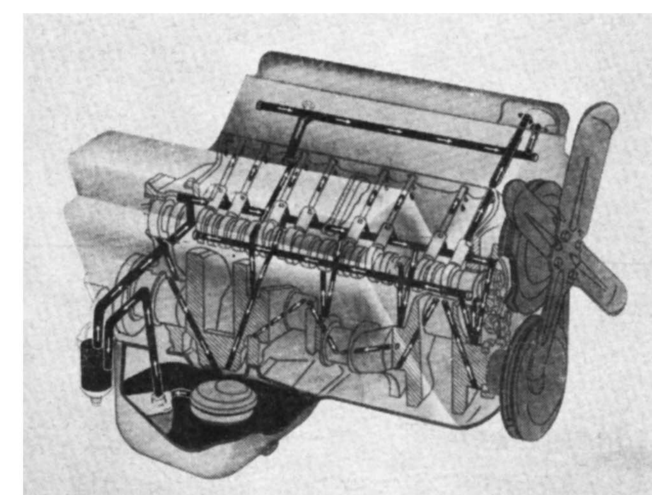


Cross section shows unusual rocker arm arrangement, wedge-shaped combustion area, large quench area and tubular rods.



Reverse flow gusher cooling system is designed to cool hottest areas around combustion chamber first for better combustion.

Quad-gallery lubrication system utilized on '55 Pontiac has been designed to adequately lubricate all engine wear points.



PONTIAC V-8

(Continued from page 34)

However, this is but one function of a well designed combustion chamber and is by no means the only favorable aspect of the new Pontiac engine. In addition, the top of the chamber, in the head, has been machined rather than merely rough-cast. This should provide Pontiac with a smoother operating power plant. Engineers should be able to overcome and limit variations between individual cylinders. They can obtain symmetrical cylinder design achieving a nearly identical compression in each of the eight cylinders. It will also allow them to control turbulence in each chamber and thus extract the utmost from each power stroke with a smoothness of firing not possible with cast head designs.

Pistons used in the Pontiac cylinders are aluminum and are tin plated—not a first for Pontiac, but a change worthy of note, since it should materially prolong cylinder wear.

The overhead valve train, which operates the intake and exhaust valves, would seem to have many advantages. The heart of its operation is a ball pivot rocker arm which should eliminate much of the need for those complicated valve adjustments often required by more conventional types. The new design, leased to Chevrolet for use in the 1955 Chevrolet ohv V-8 engine (see MOTOR *Life*, December, 1954), has fewer parts than conventional designs. There is no rocker shaft: in its place, a pressed steel half-ball on each rocker arm. Instead of the shaft, each arm is tied to an upright stud which is imbedded in the head. As yet not highway tested except by factory engineers, this engine should have the advantages which MOTOR *Life*'s test staff attributed to the Chevy engine.

Like the Chevrolet engine, the overall design is simple in both assembly and for repair. Rockers are one piece steel-on-steel ball-type joints. The fulcrum ball is placed inside the actual rocker arm. It is held in position by a nut and lock screw on the stud. It works this way: The rocker arm is standard in design with a "hollowed-out" center. There is a hole through the rocker arm to allow it to rest on the stud which juts up from the head. A half-circle ball is placed inside the rocker arm and the entire unit is secured to the stud. The push rod is placed beneath one end of the rocker arm and the valve stem fits under the other. The push rod actuates the rocker arm around the fulcrum of the arm and ball.

The valve rocker arms are of cyanide-hardened stamped steel and have a certain amount of automatic wear compensation. Remaining valve lash can be adjusted for by tightening or loosening the lock nut which holds the two-part assembly in place. This would seem to be a relatively simple operation and, in all probability, could be performed while the engine was running.

The push rods which activate the rocker arms are hydraulic rods made of tubular construction. The fact that they are hydraulic, thus having certain compensating factors, should eliminate much of the need for valve adjustment and should contribute greatly to a quieter running engine. The centers of the tubular push rods are utilized to act as oil passages for lubrication to the two most important areas on the rods: the top ball upon which the rocker arm rides, and the base which rides upon the cam lobe.

In fact, the lubrication system which Pontiac engineers have designed seems excellent. A high-velocity system called "Quad-gallery" lubrication by the factory, it consists of four main passages which carry lubricant to the moving parts. At the top, two main galleries carry lubricant to the rockers. From these, several passages carry lubricant to and from the bottom area. There are two main galleries located in the bottom. Each of these is charged with the responsibility of lubricating a portion of the main bearings.

Equally interesting and effective, in its way, is the reverse-flow gusher cooling system which Pontiac engineers have devised for the 1955 Strato-Streak engine. It has been talked about in hot rod circles for several years, but nothing was done to revise present cooling systems. A few Indianapolis car owners made attempts but Pontiac's new system is the first to be placed in modern American production cars.

The system has advantages: the heads are the hottest area in any engine. They house the combustion chamber and are subjected to white-hot temperatures for prolonged periods. It is here that cooling is most important.

Normally, cooling systems affect these areas least. The coolant is inducted into the block at its lowest point and through the utilization of water pump pressure and certain physical laws, the water is passed upward to the cylinder head. With the "old" system, the coolant is already overheated when it finally reaches the head.

This system, called "thermo-syphon," has been reversed by Pontiac. Water is pumped directly from the radiator to the heads and from that point forced downward through the remainder of the block then out the hose atop the engine. MOTOR *Life*'s test staff felt that this could be an important engineering advance. While it does have disadvantages (example: it requires a heavy-duty water pump and if the pump were to break the flow of water would probably tend to reverse itself, reverting to the thermo-syphon pattern), Pontiac's system should operate with trouble-free assurance for many years. One test staffer, however, made a true comment, "This is one engine you can't operate without a fan belt."