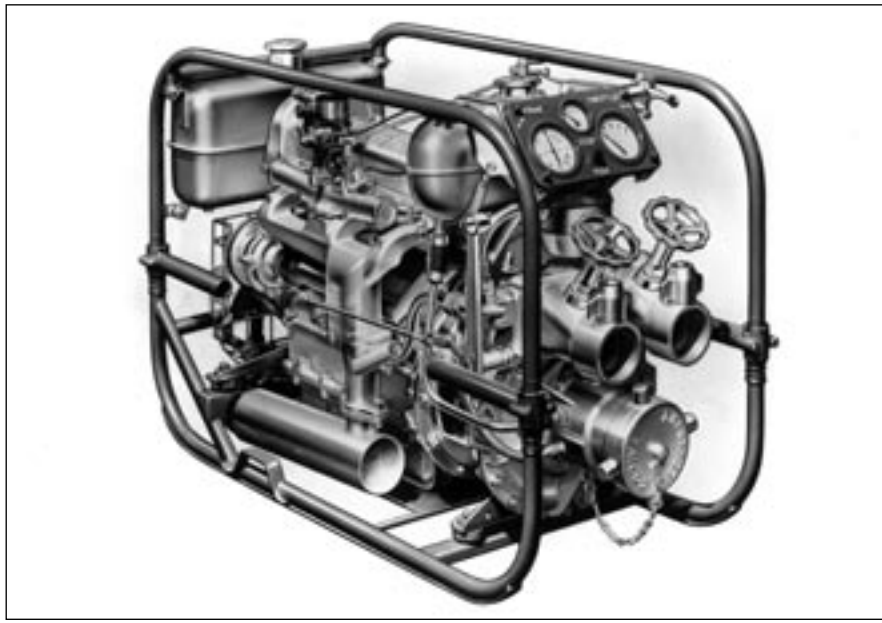
Chapter 3

FW - Four cylinder in-line engines

Origins of the FW series of engines

This was the very first engine designed and developed under the direction of Walter Hassan after he joined Coventry Climax. It was a collaboration between Harry Mundy and Walter Hassan, with the former doing the layout, and ERA draughtsmen doing most the detailing work. The FW was designed at the end of 1950, the first one was built and tested in 1951, and the engine was well into production by the end of 1952.



Portable fire pump.

Chapter 4

FPF - Four cylinder in-line racing engines

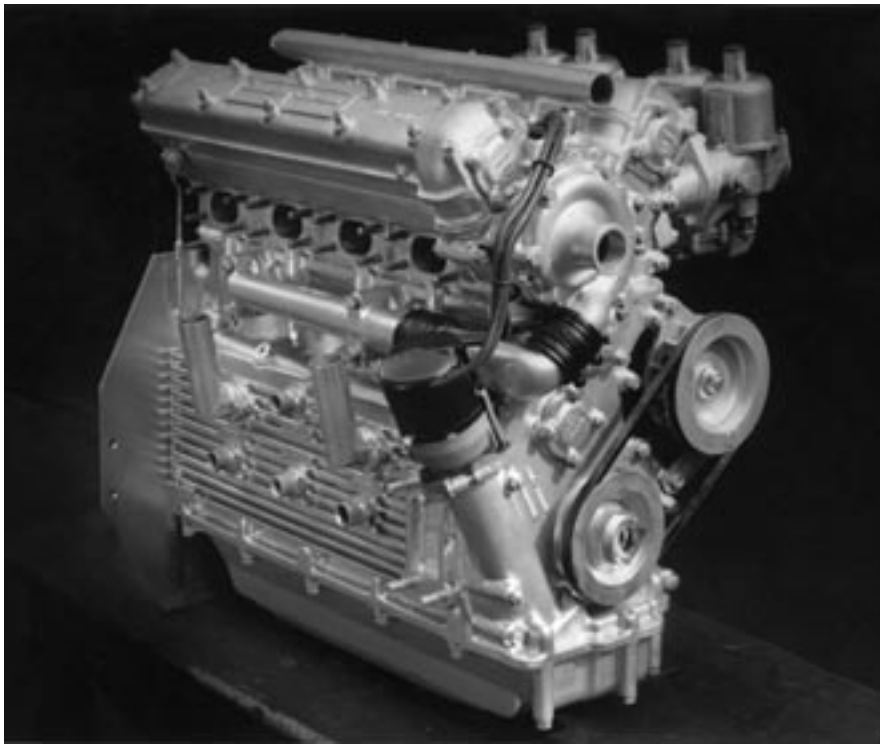
The FPF, which had been developed and tested in early 1956, was available to customers in late 1956. In fact, it only took about five months from the day it was decided to make a new engine until the development version was running on the dyno. The 1475cc FPF engine was designed to be used in two classes of racing: the 1500cc sports car class introduced in 1956, and the all new 1500cc Formula Two single seater class due to start in 1957.

This new engine was actually a derivative of the very first pure racing engine that Coventry Climax ever made: the 2.5 litre FPE. The development FPF engine even used an FPE cylinder head and related componentry, which reduced the manufacturing and development time needed. The FPE and the first 100 or so FPFs used exactly the same cylinder head casting. The main difference between a fully machined right hand FPE cylinder head and an FPF cylinder head is the fact that the hemispherical part of the FPE combustion chambers was recessed by 3/16in from the head to block mating surface. There was no such recess on the FPF cylinder head.

Designed by Harry Mundy, who left Coventry Climax in 1955 after completing the design work of this engine, the rest of the FPF was completely new. Mundy was no longer working at Coventry Climax when the development engine was assembled and first run on the dyno.

There was something of a reshuffle within the company early in 1956 immediately after Harry Mundy left. Peter Windsor-Smith, who had recently arrived from Daimler to work as a development engineer, became the Chief Designer of Engines. Hugh Reddington, who was apprenticed at Coventry Climax before becoming a draughtsman, and Ron Burr, who joined Coventry Climax in 1950 as a draughtsman, initially working on diesel engines and generating sets, both became designers.

The 1.5 litre FPF development engine was fitted onto a dyno the week it was finished, and was up and running in no time. This engine used DU6



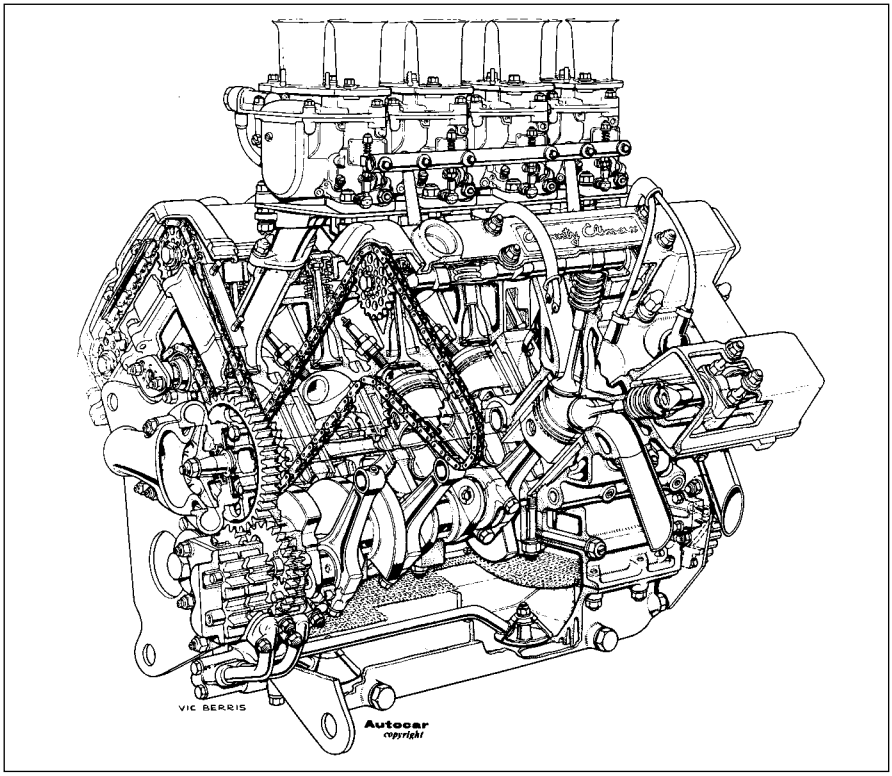
Early FPF engine with the water pump mounted high up.

an effort to minimise failures of its 'front line' engines, and it worked pretty well overall. It was Walter Hassan who decided that very regular strip downs and inspections were the best way of ensuring engine reliability, as well as making sure that the engines were tuned correctly.

Private owners, of course, have been known to run their engines for years without having them inspected. Although such engines may not have been getting the thrashing that they would have received at the hands of the front running racing car teams, they were still getting hard use, but there were few engine failures.

Many owners also tried to modify their engines further but, in most instances, this led to failure. Coventry Climax had a pretty thorough testing regime and it was difficult to improve on the power output while maintaining reliability. In fact, several engines were returned to Coventry Climax in the late 1950s to be put back to original specification!

An early design change to the FPF engine involved moving the water pump to a lower position on the block. The original design had the water pump driven from the exhaust side idler gear in the cylinder head (a throwback to the original FPE engine). The difference, however, was that on the FPE, the water pump was much lower down, since each bank of cylinders

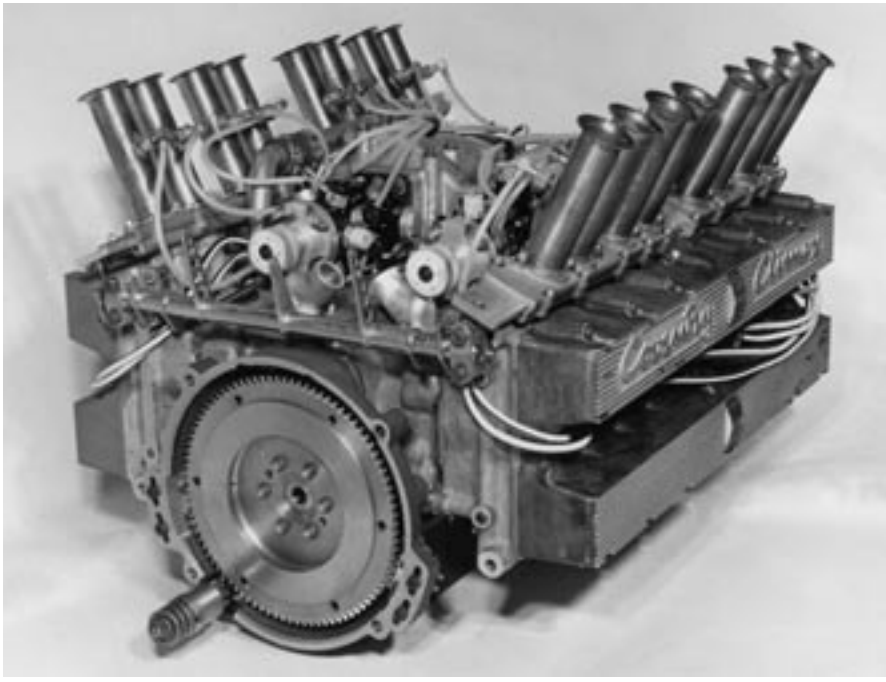


Cutaway drawing of a Weber-carburettored Mark II FWMV racing engine.

original design size as specified by Walter Hassan and Peter Windsor-Smith. When the inlet ports were finished, the power increased to 167bhp.

Although the theories and practices employed at Weslake Laboratories proved correct for larger capacity engines, such as the FPF, they did not seem to suit smaller cylinder engines such as the FWMV. Gray Ross discussed the prospect of making their own 'flow rig' with Walter Hassan, so that they could test the inlet and exhaust port designs themselves. Hassan agreed that this was a good idea so Gray Ross set about making one. While Gray Ross was making the flow rig he couldn't work out how best to power it, so asked Walter Hassan what Weslake used. Hassan didn't know, but the next time he went to Weslake Laboratories he had a good look at the equipment and noted the name of the commercially available unit used. When he returned to Coventry he told Gray Ross what the unit was and Coventry Climax soon had its own rig in operation.

Using a moulding compound (Vinamold), which was poured into the port and allowed to set, Gray Ross made a 'plug' of the inlet port of the cylinder head. Then, using Kaffia D (a dental moulding product that



Rear quarter view of the FWMV Flat 16 engine.

had to be ascertained how much each crankshaft was out, and how close the engine was to bending the valves.

Although the engine could be started and tested with the crankshafts slightly out of position (up to about six or seven degrees actually), once the crankshaft movement became too much (nine to ten degrees), which would happen during a test, the engine couldn't be restarted once it had been stopped. When the crankshafts had moved this far, the engine would have to be completely stripped. The tapers on the crankshafts had to be cleaned, as did the centre boss internal tapers if the gear teeth were not worn out. There was a definite limit to how many times this could be done on any one crankshaft combination. The crankshaft jointing system just wasn't successful, and movement of the tapers had never been solved when the project was eventually discontinued. Had the engine been further developed, the crankshaft jointing system would have had to be changed completely, or altered to prevent radial movement on the tapers. John Hilton said that he was considering keying the crankshafts to the centre section, as he'd been asked by Walter Hassan whether he had any ideas in this direction. Keying the crankshaft would have been difficult, but well within the capability of the Toolroom.

While the SKF system had been proven to work with constant torque applications, such as an electric motor driving something, it had never been